AACA 40th Annual Meeting



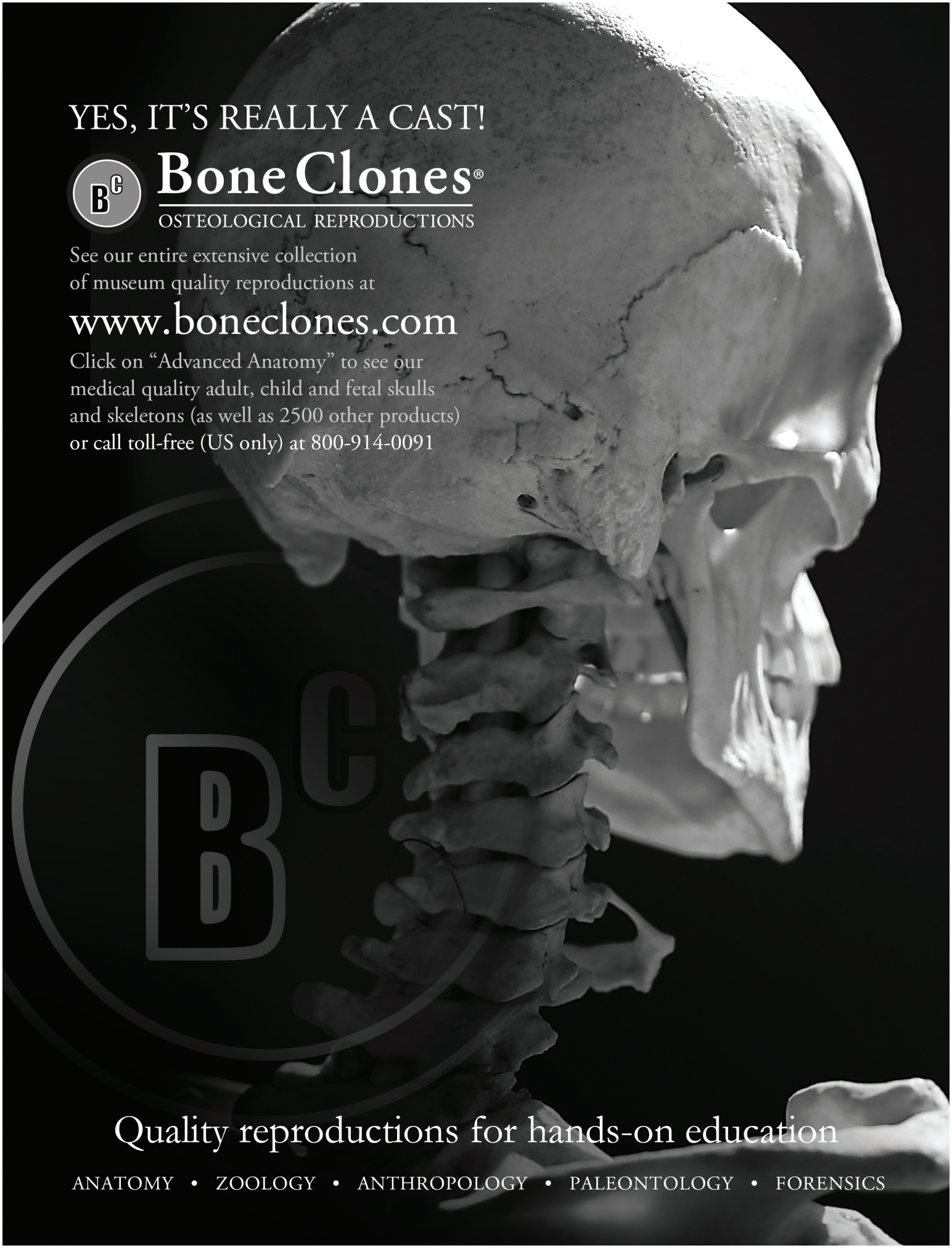
American Association of Clinical Anatomists

July 9-12, 2023 Orlando, Florida



UCF College of Medicine
UNIVERSITY OF CENTRAL FLORIDA

clinical-anatomy.org


YES, IT'S REALLY A CAST!
Bone Clones®
OSTEOLOGICAL REPRODUCTIONS
See our entire extensive collection
of museum quality reproductions at
www.boneclones.com
Click on "Advanced Anatomy" to see our
medical quality adult, child and fetal skulls
and skeletons (as well as 2500 other products)
or call toll-free (US only) at 800-914-0091
Quality reproductions for hands-on education
ANATOMY • ZOOLOGY • ANTHROPOLOGY • PALEONTOLOGY • FORENSICS

UCF College of Medicine

UNIVERSITY OF CENTRAL FLORIDA

Dear Fellow AACA Members,

The University of Central Florida in Orlando, FL is proud to host the 40th Annual Meeting of the American Association of Clinical Anatomists (AACA), July 9 – 12, 2023 and we look forward to welcoming you to Orlando. The meeting sessions will take place in The Hilton Orlando Buena Vista Palace Hotel in Disney Springs, which is surrounded by dozens of restaurants, bars and LOTS of entertainment. The ultrasound course will be hosted by the Anatomy laboratory of UCF-COM on the Health Science Campus in Lake Nona about 20 miles East of the hotel. For those of you who wish to partake in some sightseeing while you are here, the following information plus the AACA meeting website will help you plan. Feel free to contact us with questions.

Weather – July will be hot. Average highs can range in the upper 90s with lows in the 70s and scattered showers throughout the day, with thunderstorms likely in the afternoons. Bring an umbrella and sunscreen and please hydrate. Evenings in Florida are gorgeous! Grab a slice of Key Lime Pie and enjoy the sub-tropical breezes under our beautiful star-lit skies.

Transportation – Orlando International Airport (MCO) is in Central Orlando and very convenient to many locations. Taxis, Uber, and Lyft are available from the airport. The hotel provides self-parking or valet parking at $25 and $35 respectively.

Hotel Accommodations – The meeting will take place at The Hilton Orlando Buena Vista Palace Disney Springs
https://www.hilton.com/en/hotels/mcobuhh-hilton-orlando-buena-vista-palace/rooms/

Points of Interest – Orlando and the surrounding suburbs have many events happening this time of year. Check out downtown Orlando. Walk along the beautiful streets made of brick and see the historic homes. Stroll around Lake Eola Park and dine at some of the most beautiful restaurants our city has to offer. You can even take a swan ride; if you like paddle boats! https://www.orlando.gov/Parks-the-Environment/Directory/Lake-Eola-Park. Here are a couple of links to help you explore: https://www.theorlandoguy.com/ and https://www.visitorlando.com/

- Disney Springs offers a ton of fun dining options such as STK Steakhouse, Jock Lindsey's Hangar, The Boathouse, Paddlefish, The Edison and much more! Reservations are recommended.
  https://www.disneysprings.com/
- Check out one of our many famous theme parks! Disney World Resorts, Universal Orlando, SeaWorld, Legoland and Fun Spot are all located a short distance from your hotel!
  https://disneyworld.disney.go.com/
  https://www.universalorlando.com/
  https://seaworld.com/
  https://fun-spot.com/
- Explore beyond the theme parks and discover all Central Florida has to offer! Shop 'til you drop at the Orlando Vineland Premium Outlets, walk around International Drive and check out Ripley's or the Ice Bar, or stop by Icon Park and ride the 400-foot Ferris Wheel to see a 360-degree view of Orlando!
  https://www.internationaldriveorlando.com/
  https://iconparkorlando.com/
- Head over to the beach! Central Florida has beautiful and fun beaches with water temps in the mid-80s this time of year. Cocoa Beach is only one hour from the hotel, there are plenty of fishing charters in Port Canaveral too! Go on a night shark trip or book a fishing excursion during the day. There are many hotels at the beach if you decide to stay an extra day. The Sandbar is famously known for their fish tacos https://www.sandbarsportsgrill.net/. Blackened Mahi Mahi, yummy!
- Feeling lucky? Check out Victory Casino gambling boat at Port Canaveral. You can gamble and listen to the sounds of steel drums on the deck. All while enjoying a cruise on the Atlantic Ocean.
  https://victorycasinocruises.com/
- How about NASA? Kennedy Space Center https://www.kennedyspacecenter.com is also about only an hour from the hotel. As of now, there is a rocket scheduled to launch on Friday July 14th at 8 PM. Stay a couple extra days and watch it live!
- Explore Leu Gardens, an amazing botanical 50-acre oasis which boasts beautiful plants and flowers. Donated to the City in 1961 by Mr. and Mrs. Leu. https://www.leugardens.org/

Ultrasound Course – July 9th, 2023. The ultrasound course will take place on the UCF-COM Health Science campus in Lake Nona. The course is designed to appeal to anatomists and clinicians.

Welcome to Orlando! "The City Beautiful"

Jennifer Mark, Heather Hargreaves, and Jacqueline Flores
The University of Central Florida
AACA 40th Annual Meeting Local Hosts

Hilton Orlando Buena Vista Palace





AACA on Social Media

Like Us on Facebook!

News | Events | Connect

Like AACA on Facebook to stay up-to-date on all the latest news and events and to connect with other members.

American Association of Clinical Anatomists

Visit https://www.facebook.com/aacapage/ or scan the code with your phone!

Follow us at the AACA Linkedin Page

To stay up to date with the news

Discover new job opportunities

Connect to other members

Go to https://www.linkedin.com/company/american-association-of-clinical-anatomists

Or scan with your phone using any QR code reader

American Association of Clinical Anatomists

Tweet with Us! @AACAnatomy

@AACAnatomy is the Association's official Twitter account

We use Twitter to increase engagement with our Membership, professionals, and the public.

Join us on Twitter!

New to Twitter?
Use these steps to make an account!

1. Go to www.twitter.com
2. Click Log-in
3. Select Sign Up under "New to Twitter?"
4. Create username and password
5. Sign Up!
6. Find our account @AACAnatomy and follow
7. Tweet away! Share tweets all meeting long using the conference hashtag **#ClinAnat23**

Already on Twitter?

Follow @AACAnatomy and share conference tweets using the hashtag **#ClinAnat23**! Feel free to tweet anything that interests you during the conference – sessions, events, what you learn, posters, social gatherings, meetings, photos, etc. You can also tweet anytime using the hashtag #ClinAnat.

Ask your colleagues if they have a Twitter account. Follow AACA members and colleagues to make our Twitter community even stronger!

American Association of Clinical Anatomists

President's Report

July 9–12, 2023

AACA Annual Meeting

PO Box 2945
LaGrange, Ga 30241
Ph: 706-298-0287
www.clinical-anatomy.org

Welcome to Orlando. Our MOPP (Meeting Organization and Program Planning) committee, guided by Program Secretary Jennifer Burgoon, and our hosts at the University of Central Florida, have prepared a warm welcome and scientific, organizational, and social sessions that will be full of useful information and will provide ample opportunities to grow your network of academic contacts. If you are a new member of the AACA, don't be shy to make contacts with our (older) established members. And whether you are a new AACA member or not, I encourage you to become active in your association. Attend the meetings of our committees and special interest groups and consider joining those that align with your professional interests. Heads up: We have a new ad hoc committee that may interest you. Our Diversity, Equity, and Inclusion Committee will be holding a breakfast meeting in Orlando. Come, join, participate, and show your support for this important committee.

And speaking of our special interest groups and committees, they have been busy and productive during the past year. Thanks to all of the AACA members who have devoted their time and energy to the work that our committees have performed.

I hope you had a chance to visit the AACA booth at the American Association for Anatomy in March in Washington, DC and at the Human Anatomy and Physiology Society meeting in May in Albuquerque, NM. Our booth presence there was intended to make AAA and HAPS attendees aware of the opportunities that membership in AACA offers to grow a person's network of professional contacts. Be sure to tell your colleagues how beneficial membership in the AACA can be.

We greatly appreciate the support of our vendors and corporate sponsors. As a member of AACA, please express your gratitude of this support to our sponsors. Thanks to our friends and colleagues at Association Services Group. The tremendous support of AACA that Jennifer Whitlow, Alex Waters, and Rhonda Freeman and the rest of the ASG crew provides is greatly appreciated. And finally, thanks to all of the members of the Executive Committee and Council of the AACA who guide our association and make it a valuable professional organization for all anatomists.

Thomas R. Gest, Ph.D.
President

The AACA believes that each conference attendee should be treated with respect and dignity and that any form of sexual harassment is a violation of human dignity. The AACA condemns sexual harassment and maintains a "zero - tolerance" for sexual harassment. All conference attendees have the right to participate and learn free of sexual harassment. The AACA will take all reasonable efforts to prevent and promptly correct instances of sexual harassment. Any conference attendee who believes himself or herself to be a victim of sexual harassment is encouraged to report the information to the Program Secretary.

Table of Contents

Meeting at a Glance 1

Exhibitors 3

Meeting Sponsors 5

Scientific Program 6

Honored Member – Bernell Dalley, PhD 9

R. Benton Adkins, Jr. Distinguished Service Award – Gregory Smith, MS 10

Presidential Speaker – Professor Claire Smith 11

Closing Speaker – Professor Richard Tunstall 12

Ultrasound Course 13

Committee Meeting Descriptions (Open to All) 15

Committee Symposia Descriptions 17

Annual Business Meeting Agenda 19

Annual Business Meeting Minutes 20

2022-2023 AACA Council Members 23

Clinical Anatomy – The Official Journal of the AACA 24

Committee Reports 25

- Anatomical Services Committee
- Ad hoc Diversity Inclusion and Equity Committee
- Brand Promotion and Outreach Committee
- Career Development Committee
- Clinical Anatomical Terminology Committee
- Educational Affairs Committee
- Journal Committee
- Listserv Report
- Membership Committee
- MOPP Committee
- Nominating Committee

Abstract Listing by Author

- Platform Presentations 36
- TechFair Presentations 43
- Poster Presentations 45

2023 AACA MEETING AT A GLANCE

	Sunday, July 9th		Monday, July 10th	
			Registration Open 7:30 am - 5:00 pm (Citron Registration)	
7:30	**AACA Council Meeting** 7:00 am - 1:30 pm (Sunburst)	Registration Open 12:00 pm - 5:00 pm (Citron Registration)	**Career Development Committee (CDC) Breakfast Meeting** 7:30 am - 9:00 am (Meyer)	**Continental Breakfast with Exhibitors & Posters** 7:30 am - 9:00 am (Palm Event Center)
7:45				
8:00				
8:15				
8:30				
8:45				
9:00		Exhibitor Setup 12:00 pm - 5:00 pm (Palm Event Center)	BREAK	
9:15			**Welcome by AACA President and Others** 9:15 am - 9:30 am	
9:30				
9:45				
10:00			**Presidential Speaker** 9:30 am - 11:00 am (Citron East West)	
10:15				
10:30				
10:45				
11:00			**Coffee Break with Exhibitors** 11:00 am - 11:30 am (Palm Event Center)	
11:15				
11:30			**AACA Parade of Committees** 11:30 am - 12:00 pm (Citron East West)	
11:45				
12:00			**Clinical Anatomical Terminology (CAT) Committee Lunch Meeting** 12:00 pm - 1:30 pm (Meyer)	***Clinical Anatomy* Editorial Lunch Meeting** 12:00 pm - 1:00 pm (Sunburst)
12:15				
12:30				
12:45				
1:00				
1:15				
1:30			BREAK	
1:45		**Ultrasound Course** 12:15 PM - 5:30 PM (UCF College of Medicine)	**Career Development Committee (CDC) Symposium** 1:45 pm - 3:00 pm (Citron East West)	
2:00				
2:15				
2:30				
2:45				
3:00			BREAK	
3:15			**Poster Session 1 with Exhibitors & Coffee** 3:15 pm - 4:15 pm (Palm Event Center)	
3:30				
3:45				
4:00				
4:15			BREAK	
4:30			**TechFair Presentations** 4:30 pm - 6:00 pm (Citron East West)	
4:45				
5:00				
5:15				
5:30		**Judges' Orientation Meeting** 5:30 PM - 6:30 PM Meyer		
5:45				
6:00				
6:15				
6:30		**Opening Reception** 6:30 Pm - 8:30 PM Veranda & Patio		
6:45				
7:00				
>7 pm				

...CONTINUED 2023 AACA MEETING AT A GLANCE

	Tuesday, July 11th	Wednesday, July 12th
	Registration Open 7:30 am - 5:00 pm (Citron Registration)	Registration Open 7:30 am - 5:00 pm (Citron Registration)
7:30	**Brand Promotion and Outreach Committee (BPOC) Breakfast Meeting** 7:30 am - 9:00 am (Meyer)	**Diversity, Equity, and Inclusion Committee (DEIC) Breakfast Meeting** 7:30 am - 9:00 am (Meyer)
7:45		
8:00	**Continental Breakfast with Exhibitors & Posters** 7:30 am - 9:00 am (Palm Event Center)	**Continental Breakfast with Exhibitors & Posters** 7:30 am - 9:00 am (Palm Event Center)
8:15		
8:30		
8:45		
9:00	BREAK	BREAK
9:15	**Platform Presentations Session 1** Head, Neck, and Back 9:15 am - 10:30 am (Citron East West)	**Clinical Anatomical Terminology (CAT) Committee Symposium** 9:15 am - 10:30 am (Citron East West)
9:30		
9:45		
10:00		
10:15		
10:30	BREAK	BREAK
10:45	**Poster Session 2 with Exhibitors & Coffee** 10:45 am - 11:45 am (Palm Event Center)	**Coffee Break with Exhibitors** 10:45 am - 11:45 am (Palm Event Center)
11:00		
11:15		
11:30		
11:45	BREAK	**Educational Affairs Committee (EAC) Lunch Meeting** 11:45 am - 1:15 pm (Meyer) / **Career Development Committee (CDC) Awards Decision Lunch** 11:45 am - 1:15 pm (Sunburst) / **Executive Committee Award Decision Lunch** 11:45 am - 1:15 pm (Tangerine 3)
12:00	**Anatomical Services Committee (ASC) Lunch Meeting** 12:00 pm - 1:30 pm (Meyer)	
12:15		
12:30		
12:45		
1:00		
1:15		BREAK
1:30	BREAK	**Closing Speaker** 1:30 pm - 2:30 pm (Citron East West)
1:45	**Platform Presentations Session 2** Extremities 1:45 pm - 3:00 pm (Citron East West)	
2:00		
2:15		
2:30		BREAK
2:45		**AACA Annual Member's Business Meeting** 2:45 pm - 4:00 pm (Citron East West)
3:00	BREAK	
3:15	**Poster Session 3 with Exhibitors & Coffee** 3:15 pm - 4:15 pm (Palm Event Center)	
3:30		
3:45		
4:00		**Awards Reception and Celebration** 4:00 pm - 5:30 pm (Citron East West Foyer Pavilion)
4:15	BREAK	
4:30	**Platform Presentations Session 3** Education 4:30 pm - 6:00 pm (Citron East West)	
4:45		
5:00		
5:15		
5:30		BREAK
5:45		**AACA New Council Meeting** 5:45 pm - 6:15 pm (Sunburst)
6:00		
6:15		
6:30	**Anatomy Trivia with Snacks and Drinks** 6:30 pm - 8:30 pm (Citron East West)	
6:45		
7:00		
>7 pm		

Sponsors/Commercial Exhibitors

Generous donations and/or commercial exhibitor fees paid by the following companies and organizations have substantially reduced the Association's expenses in presenting this meeting. You are encouraged to visit the exhibits available for viewing in the Palm Event Center

Exhibit hours:

12:00 pm – 5:00 pm Sunday (set up)
7:30 am – 12:00 pm and 1:00 pm – 5:00 pm Monday
7:30 am – 12:00 pm and 1:00 pm – 5:00 pm Tuesday
7:30 am – 11:45 am Wednesday
TEAR DOWN is from 12:00 pm – 4:00 pm on Wednesday
(all exhibitors must be vacated from the hall at 4:00 pm)

***The hall will be closed for lunch for one hour each day (12:00 – 1:00 PM)**

LIST OF EXHIBITORS (as of 5.25.2023)

3D Organon | Medis Media Pty Ltd
Booth #8

Unit 11, Township Drive
Burleigh Heads, Queensland 04220
Australia

www.3dorganon.com

3D Organon is the Leading XR Medical Anatomy Platform. The latest 3D organon edition includes over 12.000 anatomical structures across 15 body systems, showcasing new features such as the Dicom Viewer, the Medverse, the medical metaverse, the Ultrasound VR Simulator, images, refactored body actions, new microscopic models, new environments among others.

Anatomic Excellence, LLC | von Hagens Plastination
Booth #12/13

22 Angel Oaks Dr
Savannah, GA 31410
USA

www.anatomicexcellence.com

Anatomic Excellence, LLC is the exclusive, full range agent for Dr. Gunther von Hagens Plastinated Human Tissue Specimens in the USA, Canada & Caribbean. We are committed to working with our customers to help them to establish a collection of ethically prepared specimens that meets both the anatomical needs of your program and enhances learning opportunities for your students.

Dodge
Booth #7

9 Progress Road
Billerica, MA 01821
USA

www.dodgeco.com

Embalming chemicals, instruments, and urns.

Digital Anatomy Simulations for Healthcare
Booth #2

6200 Lee Vista Blvd.
Orlando, FL 32822
USA

https://www.DASH-orlando.com

3D printed ultra realistic anatomical models.

Elsevier
Booth #9

1600 John F Kennedy Blvd. Suite 1600
Philadelphia, PA 19103
USA

https://www.elsevier.com/education/welcome-3d4medical

For more than 135 years, Elsevier has specialized in health science content across the entire curriculum, ensuring students, faculty, and institutions have access to reliable and relevant information. As the premier health science information provider, Elsevier attracts the leading authors and editors in their fields. Our content is shaped for diverse teaching and learning purposes, providing students and educators with a wide range of options for achieving successful outcomes.

Frigid Fluid
Booth #4

11631 W. Grand Ave.
Northlake, IL 60164
USA

www.frigidfluid.com

Embalming Fluids, Embalming Machine, Lowering Devices

continued on next page

Mopec
Booth #14/15

800 Tech Row
Madison Heights, MI 48071
USA

www.mopec.com

Mopec provides American-made equipment and supplies to anatomy laboratories, pathology labs, animal research facilities and medical examiner facilities. Founded in 1992, Mopec solutions are among the very best as demonstrated by the vast number of installations in America's top healthcare institutions and universities. Our reputation is built on decades of superior customer service specializing in consultation and customization. Mopec is committed to designing and manufacturing ergonomic equipment to enhance your lab's safety, flexibility, and productivity.

Mortech Manufacturing
Booth #5

411 North Aerojet Avenue
Azusa, CA 91702
USA

https://mortechmfg.com/

Mortech Manufacturing specializes in high-quality American-made anatomy laboratory equipment, including body boxes and mortuary wallk in refrigeration systems.

TDS Health
Booth #3

235 E Broadway
Jackson, WY 83001
USA

www.tetondata.com

TDS Health offers a wide-ranging collection of over 600 high quality e-resources thoughtfully curated from our network of 60+ innovative partners and publishers, giving you the flexibility to choose the best resources for your needs.

Touch of Life Technologies
Booth #10/11

12635 E. Montview Blvd., Suite 350
Aurora, CO 80045
USA

www.toltech.net

Touch of Life Technologies (Toltech) is a full solutions provider for anatomical hardware and software. Through a broad range of solutions, Toltech enables users to expand the learning experience in and out of the lab or classroom. Decades of research and development have culminated in the VH Dissector platform which enables students and educators around the world to interact with real human anatomy on a variety of devices from collaborative multi-touch tables to iPads and AR and VR devices.

Wolters Kluwer
Booth #6

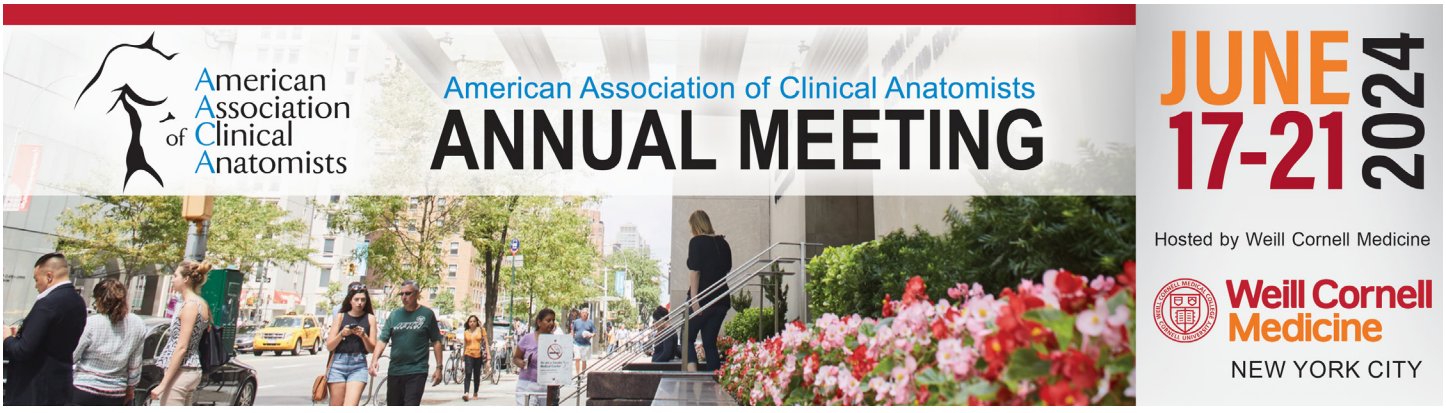
2001 Marker Street
Philadelphia, PA 19103
USA

www.lww.com

Wolters Kluwer Health is a leading global provider of information and point of care solutions for the healthcare industry. Our solutions are designed to help professionals build clinical competency and improve practice so they can make important decisions on patient care. Our leading product brands include Audio-Digest, Lippincott, Ovid®, UpToDate®, and others.

Mark your calendars for the 2024 Annual Meeting
June 17-21 in New York, NY

Weill Cornell Medicine



2023 Annual Meeting Sponsors

Gold Level Sponsor

Anatomic Excellence

Bronze Level Sponsor

Bone Clones, Inc.
OSTEOLOGICAL REPRODUCTIONS

2023 Member Sponsorship Donors as of 5/11/2023

Ruby Level $250 Donor

Lawrence Wineski, Ph.D.

Interested in becoming a member sponsor donor? Visit the AACA website for more details.

Program

Sunday, July 9th

TIME	LOCATION	ACTIVITY DESCRIPTION	ADDITIONAL INFORMATION
7:00AM – 1:30PM	Sunburst	AACA Council Meeting	Invitation Only Meeting
12:00PM – 5:00PM	Citron Registration	Conference Registration	All Are Welcome
12:00PM – 5:00PM	Palm Event Center	Exhibitor Setup	Exhibitors Only
12:15PM – 5:30PM	University of Central Florida College of Medicine	Ultrasound Course	For those that registered for the Ultrasound Course and paid the separate fee
5:30PM – 6:30PM	Meyer	Judges' Orientation Meeting	Invitation Only Meeting
6:30PM – 8:00PM	Veranda & Patio	Opening Reception	All Are Welcome

Monday, July 10th

TIME	LOCATION	ACTIVITY DESCRIPTION	ADDITIONAL INFORMATION
7:30AM – 5:00PM	Citron Registration	Conference Registration	All Are Welcome
7:30AM – 9:00AM	Meyer	Career Development Committee (CDC) Meeting and Mentor/Mentee Breakfast	All Are Welcome
7:30AM – 9:00AM	Palm Event Center	Continental Breakfast with Exhibitors	All Are Welcome
9:15AM – 9:30AM	Citron East West	Welcome by AACA President and Others	All Are Welcome
9:30AM – 11:00AM	Citron East West	Presidential Speaker	All Are Welcome
11:00AM – 11:30AM	Palm Event Center	Coffee Break with Exhibitors	All Are Welcome
11:30AM – 12:00PM	Citron East West	AACA Parade of Committees	All Are Welcome
12:00PM – 1:00PM	Sunburst	*Clinical Anatomy* Editorial Meeting	Invitation Only Meeting

continued on next page

Monday, July 10th continued			
TIME	**LOCATION**	**ACTIVITY DESCRIPTION**	**ADDITIONAL INFORMATION**
12:00PM – 1:30PM	Meyer	Clinical Anatomical Terminology (CAT) Committee Meeting with Lunch	All Are Welcome
1:45PM – 3:00PM	Citron East West	Career Development Committee (CDC) Symposium	All Are Welcome
3:15PM – 4:15PM	Palm Event Center	Poster Session 1 with Exhibitors and Coffee	All Are Welcome
4:30PM – 6:00PM	Citron East West	TechFair Presentations	All Are Welcome

Tuesday, July 11th			
TIME	**LOCATION**	**ACTIVITY DESCRIPTION**	**ADDITIONAL INFORMATION**
7:30AM – 5:00PM	Citron Registration	Conference Registration	All Are Welcome
7:30AM – 9:00AM	Meyer	Brand Promotion and Outreach Committee (BPOC) Meeting with Breakfast	All Are Welcome
7:30AM – 9:00AM	Palm Event Center	Continental Breakfast with Exhibitors	All Are Welcome
9:15AM – 10:30AM	Citron East West	Platform Presentations Session 1 Head, Neck, and Back	All Are Welcome
10:45AM – 11:45AM	Palm Event Center	Poster Session 2 with Exhibitors and Coffee	All Are Welcome
12:00PM – 1:30PM	Meyer	Anatomical Services Committee (ASC) Meeting with Lunch	All Are Welcome
1:45PM – 3:00PM	Palm Event Center	Platform Presentations Session 2 Extremities	All Are Welcome
3:15PM – 4:15PM	Palm Event Center	Poster Session 3 with Exhibitors and Coffee	All Are Welcome
4:30PM – 6:00PM	Citron East West	Platform Presentations Session 3 Education	All Are Welcome
6:30PM – 8:30PM	Citron East West	Anatomy Trivia with Snacks and Beverages	All those that registered for the Anatomy Trivia and paid the separate fee.

continued on next page

Wednesday, July 12th

TIME	LOCATION	ACTIVITY DESCRIPTION	ADDITIONAL INFORMATION
7:30AM – 5:00PM	Citron Registration	Conference Registration	All Are Welcome
7:30AM – 9:00AM	Meyer	Diversity, Equity, and Inclusion Committee (DEIC) Meeting with Breakfast	All Are Welcome
9:15AM - 10:30 AM	Citron East West	Clinical Anatomical Terminology (CAT) Committee Symposium	All Are Welcome
10:45AM – 11:45AM	Palm Event Center	Coffee Break with Exhibitors	All Are Welcome
11:45AM – 1:15PM	Meyer	Education Affairs Committee (EAC) Meeting with Lunch	All Are Welcome
11:45AM – 1:15PM	Sunburst	Career Development Committee (CDC) Awards Decision Lunch	Invitation Only Meeting
11:45AM - 1:15PM	Tangerine 3	Executive Committee Award Decision Lunch	Invitation Only Meeting
1:30PM - 2:30PM	Citron East West	Closing Speaker	All Are Welcome
2:45PM - 4:00PM	Citron East West	AACA Member's Business Meeting	All Are Welcome
4:00PM - 5:30PM	Citron East West Foyer Pavilion	Awards Reception and Celebration	All Are Welcome
5:45PM - 6:15PM	Sunburst	AACA New Council Meeting	Invitation Only Meeting

Honored Member 2023



Dr. Dalley, center

The American Association of Clinical Anatomists Recognizes and Awards Honored Membership to

Bernell Dalley, PhD

Dr. Dalley is a Professor Emeritus at the Texas Tech University Health Sciences Center (TTUHSC), Lubbock, TX and for almost 50 years, he has been teaching and mentoring the future physicians and allied health students at TTUHSC.

Arriving in Lubbock Texas in 1974 as a newly minted PhD, Dr. Dalley quickly became the director for the Medical and Allied health anatomy courses. His first teaching award came quickly after his arrival when the school of medicine faculty honored him in 1979. The medical students have recognized him as the outstanding basic science faculty member 16 times between 1985 and 2011. As recently as 2019, Dr. Dalley was recognized by the Department of Medical Education as the outstanding teacher in the Clinically Oriented Anatomy (COA) course for his significant contributions to the lab instruction he gave to the medical students.

Additional honors include twice being presented the TTUHSC President's Outstanding Basic Sciences teaching award and twice being awarded the School of Medicines highest teaching honor, the John A. Buesseler memorial award. The culmination of an outstanding academic career occurred in 2009 with the establishment of the Dr. Bernell Dalley Endowed Professorship in Medical Education and the conferral of the rank Professor Emeritus. After his retirement, Dr Dalley was bestowed the Minnie Stevens Piper Professor Award, which recognizes Texas professors for outstanding academic, scientific, and scholarly achievement and for dedication to the teaching profession.

Outside of the lab or classroom, Dr. Dalley served the School of Medicine as Assistant then Associate Dean of Admissions and Minority Affairs for over 14 years. During that time, he played a vital role in creating a paperless application as well as a common application for the consortium of Texas medical schools. Working with the other Texas medical schools and state legislature, Dr. Dalley played a key role in the creation of JAMP (Joint Acceptance to Medicine Program), which is a very successful state funded program to assist disadvantaged students in seeking their goal of a medical career. Another medical school admissions brainchild of Dr. Dalley's is the UMSI (Undergraduate to Medical School Initiative), where exceptional Texas high school seniors can qualify for a guaranteed medical school slot after their successful completion of an undergraduate degree from Texas Tech University. In an effort to broaden the opportunities for medical students, Dr. Dalley worked with the Texas Tech University business school to create the MD/MBA program and with Baylor University to create the MD\DDS tract to train future oral surgeons.

Dr. Dalley was an accomplished researcher in addition to his teaching and administrative duties. His career in research varied from wound healing, tissue regeneration, and anatomical specifics of carpal tunnel and flexor tendon retinaculum. His research was continuously supported by grants from the National Institutes of Health (NIH), the American Diabetes Association (ADA), and by various internal grants.

Previous Honored Member Award Recipients

1984 – W. Henry Hollinshead*
1985 – Chester B. McVay*
1986 – Donald James Gray*
1987 – Russell T. Woodburne*
1988 – Oliver Beahrs*
1989 – N. Alan Green*
1990 – Frank H. Netter*
1991 – Ralph Ger*
1992 – M. Roy Schwarz
1993 – Carmine D. Clemente*
1994 – Keith L. Moore*
1995 – Ray J. Scothorne*
1996 – Robert A Chase
1997 – Tatsuo Sato
1998 – John E. Skandalakis*
1999 – Donald R. Cahill*
2000 – Sandy C. Marks, Jr.*
2001 – David G. Whitlock*
2002 – Robert D. Acland*
2003 – Arthur F. Dalley, II
2004 – John V. Basmajian*
2005 – Ian Whitmore
2006 – Peter H. Abrahams
2007 – Gary Wind
2008 – T.V.N. (Vid) Persaud
2009 – Richard S. Snell
2010 – Raymond F. Gasser
2011 – Harold Ellis
2012 – Ronald A. Bergman
2013 – John Hansen
2014 – Victor M. Spitzer
2015 – Carol E. Scott-Conner
2016 – Carlos Machado
2017 – James D. Collins*
2018 – Anne Agur
2019 – Robert Anderson
2020 – Stephen W. Carmichael
2021 – Susan Standring
2022 – Cornelius Rosse

** deceased*

R. Benton Adkins, Jr. Distinguished Service Award, 2023

The American Association of Clinical Anatomists

Recognizes and Awards the R. Benton Adkins, Jr. Distinguished Service Award to

Gregory R. Smith, MS



Gregory R. Smith is a tenured professor at St. Mary's College of California where he has been on staff since 1981. Greg was promoted to Full Professor in 1997 after being tenured in 1989. His areas of teaching include Advanced Human Anatomy, Human Physiology, Biological Anthropology, and Collegiate Seminar – Greek Thought. Prior to his teaching career, Greg obtained his B.S. in Zoology from the University of California – Davis and his M.S. in Human Anatomy from California Polytechnic State University, San Luis Obispo.

As a professor, Greg was awarded Teacher of the Year for 1995-1996 and 1996-1997 by his St. Mary's College seniors. His professional appointments include the California State Anatomical Advisory Board where he has been a member since 2010. Professor Smith has given numerous invited lectures across the country and across the world on various topics relating to human adaptation, anatomical variation, and biological function. He was Founder and President of the Northern California Society of Anatomists (NCSA) from 1983-1991 and has many scholarly projects and published works in his career.

Greg has been a member of the American Association of Clinical Anatomists (AACA) since 1989 and has played an incredibly vital role to the society and its members throughout the years. From 2003-2006 he served as Allied Health Counselor on the AACA Council, served as the 2008 Annual Meeting Program Secretary, was a 2016 and 2017 Meeting Manager, and notably hosted the 2004 Annual Meeting in Moraga, California. Greg has served as facilitator and Tech Fair Moderator at nine annual meetings and Platform moderator for another two. The Tech Fair is a complex undertaking that has become a highlight of our meeting program. Greg is to be credited with the technical implementation of this session, which has been well received by presenters and attendees throughout its inception. The AACA is grateful for the lifelong contributions made to the field of anatomy that will continue to be seen and felt for years to come.

Previous R. Benton Adkins Jr. Distinguished Service Award Recipients

2004 – Robert J. Leonard
2006 – Daniel O. Graney
2007 – Ralph Ger*
2009 – Arthur F. Dalley
2011 – Carol Scott-Conner
2012 – Keith L. Moore*
2013 – Stephen W. Carmichael
2015 - Lawrence M. Ross*
2016 – Thomas Quinn
2017 – Ronald S. Wade
2019 – Brian R. MacPherson, Ph.D.
2020 – Neil S. Norton, Ph.D.*
2021 – Fiona Stewart, MB BS (Syd) BSc(UNE) FACBS MACLM

** deceased*

Presidential Speaker

Professor Claire Smith



"My Dead Body"

Body donation, when through first person consent is a unique altruistic act. Donors make a decision in life to enable the education of medical and allied health care professionals. Donors consent to furthering the understanding of the human body and of its medical treatment. This talk will explore the journey of the first individual to donate to Public Display in the United Kingdom. It will highlight the challenges and opportunities; legal, ethical, and logistical this brings. The donor waived her right to be anonymous, and with the additional consent of her family the documentary 'My Dead Body' was created, viewed by millions. Over 1,000 students were taught about the donors rare (one in a million) adenocarcinoma of the lacrimal gland as dissections and posthumous CT/MRI scans charted the journey of her cancer. This example challenges the role of anatomy being behind closed doors, and for the 'medical profession' and questions where anatomists and anatomy departments can have an influence over wider national and global understanding of the human body in health and disease.

Biography:
Professor Claire Smith B.Sc., P.G.C.E., Ph.D., P.F.H.E.A., F.A.S., F.L.F., N.T.F., A.C.I.E.A., is a Professor of Anatomy and Head of Anatomy at Brighton and Sussex Medical School. She is the Deputy Pro Vice Chancellor, Education, and Innovation for the University of Sussex. She is a Fellow of the Anatomical Society, a member of the Court of Examiners for the Royal College of Surgeons England. Claire teaches all areas of gross anatomy to medical and allied health care students and qualified trainees. Claire has published over 100 peer reviewed publications, with her research in understanding the learning experience, and the motivations around body donation. Claire has contributed to eight textbooks and is the lead author of Gray's Surface Anatomy and Ultrasound. Her book The Silent Teacher: the gift of body donation is the first book of its kind to openly explain for the public body donation. From 2018-2022 Claire was an Associate Editor for Anatomical Sciences Education. In 2017 Claire was elected secretary general of the European Federation of Experimental Morphology. She has also served as an elected member for the Anatomical Society Council. Claire has undertaken various media pieces for the BBC, ITV and Channel 4. Her latest documentary 'My Dead Body' received critical acclaim with over 1 million views in the week of its launch.

Closing Speaker

Professor Richard Tunstall



Advancing standards in clinical anatomy education: An integration of the old and the new

Learning clinical anatomy is challenging due to the high cognitive load resulting from the combination of identification and spatial orientation tasks with application to function, malfunction, examination, and symptoms. The optimum format and resourcing of clinical anatomical training is debated: notably, many approaches continue to utilise more traditional methodologies, resources, and information, despite the availability of contemporary alternatives.

This session will discuss alternative approaches that are led by contemporary learning theories, and that provides learners with opportunity to explore, mentally manipulate and conceptualise anatomical learning outcomes via a variety of routes, resources, and methodologies that integrate both the old (traditional) and new to advance educational standards.

Biography:
Richard is Professor and Chair of Clinical Anatomy at Warwick Medical School (UK), director of two medical education-based companies and holds roles in education, quality standards and examinations at the Royal College of Surgeons England. Through these roles, he is actively involved in enhancing national standards in clinical anatomy education, and in quality assuring and influencing the training standards of international organizations and healthcare-related companies. Richard's educational offerings benefit a diverse audience, from undergraduates and postgraduates, to a wider community including school pupils, patients, UK police and Team GB athletes. In recognition of his abilities, Richard and members of his teams have won numerous awards for excellence in education.

Richard is also an internationally recognized author. His own book, Pocket Tutor Surface Anatomy, is now in its second edition and has transformed how evidence-based surface anatomy is conceptualized and presented, benefitting educators and learners around the world, and winning a British Medical Association Book Award. Richard is also an author and section editor (Thorax and Surface Anatomy) on the 41st, 42nd and forthcoming 43rd editions of the world-renowned anatomical text 'Gray's Anatomy'.

Ultrasound Course

July 9, 2023

UCF School of Medicine

We are excited to offer an Ultrasound Course at this year's AACA meeting in Orlando, Florida! The goals of the course are (a) increase awareness of the utility of ultrasound as both a clinical tool and a supplement to anatomy instruction, (b) teach basic skills of MSK and cardiac ultrasound, and (c) provide more advanced content for the more seasoned attendees!

- Objectives for the first portion of ultrasound of the wrist, anterior forearm, and shoulder:
  - Differentiate between tendon, muscle, nerve, bone, arteries, veins, and membranes.
  - Recognize and identify the relevant anatomy.
  - Perform basic ultrasound examination of the joints and surrounding soft tissue structures of the wrist and shoulder.
  - Utilize artifact to help identify normal/abnormal anatomy.

- Objectives for the second portion of cardiac ultrasound:
  - Learn how to obtain parasternal long axis, parasternal short axis, apical, and subcostal views of the heart.
  - Identify the chambers, valves, and great vessels.
  - Differentiate between the inferior vena cava, hepatic veins, and portal veins within the liver, and follow the inferior vena cava to the heart.

