

7-26-2019

Teaching Neuroanatomy Through Clinical Cases

James R. Munoz

Nova Southeastern University, james.munoz@nova.edu

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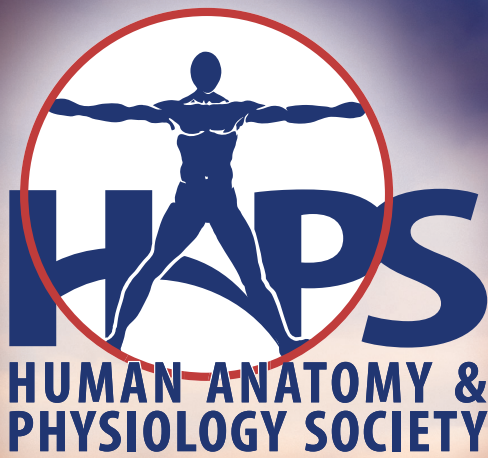
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Welcome to HAPS 2019!

HAPS 2019 is going to be a great conference. What a pleasure to be in Portland in late Spring – the whole city is blooming! The Rose Festival has been celebrating this time of year for over a century, and it is going on right across the river from our conference.

We have a record number of eight update speakers during the first two days of the 2019 annual conference, several of whom are from right here in the Pacific Northwest. And we have the largest number of posters ever for a HAPS Annual – watch for those three sessions during the breaks between the update lectures. We have a full house of exhibitors happy to get to know you – all the tables sold out months ago.



The second half of the conference will take us to the beautiful University of Portland, overlooking the Willamette River, for two days of workshops. This year we have more than 120 workshops to offer, and this is the third year in a row that we've hosted so many workshops. We gathered your preferences to establish what workshop goes where and the 2019 conference committee made the schedule work. With so many quality workshops, you will have to make hard choices about which workshops you'll attend.

The 2019 conference app is again packed with content – it is the conference equivalent of the syllabus. Download it and give it a try. The entire schedule is there with live updates, you can search by presenter or workshop, and you can even build your own personal schedule complete with reminders to keep you on time. Maps of everything are there too, including ones linked to your device's GPS so you never get lost.

The ever-popular social feed is back in the app again this year – watch the big wall in the exhibits hall to see your posts on the 30' screen.

I would like to point out two opportunities that sometimes get lost in the busy schedule. First is the General Membership Meeting on Friday morning. This is a meeting of all members and we encourage everyone to attend. Second are the committee meetings scheduled for Saturday lunch. This is a good way to meet the committee chairs and continue your involvement in HAPS, so pick a committee and go check it out.

On behalf of all of the HAPS leadership and staff, I want to welcome you to HAPS 2019 in Portland and share our sincere hope that you have a great experience while you are here.

Sincerely,

A handwritten signature in black ink, appearing to read 'Peter English'. The signature is stylized and fluid, written over a white background.

Peter English, Ph.D.
Executive Director



Office of Mayor Ted Wheeler
City of Portland

May 20, 2019

Dear Attendees and Guests of Human Anatomy and Physiology Society:

Welcome to Portland, Oregon, for the 2019 Annual Conference. I know that the Human Anatomy and Physiology Society had many destinations from which to choose. It's exciting to know that "The City of Roses" was selected.

Portland's attributes have garnered a lot of positive attention recently. Last year, Lonely Planet named Portland to their 2017 list of the world's 10 best cities to visit and *Travel + Leisure* readers voted Portland one of the "Best Cities in the U.S." for the first time. In 2015, the *Washington Post* named Portland the best food city in America.

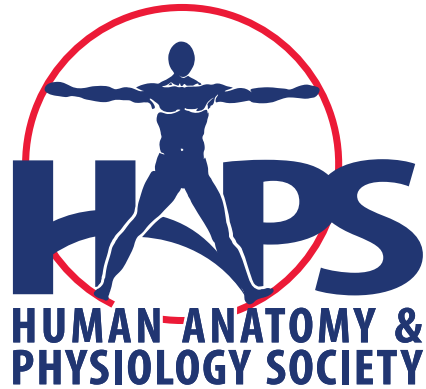
I can assure you that these are not empty platitudes. Portland has worked hard to nurture the arts, to encourage eco-friendly practices and ideas, to encourage innovative public transit, to support the chefs and winemakers of our region, and to protect and preserve the city's surrounding natural beauty.

We hope you have the pleasure of experiencing this firsthand. And we are thrilled to welcome Human Anatomy and Physiology Society to Portland.

With warm regards,

Ted Wheeler
Mayor

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The Human Anatomy & Physiology Society (HAPS) was founded in 1989, after three successful national conferences promoting communication among teachers of human anatomy and physiology at the college level. HAPS is an organization of Human Anatomy & Physiology instructors who strive for excellence in undergraduate instruction in Anatomy & Physiology. Increased growth of the Society necessitated securing an Executive Director and an organizational management firm to assist in the day-to-day administration of HAPS. However, HAPS remains primarily a volunteer organization.

The Board of Directors makes the final policy decisions that steer the organization, but most of the work of HAPS is accomplished by the committees. All of these people (including the Conference Planning Committee) are unpaid volunteers. We encourage you to attend the meeting of any committee that interests you so you may discover first-hand how HAPS works and how you can get involved. **Check out page 80 to see when and where the committee meetings will take place during lunch on Saturday.**

HAPS Board of Directors 2018 – 2019

President: Judi Nath

Past President: Ron Gerrits

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Treasurer: Leslie Day

Central Regional Director: Steve Kish

Eastern Regional Director: Elizabeth Hodgson

Southern Regional Director: Rachel Hopp

Western Regional Director: Elizabeth Pennefather-O'Brien

Executive Director: Peter English

Business Manager: Caitlin Hyatt

Assistant Business Manager: Brittney Roberts

a list of contact information can be found on the governance area of the website (<http://www.hapsweb.org/?page=BoardofDirectors>)

HAPS Presidents & Conference Coordinators

Current President

Judi Nath, 2018-2019

President-Elect

Mark Nielsen, 2019-2020

Past Presidents

Ron Gerrits, 2017-2018
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Caryl Tickner, 2010-2011
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Kevin Petti, 2008-2009
Margaret Weck, 2007-2008
Joseph Griswold, 2006-2007
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Sandra Lewis, 2004-2005
Philip Tate, 2003-2004
Michael Glasgow, 2002-2003
William Perrotti, 2001-2002
Henry Ruschin, 2000-2001
Christine Martin, 1999-2000
Steve Trautwein, 1998-1999
Kevin Patton, 1997-1998
Karen LaFleur-Stewart, 1996-1997
Robert Antony, 1995-1996
Wayne Carley, 1994-1995
Sandra Grabowski, 1993-1994
Gary Johnson, 1992-1993
Virginia Rivers, 1991-1992
Richard Welton, 1990-1991
Richard Steadman, 1989-1990

This Year

2019 – Portland, OR (Jacqueline Van Hoomissen)

Coming Attractions

2020 – Ottawa, ON, Canada (Jacqueline Carnegie)

Previous HAPS Conferences

2018 – Columbus, OH
(Jennifer Burgoon & Melissa Quinn)
2017 – Salt Lake City, UT (Mark Nielsen)
2016 – Atlanta, GA (Kyla Ross & Adam Decker)
2015 – San Antonio, TX
(Anita Moss & Jason LaPres)
2014 – Jacksonville, FL (Lourdes Norman)
2013 – Las Vegas, NV (Kebret Kebede)
2012 – Tulsa, OK (Karen McMahan)
2011 – Victoria, BC, Canada (Peggy Hunter)
2010 – Denver, CO (Terry Harrison)
2009 – Baltimore, MD (Ellen Lathrop-Davis)
2008 – New Orleans, LA (Judy Venuti)
2007 – San Diego, CA (Kevin Petti)
2006 – Austin, TX (Mary Lou Percy)
2005 – St. Louis, MO (Margaret Weck)
2004 – Calgary, AB, Canada (Izak Paul)
2003 – Philadelphia, PA (Lakshmi Atchison)
2002 – Phoenix, AZ (Philip Tate)
2001 – Maui, HI (Frederic Martini)
2000 – Charlotte, NC (Nishi Bryska)
1999 – Baltimore, MD (Robert Smoes)
1998 – Fort Worth, TX (Theresa Page)
1997 – Toronto, ON, Canada (Henry Ruschin)
1996 – Portland, OR (John Martin)
1995 – St. Louis, MO (Kevin Patton)
1994 – Portsmouth, NH (Pam Langley)
1993 – Beaumont, TX (Wayne Carley)
1992 – San Diego, CA (Shirley Mulcahy)
1991 – Greenville, SC (Karen LaFleur-Stewart)
1990 – Madison, WI (Gary Johnson)
1989 – Reno, NV (Virginia Rivers)
1987/1988 – River Grove, IL (Robert Anthony)

HAPS Board of Directors

2018 - 2019



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HAPS Committees

2018 - 2019 Committee Chairs

HAPS uses committees to further the goals and strategic vision of the Society. Each committee has a Chair who leads the committee, and a number of members who help make sure the work gets done. Pick a committee that interests you and come to the meeting at lunch on Saturday, or just find a committee Chair and ask him or her what the committee is like. Benefits of HAPS include the welcoming nature of the Society and the inclusive nature of leadership.



2019 Annual Host Committee

Jacqueline Van Hoomissen

Our committee is in charge of coordinating the 2019 Annual Conference in Portland, Oregon.



Cadaver Use Committee

Cindy Wingert

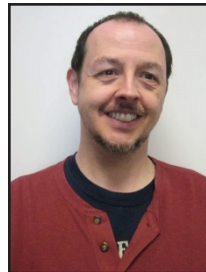
We are charged with developing, reviewing, and recommending policies and procedures on the use of cadavers and human tissues and address issues pertinent to the development and maintenance of cadaver labs.



Communication Committee

Melissa Clouse

We facilitate communication within HAPS, as well as outreach to non-members and potential members through various social media outlets.



Conference Committee

Tom Lehman

We actively encourage HAPS members to host an Annual or Regional Conference. We also provide advice and assistance to members who do host a HAPS conference.



Curriculum & Instruction Committee

Rachel Hopp, Incoming Chair

We develop and/or compile resources that are useful for teaching A&P. Recent and ongoing projects include the development of learning outcomes and compilations of a list of useful software and websites. We also have subcommittees looking at A&P lab outcomes and accommodations for students with disabilities.



Fundraising Committee

Jon Jackson

HAPS Committees

2018 - 2019 Committee Chairs



Grants & Scholarships Committee

Carol Veil

We administer the HAPS Grants & Scholarships Program.



Membership Committee

Jon Wisco

We work to increase HAPS general membership by maintaining ties with current members, creating awareness of HAPS' value, and introducing HAPS to potential members.



Safety/Animal Use Committee

Richard Simons

We promote safety in the A&P laboratory with the HAPS Safety Guidelines. Currently the committee is working on creating a library of laboratory safety videos. The committee is developing a list of animal models that can serve as alternatives to cadavers.



Steering Committee

Kyla Ross

We provide communication among the various committees of HAPS and enhance the ability of the committees to collaborate in furthering the aims of the Society.

Many of the committees will meet during the annual conference, as well as present posters with information about their activities and projects. The annual conference is a great opportunity to learn more about this aspect of HAPS. Come see what we're about!

HAPS Programs

2018 - 2019 Program Leads



Executive Committee

Judi Nath

We are the top administrators of HAPS, setting policies and governing the Society.



Nominating Committee

Mark Nielsen

We assemble a list of qualified candidates for election to the HAPS Board of Directors.



Presidents-Emeriti

Advisory Board

Terry Thompson



HAPS Educator

Committee

Kerry Hull

We oversee the peer-reviewed journal of HAPS, the HAPS Educator.



Exam Program

Jennifer Burgoon &

Valerie O'Loughlin



Diversity and Inclusion Group

Diversity and Inclusion Group (DIG) is a new task force approved by the HAPS Board. The purpose of DIG is to develop best practices, resources, and professional development for inclusive education in anatomy and physiology.

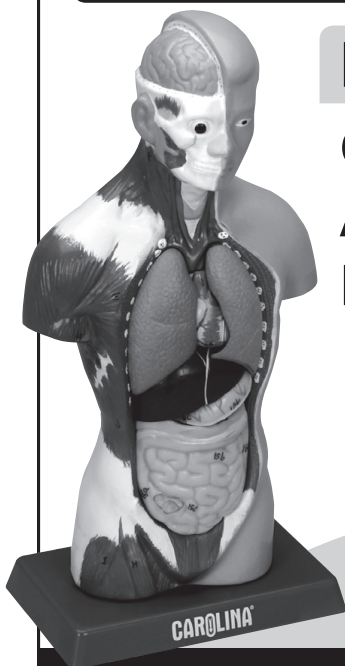
What does DIG hope to accomplish? One aim is to better serve our students. As our student bodies grow more diverse in nearly every identity group, we as educators must be versed in inclusivity and equity to create classroom environments conducive to learning for all. DIG is seeking input from HAPS members on issues such as developing inclusive A&P classes, handling mistakes in the classroom, supporting students with disabilities in lecture and labs, interacting with textbook authors and vendors to shape inclusive curricula, and much more. Through this we hope to develop resources to support inclusive teaching and learning, including workshops and presentations, publications, online materials, affinity groups, and social media.

Our second aim is to better serve our members. DIG will launch a survey in late May to collect demographic data about HAPS members and their experiences with diversity

and inclusion. The survey data will help us understand HAPS and identify areas of need within the organization, as well as allow HAPS to compete for grants from the National Science Foundation and National Institutes of Health, both of which will provide more opportunities for members.