Course Schedule (Sunday, July 9, 2023)

Time	Location
12:15 PM - 12:30 PM	Load Buses at Hotel
12:30 PM - 1:15 PM	Travel from Hotel to UCF
1:15 PM - 1:30 PM	Unload Buses & Walk to Activity Site
1:30 PM - 1:55 PM	Basics of Ultrasound
1:55 PM - 2:10 PM	Upper Extremity Ultrasound Explanation/Demonstration
2:15 PM - 3:10 PM	Hands-On Ultrasound of Wrist, Anterior Forearm, and Shoulder
3:15 PM - 3:30 PM	Cardiac Ultrasound Explanation/Demonstration
3:35 PM - 4:30 PM	Hands-On Ultrasound of Heart
4:30 PM - 4:45 PM	Walk from Activity Site & Load Buses
4:45 PM - 5:30 PM	Travel from UCF to Hotel

We are grateful to the
University of Central Florida College of Medicine
for hosting the event!

Special thanks to Evan Goldman, PhD,
for helping lead this event!

Ethically-Sourced, Plastinated Specimens from von Hagens Plastination.

- ✓ Silicone Plastinates
- ✓ Sheet Plastinates
- ✓ Anatomy Glass
- ✓ Skeletons & Skulls
- ✓ Blood Vessel Configuration
- ✓ Bespoke Specimen Dissection



Anatomic Excellence

von Hagens Plastination

REAL ANATOMY FOR TEACHING

www.**anatomicexcellence**.com

Visit us at Booths 12 & 13

Committee Meeting Descriptions

(Open to all – not restricted to members of the committee)

Brand Promotion & Outreach Committee (BPOC) Breakfast Meeting
Tuesday, July 11th from 7:30 am – 9:00 am
Open to All Attendees

How do YOU define Clinical Anatomy? Promoting who we are as an organization.
Come join the Brand Promotion and Outreach Committee (BPOC) on Tuesday, July 11th at 7:30 am in the Meyer Room. Your participation and input are needed to help the BPOC plan to best promote the AACA. At its inception in 1983, the AACA had 88 members –60% clinicians and 40% basic scientists. What does our membership look like now with 465 members? The BPOC is interested in hearing how YOU define clinical anatomy and the term "clinical anatomist". Come participate in an informal roundtable discussion and have some breakfast.

Career Development Committee (CDC) Meeting and Mentor/Mentee Breakfast
Monday, July 10th from 7:30 am – 9:00 am
Open to All Attendees

The CDC will host a welcoming "Anatomy Career Connections" breakfast on Monday, July 10th for all members, regardless of the stage of their career, to foster connections among junior and senior anatomists. The format of the breakfast will consist of several seasoned anatomy 'hosts' who will engage in conversation with a group of 8-10 attendees. Additionally, the hosts will facilitate introductions among attendees throughout the conference to foster connections between anatomists with similar backgrounds and needs. We will also nominate and elect a new Career Development Committee Member at this breakfast session.

Clinical Anatomy Terminology (CAT) Committee Lunch Meeting
Monday, July 10th from 12:00 pm – 1:30 pm
Open to All Attendees

The CAT committee will host their lunch meeting on Monday, July 10 from 12-1:30p. During the meeting, the CAT will provide an update on the activities of the committee from the last year. The committee will then host an interactive quiz on anatomical terminology with topics such as eponyms, etymology, TA2, and more! Finally, the meeting will adjourn after elections are held to fill two open positions for the upcoming cycle.

Anatomical Services Committee (ASC) Lunch Meeting
Tuesday, July 11th from 12:00 pm – 1:30 pm
Open to All Attendees

If you missed meeting our members at the welcome reception, please join us for an interactive and eventful lunch meeting. Our meeting is filled with experts on all aspects of body donation, from technical preparations to ethics, policies, and more. In addition, your colleagues bring years of experience, making our meeting a great place to find the information you need.

This year, we look forward to reviewing the results from our survey and providing an open round table discussion on hot topics identified. We are also excited to hear about your programs' innovations and advancements and how you and your team create "The Most Magical Anatomy Laboratories on Earth."

Other agenda items include a report on the work of the ASC during the last year and a discussion about potential topics for next year's symposia. Active AACA members present at lunch will also elect new committee members who will serve for three years. Please submit your nomination to any ASC member in advance. Self-nominations are welcome.

Details of the ASC meeting are at: http://clinicalanatomy.org/AnatomicalServicesCommitteeMeeting.

Come to the ASC meeting to listen or to be part of the conversation by sharing your experiences.

We look forward to seeing you there!

continued on next page

Diversity, Equity, and Inclusion Committee (DEIC) Breakfast Meeting
Wednesday, July 12th from 7:30 am – 9:00 am
Open to All Attendees

Title: ***Lessons Learned from the Voices of Anatomy Students: An AACA DEIC CART Session Debrief***

Description: We all know that listening to our students is extremely important. But how many of us truly get to know and learn from our students? This breakfast meeting will consist of a debrief from the AACA DEIC CART webinar session held on April 26, 2023. The AACA DEIC will present lessons learned from the anatomy student panelists regarding their perceptions of challenges, such as intersectionality, faced in their learning environments. The committee will also share student panelists' suggestions for how anatomy educators should enhance diversity, equity, and inclusion within their anatomy classrooms and laboratories. Then, the committee will facilitate an open forum discussion with attendees to solicit faculty perspectives on the importance and challenges of diversity, equity, and inclusion in anatomy learning environments and to come to a consensus on actionable goals for learning environments moving forward beyond the meeting. The meeting will conclude with the sharing of pertinent committee news and announcements.

Goals/Learning Objectives:

Attendees will be able to…

- Describe student and faculty perceptions of diversity, equity, and inclusion within anatomy curricula and their own programs, schools, and institutions.
- Discuss the challenges diverse students and faculty face within their anatomy curricula, programs, schools, and institutions and the importance of addressing those challenges.
- Analyze ways to apply student and faculty recommendations about diversity, equity, and inclusion improvements to their own anatomy curricula and organizations.
- Develop shared actionable, achievable goals for the promotion and enhancement of diversity, equity, and inclusion in anatomy learning environments across institutions.

Educational Affairs Committee (EAC) Lunch Meeting
Wednesday, June 12th 11:45 am – 1:15 pm
Open to All Attendees

During the 2023 AACA conference, EAC will host a lunch meeting entitled "Peer-Feedback: An underutilized tool for developing effective teaching". The EAC will offer some definitions of peer-feedback, and outline distinctions between formal versus informal feedback, the importance of each and why they both can be valuable.

Attendees will get a chance to offer their feedback to a "peer" following a brief "teaching demo" designed to engage and introduce participants to best practices on how to give, receive, and use effective peer-feedback in various settings (lecture, lab, large-group, small-group, etc). In the guided discussion that follows, the group will discuss importance and limitations of this kind of feedback, and explore what the group sees as pros and cons, and how to overcome these and other barriers to implementation at our institutions.

Lastly, the EAC committee will provide a peer-feedback evaluation template that can be modified for use across institutions and disciplines. The session will strive to equip participants with knowledge, best-practices, and a bit of first-hand experience with which to engage their home institutions in a wider discussion of peer-feedback and how it can foster an inclusive, supportive way to improve our teaching.

YOU ARE INVITED to participate on Wednesday July 12th at 11:45 am and to learn and share your experience with peer-feedback. Not only will there be lunch, the meeting features the election of a new member to the Educational Affairs Committee, for those folks wishing to get more involved. We are looking forward to seeing you!

Committee Symposia Descriptions

(Open to all – not restricted to members of the committee)

Clinical Anatomical Terminology (CAT) Committee Symposium
Wednesday, July 12th from 9:15 am – 10:30 am
Open to All Attendees

"Female Pelvic Surgery: What should we call this? Terminology from a Urogynecologist's Perspective."

A discussion of the challenges faced by surgeons in learning, teaching, and studying surgical procedures to treat pelvic floor disorders.



Sarah Collins, MD
Associate Professor of Obstetrics and Gynecology

Sarah Collins, MD, is a board-certified surgeon whose practice focuses on urogynecology and reconstructive pelvic surgery. Dr. Collins is an expert in diagnosing and treating pelvic floor disorders, including pelvic organ prolapse, urinary and fecal incontinence, complex urogenital and rectovaginal fistulae, complex lower urinary tract injuries after pelvic surgery, and congenital genitourinary anomalies. Her skill and experience allow management of complex surgical problems through minimally invasive approaches whenever possible.

Because she understands the personal and private struggles that women with pelvic floor disorder face, Dr. Collins' approach to care centers around being an advocate for her patients and prioritizing their healthcare experience from the first visit. She is heavily involved in creating and researching shared decision-making (SDM) tools for patients facing decisions about pelvic health treatment options. Her dedication to practice efficiency and streamlining the care experience is concentrated on ensuring that patients get the most out of every office and operating room encounter. She is a federally funded researcher and holds leadership roles in national and international professional organizations.

In addition to her surgical practice and research, Dr. Collins is passionate about teaching the next generation of gynecologic surgeons, providing training to medical students, residents, and fellows. She also dedicates her time and surgical skill to an annual surgical mission to Rwanda, where she teaches local surgeons in the treatment of women with obstetric injuries and complex genitourinary and rectovaginal fistulae.

continued on next page

Career Development Committee (CDC) Symposium
Monday, July 10th from 1:45 pm – 3:00 pm
Open to All Attendees

"Time Management for Faculty: Why is there never enough time?"

In this symposium, you'll learn about a combination of tools that you can use to approach time management in your work. First, we'll talk about ways to do time tracking that are free and uncomplicated, to get a sense for how you actually spend your time. Then we'll explore some of the contextual and psychological reasons why we get stuck as academics and never have enough time. Finally, we'll dig into how to respond to these common challenges, work with procrastination, and become more skilled at saying yes and no at the right time.

Darren Hoffmann, Ph.D.
Assistant Professor, Anatomy and Cell Biology



Darren Hoffmann, Ph.D. is Associate Professor and Vice Chair of Educational Programs in the Department of Anatomy and Cell Biology at The University of Iowa Carver College of Medicine. In his faculty role, Darren conducts research in anatomy pedagogy (virtual anatomy and living anatomy), and graduate education (development of teaching skills). Dr. Hoffmann is also an enthusiastic developer of graduate students and junior faculty, having led dozens of local and national workshops on various dimensions of career development in academia. Relevant to this presentation, Darren has experienced being over-committed first-hand and helped many colleagues identify reasons why they never seem to have enough time for work that really matters.

American Association of Clinical Anatomists

Annual Business Meeting Agenda

Wednesday, July 12th, 2023
Orlando, Florida

PO Box 2945
LaGrange, Ga 30241
Ph: 706-298-0287
www.clinical-anatomy.org

CALL TO ORDER: 2:45 pm
Approval of Minutes of 2022 Annual Business Meeting (ABM) and the 2023 ABM Agenda

1. **President's Report** – *Thomas Gest* – ***10 minutes***
   a. 2023 Election Results
   b. 2024 Election – Positions open to the AACA Membership in 2024
      i. Program Secretary (1)
      ii. Special Councilor – Anatomical Services (1)
      iii. Councilors-at-large (2)
   c. Presidential Committee Appointments[1]
   d. State of the Association

2. **Treasurer's Report** – *Anthony D'Antoni* – ***5 minutes***

3. **Membership Committee Report** – *R. Shane Tubbs* – ***5 minutes***
   a. Remembrance of Deceased Members – *Sarah Greene* – ***1 minute***

4. **Journal Committee Report** – *Marios Loukas* – ***2 minutes***
   a. Report of Editor-in-Chief of *Clinical Anatomy* – *Marios Loukas* – ***7 minutes***

5. **Meeting Organization & Program Planning Committee Report** – *Jennifer Burgoon* – ***10 minutes***
   a. Report of 2023 Annual Meeting Committee
   b. Future Meetings:
      i. 2024 AACA Annual Meeting, New York, NY – Estomih Mtui and Anthony D'Antoni
      ii. 2025 AACA Annual Meeting, Seattle, WA – R. Shane Tubbs and Joe Iwanaga
      iii. 2026 AACA Annual Meeting, Virtual

7. **Annual AACA Awards** – *Thomas Gest* – ***5 minutes***
   a. Honored Member Award 2023 – Bernell Dalley
   b. R Benton Adkins Distinguished Service Award 2023 – Greg Smith

8. **Old Business** – ***2 minutes***

9. **New Business** – ***3 minutes***

ADJOURNMENT: 4:00 pm

[1] The Special Interest Group (SIG) Committees (Brand Promotion and Outreach, Educational Affairs, Career Development, Clinical Anatomical Terminology, and Anatomical Services) elect members at their committee meetings.

American Association of Clinical Anatomists

Minutes from 2022 Annual Business Meeting

Thursday, June 16th, 2022
Fort Worth, Texas

PO Box 2945
LaGrange, Ga 30241
Ph: 706-298-0287
www.clinical-anatomy.org

CALL TO ORDER: 2:33 pm

1. Approval of Minutes/Agenda

a. David Porta moved to approve the minutes of the 2021 Annual Business Meeting (ABM). Motion was seconded by Vaughan Lee. Approved.

b. Stephen Carmichael moved to approve the 2022 ABM Agenda. Motion was seconded by David Porta. Approved.

President's Report (Thomas Gest)

a. Thanks to outgoing council members

b. Review of 2022 AACA election results

i. Treasurer – Anthony D'Antoni
ii. Special Councilor-Clinical – Koichi Watanabe
iii. Councilor-at-Large – Nirusha Lachman
iv. Councilor-at-Large – Estomih Mtui

c. Review of positions open in the 2023 AACA election

i. President-elect (1)
ii. Secretary (1)
iii. Special councilor – Allied Health (1)
iv. Councilors-at-large (2)

d. Presidential Committee Appointments to Committees

i. Anatomical Services Committee 2022-2025: Evan Goldman
Member elected at SIG meeting: 2022-2025: Aron Davis
ii. Brand Promotion and Outreach Committee: No new appointees
iii. Membership Committee 2022-2024: Dolgor Baatar
iv. Educational Affairs Committee 2022-2025: Jon Jackson
Member elected at SIG meeting: 2022-2025: Eiman Abdel Meguid
v. Ad hoc legacy committee 2022-? David Porta (chair) and Stephen Carmichael
vi. Ad hoc Diversity, Equity, and Inclusion Committee: Yasmin Carter continues as chair
vii. Career Development Committee 2022-2025: Priti Mishall
Member elected at SIG meeting: 2022-2025: Gurvinder Kaur
viii. Clinical Anatomical Terminology Committee 2022-2025: Brad Martin and Efrain Miranda
Members elected at SIG meeting: 2022-2025: Kathleen Brakova and Sasha Lake
ix. Bylaws Committee 2022-2025 Kazzara Raeburn (chair), Kathleen Bubb, and Ameed Raoof
x. Nominating Committee 2022-2025 Kimberley Topp and Jon Wisco

e. State of the Association

Tom feels that we are doing better after two rough years for everyone. He gave thanks to Past-President Rob Spinner for keeping us together and going strong despite the pandemic.

continued on next page

3. Treasurer's Report (Anthony D'Antoni)

a. Delivered by Caitlin Hyatt. The association still has a significant amount of money in our accounts despite financial market issues and expenses for the annual meeting expenses still pending.

b. The bad news is that we have an estimated loss of $51,000 for this meeting due to increased AV and food expenses as well as institutions being reticent to send faculty to in-person meetings. Regional meetings continue to bring in some money and serve as a good method of outreach for the organization.

c. Membership income is expected to match prior years as we typically have many renewals in the second half of the year.

d. The journal budget is good and Clinical Anatomy is on track for excellent profits, more on this during the journal report.

e. Despite losses at the annual meeting, we are on track to break even (or better) by the end of the year.

4. Membership Committee Report (R. Shane Tubbs)

a. Shane thanked the members of the committee and reviewed the membership types and dues structure.

b. Total membership appears stable, assuming that they typical ~40 members join by the end of the year.

c. New members are overwhelmingly due to word of mouth from existing members and Shane encouraged everyone to get the word out to colleagues.

d. Remembrance of Deceased Members – Sarah Greene

Delivered by Caitlin Hyatt. O.W. "Bill" Henson from University of North Carolina was noted as the only known member to have passed away during the last year. A moment of silence was observed.

5. Journal Committee Report on *Clinical Anatomy* (Marios Loukas)

a. Delivered by Shane Tubbs. Clinical Anatomy has had a banner year. Shane reviewed and thanked the Editorial staff. Downloads of articles approached half of one million, which is a new record. Downloads go to many countries, with the United States and United Kingdom in the majority.

b. Shane reviewed the top downloaded articles.

c. The countries that submit the most articles are China, United States, Turkey, United Kingdom, India, Japan, and many others.

d. Shane highlighted articles of interest that have been published or will be soon.

e. The impact factor has moved from 1.967 in 2019 to 2.414 in 2020 and we are waiting on the IF for 2021. Shane anticipates good news.

6. Meeting Organization & Program Planning Committee Report (Jennifer Burgoon)

a. Report of 2022 Annual Meeting Committee

i. Delivered by Sarah Keim. The MOPP committee continued work on the Planstone software, improved guidelines, and the post-conference survey. The Tech Fair was brought back.

ii. 97 abstract submissions, 15 late breaking. There were 282 registrants.

iii. Sarah thanked all the SIG committee chairs for their sessions and for running the breakfast meetings. She also thanked the meeting managers and the local hosts, Rusty Reeves and Cara Fisher. Sarah Keim reminded that membership that there will be openings for meeting managers for upcoming annual meetings.

b. Future Meetings:

i. 2023 AACA Annual Meeting, Orlando, FL

ii. 2024 AACA Annual Meeting, New York, NY – Estomih Mtui & Anthony D'Antoni

iii. 2025 AACA Annual Meeting, Seattle, WA – Shane Tubbs & Joe Iwanaga

c. Sarah encouraged members to consider hosting a meeting and to fill out the post-meeting survey.

d. Thanks to ASG for all their support and efforts.

continued on next page

7. Committee Elections (Thomas Gest)

a. Election of Members-at-Large for the Nominating Committee: 3 vacancies

i. Nominations: Edgar Meyer, Samir Anadkat, Rebecca Pratt

ii. Nominees were accepted by acclamation.

b. Election of Members-at-Large for the Bylaws Committee: 2 vacancies

i. Nominations: Rachael George, Diana Pettit, Adam Kolatorowicz

ii. Votes were counted and Rachel George and Adam Kolatorowicz were elected to the bylaws committee.

c. Election of Members-at-Large for the Financial Affairs Committee: 2 vacancies

i. Nominations: Greg Brower, David Porta

ii. Nominees were accepted by acclamation.

8. Annual AACA Awards (Thomas Gest)

The Honored Member Award 2022 is for Cornelius Rosse, MD, DSc. He will be honored at the banquet this evening.

9. Old Business

No old business was raised.

10. New Business

a. Neil Norton pointed out that this is the 10th year that ASG has managed our association. Neil read a resolution thanking her for her magnificent efforts on our behalf.

"Be it resolved that on this day, 16 June 2022, the AACA offers their sincere thanks and appreciation to Caitlin Hyatt for her dedicated service as Assistant and Executive Director of the AACA. Furthermore, be it resolved that the AACA wishes Caitlin continued success and best wishes in her new role as co-owner of ASG and we look forward to our continued relationship with ASG."

The motion was accepted unanimously.

b. Mohammad Khalil on behalf of the BPOC asked membership to participate in sharing information via the AACA newsletter so that it can become a richer means of communication for the entire association. Send information to Mohammed Khalil or Caitlin Hyatt and the information will be submitted to the newsletter. Caitlin noted that a submission form is also present on the AACA website.

ADJOURNMENT: 3:24pm

2022 – 2023
AACA Council Members

Officers

President – Thomas R. Gest, Ph.D.

President-Elect – R. Shane Tubbs, Ph.D.

Secretary – Sarah J. Greene, Ph.D.

Treasurer – Anthony V. D'Antoni, D.C., Ph.D.

Past-President – Robert J. Spinner, MD

Program Secretary – Jennifer M. Burgoon, Ph.D.

Councilors

Kathleen Carol Bubb, MD

Joe Iwanaga, DDS, Ph.D.

Gilbert M. Willett, Ph.D., PT, OCS

James Coey, MD

Koichi Watanabe, MD, Ph.D.

Nirusha Lachman, Ph.D.

Estomih P. Mtui, MD

Vaughan Lee, Ph.D.

Kazzara Raeburn, MD

Clinical Anatomy

The Official Journal of the American Association of Clinical Anatomists, and the British Association of Clinical Anatomists

Editor-in-Chief – R. Shane Tubbs

Editor Emeritus – Stephen W. Carmichael

AACA Senior Editor – Robert J. Spinner

AACA Co-Editors – Anthony V. D'Antoni, Thomas R. Gest, Joe Iwanaga, Marios Loukas, Susan Standring

BACA Editor – Philip Adds

Assistant BACA Editor – Jenny Clancy

Founding Editors: Ralph Ger and Ray J. Scothorne

Editorial Board – 2023
Associate Editors

Keiichi Akita
Mahindra Kumar Anand
Robert H. Anderson
Nihal Apaydin
Ronald L.A.W. Bleys
Chelsea M. Lohman Bonfiglio
Peter Dangerfield
Raffaele De Caro
Beom Sun Chung
Aaron S. Dumont
Fabrice Duparc
Georgi P. Georgiev
Duncan Lee Hamilton
Marwan F. Abu-Hijleh
Mi-Sun Hur
Soichiro Ibaragi
Ikuo Kageyama
Mohammed Khalil
Hee-Jin Kim
Nirusha Lachman
Vishy Mahadevan
Tarik Massoud
Joanna Matthan
Stuart McDonald
Ali Mirjalili
Garrett Moore
Shumpei Mori
Alan Moulton
Richard Newell
Roelof-Jan Oostra
Friedrich Paulsen
Michał Polguj
Daisy Sahni
José Ramón Sañudo
Louise Scheuer
Thomas Shiozawa-Bayer
Albert van Schoor
Justin T. Tretter, Cincinnati, OH, USA
Jerzy Walocha, Kraków, Poland
Koichi Watanabe, Kurume, Japan
Peter L.T. Willian, Chesire, UK
Adam B. Wilson, Chicago, IL, USA
Shengbo Yang, Zunyi, China

Managing Editor – Isaiah Tubbs
me.clinicalanatomy@gmail.com

Production Editor – Reeni Sunder
sreeni@wiley.com

Committee Reports

Anatomical Services Committee
Ad hoc Diversity Inclusion and Equity Committee
Brand Promotion and Outreach Committee
Career Development Committee
Clinical Anatomical Terminology Committee
Educational Affairs Committee
Journal Committee
Listserv Admin Report
Membership Committee
MOPP Committee
Nominating Committee

Anatomical Services Commitee (ASC) Report

The Anatomical Services Committee (ASC) represents academic and technical members of the Association who are active in the operations and administration of institutional whole-body donation programs. ASC functions to serve the AACA membership by developing symposia, special sessions, courses, and guidance documents and promoting technical and academic aspects of human anatomical tissue use in healthcare, university education, and research. In addition, the group advocates for the informed, ethical, and safe operation of body donation programs to support the human anatomical tissue requests of students, faculty, staff, and researchers who contribute to the advancement of medicine through education and research.

Information about the ASC, including position statements, best practices, contact information, and links, can be accessed from the Association website: http://clinical-anatomy.org/Committees
During the 2022-2023 year, the ASC met monthly to identify key issues relevant to the operation of body donation programs, including current practices, compliance, preparations, ethics, public relations, and more for discussion during the annual lunch meeting. To further identify topics most important to our members, the ASC developed and distributed a survey to all active AACA members.

Presidential Appointees:

2020-2023: Nirusha Lachman, Mayo Clinic College of Medicine, Lachman.nirusha@mayo.edu
2021-2024: Amberly Reynolds, Rocky Vista University, areynolds@rvu.edu:
2022-2025: Evan Goldman, Penn State College of Medicine, egoldman1@pennstatehealth.psu.edu

Elected Members:

2020-2023: Amanda Collins, University of Massachusetts T.H. Chan School of Medicine, Amanda.Collins@umassmed.edu
2021-2024: Amanda Mittelstadt, High Point University, amittels@highpoint.edu, Chair
2022-20225: Aron Davis, University of California, Davis ardavis@ucdavis.edu

Ex Officio:

James Coey, St. George's University, ASC Special Councilor, jcoey@sgu.edu

Anatomical Services Committee events at the 2023 AACA Annual Meeting

Welcome Reception, Sunday, July 9, from 6:30 p.m. to 8:00 p.m.

Members of the ASC will be present at the reception to greet meeting attendees. Individuals interested in anatomical services are encouraged to join and seek out committee members to learn what we do and how to get involved.

Lunch Meeting, Tuesday, June 11, from noon to 1:30 p.m.
If you missed meeting our members at the welcome reception, please join us for an interactive and eventful lunch meeting. Our meeting is filled with experts on all aspects of body donation, from technical preparations to ethics, policies, and more. In addition, your colleagues bring years of experience, making our meeting a great place to find the information you need.

This year, we look forward to reviewing the results from our survey and providing an open round table discussion on hot topics identified. We are also excited to hear about your programs' innovations and advancements and how you and your team create "The Most Magical Anatomy Laboratories on Earth."

continued on next page

Other agenda items include a report on the work of the ASC during the last year and a discussion about potential topics for next year's symposia. Active AACA members present at lunch will also elect new committee members who will serve for three years. Please submit your nomination to any ASC member in advance. Self-nominations are welcome.

Details of the ASC meeting are at: http://clinicalanatomy.org/AnatomicalServicesCommitteeMeeting.
Come to the ASC meeting to listen or to be part of the conversation by sharing your experiences.

We look forward to seeing you there!

Ad-Hoc Diversity, Equity, and Inclusion Committee (DEIComm) Report

Members:

Edgar R. Meyer (Chair)

Chelsea Lohman Bonfiglio

Amanda Collins – *has officially stepped off of the committee but has contributed to committee work this year.*

Thomas R. Gest

Haley L. Nation

Jonathan J. Wisco

Mission:

Created in 2020, the Ad-Hoc Diversity, Equity, and Inclusion Committee (DEIComm), committee is charged by the AACA with promoting and fostering a culture that values diversity, equity, and inclusion in clinical anatomy. The charges of this ad hoc committee are as follows:

1. Surveying and evaluating AACA membership, statements, and activities on issues affecting diversity, equity, and inclusion in the clinical anatomy profession and
2. Identifying gaps and making recommendations to:
    a. Raise awareness and provide education on the importance of diversity and inclusion in the profession.
    b. Promote outreach and mentorship.
    c. Identify resources for training.
    d. Support a forum for discussion on diversity and inclusion.

Summary of Past and Ongoing DEIComm Activities

The committee met monthly to discuss the needs of the membership, proposed budgets, awards, and future projects. The recurring monthly meetings have taken place every third Wednesday of the month since the first meeting with the new Chair on September 21, 2022. The following bullet points outline the tasks accomplished during and/or after these meetings up until the current timepoint:

- At the 2022 AACA Annual Meeting, we presented an overview of several diversity, equity, and inclusion topics and their relevance to health science professions and to the anatomical sciences. The presentation included personal stories from its members as panelists while inviting questions and responses from the members in attendance.
- A portion of the AACA Budget Request for 2023 was approved by the Board. The $300 approval was granted for a special award to a student who has conducted and presented pertaining to diversity, equity, and inclusion endeavors. The award description agreed upon and submitted by the committee members can be read in **Appendix A**.
- The committee finalized planning details for the AACA DEIC CART webinar session titled "Students' Perceptions of DEI in Anatomy" and shared a description with goals/learning objectives for dissemination and advertisement. The full description can be read in **Appendix B**. The webinar will be held on April 26.
- The committee initiated an AACA DEIC Blog at the beginning of the calendar year, and we have made three posts so far with the commitment to make at least two posts each month, starting this month, April 2023. So far, we have made four blog posts. They have been shared on the AACA DEIC Blog page and via social media platforms. The blog page can be viewed by visiting the following link, and posts can be made in response to blog entries and other members' responses by logging in with your membership information.
- The committee Chair has had discussions with the Board Secretary and Bylaws Committee Chair about the new process for establishing/transitioning an ad-hoc committee to a standing committee, and the committee is still awaiting feedback.

continued on next page

- The committee Chair has also had discussions with the Bylaws Committee Chair about drafting a Diversity and Inclusion Statement for the AACA, and she had mentioned including our feedback and help with the process. The committee is awaiting further information.
- The committee received Board approval to design an AACA DEIC logo which will be posted on AACA DEIC-related platforms, such as the blog, and included in AACA DEIC products (e.g., presentations, reports, etc.). A student of one of the committee members is currently working on graphic designs which we hope to review and decide upon before the annual meeting.
- The Chair has had discussions with Board members about appointing two or more new AACA DEIC members, and that allowance will be granted. The committee is awaiting further information.
- The committee has proposed an endowment/travel scholarship fund. The fund will support student travel to AACA meetings to present research related to diversity, equity, and inclusion initiatives. The committee has suggested beginning solicitation of contributions to the fund from past presidents of AACA.
- The committee has planned the DEIC breakfast meeting titled, "Lessons Learned from the Voices of Anatomy Students: An AACA DEIC CART Session Debrief," for the upcoming AACA Annual Meeting. This meeting will consist of a debrief from the AACA DEIC CART (April 26, 2023). We will present lessons learned from the anatomy student panelists and facilitate an open forum discussion with attendees to solicit faculty perspectives.

Future DEIComm Activities

The committee aims to complete the following tasks prior to or during the 2023 AACA Annual Meeting:

- Facilitate the AACA DEIC CART webinar titled "Students' Perceptions of DEI in Anatomy" on Wednesday, April 26, at noon Eastern Standard Time.
- Review abstracts submitted for the Diversity, Equity, and Inclusion Student Award, judge their posters at the 2023 AACA Annual Meeting, and select an award recipient from the presenters.
- Facilitate the DEIC breakfast meeting titled, "Lessons Learned from the Voices of Anatomy Students: An AACA DEIC CART Session Debrief," on July 12, 2023, at the Annual Meeting.
- The committee aims to have a logo by the annual meeting.
- The committee aims to have at least two new members appointed by the annual meeting.
- The committee aims to present the new endowment/travel scholarship fund details at the upcoming annual meeting.

The committee aims to complete the following tasks in the future beyond the 2023 AACA Annual Meeting:

- Review AACA membership diversity.
- Become an official standing committee.
- Initiate and/or improve relations with other national and international professional societies.

Appendix A

Diversity, Equity, and Inclusion Student Award

The Diversity, Equity, and Inclusion Student Award was instituted to honor an American Association of Clinical Anatomists (AACA) student member who has developed and implemented a research project relevant to diversity, equity, and/or inclusion (DEI) initiatives. Projects may incorporate any of the disciplines within the anatomical sciences or clinical anatomy. Projects may include, but are not limited to, research focusing on underserved populations or inequalities, understanding DEI issues faced by students and instructors, addressing issues relevant to DEI such as race, gender, nationality, etc., development of curricula and teaching strategies designed to enhance inclusion, or designing trainings to enhance intercultural competency. The purpose of this award is to acknowledge and celebrate individuals committed to advancing diversity, equity, and inclusion in the community. This inaugural award was officially requested by the AACA Diversity, Equity, and Inclusion Committee and approved by the AACA Executive Council to be granted to its first recipient at the 2023 AACA Annual Meeting. The gift associated with this award entails a monetary prize in the amount of $300 U.S. and recognition in the monthly AACA newsletter.

continued on next page

Appendix B

AACA DEIC CART

Title: *Students' Perceptions of DEI in Anatomy*

Description: So many educators are talking about the importance of diversity, equity, and inclusion in their classrooms and organizations. But what do their students actually think about diversity, equity, and inclusion? This CART webinar will feature a panel of anatomy students from diverse backgrounds in terms of their demographics, degree programs, and institutions. The student panelists will be invited to respond to a set of guided questions inquiring about their perceptions of diversity, equity, and inclusion within their anatomy curricula, programs, schools, and institutions. At the conclusion of this discussion, session facilitators will moderate a question-and-answer session between the panelists and attendees. This CART webinar will be hosted by the Diversity, Equity, and Inclusion Committee (DEIC) within the American Association of Clinical Anatomists (AACA).

Goals/Learning Objectives:

Attendees will be able to...

- Describe students' perceptions of diversity, equity, and inclusion within anatomy curricula and their own programs, schools, and institutions.
- Discuss the challenges diverse students face within their anatomy curricula, programs, schools, and institutions.
- Analyze ways to apply students' recommendations about diversity, equity, and inclusion improvements to their own anatomy curricula and organizations.

Brand Promotion & Outreach (BPOC) Report

Soo Kim, University of Saskatchewan, Chair, soo.kim@usask.ca

Nena Mason, Dartmouth, nena.mason@dartmouth.edu

Mikaela Stiver, McGill University, mikaela.stiver@mcgill.ca

Jessica Immonen, University of Nevada Las Vegas, jessica.immonen@unlv.edu

Saskia Richter, University of Delaware, srichter@udel.edu

Kelsey Picha, A.T. Still University, kpicha@atsu.edu

Brand Promotion and Outreach Committee (BPOC) is responsible for the promotion, development, and maintenance of strategic initiatives of the Association with the overarching aims of expanding membership and increasing global reach. The BPOC is responsible for planning and overseeing fundraising efforts and associated travel awards for the Annual and Regional Meetings, managing the Association's social media presence, developing ongoing promotional materials and initiatives, and supporting outreach initiatives or opportunities.

During the past year, the BPOC spent a lot of time reflecting on our promotional activities and brainstorming on how our committee could help focus our efforts and maximize our impact. As the AACA enters its 40th year as an association, the BPOC thought it would be good to connect with our members at our breakfast meeting to discuss how they define "Clinical Anatomy" and a "Clinical Anatomist". In preparation for the breakfast meeting, our committee created a pre-breakfast survey to help gather some updated membership information. Our hope is to use this information to help steer and guide future events for our members.

Other initiatives the BPOC worked hard on this year were our fundraising efforts. We are excited to launch the sale of high-quality polo shirts, lab coats, and scrubs all with our AACA logo. We have an exciting CART session planned for May focusing on how members can be successful at promoting themselves in their workplace and to the broader anatomy community.

The BPOC has continued to create promotional materials for various events throughout the year and has grown our presence on social media platforms. We thank everyone for their support!

continued on next page

Career Development Committee (CDC) Report

The Career Development Committee (CDC) supports the career growth and advancement of clinical anatomy knowledge for an individual at any stage of their career. The CDC encourages high quality anatomical research and educational scholarship through responsibilities such as judging student posters (Sandy C. Marks, Jr Award), platform presentations (Ralph Ger Award), and through hosting a CART session (The Art of Negotiation), a breakfast (Anatomy Career Connections Breakfast & Business Meeting) and a symposium (CDC Symposium) at the annual meeting.

Over the past year, committee members met monthly to plan for the events throughout the year. The CDC CART session occurred on April 5th and considered the topic of faculty negotiation. For the July annual meeting the CDC will host two events, a meeting the Anatomy Career Connections Breakfast and Business Meeting. The purpose of this breakfast is to foster connections between members looking for guidance on career advancement. The symposium will feature Dr. Darren Hoffman as he discusses faculty time management.

If you are interested in serving, have a passion for mentoring, or have innovative ideas to promote career growth, please consider becoming a member of the CDC. We will be electing one new member at our breakfast meeting.

Presidential Appointees
2020-2023: Quentin Fogg, quentin.fogg@unimelb.edu.au
2021-2024: Rekha Kar, karr@uthscsa.edu
2022-2025: Priti Mishall, priti.mishall@einsteinmed.edu

Members Elected at Annual SIG Meeting of Committee
2020-2023: Padma Gadepally, gadepadm@isu.edu
2021-2024: Amanda Troy, troya2@duq.edu, Chair
2022-2025: Gurvinder Kaur, gurvinder.kaur@ttuhsc.edu

Clinical Anatomical Terminology (CAT) Committee Report

The CAT committee holds meetings on the 2nd Wednesday of each month. Subcommittees meet on alternate weeks to the regular CAT meetings, or as needed. All CAT meetings are held using video conferencing using "Zoom". The CAT has continued creating and reviewing definitions, based on the Patterns and Guidelines document. The definitions are created using CAT's online "definition machine" (a web-based, database system hosted by LUMC, Netherlands). During 202-23, the CAT has worked on improving the content of the AnatomicalTerms.info (ATI) website. The website houses the official Terminologia Anatomica terms with common synonyms and eponyms, and CAT- created plain language definitions. The CAT continues working to fix any existing errors on the website with TA terms to ensure they are accurate and current and incorporating TA2 terminology. The CAT is also working towards collaboration with the TA2viewer online to share our plain language definitions in their repository, and is working toward developing the capability of the definition machine. Finally, the CAT is working on increasing international awareness and recruit individuals for participation in the CAT initiatives (ATI/definition machine). To that end, the CAT is promoting terminology via Social Media outlets, and is working on having a presence at a variety of conferences and working towards promoting ATI to journal and book editors as the recommended reference for authors.

At the 2023 meeting, the CAT symposium will feature an invited speaker, Sarah Collins, MD. Dr. Collins will deliver a short talk that will address real world use of anatomical terminology within the clinical environment, including how new terms are developed in the clinical environment, the differences between Terminology Anatomica 2 and clinical terms, whether students are using expected terms in clinic, whether terminological differences have caused confusion or error in the clinic, and how clinicians and anatomists could better collaborate in relation to the development of terminology for maximum and mutual benefit.

Co-Chairs
Chelsea Lohman Bonfiglio (chelsea.lohmanbonfiglio@cuanschutz.edu)
Richard Tunstall (r.g.tunstall@warwick.ac.uk)

Presidential Appointees
2020-2023: Chelsea Lohman-Bonfiglio, Co-Chair (chelsea.lohmanbonfiglio@cuanschutz.edu)
2020-2023: Richard Tunstall, Co-Chair (r.g.tunstall@warwick.ac.uk)
2021-2024: Mahindra Anand (manandk@hotmail.com)
2021-2024: Stephen Bordes (sbordes1@gmail.com)
2022-2025: Brad Martin (bdmartin@llu.edu)
2022-2025: Efrain Miranda (dremiranda@gmail.com)

Members-at-Large
2020-2023: Anthony (Tony) Weinhaus (weinh001@umn.edu)
2020-2023: Alexandra Wink (alexandra.wink@umassmed.edu)
2021-2024: Amy Lovejoy Mork (amork@msm.edu)
2021-2024: Noel T. Boaz (noeltboaz@integrativemedsci.org)
2022-2025: Sasha Lake (slake1@sgu.edu)
2022-2025: Katherine Brakora (kbrakora@tamu.edu)

continued on next page

Educational Affairs Committee (EAC) Report

Purpose of Committee: The Educational Affairs Committee (EAC) shall promote the teaching of clinical anatomy, track national and international curricular trends and changes, and develop educational initiatives that will benefit the Association's members, health care professionals, the education community, and the general public. The Committee disseminates data and recommendations for best practices for all aspects of anatomical education as it relates to clinical practice. The Committee shall plan and implement the Educational Affairs Symposium when scheduled by the Meeting Oversight and Program Planning Committee. The Committee shall consist of six (6) members, each serving a three (3) year term. The President-Elect shall appoint one (1) member in the second year of his/her term, and the President shall appoint one (1) member in the first year of his/her term. One (1) member shall be nominated and elected by the Active Members in attendance at its annual open meeting.

During the 2022-2023 monthly EAC meetings, discussions focused on a variety of topics, including: an international comparison between anatomy medical integration, the relevance of practical exams to clinical skills, learning strategies and the psychology of failure, etc. While numerous topics were discussed and researched, the committee chose to focus on peer-feedback for the upcoming lunch meeting at the AACA conference.

During the 2023 AACA conference, EAC will host a lunch meeting entitled "Peer-Feedback: An underutilized tool for developing effective teaching". The EAC will define peer-feedback and differentiate between formal versus informal peer-feedback. We will review the importance of peer-feedback and discuss why it is valuable. Participants will be introduced to the best practices on how to give, use, and receive effective peer-feedback in various settings (lecture, lab, large-group, small-group, etc). This session will include discussions on the limitations of peer-feedback and how to overcome these barriers. Participants will have an opportunity to practice providing useful peer-feedback after watching a mock presentation of a committee member interacting with a group of students. Lastly, the EAC committee will provide participants with a peer-feedback evaluation form that can be utilized across institutions and disciplines. The EAC committee hopes this session will provide participants with the knowledge, best-practices, and experience to engage in peer-feedback at their home institutions and maximize their teaching abilities.

We invite you to participate and share your past experiences with peer-feedback. We hope you will join us over lunch during our committee meeting. For those interested in getting more involved, during the lunch meeting on Wednesday, July 12th we will be electing a new member to the Educational Affairs Committee. Looking forward to seeing you!

EAC Meeting Minutes:

https://docs.google.com/document/d/1HNjcr7OOF2oNF07zazPu7t0aEY0Rig5C/edit

EAC Members:

Presidential Appointees 2018-2024:
2020-2023: Dolgor Baatar (Dolgor.X.Baatar@kp.org)
2021-2024: David Brzezinski (dbrzezin@med.umich.edu)
2022-2025: Jon Jackson (jjackson@burrell.edu)

Members-at-Large Elected at Annual SIG Meeting of Committee:
2020-2023: Haley Nation, Chair (Nation@uthscsa.edu)
2021-2024: Kathy Pappas (kpappas2@springfieldcollege.edu)
2022-2025: Eiman Meguid (E.Abdel-Meguid@qub.ac.uk)

Journal Committee Report

Committee Members: Robert Spinner, Marios Loukas, Anthony D'Antoni, Tom Gest, Andy Maldonado (Wiley editor), Phil Adds (ex officio; Editor BACA), Shane Tubbs (Editor-in-Chief), and Kazzara Raeburn (Presidential Appointee).

The Journal has continued to thrive this year with the most submissions in our history. The Journal is publishing very high quality articles from prestigious institutions from around the world. Our articles continue to have large numbers of downloads and citations. Please consider submitting your best work to the Journal and continue to follow us online, in print, or on your mobile device with the *Clinical Anatomy* app for Android or iPhone users.

continued on next page

Listserv Report

AACA's Education Issues Listserv was moved from the mail server at Einstein to being hosted on Google Groups in February of 2016. There are currently 1,129 subscribers to AACA's Listserv. From May 1, 2022 to May 1, 2023 there were 30 subjects posted. To the right of this report is a table of those posts that received the most responses.

AACA Education List

Total Subscribers (as of 5/1/23) = 1129

Activity 5/1/22 - 4/5/23 =

May 2022 – May 2023 Monthly Email Activity

May '22 = 1
June '22 = 0
July '22 = 1
August '22 = 5
September '22 = 3
October '22 = 3
November '22 = 3
December '22 = 0
January '23 = 2
February '23 = 0
March '23 = 5
April 1, '23 = 2
May 1, '23 = 5

Total Emails = 30
Total Replies = 13

Most Commented upon Threads

Advice for Photogrammetry/3D Printing and Lighting for Plastinated Specimens April 2023 – (5)
Key Card Inquiry August 2022 – (2)
Use of Donors for Research Form May 2023 – (2)

Membership Committee Report

President-Elect – R. Shane Tubbs

Past President – Robert J. Spinner

(2021 – 2023) Presidential Appointee – Skyler Jenkins

(2022 – 2024) Presidential Appointee – Dolgor Baatar

The membership committee is pleased to state that 214 new members have joined the AACA from April 2, 2022, to May 11, 2023. The total number of active members in the association is 475.

AFFILIATE

Erin Fillmore
Vivek Perumal

ASSOCIATE PRINT COPY

Schuyler Connell
Luke Urbanik

ASSOCIATE POST-DOC ELECTRONIC

Tatum Jackson
Punnose Kattil
Peter Musil

ASSOCIATE ELECTRONIC

Hasan Al Ali
Luis Alvarez
Marwin Anandrati
Luke Arsenault
Sanam Ashrafzadeh
Drew Baeza
Megan Balle
Emily Bernstein
Oheneba Boadum
Drew Campbell
Sami L Case
Robert Cesario
Ginger Chant
Evgeny Chirshev
Brigitte Cochran
T'Kayhlia Cornish
Emma Dwenger
Soroush Farsi
Michael Fei
Drew Fidler
Conner Fox
Missy Gandarilla
Snehal Garg
Anna Garvey
Joseph Gonsiorowski
Mohnish Govardhan
Maya Greenquist
Kiana Hafferty
Christyn Harkins
Delaney Hirst
Melissa Huddleston
Hannah Jackson
Natalie Jameson
Gilberto Kistner
Jonathan Lall
Nikita Lee
Ashley Lesser
Caitlin Lowry
sarah lu
Vicky Lu
Shawn Magrum
Said Maldonado
Halle Mallard
Morgan McBride

continued on next page

Joshua McCluskey
Conor McGrew
Sara Meawad
Salima Meskine
Natalija Miller
Caleb Moffett
Jessica Nguyen
Uyentam Nguyen
Jillian Niceley
Alexander Olden
Angelina Oliveti
Taylor Orchard
Elizabeth Parent
Dhvani Patel
Gregory Perrier II
Piratheep Rajan
Tyler Redway
Colleen Reed
Marissa Remedi
Veronica Rose
Kia Sanders
Reem Sarsour
Madeleine Schwab
Phil Sheridan
Harrison Smith
Anupama Somaratna
Francis St-Onge
Tamara Stojilkovic
Michelle Tan
Alfredo Torres Rodriguez
Andrew Tran
Tamryn Van Der Horn
Kathryn Veazey
Hieu Vo
Austine Wang
Michael Yip
McKenzie Young
Jiaojia Yu
Betty Zhang
Scott Zimmerle

REGULAR ELECTRONIC

Noor Akhter
Aylin Aktar
Majid Alimohammadi
Mohd (Mohammed) Allouh
Peter Amua-Quarshie
Denise Arrick
Alla Barry
Colin Barth
Elena Bozhikova
Ana Burgaya
Meadow Campbell
Jose Candelario
Arada Chaiyamoon
Shweta Chaudhary
Shahrukh Chaudhry
Stacy Chelf
PRABHJOT Kaur CHHABRA
Anna Cyrus-Murden
Mitesh Dave
Nelson Davis
Shiv Dhiman
Majid Doroudi
Sanyukta Dudhat
Austin Epstein
Adegbenro Fakoya
Martin Forde
Deon Forrester
Vaughna Galvin
Keyla GarcÃa-Crescioni
Robert Grant
Subhash Gujar
Antima Gupta
Shireen Hafez
Robert Hage
Heather Hargreaves
Shayne Hassler
Benjamin Hawfield
Tiffany Huitt
Saravanan Jagadeesan
Shilpi Jain
Mayankkumar Javia
Helen Kaiser
shifan khanday
Satyam Khare
Pil-Woo Kim
Robert Kirkby
Zachary Klukkert
Dinesh Kumar
Gail Kunath-Tiburzi
Krista Kutina
Theresa Larkin
Christina Lewis
Megan Lewis
Joanna Loukas
Adel Maklad
Farida Mehrhoff
Ritubhi Mehta
Starla Meighan
Yasmeen Mezil
Paul Miller
Vanessa Molina
Shumpei Mori
Cassandra Movinsky
Tushar VimalbhaiI Nayak
Paul Neumann
Richard Okimoto
Alexis Ortiz
Juan Jose Osorio Cardona
Joshua Owolabi
Sunilkumar Girishbhai Oza
Rajni Patel
Jeffrey Pearl
Bernadette Perchalski
George Prada III
Sandra Prantl
Anjulata Rai
Francisco Reina
Fawwaz Safi
Sumathilatha Sakthi Velavan
Sandeep saluja
Yuvedha Senthil Velan
Jake Shearer
Dr Devendra Shekhawat
Deepshikha Singh
Sara Sloan
Kuldeep Suthar
Athikhun Suwannakhan
Mohsin Syed
Mehul Tandel
Sarah Tilden
Robert Trigg
Alok Tripathi
Jordyn Troop
Bhadreshkumar Prafulbhai Vaghela
Tricia VanKirk
Ivan Varga
Ali Walji
Ronald Wilde
Shanado Williams
Karen Wines
Swati Yadav
Melissa Zolnierz

REGULAR – PRINT

Jamila Bouyahyaoui
William Burns
Amanda Cobb
Mette Coleman, Dr.
Nicole Crowe
Jodie Foster
Abigail Fredrickson
Michael Ibiwoye
Shrish Patil
Jailenne QuiÃ±ones-Rodriguez
Panida Webb

REGULAR (ANATOMICAL SERVICES) – ELECTRONIC

Kadesha Ferguson
Jason Jones
Geraldine Lin
Juanette McKenzie-Johnson
Linden Pederson

REGULAR (ANATOMICAL SERVICES) – PRINT

Sarah Garnaat
Whitney Osborn

continued on next page

Meeting Organization & Program Planning (MOPP) Committee Report

Members:

Special Interest Committees

Anatomical Services Committee (ASC), Chair – Amanda Mittelstadt
Brand Promotion and Outreach Committee (BPOC) – Soo Kim
Career Development Committee (CDC), Chair – Amanda Troy
Clinical Anatomical Terminology Committee (CAT), Co-Chairs – Chelsea Lohman-Bonfiglio & Richard Tunstall
Educational Affairs Committee (EAC), Chair – Haley Nation

Meeting Managers (Formerly Known as Annual Meeting Committee Co-Chairs)

Sarah Keim-Janssen 2022-2023
Amberly Reynolds 2022-2023-2024
Brian MacPherson 2023-2024-2025

Local Hosts

Jennifer Mark, Jacqueline Flores-Otero, & Heather Hargreaves – 2023
Estomih Mtui & Anthony D'Antoni – 2024
R. Shane Tubbs & Joe Iwanaga – 2025

ASG Representatives (Contracted Professional Organization Management Company)

Jennifer Whitlow, Executive Director
Alexandra Waters, Program Coordinator
Rhonda Freeman, Meetings Specialist

Executive Committee

Thomas Gest, President
R. Shane Tubbs, President-Elect
Robert Spinner, Past President
Anthony D'Antoni, Treasurer
Sarah Greene, Association Secretary
Jennifer Burgoon, Program Secretary & MOPP Chair

Non-Voting Members

Diversity, Equity, and Inclusion (DEI) Special Interest Committee, Chair – Edgar Meyer
2023 Special Event (Ultrasound Course) Coordinator – Evan Goldman
2023 Special Event (Trivia Night) Coordinator – Peter Ward

This report is being filed on May 10, 2023. The information contained herein is the most accurate available as of this date. I am completing the second year of my 3-year term as Program Secretary, after serving a previous 3-year term as Program Secretary and a 2-year term as a Meeting Manager.

During the 2022-2023 year, the Meeting Organization and Program Planning (MOPP) Committee has been working diligently to bring you an in-person annual meeting at the Hilton Orlando Buena Vista Palace in Orlando, Florida from July 9-12, 2023. Planning began immediately following the 2022 Fort Worth Annual Meeting by a thorough review of the results of the post-conference survey. During the year, the MOPP Committee held Zoom meetings once a month. This year we welcomed the Chair of the Diversity, Equity, and Inclusion (DEI) Special Interest Committee (i.e., Edgar Meyer), as well as two 2023 Special Event Coordinators (i.e., Evan Goldman and Peter Ward) to the MOPP meetings to assist with conference planning and internal communication. Also on the calls monthly were the three local hosts for the 2023 Annual Meeting, specifically Jennifer Mark, Jacqueline Flores-Otero, and Heather Hargreaves from the University of Central Florida.

The 2023 AACA Annual Meeting and the program you are reading are the direct result of the tireless effort of the MOPP Committee and through the exceptional professional support of ASG. Special thanks to Jennifer Whitlow, Alexandra Waters, Rhonda Freeman, Sarah Keim-Janssen, Amberly Reynolds, and Brian MacPherson whose work behind the scenes on behalf of the MOPP Committee has made the 2023 AACA Annual Meeting possible.

This year's meeting is certainly an energizing experience and one that we hope all attendees will enjoy. We have brought back many positive aspects of the 2022 Annual Meeting. For example, the TechFair has returned with its valuable hands-on activities. Next, all member presentations (i.e., platform, Tech Fair, and poster) will still be available to conference attendees in the virtual setting (i.e., Planstone), a great benefit to those judging posters and a perfect way to preserve the exceptional work of our members. Again, attendees will be able to provide feedback for all these presentations via Planstone. It is our hope that this will again offer a virtual forum for collegiality that will also be experienced once again at the in-person portion of the 2023 Annual Meeting.

Also, back again from the 2022 Annual Meeting is the wildly successful Trivia Night. A special thanks to Peter Ward for his work developing questions, planning the layout, and hosting the past few years. This year's Trivia Night is again being developed and run by a team led by Peter Ward. Members of this team include Sarah Keim-Janssen, Bobbi Morgan, and Rebecca Pratt. A special thanks to all individuals involved.

continued on next page

Added at the start of this year's annual meeting is an ultrasound course. This course will provide an opportunity for first time users to learn the basics and for seasoned users to share their knowledge. Although there was a separate registration cost associated with the course, the registration cost for the course was strategically kept low to encourage enrollment. Special thanks to all those involved in the organization of the course, especially Evan Goldman who proposed and chaired the event, along with Jennifer Mark, Jacqueline Flores-Otero, and Heather Hargreaves of the University of Central Florida. A special thanks also to other faculty, staff, and students at the University of Central Florida involved in making this event a memorable activity.

Finally, realizing the importance of the committees in the functioning of the AACA, we have added an "AACA Parade of Committees" to the schedule for the 2023 Annual Conference. This will provide a quick opportunity for each committee to give an overview of their current members, their work throughout the year, and their activities planned for the annual meeting. We believe this will be an important overview for all AACA members, especially those new to our annual meeting.

Preliminary Planning for Future AACA Meetings

One of my goals for the MOPP Committee is to have in place early the future AACA Annual Conferences. Thus far, we have been able to plan the following:

- 2024 Annual Meeting of the AACA to be held at Weill Cornell Medicine in New York, New York June 17-21, 2024, and hosted by Estomih Mtui and Anthony D'Antoni.
- 2025 Annual Meeting of the AACA to be held at the Hyatt Regency Bellevue in Seattle (Bellevue), Washington June 16 – 19, 2025 and hosted by R. Shane Tubbs and Joe Iwanaga.
- 2026 Annual Meeting of the AACA to be held virtually. No host(s) have been identified.

If you are interested in hosting a regional and/or annual meeting, please contact the ASG office via email (aaca@clinical-anatomy.org).

Abstract Submissions

Each year, the MOPP Committee reviews all its documents, including the Abstract Submission Guidelines, in an effort to improve clarity. This year we also held a Clinical Anatomy Round Table (CART) Session in January 2023 to overview the conference and discuss abstract guidelines. The AACA works to accept completed, original, previously unpublished work that has IACUC and IRB approval, if applicable.

The table below shows the recent trends regarding abstracts, attendance, and presentations at our conferences:

Meeting Stats	2023 Orlando	2022 Fort Worth	2021 Virtual	2020 Virtual	2019 Tulsa	2018 Atlanta	2017 Minneapolis	2016 Oakland
Initial Abstract Subs	96	97	78	141	97	147	135	195
Returned for Format	1	32	0	15	16	13	10	32
Late-Breaking Subs	35	15	18	15	11	15	10	4
Total Rejections	6	7	9	6	3	2	1	23
Registrants	145*	282	338	437	290	350	345	350
Platform Presentations	17	17	12	27	20	24	16	18
Tech Fair Presentations	5	7	0**	0**	0**	7	7	5
Publishable Posters	63	65	51	104	63	98	97	115
Non-Publishable Posters	40	5	17	19	11	29	22	26

*Registration for the 2023 AACA Annual Scientific Conference is ongoing, and this number is as of May 10, 2023.

**No Tech Fairs were held during the 2019-2021 AACA Meeting as not enough abstracts were submitted to necessitate the session. Additionally, virtual meetings do not provide the hands-on opportunities the in-person meetings achieve, which are needed for this event to be successful.

In closing, please let the MOPP committee know of any improvements we can make to the conference through emailing those listed above and/or completing the post-conference survey. As always, we are striving to provide you with the best conference possible.

Respectfully Submitted on Behalf of the MOPP Committee,

Jennifer M. Burgoon, PhD
AACA Program Secretary
MOPP Chair

continued on next page

Nominating Committee Report

The Nominating Committee consists of presidential appointees Jonathan Wisco (Chair) and Kimberly Topp, and elected members-at-large Edgar Meyer, Samir Anadkat, Rebecca Pratt. On October 31, 2022, the Committee met for the first time on a conference call; the main aim of the discussion was to identify a diverse group of candidates from active members of AACA. Over the subsequent three months, the committee deliberated over the candidates' qualifications and contributions to our association, then determined finalists to contact for interest in nominations. After receiving confirmation, a slate of candidates was sent to Sarah Greene, the Association Secretary. Each candidate was directed to send a copy of their CV and candidacy statement to the committee and to the association in care of Caitlin Hyatt, the Executive Director.

Bylaws Committee Report

Kazzara Raeburn, Chair

Mathangi Gilkes

Rachael George

Kathleen Bubb

Ameed Raoof

Adam Kolatorowicz

The Bylaws Committee makes recommendations to the Council on amendments to the Bylaws. The committee held several videoconference meetings. It submitted its version of AACA Bylaws revisions to the council. The proposed amendments were undertaken to better align the bylaws with both actual and best practices, as well as to reflect important changes that have occurred in our AACA organizational structure.

Proposed Bylaws changes:

Article I, Section 2:

Addition of a diversity statement:

Article VIII:

Updates to labelling of sections: Removal of subsections and additions of sections 9 to 15.

Section 8: Financial Affairs Committee - Update to add the period of membership for the members and chair of the Financial Affairs Committee.

Section 13: Special Interest Committees – Addition of the process to become a special interest committee. Addition of Subsection A: Process for a Special Interest Committee to become a Standing Committee

In addition to the proposed amendments, we continue to review the Bylaws posted on the AACA website. If you are interested in serving and want to learn more about how our association works then please attend the annual business meeting, where you will be able to meet and interact with our committee members.

Abstracts – Platform Presentations

*** Tentatively Accepted for Electronic Publication in *Clinical Anatomy***

PLATFORM SESSION 1 (HEAD, NECK, & BACK) – TUESDAY, JULY 11 FROM 9:15AM-10:30AM

Abstracts listed in order of presentation time.

Tuesday, July 11 at 9:15 AM

*CAMPISI, Emma S.[1], John TRAN[2,3], Denise M. J. ARNOLD[1], Anne M.R. AGUR[1] and Eldon LOH[2, 3]. [1]Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, M5S 1A8, Canada; [2]Department of Physical Medicine and Rehabilitation, Western University, London, ON, N6C 5J1, Canada; [3]Parkwood Institute Research, Lawson Health Research Institute, London, ON, N6C 0A7, Canada.

3D Assessment of Optimal Cranial-to-Caudal Needle Angles for Lumbar Medial Branch Denervation.

INTRODUCTION. In 2018, over 700,000 patients in the United States had fluoroscopy-guided lumbar medial branch (LMB) denervation to treat chronic axial low back pain. Clinical outcomes are dependent on accurate needle placement; however, controversy exists regarding the optimal needle angles required to denervate the LMB. The objective was to determine the optimal cranial-to-caudal needle angulation to target the L3-L5 LMBs in the lateral view, as used in fluoroscopy-guided procedures. METHODS. The posterior rami and their branches were digitized in 8 embalmed specimens (mean age= 83.0±10.9). 3D models were constructed, and virtual needles placed parallel to LMBs of L3-L5 using Blender3D. Rendered images were then imported into ImageJ and the cranial-to-caudal angulation of the needle was quantified for vertebral levels L3-L5. Descriptive statistics were generated for each level and significant differences ($p<0.05$) identified using the Krustal-Wallis and Dunn post-hoc test. SUMMARY. The LMB at each vertebral level required different cranial-to-caudal angulations of the needle to denervate the nerve. The mamilloaccessory notch between the accessory and mammillary processes provided a consistent landmark for needle placement. The L5 vertebral level required the greatest needle angulation (mean 62.9^{o}±5.0; 53.4-70.5^{o}) followed by L3 (mean 50.0^{o}±7.3; 37.8-61.3^{o}) and L4 (mean 43.5^{o}±7.6; 30.1-54.2^{o}). Significant differences were found between the needle angulation at L3 and L5 ($p=0.01$) and between L4 and L5 ($p<0.001$). CONCLUSIONS. The mean cranial-to-caudal needle angles to capture the LMB varied between vertebral levels. The results of this study can be used by spine pain interventionalists to more accurately guide needle placement. Further clinical investigations are required.

Tuesday, July 11 at 9:30 AM

*SARSOUR, Reem, Monica GUIRGUS, Maya MAALOUF, Parsa RIAZI ESFAHANI, and Sherif S HASSAN. Department of Medical Education, California University of Science and Medicine, School of Medicine (CUSM-SOM), Colton, CA, 92324, USA.

Diagnostic Accuracy of Artificial Intelligence in Vertebral Fractures: A Systematic Review.

INTRODUCTION. With the current surge of development of artificial intelligence (AI) systems, AI systems are becoming prevalently tested for their diagnostic ability of radiological imaging. The potential addition of AI in clinical settings may expedite imaging interpretation and support the radiological interpretation of resident doctors. Past reviews investigated the diagnostic accuracy of AI in hip and trauma fractures; however, its diagnostic accuracy for vertebral fractures have not been investigated yet. RESOURCES. A systematic review summarizing all studies that are currently available on the diagnostic accuracy of AI-assisted radiology for vertebral fractures. PubMed and Google Scholar were systematically searched for a variety of AI software to evaluate its specificity, sensitivity, and accuracy in assessing radiological imaging of vertebral fractures. The quality of included studies was determined with Methodologic Index for Nonrandomized Studies (MINORS). A hierarchical model was used to calculate pooled sensitivity and specificity. DESCRIPTION. Out of the 178 studies, 22 studies were selected for inclusion into the final analysis based on strict inclusion and exclusion criteria. The most prevalent used AI software to detect vertebral fractures included Deep Convolutional Network, ResNet 34, Recurrent Neural Network (RNN), Fast Reading Convolutional Neural Network, and AIDOC. The AI diagnostic sensitivity in detecting all types of vertebral fractures ranged from 54.9 to 91%, the diagnostic specificity ranged from 72 to 99% and the accuracy ranged from 75 to 92%. The pooled diagnostic accuracy of AI for thoracolumbar vertebral fractures is 91%. SIGNIFICANCE. The systematically reviewed studies reflect competency of AI models in correctly diagnosing thoracolumbar and cervical fractures. AI has strong potential in clinical practice for the detection and classification of vertebral fractures seen on MRI and CT scans which may improve automated and clinician-aided diagnostics.

continued on next page

Tuesday, July 11 at 9:45 AM

*CARDONA, Juan J.[1,2,3], Jeisson O. OSORIO[2], Veronica A. CARVAJAL[3], Arada CHAIYAMOON[1,4], Joe IWANAGA[1,5,6], Aaron S. DUMONT[1], and R. Shane TUBBS[1,6]. [1]Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [2]Department of Neurosurgery, Clínica San Rafael, Pereira, Risaralda, 660003, Colombia; [3]Department of Neurosurgery, Universidad ICESI-Fundación Valle del Lili, Cali, Valle del Cauca, 76001, Colombia; [4]Department of Anatomy, Faculty of Medicine, Khon Kaen University, Khon Kaen, 40002, Thailand; [5]Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, 113-8510, Japan; [6]Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 70112, USA.

Why Does Dural Venous Thrombosis so Often Involve the Transverse Sinus?

INTRODUCTION. The transverse sinus (TS) is often involved with pathology due to structural factors such as anatomical variations, tumors, etc. TS stenosis can cause idiopathic intracranial hypertension and pulsatile tinnitus. Other common pathologies include thrombosis of the TS although the reason for such a predilection of this thrombosis compared to other venous sinuses is not known. Therefore, this study aimed to better elucidate the anatomy along the groove for the TS. METHODS. Seventy dry skulls (140 sides) underwent detailed observations of the groove for the TS using gross investigation coupled with transillumination. The exact location, shape and other morphometric data of the groove were documented and measured. CT scans were performed on two samples which were thicker and notable internal osseous differences were seen by transillumination. Statistical analyses were performed between sides and utilizing fifteen specimens as controls. The controls were derived from the seventy skulls, which had no bony prominence, and the grooves were clearly visible on both sides. SUMMARY. A bony prominence and thus lack/discontinuity of the groove for the TS was identified on fifteen sides (10.7%), with this finding on left sides in 93.3%(p=0.0). A right dominant groove for the TS was found in 93.3% of sides (p=0.0). These bony prominences were most often located between the 2nd and 3rd thirds (60%) of the TS grove. The median thickness on the left and right sides was 6.1 ±SD 1.4 (IQR 5.0-8.1) and 5.5 ±SD 1.7 (IQR 3.5-6.9), respectively. The median left-right thickness difference was 1.3 ±SD 0.81 (IQR -1-1.6). The median left-right thickness difference of the controls was -0.3 ±SD 0.43 (IQR -0.8-0.0). CONCLUSIONS. We have identified a bony prominence in the TS groove that effaces the TS on the left. This finding could help explain the higher incidence of transverse sinus thrombosis, especially on left sides.

Tuesday, July 11 at 10:00 AM

*AYUB KHAN, Rafika Munawara, Asha RAO, Mayank SHARMA, and Tulika GUPTA. Department of Anatomy, Post Graduate Institute of Medical Education and Research, Chandigarh, CH, 160012, India.

Globus Pallidus Internus as Effective Target for Reducing Post-Deep Brain Stimulation Depression.

INTRODUCTION. Deep Brain Stimulation (DBS) of the Subthalamic nucleus (STN) or Globus Pallidus Internus (GPi) is a standard treatment for Parkinson's disease (PD), with both regions exhibiting similar treatment effectiveness. However, there are post-treatment neuropsychiatric side effects such as severe depression, and disturbance in verbal fluency and frontal lobe functions. Loss of serotonergic cells is the primary cause of severe depression. Identification of a region with lesser number of serotonergic neurons would enable reducing these side effects. This study aimed to quantify the number of serotonergic neurons and semi-quantify (H-score) the serotonin levels in the STN and GPi. METHODS. These two regions were studied histologically (Hematoxylin and Eosin stain) in 15 human brain specimens. Serotonergic neurons were identified immunohistochemically using tryptophan hydroxylase 2 antibody (1:25, NB100-74555). SUMMARY. GPi had a significantly lesser number of serotonergic neurons than STN. In STN, variability in the number of Serotonergic neurons and in the H-score was observed more in the cells in the medial half of the nucleus, than in the lateral half. Three types of neurons were observed. Large and small serotonergic neurons were present in STN, with large cells concentrated in the center and small cells in the periphery. This distribution was not observed in GPi; only small neurons were present. The majority of the cells had a fine granular pattern. In addition, the concentration of the serotonergic neurons is less in GPi. CONCLUSIONS. GPi could be a safer target region, for considerably lowering the incidence of post-DBS depression.

Tuesday, July 11 at 10:15 AM

*ABDEL MEGUID, E. Mohamed[1], Darwish NAGY[2], and Chris McKEE[1]. [1]Centre for Biomedical Sciences Education, Queen's University Belfast, BT9 7BL, UK. [2]Royal Victoria Hospital, Belfast, BT12 6BA, UK.

Zero-Profile Devices Versus Stand-Alone Cages in Anterior Cervical Discectomy and Fusion.

INTRODUCTION. Anterior cervical discectomy and fusion (ACDF) is widely accepted as the standard intervention for symptomatic cervical disc disease. This involves the removal of the native disc and replacement with an implant to increase disc height and stabilise the vertebral segment. Two implants are used routinely to treat these cases surgically; these are Zero-Profile devices (Zero-P) and Stand- Alone cages (S-A). The present study aimed to evaluate the radiological and biomechanical outcomes of Zero-P and S-A implants for both single and multi-level cervical disc disease. The results of this study will aid surgical decision making, specifically choice of implant. METHODS. A total of 420 patients were reviewed retrospectively over a five-year period (April 2015 – December 2021) in a single institution. Following the exclusion criteria, 233 cases were included and followed up beyond the time for bone fusion to occur. The Zero-P group consisted of 117 cases, with 116 in the S-A group. Radiographic assessment was implemented at the

continued on next page

pre-operative, day one post-operative, and follow-up stages. These included measurements of disc height, subsidence, segmental Cobb angle, and spondylolisthesis. SUMMARY. Patient characteristic features showed no significant difference between the two groups ($p<0.05$) with no difference in mean follow-up time ($p=0.146$). The Zero-P implant was superior in increasing and maintaining disc height post-operatively (5.20 ± 0.66mm) compared to the S-A cage (4.40 ± 0.95mm) ($p<0.001$). Zero-P was also more successful in restoring and maintaining cervical lordosis in comparison to the S-A group as it had a significantly smaller kyphosis incidence (0.85% vs 34.5%) at follow-up ($p<0.001$). CONCLUSIONS. This study shows a more advantageous outcome in the Zero-P group and advocates cautious endorsement for use of the Zero-P implant.

PLATFORM PRESENTATIONS SESSION 2 (EXTREMITIES) - TUESDAY, JULY 11 FROM 1:45PM-3:00PM

Abstracts listed in order of presentation time.

Tuesday, July 11 at 1:45 PM

*MCCUMBER, Travis, Ethan SNOW, Sophie GART, John HAO, and Baylor PRICE. Department of Genetics, Cell Biology, and Anatomy, College of Medicine, University of Nebraska Medical Center, Omaha, NE, 68198, USA.

Femoral Neck Geometry and Microstructure.

INTRODUCTION. Femoral angle of inclination (AOI) is the angle formed by the intersection of the long axis of the femoral neck and shaft. AOI impacts weight-bearing torque applied to the femoral neck. Femoral microstrain analysis and cortical and trabecular bone mapping estimates have been previously reported; however, the correlation of AOI and cortical and trabecular microstructure has yet to be described. This study used histomorphometry and micro-computed tomography (micro-CT) to expand the fields understanding of AOI and femoral neck microstructure. METHODS. The femoroacetabular joints of ethically obtained, male human cadaveric donors were visualized following muscular reflection and incision of capsular ligaments. An oscillating saw was used to section the proximal femur with approximately 20 cm of subtrochanteric femoral shaft retained. Following sectioning, a digital protractor was used to determine AOI. Six femurs were selected based upon their AOI measurements: two with 125^{o} AOI, two with 135^{o} AOI, and two with 145^{o} AOI, all $\pm$ 1^{o}. A rotary tool micro-blade was subsequently used to collect a disc-shaped, mid-femoral neck sample for histomorphometry and micro-CT analysis (SkyScan-1172 micro-CT system, Bruker Corporation). SUMMARY. Femoral neck regional cortical thickness was similar across the typical femoral AOI spectrum (125^{o} - 145^{o}). Femoral neck cortical area trended greater at the upper extreme of the typical femoral AOI spectrum. Femoral neck trabecular volume, number, and thickness trended greater and trabecular separation trended less at the extremes of the typical femoral AOI spectrum. CONCLUSIONS. This project examined the correlation of AOI on cortical and trabecular microstructure within the typical AOI spectrum. This data can be utilized to further study cortical and trabecular microstructure outside the typical AOI range and establish advanced diagnostic criteria for addressing the clinical impact of femoral geometry.

Tuesday, July 11 at 2:00 PM

*SNOW, Ethan L. and Matthew J. VILBURN. College of Medicine, University of Nebraska Medical Center, Omaha, NE, 68198, USA.

Gross, Magnetic Resonance, and Biomechanical Analyses of the Tensor Fasciae Suralis Muscle.

INTRODUCTION. The tensor fasciae suralis (TFS) is a non-typical muscle that develops from one of the hamstring muscles and attaches to the deep fascia of the posterior leg (i.e., crural fascia). By spanning the popliteal region, TFS can present as an unsuspected mass, impinge contiguous neurovasculature, complicate surgical access to posterior knee, and strain under typical use of the lower limb. Few reports of TFS contain gross, radiographic, and functional analyses. The objectives of the present study are to examine gross characteristics, present magnetic resonance imaging (MRI), evaluate biomechanical abilities, and discuss clinical implications of a TFS muscle. METHODS. A left unilateral TFS was discovered during routine human cadaver dissection. After initial discovery of its proximal segment, axial and sagittal T1- and T2- weighted MRI was performed to visualize the entire TFS and its relation to nearby structures. The entire TFS and contiguous anatomy were then dissected, carefully cleaned of extraneous fascia, and photographed in situ. Gross and microscopic architectural features of TFS were measured, and its maximal isometric force was calculated. SUMMARY. The 13.4 cm long, 5.02 g muscular belly of TFS branched 27.2^{o} from the long head of biceps femoris and inserted into the investing fascia of the gastrocnemius medial head via a prominent 2.6 cm x 4.8 mm x 0.5 mm tendon. Gross imaging and MRI showed TFS crossing over the common fibular, tibial, and medial sural nerves. Biomechanical analysis determined TFS to be capable of producing 8.10 N of force. CONCLUSIONS. The course of TFS offers notable clinical discussion about distal motor and sensory loss resulting from compression-based lesions of the underlying nerves. MRI, paired with full gross imaging and biomechanical analyses, provides a catalog of comparative information on TFS that may aide in differential diagnosis of an unsuspected mass in the popliteal region and guide subsequent treatment.

continued on next page

Abstracts - Platform Presentations continued

Tuesday, July 11 at 2:15 PM

*MCCLUSKEY, Joshua [1], Luke ARSENAULT[1], Alexander OLDEN[1,] and Brion BENNINGER[1,2]. [1]Medical Anatomy Center, Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. [2]Faculty General Surgery, Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.

POCUS, MRI, Contrast CT with Surgical Dissection of UCL on Novel vs. Traditional Cadavers.

INTRODUCTION. The elbow joint lies between the shoulder and wrist integrating the fine-tuning machinery the hand exhibits and provides anchoring and leverage for the heavy work, allowing the shoulder girdle to complete the ingenious upper limb. The dominant stabilizing ligament in the elbow is the ulnar collateral ligament (UCL) consisting of 3 sections, which the anterior band is under the greatest tension and most commonly injured. Chronic repetitive microtrauma may lead to injury or rupture of the UCL. It would be useful to identify injuries to modify upper limb activity before complete rupture occurs. The study objective was to identify and palpate surface anatomy landmarks of the UCL, conduct POCUS image acquisition, perform a palmaris longus tendon (PLT) transfer during dissection of GAX prepared cross-sectional imaged specimens vs traditional embalmed cadavers (TEC). METHODS. Literature search revealed no known cadaver studies regarding first and second year medical students learning elbow surface anatomy landmarks performing ultrasound image acquisition and subsequently dissecting the elbow UCL with PLT harvest during anatomy lab courses. Novel GAX-specimens (6 bodies, n=12 elbows, M:4, F:2) and TEC (15 bodies, n=30 elbows, M:9, F:6) were scanned with MRI, contrast CT and handheld GE Vscan Air probes, followed by open dissection. SUMMARY. POCUS ultrasound identified UCL on all elbows with the TEC elbows having a broader range of poor image quality and image acquisition. The 12 GAX elbows had superior quality image acquisition versus the 30 TEC elbows. GAX dissections revealed lifelike dermis during elbow palpation and range of motion was impressive. UCL and associated muscle structures were realistic regarding texture, responsiveness to surgical tools, hydration, and appearance. The TEC elbows had a hardened waxy dermis, essentially no range of motion which made palpation very difficult, UCL and associated muscle structures were very firm and less compliant, decreased responsiveness to surgical tools, dehydrated and dull in color. CONCLUSIONS. Based on the two types of cadaver mediums, GAX-specimens demonstrated life-like palpation, identification and superior surgical dissection of UCL with PLT harvest suggesting a fertile training medium integrating ultrasound, MRI, and CT with dissection.

Tuesday, July 11 at 2:30 PM

*FOGG, Quentin A. Department of Anatomy and Physiology, The University of Melbourne, Melbourne, Victoria, 3010, Australia.
A Combination of Bone and Soft Tissue Features Accurately Determine Scaphoid Functional Typing.

INTRODUCTION. The scaphoid continues to maintain an enigmatic place in the wrist; it is widely accepted to be a critical mobile feature of wrist kinematics, but there is no consensus on how it contributes. Much of this uncertainty stems from a limited and inconsistent understanding of scaphoid anatomy and that of related structures, and how this may be related to two distinct functional wrist types. Scaphoid, and other carpal, typing studies tend to look only at the bone or only at the soft tissue, and are yet to combine interpretation of both in a single, comprehensive investigation. This study aims to unify a variety of previously isolated concepts into an evidence-based description of clinically relevant scaphoid anatomy. METHODS. Body Donor wrists (14 embalmed, 8 unembalmed) were dissected and analysed in conjunction with 30 isolated scaphoids (20 dry, 10 wet). CT data was available for 20 of the dissected wrists. Segmented scan models were combined with microscribe-derived 3D models to map scaphoid shape and soft tissue attachments. Bone and soft tissue features were typed in accordance with previously published criteria. SUMMARY. These data support previous studies with the separation of scaphoids into two distinct subtypes. Bone only analysis of the whole sample population identified 15 (36%) with features previously termed type 1, 12 (26%) with type 2 and 16 (38%) that were inconclusive. The inconclusive dissected specimens (n= 7; 32% dissections) were clearly separated into those with type 1 ligament attachments (3; 14%) and those with type 2 ligaments (4; 18%). CONCLUSIONS. These data present, for the first time, a consistent model of scaphoid typing that includes bone and soft tissue data for the same wrists. This will inform, with more clarity, the development and application of distinct management pathways for clinical disorders of intercarpal motion, including type-specific surgery.

Tuesday, July 11 at 2:45 PM

*HAFFERTY, Kiana[1], Walker SHIBLEY-STYER[1], Dennis NGUYEN[1], and Brion BENNINGER[1,2]. [1]Medical Anatomy Center, Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. [2]Faculty General Surgery, Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.
Reassessing Distal Semimembranosus Tendon from Novel CT, MRI imaged vs. Traditional Cadavers.

INTRODUCTION. Comprehensive distal semimembranosus tendon (DST) attachment is generally not fully taught, dissected and/or discussed regarding its clinical value and orientation with other medial knee structures during healthcare anatomy courses. The medial aspect of the knee joint has critical structures providing stability and buttressing. Part of the DST attachment is often mistaken for a ligament and its importance in knee stability continues to increase and training healthcare providers should be exposed to its comprehensive anatomy. It can be injured and is a sourse of pain. It may have greater stability importance and missed diagnosis then we currently understand. The objective is to dissect the DST attachments and reveal the orientation to other anteromedial knee structures from novel GAX-specimens with MRI and contrast CT imaging versus traditional embalmed cadavers (TEC). METHODS.

continued on next page

Literature search was conducted regarding DST GAX-specimen studies. Novel GAX-specimens (n=6, 12 sides) with innovative contrast CT and MRI imaging were dissected. TEC (n=15, 26 sides) with knee replacement exclusion criteria were dissected. All dissections had soft tissue distal reflecting techniques and osteotomies. SUMMARY. Literature search revealed no known studies. GAX-specimens enabled the knee joint to be mobile for positional dissection unlike TEC. It also allowed movement observation of the DST post dissection during joint movements. Contrast CT and MRI revealed detailed vessels and associated soft tissue structures. Gax-specimen tissues were notably more compliant and lifelike vs TEC. DST layering dissections revealed a siginicant anteromedial arm deep to medial retinaculum, pes anserinus and its bursa and medial (tibial) collateral ligament. CONCLUSIONS. This study demonstrated GAX-specimen tissues are lifelike and provide full range of motion revealing an impressive anteromedial arm of the DST not routinely dissected during healthcare anatomy lab courses which could improve physical examination accumen and imaging anatomy.

PLATFORM PRESENTATIONS SESSION 3 (EDUCATION) - TUESDAY, JULY 11 FROM 4:30PM-6:00PM

Abstracts listed in order of presentation time.

Tuesday, July 11 at 4:30 PM

*ORCHARD, Taylor J.[1], Jason PEELER[2], Steve MANNS[3], and Jaime C. YU[4]. [1]Department of Human Anatomy and Cell Sciences, University of Manitoba, Winnipeg, MB, R3E 0J9, Canada; [2]Max Rady College of Medicine, University of Manitoba, Winnipeg, MB, R3E 3P5, Canada; [3]Department of Surgery, Division of Orthopaedics, Queen's University, Kingston, ON, K7L 2V7, Canada; [4]Department of Medicine, Division of Physical Medicine and Rehabilitation, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, AB, T6G 2R7, Canada.

Musculoskeletal Anatomy Education – A Survey of Canadian Medical Programs.

INTRODUCTION. Musculoskeletal (MSK) injuries/diseases are among the most frequent reasons a patient visits a physician. Despite this, previous research suggests that MSK anatomy education in medical schools may be inadequate. The purpose of this study was to evaluate the current state of MSK anatomy education among Canadian medical programs. METHODS. A 12-question MSK anatomy survey was sent to all English-speaking AFMC-accredited allopathic medical programs in Canada. SUMMARY. The survey had a 100% response rate. Results indicated the mean time spent learning preclinical MSK anatomy was 30.2 hours (±14.2, range 12 – 60) with 57% of programs integrating MSK anatomy teaching into clinical learning. Thirteen of the programs utilized cadaveric-based instruction, with 40% using both dissection and prosection. Various anatomy teaching and learning activities were used by all programs - didactic lectures (93%) were the most common mode of delivery. Summative and formative methods of evaluation were used by all programs, with in-course practice questions (64% - formative) and end-of-course written examinations (71% - summative) being most popular. Eleven of the programs included surface anatomy teaching, and radiological correlates were taught by 13 of the programs. Nearly 80% involved physicians in MSK anatomy teaching, but their specific teaching duties varied widely. A variety of learning resources were used to assist student learning - a standardized lecture notes package was most common (92%). CONCLUSIONS. These results for Canadian medical programs are consistent with data recently published in the United States, and confirm that MSK anatomy education varies greatly across accredited medical programs. Future research should be directed at establishing consistent accreditation standards for MSK anatomy education in allopathic medical programs, and examining the effect on post-graduate physician MSK anatomy knowledge and confidence.

Tuesday, July 11 at 4:45 PM

*KATTIL, Punnose K.[1], Helga N. OLSON[2], Nirusha LACHMAN[1], Sebastian COTOFANA[1] and Wojciech PAWLINA[1]. [1] Department of Clinical Anatomy, Mayo Clinic, Rochester, MN, 55905, USA; [2] Division of Surgical Services, Mayo Clinic School of Health Sciences, Mayo Clinic, Rochester, MN, 55905, USA.

Cadaveric Image-Based Oral Examinations for Reassessment: A Pathway for Success.

INTRODUCTION. Attaining competency in a first-year anatomy course may require a second attempt at taking the examination. For a prosection-based course with limited access to cadaver labs, finding creative yet educationally sound assessment strategies are challenging. In a clinical anatomy course for surgical first assistants knowledge competency was assessed using multiple choice based "written" and image-based practical examinations. Students who were unable to meet the grade requirement were offered a second attempt image based oral exam that integrated critical thinking, structure identification and relational concept driven understanding of surgically oriented anatomy. The exam was conducted by a faculty panel over a recorded zoom platform. Students had access to a bank of images that could be included in the exam and additional tutoring support. A rubric to evaluate students' performance on (1) structure identification, (2) spatial relationships and (3) applied surgical anatomy was used to determine the final grade. The purpose of this study was to assess the effectiveness of this examination approach in helping students attain minimum required

continued on next page

competency. METHODS. Cohort of students who underwent remediation were invited to take part in structured interviews utilizing pre-designed questions. Qualitative approach based on grounded theory was used in analyzing student responses. SUMMARY. Three major themes that emerged from the study related to study strategy, conceptual skill and spatial orientation. Additionally students determined that the process of preparing for and taking the second attempt examination engaged them in deep learning approaches. CONCLUSIONS. Structured cadaveric image-based examinations offer an effective tool for assessment of core competency in short year 1 anatomy courses.

Tuesday, July 11 at 5:00 PM

*AZIM, Homaira M. Department of Biomedical Education and Data Science, Lewis Katz School of Medicine, Temple University, Philadelphia, PA, 19140, USA.