Creating a diverse and inclusive organization requires a comprehensive approach, from retention of underrepresented groups in undergraduate and graduate education, to mentorship, leadership development, and involvement in national and regional conferences, and finally through professional development opportunities. DIG is excited to discuss ways we can promote diversity and inclusion among the HAPS community and in our classrooms. Look for our "Ask me about diversity and inclusion!" buttons, stop by to chat with us in the vendor hall, at our poster or workshop, or contact us directly at dig@hapsconnect.org

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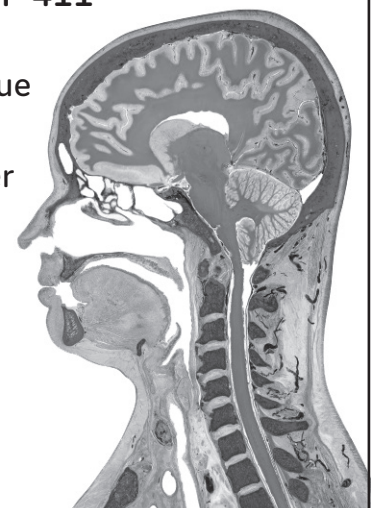
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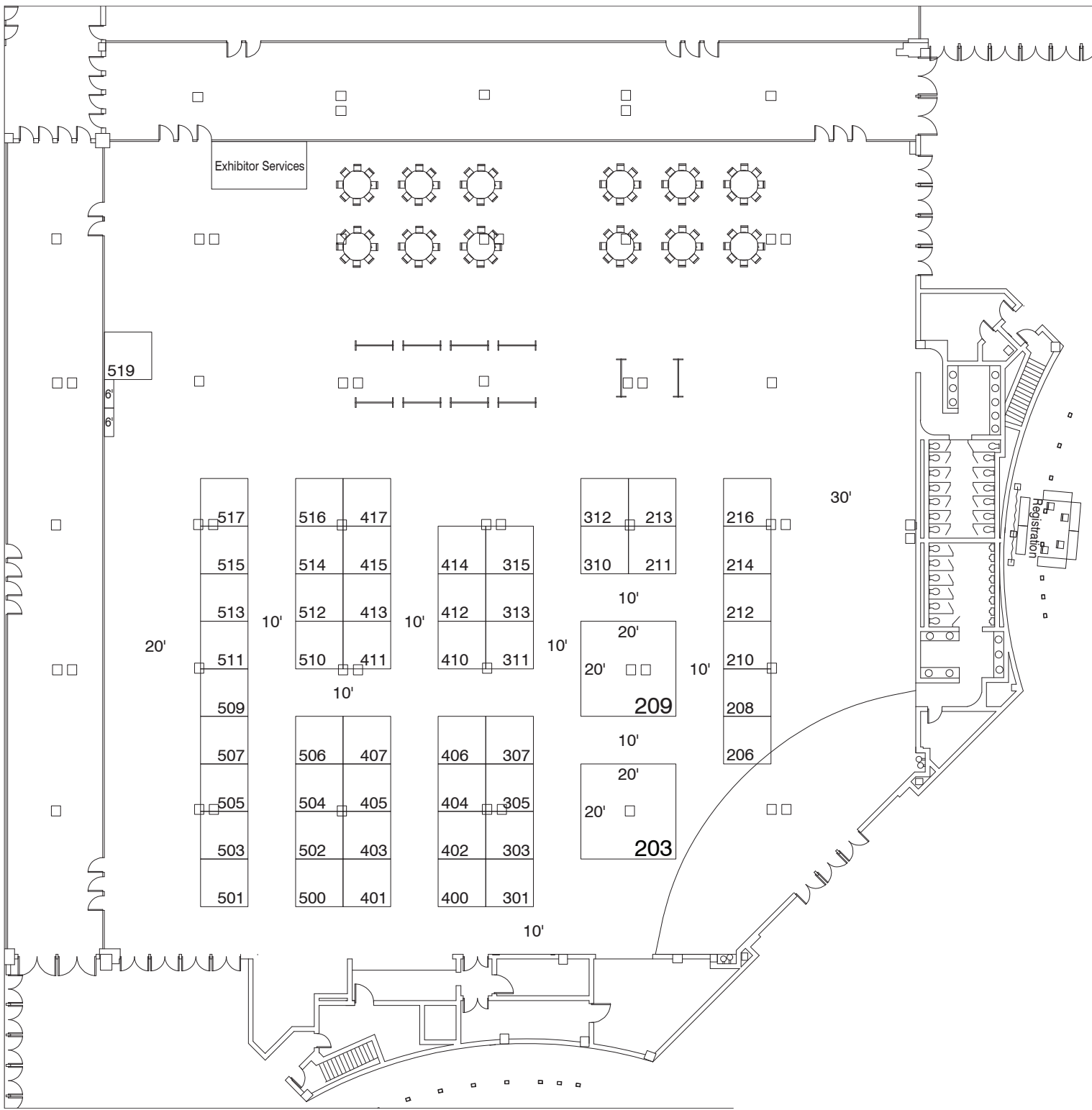
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HAPS 2019 Exhibitors



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HAPS 2020..... 514

Learn more about the HAPS 34th Annual Conference location – Ottawa, Ontario! Save the date for May 23 – 27, 2020!

HAPS Diversity and Inclusion Group & Membership Committee 513

HAPS Fundraising 519

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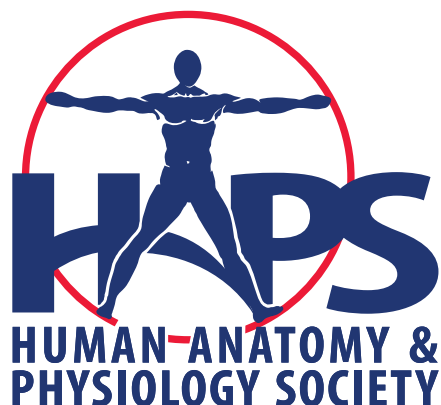


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You have a lot of questions, don't you?

The HAPS-I staff is anxious to talk to you about our current offerings and future plans. This is YOUR professional development program, so please help us to make sure that we are meeting your needs! Contact Peter English at peter@hpsconnect.org with your comments, questions, or suggestions.

There's also plenty of information about HAPS Institute on the HAPS website – look for the tab called “Graduate Credit Courses.”

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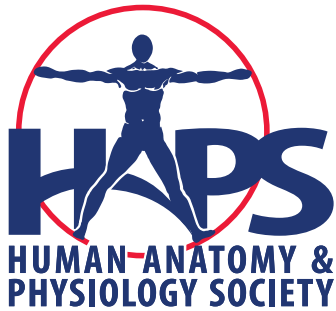
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The Human Anatomy and Physiology Society is happy to announce the following winners of the Sam Drogo Technology in the Classroom Award.

This award is sponsored by ADInstruments.



Sophie Feng

Sophie Feng, PhD, MD, is a graduate of Bengbu Medical School. She was trained in cardiology at Shanghai Hongkou District Hospital and earned a PhD in Spots Medicine at Shanghai Institute of Physical Education. Dr. Feng practiced cardiology for eight years, and then completed post-doctoral training at Boys Town Research hospital and Creighton University, Omaha, NE in the United States. Dr. Feng worked at couple companies such as Mutual of Omaha and Google, Inc before she started to teach at Nebraska Methodist College, and Clarkson College at Omaha. She currently teaches anatomy, physiology, pathology, pharmacology, imaging anatomy, complementary and alternative medicine from undergraduate to graduate programs in both colleges. Dr. Feng recently received advancement in rank to Professor, and currently hold five research and teaching grants based on classroom innovation and clinical practice. Dr. Feng became a physician supervisor of ACLS training program in 2017. She is also a panel reviewer for “Urologic Nursing” and have published over thirty manuscripts in prestigious journals.

Workshop: A113 (Franz 231) - Evidence-Based Course Development in Medical Science

The use of evidence-based methods is becoming increasingly important for many different disciplines and the field of education is no different. We provide an evidence-based pillars and checklist for education excellence,

along with reflective journaling implementation in Anatomy and Physiology courses. Students learning outcomes have been successfully measured and met.

Shawn Macauley

Dr. Shawn Macauley teaches Anatomy & Physiology at Muskegon Community College in Muskegon, Michigan. He also has a faculty appointment at the Michigan State University College of Human Medicine, is a frequent reviewer for a number of science publishers, and is the medical and scientific advisor for a company developing virtual reality platforms to teach anatomy and physiology. His research and professional interests include physical, visual, and memory rehabilitation with patients suffering from vestibular dysfunction; problems with chronic wound healing, especially as presented in patients with diabetes; effective use of technology in teaching introductory science classes; and advocacy for individuals with physical disabilities. Shawn received his M.S. in Microbiology and Cell Sciences from the University of Florida and his Ph.D. Medical Sciences from the University of Florida College of Medicine.

Workshop: A406 (Franz 6) - The Amazing Functions of the Vestibular System

Often touted as the sixth sense, balance is the least appreciated special sense. This presentation will review vestibular function and the etiology of common vestibular disorders. Dr. Macauley will discuss his challenges of living with a complete bilateral vestibular loss as well as the effects of vestibulopathies on balance, vision, reflexes, and memory. Finally rehabilitation approaches and emerging treatments, such as vestibular implants and biofeedback, will be introduced.





Lola Smith

Lola has been a HAPS member since 2015. She has been teaching in academia for over 20 years. Since 2012 she has been teaching at Penn State University the DuBois campus where she teaches anatomy & physiology, ecology, biology of aging, and medical terminology. She is involved with the campus community by being an active member of the Advising Council, Wellness Committee, Center for Undergraduate Education advisory committee, Occupational and Physical Therapy program Advisory Boards, Campus Sustainability Council, and is Chair of the Student Affairs Committee. She helps with outreach by participating in the campus student orientation day and Math Options Day. She received her Associate degree in Wildlife Technology from Penn State University, a Bachelor of Biology, and Master's in Science from Edinboro University in Pennsylvania and completed all course work for a Bachelor's in Secondary Education also at Edinboro University. She is currently continuing to learn through participation in the Gross Anatomy for Teacher Education (GATE) program at the University of Alabama School of Medicine in Birmingham Alabama.

Workshop: B503 (Shiley 124) - Using Inexpensive Technology to Connect with Students and Enhance Learning

You do not have to be a technology wizard or have an impressive department budget to make connections with students and enhance learning with technology. Get out from behind the podium by using a remote mouse. Create interactive, repeatable, tactile, immediate feedback games using free online software. Make students feel like winners by using scratch cards in your TBL activities. With a simple device you can remove the microscope learning barrier and spend more time learning tissues. Reputable, free, online, interactive laboratory exercises allow your students to travel around the world to learn.

About the Sam Drogo Technology in the Classroom Award:

In September 2010, HAPS lost a great friend. Our colleague Sam Drogo died shortly after doing one of the things he loved the most—teaching a lab full of Anatomy and Physiology students.

Sam's death has left an empty space at Mohawk Valley Community College, his home institution for over three decades. It has also left an empty space in HAPS. Sam was a long-time, devoted HAPS member, an active participant in the development of the HAPS Comprehensive Competency Test, and a consistent proponent of the use of technology in the classroom and laboratory.

In Sam's honor, ADInstruments established the Sam Drogo Technology in the Classroom Award. This is an annual award for a HAPS member who demonstrates the innovative use of technology to engage undergraduates in Human Anatomy and Physiology. The award is intended to encourage recipients to present a workshop at the HAPS Annual Conference on this innovative technology or on the use of technology in the classroom or laboratory. ADInstruments has committed to funding this award for five years. Funds will be held by the HAPS Foundation and a decision on the award will be made by the HAPS Scholarship Committee.

Sam was a wonderful man. This award is a fitting tribute to him and we look forward to implementing it. Our thanks to ADInstruments for their generosity and our lasting thanks to Sam as colleague, mentor and teacher.

The Human Anatomy and Physiology Society is happy to announce the following winner of the Gail Jenkins Teaching and Mentoring Award.

This award is sponsored by Wiley.

Thomas Pirtle

Dr. Thomas Pirtle has taught professionally in higher education for 15 years. He currently teaches undergraduate students Anatomy and Physiology, Pathobiology, and Developmental Biology at The College of Idaho in Caldwell, Idaho. Additionally, Dr. Pirtle teaches first semester physician assistant students Regional Anatomy and Histology for the Physician Assistant Studies Program—a partnership between The College of Idaho and Idaho State University. Through positive, enthusiastic leadership, Dr. Pirtle facilitates student learning in an inclusive, welcoming environment. His students engage in problem-based learning that includes participating in games and role-playing activities to illustrate physiological principles. In addition to teaching, Dr. Pirtle mentors students in research projects at The College of Idaho. His most recent research project investigates the effects of e-cigarette chemical flavorings on bone development. Dr. Pirtle is passionate about teaching and is devoted to his students and their success. He lives in Boise, Idaho with his wife Crystal where they enjoy hiking, fishing, and birding.



Workshop: B102 (Shiley 123) - Learning Anatomy and Physiology by Acting out Physiological Mechanisms and Playing Games

In the spirit of the Gail Jenkins Teaching and Mentoring Award, this workshop will present two simple methods of engaging students in the classroom to enhance learning. First will be a hands-on demonstration of engaging student participation through acting out the physiological mechanisms of signal transduction, protein synthesis, and long bone growth at the epiphyseal cartilage. Second, will be a demonstration of the effective use of board games to help students review course content. Both of these hands-on demonstrations use inexpensive materials that can be adapted to teach and review concepts in any anatomy and physiology course.

About the Gail Jenkins Teaching and Mentoring Award:

Gail was a dynamic and engaging instructor of anatomy & physiology and avid supporter of HAPS and its goals. Her death has left a hole in the hearts of many - her colleagues at Montgomery College, her publishing colleagues at Wiley, her HAPSter colleagues, her family and many friends. Gail loved teaching, and most of all, she loved being able to bring clarity to often difficult concepts for students to grasp. One of her favorite phrases with students was, "Let's **KISS** this". It meant - let's "**Keep it Simple, Sweetie**". When faced with a challenging concept, Gail would help her students KISS the topic by employing everyday analogies and/or props to visualize or un-pack the information. She provided a simple foundation on which the students could build and remember their newly acquired knowledge. No one got more use out of an old tube of toothpaste, a hot dog, a big red balloon, or a plate of chocolate chip cookies! Her students loved her for it.

In Gail's honor, Wiley publishers in partnership with HAPS has established the Gail Jenkins Teaching and Mentoring Award. This is an annual award for a HAPS member who demonstrates use of engaging learning activities to help students truly understand and retain the more difficult Anatomy and Physiology concepts with kinesthetic and active learning strategies using inexpensive everyday props. The award is also designed to recognize those willing to mentor other instructors to also incorporate active learning to benefit more students.

The Human Anatomy & Physiology Society is happy to announce the following winner of the Robert Anthony Travel Award.

Steffie Tomson

Steffie Tomson teaches at the University of St. Thomas in Houston. She investigates human cognition using functional MRI studies. Her areas of research range from synesthesia to autism to cortical remapping after amputation. She is an expert in human neuroimaging studies and has a passion for predictive statistical techniques in the medical field.



Workshop: B508 (Franz 26) - Conquering Anatomy and Physiology Program Leads to Higher Scores

The University of St. Thomas teaches A&P1 to incoming freshman on pre-health tracks who are not required to take biology as a prerequisite. In August 2018, I piloted a bootcamp called the Conquering Anatomy and Physiology Program (CAPP) to prepare these students for the rigor of the course. For the Fall semester, only 4% of CAPP students withdrew from A&P1, compared with 14% withdrawal rate overall. CAPP students also have a significantly higher average than non-CAPP students.