Can Empathy Help Medical Students Reflect Deeper on the Details of Body Donation and Dissection?

INTRODUCTION. Empathy is the awareness of feelings of others by imagining yourself in their shoes. In this study, medical students were asked whether they would like to donate their own body - or see a loved one's body donated - to anatomical dissection. The goal was to facilitate deeper reflection on the processes of body donation and human dissection from an empathetic standpoint. METHODS. Twenty semi-structured interviews and four focus group sessions were conducted with a total of 44 students from all four years of undergraduate medical education at one medical school in United States. Sessions were audio-recorded and transcribed verbatim. Qualitative thematic analysis was performed on textual data by developing an inductive coding scheme. SUMMARY. Student responses fell into three main categories: yes, no, and undecided. Major reasons for responding as "yes" included: a) no religious restrictions, b) seeing the value of human dissection, and c) providing an alternative approach to regular burial practices known to be harmful to the environment. Major reasons for responding as "no" included: a) witnessing the inherent gruesomeness in the act of human dissection in lab, b) the need for more respectful handling of the bodies on the part of the students, faculty, and institutions, c) religious restrictions, and d) consideration of family members' feelings. Major reasons for responding as "undecided" included: a) seeing the importance and necessity of the act but being uncertain of accepting it done to one's own or a loved one's body, b) family considerations. CONCLUSIONS. Anatomy lab provides medical students with an impactful introduction to dealing with the death and dissection in a professional context. Deep reflections on the experience of working with cadavers, especially when done from an empathetic standpoint, can serve as a critical step toward a more empathetic, ethical, and humane professional identity formation in medical students.

Tuesday, July 11 at 5:15 PM

*TAN, Michelle Y.[1], Charity L. THOMANN[2,5], Frank SCALI[5], Sarah LU[1], and Sherif S. HASSAN[4,5]. [1]School of Medicine, California University of Science and Medicine, Colton, CA, 92324, USA; [2]School of Psychology, Fielding Graduate University, Santa Barbara, CA, 93105, USA; [4]Department of Anatomy, Faculty of Medicine, Cairo University, Cairo, Egypt; [5]Department of Medical Education, California University of Science and Medicine, Colton, CA, 92324, USA.

Medical Student Engagement, Self-Efficacy and Neurophobia in a Blended Neuroanatomy Course.

INTRODUCTION. Neuroanatomy is an intimidating topic for medical students. This pilot study aimed to investigate how a continued, post-COVID, blended learning environment would influence relationships between indicators of neurophobia, anatomical self-efficacy, and course engagement. METHODS. Students at a newer medical school were invited to complete a survey after completing their neuroanatomy course investigating indicators of neurophobia, anatomical self-efficacy, and course engagement. Pearson and Spearman rho correlations were completed to determine relationships between variables. SUMMARY. In the blended learning environment, increased engagement was related to increased self-efficacy ($r = .79$, $p < .001$). The perceived difficulty of neuroanatomical topics was not related to engagement or self-efficacy. However, engagement was related to neuroanatomy's reputation as being a complex subject ($r^s = .49$, $p = .011$). Interest in neurology as a specialty was related to engagement ($r^s = .40$, $p = .041$) and self-efficacy ($r^s = .44$, $p = .028$). Endorsement of time spent in virtual learning as an important factor that made neuroanatomy difficult was not related to engagement ($r^s = .18$, $p = .37$), self-efficacy ($r^s = -.01$, $p = .946$), or interest in neuroanatomy as a specialty ($r^s = .14$, $p = .51$). Students with higher engagement and self-efficacy rated PowerPoint slides ($r^s = .55$, $p = .004$; $r^s = .54$, $p = .004$), tutorials ($r^s = .40$, $p = .004$; $r^s = .50$, $p = .010$), and virtual lab videos ($r^s = .48$, $p = .012$; $r^s = .45$, $p = .022$) as useful learning strategies. CONCLUSIONS. Results are mixed, but emerging relationships suggest an interplay between self-efficacy, engagement, and interest in neurology as a specialty. Future studies should discuss how specific learning modalities affect medical student engagement and self-efficacy and predict learning outcomes.

continued on next page

Tuesday, July 11 at 5:30 PM

*PATEL, Dhvani, Donna JOHNSON, Crystal, R. LEMMONS, Claire NELSON, Aadhya SUBHASH, Raasil BAHSA, Shelby KUHNERT, and Alla G BARRY. Missouri Southern State University, Joplin, MO, 64801, USA.

The Role of Undergraduate Anatomical Education in Preparing Students for Clinical Programs.

INTRODUCTION. Anatomy has survived the test of time, remaining a key pillar of medical education. However, over the last two decades, the compression of anatomical course hours, the decline in dedicated cadaver dissection time, and the controversial shift toward virtual dissection have been reported. Moreover, evidence has shown a lack of adequate anatomical knowledge in physicians and medical students, which can be hazardous to patient safety. Surprisingly, there is still no requirement for anatomy as a prerequisite for medical or dental schools in the United States. Comprehensive anatomical-based and clinically-focused undergraduate premedical education can contribute to student success in reaching core pillars such as compassionate patient care, improved medical knowledge, and efficient communication skills, as outlined by the Accreditation Council for Graduate Medical Education. For the last ten years, MSSU has offered an Advanced Human Dissection (AHD) course, utilizing the "first patient" approach. The objective of the present study was to assess students' perception of the usefulness of cadaver-based anatomical education at the undergraduate level. METHODS. The Likert scale survey, evaluating the benefits of cadaver-focused learning, was administered to MSSU students who completed AHD and are currently attending medical or dental schools (n=36). Open-ended student responses were analyzed qualitatively. SUMMARY. All respondents rated the undergraduate human dissection laboratory as the most helpful tool in learning anatomy and reported confidence regarding their preparedness for clinical programs. CONCLUSIONS. The cadaveric study of anatomy in undergraduate programs provides an opportunity to utilize a multi-faceted approach by integrating gross anatomy, histology, and pathology, as well as the development of communication, teamwork, observational, and leadership skills, and thus should be considered as a prerequisite for medical education.

Tuesday, July 11 at 5:45 PM

*PETERSON, Joanne L.[1], Teressa BROWN[2], Alexis KENDRICK[2], and LaVona TRAYWICK[2]. [1]Arkansas College of Osteopathic Medicine, Arkansas Colleges of Health Education, Fort Smith, Arkansas, 72916. [2]School of Physical Therapy, Arkansas Colleges of Health Education, Fort Smith, Arkansas, 72916.

Teambuilding in Anatomy Lab: Examining the Impact Across Healthcare Professions.

INTRODUCTION. Benefits cited in literature of cadaver dissection include team building skills and group dynamics. This study focused on the development of teamwork skills in the gross anatomy lab and how it may differ among healthcare professions. METHODS. The participants were Osteopathic Medical (DO), Doctor of Physical Therapy (DPT), and Masters of Biomedical Science (MSB) students enrolled in anatomy coursework at a private healthcare institution. DO and DPT were placed in lab groups based on MCAT/GPA and a strengths assessment, respectively, for their cadaver dissection experience. MSB were placed in their lab groups by random assignment for their cadaver prosection experience. The research design included a pre/posttest of the TCI (Team Climate Inventory) with additional open-ended questions. The TCI utilizes a Likert scale, analyzed using SPSS. The open responses were coded, analyzed by the research team. SUMMARY. 15 DO, 35 DPT, and 5 MSB students (N=107) completed the pre/posttest TCI for paired data. The mean of the total scores for DO pretest 174.9 (SD 21.6), posttest 189.2 (SD 35.6), significant (p=0.033); DPT pretest 234.4 (SD 28.4), posttest 243.94 (SD 36.8), not significant (p=0.081); MSB pretest 177.4 (SD 40.1), posttest 185.0 (SD 34.3), not significant (p=0.357). Open-ended responses indicated DO largely had positive experiences with teambuilding and MSB generally lacked cohesion resulting in a negative experience. DPT identified varying group dynamics. CONCLUSIONS. Differences in student teambuilding may be associated with the cadaver dissection verses cadaver prosection experiences of DO and MSB; however, the intentional grouping of DPT did not result in overall improved team dynamics despite having a dissection experience. This study showed significant changes in team dynamic with grouping based on MCAT/GRE scores. Future research is needed looking at specific characteristics for intentional grouping compared to the dissection experience itself.

continued on next page

Abstracts – TechFair Presentations

*** Tentatively Accepted for Electronic Publication in *Clinical Anatomy***

TECHFAIR – MONDAY, JULY 10 FROM 4:30PM-6:00PM

Abstracts listed in order of presentation time.

Monday, July 10 at 4:30 PM

*KEIM, Sarah A.[1], Leonidas E. BANTIS[2], Max HARDENBROOK[3], Barth W. WRIGHT[1], and German BERBEL[1]. [1]Department of Surgery, University of Kansas Medical Center, Kansas City, KS, 66106, USA; [2]Department of Biostatistics and Data Science, University of Kansas Medical Center, Kansas City, KS, 66106, USA; [3]Department of Neurosurgery, University of Kansas Medical Center, Kansas City, KS, 66106, USA.

Using 3-D Printed Pathologies to Provide Direct Clinical Experiences in the Surgery Clerkship.

INTRODUCTION. The surgical clerkship has undergone revision of educational diagnostic and procedural targets to align with national benchmarks. However, the general surgery clerkship is more subspecialty based resulting in a higher proportion of students achieving the diagnostic and procedural targets primarily through alternative experiences rather than by direct experiences. This has led to concerns about meeting accreditation requirements for minimum standards. To address these issues, we developed an experiential learning session using soft-embalmed cadavers with 3-D printed pathologies placed within the cadaver. Students then have a direct simulated surgical experience to address these pathologies. This intervention was implemented during the 2022-23 academic year. Outcomes were compared to students who took the surgery clerkship during the 2021-22 academic year. This study had two aims: 1) to determine if students who complete the intervention performed as well, or better, on the NBME shelf exam and oral exam, and 2) to increase student numbers in meeting established thresholds on procedural targets by direct experiences. METHODS. We accessed an initial STL file online of an appendix and breast mass. These files were modified and then printed on a Stratasys J750 3-D printer. The pathologies were then placed in the soft-embalmed cadavers. The non-parametric two-sample Mann-Whitney test was used to compare continuous variables between the two cohorts. Chi-square test was used to compare categorical variables between the two cohorts. SUMMARY. There were no significant differences on shelf scores between the two cohorts. There was a significant difference between cohorts on oral exam scores (p= 0.002). The 2022-23 cohort has reached the threshold on diagnostic and procedural targets. CONCLUSIONS. Using 3-D printed pathologies allowed students a direct simulated surgical experience to reach diagnostic and procedural targets and was associated with increased oral exam scores.

Monday, July 10 at 4:35 PM

*KISTNER, Gilberto G. and Jailenne I. QUIÑONES-RODRIGUEZ. Department of Clinical Anatomy, Sam Houston State University, College of Osteopathic Medicine, Conroe, TX, 77304, USA.

An Innovative Three-Dimensional Model for Early Human Development.

INTRODUCTION. Embryology is a foundation of the anatomical sciences that allows scientists to comprehend gross anatomy, anatomical variations, and fetal defects. Despite its noticeable applicability to other basic sciences and clinical medicine, curricular hours dedicated to this discipline in medical education have been minimal. As a result of this as well its multidimensional nature, embryology is often perceived as one of the most complex subjects to learn and teach. However, recent literature addresses the adjunctive role that three-dimensional (3D) anatomical resources have in clinical anatomy education for medical students. This work aimed to advance the development of 3D models in-situ to encompass early stem-cell development. RESOURCES. We developed a series of physical models to demonstrate critical stages in early human development to medical students. DESCRIPTION. A series of physical scale models depicting a human ovum at fertilization and at several stages of zygote development through implantation. Accompanying these models is supplementary learning material defining the relevant cellular structures and the points in time each model represents. SIGNIFICANCE. Digital atlases have expanded the possibilities for educators in correlating *in situ* anatomy to radiologic imaging and disease pathologies. The COVID-19 pandemic inadvertently emphasized the adjuvant role of digital anatomical resources confidently influencing medical student learning experience. Although that is the case, no current resource exists to demonstrate early human development. The clinical significance may lead to implantation problems, fetal defects, and placental insufficiencies, resulting in early pregnancy loss. This work contributes a series of three-dimensional models to evolve embryology medical science education further.

Monday, July 10 at 4:40 PM

*MACPHERSON, Brian R.[1] and James G. TIEMAN[2]. [1]Department of Neuroscience, College of Medicine, University of Kentucky, Lexington, KY, 40536, USA; [2]BOLD Education, Antioch, TN, 37013, USA.

An Osteology Program for Dental Students That Strengthens Deeper Understanding and Integration.

INTRODUCTION. Effective learning of dental osteology requires more than simple memorization/recognition of bony landmarks. This learning program ensures that each osteological landmark has information related to its significance/function linked to it. RESOURCES. A series of 19 osteological modules – based on the regions of the skull, were developed using Storyline 360™ by

continued on next page

Articulate. Class A skulls were photographed from typical and unusual aspects and imported into Adobe Photoshop™. Each landmark was not only identified, but typically had two other anatomical facts linked to it. The project has two main objectives: teaching the information to be learned and testing the information learned. Both were integrated into the University Learning Management System (Canvas™) and the testing data was imported to the grade book through SCORM. DESCRIPTION. To design and create an osteology learning and testing program that can be utilized on all formats: PC, Mac, iPad, Android and iPhone platforms for use in any wi-fi-equipped location. SIGNIFICANCE. This learning and testing program ensures that dental students mastering the osteological landmarks of the skull integrate not only the identification of the landmark but anatomical relationships about it: what attaches here, what exits this foramen, what is the main action of the muscle attaching here. Student evaluations for its first year of use indicate an assigned usefulness value of 3.67 out of a potential 4.0 points.

Monday, July 10 at 4:45 PM

*SOMARATNA, Anupama, Daniel NGUYEN, Margaret ATKINSON, and Manuel CEVALLOS. Medical Education Department, School of Medicine, Creighton University, Phoenix, AZ, 85012, USA.

Microlearning: Impact on Medical Education Satisfaction and Anatomy Knowledge Retention.

INTRODUCTION. Microlearning is a powerful interactive tool that can engage students through short, focused content to address specific objectives. The high volume of anatomy content in medical school can overwhelm students; breaking the material into smaller pieces makes microlearning favorable vs. traditional education designs. This study aims to assess first-year medical students' (M1s) satisfaction and knowledge retention after using a microlearning tool. METHODS. 101 M1s were invited to use a microlearning platform, EdApp, that consisted of 11 HEENT and neuroanatomy modules. Modules were accessed electronically and completed voluntarily. Phase 1: After exposure to EdApp, all M1s were invited to complete a voluntary and anonymous satisfaction survey. Phase 2: Students were invited to complete an EdApp-content-based knowledge assessment to evaluate retention three weeks after the initial introduction to the modules. Statistical significance of scores was evaluated using p values. SUMMARY. 101 M1s were invited to EdApp and 59 students participated. Phase 1: 47% of EdApp users responded to the satisfaction survey. From the group that used EdApp, the average reported content and App satisfaction were 8.8±1.4 out of 10 and 8.6±1.7, respectively. 96% stated they would use EdApp again. Phase 2: Of the 101 M1s, 23 (10 app-users vs 13 non-app users) completed the knowledge assessment. Scores were 92% average score for App-users vs. 87% for non-app users. While the scores show high levels of knowledge and understanding, the difference was not significant (p=0.25). Limitations include a small sample size, voluntary basis for assessment, and EdApp's lack of integration into the official curriculum. CONCLUSIONS. This introductory study demonstrates high satisfaction with the microlearning tool and high scores in the long-term knowledge retention assessments. With the increasing affinity for screen device-friendly and diverse interactive learning methods among students, anatomy must evolve with the landscape of medical education. Future studies can be aimed at adjusting module content, integrating microlearning into the official curriculum, or comparing student end-of-semester grades. (IRB approved: Exempt under 45CFR46.104(d), Categories 1 and 2).

Monday, July 10 at 4:50 PM

*FEI, Michael K[1]., Sarah LU[2]., and Sherif S. HASSAN[3]. [1]School of Medicine, Creighton University School of Medicine, Phoenix, AZ, 85012, USA; [2]School of Medicine, California University of Science and Medicine, Colton, CA, 92324, USA; [3]Department of Medical Education, California University of Science and Medicine, Colton, CA, 92324, USA.

Using Regression Models with Convolution Neural Networks to Diagnose Knee Osteoarthritis Severity.

INTRODUCTION. Osteoarthritis (OA) of the knee is one of the most common disabling joint diseases, and early diagnosis is critical for a favorable prognosis. Convolution neural networks (CNN) is a form of deep learning AI that learns to evaluate images, through thousands of features present in the image. This has the perfect application for evaluating the severity of OA since there are minute differences between disease stages. This study investigates the efficacy of various CNN models in evaluating OA severity on a continuous and discrete scale. METHODS. An X-ray dataset from the Osteoarthritis Initiative with a 5778/826/1656 train/evaluation/test, respectively, images were used to train 3 different CNN models (EfficientNet, Vgg, and DenseNet) according to KL grading criteria (KL1-KL4). All models were modified to have a final global average pooling layer and a fully connected layer to the output node. The models graded each OA image with a decimal score(0-4) using a regression model; this number was rounded and evaluated against labeled scores. The model was created through Python Monai and PyTorch. Statistics were obtained through Python SciKit-learn libraries. SUMMARY. The accuracy rates from rounded scores of Efficientnet, Vgg, and DenseNet were 0.65, 0.56, and 0.60, respectively. Likewise, AUC scores were 0.786, 0.755, and 0.766; MAE scores were 0.394, 0.484, and 0.484. Across all models, precision and F1-score were lowest when evaluating KL1 images. The decimal scores of each KL grade were plotted for each model. The histogram displayed that only KL1 followed a uniform distribution ranging between 0 and 2. The other grades followed a unimodal distribution. CONCLUSIONS. The use of CNN models in diagnosing OA using the KL grading scale was fairly accurate, with Efficientnet having the strongest performance. The uniform distribution of final KL1 scores implies mild cases of OA are difficult to diagnose, due to its subjective criteria. Thus, a non-discrete scale for diagnosing OA could be developed to accommodate the dynamic, continuous progression of the disease. CNN is a viable diagnostic aid for the clinic to provide granular insights into OA disease progression, otherwise unnoticed by physicians. Future studies should continue to study the reliability of continuous CNN grading and the objectivity of the KL grade.

continued on next page

Abstracts – Poster Presentations

*** Tentatively Accepted for Electronic Publication in *Clinical Anatomy***
(Listed by presenting author last name)

POSTER SESSION 1 – MONDAY, JULY 10 FROM 3:15PM-4:15PM

Poster #58
*ALVAREZ, Luis A., William T. CORRIGAN, Caitlin MCGONEGAL, Jimmy LEON, Daniela AVILA, Seth GARDNER, and Oren ROSENTHAL. Department of Anatomy, Lake Erie College of Osteopathic Medicine Bradenton, FL, 34202, USA.
The Clinical Manifestations of Hyperostosis Frontalis Interna: A Systematic Review of Cases.

INTRODUCTION. Hyperostosis frontalis interna (HFI) is a condition defined as abnormal bone growth on the posterior aspect of the frontal bone. Despite uncertainties regarding its etiology and prognosis, clinicians typically consider HFI a benign pathology. There are no studies organizing all the possible manifestations of the disease. The present study aims to organize all the clinical manifestations of HFI within the current case report/series literature. The case report literature will present the most unique manifestations of HFI and aid in developing new hypotheses or patterns of HFI not previously considered by past researchers. METHODS. A blinded PRISMA-guided search of HFI case reports and case series was applied to the databases Pubmed and Google Scholar. 1377 articles were sorted through inclusion and exclusion criteria yielding 43 relevant articles and providing 90 patients for analysis. The symptoms presenting alongside HFI were extracted and tabulated. SUMMARY. We found high-frequency clinical manifestations of HFI (>20% of patients) to include headaches, obesity, vertigo/dizziness symptoms, cognitive decline, and depression. An additional 15 symptoms were tabulated at frequencies found to be less than 20%. CONCLUSIONS. Based on our analysis, we suggest the constellation of high-frequency symptoms can offer a more comprehensive clinical picture of symptomatic HFI. Symptoms found at lower frequencies may provide novel associations with HFI, but may not be as strongly associated with the pathology. Clinicians may find it valuable to consider that these symptoms may present alongside HFI patients.

Poster #10
*ASHRAFZADEH, Sanam. Department of Cellular, Anatomical and Physiological Sciences, Faculty of Medicine,The University of British Columbia, Vancouver, BC, V6H 1C9, Canada.
Anatomical Variations of Pancreatic Duct Pattern: A Cadaveric Study.

INTRODUCTION. The main pancreatic duct and accessory pancreatic duct work hand in hand to secrete the pancreatic juices into the second part of the duodenum. The common bile duct (CBD), descending from the gallbladder, converges with the main pancreatic duct (MPD) and drains a mixture of pancreatic juice and bile into the duodenum via the major duodenal papilla (MAP) while the accessory pancreatic duct (APD) drains independently into the minor duodenal papilla (MIP). During embryonic development, there can be variations in ductal fusions leading to pancreas divisum. The aim of this study was to gain a perspective into what percentage of agiven population displays pancreatic duct variation and explore what these variations are. METHODS. This objective was achieved by the dissection of the pancreas of 19 (10 female, 9 male) embalmed cadavers. The pancreas and duodenum were isolated and separately observed using #20 surgical blades and Metzenbaum scissors, as well as dull probes and non-toothed forceps. SUMMARY. It was found that only 78.9% (15/19) of the specimens had a present APD. 31.6% (6/19) of the specimens had communicating APD and CBD. 63.2% of the specimens had MIP present (12/19). 73.7% of the specimens had communicating MPD and CBD. All specimens had MAP present (19/19). 68.4% (13/19) of the specimens were considered variations. CONCLUSIONS. These results can be used to create a database that can be used to further investigate pancreatic duct patterns' relationship with pancreatic diseases.

Poster #64
*BAIDYA Ritwik, Anna BRENNAN, Jonathan BREWER, Haley BUGGY, Amanda CALLEGARI, Sydnee BRADSHAW, Kathleen C. BUBB, Sushil KUMAR, Tanya MAISTRY, Santosh K. SANGARI and Estomih P. MTUI. Division of Anatomy, Department of Radiology, Weill Cornell Medicine, New York, NY, 10065, USA.
Herniation of the Pancreas and Splenic Artery Through the Esophageal Hiatus – A Rare Case Report.

INTRODUCTION. Hiatal hernia is defined by the permanent or intermittent prolapse of any abdominal structure into the chest through the diaphragmatic esophageal hiatus. Prolapse of the stomach, intestine, transverse colon, and spleen is relatively common, but herniation of the pancreas and splenic artery is a rare condition. RESOURCES. Herniation of the body and tail of the pancreas along with the splenic artery was observed during dissection of the thorax and abdomen in a 94-old-female donor who had died due to cardiopulmonary arrest. DESCRIPTION. The esophageal hiatus was normal in size. The gastroesophageal junction, fundus of the stomach and spleen were in normally located in the abdominal cavity. The body and tail of the pancreas along with a tortuous splenic artery were seen to pass through the esophageal hiatus into the posterior mediastinum and lying along the right of the esophagus. The splenic artery reentered the abdominal cavity via the esophageal hiatus to reach the hilum of the spleen. The spleen was normal in size and did not show any evidence of any infarcts. SIGNIFICANCE. Type paraesophageal hernias (5-7% of all hiatal hernias) are the rarest of the hiatal hernias. Usually, colon or small bowel is herniated within the mediastinum along with the stomach. Symptomatic patients most commonly present with gastroesophageal reflux and very rarely acute pancreatitis when the pancreas is involved. This case that we present is even rarer since there was no accompanying herniation of the stomach.

continued on next page

Abstracts - Poster Presentations continued

Poster #91

CARDONA, Juan J.[1,2,3], Jeisson O. OSORIO[2], Veronica A. CARVAJAL[3], Arada CHAIYAMOON[1,4], Joe IWANAGA[1,5,6], Aaron S. DUMONT[1], and R. Shane TUBBS[1,6]. [1]Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [2]Department of Neurosurgery, Clínica San Rafael, Pereira, Risaralda, 660003, Colombia; [3]Department of Neurosurgery, Universidad ICESI-Fundación Valle del Lili, Cali, Valle del Cauca, 76001, Colombia; [4]Department of Anatomy, Faculty of Medicine, Khon Kaen University, Khon Kaen, 40002, Thailand; [5]Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, 113-8510, Japan; [6]Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 70112, USA.

Angulation of the Dural Venous Sinuses of the Posterior Cranial Fossa: Anatomical Study.

INTRODUCTION. Cerebral vein and dural venous sinus thrombosis (CVT) represent 0.5-1% of all strokes. This entity mainly affects the dural venous sinuses (DVS). Some anatomical factors associated with a potential higher risk of CVT development have been described. However, the angulation between the sigmoid and transverse sinuses has not been previously studied. As this variable could be related to alterations in the venous flow thus predisposing one to a greater risk of CVT development, the current anatomical study was performed. METHODS. The angulation between the different segments of the grooves of the transverse (TS), sigmoid (SS), and superior sagittal sinuses (SSS) was determined in 45 skulls (90 sides). The entire angulation of the TS groove was measured using two reference points. Other variables such as patterns of communication at the confluence of sinuses and the length and width of the sinus grooves were evaluated. Statistical analyses were performed according to the patter of confluence and between sides. SUMMARY. The commonest pattern was a right dominant TS groove (82.69%). The mean angulation of the left TS groove at two different points (A and B) was 46.94 degrees (range 31-56 degrees) (p=0.37) and 43.16 degrees (range 34-59 degrees) (p=0.71), respectively. The right TS groove was 45.41 degrees (range 36-60 degrees) (p=0.02) and 44.49 degrees (range 31-54 degrees) (p=0.01), respectively. The median angulations of the right and left SSS-TS groove junctions were 120 degrees (IQR 118-124 degrees) and 115 degrees (IQR 110-118 degrees), respectively. The median angulations of the right and left TS-SS groove junctions were 102 degrees (IQR 96-106 degrees) and 108 degrees (IQR 98-116 degrees), respectively. CONCLUSIONS. Differentiating normal and abnormal angulations of the DVS of the posterior cranial fossa can aid in our understanding of why some patients are more likely to have dural venous sinus thrombosis.

Poster #49

*CROWE, M. Nicole, Tara TOVAR-VIDALES, Stephen THAI, Jenny PHAN, Carter TAFT, and Hannah ROTH. Department of Physiology and Anatomy, The University of North Texas - Health Science Center, Fort Worth, TX, 76107, USA.

It's Not a GIST: A Histopathological Investigation of a Rare Gastric Schwanomma.

INTRODUCTION. Gastric schwannomas are rare, benign gastrointestinal mesenchymal tumors that account for <0.2% of all gastric neoplasms. Typically, these neoplasms are incidental findings on conventional imaging studies, at surgery, or during autopsy. In this report, we present a rare case of a gastric schwannoma in a 78-year-old Caucasian female. RESOURCES. During routine dissection, a 1.5 x 1.2 x 1.0 cm tan, firm nodule protruding from the anterior stomach wall was identified. The nodule was located 11 cm from the gastroesophageal junction, 7 cm from the incisura angularis, and 6 cm from the pyloric sphincter. Sectioning revealed white, whorled, and rubbery cut surfaces. No hemorrhage, necrosis, or cystic spaces were grossly appreciated. DESCRIPTION. Subsequently, the tissue underwent routine histological processing and H&E staining. Using light microscopy, histopathologic findings included a well-circumscribed area containing eosinophilic spindle shaped cells with rare mitotic figures, foci of lymphoid infiltration, and a micro-trabecular pattern noted centrally. Furthermore, a peripheral lymphoid cuff was present. Based on our histopathology findings, we hypothesized the presented nodule to be a gastric schwannoma. This diagnosis was corroborated by immunohistochemistry to demonstrate positive S100b protein expression. Common differential diagnoses for gastric schwannomas include gastrointestinal stromal tumors (GISTs), leiomyomas, and solitary fibrous tumors, all which lack S100b protein reactivity. SIGNIFICANCE. This case described a rare case of a gastric schwannoma in a 78-year-old Caucasian female. These findings will further contribute to a scarcely documented gastric neoplasm.

Poster #4

*DASH, Suneeti, Garrett DUNN and Melissa ZOLNIERZ. Department of Anatomy and Pathology, Kansas City University, Joplin, MO, 64804.

Sigmoid Megacolon Secondary to Metastatic Bladder Cancer: A Cadaveric Case Study.

INTRODUCTION. During the dissection of an 89-year-old male cadaver (BMI 26.8 kg/m^2), a sigmoid megacolon was discovered that was not disclosed in the donor's past medical history (PMH). His cause of death was bladder cancer, the 4th most common cancer in men and the 8th most common cancer in women. RESOURCES. One formalin-embalmed cadaver was the subject of this case study due to his PMH detailing metastatic bladder cancer and incidental findings of megacolon. General dissection tools and techniques were used to clean and examine the sigmoid region and surrounding abdominal cavity. DESCRIPTION. The donor's megacolon measured 17.23 cm in length and 8.81 cm in width. When opened, the colon and rectum showed no gross signs of metastasis. A large vertebral column cancerous mass measured 5.25 cm by 5.89 cm, just superior to the sigmoid colon. The kidneys were atrophied,

continued on next page

and the medulla was comprised of fat. The right kidney pole-to-pole length was 6.208 cm and the width was 3.52 cm. The left kidney pole-to-pole length was 8.27 cm and the width was 5.77 cm. The fat within the right kidney extended 36% of the total width while it extended 50% of the total width of the left kidney. There were no enlarged lymph nodes visible through gross dissection. SIGNIFICANCE. Bladder cancer is the most common urinary tract neoplasm. Clinically, bladder cancer causes weight loss, fatigue, bowel obstruction, metastasis, chronic kidney disease, and urinary obstruction leading to chronic kidney failure. During gross dissection, we were able to visualize four of the clinical symptoms listed. Noting the pathologies found in a donor and reviewing the effects of different cancers (e.g., bladder) on other body systems creates a more well-informed approach to dissections and understanding disease processes.

Poster #31

*GANDARILLA, Missy[1] and John K. HUBBARD[2]. [1]Department of Anthropology, College of Arts and Sciences, Texas A&M University, College Station, TX, 77843, USA; [2]Department of Neuroscience & Experimental Therapeutics, College of Medicine, Texas A&M University, Bryan, TX, 77807, USA.

An Economic Alternative to Traditional Bone Cleaning Methods in Preserved Cadavers.

INTRODUCTION. Human osteological material is an essential part of research, education, physical, and 3D collections. Several methods for removing soft tissue from bones in non-embalmed cadavers have been published including laundry detergent, enzymatic maceration, insect consumption, and manual removal. The most effective methods for cleaning bones from embalmed cadavers has not previously been described. This study tested the efficacy of published bone cleaning procedures on cadaver bones to determine the most cost and time effective method. METHODS. 28 human cadaver tali and calcanei from the Willed Body Program at Texas A&M University were cleaned following 7 bone cleaning techniques: Plain water bath and boil, Ariel detergent water bath and boil, Tide + bleach water bath and boil, and Alconox multipurpose cleaner boil. All water bath trials were evaluated after 1, 2, and 3 days, while boil trials were evaluated after 3, 4.5, and 6 hours. All solutions were crafted with 50 ml of cleaner product per liter of water. A scoring system evaluated each trial for odor, ease of soft tissue removal, time, and cost. SUMMARY. Results of the scoring system indicate the Tide + Bleach boil was the only solution to effectively clean dense tissue from these embalmed irregular shaped bones. This technique minimizes investigator health and safety risks inherent in other maceration techniques. CONCLUSIONS. Digital learning is becoming more commonplace and vital as access to natural material is not always available or guaranteed. This study demonstrates a technique that is simple to execute where embalmed cadaver bones may need to be cleaned, catalogued, digitized, and subsequently returned to donor families. This bone cleaning method can be utilized quickly and cost efficiently for a multitude of educational or research purposes. (Acknowledgement: Donors to the TAMU School of Medicine Willed Body Donation program).

Poster #52

*GOVARDHAN, Mohnish[1], Shrihari NAGARAJAN[1], Nitin NAMBURI[1], Farida MEHRHOFF[2], Shelby KUHNERT[1], Katie KILMER[1], and Alla BARRY[1]. [1]Missouri Southern State University, Joplin, MO, 64801, USA; [2]Kansas City University of Medicine and Biosciences, Joplin, MO, 64804, USA.

An Evaluation of the Catecholaminergic Fibers within Orbital Cranial Nerves.

INTRODUCTION. A constricted pupil, drooping of the upper eyelid, and sinking of the eyeball characterize the ophthalmic effect of sympathetic outflow disruption. Additionally, sympathetic outflow could influence ocular accommodation, blood flow, and aqueous humor production. Despite the multifaceted impact of sympathetic innervation (SI) on eye functions, the anatomy of SI within the orbit is still under debate. Previous studies utilizing immunohistochemical verification with anti-Tyrosine Hydroxylase (TH) antibody qualitatively examined sympathetic fibers within orbital nerves. However, a thorough quantitative analysis of these fibers has yet to be performed. The present study aimed to elucidate the presence, distribution, and quantity of catecholaminergic element within orbital cranial nerves. METHODS. The ophthalmic nerve's frontal, nasociliary, and lacrimal branches, superior and inferior divisions of the oculomotor nerve, trochlear, and abducens nerves were collected bilaterally from the orbits of 5 formalin-preserved adult human cadavers (male n=3, females n=2) for histological examination. All sections were validated using Luxol Fast Blue staining and for TH reactivity. Histological slides were photographed. Quantitative analysis was conducted with ImageJ software. SUMMARY. Catecholaminergic fibers were detected in all frontal nerves bilaterally, ranging from 0.2% to 11.45%. The mean area of TH-positive fibers within the right frontal nerve was comparable to the left (0.022 ± 0.003 mm2 and 0.04±0.019 mm2, respectively, $p>0.05$). TH+ fibers were detected bilaterally or unilaterally in other collected samples ranging from 0% to 25%. CONCLUSIONS. There is a considerable difference between individuals in the number and distribution of TH+ fibers within orbital cranial nerves. Our study contributed to a deeper understanding of orbital cranial nerves morphology which is crucial in developing pharmacologic agents and surgical techniques to treat ophthalmic diseases.

continued on next page

Abstracts - Poster Presentations continued

Poster #37

*IMMONEN, Jessica A[1], Jason CICCOTELLI[2], Philip FRIESEN[1], Megan MELOCOTON[1], Yuxuan REN[1], Ceanna ROBINSON-WILEY[1], and Linh M NGUYEN[1]. [1]School of Dental Medicine University of Nevada Las Vegas, Las Vegas, NV, 89106, USA. [2]Department of Physiucal Therapy University of Nevada Las Vegas, Las Vegas, NV, 89106, USA.

Mandibular Fossae Degenerate Comparably to Femoral Condyles in Multi-Joint Osteoarthritis Patients.

INTRODUCTION. The objective of this study was to determine how gross signs and symptoms of osteoarthritis (OA) present in the temporomandibular joints (TMJs) and knee joints of a single donor. Disease severity for 28 ipsilateral sets of TMJs and knee joints harvested from 16 donors were assessed using a validated scale for OA gross symptoms. METHODS. TMJs were dissected from skulls after the calvaria and brain were removed. Knee joints were removed with classic transfemoral and trans-tibiofibular cuts, tendons and the joint capsule were completely removed to expose the intracapsular anatomy. The mandibular condyles, fossae and the femoral condyles were all scores by two blinded reviewers and awarded a Grade 0-4 on an OA Disease Severity Scale. Donor age ranged from 69-95 years old and were half female (N=14) and half male (N=14) specimens. SUMMARY. The TMJ condyle demonstrated significantly less severity in OA presentation compared to the femoral condyles (*p=0.04) in the mixed sex population whereas the fossa was comparably pathological to the knee. When OA symptoms were assessed in same sex populations, the mandibular fossa and the knee joint were consistently comparable whereas the mandibular condyle was statistically less pathological compared to femoral condyles from the same donor (*p=0.05). CONCLUSIONS. In conclusion, patients indicating severe OA symptoms in their knee or TMJ should not only be considering rehabilitation and preservation techniques for the joint expressing pain or inflammation but should also be aware that their occupational and recreational choices along with potential comorbidities may be altering the health of other joints in the body. In addition, the mandibular fossa should be an emphasis in TMJ OA research as it was regularly far more diseased than the mandibular condyle (*p=0.03).

Poster #22

*JACKSON, Tatum O, and Samuel J. COEY. St. George's University International School of Medicine at Northumbria University, Newcastle Upon Tyne, NE1 8JG, UK.

POCUS: A Potential Tool to Identify Anatomical Landmarks and At-Risk Vasculature in Cricothyrotomies.

INTRODUCTION. Surgical cricothyrotomy (SC) has historically been dependent on digital palpation of anatomical landmarks, the thyroid cartilage superiorly and the circoid cartilage inferiorly, to gain emergency airway access via the cricothyroid membrane. Major complications to SC include incorrect device insertion due to difficult landmark palpation and midline vessel perforation leading to bleeding risk. The aim of this study was to assess the ability of point of care ultrasound (POCUS), an ultrasonography technique performed and interpreted rapidly by the physician at the patient's bedside, to identify anatomical landmarks necessary for performing a cricothyrotomy including, identification of at-risk, midline vasculature. METHODS. A study of eighty participants (37 females, 43 males) between the ages of 18 and 77, with no prior history of surgical airway access, were scanned and interpreted using a GE Logiq e ultrasound system with a 12L-RS transducer by a single operator. In vivo short-axis, ultrasound images were taken of the neck to identify three, anatomical landmarks: the thyroid isthmus (TI), the superior border of the cricoid cartilage (CC), and the inferior border of the thyroid cartilage (TC). Any vascular structures crossing the inferior aspect of the TI, the superior border of the CC, and the inferior border of the TC were noted. SUMMARY. The following anatomical landmarks, TI, CC, and TC, were identified in 100% of the participants. Mid-neck vasculature was found inferior to the TI, superior to the CC, and inferior to the TC in 22.5% (18/80), 3.8% (3/80), and 2.5% (2/80) of participants, respectively. There was no significant effect of sex, body mass index, or ethnicity on the presence of the TI, CC, TC, or mid-neck vasculature. CONCLUSIONS. Our data demonstrate POCUS can be used to identify anatomical landmarks before obtaining emergency airway access. Ultrasound-guided cricothyrotomy has the potential to improve the correct insertion of airway devices within the cricothyroid membrane, as well as, avoid midline plane vessel perforation to minimize bleeding risk.

Poster #40

*JACKSON, Hannah N., Sarah AMARIS, Brigitte L. COCHRAN, Shiv C. DHIMAN, and Savita ARYA. Philadelphia College of Osteopathic Medicine, Moultrie, GA, 31768, USA.

Clinical Significance of the Anatomical Variations in Splenic Morphology.

INTRODUCTION. From helping defend the body against infections to cleaning the blood of damaged red blood cells, the spleen is crucial to maintaining homeostasis for primates. The primary objective of this study was to analyze anatomical variations of cadaveric spleens and determine an association with demographic and clinical characteristics of individuals; and thus enrich the current understanding of splenic variations in the South Eastern part of the US. METHODS. The present study was conducted with specimens from two gross anatomy cadaver labs, with data from donor cadavers at two medical school campuses. A total of 37 cadavers were studied for variations in measurement of shape, weight, length, width, thickness, and length of spleen. Other characteristics noted were presence and number of notches, and the presence or absence of an accessory spleen, and the cause of death of the individual. SUMMARY.The average spleen weight for this study was 164 grams which is slightly more than the average spleen weight found in previous studies. Cadavers with reported cardiovascular and cancer related causes of death had an associated increase in spleen size and weight. 66% of the cadavers with malignancy had a spleen size greater than 160 grams. The two largest spleens weighed

continued on next page

432 and 427 grams and had an associated cause of death of colon cancer and lung cancer respectively. In five out of the 13 cadavers that expired from cardiovascular complications, spleens weighed greater than 200 grams. The three most common shapes found among the cadavers were oval, triangular, and oblong. Two accessory spleens were observed, with one being triangular and the other irregularly shaped. Majority of cadavers have notches, with 6 being the most notches observed in this group. CONCLUSIONS. Concentrating on increased spleen size and associated disease processes is of particular importance as splenomegaly can be a clinical sign detected upon physical exam and a variety of medical scans. Understanding what diseases could be associated with increased spleen size will aid health care professionals in developing a more comprehensive differential diagnosis. Histopathology should be evaluated along with spleen morphology in future studies to further confirm disease correlation with spleen size.

Poster #61

*KATHIRVELU, Balachandar[1], [2]and Daniel A. CONDE.[2]. [1]Doctor of Physical Therapy Program, The University of Texas at El Paso, El Paso, TX, 79902, USA; [2]Rehabilitation Sciences, The University of Texas at El Paso, El Paso, TX, 79902, USA.

Pectoralis Intermedius: A Rare Accessory Muscle in the Pectoral Region.

INTRODUCTION. Several anatomical muscle variations in the pectoral and axillary regions were reported in the past. The major muscle in the pectoral region includes pectoralis major and minor, with rare variations of accessory muscle in between them. We report a rare accessory muscle noted bilaterally. The muscle extends between the pectoralis major and minor, matching the description of the Pectoralis Intermedius. RESOURCES. During the routine pectoral dissection of an 81-year-old male cadaver, a rare accessory muscle was noted bilaterally between the pectoralis major and minor muscle. DESCRIPTION. The accessory muscle was located bilaterally at the inferior border of the pectoralis major muscle. Careful cleaving of the superior and medial attachment of the pectoralis major muscle, followed by reflecting it laterally, revealed the accessory muscle. The muscle originated near the 6th coastal cartilage. It traversed along the inferolateral border of pectoralis minor and inserted into the coracoid process, merging between the short head of the biceps and pectoralis minor muscle. Based on the extent and location, the accessory muscle matches the description of the rarely reported pectoralis intermedius muscle. SIGNIFICANCE. Knowledge of the rare accessory muscle in the pectoral region might help the imaging and surgical team accurately diagnose, plan, and prepare the chest wall and breast reconstructive procedures ahead and avoid planning on the surgical table. (Acknowledgements: TTUHSC El Paso PLFSOM Willed Body Program)

Poster #28

*KIKUCHI, Keishiro[1,2], Kousuke TABUCHI[2], Shotaro KINOUCHI[2], Akihiro YAMASHITA[2], Aya HAN[1], Yuto HAIKATA[1], Kunimitsu NOOMA[1], Eiko INOUE[1], Tsuyoshi SAGA[3], Koji HIRAOKA[2], Takahiro OKAWA[2], and Koichi WATANABE[1].[1]Department of Anatomy, Kurume University School of Medicine, Kurume, Fukuoka, 8300011,Japan; [2]Department of Orthopedic Surgery and Sports Medicine, Kurume University, Kurume, Fukuoka,8300011,Japan; [3]Domain of anatomy, Kurume University School of Nursing, Kurume, Fukuoka, 8300011, Japan.

Evaluation of the Tibial Attachment of the Superficial Medial Collateral Ligament of the Knee.

INTRODUCTION. In high tibial osteotomy (HTO) for the medial osteoarthritis of the knee, the tibial attachment of the superficial medial collateral ligament (sMCL) is often partially released. However excessive release may lead to valgus and rotational instability of the knee. Therefore, it is important to know the exact location of the sMCL attachment. In this study, we aimed to clarify the location of the sMCL tibial attachment. METHODS. Seventeen formalin-fixed cadaveric knees were examined in this study. The tibia was divided into two sections in the coronal plane along the midline of the sMCL. The distal attachment of the sMCL was identified from the coronal section. The longitudinal length of the tibial attachment and the distance from the joint surface of the proximal and distal margin of the tibial attachment were measured. Hematoxylin and eosin staining and Masson's trichrome staining of 5-mm tibial attachment sections were used for histological evaluation. SUMMARY. The longitudinal length of the tibial attachment was 23.6 (standard deviation [SD] 3.2) mm. The distance from the joint surface of the proximal and distal margin of the tibial attachment was 36.1 (SD 4.0) mm and 59.1 (SD 4.8) mm, respectively. The histological evaluation revealed that the sMCL comprised dense collagen fibers running parallel to the bone surface, which attached to the cortical bone via dense connective tissue running in multiple directions. CONCLUSIONS. The findings of this study may help surgeons to avoid excessive release of the sMCL in HTO.

Poster #7

*LALL, Jonathan S., Christyn E. HARKINS, and Colin A. BARTH. Department of Biomedical Sciences, College of Medicine, University of Houston, Houston, TX, 77204, USA.

Utilization of Referential Landmarks to Document the Course and Pathway of Palmaris Longus Muscle.

INTRODUCTION. Current literature on the palmaris longus muscle (PLM), has detailed variations, muscle-tendon ratios, morphometric parameters of the PLM and median nerve, and the proximal location of the PLM in the carpal region. As a desirable tendon to graft for a variety of procedures, a reliable, referential, and in-depth understanding of the course and pathway of the PLM may prove to be beneficial. The purpose of this study is to determine the potential course and pathway of the PLM in relationship to surrounding muscular, nervous, and osteological structures, in order to better understand the PLM for use by clinicians, surgeons,

continued on next page

and anatomists. METHODS. This observational cadaveric study was composed of a sample size of N=18 cadaveric donor forearms (FA) assessed through the University of Houston Tilman J. Fertitta Family College of Medicine via the Willed Donor Program. All skin and external fascial layers of the FA, carpus, and palmar region of the hand were reflected in order to expose and preserve all musculature, vasculature, nervous structures, and osteological structures deep to the reflected layers. After this stage, measurements in anatomical position were obtained using a digital vernier caliper(mm), in reference to lateral/medial surface of the (FA) at the interstyloid line(ISL), then at 20mm increments proximal to the ISL. SUMMARY. On average, the lateral edge of median nerve to the lateral edge of the radial styloid process(RSP) was measured as 23.484mm (SD=5.693mm), medial edge of median nerve to medial edge of the Ulnar styloid process(USP) was 26.322mm (SD=5.723mm). Furthermore, on average the lateral edge of PLM to RSP was 28.400mm (SD=5.314mm) and medial edge of PLM to USP was 24.507mm (SD= 5.074mm). There was a strong positive correlation between FA length and PLM total length ($r=0.701$, $p<0.001$, $df=17$). A moderate positive correlation was seen between FA length and length of the PLM Muscle Belly ($r=0.468$, $p<0.001$, $df=17$) as well as FA length and PLM tendon ($r=0.409$, $p<0.001$, $df=17$). CONCLUSIONS. This study suggests that utilization of lateral and medial surfaces of the FA to lateral and medial edges of PLM and the Median Nerve are a viable anatomical reference marker, when predicting the location of the PLM and Median Nerve until 220mm and 60mm proximal to the ISL, respectively.

Poster #12

*MALDONADO, Said, Valerie DELEON, and Brandon GONZALEZ. Tilman J Fertitta Family College of Medicine, The University of Houston, Houston, TX, 77204, USA.

A Rare Variant of the SCAs and AICAs Observed during Cadaveric Dissection.

INTRODUCTION. Several variants of the superior cerebellar arteries (SCA) and anterior inferior cerebellar arteries (AICA) and a variety of clinical manifestations of these variants have been reported. Knowledge of variants in these arteries is important during the recognition and treatment of neurovascular pathology or tumor resections of the posterior cranial fossa. RESOURCES. A rare variation of the SCA and right AICA was observed during cadaveric dissection of a 63-year-old male donor. DESCRIPTION. Bilateral duplications of the SCAs were observed at the distal basilar artery (BA) below the posterior cerebral arteries and cranial nerve III. Right-sided SCAs arose as rostral and caudal trunks from the distal BA. Left-sided SCAs arose from a common trunk at the distal BA. The rostral trunk of the right SCA bifurcated to give off the rhomboidal artery before bifurcating again into the vermian and medial hemispheric branches. The right caudal trunk bifurcated into the lateral and intermediate hemispheric branches. The left rostral trunk of the SCA trifurcated to become the medial hemispheric, vermian, and rhomboidal branches, supplying the vermis, intermediate zone, and dentate nucleus. The left caudal trunk bifurcated into the lateral hemispheric and intermediate hemispheric branches. A double origin of the right AICA of which the rostral trunk arose from both the distal and proximal BA was observed. The rostral trunk traversed inferior to cranial nerve V and superior to cranial nerve VII and VIII and posterior to the flocculus. The caudal trunk traversed over cranial nerve VI, inferior to cranial nerve VII and VIII and anterior to the flocculus. SIGNIFICANCE. The SCA and AICA variant presented here adds to the body of data describing anatomical variations in these arteries. Clinically significant variations of the SCAs and AICAs should be considered and identified by neuroradiologists and neurosurgeons to promote patient safety and limit complications.

Poster #19

*MAYER, William and Faisal, HOSSAIN. Dalhousie Medicine New Brunswick, Saint John, NB, E2K 5E2, Canada.

A Rare Variation of the Renal Inferior Segmental Artery and Unusual Origin of the Testicular Artery.

INTRODUCTION. To supply separate and surgically resectable kidney areas, the renal arteries typically emerge from the abdominal aorta at a level between the L1 and L2 vertebrae and branch into 5 segmental arteries near the kidney's hilum. In this report, we describe a case of the inferior segmental artery (ISA) of the kidney with an isolated origin from the abdominal aorta that has given an unusual right testicular artery (TA). RESOURCES. This case was identified in a retroperitoneal dissection of a cadaver available at the Dalhousie Medicine New Brunswick anatomy laboratory. The Dalhousie Human Body Donation Program accepts donors from the Maritime provinces of Canada and is regulated by the anatomy act of those provinces. DESCRIPTION. A right ISA of the kidney was found originating from the abdominal aorta 3.7cm below the main trunk of the right renal artery. Before reaching the renal hilum, the artery crossed the anterior surface of the inferior vena cava (IVC), inferior to the attachment of the right testicular vein into the IVC. In addition, the right TA originated from the anatomical variation of the ISA of the kidney. The right TA detached from the ISA of the kidney 2.5 cm distant from its aortic origin while crossing the anterior surface of the IVC. SIGNIFICANCE. While performing retroperitoneal procedures, it is essential to be aware of potential changes in the kidney's vascular supply to avoid unintentional bleeding or damage to anatomical variations. In the present case, either a total nephrectomy or a partial nephrectomy of the inferior segment of the right kidney could cause ischemic injury to the right testis due to its unusual blood supply origin. Before manipulating the ISA of the kidney that displays such an unusual arrangement, a surgical anastomosis of the right TA into the abdominal aorta must be taken into consideration to preserve appropriate blood supply to the gonads.

continued on next page

Abstracts - Poster Presentations continued

Poster #43
*MCBRIDE, Morgan L., Sylvia K. JENNETTE, and Anthony B. OLINGER. Department of Pathology and Anatomical Sciences, Kansas City University, Kansas City, MO, 64106, USA.
Anatomical Interaction of the Greater Occipital Nerve and the Obliquus Capitis Inferior.

INTRODUCTION. The greater occipital nerve (GON) has been identified as vulnerable for compression resulting in occipital headaches. The locations of possible compression for the GON are well documented, however, to the best of our knowledge, there has only been one study that has investigated the myofascial attachment strength between the GON and the obliquus capitits inferior muscle (OCIM). This study aims to further characterize and quantify the myofascial relationship between the GON and the OCIM. METHODS. Twenty-one formalin fixed cadavers were dissected bilaterally to characterize the GON as it travels inferior to the OCIM. Given that treatment for this condition would likely involve diagnostic imaging, characterization of the relationship between GON and OCIM was based on appearance and physical manipulation. Each GON was described as either strongly attached via dense fascia to the OCIM (the GON could not be moved from the OCIM), loosely associated with the OCIM (the GON could be easily moved with forceps) or piercing the OCMI. To further quantify this attachment, a digital force gauge hook was used to determine the actual force needed to detach the GON from the OCIM. The forces were measured multiple times by two investigators and an average was taken. The diameter of the OCIM was measured and then the GON was removed and prepared for histological examination to determine if compression of the GON was present. SUMMARY. The average force needed to detach the nerve from the muscle was highest for the nerves that appeared loosely attached. There was a relationship between the force needed to remove the nerve and the histological compression findings. CONCLUSION. These findings suggest that the relationship between the GON and OCIM and their relationship to occipital headaches may be quite complex. Furthermore, the use of imaging to determine the relationship between these structures and occipital headaches may be counterintuitive.

Poster #67
*MILLER, Natalija[1], and Brion BENNINGER[1],[2]. [1]Medical Anatomy Center, Western University of Health Sciences, COMP–Northwest, Lebanon, OR, 97355, USA. [2]Faculty General Surgery, Samaritan Health Services, Lebanon and Corvallis, OR, 97355, USA.
Determining Platysma Facial Attachment with Novel & Fresh Frozen vs Traditional Embalmed Cadavers.

INTRODUCTION. Surgical procedures in general, plastic, otolaryngology and oral maxillofacial surgery involving the neck and face with thyroid and parathyroid surgery, neck dissections, laryngeal surgery, and face lifts include raising a subplatysmal flap. Many anatomical and surgical texts and atlases often depict the facial platysma attachment just over the inferior border of the mandible. The platysma is involved with less-than-ideal results from facial surgeries and is known to become less prominent with age leading to increased face and neck superficial structure redundancy. Identifying the consistent dominant facial attachment may continue improving our understanding of the platysma regarding surgical procedures and its function. The objective of this study is to dissect and assess the platysma with novel prepared and imaged specimens versus traditional embalmed cadavers revealing an accurate facial platysma attachment. METHODS. Literature search was conducted regarding facial platysma attachment. Novel GAX-specimens (n=6, 12 sides, average 63yrs) were MRI, contrast CT and GE Vscan Air ultrasound scanned. Unembalmed (n=18, 36 sides, average 67yrs) fresh frozen cadavers (FFC) were dissected. Traditional embalmed cadavers-TEC (n=15, 30 sides, average 83yrs) were all dissected. SUMMARY. Literature search revealed majority of texts revealing facial attachment just above the inferior mandible border (IMB). Combined GAX-specimens and FFC sides (n=48) all revealed a more proximal attachment ascending anteriorly to at least the modiolus (40/40) and frequently zygomaticus minor (32/40) and posteriorly to the buccinator muscle level (38/40) and commonly to zygomaticus major (35/40) and occasionally orbicularis oculi (4/40). TEC were more difficult to dissect and assess proximal attachment as they were more dehydrated with an average age of 83. TEC (22/30) revealed platysma reaching over the IMB. This may explain why many texts demonstrate insertion above IMB attachment. CONCLUSIONS. Assessing platysma dissections from three types of cadaver preparations demonstrated GAX and FFC have superior quality tissue enabling delicate dissections versus TEC and significantly demonstrated a more proximal attachment deserving further recognition.

Poster #100
MUSIL Peter, Martina MUSILOVA, and Jan Kyselovic. Comenius University Bratislava, Faculty of Medicine, Spitalska 24, Bratislava, 81372, Slovakia.
Blood Flow Changes in Microcirculation of Mesentery Studied by Real-Time Video Microscopy.

INTRODUCTION. Capillary microscopy is a noninvasive technique allowing direct visualization of capillaries. It can be used for dynamic measurement of red blood cell velocity (RBCV) and for determination of nutritional blood flow in capillaries of human body (in the nail fold of the fingers and toes and on the dorsa of the hands and feet) and the capillaries of animals (in mesentery, or in brain- retinal, or muscle. METHODS. The *in vivo* capillaroscopy (made in the Centre of analysis of substances, Joint Stock Company) was performed on 3 groups of rats: Wistar 12 weeks old, spontaneous hypertension rats (SHR) 12 weeks old, and SHR 20 weeks old. Under total anesthesia the mesentery was carefully placed into a glass chamber with 0.9% NaCl solution (with temperature 37°C). The red blood cell velocity (RBCV) and morphometric parameters (diameter and length of capillary where RBCV was measured) were calculated using frame-to-frame analysis. SUMMARY. There were no significant differences in morphometric parameters among study

continued on next page

groups. The capillary blood flow velocity in the venous limb of capillaries was the highest in SHR20, the difference between SHR20 and control Wistar (302,60±44,19 and 260,70±39,57 m/s, respectively) and comparison of Wistar and SHR12 were statistically significant ($p < 0.01$). A comparison of SHR20 and SHR12 group (302,60±44,19 and 294,75±53,65) revealed no significant differences in RBCV. The highest RBCV in SHR20 group can be probably associated with higher blood pressure and hyperkinetic circulation in SHR rats. CONCLUSIONS. We showed that the capillaroscopy could be used after adaptation for in vivo real-time measurement of RBCV and selected morphometric parameters in rats. The frame-to-frame method allowed quantifying morphometric parameters of selected micro vessels. This work was created thanks to support within the Operational Program Integrated Infrastructure for the project code 313021BUZ3, co-financed from the resources of the ERDF.

Poster #25

*NGUYEN, Uyentam T., Delaney K. HIRST, Philip T. SHERIDAN, Catie EVENSON, Dhvani PATEL, Shelby KUHNERT, Katie KILMER, and Alla BARRY. Missouri Southern State University, Joplin, MO, 64801, USA.

The Catecholaminergic Component Within Vagus Nerve Influences Heart Remodeling: A Pilot Study.

INTRODUCTION. The tandem of two antagonistic divisions of the autonomic nervous system, parasympathetic and sympathetic, controls cardiac functions such as heart rate, contractility, and coronary blood vessel diameter. Increased sympathetic outflow is involved in cardiac remodeling leading to the development and progress of congestive heart failure. Concurrently, parasympathetic activity may exert a protective effect on the heart. The Vagus Nerve (VN) is known as a principal source of preganglionic parasympathetic fibers to the heart. However, the presence of catecholaminergic fibers, presumably postganglionic sympathetic, ranging from 0% to 22%, has been detected through immunohistochemical assessment of the VN with anti-tyrosine hydroxylase (TH) antibody. The present study aimed to evaluate the correlation between the quantity of TH+ fibers within the cervical VN and the degree of heart remodeling. METHODS. Cervical VN samples were collected bilaterally from 6 embalmed cadavers (male n=3, females n=3) at superior and inferior cervical ganglia levels for histological examination. All samples were validated for TH reactivity. Heart dimensions and wall thickness were measured before collecting myocardium for histological processing. Samples were harvested from both ventricles, interventricular septum and stained with trichrome to validate the presence of Connective Tissue (CT). All slides were photographed for quantitative analysis using ImageJ. SUMMARY. The linear regression showed a significant positive correlation between the thickness of the right ventricular wall and the number of TH+ fibers in the left VN ($p=0.02$). A trend towards increased CT within both ventricles and TH+ fibers within the right VN was apparent. CONCLUSIONS. The sympathetic component within VN can lead to augmented sympathetic outflow to the heart and reduction in the cardioprotective function of parasympathetic influence, thus, increasing cardiovascular risk.

Poster #94

OLDEN, Alexander[1], Dennis Nyugen[1] and Brion BENNINGER[1,2]. Medical Anatomy Center[1], Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. Faculty General Surgery[2], Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.

Pes Anserinus of Medial Longitudinal Arch From Novel CT/MRI Specimens and Formalin Fixed Cadavers.

INTRODUCTION. The pes anserinus is a well-known structure on the anteromedial aspect of the knee. It represents an architectural marvel of the human body culminating in 3 structures (each from separate thigh compartments with different nervous innervation) essentially fusing to form a tendon-bursa complex attaching to the distal anteromedial knee. It provides knee stability and its structures are harvested for common knee surgery. Human body generally repeats successful morphological patterns which suggests the medial aspect of the foot should have a pes anserinus concept equally admired for its design and clinical relevance. The objective of this study is to identify the pes anserinus of the medial foot from dissecting novel prepared innovative contrast imaged specimens versus formalin-fixed cadavers (F-FC). METHODS. Innovative contrast CT, MRI and radiographic imaging of novel GAX-specimens (n=6, 12 sides) were dissected. F-FC (n=29, 58 sides) were dissected. All dissections applied soft tissue proximal reflecting techniques preserving distal attachments. SUMMARY. No known studies using GAX-specimens to reveal pes anserinus concept of the medial longitudinal arch were identified. All dissections demonstrated a pes anserinus concept focusing attachments to the medial cuneiform. The three structures included anterior, posterior tibialis and fibularis longus receiving different innervation from three separate leg compartments. This could be a useful concept for students/trainees regarding stability of the foot especially the medial longitudinal arch which has significant pathologies associated with it. The GAX-specimens demonstrated lifelike textutres and appearences which provides a realistic experience for open and laparascopic procedures benefitting anatomy education, invasive clinical skills and radiology assessment. CONCLUSIONS. This study highlighted disruptive conceptual anatomy applying the pes anserinus knee concept to the important medial longitudinal arch of the foot reinforcing the why's and how's of normal biomechanics and pathologies leading to better understanding of the results from positive provacative physical examination signs and imaging assessment.

continued on next page

Abstracts - Poster Presentations continued

Poster #97

PETTIT, L. Diana[1], Heather A. BALSIGER[1], Ricardo BELMARES[1], Geoffery D. GUTTMANN[2], Churchill J. IHENTUGE[1], Ronald T. SMITH[3], and Mina ZILAWE[1]. [1]Paul L. Foster School of Medicine, Department of Medical Education, Texas Tech University Health Sciences Center, El Paso, TX 79905, USA. [2]Woody L Hunt School of Dentistry, Texas Tech University Health Sciences Center El Paso, El Paso, TX, 79905, USA. [3]Department of Radiology, [1]Paul L. Foster School of Medicine, Department of Medical Education, Texas Tech University Health Sciences Center, El Paso, TX, 79905, USA.

How to Teach Neuroanatomy on a Shoestring Budget In an Integrated Curriculum.

INTRODUCTION. As part of an integrated curriculum, we have restricted live Neuroanatomy lab time in our curriculum. The Neurology Clerkship Director has emphasized that students are ill-prepared to read images, and increased enrollment has further reduced directed laboratory instruction. To address the problem, we have reorganized Neuroanatomy instruction to maximize student outcomes without increasing resources. METHODS. To insure students could identify structures on imaging, we reduced the total number of structures across all 3 Neuro labs to include only clinically relevant structures. We used a combination of cadaveric brain slices, CT and MRI images for instruction. Practical exams consisted of brain sections and images, with an MRI image-only final practical exam. We compared student performance on the summative Anatomy test questions (in-house and NBME) with test scores for the previous year. SUMMARY. Students did well on the practical exam (Mean = 85%). Summative exam performance on questions with MRI or CT images (NBME and in-house), increased significantly from a mean of 69% (2022) to 84% (2023, N = 9; t-test $p < 0.01$). While organized lab time decreased 50%, there was a big increase in time spent in lab after hours. End of unit student evaluations specifically noted their preference in the new anatomy format over the previous year. Overall, students expressed a much more positive view of anatomy and having a practical exam score allowed them to track progress. CONCLUSIONS. Despite reduced lab time, students performed better on summative Anatomy test items. Further, they enjoyed the new format, and spent extra time in the lab for review, which more than made up for the reduction in organized lab time. Aspects of this approach may be useful for schools with distributed Anatomy labs, and increased pressure to reduce hours, while insuring students are well prepared for clerkship.

Poster #1

*KIM, Pil-Woo. Anatomy department, Collage of Allied Health Sciences, Augusta University, GA, 30912, USA.

Description of Accessory Paraspinal Muscle and the Adjacent Structures Differences: Cadaver Studies.

INTRODUCTION. Abnormal muscles in the posterior neck are called accessory paraspinal (APS) muscles. The location and dimensions of the muscles does not conform to existing descriptions in the area. The muscles showed unilaterally between the semispinalis capitus (SSCap) muscle and suboccipital (SO) muscles with abnormal muscle tone of adjacent muscles and the artery. The case and the adjacent structure difference can be an obstacle for the surgeon since they alter the anatomical landmarks of reference to the muscle and vascular elements of the region. RESOURCES. The case was found while in the routine dissection lab class. The cadaver had been dissected properly to figure out the muscle and adjacent structures. DESCRIPTION. The APS muscle was found on the right side between the SSCap muscle and SO muscles. It attaches to inferior nuchal line of occiput rostrally, and the Nuchal ligament (NL) caudally which is connect to the skin in the posterior neck. The APS muscle was 4.5cm long and 3mm thickness. It became tendonous and attached to the NL that connects to the skin of the neck. The rostral attachment of APS muscle to the occiput was between the SSCap muscle and rectus capitus posterior major (RCPMaj) muscle in the inferior nucleal line. The RCPMaj muscle on the right side was 4cm and on the left side was 2.5cm widely attached to occiput. The obliques capitus inferior on the right side was 12mm wide and on the left side was 10mm wide. Vertebral artery on the right side is significantly bigger showed to APS muscle. It passed through suboccipital triangle and pierced through the middle of RCPMaj muscle. It traveled superficially in RCPMaj muscle and terminated around APS muscle. The left side doesn't have the branch of the vertebral artery outside of RCPMaj muscle. SIGNIFICANCE. Morphological understanding of the APS muscle will give us to a better understanding of the posterior neck. The vertebral artery through the RCPMaj muscle to the APS muscle may be related to the bigger on the right RCPMaj muscle. Thus, the changes of adjacent structure unilaterally can give surgeon an idea what to expect to see by looking at a variation structure.

Poster #103

ROSEN, Veronica M., Bryant TRANSTRUM, Allen WANG, Katherine SCHENKEL, Colby GENRICH, Heather BALSINGER, Edith OLEXIUC, Diana PETTIT, and Ricardo BELMARES. Department of Medical Education, Texas Tech University Health Sciences Center El Paso - Paul L. Foster School of Medicine, El Paso, TX, 79905, USA.

Efficacy of Online Radiographic and Cadaveric Anatomy (ORCA) Modules in Medical School Education.

INTRODUCTION. The COVID-19 pandemic's requirement for exclusive online instruction forced traditional medical education to quickly adapt to distance learning. As an adjunct to the Musculoskeletal System (MSK) curriculum, we developed an interactive computer module teaching anatomy of the leg and foot utilizing cadaveric and radiological imaging, clinical cases, and quizzes. This study aims to assess module effectiveness in anatomy medical education and help guide advancement in academic technology. METHODS. Subjects consisted of 126 medical students from the Class of 2026. Performance data on student scores were collected and defined as the percent of total questions answered correctly on various mandatory module-associated assignments and relevant

continued on next page

MSK practical and end-of-unit summative examinations. Descriptive statistics and paired t-test analyses were used to assess module-associated learning and qualitative data was obtained from a voluntary survey investigating student module satisfaction. SUMMARY. The calculated class average score of all leg and foot module-associated assignments combined was 79% (M = 0.79, SD = 0.2) with results of the Lower Limb Practical Exam revealing a statistically significant increase in class average score to 89% (M = 0.9, SD = 0.1), $t(125) = 6.3$, $p < .001$. Additional cohort data illustrated further growth with a class average score of 89% on the Combined Upper & Lower Limb Practical Exam and an 84% on content-matched questions of the MSK summative exam. CONCLUSIONS. Addition of ORCA modules to the MSK curriculum was seen with an increase in class average scores from graded course assignments to that of final examinations, thereby demonstrating efficacy in medical education. These findings suggest that incorporation of alternate technological modalities may assist in medical student intellectual advancement during a dynamic time of excitement and uncertainty.

Poster #76

SHEARER, Jake, Maureen ESTEVEZ STABIO, Ernesto SALCEDO, Noah LEPPEK, and Chelsea M. LOHMAN BONFIGLIO. University of Colorado Anschutz Medical Campus, Aurora, CO, 80238, USA.

Incorporating Unreal Engine 5 into a Curriculum of Digital Cadaver Preservation.

INTRODUCTION. The modern anatomist must not only be a master of classical anatomy but also be fluent in 3D virtual anatomy. Advances in medical imaging, segmentation powered by machine learning, surface scanning, and 3D printing have made virtual anatomy more prevalent in contemporary anatomy curricula. In 2022, The Masters of Modern Human Anatomy program at the University of Colorado Anschutz Medical Campus piloted a technology-focused Anatomical Imaging and Modeling (AIM) track to address this growing need. RESOURCES. We identified six core competencies we want our graduates to be proficient in: (1) Photogrammetry, (2) 3D modeling, (3) texturing, (4) 3D printing, (5) animation, and (6) real-time rendering. After reviewing our curricular offerings, we determined we needed to design and implement a new course in Unreal Engine 5 (UE5) to fill in curricular gaps. We secured grant funding for a new computer lab and to provide financial support for our under-represented minority (URM) students. DESCRIPTION. We reorganized our technology-focused offerings into three core courses: one fundamentals course and two focusing on industry-standard software—Maya and UE5. Five students and one faculty member took the initial offering of the UE5 course. Student surveys and course evaluations indicate that our efforts were successful. All our students demonstrated the competencies we were looking for and have all submitted abstracts for conference presentations or journals. SIGNIFICANCE. These skills will empower our graduates as they advance into their career paths. We hope our pilot inspires other schools to design similar educational tracks for their programs. (Sponsored by a grant from the Epic MegaGrant Program.)

Poster #70

*SNOW, Ethan L., Lina M. ADWER, Keland A. POTTHOFF, and Travis L. MCCUMBER. College of Medicine, University of Nebraska Medical Center, Omaha, NE, 68198, USA.

Cross-Section and Biomechanical Study of Concurrent Accessory Infraspinatus and Teres Minor Muscles.

INTRODUCTION. The infraspinatus and teres minor are scapulohumeral muscles that laterally rotate the arm. Multiple variations in these muscles have been reported; however, the impact of concurrent accessory infraspinatus (a-I) and teres minor (a-TM) muscles has yet to be described. The present study aims to employ gross cross-sectional and biomechanical analyses to investigate a case of coexistent a-I and a-TM muscles for structural effects, biomechanical impacts, and clinical implications. METHODS. Bilateral a-I muscles and a left a-TM muscle were discovered during routine human cadaver dissection. The aberrations were carefully cleaned of extraneous tissue and photographed. The left glenohumeral joint was sectioned sagittally and photographed to confirm the relation of a-I and a-TM to contiguous structures. The infraspinatus, a-I, teres minor, and a-TM muscles were examined for gross and microscopic structural features used to calculate maximal isometric force (F_{max}) and bilateral comparability (δ). SUMMARY. The 8.66 g (mean) a-I and 13.42 g (left) a-TM inserted on the greater tubercle just distal to their namesake muscle. At the left glenohumeral joint, a-I remained distinct from infraspinatus while a-TM and teres minor exhibited connected bellies. Bilateral a-I and teres minor muscles were structurally similar ($\delta < 0.30$), while left and right infraspinatus muscles approached non-similarity ($\delta = 0.69$). F_{max} of the left infraspinatus, a-I, teres minor, and a-TM were 117.12 N, 26.45 N, 59.93 N, and 29.88 N, respectively. CONCLUSIONS. Coexistent a-I and a-TM muscles can increase the rotator cuff's lateral rotation force by 31.82%. These non-typical muscles may imbalance glenohumeral joint stability, complicate surgical approaches to the region, and contribute to unexpected musculoskeletal inflammation. This study provides gross and functional analyses of concurrent a-I and a-TM muscles that may help guide clinical diagnosis and treatment in related cases.

continued on next page

Abstracts - Poster Presentations continued

Poster #73
*TRAN, Andrew[1], Omar A. RAMOS-MAS[2], Limael E. RODRIGUEZ[3], and Jailenne I. QUIÑONES-RODRIGUEZ[1]. [1]Department of Clinical Anatomy, Sam Houston State University, College of Osteopathic Medicine, Conroe, TX, 77304, USA; Universidad Central del Caribe School of Medicine, Bayamon, PR, 00960, USA; [3]Texas Vascular and Imaging, Houston, TX, 77063, USA.
Impact of Renal Artery Variations on Endovascular Aneurysm Repair: A Comprehensive Review.

INTRODUCTION. The renal artery (RA) typically arises from the lateral aspect of the abdominal aorta supplying blood to the kidneys. With the increasing rate of endovascular aneurysm repair (EVAR) being performed on individuals suffering from an abdominal aortic aneurysm over traditional open abdominal aortic repair, RA variations represent a technical challenge for surgeons that could lead to increased morbidity of patients. Therefore, this study aimed to investigate recent advances in surgical and pre-operative evaluation criteria of accessory renal arteries (ARA) and their impact on patients treated with EVAR. METHODS. A comprehensive review was performed from 2017–2022 about RA variations and their effects on EVAR using MEDLINE as our primary search engine. Overall, four retrospective studies and one prospective study were identified. SUMMARY. The medical literature reported 195 patients with ARA treated with EVAR. ARA arising from the abdominal aorta was the most common anatomical variation. When evaluating EVAR with patients treated with ARA, rates of renal infarction, acute kidney injury, and decline in estimated glomerular filtration rate were significantly higher than those without ARA. In contrast, there were no significant findings regarding the development of chronic kidney disease in patients with ARA coverage compared with those with uncovered ARA or without ARA. Finally, there was no difference in 30-day mortality between patients with and without ARA. CONCLUSIONS. The presence of ARA may be correlated to renovascular consequences in patients undergoing EVAR. The development of ARA preservation techniques can potentially improve postoperative outcomes.

Poster #82
WARD, Peter and Steven SKOWRONEK. West Virginia School of Osteopathic Medicine, Lewisburg, WV, 24901, USA.
A Transverse Hypogastric Venous Loop Posterior to the Rectus Abdominis Muscles.

INTRODUCTION. During dissection in the gross anatomy laboratory, we encountered an unusual vein that crossed superior to the pubic bones in the space anterior to the peritoneal lining and posterior to the rectus abdominis muscles. This vein ran transversely across the lower abdomen and formed a loop that connected the right and left inferior epigastric veins near their origins from the right and left external iliac veins. In this presentation, we describe this novel vascular structure and identify procedures that could put it at risk and cause unexpected hemorrhage. RESOURCES. This venous loop was discovered during the normal process of dissection during a first-year medical school laboratory. Thereafter, the relationships of the venous loop to other nearby structures was investigated. DESCRIPTION. A unique variation in the abdominal vasculature, called a deep transverse hypogastric vein (THV) was found running 2 cm superior to the pubic bone within the extraperitoneal fascia posterior to the rectus sheath. The THV connected the left and right inferior epigastric veins. The left inferior epigastric vein branched from the external iliac vein and extended superiorly before branching into the THV and continuing superiorly. Likewise, the right inferior epigastric vein extended superiorly after branching from the right external iliac vein and gave off the THV and continuing superiorly. The entire length of the THV measured 108.31 mm. SIGNIFICANCE. A THV could cause significant hemorrhage if it were cut during operations of the lower abdominal wall. Midline, paramedian, Pfannenstiel, incisions would likely disrupt this vein and cause unexpected hemorrhage, especially in flap surgeries for breast reconstruction, which utilize tissue from the abdominal wall and rely on venous drainage from the surrounding areas. We would like to thank the anatomic donors whose generosity makes these studies possible.

Poster #46
*WHITMORE, Ian and Sakti SRIVASTAVA. Clinical Anatomy Division, Department of Surgery, Stanford School of Medicine, Stanford, CA, 94305, USA.
Teaching and Assessing Professionalism in the Clinical Anatomy Course at Stanford.

INTRODUCTION. Professionalism is an important part of training for a health worker but has generally been difficult to include in Anatomy teaching and then assess. RESOURCES. Using the Professionalism Principles published in the Stanford School of Medicine MD Handbook for the whole medical curriculum, a set of principles was derived for use in the Clinical Anatomy course for MD and MSPA students. DESCRIPTION. These Principles as applied to Anatomy teaching included individual and group attributes and were made available to Medical and MSPA students in the SURG203 Clinical Anatomy course with suitable introduction and explanation at the beginning of the course. For the first year of implementation no assessment was made, but feedback about the principles from the students was gathered. In the second year students were assessed for their adherence to the principles and given marks which equated to 1/9th of their marks overall. For the third year the assessment was made more granular and Teaching Assistants scored each student and the group to which they belonged for every Lab class. These scores were entered on an Excel spreadsheet to give a

continued on next page

total mark for the whole course for each student that accounted for their individual and the group's score. The total Professionalism mark was scaled down to represent the same value as each of the other 8 practical assessments. SIGNIFICANCE. It has proved possible to teach Professionalism values and assess them in our Clinical Anatomy course. As these courses are often very early, if not the first, in a medical school curriculum the benefit of introducing Professionalism training from day one is valuable. As time progresses, we hope to see an improvement in Professionalism throughout the medical curriculum as a result of teaching it in Clinical Anatomy.

Poster #34

*YOUNG, McKenzie, Alexis ZAVITSKY, Jillian NICELEY, Gabriella BATTISTON, and Sumathilatha SAKTHI-VELAVAN. Marian University College of Osteopathic Medicine, Indianapolis, IN, 46222, USA.

A Unique Variation of the Common Facial Vein and Veins of the Neck: A Case Report.

INTRODUCTION. Embryological variations of head and neck veins are common. Understanding variations of the veins can prevent complications during cannulation, catheterization, and surgical procedures. This case report explores a rare occurrence of a variant course and drainage of the common facial vein (CFV), its relation to the jugular veins, and its clinical significance. RESOURCES. During a cadaveric dissection of a 78-year-old male, bilateral anatomical variations of the neck veins were noted. The veins were dissected, measured using digital calipers, and concurrent pathology was explored. The veins were painted, and photographs were taken. DESCRIPTION. The left anterior jugular vein (AJV) was formed by the union of the left CFV and a communicating vein from the left internal jugular vein (IJV). The left AJV appeared enlarged, followed a curved course, and united with the left external jugular vein (EJV) before draining into the subclavian vein. The diameters of left IJV, AJV, and EJV at the level of thyroid cartilage measured 6 mm, 14 mm, and 8 mm, respectively. The right facial vein terminated as anterior and posterior divisions. The posterior division continued as the right CFV, while the anterior division continued as the AJV. The dimensions of the veins on the right side were normal. No other variations or concurrent pathology in the neck were found. SIGNIFICANCE. Enlarged superficial veins without pathological obstruction within the AJV indicate variant anatomy. Mispositioning of a catheter or failed IJV cannulation may result if the variant superficial veins are not noted during the procedure. The variant veins may serve as a collateral pathway for intracranial venous drainage and should be considered while performing IJV reconstruction. A prominent CFV could be of assistance in surgical interventions such as carotid angioplasty and ventricular-jugular shunts.

Poster #16

ZOLNIERZ, Melissa S.[1], Keanna G. THEOBALT[1], Morgan MCBRIDE[2], Miles A. TURK[1], and George KALU[1]. [1]Department of Pathology and Anatomical Sciences, Kansas City University, Joplin, MO, 64804, USA; [2]Department of Pathology and Anatomical Sciences, Kansas City University, Kansas City, MO, 64106, USA.

Furthering the Understanding of Tumescent Fluids in Cadaveric Dissections.

INTRODUCTION. Surgeons and anesthesiologists use tumescent fluid to aid in the effectiveness of procedures. For instance, during liposuction, the tumescent fluid helps release adipose tissue from surrounding areas to make removal more successful. Injecting fluid to aid novice dissectors improve upon speed, ease, and ability to distinguish planes has recently been proposed in the literature. However, these studies focus on qualitative results, not quantitative ones. In our study, we quantified dissections performed by first-year medical students after injecting fluid into the hands, feet, and faces. These locations were chosen based on difficulty in dissecting due to the intricate nature of the structures. METHODS. Twenty minutes before prescribed donor hand, foot, or face dissections, 30 ml of a wetting solution (water, ethylene glycol, 2-Phenoxyethanol, and Downey), was injected by members of the study at prearranged locations. Injections were done on the donor's right side allowing the left to serve as a control. A week after dissection, photos were taken of all aspects of the left and right sides. Members of the study then individually scored the images based on what structures were dissected, their quality, and their dryness. These scores were averaged and compared statistically using Excel (Microsoft Office). SUMMARY. Although previous studies found students felt the dissections were easier with fluid injections, no significant results occurred between the right and left sides of our three focus areas in quality or amount dissected. We did find, however, that dryness was not comparable in the feet with the left, untreated side, drying out faster than the right side ($p = 0.003$). CONCLUSIONS. Injecting fluid in the hands, feet, and faces may not increase the effectiveness of dissections directly, but can help in the longevity of dissections in structures that tend to be difficult for students to dissect and learn.

continued on next page

POSTER SESSION 2 – TUESDAY, JULY 11 FROM 10:45AM-11:45AM

Poster #50

ANGELES, Miguel and Sakti SRIVASTAVA. Division of Clinical Anatomy, Stanford University School of Medicine, Stanford, CA, 94305, USA.

Individualized Anatomy Tutorials for Occupational Therapy Students.

INTRODUCTION. The study of anatomy using cadavers is a very important educational component of Allied Health Studies. In response to a demand of anatomy review from an Occupational Therapy program we designed a customized program (Individualized Anatomy Tutorials) to teach anatomy review using prosections. RESOURCES. Individualized anatomy tutorials with prosections were given to 149 occupational therapy students from 2012 to 2021 in the Division of Clinical Anatomy at Stanford University. DESCRIPTION. The students had been admitted to an Occupational Therapy program and requested a 6 hour-review of anatomy using cadavers. The tutorials were conducted using prosections and the Anatomage table for the digital component. It was given to students in groups of 3 to 5. The Tutorial was divided into three sessions of 2 hours each with the following contents: 1st day: Upper limb, lower limb; 2nd day: Thorax, head, and neck. 3rd day: Abdomen, Pelvis, and digital anatomy using Anatomage Table. The structure of each session was: (1) Review of prosections with an anatomy faculty to identify anatomical structures listed in the learning objectives making emphasis in clinical correlates. (2) Student activity that consisted in identification of pineed structures checking them with a list of structures given on a worksheet. (3) Review and discussion of the activity with an anatomy faculty. SIGNIFICANCE. An individualized review of anatomy using prosections allowed the occupational therapy students to brush up their knowledge in a short period of time and appreciate anatomical variations and pathology as well as exploring anatomical regions according to their career interests.

Poster #8

*ARNOLD, Denise M.J.[1], Gustavo BERSANI SILVA[2], and Anne M.R. AGUR[1]. [1]Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, M5S 1A8, Canada; [2]Institute of Orthopedics and Traumatology, Faculty of Medicine, University of São Paulo, São Paulo, SP, 05403-010, Brazil.

Feasibility Study: 3D Morphologic Suitability of Gracilis-to-Biceps Brachii Transfer.

INTRODUCTION. Traumatic brachial plexus injury is a potentially devastating pathology when acute phase neurological reconstruction fails or treatment is delayed. Elbow flexion restoration is a primary treatment goal. Free functioning muscle transfer of gracilis has been used clinically to replace the wasted biceps brachii. Comparison of the morphology of these muscles has been limited by 2D measurements. The aim of this feasibility study was to investigate the use of volumetric dissection, digitization, and 3D modelling of gracilis and biceps brachii as in situ, to provide an evidence-based muscle-transfer paradigm. METHODS. One gracilis and one biceps brachii specimen were laser scanned, dissected and digitized volumetrically at the fiber bundle/tendon level. Digitized and laser scanned data were imported into Blender3D to construct comprehensive models as in situ. Architectural parameters were computed in 3D. The morphology and architectural parameters of gracilis and biceps brachii were compared to determine suitability for muscle transfer. SUMMARY. Gracilis and biceps brachii both have fiber bundles with parallel arrangement (mean pennation angle of 4.46° and 4.94° respectively). The attachments and length of gracilis, the donor muscle, need to be aligned with those of the short head of biceps. The gracilis (578mm) has longer muscle-tendon length than the short head of biceps (337mm), however approximately 130mm of gracilis is needed for anchoring it to the distal biceps tendon. Mean fiber bundle length of the gracilis is 255±65mm compared to 164±15mm of the short head of biceps. Physiological cross-sectional area of gracilis (444 mm^2) is similar to biceps (403mm^2). CONCLUSIONS. The results demonstrate that this methodology provides a high-fidelity volumetric technique to document and compare donor (gracilis) and recipient (biceps brachii) muscle architecture and morphology in 3D space. This technique will be used to conduct an expanded anatomical study of the suitability of gracilis-to-biceps brachii free functioning muscle transfer. The 3D models, based on cartesian coordinate data, offer the opportunity for development of surgical simulation training modules.