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HAPS 33rd Annual Conference May 22 – 26, 2019

Schedule of Events

Wednesday, May 22 <i>Oregon Convention Center</i>	
8:00 AM – 5:00 PM	Exhibitor Set up: Exhibit Hall B
8:00 AM – 12:00 PM	Board of Directors and Steering Committee Meeting <i>(Board of Directors and Steering Committee Chairs Only)</i>
12:00 PM – 1:00 PM	Board of Directors and Steering Committee Luncheon <i>(Board of Directors and Steering Committee Chairs Only)</i>
1:00 PM – 4:30 PM	Board of Directors Meeting <i>(Board of Directors Only)</i>
1:00 PM – 4:30 PM	Steering Committee Meetings
1:00 PM – 5:00 PM	Registration: B Meeting Rooms Lobby
4:30 PM – 5:30 PM	HAPSconnect Training <i>(Board of Directors and Steering Committee Chairs Only)</i>
5:45 PM – 7:30 PM	Registration: Meeting Room A105-106
6:00 PM – 8:00 PM	Welcome Reception: Meeting Room A105-106
Thursday, May 23 <i>Oregon Convention Center</i>	
7:00 AM – 5:00 PM	Registration: B Meeting Rooms Lobby <i>(closed from 12:00 PM – 1:00 PM)</i>
7:30 AM – 8:30 AM	First Timer's Breakfast: Meeting Room A105-106 <i>Sponsored by ADInstruments & McGraw Hill Education</i>
7:30 AM – 8:30 AM	Second Timer's Breakfast: Meeting Room A107-109 <i>Sponsored by Pearson</i>
7:30 AM – 8:30 AM	Continental Breakfast (for all other attendees): Exhibit Hall B

7:30 AM – 6:15 PM	Silent Auction Open: Exhibit Hall B
7:30 AM – 6:15 PM	Exhibits: Exhibit Hall B (Exhibits are closed from 12:00 PM - 1:00 PM)
8:30 AM – 9:00 AM	Welcome and Opening Remarks: Meeting Room B113-116
9:00 AM – 10:00 AM	Update Seminar I: Meeting Room B113-116 Meghan Moran, Rush University Medical Center <i>Sponsored by the American Association of Anatomists</i> "Targeting Biological Systems for Bone Health"
10:00 AM – 11:00 AM	Refreshment Break & Exhibits: Exhibit Hall B
10:00 AM – 11:00 AM	Poster Session 1: Exhibit Hall B (posters for session 1 should be set-up by 9:00 AM and removed by 12:00 PM)
11:00 AM – 12:00 PM	Update Seminar II: Meeting Room B113-116 Kent Thornburg, Oregon Health and Science University <i>Sponsored by HAPS</i> "Chronic Disease Begins in the Womb – and Earlier"
12:00 PM – 1:15 PM	Lunch on your own Registration & Exhibits closed from 12:00 PM - 1:00 PM
1:15 PM – 2:15 PM	Update Seminar III: Meeting Room B113-116 Elinor Sullivan, University of Oregon <i>Sponsored by HAPS</i> "Maternal Metabolic and Dietary Environmental Influences on Offspring Behavior"
2:15 PM – 3:15 PM	Refreshment Break & Exhibit: Exhibit Hall B
2:15 PM – 3:15 PM	Poster Session 2: Exhibit Hall B (posters for session 2 should be set-up by 1:00 PM and removed by 4:00 PM)
3:15 PM – 4:15 PM	Update Seminar IV: Meeting Room B113-116 R. Shane Tubbs, Seattle Science Foundation <i>Sponsored by the American Association of Clinical Anatomists</i> "Can Anatomical Feasibility Studies Drive Surgical Practice?"
4:15 PM – 5:15 PM	Update Seminar V: Meeting Room B113-116 Lawrence Sherman, Oregon Health and Science University <i>Sponsored by HAPS</i> "Every Brain Needs Music – A Lecture and Musical Performance"
5:15 PM – 6:15 PM	Drinks with Exhibitors: Exhibit Hall B Silent Auction closes at 6:15 PM
	Free Night!

Friday, May 24

Oregon Convention Center

7:30 AM – 8:30 AM	Continental Breakfast: Exhibit Hall B
7:30 AM – 5:00 PM	Exhibits: Exhibit Hall B (Exhibits are closed from 12:00 PM – 1:00 PM)
8:00 AM – 3:00 PM	Silent Auction Item Collection & Payment: B Meeting Rooms Lobby If you are a winner, make sure to stop at the Registration desk between 8:00 AM and 3:00 PM to collect/pay for your item!
8:00 AM – 5:00 PM	Registration: B Meeting Rooms Lobby (Closed from 12:00 PM – 1:00 PM)
8:30 AM – 9:45 AM	HAPS Annual General Membership Meeting: Meeting Room B113-116
9:45 AM – 10:45 AM	Refreshment Break & Exhibits: Exhibit Hall B
9:45 AM – 10:45 AM	Poster Session 3: Exhibit Hall B (posters for session 3 should be set-up by 9:00 AM and removed by 12:00 PM)
10:45 AM – 11:45 AM	Update Seminar VI: Meeting Room B113-116 Jeff Schinske, Foothills College <i>Sponsored by HAPS</i> "Investigating Inclusive Curricula in the A&P Classroom: Scientist Spotlight Homework Assignments"
11:45 AM – 1:15 PM	Lunch on your own Registration & Exhibits close for lunch from 12:00 PM-1:00 PM
1:15 PM – 2:15 PM	Update Seminar VII: Meeting Room B113-116 Nicole Swann, University of Oregon <i>Sponsored by HAPS</i> "Parkinson's Disease Neurophysiology, Treatments, and Future Directions"
2:15 PM – 3:15 PM	Refreshment Break & Exhibits: Exhibit Hall B
3:15 PM – 4:15 PM	Update Seminar VIII: Meeting Room B113-116 Virginia Brooks, Oregon Health and Science University <i>Sponsored by the American Physiological Society</i> "Curiouser and Curiouser: How Can a Hormone Have an Effect if There are No Receptors?"
4:15 PM – 5:00 PM	Door prizes: Exhibit Hall B
6:00 PM – 9:00 PM	HAPS Social: Meeting Room A105-109

Saturday, May 25

University of Portland

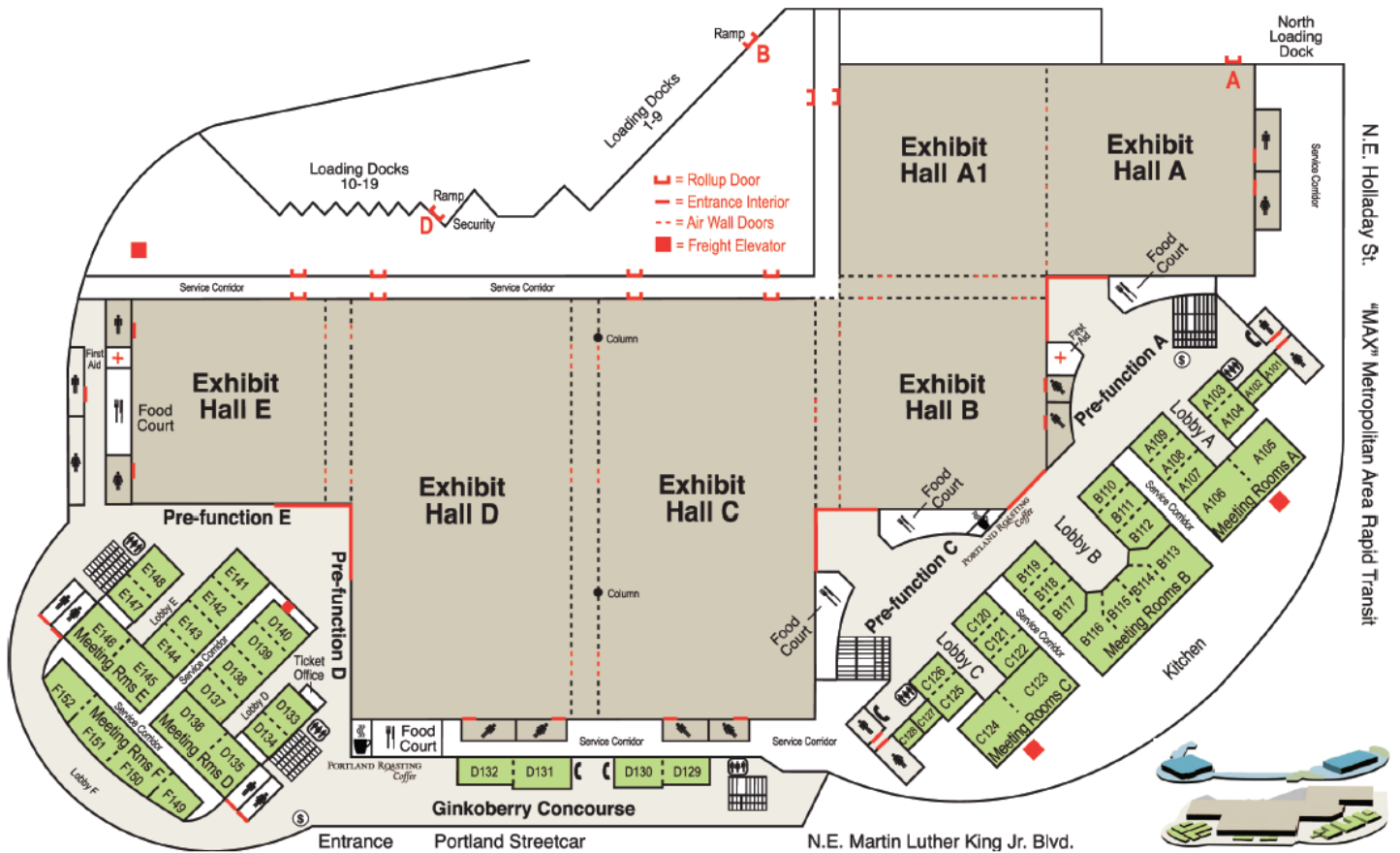
7:00 AM – 9:00 AM	Transportation to the University of Portland Buses will load at the Oregon Convention Center on MLK Jr. Blvd. Drop off will be at Mehling Hall at the University of Portland.
7:30 AM – 8:30 AM	Welcome Breakfast Breakfast served in Bauccio Commons Registration will be set up in the Bauccio Commons Building.
8:30 AM – 12:00 PM	Workshops Session A1: 8:30 – 9:30 AM Session A2: 9:45 – 10:45 AM Session A3: 11:00 AM – 12:00 PM
12:00 PM – 1:00 PM	Lunch (lunch is provided) Lunch is served in Bauccio Commons Committee Meetings – 12:30 PM – 1:00 PM
1:15 PM – 3:30 PM	Workshops Session A4: 1:15 – 2:15 PM Session A5: 2:30 – 3:30 PM
3:30 PM	Bus transportation back to the Oregon Convention Center. Pick-up point is Mehling Hall at the University of Portland.

Sunday, May 26

University of Portland

7:00 AM – 9:00 AM	Transportation to the University of Portland Buses will load at the Oregon Convention Center on MLK Jr. Blvd. Drop off will be at Mehling Hall at the University of Portland.
7:30 AM – 8:30 AM	Welcome Breakfast Breakfast served in Bauccio Commons Registration will be set up in the Bauccio Commons Building.
8:30 AM – 12:00 PM	Workshops Session B1: 8:30 – 9:30 AM Session B2: 9:45 – 10:45 AM Session B3: 11:00 AM – 12:00 PM
12:00 PM – 1:00 PM	Lunch (lunch is provided) Lunch is served in Bauccio Commons
1:15 PM – 3:30 PM	Workshops Session B4: 1:15 – 2:15 PM Session B5: 2:30 – 3:30 PM
3:30 PM	Bus transportation back to the Oregon Convention Center. Pick-up point is Mehling Hall at the University of Portland.

Oregon Convention Center



Update Seminars: Meeting Room B113 - 116

Exhibits & Posters: Exhibit Hall B

Registration: B Meeting Rooms Lobby

Welcome Reception / Social: Meeting Room A105 - 106

First Timer's Breakfast: Meeting Room A105 - 106

Second Timer's Breakfast: Meeting Room A107 - 109

HAPS 33rd Annual Conference Speakers 2019

Update Seminar I: Meeting Room B113-116

Thursday, May 23 from 9:00 AM – 10:00 AM

Meghan Moran

Sponsored by the American Association of Anatomists



Assistant Professor
Rush University Medical Center
Chicago, Illinois
meghan_moran@rush.edu



Targeting Biological Systems for Bone Health

Abstract: The connections between biological systems are the foundations of homeostasis, the equilibrium between interdependent elements. These interdependent elements are at the organ, tissue or cellular levels and play roles in growth, development and disease. Cross-disciplinary terms have emerged such as 'osteimmunology' and 'osteomicrobiology' to describe bone-immune system interactions, suggesting the increasing attention paid to the importance of cross-talk biology. My research focuses on the cross-disciplinary connections and interactions between the gut, gut microbiome and bone, specifically the bone microenvironment surrounding an implant. The gut microbiome is defined as the bacteria, viruses and fungi found in feces. These commensal gut bacteria play a role in the immune response, circadian rhythm, stress and overall host health. Previous studies have shown that altering the gut microbiome affects bone mechanical and material properties. Through my research, I want to understand 1) the interactions between the gut/gut microbiome and the bone surrounding an implant and 2) the impact an implant has on the gut/gut microbiome. Recently, I showed a link between inflammatory bowel disease (IBD) and hip implant failure using the Swedish Hip Arthroplasty Registry and the National Patient Register. Our data showed survivorship of hip implants was not different between IBD and non-IBD patients. However, IBD patients who did experience hip implant failure had a significantly shorter time to revision surgery compared to non-IBD patients. This suggests that bowel health should be considered for patients undergoing joint replacement. In a pre-clinical model of implant failure due to osteolysis (bone loss surrounding an implant) I showed that this peripheral musculoskeletal challenge alters the gut microbiome. Taken together, these studies suggest there is a bi-directional cross-talk between gut and bone. Through this research, I hope to establish a mechanistic understanding of gut-bone cross-talk and ultimately identify novel therapeutic approaches to delaying or preventing implant failure.

BIO: Meghan is an assistant professor at Rush University Medical Center (RUMC) in the Department of Cell & Molecular Medicine in Chicago, IL. She conducts basic and translational research to understand the connection and interaction between the gut and bone. Specifically, she is interested in how a peripheral musculoskeletal challenge alters the gut and the gut microbiome. To do this she uses a pre-clinical model of aseptic peri-implant osteolysis, which is bone loss

Update Seminar II: Meeting Room B113-116

Thursday, May 23 from 11:00 AM – 12:00 PM

Kent Thornburg

Sponsored by HAPS



Professor
Oregon Health and Science University
Portland, Oregon
thornbur@ohsu.edu



Chronic Disease Begins in the Womb – and Earlier

Abstract: Most people are aware of the fact that the health status of Americans has been plunging at a high rate since the mid-nineties. The skyrocketing rates of diabetes and obesity are key to the worsening health of many populations; several ethnic groups and rural communities are especially affected. This situation is alarming not only because of the suffering of people with chronic conditions, but also because the cost of caring for people with these diseases will add immensely to the cost of health care. While most people on the street, and some scientists have believed that this increase has its roots in genetic vulnerabilities, all epidemiological evidence points to an environmental cause. That is by the nutritional stress, social stress and chemical environments in which we live. For nearly 30 years, there has been a new paradigm for determinants of public health. In 1989 Professor David Barker showed that ischemic heart disease is predicted by a person's birthweight. His work showed that the lower a person's birthweight, the higher the risk for the disease. We now know that the risk curve is "U" shaped with both high and low birthweight having equally high risks. Following Barker's predictions of heart disease, he and others discovered that a large number of chronic conditions are related to birth patterns before birth. In fact, all the major killer diseases are predicted by birthweight. Now we know that maternal body phenotype, placental size and shape, fetal exposure to social stress and exposure to hypoxia are additional independent determinants of disease risk. Recent data associate the nutrition-poor diets in people of reproductive age with the decline in population health of the nineties and beyond. Mothers pass epigenetic changes wrought by poor nutrition to their kids and grandkids. Unless we reverse this trend, we will face medical costs that will exceed our ability to care for the masses of people who are ill.

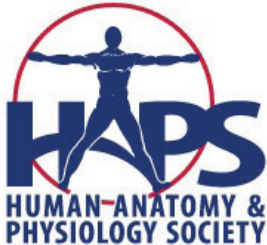
BIO: Kent L. Thornburg, Ph.D., is the M. Lowell Edwards Chair of Cardiovascular Research and Professor of Medicine in the Knight Cardiovascular Institute at the Oregon Health & Science University (OHSU). He holds joint professorships in 5 departments. He directs the Center for Developmental Health in the Knight Cardiovascular Institute, the OHSU Bob and Charlee Moore Institute for Nutrition & Wellness and co-directs the Institute's Epigenetics Consortium. Dr. Thornburg investigates the early life origins of heart disease, diabetes and obesity using basic science, epidemiological and clinical studies. He oversees clinical studies in rural Oregon and Alaska and collaborates with scientists in 5 countries. Dr. Thornburg serves regularly on advisory panels at the NIH, the American Heart Association and the Children's Heart Foundation and serves on the scientific advisory board of the Preeclampsia Foundation. He chairs the oversight committee for the Genome--British Columbia program and he serves on the External Scientific Board that oversees the NIH director's program entitled, Environmental influences on Child Health Outcomes (ECHO) program. He is committed to improving the health of Oregonians across the state of Oregon.

Update Seminar III: Meeting Room B113-116

Thursday, May 23 from 1:15 PM – 2:15 PM

Elinor Sullivan

Sponsored by HAPS



Associate Professor
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Maternal Metabolic and Dietary Environmental Influences on Offspring Behavior

Abstract: In recent decades, the prevalence of pediatric neurodevelopmental disorders has risen dramatically. Perinatal environmental factors such as poor maternal diet influence the risk of these disorders. In these studies, we compared the impact of maternal malnutrition (excess fat versus protein deficiency) on brain development and behavior of nonhuman primate offspring. We hypothesized that exposure to maternal high-fat diet or a protein-deficient diet impacts the development of neural circuits critical in the regulation of behavior. We first examined offspring from female Japanese macaques (*macaca fuscata*) that consumed either a control diet (13% of calories from fat) or a high-fat diet (HFD) (37% calories from fat) during gestation and lactation. In a second study, we examined rhesus macaque (*macaca mulatta*) offspring from mothers that consumed either a control diet (26% protein) or a low-protein diet (LPD) (13% protein) diet during gestation and lactation. In both studies, offspring growth, energy balance, and behavior were tracked closely across development. Brain development was examined using a combination of histochemical and magnetic resonance imaging studies. Interestingly, both exposure to maternal HFD or LPD impaired offspring brain development and resulted in increased offspring anxiety and impairments in social behavior. Exposure to maternal HFD resulted in impairments in the development of the central serotonergic and dopaminergic system and alterations in functional connectivity. Exposure to a low-protein diet during gestation resulted in decreased white matter maturation. These findings indicate that inadequate maternal nutrition (either excess or insufficient nutrient intake) initiates a fetal environment that results in neural reprogramming and predisposes offspring to pediatric neurodevelopmental disorders.

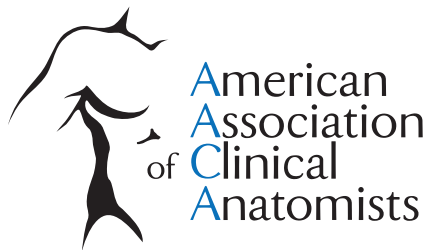
BIO: Elinor L. Sullivan is an Associate Professor in the Department of Human Physiology at the University of Oregon and an Assistant Professor in the Division of Neuroscience at Oregon National Primate Research Center and in the Department of Psychiatry at Oregon Health and Science University. Dr. Sullivan received her Ph.D. in Physiology from OHSU in 2000 and her bachelor's degree in Biology from Willamette University. She received her postdoctoral training at the University of California San Francisco and OHSU. Her research focuses on examining the influence of maternal metabolic state and dietary environment on offspring behavioral regulation, with an emphasis on behaviors that relate to mental health and behavioral disorders including autism spectrum disorders, attention deficit hyperactivity disorder, anxiety, and depression. Dr. Sullivan is actively involved in training future scientists through her teaching and mentoring of University of Oregon undergraduate and graduate students. Webpage: <https://physiology.uoregon.edu/profile/esullivan/>

Update Seminar IV: Meeting Room B113-116

Thursday, May 23 from 3:15 PM – 4:15 PM

R. Shane Tubbs

Sponsored by the American Association of Clinical Anatomists



Professor, Chief Scientific Officer, and Vice President
Seattle Science Foundation
Seattle, Washington
shanet@seattlesciencefoundation.org



Can Anatomical Feasibility Studies Drive Surgical Practice?

Abstract: Dr. Tubbs' laboratory efforts are based on the so-called reverse translational research in anatomy. With this paradigm, anatomical feasibility studies are often performed in cadavers. To this end, this presentation will highlight a 25-year experience demonstrating examples from the literature of cadaveric feasibility studies that went on to be used clinically. The time between publication of the former and latter will be discussed and compared to traditional translational research. Additionally, the presenter will answer the question of whether or not cadaveric feasibility studies can drive surgical practice.

BIO: R. Shane Tubbs, MS, PA-C, PhD is a native of Birmingham, Alabama and a clinical anatomist. He is the Chief Scientific Officer and Vice President of the Seattle Science Foundation in Seattle, WA. The Foundation is a non-profit that provides specialty training for surgeons and physicians and performs original clinical anatomical research. Dr. Tubbs is also an Affiliate faculty at the Institute of Systems Biology, Seattle, WA, and Professor of Anatomy at St. George's University, Grenada and has other honorary professorships/faculty positions at Dundee University, Dundee, Scotland, Department of Neurosurgery, Vanderbilt University, Nashville, TN and the National Skull Base Center of California.

Dr. Tubbs' research interests are centered around what his lab has termed "reverse translational anatomy research" where clinical problems are identified and solved with anatomical studies. This investigative paradigm as resulted in over 1,300 peer reviewed publications. Once thought to be a static discipline, Dr. Tubbs' lab has made novel discoveries in human anatomy including a new nerve to the lower eyelid, a new space of the face, a new venous sinus of the spinal cord, new connections between the parts of the sciatic nerve, new ligaments of the neck, and an etiology for postoperative C5 nerve palsies. Moreover, many anatomical feasibility studies from Dr. Tubbs' lab have gone on to be used by surgeons from around the world and have thus resulted in new surgical/clinical procedures such as shunting cerebrospinal fluid into various bones for treating hydrocephalus. Lastly, under Dr. Tubbs, the Seattle Science Foundation is currently working on the world's first 3D atlas of the human spinal cord.

He sits on the editorial board of over 10 anatomical journals and has reviewed for over 100 scientific journals. He has been a visiting professor to major institutions in the US and worldwide. Dr. Tubbs has authored over 20 books and over 50 book chapters. His textbooks include *The Chiari Malformations*, *Gray's Anatomy Review*, *Gray's Clinical Photographic Dissector of the Human Body*, *Netter's Introduction to Clinical Procedures*, *Anatomy for Plastic Surgery of the Face, Head, and Neck*, *Nerves and Nerve Injuries* volumes I and II, *A History of Human Anatomy*, and *Bergman's Comprehensive Encyclopedia of Human Anatomic Variation*. He is an editor for the 41st and 42nd editions of the over 150-year-old *Gray's Anatomy*, the 5th through 7th editions of *Netter's Atlas of Anatomy* and is the editor-in-chief of the journal *Clinical Anatomy*, which is the official journal of the American and British Associations of Clinical Anatomists.

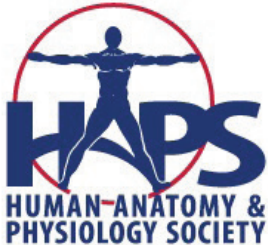
In addition, Dr. Tubbs is chair of the International Federation of Anatomists' Committee on Anatomical Publishing and sits on this Federation's committees devoted to devising official anatomical terminologies.

Update Seminar V: Meeting Room B113-116

Thursday, May 23 from 4:15 PM – 5:15 PM

Lawrence Sherman

Sponsored by HAPS



Professor
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Every Brain Needs Music – A Lecture and Musical Performance

Abstract: This talk focuses on insights into some of the most exciting brain research in recent years - the connection between music, brain development and the ways music can prevent or delay brain aging and help patients with damage to the brain. In this multi-media experience, Dr. Sherman mixes musical performances, humor and neuroscience to reveal the amazing connection between music and human brain function.

BIO: Dr. Larry S. Sherman is a Professor of Neuroscience at the Oregon National Primate Research Center and at the Oregon Health & Science University. He is also President of the Oregon and Southwest Washington Chapter of the Society for Neuroscience. He has over 90 publications related to brain development and neurodegenerative disease including Alzheimer’s disease and multiple sclerosis. He serves several US and international scientific review panels for the US National Institutes of Health, the US Congressionally directed Medical Research Programs, and others. He has made numerous television appearances discussing topics such as the neuroscience of pleasure and love, music and the brain, the neuroscience of racism, and the neuroscience of concussions. The Oregon Museum of Science and Industry and Portland Monthly Magazine recognized Dr. Sherman as one of the “People who are changing our world.” He was also the 2012 Teacher of the Year at the Oregon Health and Science University School of Medicine.

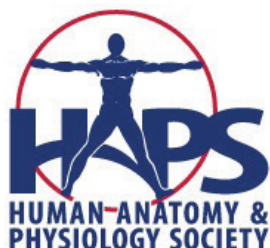
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Update Seminar VI: Meeting Room B113-116

Friday, May 24 from 10:45 AM – 11:45 AM

Jeff Schinske

Sponsored by HAPS



Instructor
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Investigating Inclusive Curricula in the A&P Classroom: Scientist Spotlight Homework Assignments

Abstract: From television shows and movies to science classes themselves, we recurrently encounter images of scientists that, more often than not, convey a relatively narrow view of who does science. We might wonder, then; what are the impacts of these messages on students and what, if anything, might faculty do in response to this messaging? Numerous studies of science majors and non-majors have suggested that student success correlates with the extent to which students see themselves as scientists and the stereotypes students hold regarding scientists. However, few studies have examined these phenomena among pre-health career students. Given the urgent demand for a more diverse health science workforce and gaps in success in anatomy and physiology (A&P) between traditionally underserved students and those from backgrounds well represented in the sciences, we wondered whether interventions targeting scientist stereotypes might enhance success in A&P and narrow existing equity gaps.

We developed a series of homework assignments (“Scientist Spotlights”) featuring counter-stereotypical scientists while simultaneously assisting with course curriculum goals. We hypothesized that students completing Scientist Spotlights would: 1) adopt counter-stereotypical views of scientists, 2) report an enhanced ability to relate to scientists, and 3) earn higher course grades than students not completing Scientist Spotlights. Students in A&P and Human Biology courses completed beginning- and end-of-course surveys during Scientist Spotlight and “control” versions of our courses to assess scientist stereotypes and relatability. Analyses detected significant shifts from mostly stereotypical to counter-stereotypical descriptions of scientists and an enhanced ability to relate to scientists among students in Scientist Spotlight courses, but not in control settings. We further observed positive interactions between treatment and course grades, with possible disproportionate impacts on students from backgrounds underrepresented in science. In this interactive presentation, attendees will reflect on the impacts of scientist stereotypes in A&P classes, examine sample Scientist Spotlight assignments, and discuss our results surrounding the implementation of Scientist Spotlights.

BIO: Jeff Schinske is the anatomy and physiology course coordinator at Foothill Community College (San Francisco Bay Area) where he conducts research on equity and inclusion in science classrooms. He leads two federal grant programs: *The Scientist Spotlights Initiative*, which supports the development and dissemination of inclusive biology curricula, and *CC Bio INSITES*, which empowers community college biology faculty to conduct and publish education research. Jeff has authored numerous high-profile biology education research articles, is a steering committee member for the *Society for the Advancement of Biology Education Research (SABER)*, and serves as lead biology curriculum reviewer for *C-ID*, California’s statewide course articulation system. Jeff is a frequent featured speaker in the areas of discipline-based education research and STEM equity, and was the 2018 recipient of the national *Outstanding Undergraduate Science Teaching Award* from the Society for College Science Teachers.

Update Seminar VII: Meeting Room B113-116

Friday, May 24 from 1:15 PM – 2:15 PM

Nicole Swann

Sponsored by HAPS



Assistant Professor
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Parkinson's Disease Neurophysiology, Treatments, and Future Directions

Abstract: In this talk I will briefly discuss Parkinson's disease including the hallmark symptoms and conventional approaches to treatment. Next, I will cover neurosurgical treatments such as deep brain stimulation including how the surgery is performed, considerations for treatment, and potential mechanisms of the therapy. This will be further discussed in the context of recent research on Parkinson's disease neurophysiology. The talk will conclude with a discussion of possible future treatments for Parkinson's disease that integrate current neurophysiological research with clinical treatments, to improve clinical care.

BIO: Nicki is interested in how different parts of the brain interact to produce and control movement and how this can be disrupted in disease. She got her undergraduate degree at UC Berkeley with a double major in Molecular Cell Biology and Psychology, her Ph.D. from UC San Diego in Neurosciences, and completed her postdoc at UC San Francisco. She joined the University of Oregon faculty in fall 2017.

When she is not working, Nicki enjoys swimming, camping, hiking, and spending time with her family and pets.

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Update Seminar VIII: Meeting Room B113-116

Friday, May 24 from 3:15 PM – 4:15 PM

Virginia Brooks

Sponsored by the American Physiological Society



Professor
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Portland, Oregon
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Curiouser and Curiouser: How Can a Hormone Have an Effect if There are No Receptors?