Poster #62

*BAEZ, Ramona F., Adam S EPSTEIN, Anh T. NGUYEN, Johnna R. DIOUF, and Sushama RICH. Anatomy Department, Touro College of Osteopathic Medicine - Harlem, New York, NY, 10027.

Unique Four-Headed Accessory Abductor Digiti Minimi: A Case Report.

INTRODUCTION. The Abductor Digiti Minimi (ADM) together with the Flexor Digiti Minimi (FDM) and Opponens Digiti Minimi (ODM) are intrinsic muscles of the hypothenar eminence in the hand. The ADM originates from the pisiform bone & inserts into the base of the fifth proximal phalanx. The Palmaris Longus muscle (PLM) is one of the superficial flexor muscles of the forearm that originates at the medial epicondyle of the humerus & inserts into the flexor retinaculum & palmar aponeurosis. During anatomy lab dissection, we noticed a four-headed muscle belly of the Accessory Abductor Digiti Minimi muscle (AADM). RESOURCES. Meticulous dissection of the right upper limb of a 90 y/o Caucasian male donor was performed without evidence of previous surgery or trauma within the forearm and hand region. Findings were documented and photographed. DESCRIPTION. After exposing the flexor compartment of the

continued on next page

forearm and palm of the right hand, we found a normal PLM attachment, In addition, three muscle bellies attached deep to the distal third of the tendon of the PLM and the fourth muscle belly attached to the antebrachial fascia. All four muscle bellies passed deep to the flexor retinaculum, into the Guyon's Canal overlying the Ulnar nerve and artery. Distally, all four aberrant muscle bellies join and attach to the base of the proximal phalanx of the fifth finger just between the insertion of the ADM and FDM. Upon manual traction of the AADM, abduction of the fifth digit and contraction of palmar aponeurosis was observed. The left forearm was anatomically normal. SIGNIFICANCE. The four muscle bellies presented here, act as accessories to the ADM in function. Muscle size and course may be an important risk factor in hand neuropathy and Guyon Canal Syndrome. Awareness of this is essential to understand etiologies, symptoms & differential diagnoses within the hand and can also improve outcomes of hand surgeries.

Poster #53

*BAEZA, Drew C.[1], Jordyn TROOP[2], Nouha NATOUR[2], Carolina ALZAMORA[1], Alex HATTENHAUER[1], Cheryl PURVIS[1], and Liliya RYSHCHAK[2]. [1]Department of Medical Education, Dr. Kiran C. Patel College of Allopathic Medicine, Nova Southeastern University, Fort Lauderdale, FL, 33328, USA.; [2]Diagnostic Medical Sonography Program, Dr. Pallavi Patel College of Health Care Sciences, Nova Southeastern University, Fort Lauderdale, FL, 33328, USA.

The Use of Ultrasonography in the Detection of Retinal Detachment - An Anatomical Perspective.

INTRODUCTION. Ultrasonography is a noninvasive diagnostic technique that uses high-intensity sound waves to image internal body structures. It is an efficient and accurate tool that provides valuable information for diagnosing and directing treatment for a variety of diseases and conditions. This technology has been used to aid in the detection of vital ophthalmic conditions in the emergent setting. Retinal detachment is a highly debilitating ocular condition that requires swift intervention to diagnose and treat. The use of ultrasonography in the detection of retinal detachment has proven to be highly useful. The objective of this poster is to improve the understanding of retinal anatomy and pathology by using clinically relevant sonographic images to show the role of ultrasonography in the detection of retinal detachment. RESOURCES. A review of the existing literature was conducted to illustrate the effectiveness of diagnostic ultrasound in the detection of retinal detachment and provide an anatomical perspective of the disease process. DESCRIPTION. By observing the retinal surface using a multitude of ultrasound techniques such as dynamic scanning at different positions, medical providers can determine the presence of retinal detachment at the bedside. We aim to discuss the anatomical perspective of retinal detachment and how it can be beneficial in the detection of this pathology while aiding in the differentiation of it from other diseases of the retina. SIGNIFICANCE. The swift detection of retinal detachment is key to providing intervention before devastating consequences occur, such as permanent blindness. The timely use of ocular ultrasound, coupled with a substantial understanding of the retinal anatomy, could prove to be crucial in the diagnosis of this acute condition.

Poster #101

BAUMAN, Jay M. Center for Anatomical Science and Education, Saint Louis University School of Medicine, St. Louis, MO, 63104, USA.

Assessing Completeness of the Circle of Willis via 3D Reconstruction.

INTRODUCTION. The Circle of Willis (CoW) is a critical structure in the distribution of arterial blood to the brain. However there is often variation in the presence of its anastomotic branches: a single anterior communicating artery (ACoA) and two posterior communicating arteries (PCoA). This study classified the completeness of the CoW using 3D reconstruction of medical imaging. METHODS. Magnetic resonance angiography (MRA) scans of 109 health subjects were obtained from the open-source database provided by Elizabeth Bullitt of the University of North Carolina. 3D Slicer software was utilized to render the series of two-dimensional MRA images into three dimensions as well as visually isolate the arteries from surrounding tissue. SUMMARY. A complete CoW was observed in 37% of the study population. An additional 40% of subjects had only a single unilateral PCoA, while in 19% both PCoA were absent bilaterally. The CoW was significantly more likely to be complete in females (53%) compared to males (26%). CONCLUSIONS. This distribution of CoW variations is consistent with that measured by other methodologies. 3D reconstruction offers the advantage of directly visualizing structures that may travel obliquely through a stack of 2D images, such as the PCoA. This technique has promising applications to preoperative planning and surgical simulation.

Poster #104

BENNINGER Brion [1,2]. [1]Medical Anatomy Center, Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. [2]Faculty Orthopaedic Surgery, Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.

Stereostructural Anatomy: Posterior and Anterior Arm Both Have Triceps Muscle Representation.

INTRODUCTION. Posterior arm compartment has a well-recognized 3-headed muscle, the triceps brachii and a single headed muscle the articularis cubitii creating a total of 4 muscle heads. Triceps brachii is a powerful extensor consisting of medial, lateral, and long (crosses 2 joints) heads with dominant innervation by the radial nerve. It has been reported to receive ulnar nerve and occasionally axillary nerve innervation. Its tendon is used to assess a reflex representing C-7, 8 nerve roots. Anterior arm compartment observation also has 4 muscle heads, which 3 fuse to each other forming medial, lateral and long (crosses 2 joints) heads, thus an

continued on next page

anterior triceps brachii muscle, yet they have separate names of biceps brachii (BB) and coracobrachialis (CB) muscles. The single headed muscle is brachialis. They are powerful flexors and supinators with dominant innervation by musculocutaneous nerve (MCN). Its tendon is used to assess a reflex representing C-5, 6 nerve roots. The study objective is to dissect arms of novel prepared and imaged GAX-specimens (GAX) and formalin-fixed cadavers (F-FC) to demonstarte a consistent anterior triceps muscle essentially mirroring in orientationof the posterior arm triceps brachii. METHODS. CT/MRI imaging of 6 GAX-specimens, 12 arms and 31 F-FC (62 arms) were all dissected. SUMMARY. All 12 GAX and 60/62 F-FC arms revealed CB muscle fibers interdigitating with short head of biceps (SHB) and fibers were torn between CB and SHB when trying to separate them. 2/62 arms demonstrated variant with CB attaching directly into humerus. The MCN split through the CB muscle 71/74 arms. CB represents the medial head of its posterior counterpart, short-head of current biceps represents lateral head of its posterior counterpart and current long head of biceps represents long head of posterior triceps. CONCLUSIONS. Based on this studies dissections, the arm has both posterior and anterior triceps brachii muscles with CB being equivalent to medial head, SHB equivalent to lateral head and long head crossing 2 joints as its counterpart from the posterior arm. This demonstrated stereostructural anatomy of the arm.

Poster #23

*BRUECKNER-COLLINS, Jennifer, Avery NEWCOMB, Jefferey BAKER, and Katarina JONES. Department of Anatomical Sciences and Neurobiology, University of Louisville School of Medicine, Louisville, KY, 40202, USA.

Incorporating Ultrasonography to Enhance Anatomy Learning for the First Year Medical Student.

INTRODUCTION. Ultrasonography is widely used to visualize anatomy, diagnose pathology, and monitor physiological function. As such, there is a movement to introduce ultrasound imaging into undergraduate medical education, mostly in the third and fourth years. However, a more natural introduction would be during the anatomy course, while other imaging modes are incorporated. The objective was to ascertain the feasibility and usefulness of incorporating ultrasonography into first year undergraduate medical education to improve anatomy learning and begin familiarity with the imaging modality. RESOURCES. Five guided ultrasound modules were created and incorporated into the first-year medical student anatomy lab. Topics were selected that demonstrate the usefulness of point of care ultrasonography: antebrachial nerve visualization for nerve blocks, DVT scans of the legs, FAST exams for fluid identification, pelvic screening for ectopic pregnancies and retinal disc visualization. DESCRIPTION. Students were anonymously surveyed before and after using the first ultrasound module to obtain data on student attitudes toward the ultrasound materials being incorporated into the anatomy course and their effectiveness in promoting student knowledge. Paired t-test were used to analyze pre and post intervention surveys. Confidence significantly increased in answering anatomy-based questions on ultrasound images ($p < 0.001$), in applying anatomical relationships ($p < 0.001$), and in ultrasound structure identification questions on lab practical exams ($p < 0.001$). SIGNIFICANCE. The overwhelming majority of students recommended including more POCUS content into the anatomy course. Anecdotally the students were vocal about their appreciation of the ultrasound additions to the lab guides. Introducing ultrasonography early in medical education offers a unique opportunity to incorporate point of care imaging to help master clinical anatomy knowledge, improve identification of pathology, and begin understanding basic ultrasound concepts.

Poster #80

CHAIYAMOON, Arada[1,4], Athikhun SUWANNAKHAN[2], Laphatrada YURASAKPONG [4], Juan J. CARDONA[4], Joe IWANAGA[4,5], and R. Shane TUBBS[4,5]. [1]Department of Anatomy, Faculty of Medicine, Khon Kaen University, Khon Kaen, 40002, Thailand; [2]Department of Anatomy, Faculty of Science, Mahidol University, Bangkok, 10400, Thailand; [3]Princess Srisavangavadhana College of Medicine, Chulabhorn Royal Academy, Bangkok, 10210 Thailand; [4]Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [5]Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 70112, USA.

Prevalence of the Accessory Transverse Foramina: A Study of 4,375 Cervical Vertebrae.

INTRODUCTION. The foramen transversarium (FT) is the passageway for the vertebral artery that then enters the foramen magnum to form the basilar artery. Stenosis of the FT can result in vertebral artery compression. Understanding FT variations is crucial for surgeons during neck surgeries and also for radiologists when interpreting computed tomography scans of the cervical spine. However, there are only a very few reports available on the morphology of the accessory transverse foramina (AFT) and their prevalence. Therefore, the purpose of this study was to calculate the prevalence of accessory foramen transversarium (AFT) of the cervical vertebrae, and to discuss the clinical significance of these structures. METHODS. A total of 4,375 dry vertebrae (C1-C7) from 625 subjects (325 Thai subjects and 319 American subjects) were investigated. SUMMARY. The AFT was most commonly found at the C6 level in both the Thai (17.5%) and American populations (22.2%). Co-occurrence of AFT at C5 and C6 levels was the second most common type of AFT variation and was present in 11.4% and 13.8% of the Thai and American populations, respectively. Similarly, co-occurrence of AFT at C6 and C7 levels was found in 6.2% of the Thai population and 4.6% of the American population. Interestingly, the AFT at C1 was 10 times more common in the Thai population (5.8%) than the American population (0.6%) ($p<0.0$). The AFT at other levels were rarely observed. CONCLUSIONS. Knowledge of the prevalence of AFT is clinically important as they may alter the course of the vertebral vessels and cervical sympathetic nerves. These data will be useful when interpreting cervical spine imaging and also critical for planning surgical approaches to the cervical spine.

continued on next page

Poster #35
*COCHRAN, Brigitte L., Shiv C. DHIMAN, and Savita ARYA. Philadelphia College of Osteopathic Medicine, Moultrie, GA, 31768, USA.
Cadaveric Study: Sign of Leser-Trélat Associated with Breast Cancer.

INTRODUCTION. Seborrheic keratoses (SK) is considered the most common benign skin lesions found in individuals that are middle aged and older. In dermatology practice, these lesions pose no threat to the individual but can be concerning for cosmetic and underlying malignancy reasons when they cover most of the skin surface. Of specific concern is the sign of Leser-Trélat, which has been documented as a cutaneous harbinger of underlying malignancy associated with proliferation of the size and/or number seborrheic keratoses. This rare sign is usually caused by malignancies such as gastrointestinal adenocarcinoma and lung, kidney, liver, pancreatic cancer or malignant melanoma. This case report will describe the histology of the skin lesions in Lesar-Trélat and analyze the current literature regarding its association with breast cancer, which is quite rare. RESOURCES. For this case study, a cadaver from the body donor program at Philadelphia College of Osteopathic Medicine (PCOM), South Georgia, was studied. Skin samples were sent to Colquitt Regional Center for processing, where sections were embedded in paraffin and were stained with H&E stain. A pathologist reported histopathological findings of the skin lesions and the breast tissue samples. DESCRIPTION. Multiple SK lesions covering the face, abdomen, back, as well as both upper and lower extremities were observed in one of the cadavers in the gross anatomy laboratory. Due to the significant number of pigmented, verrucous lesions, the sign of Leser-Trélat was clinically postulated, later confirmed during routine laboratory dissection of the breast tissue. Histology sections confirmed not only multiple SK lesions in the skin, but also revealed an associated breast cancer in the form of an infiltrative ductal carcinoma. SIGNIFICANCE. The sign of Leser-Trélat is rare by itself and its association with breast cancer is even more uncommon. Once a clinician recognizes the multiple SK eruptions, the patient should be meticulously investigated for an underlying GI malignancy and other cancers like breast cancer. Biopsy and histology diagnosis is crucial for ruling out both cutaneous as well as underlying visceral malignancies; and should be encouraged when patients present in clinic rather than assuming the seborrheic keratosis is benign.

Poster #17
*FOX, Branden C.[1], Adam KOLATOROWICZ[2], Nicholas A. LARSON[1], John H. GASSLER[1] and Grant J. BOXEY[1]. [1]Department of Anatomy, Lincoln Memorial University – DeBusk College of Osteopathic Medicine, Harrogate, TN, 37752, USA.; [2]Department of Anatomy, DeBusk College of Osteopathic Medicine at Lincoln Memorial University – Knoxville, Knoxville, TN, 37932, USA.
The Contribution of Gluteus Maximus to the Posterior Iliotibial Tract: An Anatomic Study.

INTRODUCTION. Understanding the human anatomy of the proximal hip myofascial complex is an intricate problem that can be simplified by studying its morphology. Knowledge of its morphology could gain insight about the development of musculoskeletal disorders at the hip, thigh, and knee. The aim of this study is to explore the kinematic intersectional relationship between gluteus maximus (GMax) and the iliotibial tract (IT) to provide angular and linear data relevant to the function of the proximal hip myofascial complex. METHODS. Forty-nine hips from 32 formalin-fixed whole-body donors (female=11, male=21, 55-94 yo) underwent dissection to reveal an anatomical complex involving the median sacral crest superior prominence (MSCSP), iliac tubercle and the mean width of the superior tendon of GMax lying in the plane of the IT. A MiscroScribe™ 3DX digitizer was used to register 3D landmarks and calculate interlandmark distances and the angle of GMax convergence on the IT. Geometric morphometric analyses were performed to identify and visualize areas of greatest shape variation in the hip complex. SUMMARY. The angle at which GMax inserts into the IT was moderately correlated with the distance between the MSCSP and iliac tubercle ($r=0.50$, $p<0.001$) and weakly correlated with the length at which GMax attached to the iliac tubercle ($r=-0.29$, $p=0.044$). Anterior displacement of the iliac tubercle and increased GMax convergence angle accounted for 55% and 45% of shape variation in the complex, respectively. CONCLUSIONS. Analysis of the quantitative measurements supports that there is a link between the morphological and kinematic components at the GMax-IT intersection. Follow-up studies with more accurate measurement tools will need to seek further associations. The data produces preliminary information to better personalize medical procedures and modalities such as choosing directional approaches for hip surgeries and proper fitting of post-operative hip bracing.

Poster #38
*GREENQIUST, Maya, Carrie WALLACE, Dhvani PATEL, Donna JOHNSON, Crystal LEMMONS, Mary KILMER, and Alla BARRY. Department of Biology and Environmental Health, Missouri Southern State University, Joplin, MO, 64801, USA.
Integration of Art in Pre-Medical Education: An Artful Medicine Symposium as a Model Tool.

INTRODUCTION. Evidence has shown a decline in observational skills, empathy, and tolerance for ambiguity in medical students and clinicians. As a result, multiple medical schools have incorporated art modules in their curriculum to promote these skills in future clinicians. As a liberal arts undergraduate institution, MSSU developed an Artful Medicine Symposium (AMS) as a collaboration between the science and art departments, thus providing a platform to enhance student learning of the connectivity between art, medicine, and science as well as beneficial skills that can be gained from including humanities in a science curriculum. METHODS. Medical and art scholars discussed the relationship between art and medicine. Students participated in scientific and creative

continued on next page

research in a poster and model exhibition. Other events included an insightful presentation of the art of observation, art workshops, and a round table panel discussion entitled "The Healing Powers of Art." Surveys were conducted before and after the workshops. The post-symposium survey explored attitudes toward the connection between art and medicine SUMMARY. Respondents (n=323) who had attended the AMS indicated a significantly greater appreciation of art than those who did not attend the symposium ($p<0.01$). Evaluation of stress levels in all participants of workshops showed a significant decrease ($p=0.015$). CONCLUSIONS. The ability to incorporate art and science in the undergraduate curriculum to increase observation skills and empathy can be accomplished. The development of these skills will help improve the overall standards of care. Undergraduate institutions are capable of this interdisciplinary approach and can change the trajectory of pre-health education.

Poster #41

IN, Alexander, John P. MCNAMARA, and Michael F. NOLAN. Virginia Tech Carilion School of Medicine, Roanoke, VA, 24016, USA.

Medical School Anatomy Education in Virginia.

INTRODUCTION. Anatomy in medical education is foundational in understanding the human body and regardless of specialty, knowledge of the human structure is important and necessary for a full understanding of human function, both typical and pathological. Therefore, it is crucial to constantly investigate the innovation of medical anatomy education and explore different teaching methods and styles to continue training competent health-care professionals. The objective of this survey study is to explore the various cadaveric anatomy curriculum of medical schools in Virginia to not only demonstrate the current innovations being implemented but also provide a resource of reference for medical schools, medical students, anatomy faculty and those invovled with medical education. METHODS. There are six medical schools in the state of Virginia (Eastern Virginia Medical School, Edward Via College of Osteopathic Medicine-Virginia Campus, Liberty University College of Osteopathic Medicine, University of Virginia School of Medicine, Virginia Commonwealth University School of Medicine, Virginia Tech Carilion School of Medicine) and the anatomy directors from each institution were interviewed (n=6). The 50 question survey is broken down into eight sections including: School Demographics, Anatomy Curriculum Overivew, Cadaver, Resources, Facutly, Assessment, Electives, and Miscellaneous. SUMMARY. We will present our results of all six interviews onto a single document, organized into graphs, tables or charts to demonstrate the comparison of anatomy curriculum from each medical school. CONCLUSIONS. Anatomy curriculum in medical school is important to continually evaluate and innovate; therefore, it is helpful to provide detalied information of the various anatomy curriculum of different medical schools to both highlight and share ideas of the innovations being implemented in medical education.

Poster #20

*JAMESON, Natalie L., Jessica MORTENSON, Taylor GOODFELLOW, and Gurvinder KAUR. Department of Medical Education, Texas Tech University Health Sciences Center, Lubbock, TX, 79410, USA.

Effect of Pass/Fail Medical School Curriculum on Student Wellness and Extracurricular Involvement.

INTRODUCTION. Step1 scores have played a critical role in residency selection decisions. In 2020, Step1 became pass-fail to improve student wellness and develop well-rounded physicians, which will enhance student engagement in extracurriculars such as leadership and research to volunteering. According to AAMC, increasing number of medical schools are also shifting to pass-fail pre-clerkship curricula. In 2020, our school changed its pre-clerkship curriculum to pass-fail. Effect of pass-fail curriculum on student wellness and engagement in extracurriculars at our school has not been analyzed. METHODS. A survey was administered to first-year medical students (Class of 2026) and consisted of questions that gauged impact on student wellness and participation in extracurricular activities. SUMMARY. Majority of the students were involved in specialty interest group organizations (n=82, average= 3.41; maximum=12) and were participating in electives (average=3; maximum=19). Twenty-four percent of students have authored a research paper while 25% presented their research at a local/national meeting. Seventy-one percent of students preferred a categorical as compared to pass fail grading system. Eighteen percent of students indicated they experienced burnout frequently, 54% experienced it occasionally while 28% rarely experienced it. Students ranked Step2 performance, academic performance, and research as top 3 criteria to enhance residency application. CONCLUSIONS. Overall, vast number of students are engaged in extracurriculars. Majority of the students are experiencing some form of burnout in the pre-clerkship curriculum. Ranking of academic performance and research as top 3 criteria to enhance residency applications indicate students' value these equally to become a well-rounded physician. Exam score comparison between pass/fail and graded curriculum classes will help us evaluate the impact of these changes on academic performance. (Study IRB # L23-026)

continued on next page

Abstracts - Poster Presentations continued

Poster #2
LABIB, H. William Carey University, Hattiesburg, MS, 39401, USA.
Anatomy of the Human Otic Ganglion; A Cadaveric Study.

INTRODUCTION. The study of the human otic ganglion (OG) and its communications is not sufficiently available in Anatomy teaching courses, given the time and effort needed and difficulties associated with its dissection. Therefore, most anatomical descriptions of its anatomy are shown by means of illustrations and not photographs. The aim of this study was to provide photographs of the otic ganglion with review of its size, relations, and communications by use of cadaveric specimens and by means of meticulous dissection and accurate photo documentation. METHODS. The study was carried out on 12 infratemporal fossae in 12 cadaveric specimens, all structures that covered the OG from the medial side of the halved heads were carefully removed to expose the OG and its connections. SUMMARY. The OG, the mandibular, the inferior alveolar and the lingual nerves were identified in all of them. There was no significant variations regarding the location of the studied otic ganglia in the current study. Morphologically, our observations concur with previous classical descriptions of otic ganglia, but with variations regarding their size and communications. CONCLUSIONS. I conclude that thorough knowledge of the cadaveric illustration and description of the otic ganglion would be of help in enhancement of anatomical teachings, as well as to head and neck surgeons, ear, nose and throat specialists and neurosurgeons.

Poster #56
*LU, Sarah L.[1], Charity L. THOMANN[2,4], Frank SCALI[4], Michelle Y. TAN[1], and Sherif S. HASSAN[3,4]. [1]School of Medicine, California University of Science and Medicine, Colton, CA, 92324, USA; [2]School of Psychology, Fielding Graduate University, Santa Barbara, CA, 93105, USA; [3]Department of Anatomy, Faculty of Medicine, Cairo University, Cairo, Egypt; [4]Department of Medical Education, California University of Science and Medicine, Colton, CA, 92324, USA.
Medical Student Engagement & Self-Efficacy in a Teaching Blended Sequential Model in MSK Anatomy Lab.

INTRODUCTION. Faculty at the California University of Science and Medicine developed a sequential model for teaching the musculoskeletal system (MSK). Concepts are gradually introduced within a blended learning environment and integrated with increasingly complex modalities. The aim of this pilot study was to investigate the relationship between students' self-efficacy, engagement, perceptions of difficulty, exam scores, and sense of the learning environment within this model. METHODS. First-year medical students at a newer medical school were invited to complete a questionnaire after completing their MSK course. Pearson and Spearman rho correlations were completed to determine relationships between variables. Independent T-tests were calculated to find differences between variables. SUMMARY. Participants contributed the difficulty of learning MSK to the need to memorize terms and access to MSK textbooks. The utility of time watching virtual anatomy videos positively correlated to total engagement, $r_s = .51$, $p = .010$. Students who would like for videos to continue were more engaged and perceived the learning environment to be better $t(22) = -6.11$, $p < .001$. The ratings of difficulty of MSK and self-efficacy were negatively correlated, $r = -0.620$, $p < 0.001$. Engagement but not self-efficacy correlated to lab exam scores ($r = 0.593$, $p < 0.01$; $r = 0.29$, $p = .155$. Notably, no differences in outcomes were found for demographic factors. CONCLUSIONS. Results of the pilot suggest more investigation of the model is needed. Increased engagement was associated with more time watching virtual lab videos and higher lab exam scores. Students with higher self-efficacy did not rate MSK as being difficult. With the emerging relationship between engagement and self-efficacy on improved lab exams, future studies should continue to study facilitators of engagement and self-efficacy in anatomy.

Poster #68
*LU, Vicky, Alicia BUI, Maggie BAILEY, Matthew HELOU, Marvin PAGUIO, Priya RAZDAN, and Malli BARREMKALA. Department of Anatomy, Oakland University William Beaumont School of Medicine, Rochester, MI, 48309, USA.
Gross Anatomical Study of Unilateral Megaureter Finding in Anatomical Laboratory Setting.

INTRODUCTION. This case study presents and describes the anatomical variation of a megaureter (enlarged or dilated ureter greater than 7-8 mm) discovered during routine dissection in an anatomical laboratory setting. While megaureters have a higher incidence in pediatric males, they may present asymptomatically and are therefore challenging to diagnose. In adults, acquired causes of megaureters can be obstructive or non-obstructive. Obstructive megaureters are commonly due to ureteral nephrolithiasis, proximal to the ureterovesical junction. Non-obstructive megaureters are typically complications secondary to other pathologies. Moreover, megaureter findings specifically in the anatomical laboratory setting have not been well described or explored. RESOURCES. Of the 32 formalin embalmed donors in the lab (average age of 82, 17 males, 15 females), 18 donors had at least one ureter that was adequately dissected and preserved. The ureters were measured across their diameter at the level of the bifurcation of the common iliac artery into the internal and external iliac arteries. Analysis of the data revealed an average ureter diameter of 7 mm (N= 32 measurable ureters). In comparison, dissection of a 68-year old male donor revealed a right megaureter with a diameter of 31 mm. DESCRIPTION. To determine if the diameter of the megaureter identified in the lab deviates from the average ureter size in embalmed cadavers. SIGNIFICANCE. Following this unique discovery, a literature review was conducted to investigate the prevalence of megaureters, the underlying pathophysiology, and clinical implications. Moving forward, histopathology will be performed and gross study of other associated organs may provide additional insight into our megaureter finding.

continued on next page

Abstracts - Poster Presentations continued

Poster #74
*MAISTRY, Tanya, Sushil KUMAR, Kathleen BUBB, Ritwik BAIDYA, Estomih P. MTUI, and Santosh K. SANGARI. Division of Anatomy, Department of Radiology, Weill Cornell Medicine, NY, NY, 110065, USA.
Occipitalization of the Atlas Vertebra – A Case Report and Review of Literature.

INTRODUCTION. Occipitalization of the atlas vertebra is a rare congenital skeletal variation with an incidence of 0.12% to 0.72%. It is an important malformation due to the proximity with the spinal cord and medulla oblongata and may lead to serious clinical manifestations such as myopathy, limitation of neck movements, vascular and neurological complications. RESOURCES. The observations were made in a dry human adult skull used for teaching purposes in the gross anatomy lab. Data regarding the age, sex and race of the specimen were not available. Multiple photographs of the specimen were taken and the measurements of the foramen magnum were recorded with the help of digital vernier calipers. DESCRIPTION. The base of the skull showed atlantooccipital fusion. The anterior arch and both right and left lateral masses of the atlas were completely fused with the basilar and the lateral parts of the occipital bone including the atlantooccipital joints. The posterior arch of the atlas was incomplete and fused with the occipital bone on its right side, with its posterior end pointing 4.00 mm anterior to the posterior margin of the foramen magnum. The antero-posterior and transverse diameters of the foramen magnum were 33.03 mm and 29.25 mm respectively. SIGNIFICANCE. The clinical manifestations of occipitalization of the atlas vertebra are mainly attributed to the laxity of the cruciform ligament in relation to the odontoid process, leading to narrowing of the space available for the spinal cord or brainstem. The atlantooccipital fusion and the associated changes in the dimensions of the foramen magnum may lead to serious symptoms and signs due to close proximity with the spinomedullary junction, vertebral arteries and C1 spinal nerves. Detailed clinical assessment and evaluation for diagnostic and therapeutic purposes is required.

Poster #71
*MIHAILA, Dana M.[1], Angela LOVE[2], Matthew P. CAMARA[3], Rebecca J. GREENBLATT[4], and Sriram S. NARSIPUR[2]. [1]Cell and Developmental Biology Department, [2]Department of Medicine, [3]Department of Emergency Medicine, [4]Department of Microbiology and Immunology, SUNY Upstate Medical University, Syracuse, NY, 13210, USA.
Integration of Anatomy and Clinical Medical Education Using Hand Held Ultrasound.

INTRODUCTION. Point of care ultrasound (POCUS) is a noninvasive diagnostic imaging technique used increasingly in nearly every medical specialty. We describe an innovative longitudinal four-year POCUS curriculum vertically integrated with the curricular activities: integration with anatomy (didactic sessions) and integration with clinical experience (clinical preceptorship and clerkships), that will prepare our graduates to perform POCUS as part of the routine physical exam and enhance clinical decision making. RESOURCES. The didactic sessions will be designed and conducted by ultrasound experts from different departments in SUNY Upstate Medical University (Emergency Department, Department of Medicine, Curriculum Office, Cell and Development Biology Department). Students will be provided with hand-held ultrasound devices for their use at a clinical site or during clerkships. A portfolio will be built for each student, and images will be stored using a secure server. DESCRIPTION. The pre-clerkship POCUS sessions will be integrated with the major organ systems studied in Anatomy. In the setting of the Anatomy Laboratory students will be guided to acquire basic POCUS images for core organ systems. They will work in small groups of 3-4 students/faculty giving each student the opportunity to have a hands-on, personalized experience supervised by faculty. Because medical students are adult learners motivated by goals and tasks that have real-world application, our teaching modalities will include self-directed activities, involving acquisition of images in clinical setting. SIGNIFICANCE. The integration of ultrasound curriculum with anatomy helps to reinforce the anatomical structures studied in the cadaver laboratory and their relationships. In addition, our curriculum underlines the clinical significance of anatomy, solidifying a foundation to bring about a future where point of care ultrasound is routinely integrated into the physical exam.

Poster #14
*MOFFETT, Caleb, Joseph CHERULLO, Yun TAN, and Daniel DALY. Center for Anatomical Science and Education, Department of Surgery, Saint Louis University School of Medicine, Saint Louis, MO, 63104, USA.
A Distinctive Case of a Circumaortic Renal Vein and Multiple Bilateral Accessory Renal Arteries.

INTRODUCTION. Renal vasculature morphological variations are well-documented. However, the combination of a circumaortic left renal vein, two right renal veins, and multiple renal arteries is a unique presentation. RESOURCES. A combination of novel renal vascular variations was observed in a 75-year-old male cadaver. DESCRIPTION. Three right and two left renal arteries originated from the abdominal aorta. On the right side, the first renal artery was a superior polar renal artery which gave off the inferior suprarenal artery and a large branch running inferiorly along the posterior abdominal wall. The second renal artery emerged 0.703 cm below the first before dividing into anterior superior and posterior segmental arteries. The third renal artery branched immediately inferior to the second, trifurcating into the testicular, anterior inferior and inferior segmental arteries. Two right renal veins, anterior and

continued on next page

posterior, emptied into the inferior vena cava separately. On the left side, a small accessory renal artery traveled superior to the typical renal artery and passed superficial to the anterior renal vein before terminating as an anterior inferior segmental artery. The main renal artery divided into the typical anterior and posterior divisions with the anterior division giving rise to the apical, anterior superior, and inferior segmental arteries. Anterior and posterior renal veins emerged from the left renal hilum. The common trunk from the inferior phrenic and suprarenal veins drained into the anterior renal vein. The posterior renal vein continued retroaortically. The left testicular vein connected the anterior and posterior renal vein draining into both veins. SIGNIFICANCE. The presence of a circumaortic left renal vein, double right renal veins, and accompanying multiple renal arteries bilaterally is a unique presentation that is clinically significant in surgery and diagnostic imaging.

Poster #47

*MOLINA, Vanessa[1], Radhika PATEL[1], Peggy TAYLOR[2], Jaime HINOJOSA[1], and Jailenne I. QUIÑONES-RODRIGUEZ[1]. [1]Department of Clinical Anatomy, Sam Houston State University, College of Osteopathic Medicine, Conroe, TX, 77304, USA**;** [2]Department of Primary Care and Clinical Medicine, Sam Houston State University, College of Osteopathic Medicine, Conroe, TX, 77304, USA**.**

Significance of Pudendal Nerve Variations in the Management of Pelvic Disorders.

INTRODUCTION. A comprehensive understanding of pelvic anatomy is crucial for properly diagnosing and managing gynecological procedures. The pelvic neurovasculature is one of the regions with the most anatomical variations. This research aims to identify the significant variations in the origin of the pudendal nerve and the gynecological management of clinical implications. Bilateral or unilateral variations of the pudendal nerve may exist and appear in the extrapelvic or intrapelvic portions along its route to the perineum. Anatomical variations of this nerve may have an increased risk of entrapment depending on its location, and pudendal nerve dysfunction may arise due to this entrapment. METHODS. A systematic search of all major databases was performed from 2017 – 2022 to identify anatomical variations of the pudendal nerve in females (n=126: 100 living patients and 26 cadavers). The variations were categorized according to the nerve origin, distribution, and location of the sacrospinous ligament. SUMMARY. An understanding of variations from the origin and course of the pudendal nerve is imperative to evaluate if there is a distinction between variations and pathologies such as pudendal canal syndrome and vulvodynia. While many established causes of vulvodynia exist, an idiopathic group remains with unknown etiology and variable treatment results. CONCLUSION. Awareness of anatomical variations in pelvic neurovasculature are essential for understanding pelvis anatomy and enhancing the safety of interventional procedures and accurate diagnoses for treating pelvic diseases.

Poster #32

*PORTA, Emily M. and Jennifer BRUECKNER-COLLINS. Department of Anatomical Sciences and Neurobiology, School of Medicine, University of Louisville, Louisville, KY, 40222, USA.

Medical Students' Self-Assessments of Competencies in the Gross Anatomy Laboratory Context.

INTRODUCTION. Competency-based medical education (CBME) is a budding paradigm internationally and it is gaining traction in the United States. CBME is an outcomes-based approach to the education and assessment of learners that uses competencies (observable abilities). We propose the Gross Anatomy dissection lab as an opportune venue to implement aspects of CBME in undergraduate medical education. This study investigates if medical students' self-perceived abilities in the competencies of Professionalism, Teamwork, and Communication within the Gross Anatomy lab context improve over the course of their first semester in medical school. METHODS. First-year medical students at the University of Louisville School of Medicine completed self-assessments of each competency at the beginning and end of their first-semester course entitled Clinical Anatomy, Development, and Examination (CADE) (N=132). Data were analyzed using paired samples t-tests within SPSS. SUMMARY. Paired-samples t-tests were conducted to evaluate the impact of the gross anatomy course on students' scores on the Communication Assessment Tool (CAT), the Teamwork Performance Scale (TPS), and the Professionalism Assessment Scale (PAS). There was a statistically significant increase in CAT scores from Time 1 (M = 4.45, SD = .525) to Time 2 (M = 4.74, SD = .362), t (131) = -7.021, p < .001 (two-tailed). There was a statistically significant increase in TPS scores from Time 1 (M = 4.63, SD = .389) to Time 2 (M = 4.71, SD = .330), t (131) = -3.229, p = .002 (two-tailed). Finally, there was a demonstrated increase in PAS scores from Time 1 (M = 4.77, SD = .249) to Time 2 (M = 4.81, SD = .232), t (131) = -.035, p = .051 (two-tailed). CONCLUSIONS. First-year medical students demonstrated self-perceived growth within the competencies of Communication, Teamwork, and Professionalism in the Gross Anatomy lab context.

continued on next page

Poster #98

RAJAN, Piratheep, Nicholas MARSON, Hiva AFSHARIAN, Elizabeth VAN WYK, Nahidh AL-JABERI, Tarek ALMABROUK and Husein ALGHURAIRY. St. George's International School of Medicine, Keith B. Taylor Global Scholars Program, Northumbria University, Newcastle upon Tyne, NE1 8ST, United Kingdom.

Ultrasonography as a Viable Method to Investigate Variations of Tibial Nerve Bifurcation.

INTRODUCTION. Historical cadaveric studies have observed three anatomical variations in the location of tibial nerve bifurcation into medial and lateral plantar nerves. An established mideo-malleolar-calcaneal axis (MMC), which joins the medial malleolus to the medial tubercle of the calcaneus, functions as a reference line categorizing the variations into Type I (proximal), Type II (on), or Type III (distal) to the MMC. Although these cadaveric studies provided significant data, there is still a lack of ultrasound studies on the varying bifurcation of the tibial nerve. The goal of this study was to assess the feasibility of ultrasound sonography as a tool to investigate the differential branching patterns of the tibial nerve. METHODS. Ultrasound imaging using a GE LOGIQ e Ultrasound system with a 12-15Hz linear transducer was performed on both lower extremities of thirty participants, yielding two images each, that were classifies into the aforementioned groups. SUMMARY. The study results showed Type I was the most common (66.6%) while Type III was the least common variation found (5.0%). CONCLUSIONS. This study is novel in its use of ultrasound to analyze the differential branching patterns of the tibial nerve, which could be utilized clinically to classify variations prior to surgical intervention. These variable patterns are significant in procedures such as tarsal tunnel decompression surgery, tibial nerve block, and trauma involving the tarsal bone. This study concluded that our results confirm the Cadaveric studies result furthermore ultrasonography can be used as a viable visualization tool to determine the variations of tibial nerve bifurcations, resulting in clinical implications and improving surgical site awareness.

Poster #77

SCHWAB, Madeleine C., Samantha M. SPENCE, Sophia S. IZHAR, Mahak JUNEJA, Matthew T. BRADDOCK, Beker A. KARADAGHY, Yun TAN, and Daniel DALY. Center for Anatomical Science and Education, Department of Surgery, Saint Louis University School of Medicine, Saint Louis, MO, 63104, USA.

Accessory Pulmonary Veins: A Cadaveric Study.

INTRODUCTION. Variation in the quantity and diameter of pulmonary veins results in abnormal blood flow and increased fluid resistance in the vessels. Recently, correlations between pulmonary vein defects, atrial fibrillation, and ectopic heartbeats have been elucidated. Appreciation of these variations could allow for a better understanding of pathology and appropriate treatment. RESOURCES. Two male cadavers, 87 and 83 years of age, were received through the Saint Louis University Gift of Body Program. DESCRIPTION. Significant pulmonary vein variations were observed following routine dissection. One donor displayed two normal left pulmonary veins and ten drastically undersized right pulmonary veins with diameters of 16.5mm and 17.5mm on the left and a range from 1mm to 11mm on the right. The total cross-sectional area of 691mm^2 for the right pulmonary veins was significantly less than the 1716mm^2 total cross-sectional area of the two left pulmonary veins. This was unexpected since the diameter and cross-sectional area of right pulmonary veins are usually larger. The second donor displayed one drastically oversized left pulmonary vein with its diameter (32mm vertically, 11mm horizontally) and a cross-sectional area of 1106mm^2 and three right pulmonary veins with a cross-sectional area of 2026mm^2. SIGNIFICANCE. Atypical pulmonary anatomy occurs in 30% of individuals. However, there are no known reports of patients with twelve asymmetric pulmonary veins. A comprehensive understanding of both typical and atypical pulmonary vasculature prompts refinement of interventional procedures for maximal safety and efficacy for these patients. Patients with abnormal pulmonary veins express higher rates of ectopic foci resulting in atrial fibrillation. Successful resolution of ectopic foci via radiofrequency catheter ablation requires accessory pulmonary veins to be effectively identified and accounted for when evaluating treatment options.

Poster #86

SHEKHAWAT, Devendra.[1], Juan J. CARDONA[1], Arada CHAIYAMOON[1], Joe IWANAGA[1,2], and R. Shane TUBBS[1,2]. [1]Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [2]Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 70112, USA.

Are the Ethmoidal Foramina through the Frontal Bone, Ethmoid Bone, or Frontoethmoidal Suture?

INTRODUCTION. The anterior cranial fossa (ACF) is an important anatomical and surgical space that is frequently accessed during endonasal surgical procedures. The ethmoid bone articulates with the frontal bone a frontoethmoidal suture. Thus, if ethmoidal foramina can be found inferior or superior to the frontoethmoidal suture, they and their related neurovascular bundles can be injured inadvertently during surgery. To investigate the locations of the anterior, middle, and posterior ethmoidal foramina and their relationships to the frontoethmoidal suture, study was performed. METHODS. One hundred twenty sides from sixty adult human skulls were used. The number of ethmoidal foramina (anterior, middle, posterior) on the medial orbital wall and the relationship

continued on next page

of each foramen to the frontoethmoidal suture were recorded and classified as follows. Type I: superior to the frontoethmoidal suture; Type II: in the frontoethmoidal suture; Type III: inferior to the frontoethmoidal suture. SUMMARY. Of the ninety-four sides, fourteen (14.9%) had one foramen, sixty-two (66.0%) had two foramina, and eighteen (19.1%) had three foramina. In total, 192 ethmoidal foramina were observed. Among the fourteen sides with one foramen, eight foramina were anteriorly located while six were posteriorly located. Among the 192 ethmoidal foramina, 162 were eligible for further classification (74 anterior, 14 middle, 74 posterior). Types I, II, and III ethmoidal foramina were found in 38.3% (62/162), 61.7% (100/162), and 0% (0/162), respectively. CONCLUSIONS. Our study found a higher prevalence of the type I foramen than previously reported. It is important to be aware of the significant incidence of foraminal variations when the medial orbit wall is manipulated during surgery.

Poster #95

ST-ONGE, Francis, Jean-Felix ST-ONGE, Allyson E. WHITSETT, Jeriel E. CRUZ, Rajab K. ABDULSADEK, James COEY, Tarek ALMABROUK, Najla Y. MOOSA, and Husein ALGHURAIRY. St. George's School of Medicine, Drill Hall, Northumberland Rd, Newcastle upon Tyne, NE1 8JG, United Kingdom.

Relationship between Peri-Mesenteric Fat and Measures of Central Adiposity in Young Adults.

INTRODUCTION. Visceral fat has been identified as a key contributor to metabolic disorders owing to its association with decreased adipocytokine function. Perivascular adipose tissue (PVAT), a specialized local deposit of adipose tissue surrounding arteries, has been shown to regulate vascular tone through adipocytokine functions, but is compromised in obesity, contributing to increased vascular resistance. This study aimed to investigate the relationship between PVAT of the superior mesenteric artery (SMA), visceral adipose tissue (VAT), body mass index (BMI), and waist-to-hip ratio (WHR). METHODS. WHR and BMI were anthropometric measurements used to assess body composition. GE LOGIQ ultrasound system with a 12 MHz abdominal probe transducer was used to measure VAT at the SMA, VAT at the umbilicus, and PVAT of SMA in 31 healthy participants, male and female, aged 18-30. Pearson's correlation matrix was generated to assess the strength of the correlation between variables, and ANOVA was used to assess the statistical significance of Pearson's correlation coefficient (r) values. SUMMARY. PVAT of SMA was positively correlated with BMI, WHR, and VAT ($p<0.05$). Interestingly, PVAT was more strongly correlated with BMI ($r=0.61$) than with WHR ($r=0.38$) and should be considered when evaluating PVAT if ultrasound is unable. CONCLUSION. Peri-mesenteric fat is correlated with adiposity. Further investigation is required to investigate associations between PVAT of other named arteries with measures of adiposity in older adults and patients with cardiovascular disease. In addition, given the vascular dysfunction of PVAT in obesity, correlation with factors such as blood flow and pressure should be considered.

Poster #65

TORRES-RODRIGUEZ, Alfredo[1], Jessica NGUYEN[1], Norman RAMIREZ[2], Mario LOOMIS[1], and Jailenne I. QUIÑONES-RODRIGUEZ[1]. [1]Department of Clinical Anatomy, Sam Houston State University, College of Osteopathic Medicine, Conroe, TX, 77304, USA; [2]Pediatric Orthopedic Department, Mayagüez Medical Center, Mayagüez, Puerto Rico, 00681, USA.

Implications of Median Nerve Variations and Surgical Management.

INTRODUCTION. The embryological path of the median nerve determines the variations that arise throughout the upper extremities. Several origins and distributions of the median nerve have been studied extensively. Based on previous studies, the anatomical differences of these variations relate to several clinical implications. Due to imperative concerns of iatrogenic injuries and postoperative complications, this study aims to comprehensively analyze median nerve variations to advance in accurate diagnosis and appropriate management. METHODS. Our implications were discovered through a literature review from the past six years using MEDLINE as the primary search database. We analyzed twenty studies that included an evaluation of 445 limbs to evaluate the relationship between variations and implications. SUMMARY. At the brachial plexus, damage to thick variant branches from pre-surgical axillary nerve blocks may lead to sensorimotor deficits in the anterior compartment of the forearm. Terminal nerve branches are crucial to identify proper post-operative regeneration after nerve transfer procedures and to avoid denervation. Persistent median arteries, often accompanying bifid median nerves, are significant for avoiding anastomosis complications like necrosis. In the same manner, compression syndromes can occur in various limb sites; therefore, understanding the variations can contribute to the solution through nerve releases. CONCLUSION. Successful management of median nerve anatomical variations requires an accurate diagnosis and appropriate treatment. Furthermore, awareness of anatomical variations will better assist physicians during evaluations and treatment options in diagnostic studies, nerve grafting, and nerve transfers.

continued on next page

Abstracts - Poster Presentations continued

Poster #92

VISHWAKARMA[1], Nitin, Anil KUMAR[2], and Smitha ELIZABETH[2]. [1]Department of Biomedical Sciences, Mercer University School of Medicine, Columbus, GA, 31901, USA; [2]Department of Anatomy and Neurobiology, College of Medicine and Health Sciences, National University of Science and Technology, Suhar, Al Batinah, 321, Oman.

A Morphometric Study of Coronary Ostia and Its Clinical Significance.

INTRODUCTION. The right and left coronary arteries arise from the right and left aortic sinuses, respectively. Their site of origin in the sinus is the coronary ostia. Coronary ostia are variable in their location, size and shape. The present study was undertaken to study the variations in the morphology and morphometry of coronary ostia. METHODS. In the present study, 60 formalin-fixed heart specimens were studied. The shape and diameter of coronary ostia, their circumferential location, and their location with respect to the sinutubular junction and the upper margin of leaflets of aortic sinus was noted. Accessory ostia were recorded. The observations in the present study were compared with the previous studies and the differences are discussed. SUMMARY. In the present study, the mean diameter of right coronary ostia (RCO) was 4.78 mm and left coronary ostia (LCO) was 5.02 mm. The RCO were located 13.7 mm from the base of aortic sinus and the LCO were located 14.17 mm from the base of aortic sinus. The majority of coronary ostia were located below the sinutubular junction. The majority of the RCO were proximal to the upper margin of the aortic leaflets while majority of the LCO were at the level of upper margin of the aortic leaflets. The RCO were circumferentially located near to the non-coronary aortic sinus (58.3%) while the LCO were located centrally in the left aortic sinus (56.7%). Accessory ostia were found in 22 specimens (36.67%). 66.7% of coronary ostia were found to be oval in shape. CONCLUSION. The location of coronary ostia below the sinutubular junction and at or above the upper margin of the aortic leaflet is functionally advantageous. The knowledge of variant anatomy of coronary ostia is important while performing cardiac interventional procedures.

Poster #26

*VO, Hieu M, Joshua L DALE, Jackie ZHANG, Quyen T NGUYEN, and Kenneth HISLEY. Department of Anatomy, William Carey College of Osteopathic Medicine, Hattiesburg, MS, 39402, USA.

Variation in Tensile Properties of Cooper's Ligament across the Breast.

INTRODUCTION. Tensile property of Cooper's ligaments has been characterized mathematically by N. Briot et al. There do not appear to be studies in the literature that quantify the tensile property of these ligaments. For an elastic material, when stretched, the atomic reorganization increases the stiffness (Young's modulus) of the material. With the differential gravitational force exerted on these ligaments, we hypothesized that the ligaments in the superior quadrant have higher Young's moduli and lower ultimate strengths. The purpose of this study is to compare maximum Young's moduli and ultimate strengths between Cooper's ligaments in the superior and inferior quadrants of the breast. METHODS. Samples of Cooper's ligaments were dissected from 4 embalmed cadavers representing 8 breasts and yielding 36 20 mm x 10 mm samples divided into 2 groups representing upper (19 samples) and lower quadrants (17 samples). These samples were submerged in a formalin/phenol solution and kept in 65 degrees Fahrenheit. A micrometer (Neotek Digital Thickness Gauge) was used to measure the thickness of each sample. Tensile properties of each sample were tested on a texture analyzer (TA.XTplus-Stable Micro Sytems) with a strain rate of 0.5mm/sec. Final parameters - 1) average thickness, 2) cross-sectional area, 3) stress and 4) strain - were computed to plot the stress vs strain curve of each sample. From these plots, the Young's modulus maxima and the ultimate strength of each sample was determined and compared between the 2 groups. SUMMARY. Young's moduli mean values for the superior quadrant samples was 240.95±109.3 MPa and the ultimate strength as 1.98±1.08 Mpa. For the inferior quadrant, the values were 245.95±115.56 MPa and the ultimate strength as 2.49±1.17 MPa. Ultimate strength p-value was 0.196; maximum Young's modulus was p-value was 0.9. Therefore, there was no significant difference in Young's moduli and ultimate strengths between superior and inferior quadrants. CONCLUSIONS. Currently, there have been no surgical techniques directed at the Cooper's ligament. Understanding its characteristics could possibly contribute to designing artificial ligaments to replace damaged ones. (Sponsored by William Carey University College of Osteopathic Medicine)

Poster #59

WANG, Austine Y., Sorin DARIE, Betty Z. ZHANG, Laura N. NGUYEN, Darren L. DESA, Jasmine L. ROCKARTS, Andrew S. PALOMBELLA, Brooke J. DECARLO, Naomi K. DOWNER, Sandra D. MONTEIRO, Esa S. AHMAD, Gregory R. WOHL, and Bruce C. WAINMAN. Faculty of Health Sciences, McMaster University, Hamilton, ON, L8S 4L8, Canada.

Development and Pilot Testing of a Scale to Assess Embalming Solutions for Surgical Skills Training.

INTRODUCTION. Although many embalming solutions attempt to preserve the visual and tactile qualities of cadavers used for surgical skills training, no standardized method for assessing the utility of these solutions exists. Therefore, a scale was developed to assess the fidelity of different embalming solutions for surgical skill acquisition by surgical residents. A pilot study testing porcine material was conducted to validate the psychometric properties of the scale. METHODS. Porcine tissues were either fresh frozen or embalmed using one of seven solutions. Twenty-three surgical residents performed one of four surgical skills and rated their experiences using the scale, which follows a five-point Likert format. Descriptive statistics determined the average scores of the solutions. Cronbach's

continued on next page

alpha evaluated internal consistency. A g-study identified the sources of variance impacting the scores. SUMMARY. Formalin-fixed tissue achieved the lowest average scores (2.16, SD = 1.16) for each domain of the scale and fresh-frozen tissue achieved the highest (3.97, SD = 0.87). Surgical Reality Fluid achieved the highest scores among embalmed tissues (3.75, SD = 1.00). The Cronbach's alpha scores ranged from 0.85 to 0.92. All domains other than odor were positively correlated. This indicated high internal consistency, meaning the domains of the scale reliably measure each embalming solution's effectiveness. The g-study indicated that the scale scores were influenced primarily by the embalming solution itself (0.23) and the interaction between the embalming solution and the rater, meaning the user's preference for tissue preparation was also a significant source of variance (0.34). The absolute g-coefficient of 0.89 indicated the same findings can be expected in similar studies using the scale. CONCLUSIONS. Future steps include further validating the scale on cadavers and to determine its utility for institutions.

Poster #83

KARCZEWSKI, Kylie, J.M. PIRTLE, and Peter WARD. West Virginia School of Osteopathic Medicine, Lewisburg, WV, 24901, USA.

An Investigation of Various Coatings to Prevent Dehydration of Prosection Anatomical Specimens.

INTRODUCTION. During the COVID pandemic our institution shifted to an increase use of prosection in the anatomy lab as constraints on the number and spacing of students were imposed. Preparation of prosection donors is time-consuming and they were prone to dehydration as they were exposed during labs. To combat degradation of the tissues, we investigated ways to coat prosections in a way that would provide a barrier to evaporation while maintaining the utility of the specimens. METHODS. To test various types of coatings, we cut donor thighs into eighteen cross-sections that were 3 cm in depth. Thighs were chosen due to their larger size and mixture of bone, muscle, and adipose tissue. Sections were randomly assigned into six groups with three cross-sections in each: 1. Control (no coating), 2. Wetting solution applied once per day, 3. Petroleum jelly, 4. Hairspray, 5. Polyurethane, 6. Epoxy. Each coating was applied onto both surfaces of each section until fully coated but not obscuring underlying tissues. The sections were then left exposed to the open air within the anatomy laboratory and weighed at regular intervals (Start, 1, 2, 4 days, 1, 2, 4 weeks) to track how much water was lost to evaporation. SUMMARY. All cross-sections lost weight during the course of the experiment with the control specimens losing the most (26%), followed by wetting solution (24%), polyurethane (23%), hairspray (20%), epoxy (19%), and petroleum jelly (16%). Despite the epoxy coating preventing excessive water loss, it formed a hard crust over the sections and was deemed aesthetically unsuitable for use. CONCLUSIONS. The use of petroleum jelly or hairspray appears to have some potential to reduce the dehydration encountered when specimens are used in the anatomy lab and not frequently doused with wetting solution. Additional studies on fully prosected specimens will be needed to test the efficacy of these treatments to preserve anatomical details for teaching.

Poster #29

*WATANABE, Koichi[1], Eiko INOUE[1], Aya HAN[1], Joe IWANAGA[1, 2, 3], Yuto HAIKATA[1], Yoko TABIRA[1], Keishiro KIKUCHI[1], Tsuyoshi SAGA[4], and Koh-ichi YAMAKI[1]. [1]Department of Anatomy, Kurume University School of Medicine, Fukuoka, 8300011, Japan; 2 Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; 3 Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, 1138519, Japan; 4 Domain of Anatomy, Kurume University School of Nursing, Fukuoka, 8300003, Japan.

The Bucco-Mandibular Space and its Relationship to the Retaining Ligaments of the Mandible.

INTRODUCTION. The bucco-mandibular space (BMS) is the outer space of the mandibular body as reported by Iwanaga et al. in 2017. The soft tissue structure of the mandibular region is important in anti-aging therapy, but little is known about this region. The purpose of this study was to clarify the relationship between the BMS, a large space in the external mandible, and the retaining ligaments of the mandible. METHODS. A layer-by-layer gross anatomical dissection was conducted from superficial to deeper layers on the three sides. The stretched tissue dissection method was then applied to the five frontal and five horizontal sections. In this method, the cross-sections were stained by eosin, and fixed on the board. The skin was pulled outward with sutures to stretch the soft tissue, and the fat tissue was removed under a stereomicroscope to observe the fibers in the soft tissue. SUMMARY. The mandibular osteo-cutaneous ligament (MOC) was present at the anterior margin of the masseter muscle near the inferior border of the mandible. The MOC and surrounding connective tissue formed the posterior border of the BMS. The platysma muscle inserted at the inferior border of the mandibular body, forming the inferior margin of the BMS, but the platysma mandibular ligament was not observed in all cases, and was considered to be the same structure as the insertion of the platysma. Outside of the BMS, a fibrous septum was present between the platysma and the BMS, and the facial artery ran in the space formed between the septum and the platysma. CONCLUSIONS. The lower face is an area where aging change is most pronounced. However, the soft-tissue anatomy of some sections of the mandibular region is still unclear. It is difficult to obtain detailed anatomical findings by conventional gross dissection alone. The detailed anatomical findings of the mandible obtained in this study are essential for the development of anti-aging medicine.

continued on next page

Poster #44

*YU Jiaojia, John TRAN, and Anne M.R. AGUR. Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, M5S 1A8, Canada.

Saphenous Nerve and Inferior Medial Genicular Nerve: Implications for Knee Joint Denervation.

INTRODUCTION. Genicular nerve radiofrequency ablation(RFA) is used to treat osteoarthritis-related chronic knee joint pain. Recently, Beckwith et al. (2022) proposed an RFA protocol, that targets only the infrapatellar branch of the saphenous nerve (IPBSN). However, the IPBSN has been reported to be solely a cutaneous nerve. The purpose of this study was to determine the feasibility of mapping the 3D relationship of the branches of the IPBSN and inferior medial genicular nerve (IMGN) to visualize their course and quantify nerve capture rates based on RFA lesion size. METHODS. The IPBSN/IMGN with branches (N=1 embalmed specimen), were serially dissected, digitized, and modelled in 3D. The dissection/3D models were used to document the relationships of the nerves. The RFA lesion, as used clinically, was placed on the 3D model to determine and compare nerve capture rates. SUMMARY. The IPBSN did not innervate the knee joint capsule. It emerged posterior to the sartorius and split into superior and inferior branches. The superior branch coursed in the subcutaneous tissue overlying the knee joint line, superficial to the branches of the IMGN. The IMGN, originated from the tibial nerve, and coursed anteriorly just inferior to the medial tibial condyle, where it divided into three articular branches. The branches coursed anteriorly to supply the joint capsule superior and inferior to the knee joint line and then penetrated the joint capsule to terminate in the infrapatellar fat pad. The 3D model with RFA lesion revealed that both the IPBSN and IMGN would be captured by Beckwith et al. (2022) lesion. CONCLUSIONS. This technique is feasible for mapping the 3D relationship of IPBSN and IMGN. The results suggest that the Beckwith et al.(2022) technique, although targeting the IPBSN, would also capture the IMGN, accounting for their reported decrease in pain. Further anatomical and clinical studies are required to validate this preliminary finding.

Poster #5

*ZIMMERLE, J. Scott, Jonathan S. LALL, Said MALDONADO, Sydney T. GANDY, and Farnaz KARIMIGHOVANLOO. Tilman J Fertitta Family College of Medicine, University of Houston, 5055 Medical Cir, Houston, TX, 77204, USA.

Concomitant Presentation of Codominant Coronary Artery, Patent Foramen Ovale, and Chiari Network.

INTRODUCTION. Although findings related to Codominant Coronary Artery Circulation, Patent Foramen Ovale (PFO), and Chiari Network have been documented in isolation, there is a lack in literature detailing the unique case with the presence of all three cardiac anomalies concomitantly present in a single heart. The purpose of this case report is to detail a unique cadaveric heart case, and serve as reference to provide useful data for interventionalists and clinicians. METHODS. This observational cadaveric study assessed a single donor heart obtained through the University of Houston College of Medicine's Willed Donor Program. After meticulous dissection, relevant heart surface structures were isolated and identified. Morphometric analysis and measurements were obtained via a digital vernier caliper. SUMMARY. The donor heart exhibited a typical codominant coronary arterial scheme, in that the posterior interventricular artery arose as a merger between the right coronary and the circumflex on the postero-inferior surface of the heart when placed in the valentine orientation. Interestingly, the antero-lateral surface of the heart was supplied via a left marginal artery and an accessory left anterior interventricular artery. The elliptically-shaped PFO was displaced inferiorly towards the opening of the inferior vena cava (IVC) and was 24.21mm in transverse diameter. Patency of the PFO was measured from the right atrium to be 10.56mm transversely and 22.16mm vertically. The Chiari network's strands traversed the opening of the IVC and extended to the wall of the right atrium and the interatrial septum with the membranous portion primarily protruding from the eustachian ridge. CONCLUSIONS. Contribution to the existing knowledge base of unique concomitant cardiac anomalies, may prove to be a beneficial future reference for interventionalists in hopes that an expanded knowledge base may lead to comprehensive and safe implementation of a wide variety of procedures.

continued on next page

POSTER SESSION 3 – TUESDAY, JULY 11 FROM 3:15PM-4:15PM

Poster #87

AL ALI, Hasan[1], Nour GAMGOUM[1], Michael ATALLA[1], Andrew YACOUB[1], Ali SKIREDJ[1], Youssef SKIREDJ[1], Haider HILAL[1], Tarek ALMABROUK[1], James COEY[1,2], Kristna THOMPSON[1], and Sadia JAVAID[1]. [1]St. George's University School of Medicine, Northumbria University, Newcastle upon Tyne, NE1 8ST, United Kingdom; [2]Department of Anatomy, St. George's University, Grenada, West Indies.

A Comparative Study of Palmaris Longus Tendon Presence Using Physical and Ultrasound Examination.

INTRODUCTION. The palmaris longus muscle, located in the forearm's anterior compartment, plays an essential role in wrist flexion, and its tendon is often used for grafting because of its accessibility and minimal function. However, its anatomy varies, with congenital absence being the most common. This study aims to detect the incidence of palmaris longus muscle tendon and to compare physical examination methods with standard ultrasonography, as previous studies have only utilized physical examinations. METHODS. In this study, 61 participants were examined bilaterally (122 wrists) using three different physical examination methods (Schaeffer, Thompson, and Mishra 1 tests). The ultrasonography test was conducted by a single observer using a GE LOGIQ e ultrasound system equipped with a linear transducer with a frequency range of 12-15 Hz attached transversely to the anterior distal forearm. This tendon was visualized anteriorly to the median nerve, medially to the flexor carpi radialis, and superficially to the flexor retinaculum. In order to assess the difference between the physical examination compared to ultrasound, statistical analyses were conducted on subgroups using t-test. Additionally, palmaris longus incidence was evaluated according to gender. SUMMARY. On ultrasound examination, the palmaris longus tendon was detected in 72.1% of wrists bilaterally, 11.5% unilaterally, and it was absent in 16.4% of the 122 wrists examined. Physical examination methods detected an average of 65.3% bilaterally, 13.1% unilaterally, and 30.6% absent. Overall, there is a significant difference between the physical examination methods and ultrasonography in detecting palmaris longus with ultrasonography having greater accuracy. It should also be noted that the prevalence of palmaris longus is not affected by gender. CONCLUSIONS. According to the study, ultrasonography is crucial in clinical settings to confirm the presence of the palmaris longus tendon, even when a physical examination is inconclusive. Physical and ultrasound approaches can therefore be combined in order to avoid producing incorrect negative results when locating the palmaris longus for tendon grafting.

Poster #48

*ANGELES, Miguel and Sakti SRIVASTAVA. Division of Clinical Anatomy, Stanford University School of Medicine, Stanford, CA, 94305, USA.

Bilateral Flexor Digitorum Accessory Longus Found in Cadaver Dissection.

INTRODUCTION. The development of the flexor muscles of the foot and toes is a process that involves calf muscles, flexor digitorum longus, flexor hallucis longus and quadratus plantae. Different types of anatomical variations of these muscles have been described in humans. The Accessory Flexor Digitorum Longus is one of those variations. RESOURCES. A case of Bilateral Accessory Flexor Digitorum Longus was found during the dissection laboratory in the Clinical Anatomy class for medical students at the Division of Clinical Anatomy at Stanford. DESCRIPTION. The donor was an 83-year-old male who died of end stage chronic interstitial disease. The Accessory Flexor Digitorum Longus was present bilaterally. In both sides, its proximal attachment was on the deep posterior fascia that covers the flexor digitorum longus, flexor hallucis longus and tibialis posterior, the muscle belly was located in the tarsal tunnel between the flexor digitorum longus and flexor hallucis longus and the distal tendon attached to the medial border of the quadratus plantae. SIGNIFICANCE. The presence of Accessory Flexor Digitorum Longus may be involved in the etiology of Tarsal Tunnel Syndrome (TTS), and it should be kept in mind in the evaluation of ankle pain.

Poster #57

*ARSENAULT, Luke A[1], Joshua MCCLUSKEY[1], and Brion BENNINGER[1,2]. [1]Medical Anatomy Center, Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. [2]Faculty General Surgery, Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.

POCUS of Hoffa's Fat Pad and Infrapatellar Plicae of Novel vs Traditional Cadaver Dissections.

INTRODUCTION. Knee joint pathology is extremely common and debilitating. The knee has a known structure termed Hoffa's fat pad which has a characteristic shape and plicae has been found to be associated with pain and knee deterioration which can result in osteoarthritis. Hoffa's knee disease/syndrome is a common condition and is a severe pathology of the knee joint in many subjects. POCUS ultrasound can be a convenient method of primary diagnosis of this pathology. However, in the literature only a single study provided an analysis of the characteristic ultrasound image of Hoffa's disease/syndrome regarding its most common and pathognomonic symptoms. The study objective was to identify Hoffa's fat pad with POCUS ultrasound and cross-sectional scanning comparing cadaver preparations with subsequent dissection of the fat pad assessing its morphology. METHODS. Literature search revealed no known cadaver studies regarding ultrasound and cross-sectional imaging of Hoffa's fat pad and structures. Exclusion criteria included knee replacement and/or multiple knee surgeries. Novel GAX-specimens (6 bodies, n=12 knees, M:4, F:2) and

continued on next page

traditional embalmed cadavers-TEC (15 bodies, n=26 knees, M:9, F:6) were scanned with MRI, contrast CT and GE Vscan Air probes, followed by open dissection. Four knees from TEC were excluded for a total of 38 knees. SUMMARY. POCUS ultrasound identification of the fat pad was confirmed on all knees with the TEC knees having a broader range of poor image quality. 12 GAX knees had superior quality image acquisition versus the 38 TEC knees. GAX dissections revealed lifelike dermis during knee palpation and range of motion, knee fat pads and associated structures were realistic regarding texture, responsiveness to surgical tools, hydration and appearance. The TEC knees had a hardened waxy dermis, essentially no range of motion which made palpation very difficult, fat pads and associated structures were very firm and less compliant, decrease responsiveness to surgical tools, dehydrated and dull in color fat pad. CONCLUSIONS. Based on the two types of cadaver mediums, imaging and dissection included in this study, GAX-specimens demonstrated superior POCUS identification and dissection of Hoffa's fat pad suggesting a fertile training medium integrating ultrasound with dissection.

Poster #90

AYUB KHAN, Rafika Munawara, Chiman KUMARI, Ranjna JANAGAL, Anmol SINGH, Ria SHARMA, and Aditi VISHWAJIT. Department of Anatomy, Post Graduate Institute of Medical Education and Research, Chandigarh, CH, 160012, India.

Utilizing Early Surgical Exposure Module to Enhance Clinical Anatomy Correlation.

INTRODUCTION. In the Early Surgical Exposure (ESE) module, the students will be taught to conduct simple procedures in the cadaver along with routine dissection. This module will remind the students of the importance of anatomical knowledge in clinical practice. However, the evaluation of objective and motivational outcomes is crucial before allocating precious anatomy hours for this module. METHODS. A randomized-controlled study was conducted to compare the objective outcome of the ESE method as compared to the routine dissection. A 15-minute common briefing session was given where clinical anatomy was explained theoretically. Followed by a random allocation of participants to group A (n=48, dissection only) and group B (n=56, procedural exposure and dissection). Topics include the spinal cord, pleura, and femoral triangle in which simple procedures like lumbar puncture, pleural tap, and arterial blood gas analysis were taught respectively. Post-test was conducted immediately after the sessions (Test 1) and four weeks later (Test 2) to assess the retention of the subject. Cognitive outcome was assessed using Miller's framework. The feedback was taken with prevalidated 22-item questionnaire. SUMMARY. There was no significant difference between group A (Test 1=83.2%±13.7; Test 2= 64.5%±9.2) and group B (Test 1=79.5%±15.3; Test 2= 64.3%±12.6) in both the tests. But, interestingly group B, showed a reduction in score of only 5% as compared to group A which showed a 19% reduction in score. The cognitive domains showed better outcomes in group B in the application (Miller's Level 2) questions though it was not statistically significant. However, the students felt that their approach to anatomy with clinical correlation significantly improved after ESE sessions. The majority of the students wanted these sessions to be made mandatory and conducted for 30 to 60 minutes once a week. CONCLUSIONS. ESE sessions can be introduced sporadically to motivate and encourage the critical application of anatomical knowledge among the students.

Poster #51

*BAEZ, Ramona, Domaldy DE JESUS, Faatin SALEKIN, Raul FRANCO, Ahmed SHABIR, and Sushama RICH. Anatomy Department, Touro College of Osteopathic Medicine, New York, NY, 10027, USA.

Bilateral Anterior Scalene Muscle Trifurcation and Rare Left Sided Formation of the Brachial Plexus.

INTRODUCTION. The Brachial Plexus (BP), a major nerve network supplying the upper limb, is formed by the anterior rami of nerve roots C5-T1 at the lateral border of the Anterior Scalene Muscle (ASM). Roots will join to form three trunks: the Superior Trunk (ST), Middle Trunk (MT), & Inferior Trunk (IT). Each of these trunks split into Anterior Division (AD) & Posterior Division (PD) joining to form cords. The PD forms the posterior cord, the ST & MT form the Lateral Cord (LC) & IT form the Medial Cord (MC). Near the Axillary Artery, cords give off their terminal branches. ASM originates on the transverse processes of C3- C6 & attaches to the first rib. The ASM & Middle Scalene muscle (MSM) form the interscalene triangle, allowing the passage of the BP from the root of the neck into the cervico-axillary canal located posterior to the clavicle. RESOURCES. During anatomy lab, medical students dissected & exposed the root of the neck of a 94 y/o male donor with unknown cause of death. Documentation of the formation & relationship of the BP to the ASM was performed & aberrant structures were painted & photographed. DESCRIPTION. Ventral roots C5 & C6 pierced the ASM bilaterally dividing it into three bellies. Additionally, on the left side of the neck, the ST was formed by the union of C5 & C6 right after exiting the anterior surface of it. The MT was formed by C7 & C8, & IT was formed by T1. The MT united with IT to form the IT proper. The PD & PC were anatomically normal; IT proper divided & joined the ST to form the LC & MC and its branches. This variation of the BP has not been reported previously. SIGNIFICANCE. Based on our discovery an individual with this anomaly may have a possible scissor type compression on cervical nerve roots in the anterior & lateral neck. Open fasciotomy would be the best course of treatment since nerve blocks can be problematic as the BP deviates from the interscalene groove, which is where anesthetics are usually instilled.

continued on next page

Abstracts - Poster Presentations continued

Poster #9
*BARTH, Colin A., Jonathan S. LALL, and Christyn E. HARKINS. Department of Biomedical Sciences, College of Medicine, University of Houston, Houston, TX, 77204, USA.
Feasibility of Ultrasound as an Accurate Device When Evaluating the Referential Course of the PLM.

INTRODUCTION. As a common tendon of choice in surgical grafting/repair procedures, accurate assessment for the presence and referential course of the Palmaris Longus Muscle (PLM) is imperative to prevent surgical complications. This study assesses the feasibility of Point of Care Ultrasound (POCUS) as an accurate measurement device when evaluating the course of the PLM in reference to surrounding anatomical structures. METHODS. This observational cadaveric study was composed of a sample size of N=18 cadaveric donor forearms (FA) assessed through the University of Houston via the Willed Donor Program. Prior to dissection, using a Butterfly iQ+ and digital vernier caliper, measurements in anatomical position were obtained in reference to lateral/medial surfaces as well as the width of the PLM at the interstyloid line (ISL), then at 20-40mm increments proximal to the ISL. Following this step, dissection of the upper extremity was performed followed by repeat measurements of the dissected forearms, and relationships were analyzed. SUMMARY. A strong positive and statistically significant correlation was noted between POCUS vs. Dissected measurements of the Lateral surface of the FA to the lateral edge of PLM at the ISL($r=0.920$, $p=0.011$, $df=17$), 20mm proximal from ISL($r=0.960$, $p<0.001$, $df=17$), 40mm proximal from ISL($r=0.921$, $p=0.029$, $df=17$), 80mm proximal from ISL($r=0.910$, $p=0.008$, $df=17$), and 120mm proximal from ISL($r=0.971$, $p=0.049$, $df=17$). A strong positive and statistically significant correlation was noted between POCUS vs. Dissected measurements of the medial surface of the FA to the medial edge of the PLM and width at all increments from ISL to 200mm proximal from ISL. CONCLUSIONS. This study's findings suggest that Butterfly iQ+ POCUS is a viable tool in the accurate measurement and referential course mapping of the PLM. Implications include use of POCUS prior to surgical grafting in order to accurately predict the course of the PLM.

Poster #18
*BERNSTEIN, Emily E.[1], Beverly S. CHILTON[2], Jannette M. DUFOUR[2] , and Gurvinder KAUR[1]. [1]Department of Medical Education, Texas Tech University Health Sciences Center, Lubbock, TX, 79430, USA; [2]Department of Cell Biology and Biochemistry, Texas Tech University Health Sciences Center, Lubbock, TX, 79430, USA.
Connecting the Layers: Enhancing Medical Students Knowledge of Male and Female Perineum Anatomy.

INTRODUCTION. First year medical students (MS1s) at our institution begin their medical training by learning human anatomy through lectures and cadaveric dissections in the Anatomy, Histology and Embryology (AHE) block. Historically, pelvis and perineum (P&P) anatomy is considered the most difficult topics. A needs-analysis was performed by surveying MS1s (n=47) who had completed anatomy with 73% indicating P&P anatomy as the most difficult with limited resources, time, and old models hindering their ability to master content. We hypothesized that additional educational resources on P&P anatomy would enhance student learning. METHODS. A stepwise male and female perineum dissection manual to facilitate P&P dissection in conjunction with a review session focused on P&P was provided. Medical students were given a pre-test (15 minutes prior to review) and post-test (immediately after the review) to determine the efficacy of the dissector manual and the review to assess students' understanding and readiness of P&P. SUMMARY. Before the review, 77% (n=125) of students mentioned P&P anatomy as the most intimidating topic in AHE, 27% felt prepared and 73% felt overwhelmed with P&P anatomy. After 65% (n=118) mentioned P&P anatomy as the most intimidating topic in AHE, 65% felt prepared and 35% felt overwhelmed with P&P anatomy. Overall, student performance showed improvement (pre-test = 67%, n=127 and post-test=74%, n=120; p=0.3). Additionally, MS1 performance on the P&P section of the National Board of Medical Examiners was better as compared to other medical schools (Our institution -75%; National average-69%). CONCLUSIONS. A newly created stepwise perineum dissection manual alongside an in-depth review directly impacted students' knowledge over the male and female perineum, which translated into improved student performance. Future studies should incorporate additional P&P resources to better student learning. (QIRB approval #: 22069)

Poster #102
CAMPBELL, Drew M., Veronica ROSEN, Heather BALSIGER, Diana PETTIT, Shaked LAKS, and Ricardo BELMARES. Department of Medical Education, Paul L. Foster School of Medicine, El Paso, TX, 79905, USA.
Using Online Radiology Education to Impact Medical Student Performance on GI Anatomy Objectives.

INTRODUCTION. There has been great interest in implementing online medical education models in recent years, driven in part by the COVID-19 pandemic and popularity of virtual platforms. Perhaps no subject has undergone more significant challenges during this time than gross anatomy. This has required the use of innovative approaches to teach medical students the interpretation of clinical imaging, thereby preparing them for the clerkships. Evaluating the efficacy of novel teaching approaches can help educators fill in knowledge gaps. METHODS. Mandatory online modules were developed to teach radiological anatomy to 1st year medical students in the gastrointestinal unit. Each lab included a lab pre-test, clinical-case post-test, and an imaging module post-test. Final assessment was a practical exam with four imaging-specific question. Total live anatomy instruction was one hour per week, coupled with three

continued on next page

hours of asynchronous materials. SUMMARY. Reported scores included pre-test questions (82%), clinical case quizzes (80%), post-test questions (85%), practical exam (82%) with imaging-specific questions at 90%. CONCLUSIONS. Average scores on the radiology post-test were significantly higher than the pre-test ($p < .05$), indicating that asynchronous radiology modules can be effective for teaching 1st year medical students. Overall, the average scores for all assignments and exams were strong, indicating that medical programs with less in-person anatomy instruction can still be effective in teaching anatomy.

Poster #36

CHANT, Ginger G., Kristof S. GUTOWSKI, Janice A. WANG, John R. DOBSON III, Larry W. SEGARS and Jennifer F. DENNIS. Department of Pathology and Anatomical Sciences, Kansas City University, Kansas City, MO, 64106, USA.

Association between Age and Renal Artery Stenosis Classification: A Cadaver Study.

INTRODUCTION. Renal artery stenosis (RAS) is a pathological condition that narrows the lumen of the renal artery, reducing blood flow to the kidney. RAS can lead to refractory hypertension and end stage renal disease. Literature has shown an increase in mortality and shortened survival in cardiac catheterization patients and hemodialysis patients with renal artery stenosis, respectively. A guideline on which patient populations to screen for renal artery stenosis has yet to be defined; however, age has been shown to be a significant factor in the development of renal artery stenosis. The present study will identify which patient age ranges are at highest risk for developing renal artery stenosis. METHODS. Renal artery samples were taken from 30 formalin-embalmed cadavers from Kansas City University to assess renal arterial stenosis in association with age. The left renal arteries were removed from each body and divided into 3 mm segments and stained for histological analysis. Specimens were analyzed under light microscopy. The lumen area and area circumscribed by the internal elastic lamina were measured and the stenosis of each segment was documented and organized into age groups to assess for average percent stenosis among age groups. SUMMARY. An analysis of variance test was performed and a correlation between the age of the donor and renal artery stenosis was observed. CONCLUSION. Physicians would benefit from knowing that their patients are at risk for a certain degree of renal artery stenosis based on their age. Additionally, this information serves as evidence for creating guidelines on which patient populations to screen for renal artery stenosis.

Poster #39

*CORNISH, T'Kayhlia[1] and Sarah GREENE[2].[1]Master of Science in Biomedical Research Program, Morehouse School of Medicine, Atlanta, GA, 30310, USA; [2]Department of Pathology and Anatomy, Morehouse School of Medicine, Atlanta, GA, 30310, USA.

How the Anatomy of Anatomy Drawing Tutorials Impacts Academic Performance.

INTRODUCTION. The use of online educational media in anatomy is common among medical students. Various types of online media have been created; however, exploring how to create videos that are ideal in terms of length and content to promote student success has received less attention. The purpose of this study was to evaluate three drawing tutorials of varying lengths and difficulty to determine: 1) Total viewing time (TVT) and average VT (AVT) across views, 2) Student reported viewing speed (VS), 3) How students reported using videos, and 4) practical examination performance (PEP). METHODS. For each video, TVT and AVT were recorded for each student (n = 113) in the 2021-22 first-year medical student class. Students were surveyed about VS and methods for viewing videos. Data were evaluated for differences in TVT, AVT, VS, viewing methods, and PEP. SUMMARY. In general, 86 students (76.1%) viewed the shortest video (Arteries of Posterior Abdominal Wall [APW]; 3.6 min), 83 students (71.6%) viewed the mid-length video (Arteries of the Pelvis [AP]; 11.7 min), and 94 students (83.2%) viewed the longest video (Arteries of the Head and Neck [AHN]; 16.4 min). There were no significant differences in TVT, AVT, VS, and PEP for these videos. The difference between the AVT for students who viewed at versus above normal VS for AP approached significance. Students who reported not drawing along with AP had significantly higher TVT (21.3±14.2 min; n=25) than students who did not select this method (12.9±2.6 min; n=5; $P=0.01$). The difference between students who did and did not report scrolling to the end of AHN and printing the final picture approached significance. Students who reported drawing from memory had significantly higher PEP for two exams ($P<0.05$, $P=0.05$, respectively). CONCLUSIONS. A majority of students utilized these videos and reported methods of viewing impacted TVT and PEP. Data are continuing to be evaluated from the current year to increase survey response data for VS.

Poster #105

FIDLER, Drew C., Britany DYER, Makayla FARR, Youmna ELKAMHAWY, Sammy ELMOR, D'angelo STOKES, and Arya SAVITA. Philadelphia College of Osteopathic Medicine, South Georgia Campus, GA, 31768, USA.

Widespread Cutaneous Metastasis of Oropharyngeal Cancer.

INTRODUCTION. Oropharyngeal Cancer (OC), is primarily caused by squamous cell carcinoma. OC is often categorized into HPV-associated carcinoma or non-HPV-associated carcinoma. While research has investigated common gene mutations associated with an increased risk of OC, there are only a few cases highlighting genes that lead to its cutaneous spread, which represents less than 10% of cases. This study's objective was to determine what genetic/environmental factors may have contributed to the developing of multiple OC metastatic tumors with significant and otherwise rare cutaneous spread. METHODS. This was a cadaveric study that involved taking tissue samples from various sites on the skin, lungs, trachea, and submandibular lymph nodes from a

continued on next page

cadaver. Tissue samples were processed at the pathology lab at Colquitt Regional Medical Center. Histology slides were analyzed on routine hematoxylin and eosin stains. Special stains (Ki-67, p16, and p53) were used to characterize the tumor further. SUMMARY. Histopathological samples revealed a moderately differentiated keratinizing squamous cell carcinoma of the oropharynx. Tumor sections showed sheets and nests of malignant tumor cells with enlarged hyperchromatic nuclei, polymorphism, and numerous necrotic centers. Skin samples indicated the spread of the tumors through muscular layers and subcutaneous tissue leading to skin infiltration and ulceration. Lymph nodes showed tumor metastasis and anthracosis in the form of black pigment deposition in the lymph nodes. Lung tissue samples also displayed tumor metastasis and Ki-67 staining was highly positive that reflected the proliferative index of the tumor. Approximately 90-95% of tumor cells were positive for p16. Tumor samples were negative for P53 markers. These findings may help contribute to the body of evidence that infection of HPV and risk factors as in this case smoking, may contribute to the cause of metastatic oropharyngeal cancer, including rare instances where the spreading of oropharyngeal malignant cancer cells travel to the skin. CONCLUSIONS. Analysis of cadaveric samples of tissue biopsies revealed genetic factors that are the likely major contributors to disease manifestation and/or metastasis. These findings indicate HPV-associated oropharyngeal squamous cell carcinoma.

Poster #96

HAFFERTY Kiana [1], Alexander OLDEN[1], Ruben ESTRADA[1] and Brion BENNINGER[1,2]. Medical Anatomy Center[1], Western University of Health Sciences, COMP–Northwest, Lebanon, 97355, OR, USA. Faculty General Surgery[2], Samaritan Health Services, Lebanon and Corvallis, 97355, OR, USA.

Comparing Deep Fascia of Lower Limb from Novel Imaged Prepared Specimens and Formalin Fixed Donors.

INTRODUCTION. Lower limb (LL) musculoskeletal teaching to healthcare students as didactic and dissection mediums almost exclusively focuses on muscles, innervation, tendons, ligaments and their bony attachments. Deep fascia (DF) of the LL is of greater importance then often afforded in anatomy courses. Interestingly DF morphs itself depending on the desired function and location, often earning separate terminology throughout LL which can be challenging. Clinically, LL DF fascia are associated with compartment spacing, venous patency and return, absorbing and redirecting energy around joints, proprioception, causes of pain/tenderness especially in adolescent and adult amateur/professional sporting people, surgical planes and needle placement procedures. LL DF issues can be treated via conservative and/or surgical techniques. The study objective is to highlight LL DF by dissecting novel prepared imaged (GAX) specimens and formalin-fixed cadavers (F-FC). METHODS. Literature search was conducted on LL DF studies with GAX specimens and contemporary teaching. CT/MRI and ultrasound imaging of 6 GAX-specimens (12 LL) and ultrasound imaging of 16 F-FC (31 LL). Each LL will have DF palpated, have range-of-motion (ROM) assessed, and highlight DF dissection from GAX-specimens and F-FC. SUMMARY. Literature search revealed no previous GAX-specimen studies and minimal time was spent on LL DF compared to other musculoskeletal stuructures of LL from didactic or dissection lab teaching. CT/MRI and ultrasound revealed LL DF from 12 LL's of GAX-specimens. F-FC ultrasound revealed DF in some regions with limited to poor quality. GAX-specimens revealed DF movement during normal joint ROM and layering with DF dissection. F-FC demonstrated DF on dissection, limited ROM dissecting layering. F-FC tissue was less compliant, dehydrated and rigid whereas GAX-specimen DF was supple, hydrated and flexible. LL dissection of DF revealed the varied shapes, thickness and fiber orientation which exits throughout the LL. CONCLUSION. This study suggests dissecting and imaging LL GAX-specimens can better emphasize DF function and clinical associations regarding radiology, physical examination, conservative and surgical treatments improving normal and pathological musculoskeletal knowledge of healthcare trianees.