Abstract: Leptin, a metabolic peptide produced in adipose tissue, binds to receptors in multiple brain sites to activate the sympathetic nervous system. Since plasma leptin levels increase with eating, one physiologic consequence is stimulation of glucose uptake, mediated by sympathetic nerves innervating skeletal muscle. This lecture will explore if and how leptin increases sympathetic activity by acting in the hypothalamic paraventricular nucleus, a brain nucleus in which leptin receptors are undetectable or scarce.

BIO: Ginny Brooks received her Ph.D. in Physiology from the University of Michigan in 1978. After a postdoctoral fellowship at the University of California, San Francisco, she accepted a faculty position in the Department of Physiology and Pharmacology at Oregon Health & Science University, where she was appointed Professor in 1997. During her tenure there, she has taught renal physiology, body fluids, and acid-base physiology to medical students, graduate students, dental students, and physician assistant students.

Her lab investigates brain control of the autonomic nervous system and blood pressure, not only in normal individuals, but also the changes that occur with obesity and pregnancy. A recent focus is the actions and brain neurocircuitry by which metabolically relevant proteins and peptides, such as insulin, leptin, alpha-MSH, Neuropeptide Y, and angiotensin II, alter basal and baroreflex control of sympathetic nerve activity and heart rate. Our experimental strategies are generally integrative and range from acute and chronic measurements of blood pressure and sympathetic nerve activity in conscious and anesthetized rats and mice, brain nano-injections, immunohistochemistry and in situ hybridization, standard molecular techniques, and select activation or inhibition of specific brain cell types using chemogenetics and optogenetics.

Poster Presentation Abstracts

Poster Session 1: Thursday, May 23 from 10:00 – 11:00 am in Exhibit Hall B

Poster #101

Study Approaches in Human Anatomy, Human Physiology, and A&P

Jessica Adams, University of Rhode Island, jessica_a_adams@uri.edu

Co-Author: Bryan Dewsbury, University of Rhode Island, dewsbury@uri.edu

Educational research has identified three study approaches of students: deep, strategic and surface. Students who adopt a deep learning approach are described with the ability to relate new information to prior knowledge in a meaningful way. Surface learners focus on memorization and rote learning to remember facts. Whereas strategic learners are motivated by grades and vacillate between deep and surface approaches in order to be successful in class. Study approaches will be examined in three classes: human anatomy, physiology, and A&P, as they relate to academic performance and content retention.

Poster #102

Understanding Group Dynamics: Know the Characters in the Kingdom

Cheryl Purvis, Nova Southeastern University, cpurvis@nova.edu

Co-Author: Camille Arca, Nova Southeastern University, camille.arca@gmail.com

To discuss various personality types, we created animal character portraits representing specific qualities. Kingdomality Personality Profiles and historical portraits were examined to develop illustrations using an IPAD Paint program. Inspiration for each character comes from the loving bond I have fostered with animals since I was little ... watching the discovery channel or animal planet and volunteering at zoos and animal hospitals. Getting to know animals at a deeper level allows one to recognize that, much like humans, they are all individuals with their own unique personalities. "Until one has loved an animal, a part of one's soul remains un-awakened." – Anonymous.

Poster #103

Personality Types of Undergraduate Students and Pre-Health Majors: Future Healthcare Professionals Begin with Success in Anatomy & Physiology

Cheryl Purvis, Nova Southeastern University, cpurvis@nova.edu

Co-Authors: Yuri Zagvazdin, Nova Southeastern University, yuri@nova.edu, Sydney Byk, Nova Southeastern University, littlepinkappleseb@gmail.com, Anastasia Mashukova, Nova Southeastern University, amashukova@nova.edu, Emily Schmitt-Lavin, Nova Southeastern University, eschmitt@nova.edu

Personality types of undergraduate students were identified using the Kingdomality Personal Preference Profile Test by Bowles, Silvano and Silvano (2005). More than 75% of Pre-Health Majors belonged to "Emotional Helpers"; one of the four major categories developed by the Test creators. Within this category, the Shepherds and White Knights were the most successful, and only those with the highest grades in this Anatomy and Physiology course were ultimately accepted into the healthcare profession of their choice. Our data suggest that personalities of many Pre-Health Majors favor entering healthcare professions. Individual strengths associated with their success are yet to be determined.

Poster #104

Identifying the Prevalent Personality Types and Individual Strengths in First Year Optometry Students: Implications for their Well-Being, Resilience and Academic Success as Future Healthcare Professionals

Yuri Zagvazdin, Nova Southeastern University, yuri@nova.edu

Co-Authors: Cheryl Purvis, Nova Southeastern University, cpurvis@nova.edu, Sydney Byk, Nova Southeastern University, littlepinkappleseb@gmail.com, Anastasia Mashukova, Nova Southeastern University, amashukova@nova.edu, Betty Zhang, Nova Southeastern University, bz99@mynsu.nova.edu, Ingrid Henson, Nova Southeastern University, ih211@mynsu.nova.edu

First year Optometry students (N=315) identified their personality profiles using Kingdomality test (Bowles, Silvano and Silvano, 2005), and StrengthsFinder self-assessment test by reading the definitions of 34 strengths (Rath, 2007) and choosing five most reflective of their personality. Kingdomality testing revealed the following distribution: 75% Emotional Helpers, 14% Logical Challengers, 6% Realistic Maintainers, and 5% Creative Explorers. Self-assessment showed the overall most common strength is Empathy, and the least common one is Maximizer. Each personality type was associated most frequently with the following strength: Emotional Helpers - Empathy, Logical Challengers - Analytical, Realistic Maintainers - Strategic, Creative Explorers - Adaptability.

Poster #105**The Art of Creating a Neuroanatomy Companion****Cheryl Purvis, Nova Southeastern University, cpurvis@nova.edu****Co-Author: Cate Wrege, Nova Southeastern University, catewrege@gmail.com**

Many students enrolled in Health Professions programs learned about the nervous system in Anatomy and Physiology. Knowledge of basic neuroanatomical terms is crucial to their understanding of clinical cases. To be successful as future healthcare professionals, students must appreciate the beauty and complexity of the external, as well as the internal morphology of the brain, brainstem and spinal cord. To promote active learning, we are developing a workbook designed to help students review key concepts. By creating drawings with a memorable, aesthetic quality, our innovative Neuroanatomy Companion reinforces student's understanding and retention of essential material while making learning more enjoyable.

Poster #106**Complete Brain & Spinal Cord Removal with Dural Sac & Dorsal Root Ganglia Intact****Ashley Aslo, ashleysaslo@gmail.com**

Having a brain and spinal cord prosection with the dural sac and dorsal root ganglia still intact is a tool that can be used when teaching neuroanatomy at a range of different levels, from undergraduate to professional education. It can be difficult to remove these structures from the body without damaging them. This poster will highlight the dissection techniques used to complete the removal of these structures as well as elicit conversation for improvement of this technique so it can be replicated.

Poster #107**Osteoporosis: Porous Bone Disease and Reduction in Bone Mass A Simple Educational Model****Lakshmi Atchison, Chestnut Hill College, latchiso@chc.edu*****Sponsored by MaLa Scientific***

Osteoporosis is a progressive bone disease leading to porous bones, bone mass reduction, and susceptibility to high risk for fracture. An educational model is presented using two human diagrams rolled into tubes representing a) a normal/healthy individual, or b) one with disease/osteoporosis. The disease/osteoporosis individual is illustrated with pores. When the two tubes are positioned vertically and identical weights are placed on top, the normal/healthy individual will remain steady, whereas the disease individual with pores will collapse and fall like a person with osteoporosis. This simple demonstration shows the seriousness of osteoporosis that causes an individual to easily fracture and fall.

Poster #108**Cooperating to Clear Up Muddiest Points: Effects on Performance in Under-Represented Groups****Nancy Barrickman, Salt Lake Community College, nancy.barrickman@slcc.edu****Co-Author: Kyla Ross, Georgia Institute of Technology, kross@hapsconnect.org**

Research shows that performance in community college anatomy courses is significantly lower than other courses, and Evidence-Based Instructional Practices (EBIPs) may improve student outcomes. The purpose of this study was to investigate how EBIPs impacted outcomes for Salt Lake Community College students who identified as first-generation or underrepresented minorities. Students identified their "muddiest points" regarding concepts covered during a two-week period, and the concepts were incorporated into cooperative, in-class quizzes. Student performance was tracked on exam questions that assessed comprehension of these concepts. Results inform best practices for teaching and learning in community college human anatomy and physiology courses.

Poster #109**The Physiology of Mythical Creatures: A Pedagogical Tool for Teaching Normal A&P****Jill Bennett-Toomey, Ohio Northern University, j-bennett-toomey@onu.edu****Co-Authors: Rema Suniga, Ohio Northern University, r-suniga@onu.edu, Vicki Abrams Motz, Ohio Northern University, v-motz@onu.edu**

Active learning enhances understanding and retention. Students were more engaged when faculty used disease states or disorders of normal function in beings such as Greek mythological creatures, science fiction characters or popular icons (superheroes), with the character serving as a familiar 'hook'. In this study, students were asked to focus on normal anatomy and physiology and propose modifications which enhance human capabilities in the fictional creatures/characters. The efficacy of this approach was tested using several active learning methods: individual student homework questions, in class polling and small group scenario analysis or case study presentations.

Poster #110**Student Perceptions of Microscope Comfort and VARK assessment Do Not Predict Laboratory Practical Scores****Emily Bradshaw, University of Central Florida, emily.bradshaw@ucf.edu****Co-Author: Tim Bradshaw, Polk State College, tbradshaw@polk.edu**

Student confidence and knowledge of their specific learning style may predict performance in the classroom. If so, then early assessments can determine which students may need more guidance. Students were asked at the beginning of a microscope based, upper level histology course to rate their comfort level with using a microscope and to complete a VARK survey to determine their learning style. Responses were grouped into low, moderate, or high confidence. Student performance on a practical based lab exam was compared between confidence groups and between different learning styles. Neither confidence levels nor learning style was correlated with student scores.

Poster #111**Preparing Students for Gross Anatomy Practical Examinations****Sheryl Sanders, Pacific University, sanderss@pacificu.edu****Co-Authors: Jose Reyna, Pacific University, reyn1741@pacificu.edu, Jenelle Andrews, Pacific University, andr5397@pacificu.edu**

To enhance learning of structures and to prepare students for laboratory practical exams, we utilize two review methods. First, physical therapy students participate in a round robin review. Students divide into two groups. Group A students remain at their lab table demonstrating anatomical structures, while Group B students rotate through tables for peer instruction. Roles are then reversed. Secondly, undergraduate students participate in mock practicals. Structures are pinned; students identify the structures in writing. These methods allow for repetition and assessment of knowledge retention prior to exams. We will survey students regarding their perceptions of these methods.

Poster #112**Does Word Root Knowledge Impact Course Performance in Undergraduate Human Anatomy?****Patricia Brady, Johnson & Wales University, tricia.m.brady@gmail.com**

We typically ask students to learn word roots early in their study of A&P with the belief that understanding word roots will aid in course performance. How rigorously has this hypothesis been tested? I will present data gathered on student performance in sections of Human Anatomy where word root study was embedded throughout the course compared to a control group that had no specific focus on learning word roots. Of particular interest is addressing performance in under prepared students. Comparison across groups of students in programs with different admission criteria are evaluated to examine this question. This is a preliminary study – collaborators welcomed!

Poster #113**Enhancing Supplemental Instruction Sessions with Adaptive Courseware Diagnostics and HAPS Teaching Tips****Carol Britson, University of Mississippi, cbritson@olemiss.edu**

An advantage of using adaptive courseware to support course objectives in Human A&P is the ability to link various elements of the courses (e.g., lecture, lab, supplemental instruction (SI) sessions, online homework, group study, and self-study) with a consistent platform. Diagnostic data were used to prepare a weekly report for SI leaders in which I wrote short explanations of where students were making errors in using their knowledge and provided HAPS Teaching Tips to help students prevent similar errors in the future. SI leaders used the diagnostics to deliver a personalized learning experience that has been well-received by students.

Poster #114**Oaks to Arteries: Principle-based Reasoning Varies with Physiological Context****Jack Cerchiara, University of Washington, cerchiara@gmail.com****Co-Authors: Emily Scott, University of Washington, scottemi@uw.edu, Jenny McFarland, Edmonds Community College, jmcfarla@email.edcc.edu, Mary Pat Wenderoth, University of Washington, mpw@uw.edu**

In physiology, experts reason using disciplinary principles that span different contexts. We predicted that the students' principle-based reasoning would differ depending on the type and amount of context in a question. To test this, we gave students context-free, animal-context, animal context-heavy, plant-context, and plant context-heavy questions. Seventy-percent of students used principle-based reasoning in context-free, compared to 56% in animal context-heavy questions. In plant scenarios, 75% of students had sophisticated reasoning, greater than what was observed in animal scenarios. We demonstrate that the context of questions influences the level of reasoning students bring to solving problems.

Poster #115**Developing learning progressions in undergraduate physiology****Jennifer Doherty, University of Washington, doherty2@uw.edu****Co-Authors: Emily Scott, University of Washington, scottemi@uw.edu, Jack Cerchiara, University of Washington, jackc44@uw.edu, Jenny McFarland, Edmonds Community College, jmcfarla@email.edcc.edu, Mary Pat Wenderoth, University of Washington, mpw@uw.edu**

To gain expertise in a physiology is to appropriately use fundamental principles. However, students often rely on factual recall rather than principle-based reasoning to solve problems. We used learning progressions as a theoretical framework to better understand how undergraduates develop principle-based reasoning in physiology, focusing on the principles of flux and mass balance. We developed two learning progressions that describe the many ideas students hold as they progress towards mastery. Instructors can use our learning progressions to tailor instruction to ideas students find challenging and in ways that shift student reasoning from primarily factual recall towards principle-based reasoning.

Poster #116**Novel and Inexpensive Method to Clean Anatomical Models****Carol Britson, University of Mississippi, cbritson@olemiss.edu**

Have the hands of time been unkind to your anatomical models? Replacing models just because they are dirty and grimy is fiscally and environmentally irresponsible, but what can you do when your models are in otherwise good condition AND all attempts at conventional cleaning have been unsuccessful? Before and after examples of models cleaned with inexpensive denture cleaning tablets and an overnight soak will be presented along with new models. Can you tell the difference?

Poster #117**Development of a Project Based Learning (PBL) Course – “Interdisciplinary Perspectives on Malaria”****Nalini Broadbelt, MCPHS University, nalini.broadbelt@mcphs.edu****Co-Authors: Michelle Young, MCPHS University, michelle.young@mcphs.edu, Nevila Jana, MCPHS University, nevila.jana@mcphs.edu, Katrina Van Dellen, MCPHS University, katrina.vandellen@mcphs.edu**

This presentation will provide key information on the development of a project based learning (PBL) course. The major areas that will be addressed are (1) how to select a topic for a PBL course, (2) selection of relevant course content to fulfill the objective, (3) the course goals asked of the students, as well as the overall outcome goals, and (4) support needed from the university to get this project into the curriculum. In addition the communication strategy used by three faculty in different disciplines in order to bring the course together to be taught next semester.