Poster #84

HAN, Aya[1,2], Koichi WATANABE[1], Yoko TABIRA[1], Joe IWANAGA[1], Keishiro KIKUCHI[1], Kouichi YAMAKI[1], and Tsuyoshi SAGA[3]. [1]Department of Anatomy, Kurume University School of Medicine, Kurume, Fukuoka, 830-0011, Japan; [2]Department of Plastic and Reconstructive Surgery, Kurume University School of Medicine, Kurume, Fukuoka, 830-0011, Japan; [3]Domain of anatomy, Kurume University School of Nursing, Kurume, Fukuoka, 830-0011, Japan.

A Case of Persistent Sciatic Veins of Both Lower Extremities.

INTRODUCTION. Persistent sciatic vein (PSV) is a vascular malformation of the lower extremities that can occur in Klippel-Trenaunay syndrome. The sciatic artery, which is the main artery of the lower extremities in the fetus, and the sciatic vein are usually absent in adults because they are replaced by the femoral artery and vein around the 22-mm stage. Here we report a case with PSV in both lower extremities. RESOURCES. A 97-year-old female cadaver donated to our medical school. DESCRIPTION. We found PSVs in both lower extremities during a dissection course. No other cardiovascular anomalies were found. The popliteal vein usually passes through the hiatus tendineous adductorius and is renamed the femoral vein, ascending posteriorly to the femoral artery. However, on the right leg of the present case, the vein that accompanied the popliteal artery did not pass through the hiatus tendineous adductorius but ascended the posterior thigh and penetrated at the head of the adductor magnus muscle, accompanying the deep femoral artery, and then joined the medial and lateral circumflex femoral veins and the great saphenous vein, suggesting a PSV. The vessel had a maximum diameter of approximately 7 mm and functioned as the main vein of the lower extremity. On the left leg, a similar vein was present, with a maximum diameter of approximately 3 mm. This vessel, which ascended the posterior thigh and

continued on next page

penetrated the intermuscular space under the quadratus femoris muscle, was identified as a PSV based on its course. SIGNIFICANCE. There are reports of PSV cases identified via imaging studies, but there are few reports of PSVs identified by gross anatomical dissection. PSV may be associated with chronic venous valve insufficiency or varicose veins and may cause stasis dermatitis. Moreover, accidental ligation or amputation of PSVs during lower extremity surgery can result in the loss of major veins returning to the trunk, putting the patient at risk for postoperative complications to the lower extremities, such as venous stasis. Therefore, it is important to keep PSV in mind when evaluating venous flow paths with venous echocardiography or CT scan.

Poster #6

*HARKINS, Christyn E., Jonathan S. LALL, and Colin A. BARTH. Department of Biomedical Sciences, College of Medicine, University of Houston, Houston, TX, 77204, USA.

Proposal for New Classification of a Variation of Palmaris Longus Muscle Named Palmaris Oblongus.

INTRODUCTION. The palmaris longus muscle/tendon is commonly used as a tendinous graft for reconstructive surgeries. The variations of the palmaris longus muscles (PLM) are well documented and include bifid/trifid of PLM, digastric muscle belly (proximal and distal belly), duplication/triplication of PLM, reversed muscle (coexisting with DM), intermediate muscle belly, palmaris accessorius (with proximal/distal variation), hypertrophied PLM, PLM profundus, and absent PLM (most common 20.25%). Upon dissection of a cadaveric forearm (FA), a PLM tendon with a disproportionately long tendon, as evidenced by an increased tendon to muscle ratio, was discovered. As such, a proposal for a new classification of palmaris longus muscle named palmaris oblongus is proposed. METHODS. During meticulous cadaveric dissection of the donor's right FA from the Willed Donor Program at the Tilman J. Fertitta Family College of Medicine, the anomalous PLM presentation was noted. After dissection, measurements were obtained using a digital vernier caliper (in mm), and pictures were taken with the cadaver in anatomical position. SUMMARY. The length of the PLM tendon was measured at 181.19mm, while the length of the PLM muscle belly was 63.66mm. The tendon to muscle ratio was 2.85 in the right FA without gradual muscle tapering. Furthermore, length of the forearm was measured at 235.50 mm, yielding a FA to PLM tendon ratio of 1.30. The width of the PLM at muscle-tendon junction was 92.60 mm. CONCLUSIONS. Palmaris oblongus has a similar nature to palmaris longus, with a higher tendon to muscle ratio. The palmaris oblongus observed has a relatively longer tendon, which could provide surgical graft benefits pending analysis on tensile strength and graft feasibility. This unique presentation of PLM noted in this study may provide insight into the vestigial nature and current evolutionary interpretation of the PLM's variations, functionality, and frequent agenesis.

Poster #27

*IWANAGA, Joe[1-3] and R. Shane TUBBS[1,2]. [1]Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [2]Department of Structural & Cellular Biology, Tulane University School of Medicine, New Orleans, LA, 70112, USA; [3]Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, 1138519, Japan.

Can the Perceived Ligamentum Arteriosum in Adults Still Be a Ductus Arteriosus?

INTRODUCTION. It is widely accepted that the ductus arteriosus in the fetus becomes the ligamentum arteriosum in adults. As the ligamentum arteriosum is assumed to become ligamentous in most adults, investigations of this structures in adults have been scant. However, we have occasionally seen duct-like structures within the ligamentum arteriosum. To investigate these structures further, a histological study was performed. METHODS. Twelve ligamenta arteriosa from adult human cadavers were used in this study. All cadavers were preserved with formalin and none were found to have signs or a previous medical history of, a patent ductus arteriosus. The ligamenta arteriosa were cut in the axial plane and then histologically observed with Masson's trichrome staining. SUMMARY. The majority of the specimens were found to have a lumen which was surrounded by connective tissue. Additionally, vessel-like structures within the ligamenta were observed. CONCLUSIONS. To our knowledge, this is the first histological study to demonstrate a lumen within the ligamentum arteriosum in adults. These data could better elucidate our understanding of the pathology and etiology of a patent ductus arteriosus.

Poster #42

*KIM, Soo Y[1], Rhonda LOEPPKY[1], Katherine M. HENDERSON[2], Anne A.M. AGUR[2], and Angelica LANG[3]. [1]School of Rehabilitation Science, University of Saskatchewan, Saskatoon, SK, S7N 2Z4, Canada; [2]Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, M5S 1A8, Canada; [3]Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan, Saskatoon, SK, S7N 2Z4, Canada.

Anatomical and Kinematic Insights Informing Exercises Post-Mastectomy and Breast Reconstruction.

INTRODUCTION. Following breast cancer treatments, such as mastectomy and reconstruction, many survivors experience shoulder dysfunction. The reported prevalence of shoulder pain is as high as 68%. Until recently, the anatomic and kinematic underpinnings contributing to these shoulder morbidities have not been well understood. Consequently, rehabilitation exercises have often been symptom-driven and generic. With new insights, however, opportunity for our team to re-evaluate common exercises and tailor

continued on next page

different shoulder activities based on novel findings has been possible. RESOURCES. Findings from a recent cadaveric study where the pectoralis major of specimens with mastectomy were volumetrically dissected, digitized, and modelled in 3D, along with data from a recent kinematic study of women with mastectomies and breast reconstruction served as resources. Our team, which included physical therapists, a clinical anatomist, and a biomechanist, evaluated exercises outlined in pamphlets provided to breast cancer patients following surgery. DESCRIPTION. An eight-week shoulder rehabilitation program for patients post-mastectomy and reconstruction was developed. Emphasis on tailoring exercises to facilitate stretching and strengthening of lower partitions of pectoralis major were made since cadaveric findings demonstrated that scarring, loss of muscle volume, and shortening of fiber bundles were most profound in this region. Focus on exercises able to promote co-contraction of the shoulder girdle muscles was made because kinematic findings of scapular tilt and humeral axial rotation were suggestive of stability issues. SIGNIFICANCE. The practical application of anatomical and kinematic knowledge is critical to advancing clinical care. The tailored shoulder exercise program is currently being used on a custom mobile app that is available for breast cancer survivors and will be incorporated into future clinical studies.

Poster #60

*LEE, Nikita T., Jickssa GEMECHU, Stefanie ATTARDI, and Malli BARREMKALA. Oakland University William Beaumont School of Medicine, Rochester, MI, 48309, USA.

The Impact of Student-Led Anatomy Mockticals on Performance and Learning in Medical School.

INTRODUCTION. The concept of practice lab practical exams (PLPE) has long been known to improve the students' performance in health professions education. However, a novel approach to PLPE was introduced as mockticals (mock practicals). These mockticals differ from traditional PLPE as they are entirely student-led yet maintain the high-stress test-taking environment of a lab practical exam (LPE). This study aims to investigate the value of these mockticals on learning anatomy in medical school. METHODS. A week before a midterm or final mocktical exam, each dissection group, consisting of 5-6 first year medical students (M1), contributes to the mocktical by tagging their donors for a total of 50 questions in the same format as a LPE. The M1s took four mockticals on iPads in the span of two anatomy courses. Each mocktical included three optional Likert scale questions that asked how prepared M1s felt for their upcoming lab exam. The iPad usage allowed for student responses and scores to be tracked and used for analysis. SUMMARY. Close to full attendance was observed from the M1 class (N=125) in each mocktical despite it being optional, thus showing the unique benefits of mockticals. A 2-sample t-test (N=90), showed that M1s who scored 70-89% on the mocktical exam had more preparedness than those who scores less than 70% (3-question Likert scale means scores of 6.8 vs 4.8; 7.3 vs 5.1 and 6.5 vs 5.0 respectively) which showed to be statistically significant (p-value <0.05). CONCLUSIONS. The preliminary data analysis showed that increased perceived preparedness is positively correlated with higher mocktical scores. Further exploration is currently being conducted to examine correlations between the mocktical and practical exam scores. Additionally, this study will explore a more in-depth understanding of the value of mockticals with focus groups.

Poster #45

*LESSER, Ashley P. [1], Tamara S. STOJILKOVIC[1], Kelsey A. STAUDINGER[2], and Anthony B. OLINGER[1]. [1]Anatomy Department, Kansas City University, Kansas City, MO, 64106, USA. [2]Department of Surgery, Swedish Medical Center, Englewood, CO, 80113, USA.

Anatomic Variations of Calot's Triangle: A Cadaveric Study.

INTRODUCTION. Calot's triangle is a triangular space near the porta hepatis formed by the cystic duct, the common hepatic duct, and the inferior edge of the liver. The cystic artery travels through this triangle. This is the area of dissection during a laparoscopic cholecystectomy. Anatomic variations within this region may exist, and failure to recognize these differences can result in iatrogenic biliary injury or hemorrhage. This study seeks to better understand the anatomic variations within Calot's triangle. METHODS. Fourteen formalin-embalmed cadavers were dissected from the Kansas City University body donor program. Dissection of Calot's triangle was performed to expose the cystic artery, cystic duct, common hepatic duct, and the inferior edge of the liver. The following measurements were then taken with a digital caliper: (1) the length of the cystic artery between the common hepatic duct and gallbladder, (2) the distance along the common hepatic duct from the bile duct to the cystic artery, (3) the distance along the cystic duct from the bile duct to the neck of the gallbladder. Statistical analysis was done using SPSS. SUMMARY. The cystic artery was found to have a mean length in Calot's triangle of 6.31 mm (range 1.14-12.85 mm). Cystic Duct was found to have a mean length of 8.67 mm (range 1.7-21.91 mm). The common hepatic duct was found to have a mean length of 6.94 mm (range 2.13-15.2). In addition, the cystic artery was found traveling posterior to the common hepatic duct 71.5% of the time and running anterior to the common hepatic duct 28.5% of the time. CONCLUSION. Understanding the distances and variations that make up Calot's triangle will decrease morbidity and help decrease the number of surgical complications during laparoscopic cholecystectomy.

continued on next page

Abstracts - Poster Presentations continued

Poster #33
*LOWRY, Caitlin V., Vishal V. BANDARU, Anthony A. HEWETSON, Keith N. BISHOP, Brandt L. SCHNEIDER, and Gurvinder KAUR. Department of Medical Education, School of Medicine, Texas Tech University Health Sciences Center, Lubbock, TX, 79430, USA.
Case Study: Descendens Vagi Replacing Normal Ansa Cervicalis.

INTRODUCTION. The ansa cervicalis is a neural loop generally consisting of a superior root arising from C1 and C2 ventral rami and an inferior loop consisting of contributions from ventral rami of C2 and C3. The superior root supplies 3 of the 4 infrahyoid muscles – sternohyoid, sternothyroid, and omohyoid before it joins the inferior root and forming the ansa cervicalis. This case study describes an abnormal presentation of an ansa cervicalis on the left side of a cadaveric dissection. RESOURCES. During the routine cadaveric dissection of the left carotid triangle (anatomy lab of Texas Tech University Health Sciences Center), a unilateral variation was observed in the formation of ansa cervicalis by a medical student. DESCRIPTION. The case presentation of the ansa cervicalis had a superior root hitchhiking with the vagus nerve within the carotid sheath and the C2 and C3 contributions joining the superior root independently and medially to the internal jugular vein. The superior root descends directly down the vagus nerve in the same connective tissue envelopment without meeting the hypoglossal nerveand was lateral to the C2 and C3 contributions. Together the vagus nerve, superior root, and inferior root run within the carotid sheath in one fascia sheath rather than forming a loop. Muscular branches to the infrahyoid muscle emerge after the nerve roots run together in the vagus sheath and follow typical muscular innervation patterns. Two additional aberrations existed: the C2 root sends a contributory branch to the C3 root before the C3 root joins the superior root and then attachment between the vagus and superior root exists indicating a possible vagocervical plexus. SIGNIFICANCE. The ansa cervicalis has been known to have a variety of possible variation types between different individuals. However, the frequency of superior root aberrations is low and the possibility of a true vagocervical plexus has been frequently debated. This case study will help build upon the current knowledge of ansa cervicalis aberrations.

Poster #69
*MEAWAD, Sara G., Tristan C. HENRIS, Ansley MYRICK, Savita ARYA, and Shiv DHIMAN. Philadelphia College of Osteopathic Medicine, Moultrie, GA, 31768, USA.
Prevalence of Hyperostosis Frontalis in Georgia Elderly Cadaver Population.

INTRODUCTION. Hyperostosis frontalis interna (HFI) is a condition that causes a benign thickening of the frontal bone. Many studies in the past have correlated sex with the incidence of HFI. Additionally, females, especially those postmenopausal, seem to be the predominant group affected. The primary objective of this study is to explore incidence of HFI and how it relates to the different sexes. The secondary objective is to further investigate the correlation of HFI with liver and gonadal pathologies. METHODS. A study is designed to explore the prevalence of hyperostosis frontalis interna among sexes in a sample of cadavers (n=38) at two medical education institutions. The dependent variable is whether the cadavers had HFI. The independent variable is the sex of the cadaver. Additionally, the livers of the cadavers are weighed, and the size and weight of the testes are measured to explore the correlation of their pathologies to HFI. SUMMARY. From our cadaveric samples, 45% have HFI, of which 53% are females and 47% are males. 100% of the females with HFI have liver weights less than the median liver weight of an adult female which could be consistent with liver fibrosis, consistent with previous literature. While 87.5% of the males with HFI have absent testes or testicular atrophy supportive of the possible decrease in Leydig cells in previous studies. CONCLUSIONS. The overall prevalence of HFI in all the cadavers (45%) is much higher than previously established in literature (5%-12%). The frequency of HFI is more common in the females (53%) when compared to the males (47%). Age of the females seems to have a direct impact on the severity of HFI, characterized by the increased thickness of the frontal bone, while age plays a far less important role in the males. Thus, through this data, the role of estrogen on HFI requires further investigations.

Poster #66
*MISHALL, Priti L[1], [2] , and Adi PINKAS[1]. [1]Department of Pathology, Albert Einstein College of Medicine, Bronx, NY, 10461, USA; [2]Department of Ophthalmology and Visual Sciences, Albert Einstein College of Medicine, Bronx, NY, 10461, USA.
An Innovative Prosection-based Anatomy Course in a time-compressed Preclerkship Medical Curriculum.

INTRODUCTION. Most US medical schools have recently been leaning towards a curriculum with a shortened pre-clerkship phase to give students early exposure to clinical care, which means a decrease in course hours and emphasis on basic science; it is essential that innovative approaches to teaching gross anatomy are explored to ensure medical students' competency. RESOURCES. The course's major instructional method includes prosected cadavers and online assessments. DESCRIPTION. The anatomy course in a medical school of about 180 students was revised to fit a time-compressed, student-centered curriculum. The anatomy lab instruction for first-year medical students was changed from the whole-body dissection to reviewing of the prosected cadavers. The total course

continued on next page

hours were reduced from 165 to 96. The new course was designed with the principles of constructive alignment (aligning content with assessment) and includes a total of 30 lectures and 30 labs. The 50 minutes gross anatomy lectures are live-streamed and recorded while the 45-minute regional embryology and radiology lectures are pre-recorded and watched asynchronously. Prior to each lab session, students are required to review a cadaver-image-based PowerPoint which provides a preview to the lab. In the labs, students rotate between 3 stations (usually one bone and two cadaver stations). Anatomy lab instructors use a reference structure list to ensure that all students identify the structures on the prosections. Students take several formative and summative assessments (MCQ) to test their understanding of learning. We currently have highly positive course evaluations for both the quantitative rating (AY 2021 and AY 2022 = 3/4) and qualitative comments. SIGNIFICANCE. This successful anatomy course might be of interest to clinical anatomists looking to address the challenges of a time-compressed, student centered and prosection-based curriculum.

Poster #3

*OLIVETI, Angelina, Kelly SCHAEFFER, Michael ADAMS, Andrew MONHOLLEN, and Alexis KENDRICK. Arkansas Colleges of Health Education, Fort Smith, AR, 72916, USA.

A Unique Case of Congenital Diaphragmatic Hernia - Why it Matters.

INTRODUCTION. During a graduate level anatomy course, a diaphragmatic hernia was incidentally found in an 89-year-old Caucasian donor. The absence of visible trauma and the co-existence with a midgut nonrotation led investigators to believe the pathology was a congenital diaphragmatic hernia (CDH). Incidence of CDH in neonates is roughly one in 3,000 live births with a fatality rate approaching 50%. Since 1977, approximately 70% of CDH cases are diagnosed prenatally with ultrasound technology; however, prior to 1977 CDH was diagnosed using auscultation alone. RESOURCES. After gross observation of the donor, photographs were taken to highlight the existing pathology. The lungs were also weighed for comparison purposes to highlight the right pulmonary hypoplasia (Left: 461g, Right: 201g). Peer-reviewed publications were analyzed to gain insight into related cases and the introduction of ultrasound screening for neonates. DESCRIPTION. Evaluation of pathology observed on the donor and exploration of deleterious health effects of existing pathologies leads to the determination of the need for CDH screening in elderly populations with possible restrictive lung diseases. SIGNIFICANCE. This case study demonstrates the need for including CDH in the differential diagnosis for restrictive lung disease in elderly populations. This is due to the lack of neonatal ultrasound in populations born before 1977 and CDH's established link to pulmonary hypoplasia.

Poster #81

RAJARAM-GILKES, Mathangi[1], Hamzah SHARIFF[1], Nevin ADAMSKI[1], Sophia COSTAN[1], Marybeth TAGLIERI[1], Marios LOUKAS[2], and Shane R. TUBBS[3]. [1]Department of Medical Education, Geisinger Commonwealth School of Medicine, Scranton, PA, 18509, USA; [2]Department of Anatomical Sciences, St. George's University School of Medicine, St. George's, Grenada; [3]Department of Neurology & Neurosurgery, Tulane Center for Clinical Neurosciences, Tulane University School of Medicine, New Orleans, LA ,70118, USA.

A Review of Crucial Radiological Investigations in the Management of COVID-19 Cases.

INTRODUCTION. Chest X-ray, chest CT, and lung ultrasound are the most common radiological interventions used in the diagnosis and management of COVID-19 patients. The purpose of this literature review is to determine which radiological investigation is crucial for that purpose. METHODS. PubMed, Medline, AJR, PLOS, Elsevier, NCBI, and ScienceDirect were explored. Sixty-two articles were reviewed for potential inclusion, including 50 discussing chest CT, 15 discussing chest X-ray, 10 discussing lung ultrasound, and two discussing COVID-19 epidemiology. SUMMARY. The reported sensitivities and specificities for chest CT ranged from 64 to 98% and 25 to 88%, respectively. The reported sensitivities and specificities for chest X-ray ranged from 33 to 89% and 11.1 to 88.9%, respectively. The reported sensitivities and specificities for lung ultrasound ranged from 93 to 96.8% and 21.3 to 95%, respectively. The most common findings on chest CT include ground glass opacities and consolidation. The most common findings on chest X-ray include opacities, consolidation, and pleural effusion. CONCLUSIONS. The data indicate that chest CT is the most effective radiological tool for the diagnosis and management of COVID-19 patients. The authors support the continued use of RT-PCR, along with physical examination and contact history, for such diagnosis. Chest CT could be more appropriate in emergency situations when quick triage of patients is necessary before RT-PCR results are available. CT can also be used to visualize the progression of COVID-19 pneumonia and to identify potential false positive RT-PCR results. Chest X-ray and lung ultrasound are acceptable in situations where chest CT is unavailable or contraindicated.

continued on next page

Abstracts - Poster Presentations continued

Poster #30
REED, Colleen M. and Jennifer F. DENNIS. Department of Pathology and Anatomical Sciences, Kansas City University, Kansas City, MO, 64106, USA.
Development and Analysis of an Educational Cadaveric Breast Ultrasound Module.

INTRODUCTION. Although suggestions for standardized ultrasound curriculum among medical schools have been made, little guidance has been provided for the integration of breast ultrasound into medical school curricula. Due to the sensitive nature of this imaging, medical schools may encounter difficulties in obtaining patient subjects who are willing to be practiced upon. Therefore, a cadaver-based ultrasound module may prove useful for the introduction students to the use of point-of-care ultrasound (POCUS) for the identification of breast anatomy and pathology. METHODS. First- and second-year students (COM 2026 and 2025) at Kansas City University completed a pre-instruction assessment prior to accessing an online breast ultrasound learning module and in-person training session using cadaver models to examine characteristics of normal breast tissue, fluid-filled cysts, benign solid lesions, and breast implants. After completion of the online module and in-person lab, a post-instruction assessment was provided to students. Scores from the pre- and post-instruction assessments were compared to examine any changes. SUMMARY. Multivariate statistics enabled comparison of scores on the pre- and post-instruction assessments to determine the impact of the cadaver-based ultrasound module on COM 2025 and 2026 student learning both as separate and combined cohorts. CONCLUSIONS. Results from the introduction of a cadaver-based breast ultrasound module early in medical students' careers could prove useful for determining its integration into pre-clinical curriculum and increase the preparedness of students for clerkships.

Poster #75
SHEARER, Jake[1], Maureen ESTEVEZ STABIO[2], Ernesto SALCEDO[2], Noah LEPPEK[2], Jonathan J. WISCO[3], and Chelsea M. LOHMAN BONFIGLIO[2]. [1]Touch of Life Technologies, Aurora, CO, 80238, USA; [2]Modern Human Anatomy, Department of Cell & Developmental Biology, University of Colorado Anschutz Medical Campus, Aurora, CO, 80238, USA; [3]Department of Anatomy & Neurobiology, Boston University Chobanian & Avedisian School of Medicine, Boston, MA, 02118, USA.
Evaluating High-Resolution Smartphone Photogrammetry to Democratize Digital Cadaver Preservation.

INTRODUCTION. Digital cadaver preservation requires advanced and often expensive imaging technology to create a 3D mesh replica of a cadaveric dissection. Structured light surface scanners such as the Artec Space Spider have become an effective—yet cost-prohibitive—tool for rapidly digitally preserving human diversity through anatomical variation, pathology, and cadaveric dissections. RESOURCES. To democratize DCP by developing a protocol that utilizes commonly accessible hardware and software. DESCRIPTION. We created a series of 3D meshes generated from cadaveric bones in duplicate. One set with a Space Spider and the other with the RealityScan app on an Apple iPhone 13 Pro. We used Artec3D Studio 15 to generate distance maps to analyze surface geometry deviation between the two modalities. After morphometric analysis, the models were annotated and hosted as open education resources on SketchFab and loaded into the VH Dissector VR for future evaluation as educational resources. SIGNIFICANCE. Through digital cadaver preservation, human diversity, anatomical variations, or clinical pathology can be recorded through high-fidelity 3D models, extending the value of human body donation. However, many institutions cannot afford to participate due to the high cost of industry-standard structured light scanners. We propose a protocol that uses commonly accessible smartphones to create high-resolution 3D models of cadaveric anatomy.

Poster #21
*SHERIDAN, Philip T., Delaney HIRST, Colby JEROME, Mohnish GOVARDHAN, Tam NGUYEN, and Alla BARRY. Department of Biology and Environmental Health, Missouri Southern State University, Joplin, MO, 64801, USA.
Discovery of Chilaiditi's Syndrome During Dissection of an 88-Year-Old Male Whole Body Donor.

INTRODUCTION. Chilaiditi's syndrome is a rare intestinal disorder characterized by the anterior interposition of the colon between the liver and right hemidiaphragm. The condition is estimated to be present in 0.025-0.28% of the population, with the prevalence in males being four times that of females. Patients with Chilaiditi's syndrome are generally asymptomatic, but common symptoms include abdominal pain, vomiting, and indigestion. The etiology of Chilaiditi's Syndrome is unknown. However, current theories include dolichocolon, laxity of the falciform ligament, diaphragmatic paralysis, and increased intraabdominal pressure from ascites. Many cases are believed to be misdiagnosed due to the presentation and radiological similarities to pneumoperitoneum. RESOURCES. During an undergraduate cadaver dissection, an 88-year-old male whole-body donor (WBD) was found with the qualifying aspects of this condition. WBD underwent a whole-body computed tomography (CT) scan prior to dissection. DESCRIPTION. CT scan demonstrated an atypical course of the colon, revealing a segment of the transverse colon distended with gas between the liver and right hemidiaphragm positioned at the right atrium level. Dissection of the abdominal cavity confirmed CT scan findings revealing interposition and displacement of the transverse colon. In addition, the sigmoid colon was discovered in the right lower quadrant, forming a "pseudotransverse" colon. The colon was 188 cm long, 30.5 cm longer than a typical colon in a male. Histological samples of the transverse colon wall indicated a high level of inflammation and destruction of the mucosa. SIGNIFICANCE. According to medical textbooks, air under the diaphragm should be considered a medical emergency. However, clinical correlation is crucial to avoid unnecessary surgical interventions. Knowledge and awareness of this rare syndrome are imperative in the differential diagnosis of pneumoperitoneum.

continued on next page

Abstracts - Poster Presentations continued

Poster #72
*SNOW, Ethan L. and Wyatt E. LANIK. College of Medicine, University of Nebraska Medical Center, Omaha, NE, 68198, USA.
Structural and Functional Analyses of Bilateral Five-Headed Biceps Brachii Muscles.

INTRODUCTION. The biceps brachii short head (BBSH) and long head (BBLH) supinate and flex the forearm after innervation by the musculocutaneous nerve. Accessory heads are well described and classified; however, reports of five heads are especially rare, and functional analyses of accessory heads still require investigation. This study aims to analyze the structural and functional properties of a case of bilateral five-headed biceps brachii muscles. METHODS. Three distinct accessory heads to the biceps brachii were discovered bilaterally during routine human cadaver dissection. The aberrations were carefully cleaned of extraneous tissue and photographed in situ. All five heads were examined bilaterally for gross structural features, and sarcomere states were examined via light microscopy for each BBSH. Maximal isometric force (F_{max}) and contralateral comparability ( ) were calculated for each muscle. SUMMARY. The accessory heads originated sequentially from the mid-shaft of the humerus and merged with BBLH and BBSH just before the common tendon. All accessory heads were structurally similar (< 0.20; mass = 2.10 g; length = 10.33 cm; PCSA = 0.23 cm^2; F_{max} = 5.24 N) and received innervation from the musculocutaneous nerve. The left and right BBLH and BBSH collectively generated a F_{max} of 49.91 N and 53.05 N while the left and right accessory heads collectively generated a F_{max} of 18.04 N and 13.38 N, respectively. CONCLUSIONS. The bilateral five-headed biceps brachii muscles generated an almost equivalent total F_{max} (67.94 N vs. 66.43 N), and the three accessory heads increased the biceps brachii's F_{max} by 30.52%. Despite this conceivable advantage, accessory biceps brachii heads can impinge neurovasculature in the anterior compartment of the arm and complicate surgical approaches to the region. This study provides structural and functional analyses of bilateral five-headed biceps brachii muscles that may help guide diagnosis and treatment in related clinical cases.

Poster #63
*SYED, Mohsin, Noor AKHTER, Tiffany W. HUITT, Erica R. MALONE, Helen R. HAYES, and David L. DAVIES. Department of Neurobiology & Developmental Sciences, Division of Clinical Anatomy, University of Arkansas for Medical Sciences, Little Rock, AR, 72205, USA.
Formation of Inferior Vena Cava (IVC) at L1 Vertebral Level: A Cadaveric Finding in the Anatomy Lab.

INTRODUCTION. Medical students frequently observe developmental variations in anatomy lab during cadaver dissection. Some variations remain asymptomatic, but others may have significant clinical consequences. The purpose of this study is to highlight the importance of learning anatomic variations and their potential impact in clinical practice. RESOURCES. The findings reported here were observed by freshman medical students in an approximately 80-year-old male cadaver donor. Careful dissection of the posterior abdominal wall revealed an unusual pattern of venous drainage and atypical formation of the IVC at the level of L1 vertebra. DESCRIPTION. The complex embryological development of the IVC accounts for multiple potential congenital variations. Typically, the IVC is formed by the confluence of the right and left common iliac veins at the level of L5 vertebra. Here, we report a case where IVC is formed at the level of L1 vertebra, and the left common iliac vein (LCIV) crossed the anterior aspect of the aorta to join the right common iliac vein. The left renal vein which normally drains into the IVC, drained into the left common iliac vein. The left suprarenal vein, that normally drains into the left renal vein, drained into the left common iliac vein. The region of LCIV that received the left renal and left suprarenal veins was much dilated as it crossed the aorta anteriorly. SIGNIFICANCE. IVC filters are surgically placed in the infrarenal portion of IVC to avoid interference of venous return from the kidneys in patients with deep venous thrombosis (DVT). In this case, a clinician might have to think of placing two filters in the common iliac veins to trap potential migratory blood clots. Knowledge of this variation is also essential while planning an abdominal aortic aneurysm repair. This study emphasized the importance of learning morphologic variations in clinical practice.

Poster #13
*TABIRA, Yoko[1], Keishiro KIKUCHI[1], Aya HAN[1], Joe IWANAGA[1,2,3], Tatsuya HARANO[1], Tsuyoshi SAGA[4], Koh-ichi YAMAKI[1], and Koichi WATANABE[1]. 1 Department of Anatomy, Kurume University School of Medicine, Fukuoka, 8300011, Japan; 2 Department of Neurosurgery, Tulane University School of Medicine, New Orleans, LA, 70112, USA; 3 Department of Oral and Maxillofacial Anatomy, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, 1138519, Japan; 4 Domain of Anatomy, Kurume University School of Nursing, Fukuoka, 8300003, Japan.
Which Ribs are Important in the Structure of the Lateral Abdominal Muscles?

INTRODUCTION. Several patients with postpartum low back pain had abnormal rib positioning, and ultrasonography showed inactivation of the lateral abdominal muscles. The lateral abdominal muscles (external oblique, internal oblique, and transverse abdominis) play important roles in respiration, defecation, and trunk fixation. Ultrasonography is a noninvasive simple method of assessing the function of these muscles. We performed anatomical dissections to determine which ribs are involved in the structure of the lateral abdominal muscles. METHODS. The abdominal walls of five preserved female cadavers were supplied by the anatomical dissection course of our medical school. The attachment of each lateral abdominal muscle was dissected in detail, and the paths of the muscle bundles were studied. SUMMARY. The external oblique abdominal muscles originated from the anterior and inferior margins of the 5th through 12th ribs. The anterior surface of the ribs to which the external oblique and serratus anterior muscles were

continued on next page

attached was raised like a tubercle. The muscle bundle originating from the 9th and 10th ribs formed the groin ligament and had the greatest muscle width. The internal oblique abdominal muscle rested on the inferior borders of the 10th–11th/12th costal cartilages. The broad muscle bundle arising from the thoracolumbar fascia and iliac crest rested on the 10th costal cartilage. The transversus abdominis muscle had multiple attachments on the inner surface 1–2 cm from the inferior margins of the 6th to 12th costal cartilages. CONCLUSIONS. The external and internal oblique abdominal muscle bundles attached to the 9th and 10th ribs, making these costal cartilages structurally important. The transversus abdominis muscle had a wide origin at the 8th–10th costal cartilages and was thought to contribute to rib movement and stability. It is important to show detailed anatomical views on ultrasonographic imaging.

Poster #15

*TRAN, John [1,2], Emma S. CAMPISI,[3], Denise M. J. ARNOLD[3], Anne M.R. AGUR[3], and Eldon LOH[1,2]. [1]Department of Physical Medicine and Rehabilitation, Western University, London, ON, N6C 5J1 Canada; [2]Parkwood Institute Research, Lawson Health Research Institute, London, ON, N6C 0A7 Canada; [3]Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON, M5S 1A8, Canada.

Three-Dimensional Modelling of the Branches of the Lumbar Dorsal Rami.

INTRODUCTION. Lumbar medial branch (MB) denervation is commonly used to manage chronic facetogenic low back pain and traditionally involves placement of the electrode tip along the posterior 3/4 of the neck of the superior articular process on lateral fluoroscopic images. Controversy exists regarding the proximity of MB to the lateral branch (LB) of the lumbar dorsal ramus. This anatomical relationship has implications on the extent of denervation of MB and LB. Therefore, the objective was to quantify and compare the distance between MB and LB of L1-L5 dorsal rami at the traditional placement site. METHODS. In 4 formalin-embalmed specimens (mean age= 83.0±10.9) the L1-L5 dorsal rami were dissected bilaterally and digitized. The digitized data were then 3D modelled in Blender3D. Using the built in measurement tool, mean distances between MB and LB of the L1-L5 dorsal rami were quantified and compared. The capture rate of MB and/or LB was determined based on the diameter (1cm) of a conventional monopolar lesion created using an 18-gauge, 10 mm active tip cannula. SUMMARY. The mean distances between the MB and LB of the L1-L5 dorsal rami were variable (range: 0.03cm to 0.10cm). In all specimens, the L2 dorsal ramus had not bifurcated into MB and LB at the posterior 3/4 of the neck of the superior articular process. The L1 dorsal ramus had the greatest mean distance between MB and LB (0.10cm±0.12cm) and L3 the smallest (0.03cm±0.05cm). Therefore, both MB and LB would be captured using the traditional 1 cm lesion diameter at L1, L3, L4, and L5. At L2 the entire dorsal ramus would be denervated. CONCLUSIONS. The result of the current study suggests that the traditional lumbar MB denervation technique using conventional electrodes may not be selective for MB. Modification to the traditional technique may spare LB and improve patient outcomes. Future anatomical and clinical studies are required to confirm the implications of the current study.

Poster #93

VAN DER HORN, Tamryn L, Brigitte L COCHRAN, Shiv C. DHIMAN and Savita ARYA . Philadelphia College of Osteopathic Medicine, Moultrie, GA, 31768, USA.

Case Series of Common Skin Lesions Encountered in Elderly Cadavers: A Dermatopathology Analysis.

INTRODUCTION. Gaining hands-on experience in both dermatology and pathology is a common barrier that prevents first and second year medical students from refining skills that are not later taught until residency. Due to the pathology and dermatology interests of the medical students as well as a students dermatology clinical background, almost all of the differential diagnosis through both clinical and histology analysis should be accurate with the pathologist's final diagnosis. RESOURCES. Ten cadavers used for the first year medical students gross anatomy lab during the year 2022-2023. Shave biopsies were performed on all abnormal skin lesions observed and stained using hematoxylin and eosin stains. DESCRIPTION. An analysis on common skin lesions was performed to refine medical student's diagnosis skills in both clinical and histology presentation. SIGNIFICANCE. Anatomy lab cadavers provide a hands-on, active learning method for teaching gross anatomy to medical students. While dermatopathology is not always accessible to all anatomy labs, gross anatomy labs provide opportunities to develop differential diagnosis skills based on clinical findings and the use of histopathology slides to diagnose common skin lesions encountered in elderly cadavers.

continued on next page

Poster #99
VARGA, Ivan, Kristina VISNYAIOVA, Peter MUSIL, Martina MUSILOVA, Maria CSOBONYEIOVA, and Martin KLEIN. Comenius University in Bratislava, Faculty of Medicine, 813 72, Bratislava, Slovak Republic.
Anatomy of the Human Uterine Tubes in the 21st Century: Novelties and Possible Clinical Applications.

INTRODUCTION. Uterine tube diseases account for 25–35 % of female factor infertility. Professor Eve C. Feinberg, in her Editorial in the journal Fertility and Sterility in 2018, pondered: "Fifty years from now, assisted reproductive techniques may completely replace medical therapy for infertility and obviate the need for functional uterine tubes." If this were true, further research into the functional anatomy of the UTs would be meaningless. RESOURCES. The primary purpose of this descriptive abstract is to present a summary of the latest findings on the functional anatomy of the uterine tubes discovered and published during the 21st century and correlate them with our previous research results. DESCRIPTION. Over the course of the 21st century, many new insights have been obtained: the presence of a population of telocytes in the tubal wall responsible for normal motility and hormone sensory function, the demonstration of lymphatic lacunae of the mucosal folds necessary for oocyte capture and tubal fluid recirculation, or a thorough profiling of the immune makeup of the uterine tube epithelial lining with the discovery of regulatory T- lymphocytes presumably important for maternal tolerance towards the semi-allogenic embryo. New discoveries also include the notion that the uterine tube epithelium is male sex hormone-sensitive, and that the uterine tube is not sterile, but harbours a complex microbiome. The tubal epithelial cells were also shown to be the cells-of-origin of high-grade serous ovarian carcinomas. Finally, yet importantly, several modern morphological directions have been emerging recently, including cell culture, the development of tubal organoids, in silico modelling, tissue engineering and regenerative medicine. SIGNIFICANCE. All these novel anatomical insights and new approaches can contribute to better clinical practice and successful pregnancy outcomes. This study was supported by a grant from the Slovak Research and Development Agency, number APVV-18-0499. This publication was also supported by the Operational Program Integrated Infrastructure for the project: Increasing the capacities and competences of the Comenius University in research, development, and innovation 313021BUZ3, co-financed from the resources of the European Regional Development Fund.

Poster #54
ZHANG, Betty Z., Sorin DARIE, Austine Y. WANG, Laura N. NGUYEN, Darren L. DESA, Jasmine L. ROCKARTS, Andrew S. PALOMBELLA, Brooke J. DECARLO, Naomi K. DOWNER, Danielle BREWER-DELUCE, Sandra D. MONTEIRO, Esa S. AHMAD, Gregory R. WOHL, and Bruce C. WAINMAN. Faculty of Health Sciences, McMaster University, Hamilton, ON, L8S 4L8, Canada.
Continued Validation of a Scale for Assessing Soft Embalming Solutions for Surgical Skills Training.

INTRODUCTION. Surgical skills training on high-fidelity models is a universal method that allows surgical residents to learn in a controlled setting without the risk and time constraints of an operating theater. Many soft-preservation solutions are able to maintain lifelike joint flexibility and tissue textures in cadavers. In a past pilot study, a psychometric scale was developed for standardized assessment of the visual, tactile, and overall characteristics of tissues embalmed with various solutions. The present study further validates the scale by using it to evaluate the four highest-scoring embalming solutions from the pilot study. METHODS. Four donors from the affiliated institution's bequeathal program were embalmed using Surgical Reality Fluid©™, saturated salt solution, an ethanol-based solution, or the Imperial College London soft-preservation solution. Twenty-five surgical residents conducted three different surgical skills on the cadavers and rated their experience using the scale, which follows a five-point Likert format. Thirteen participated on the first testing date and twelve participated on the second testing date two weeks later. SUMMARY. While Surgical Reality Fluid©™ had the highest mean score on the first testing date (3.69, SD = 0.23), ethanol had the highest on the second testing date (3.75, SD = 0.17), indicating that time since embalming may affect the suitability of the solution for surgical skills training. Kruskal Wallis tests generally found insignificant differences between embalming solutions for the scale domains. However, there was a significant difference between embalming solutions for electrocautery ($p = 0.03$ with mean scores ranging from 3 to 3.6), indicating that some solutions may be more suitable for the training of this skill. CONCLUSION. Certain embalming solutions performed better for a specific surgical skill, but their general performance did not vary significantly. This either indicates that there is a negligible true difference or that the scale is not sensitive enough to capture these differences. Therefore, this could be an area for future exploration and research. (Sponsored by Grant No. 22-23 from the PSI Foundation.)

continued on next page

AMERICAN ASSOCIATION FOR ANATOMY

Join our Anatomy community today!

The American Association for Anatomy (AAA) is a community of peers – educators, researchers, and students of the anatomical sciences and anatomy-related fields – that offers support and collaboration to fellow members, future members, as well as healthcare and allied professions.

Special Invitation for AACA attendees
Join by August 1, 2023 and receive $25 off of your membership fees when you use the promotion code Join23

Learn more at anatomy.org/membership or scan the QR code.

LEARN MORE

Notes:

Notes:

Notes:

continued on next page



for attending the 40th Annual Meeting

of the American Association of Clinical Anatomists in Orlando, Florida.

We look forward to seeing you next year.

The 2024 Annual Meeting will be held in New York, NY from June 17-21, 2024.

For further information, please visit www.clinical-anatomy.org