Poster #118**Use of Student-Created Video Resources to Enhance Science Practical Skills Training****Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk****Co-Author: Alison Jenkinson, University of Aberdeen, a.jenkinson@abdn.ac.uk**

Increasing academic diversity and student numbers has challenged traditional delivery of core practical skills. Utilising Objective Structured Practical Examinations (OSPE's), time spent delivering science practical skills has been reduced substantially. However, student-developed short video resources utilised before and after the practical class has enabled more effective use of practical class time. VLE data demonstrated high video utilisation and attainment was not adversely impacted. Feedback from anatomy, physiology and sport science students has been very positive. These results suggest that larger, diverse practical classes can be trained in a consistent and effective manner by using student-created video resources.

Poster #119**Bringing Science to Life – Teaching Metabolism through Augmented Reality****Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk****Co-Authors: Darryl O'Hare, Imagin3D, Andrew Sands, Imagin3D, William Hurst, Liverpool John Moores University, John Barrow, University of Aberdeen, j.barrow@abdn.ac.uk**

We have developed an augmented reality application that allows the abstract processes involved in food digestion and metabolism to be visualised, thereby providing interactive and tangible models of the processes involved. Additionally the augmented reality experience was blended with physical documentation that allowed the integration of key concepts and ideas alongside the modelled content. This is the first app that we have developed in this way to aid in our teaching, and it is hoped to be the beginnings of a new way of learning conceptual processes in many areas of the life sciences.

Poster #120**Connecting the CNS to the PNS: Using Prosections to Teach Neuroanatomy****Bridgett Severt, Wright State University, bridgett.severt@wright.edu****Co-Authors: Cindy Wingert, Cedarville University, cwingert@cedarville.edu, Victoria Gahman, Cedarville University, victoriagahman@cedarville.edu**

Students often fail to see the connection between the central nervous system and the peripheral nervous system. As educators, we wanted to find a way to make this more transparent. To help students see the big picture, we have dissected a brain, spinal cord, optic nerves, eyes, cauda equina, brachial and lumbosacral plexus all as one prosection. The difficulty in doing this dissection is there currently isn't a set of guidelines for the whole project. Therefore, we have created a detailed guide for removing the CNS and PNS as one prosection to clearly display the intricate human neurological system.

Poster #121**Maria's Marathon: A Scalable Case Study For Use in the Undergraduate Classroom****Megan Sherbenou, Colorado Mesa University, msherbenou@coloradomesa.edu**

This case study was developed to be delivered in-class to lower-division human anatomy and physiology students. The case study explores muscle fiber content, cardiovascular, and some respiratory effects of physical exercise. Specifically, we step through the effects different types of athletic training on muscle physiology and health, and then how drugs might mimic or impair training effects. This case study was designed and piloted to be used in a variety of classroom settings, including very large undergraduate classrooms. Thus, learning objective can be assessed through a series of multiple choice questions via clicker or Scantrons.

Poster #122**Twitter, Evolution, Human Anatomy and Tinbergen: A Class Case Study****Theodore Smith, IUSM, smittheo@iu.edu****Co-Authors: Valerie O'Loughlin, IUSM - Bloomington, vdean@indiana.edu, Polly Husmann, IUSM - Bloomington, phusmann@indiana.edu**

Undergraduate anatomy labs rarely have curricular time to answer the "why" questions students ask: Why do we have an appendix? Why does cranial nerve XI enter and exit the skull? Why are humans susceptible to lower back pain and knee injuries? Using a modified version of Tinbergen's 4 questions, an upper-level undergraduate course was developed to assist students with answering these "why" questions. Using the case study approach for anatomy review, live-tweeting and a final research poster as assessment, this course represents a committed approach to including evolutionary history into anatomy education.

Poster #123**Manifestation of Sexual Minority Identity in First-Year Medical Students****Theodore Smith, IUSM-Bloomington, smittheo@iu.edu****Co-Authors: Valerie O'Loughlin, IUSM - Bloomington, vdean@indiana.edu, David Flinders, Indiana University, dflinder@indiana.edu**

How do sexual minority medical students navigate their first year of medical school? How do their sexual identities affect this learning environment and wellness? Two theories about underrepresented individuals offer general perspectives to social experiences. Queer theory establishes that sexual identity is a vital part of the human experiences, while minority stress theory indicates that minorities experience higher levels of stress in situations than their majority counterparts. How can these theories be used to be proactive and supportive of sexual minority students? This qualitative research examines first-year sexual minority medical students at Indiana University School of Medicine–Bloomington as they experience encounters with peers, instructors and LGBTQA+ specific curriculum. This research was approved by the Indiana University Institutional Review Board (IRB # 1810842950). Each sexual minority medical student volunteer completed 2 interviews about their experiences and were observed during a classroom activity. Thematic analysis of field notes and interview transcripts was performed. Five major themes of identity manifestation were identified and will be discussed in this poster: Advocacy, Representation, Ignorance/Disrespect, Heteronormativity, and Humor. A model for manifestation of LGBTQA+ identity in medical school is also proposed using the tenets of queer and minority stress theories. Understanding the unique experience of sexual minority medical students may provide instructors with more tools to better assist students during a major life transition.

Poster #124**Participation in Outreach Activities Enhances Undergraduate and Graduate Education****Leslie Stone-Roy, Colorado State University, leslie.stone-roy@colostate.edu**

Experiential and service-learning benefit university students, and community outreach can provide both. Science-related outreach programs also may deepen student understanding of specific topics. At Colorado State University, students can volunteer to help with university led "Brain Awareness Week" activities at local middle and high schools. Participation in these events allows students to learn more about neuroscience, experience teaching in a small group format, and interact with younger students. Opportunities to create new stations or manage and train other volunteers are also available. Each of these experiences provides valuable learning opportunities that enhance university student education.

Poster #125**Does Screen Time Affect the Academic Performance of University Students?****Arianna Turello, Florida Gulf Coast University, aeturello9516@eagle.fgcu.edu****Co-Author: Alexandra Smith, Florida Gulf Coast University, alsmith5705@eagle.fgcu.edu**

To gather data for our study, we will invite students to participate in an anonymous online survey that was approved by our Institutional Review Board (IRB). Participants will be asked about their current GPA and GPA from past years depending on how long they have been in college. Other questions will cover different aspects of usage of electronic devices and how much time students spend on average per day using them. Our goal is to receive 700-750 completed surveys. Our poster will report on initial results of the study.

Poster #126**Research Critique and Poster Assignment****Justin Ulbright, Whitworth University, julbright@whitworth.edu**

The skills of reading, understanding, and relaying health-related scientific research should be cultivated in students taking anatomy and physiology courses. This poster presents a two-part assignment where students locate an original research article, then give a written summary and critique of the article. Following the completion of the written summary, a poster presentation is given. The student learning outcomes are to 1) identify important information within the article, 2) formulate an original and insightful critique, 3) demonstrate professional writing mechanics, 4) deliver a presentation of the articles major points, and 5) adhere to all formatting requirements.

Poster #127**Roadblocks to Student Learning About Evolution - Cognitive and Cultural Challenges****Jason Wingert, University of North Carolina Asheville, jwingert@unca.edu****Co-Authors: Rebecca Hale, University of North Carolina Asheville, rhale@unca.edu**

Student understanding of evolution is tenuous and challenged by several cognitive biases. Teleological reasoning is one such cognitive bias shown to disrupt student ability to learn about evolution. Teleological reasoning is the cognitive tendency to explain natural phenomena by their purpose, rather than by natural forces. This can lead students to assume that all traits are adaptations that evolved toward a prescribed endpoint. Therefore, students do not acknowledge the importance of trait variation, genetic drift, and gene flow in evolution. The current study presents data demonstrating that specifically interrogating students' biases in an evolution course improves student learning about evolution.

Poster #128**Wake up! Engaging Verbal and Nonverbal Autism Spectrum Elementary School Students in the Anatomy Academy Service-Learning Environment****Jonathan Wisco, Boston University School of Medicine, jjwisco@bu.edu****Co-Authors: Chloe Read, Brigham Young University, chloe.read@spectrumcharter.org, Jessica Kudlacek, Brigham Young University, jessicakudlacek@gmail.com, Ryan Jensen, Brigham Young University, wakejensen@gmail.com, Jared Duvall, Brigham Young University, jared.scott.duvall@gmail.com, Elizabeth Banner, Spectrum Academy, lbanner@spectrumcharter.org**

Children with autism flourish in a learning environment augmented by the presence of paraprofessional teachers and an engaged learning curriculum. We have developed Anatomy Academy, a community outreach service-learning program in which pre-professional students serve as paraprofessionals – Mentors – to teach concepts of anatomy, physiology and nutrition that inform and inspire their students to adopt a healthy lifestyle. We report that children with ASD become highly engaged in the Anatomy Academy learning environment as a result of a synergistic combination of interaction with caring and inspired Mentors, and an engaged curriculum teaching the wonders of the human body.

Poster #129**The Use of Virtual Reality Anatomy Resources in Undergraduate Anatomy and Physiology Education****Amie Yenser, Penn State Hazleton, alv10@psu.edu****Co-Authors: Christina Wissinger, Penn State University, clw68@psu.edu, Kat Phillips, Penn State University, kec5013@psu.edu, Valerie Lynn, Penn State University, vag3@psu.edu, Chris Stubbs, Penn State University, cas391@psu.edu**

The Pennsylvania State University Hazleton Library and Biology Department collaborated to use Virtual Reality (VR) software and hardware in the Fall 2018 Anatomy course. The Hazleton campus does not have access to a cadaver lab, and dissection opportunities are limited. VR apps allow dissection of all organ systems. While previous research has reported pedagogically beneficial experiences related to VR used in Anatomy, preliminary findings from our study showed students did not feel the virtual dissection helped them to learn the structures despite a slight increase in exam scores from the previous year when VR technology was not available.

Poster #130**Evolution of a New Laboratory Experience in PSL 311L: Gastric Motility from Mouth to Anus.****John Zubek, Michigan State University, zubekjoh@msu.edu**

Goals: The goal of this laboratory experience is to expose students to the many challenges the gastrointestinal system encounters during the course of food breakdown and motility. Rationale: Student laboratory experiences often focus on the digestive and absorptive aspects of the gastrointestinal system. While these are important, this comes at the expense of understanding how proper chewing, swallowing and gastric motility relate to one's overall systemic health. Lab station activities include: Mastication, Mock dental filling, Swallowing, Dysphagia, Smooth muscle activity, Longitudinal smooth muscle contribution to peristalsis, and Understanding defecation.

Poster Session 2: Thursday, May 23 from 2:15 – 3:15 pm in Exhibit Hall B

Poster #201**High Impact Experience in the Biomedical Sciences: Short-Term Study Abroad in Madrid & Paris****Emily Bradshaw, University of Central Florida, emily.bradshaw@ucf.edu****Co-Author: Alicia Hawthorne, University of Central Florida, alicia.hawthorne@ucf.edu**

Short-term study abroad courses have a variety of benefits including increased student retention, improved critical thinking skills, and a greater appreciation for the history of science and other cultures. This project describes a short-term study abroad course, "Icons of Neuroscience." Eight students from a university attended a nine day trip to Madrid, Spain and Paris, France to see historical laboratories of Santiago Ramón y Cajal, Jean-Martin Charcot, Marie Curie, and Louis Pasteur. The development of a study abroad trip, overall experiences of students, and suggestions for faculty members interested in designing a similar trip will also be discussed.

Poster #202**Novel and Economical Shoulder Model for Bursae Injections****Rachael Carter, Weber State University, rachaelcarter@mail.weber.edu****Co-Authors: Graeme Beatie, Weber State University, graemebeatie@mail.weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

The numerous synovial joints and bursae of the shoulder are the site of many sports injuries and often require specialized training to diagnose and inject. An injection into any of the bursae of the glenohumeral joint can cause permanent damage if performed incorrectly. Teaching models for shoulder injections are expensive and can be inaccessible for small programs. Our goal was to create an ultrasound compatible, cost-effective shoulder model to be used for demonstration and teaching purposes. We gathered qualitative data from licensed instructors to analyze the usefulness of our model in practice.

Poster #203**Challenges Encountered When Integrating Case Studies Across a Foundational Anatomy and Physiology Sequence****Janet Casagrand, University of Colorado Boulder, janet.casagrand@colorado.edu****Co-Authors: Ruth Heisler, University of Colorado Boulder, ruth.heisler@colorado.edu, Teresa Foley, University of Colorado Boulder, teresa.foley@colorado.edu**

Our majors take a 3-course introductory sequence (Anatomy, Physiology 1 & 2). One challenge is students often see these as isolated experiences and fail to recognize how concepts fit together within and across courses. Students can also have difficulty appreciating the real-world relevance of concepts. To address this, we began developing two integrative, interrupted case studies following one patient with celiac disease and another experiencing stress across the courses. These allowed us to address key learning objectives in the courses. We will discuss preliminary pre/post and student attitudes data, along with challenges that surfaced with broader faculty implementation.

Poster #204**Assessment of Student Use of Learning Tools****Pat Clark, IUPUI, patclark@iupui.edu**

Students usually have a variety of study tools available, but what do they actually use? And do they change what they use as they progress through the semester? If instructors want to help direct their students towards more effective resources, they must first know what students think is effective for them. Students in a non-major sophomore level physiology course were surveyed prior to each of 5 exams to determine what they identified as their key study tools and if their used changed over the semester.

Poster #205**Production of Interactive Pelvis Plastinates****Mark Cook, University of Minnesota, cookx072@umn.edu**

The anatomy of the pelvis is complex and difficult to visualize from conventional two-dimensional anatomy pictures. Advancements in the development of novel educational innovations, such as three-dimensional (3D) computer models, have helped many students understand the organization of the pelvic region. However, cadaveric dissection remains the “gold standard” for understand the construct of the human body and its variations. Pelvic dissections are relatively difficult and time-consuming and student’s dissections are often incomplete. In this study, an innovative cadaveric dissection technique is described in which the pelvic bones, ligaments, viscera, blood vessels and nerves can be removed and plastinated separately to provide the student with an interactive pelvic model experience.

Poster #206**Metacognition and Science Identity in Anatomy Labs****Alexandra Daemicke, Northern Illinois University, adaemicke@yahoo.com****Co-Authors: Heather Bergan-Roller, Northern Illinois University, hroller@niu.edu, Daniel Olson, Northern Illinois University, dolson@niu.edu**

This project sought to investigate how attention to improving student metacognition in a cadaver-based anatomy course can benefit their science identity and exam scores. Aspects of intervention included, but were not limited to, metacognition presentations, metacognitive-based review sessions, as well as post-exam reflection worksheets. A group of students enrolled in Northern Illinois University’s cadaver-based functional anatomy course were included in the study. Both the control and treatment groups had the same lecture instructor, teaching assistant, lecture format, and laboratory protocol. The students’ sense of science identity was measured before and after the introduction of metacognition instruction and activities. Four unit exam scores were collected throughout the course of the semester. Initial data analysis shows that although metacognition instruction does not have a large impact on science identity, it does positively affect exam scores even with a limited sample size. Apart from content illustrated by the poster presentation, attendees will also have the opportunity to learn more about and view resources utilized in the study, including various exercises and worksheets.

Poster #207**Using Student Response Systems to Improve the Effects of Cooperative Learning in Anatomy and Physiology Students at a Community College****Nancy Djerdjian, Anoka-Ramsey Community College, nancy.djerdjian@anokaramsey.edu****Co-Author: Shawn Magner, Anoka Ramsey Community College, shawn.magner@anokaramsey.edu**

We are investigating whether Student Response Systems (SRS) use to facilitate group discussion increases exam scores. Many studies regarding SRS use rely on anecdotal reports to determine their effectiveness, this comparative study will elucidate empirical results of SRS usage (i.e., exam scores with and without the use of SRS). Most studies citing an improvement in class scores related to SRS use are actually introducing and measuring the use of active learning techniques. This study will compare the use of an active learning technique, with and without the use of SRS, to determine if SRS use increases student exam scores.

Poster #208**Ceci N'est Pas Un Crâne: the Influence of Contemporary Art Styles on Medical Diagrams from 2000 BCE to Present Day****Julie Doll, Midwestern University, jdoll@midwestern.edu**

Throughout history, art has been used to record events, ward off spirits and honor gods, and demonstrate scientific concepts. Anatomists and artists have a long, complex relationship with both parties consulting each other still today. Art schools hire anatomists to ensure their representations of the body are accurate and education companies hire artists to create comprehensible images. As a result, medical diagrams reflect the artistic era in which they were created. A group of undergraduate students was instructed in recognizing anatomical features in art and traveled to the Louvre and Musee d'Orsay to locate specific works of art discussed.

Poster #209**Hybrid Virtual Kinesiology Laboratory Module Improves Students' Understanding of Integrative Musculoskeletal Anatomy and Exercise Physiology Concepts****Edgar Meyer, University of Mississippi Medical Center, emeyer@umc.edu****Co-Authors: Julianne Locke, Millsaps College, julianne.locke717@gmail.com, Yvette Langdon, Millsaps College, langdyg@millsaps.edu**

Digital learning tools have become increasingly popular in anatomical education. Virtual dissection tables can prove especially useful and cost effective for institutions that do not have access to cadaveric material. This study explored the curricular implementation of a hybrid virtual kinesiology lab module with undergraduate anatomy and physiology students at a liberal arts college. The module included a virtual dissection of back and upper and lower extremity muscles and an exercise physiology component using the Wingate and accumulated oxygen deficit tests. Students were administered pre- and post-tests. Initial results indicate positive increases in students' performance between pre- and post-tests.

Poster #210**Solve the Case! Case-Based Cumulative A&P Review as a Penultimate Learning Activity****Tracy Ediger, Georgia State University, tediger@gsu.edu****Co-Authors: Taylor Harkness, Georgia State University, tharkness1@gsu.edu, Phillip Philon, Georgia State University, pphilon1@gsu.edu**

Opportunities that support creative, engaging teamwork can make learning fun. We created a case-based instruction session with groups of students working through a series of cases. Cases chosen from a variety of sources were standardized by re-formatting into a one-page document. Each case focused on one organ system but also illustrated a specific connection between at least two organ systems. When possible, cases also included physical exam and laboratory data for interpretation. For efficient grading, a one-page answer sheet was utilized. Our hope was that this activity would encourage review in a fun and relatively low-stress environment.

Poster #211**To Poll or Not to Poll? Assessing the Impact of Interactive Polling Versus Group Discussion on Student Engagement and Learning****Heather Evans Anderson, Stetson University, hevansanderson@stetson.edu**

Active learning is known to promote student depth of knowledge, engagement in the classroom, and retention in the sciences. The purpose of this project was to compare the effectiveness of two different active learning strategies: 1) problem-based learning using interactive polling of individual students interspersed in between brief lectures 2) team-based learning using group discussions after an in-class hands or activity that illustrates a physiological concept. Targeted learning objectives were assessed by ranking exam questions using Blooms taxonomy on separate exams and again on a cumulative final exam. The effectiveness of each strategy was determined by student performance on exams.

Poster #212**Stature Estimation from Facial Anthropometry of Igbo People in Abakaliki, Southeast Nigeria****Edwin Ewunonu, Ebonyi State University, ediojims02@yahoo.com**

The study estimates the height of Igbo people in Abakaliki, Nigeria from their facial parameters. The facial length; nasal length, breadth; bizygomatic diameter of a sample of 669 males and 331 females whose age-range falls within 12 years to 45 years were measured with a pair of metal spreading calipers. The bizygomatic diameter showed stronger correlation ($r = 0.55$) with stature ($p < 0.01$) and gives better prediction of stature than others. This could be useful in forensic investigations. KEY WORDS: Bizygomatic diameter, Facial length, Nasal length, Nasal breadth, Abakaliki, Stature.

Poster #213**Use of a Bookend Think-Pair-Share EBIP in a Community College Human Physiology Class to Improve Scores and Academic Self-Efficacy****Melaney Farr, Salt Lake Community College, melaney.farr@slcc.edu****Co-Authors: Sarah Balizan, New Mexico State University - Dona Ana Community College, sbalizan@dacc.nmsu.edu, Kyla Turpin Ross, Georgia Institute of Technology, kross@hpsconnect.org**

Pre-clinical community college physiology students have difficulty with causal reasoning and interpreting data. Evidence-based instructional practices (EBIPs) (e.g., think-pair-share) have been shown to improve performance and may address this gap. The purpose of this NSF-funded (CAPER) study was to investigate the impact of a bookend, think-pair-share technique on student sense of academic self-efficacy, anxiety and performance, as assessed by surveys and performance on exam questions. Specifically, we asked a question, allowed students to answer, taught the concept, and repeated the question, allowing time for think-pair-share and class discussion. Both quantitative and qualitative results will be presented as available.

Poster #214**iPad Use for A&P Lab Practical Exams Does Not Have a Negative Impact on Scores****Jeannine Foley, Regis College, jeannine.foley@regiscollege.edu****Co-Author: Shari Litch Gray, Regis College, shari.gray@regiscollege.edu**

iPad technology provides a new platform for test taking. We asked whether the use of iPads with Respondus lockdown browser for test taking in Human Anatomy and Physiology I Labs would have a negative effect on practical exam scores. All students were administered a standard visual lab practical with stations displaying anatomical models or histology slides on microscopes. We compared grades of one cohort of students who took paper practical exams (n=173) to a cohort of students who used iPads (n=132) to record their answers. We found that using iPads for lab practicals did not lower average exam scores.

Poster #215**The Influence of Healthy Eating Habits on the Academic Performance of University Students****Bridget Forster, Florida Gulf Coast University, blforster9951@eagle.fgcu.edu****Co-Author: Sierra Brister, Florida Gulf Coast University, srbrister2339@eagle.fgcu.edu**

The biannual national youth risk behavior study has shown that health behavior has an impact on the academic performance of high school students. The National College Health Assessment focuses on factors that can be stressful for students, but doesn't look at dietary choices or academic performance. Study participants will be asked about their current GPA and GPA from past years in addition to questions about their eating habits. Our goal is to receive 700-750 completed surveys. College students have control over their nutrition, which is why the results of our study will be important for efforts to educate university students about the benefits of healthy eating habits.

Poster #216**Distance Learning and a Flipped Classroom in Gross Anatomy****Samuel Franklin, University of Kentucky, samuel.franklin@uky.edu**

There is an ever expanding need for well trained health professionals to provide quality health care to the underserved regions in the state of Kentucky. In order to address this need, the College of Medicine and the College of Allied Health at the University of Kentucky have established external campuses in different regions around our state to train medical professional students. Gross anatomy is a core course in the curriculum of the Physician Assistant program at the University of Kentucky. The current gross anatomy course is comprised of didactic lectures, formative feedback activities, and a full dissection laboratory experience. Historically for students on external campuses, didactic lectures have been provided by using basic distance learning technology. The instructor would lecture from the campus in Lexington Kentucky and the students would watch the lectures in a classroom on the external campus. For laboratory session the instructor would travel to the external campus to conduct the laboratory. Since spring 2015 we have employed a variant of a flipped classroom model to teach the gross anatomy course to Physician Assistant students on the external campus in Morehead Kentucky. Here we report the organization of the current gross anatomy course, how a flipped classroom model can be used in conjunction with distance learning technology, our experiences using this approach, and student feedback.

Poster #217**Use of Lasers to Identify Delicate Structures in the Human Anatomy Laboratory****Kelton Friedel, Weber State University, keltonfriedel@mail.weber.edu****Co-Authors: Thomas Odenwalder, Weber State University, thomasodenwalder@weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Identifying cranial nerves and other central nervous system structures can be particularly challenging and is often done through numbered pins. However, the pinning method is destructive to these delicate structures. We worked in collaboration with our Engineering college to develop a multi-articulate laser pointer apparatus specifically for use in these situations for quizzes and exams. A number of lasers could then be aimed at specific anatomic structures and activated by students sequentially. This innovative, non-destructive, low-cost and collaborative design allowed a single cadaver to be used for multiple quizzes and exams throughout the semester.

Poster #218**How Painted Bones Aid Undergraduate Students in Learning the Human Skeletal System****Shelby Geilmann, Weber State University, shelbygeilmann@mail.weber.edu****Co-Authors: Maya LeeMaster, Weber State University, mayaleemaster@mail.weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Effectively and efficiently teaching the various structures on skeletal bones is a challenge for undergraduate laboratory teaching assistants. Since bone structures are often unmarked on most models, we painted these surface features to aid our undergraduate laboratory instructors and their students. Instructors were surveyed about their teaching experience with painted versus unpainted bones. Student quizzes and exams from previous semesters were compared to determine if painted models aided in learning. Our preliminary evidence indicates that while the student lab instructors preferred teaching with the painted models, there was not a significant difference of student scores.

Poster #219**Do Student Grades Truly Reflect Their Skill Set?****Tejendra Gill, University of Houston, tgill@uh.edu**

Students in Human Anatomy and Physiology labs earn their grades by performing different activities. In general, student performance is assessed based on, (i) Physical examination of body system, organs, and tissues (models and slides), (ii) Physiology experiments and dissections, (iii) Hands-on practical exams, and (iv) Online quizzes. Students get an opportunity to utilize their specific skill set(s) to maximize their performance. Analysis of the student grades on various activities reveals that a majority of students score high on the hands-on activities than on the online portion. It is, therefore, imperative that delivery of hands-on and online components is well balanced to allow the students to not only perform well on the tests but also gain and retain the information over long term.

Poster #220**Fats are Friends, not Foes****Bridgit Goldman, Siena College, bgoldman@siena.edu****Co-Author: Sean Fitzpatrick, The University at Albany – SUNY, s21fitz@siena.edu**

Lipids are an integral component of our bodies. The myriad forms of lipids allow them the versatility to perform countless functions including maintenance of cellular integrity, flow of proper neural conduction, efficient fuel storage, and cell signaling. Proper anatomical structure is needed for optimal physiological function and requires a diet composed of lipids of the right kind and in the correct quantity. Here we present how dietary lipids are incorporated into our anatomy which can either help or hinder our physiology. Our goal is to link basic biochemical facts with emerging data on how dietary lipid source, state of oxidation, and conformation influence the overall health of humans.

Poster #221**Muddiest Undergraduate Human Anatomy Practical Items: An Evaluation of Undergraduate Human Anatomy Practicals for Most Missed Items****Camryn Hawkins, The Ohio State University, hawkins.432@osu.edu****Co-Authors: Eileen Kalmar, The Ohio State University, eileen.kalmar@osumc.edu, Melissa Quinn, The Ohio State University, melissa.quinn@osumc.edu, Spenta Bamji, The Ohio State University, bamji.2@osu.edu**

For most undergraduate human anatomy courses with a cadaver lab, student's study items on prosected cadavers, and their anatomical knowledge is tested through a laboratory practical examination. Often times, students struggle differentiating items of different tissue types that look similar (i.e. arteries, veins, and nerves). This study evaluated past practical examinations from the Anatomy 3300 Advanced Human Anatomy for Undergraduates course at the Ohio State University, to assess the items students struggled identifying most often.

Poster #222**Department Education Specialists in Integrative Physiology: A New Approach to Sustaining STEM Transformations****Ruth Heisler, University of Colorado Boulder, ruth.heisler@colorado.edu****Co-Authors: Janet Casagrand, University of Colorado Boulder, janet.casagrand@colorado.edu, Teresa Foley, University of Colorado Boulder, teresa.foley@colorado.edu**

Over a 10-year span, the Department of Integrative Physiology was successful in improving undergraduate education through implementation of evidence based teaching approaches with the guidance of embedded Science Teaching Fellows (STFs). In 2011, external funding for STFs ended. Without the leadership, educational expertise, and support these unique individuals provided, a key question for IPHY was how to sustain and build on the progress that had been made. We highlight the process that our department took to formally adopt the use of internally supported Department Education Specialists (DESS) as a way to sustain curricular reform efforts.

Poster #223**Pre-Health Professions Students' Knowledge of and Attitude toward Holistic Medicine Practices****Leia Holland, Florida Gulf Coast University, lmholland1706@eagle.fgcu.edu****Co-Author: Arianna Turello, Florida Gulf Coast University, aeturello9516@eagle.fgcu.edu**

There is a lack of studies looking into the knowledge of and attitude towards holistic medicine practices among undergraduate students in the health professions in the United States.

Our survey asks about participants' general attitude towards holistic medicine, which practices they are familiar with, whether they expect to learn about holistic medicine practices in their major, and which practices they plan on integrating into their future careers as health professionals. We are hoping to receive 300-350 completed surveys.

The results will show whether teaching holistic medicine practices should be added to the curriculum for health professions or, if they already are in the curriculum, whether they need to receive more attention.

Poster #224**Visualizing Cervical Effacement and Dilation: A Balloon Activity****Juanita Jellyman, California State Polytechnic University at Pomona, jkjellyman@cpp.edu**

During pregnancy, the cervix is long, thick and resistant to stretch thereby helping to retain the fetus in the uterus. For birth to occur, contractions of the uterine muscle cause cervical effacement, in which the cervix thins and retracts upward into the uterus. Longer, more frequent, and more intense uterine contractions cause the cervix to dilate from ~0.3cm diameter to a diameter of ~10cm to allow the fetus to pass into the birth canal. The poster describes an active learning activity using a balloon and ping-pong ball to help students to visualize and distinguish between the concepts of effacement and dilation of the cervix.

Poster #225**Community College Anatomy and Physiology Education Research****Murray Jensen, University of Minnesota, msjensen@umn.edu****Co-Authors: Kerry Hull, Bishop's University, khull@ubishop.ca, Kyla Ross, Georgia Tech, kyla.t.ross@gmail.com, Ron Gerrits, Milwaukee School of Engineering, gerrits@msoe.edu, Betsy Ott, Tyler Junior College, bott@tjc.edu, Hiranya Roychowdhury, Dona Ana Community College, rpankayatse@dacc.nmsu.edu, Sarah Balizan, Dona Ana Community College, sbalizan@dacc.nmsu.edu, Melaney Farr, Salt Lake Community College, melaney.farr@slcc.edu, Nancy Barrickman, Salt Lake Community College, nancy.barrickman@slcc.edu, Shawn Magner, Anoka Ramsey Community College, shawn.magner@anokaramsey.edu, Nancy Djerdjian, Anoka Ramsey Community College, nancy.djerdjian@icloud.com, Heather Lawford, Bishop's University, hlawford@ubishops.ca, Suzanna Hood, Bishop's University, shood@ubishops.ca**

The Community College Anatomy and Physiology Education Research (CAPER) project is a NSF funded program that aims to promote evidence based instructional methods, such as guided inquiry and cooperative group learning. Participants first engage in the HAPS I course Introduction to Education Research Methods, where individualized classroom research projects are designed. Next, instructors implement their research projects within the community colleges. And finally, each instructor publishes their results by presenting a poster at the HAPS Annual Conference and submits manuscript to the HAPS Educator. Along the way, all the instructors have support from mentor and experts in education research.

Poster #226**Photogrammetry as a Method for Producing Interactive 3D Digital Models of Laboratory Specimens****Corey Johnson, University of North Carolina at Chapel Hill, johnsonc@bio.unc.edu**

Photogrammetry is a technique that generates an interactive three-dimensional (3D) models from a series of photographs. This method can be used in a cost-efficient manner with a variety of free or low-cost software options, digital photography with common mobile phones, and standard laptop computers. Additionally, little expertise is necessary. The proposed application is to provide students ubiquitous access to interactive digital models of the same plastic lab models, organ specimens, or cadaveric specimens used in the laboratory.

Poster #227**Flipping the Classroom: Nursing Students' Performance and Satisfaction in an Anatomy and Physiology Course****Mickael Joseph, Sultan Qaboos University, mickaelj@squ.edu.om****Co-Authors: Erna Judith Roach, Sultan Qaboos University, erna@squ.edu.om, Suja Karkada, Sultan Qaboos University, karkada@squ.edu.om, Arcalyd Rose Cayaban, Sultan Qaboos University, arcalydrose@squ.edu.om**

The aim of this study was to determine the impact of a flipped-classroom method on learning outcomes and satisfaction of nursing students in an anatomy and physiology (A&P) course. Flipped classroom approach was used in teaching the respiratory system with 49 first-year students at College of Nursing, Oman. Students' mean scores of the respiratory system items in the final examination have improved significantly after a flipped classroom method compared to a control group. Moreover, students were satisfied with the flipped classroom. Flipped classroom approach is a valuable teaching strategy that can improve students' performance and satisfaction in an A&P course.

Poster #228**Educating and Employing Undergraduate Students as Lab Assistants in Graduate-Level Gross Anatomy Courses****Karen Kelly, Milligan College, klkelly@milligan.edu**

The MSOT and MSPAS programs at Milligan College, a small liberal arts college in east Tennessee, have anatomy courses that include dissection of anatomical gift donors. Since 1998, we have been educating undergraduate science majors to act as lab assistants in these courses. Their responsibilities include prosection, demonstration of the prosections to the graduate students, and guiding those students through the dissection process. They are paid for their work and receive course credit. Professors, lab assistants, graduate students, and the college all benefit from this program as well as the graduate programs these lab assistants often enter.

Poster #229**Does a Critical Review of Scientific Literature Improve Student Skills?****Nathaniel King, Palm Beach State College - Boca Raton, kingn@palmbeachstate.edu****Co-Author: Stefania Volpe, Palm Beach State College, volpes@palmbeachstate.edu**

Critical thinking is a necessary skill needed by students to be successful in their careers as future healthcare professionals. There are several unique approaches that can be used by faculty to increase the students' skills. In lecture, activities designed to use current events and relate them to scientific material have helped students to think more critically about scientific current events portrayal in the media. This poster will present data on several variables that contribute to student success.

Poster #230**Using Infographics to Revitalise a Physiology Communication Skills Assessment****Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk****Co-Author: Alison Jenkinson, University of Aberdeen, a.jenkinson@abdn.ac.uk**

Poster assignments challenge students to deliver clear and detailed scientific information. Infographics can communicate complex concepts in simple graphical form to broad audiences. Students presented a physiology project using an infographic online and in print form. Students chose the topic, used free software and were invited to complete an anonymous questionnaire on the experience. Feedback suggests that simplifying the science was challenging but this format encouraged greater thought and critical analysis of their own work, communicating complex concepts more effectively than traditional posters. This approach has revitalised a physiology project assignment, enthused students and broadened communication and transferable skills.

Poster #231**"Mini OSPE" Practicals to Prepare Students for Examinations Involving Human Subjects****Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk****Co-Author: Michael Scholz, University of Aberdeen**

OSPEs (objective structured practical examinations) are common in medical education, and have been adopted into honours sport science teaching, developing skills linked to time management and interaction with patients/volunteers. Interaction with volunteers is important in Sport Science, because interaction with volunteers is an integral part of research. A simplified OSPE measuring volunteers' blood pressures was introduced to third year teaching to provide earlier exposure to such experiences. Proper technique, interaction with "volunteers" and professionalism are the main assessment criteria. Student feedback illustrates that, despite initial anxieties, the exercise is perceived as useful and helps build confidence interacting with people.

Poster Session 3: Friday, May 24 from 9:45 – 10:45 am in Exhibit Hall B

Poster #301

Writing to Learn: Editing Anatomical Content in Wikipedia

Heidi Schutz, Pacific Lutheran University, schutzha@plu.edu

Recently, the number of students at both the graduate and undergraduate level editing Wikipedia grew steadily. This rise, driven by Wikipedia's educational tools, the increased focus on writing as a vehicle for deep learning in STEM, and an emerging focus on effective science communication led to significant growth in Wikipedia's biological content. This presentation utilizes examples from three semesters of an upper division comparative anatomy course to demonstrate how student editing of Wikipedia not only improves its anatomy-based content, but is also a potentially highly effective teaching tool.

Poster #302

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part I: General Instructional Trends in Muscular System Coverage

Amberly Reynolds, Indiana University, ammreyno@iu.edu

Co-Authors: Lance Forshee, Southern Utah University, lanceforshee@suu.edu, Nizhoni Marasco, Southern Utah University, nizhonimarasco@yahoo.com

Anatomical content coverage across undergraduate human anatomy and A&P courses is widely variable. A previous study by Saladin (2008) assessed muscle coverage (n~20) via self-report in response to a listserv question. Given the need for a more global understanding of the content taught in undergraduate anatomy courses, we prepared a muscular system survey for which the data provide that identification of muscles is taught more frequently than actions, followed by innervation. We also present which muscles are taught with greater frequency (e.g., sternocleidomastoid is the most frequently taught muscle of the head and neck region).

Poster #303

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part II: Comparisons Between U.S. and International Institutional Coverage

Amberly Reynolds, Indiana University, ammreyno@iu.edu

Co-Authors: Michael Goodwin, Indiana University, micegood@iu.edu, Valerie O'Loughlin, Indiana University, vdean@indiana.edu

Previous studies assessing differences in muscular system coverage have been limited due to small sample sizes and incomplete representation. This poster summarizes and compares general trends observed in muscular system coverage between stand-alone anatomy and A&P courses based in the U.S, and those taught internationally. Comparative data analysis provides that both U.S and international stand-alone anatomy and A&P courses tend to require students to learn specific muscles and compartments of general regions (i.e. upper limb). However, U.S. courses place less emphasis on specific body regions, one specific example being the hand.

Poster #304

Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part III: Comparisons Between Stand-alone Human Anatomy and A&P Courses

Valerie O'Loughlin, Indiana University-Bloomington, vdean@indiana.edu

Co-Authors: Amberly Reynolds, Indiana University - Bloomington, ammreyno@iu.edu, Michael Goodwin, Indiana University - Bloomington, micegood@iu.edu

Undergraduate anatomy and A&P courses vary in depth and breadth of skeletal muscle system coverage, yet little data has been collected about these differences. To address this data deficit, the authors developed a skeletal muscular survey (presented at HAPS 2018) and received complete responses from 115 anatomy and 143 A&P courses. When comparing stand-alone anatomy versus A&P courses, both were similarly likely to teach specific muscles and compartments across broad muscular regions. However, anatomy courses required students to identify more specific muscles in each region than A&P courses. Additional data comparisons between these two types of courses will be presented.

Poster #305**Skeletal Muscular System Coverage in Undergraduate Human Anatomy and A&P Courses, Part IV: Comparisons Between Community Colleges and Four-year Universities****Amberly Reynolds, Indiana University, ammreyno@iu.edu****Co-Authors: Michael Goodwin, Indiana University, micegood@iu.edu, Valerie O'Loughlin, Indiana University, vdean@indiana.edu**

In response to the need for a more thorough understanding of the content taught in undergraduate anatomy (and A&P) courses across various institutions, a muscular system survey allowed Anatomy faculty to report the extent to which they discuss skeletal muscles in their courses. This poster compares muscular system coverage trends between community college (n~90) and four-year university (~130) Anatomy (and A&P) courses. In general, there are more similarities in content coverage than differences. Yet one difference found is that community colleges more frequently teach muscles via compartments paired with grouped actions.

Poster #306**Factors Influencing Osteoarthritis and Preventative Treatment Recommendations for People with Traumatic Transtibial Amputation: A Systematic Review****Rebecca Slape, Tennessee State University, r.slape@gmail.com****Co-Authors: Drew Blank, Tennessee University, ablank206@gmail.com, Lauren Atkinson, Tennessee University, laurenatk13@gmail.com, Edilberto Raynes, Tennessee State University, eraynes@tnstate.edu**

Long-term lower extremity prosthetic use has been linked to secondary conditions, including osteoarthritis of the intact limb. The purpose of this review is to determine strategies for reducing the incidence of osteoarthritis in individuals who have undergone traumatic unilateral transtibial amputations. The literature supports the following recommendations: loading the intact joints, weight distribution training, cardiovascular training and weight management, and the use and reevaluation of appropriate prostheses. Therefore, a perioperative exercise routine, regular follow up rehabilitation, and regular prosthetic evaluation may be recommended. Further evidence is needed to evaluate the outcomes of these preventative strategies.

Poster #307**The Effect of Negatively Worded Stems on Item Difficulty and Discrimination****Sara Klender, University of Mississippi Medical Center, sklender@umc.edu**

Flawed multiple choice questions, such as those with negatively worded stems (i.e., questions including not or except), are quite common on assessments in health-related professional programs and may influence student performance. The purpose of this study is to determine if there is a difference in item difficulty and discrimination on medical histology questions with negatively worded stems compared to positively worded stems. To achieve this, seven histology exams from the 2017-2018 school year were analyzed. Results of this study should guide instructors in writing multiple choice questions that are well designed and follow current question writing guidelines.

Poster #308**Tutorial Anatomy Podcasts as Study Aids****Theresa Lake, Harper College, tlake@harpercollege.edu****Co-Author: Jace Robinson, Harper College, jrobinso@harpercollege.edu**

Harper College anatomy students are challenged with limited lab time and conflicts that reduce the necessary hands-on experience with lab models to master the required knowledge. We produced video podcasts that display individual closeups of Harper's lab specimens with tutorials on the targeted information required for lab exams. These tutorials address the first two of three lab exams, which tend to define a student's final course grade and most strongly contribute to attrition. They are posted for easy accessibility by students on all computers and mobile devices, allowing them to be more efficient learners during scheduled lab times.

Poster #309**Does Size Really Matter? A Comparison of Class Size and Student Outcomes in Introductory Physiology Courses****Carol Kroeker, University of Calgary, kcagibbo@ucalgary.ca**

It's often thought that small class size resulted in better student success. This study examined student outcomes for physiology courses of different sizes (30 students vs. 200+). Both courses were taught by the same instructor, using the same teaching and testing materials. Class size was the only significant variable. A pre-test determined all students had a similar knowledge base. Exam grades (overall and individual questions), lab grades, and final course grades were compared. These parameters showed no significant difference between the courses, with students showing similar levels of success and satisfaction. Class size may be far less significant than teaching methodology (eg. Case studies, inquiry-based) in determining student success.

Poster #310**Writing Higher Order Assessment Questions for an Undergraduate Anatomy Laboratory****Danielle Loder, Indiana University, dloder@iu.edu****Co-Author: Stacey Dunham, Indiana University, dunhams@indiana.edu**

Basic Human Anatomy (A215) at Indiana University is a 200-level course with both laboratory and lecture portions. Students attend two labs per week and examine anatomical models, virtual microscopy, and cadaver demonstrations to learn relevant structures. Currently, students are assessed via four practical exams, each consisting of 40 purely identification questions. Instructors of A215 identified the need to include higher order questions on laboratory exams. A collaborative research group consisting of 2 undergraduate students, 2 graduate students, and 1 faculty member used current literature to guide the writing of higher order questions to be used on future A215 lab exams.

Poster #311**The Effects of Immediate Feedback on Success Rates of Anatomy and Physiology Students at a Community College****Shawn Magner, Anoka-Ramsey Community College, shawn.magner@anokaramsey.edu****Co-Author: Nancy Djerdjian, Anoka Ramsey Community College, nancy.djerdjian@anokaramsey.edu**

We are investigating whether the immediate feedback provided by the use of Student Response Systems (SRS) increases student success as identified through exam scores. This comparative study will provide planned group discussions, a known effective teaching practice, to all students in a community college A&P course. One-half of the students will also utilize SRS. Evidence of any additive effect produced by the SRS will be examined by comparing unit exam scores between the SRS and non-SRS students.

Poster #312**Understanding Resource Use Related to Self-Regulation in an Introductory Physiology Course****Jennelle Malcos, The Pennsylvania State University, jlh608@psu.edu****Co-Authors: Rayne Sperling, The Pennsylvania State University, rsd7@psu.edu, Joseph Tice, The Pennsylvania State University, jzt58@psu.edu**

While actively learning, maximal success occurs when students set goals, enact strategies, monitor progress, control motivation, and reflect on their performance – in other words, they demonstrate self-regulated learning. In this work we leveraged NUDGE, a learning app created to promote self-regulated learning by sending prompts to students. This tool was used in a large introductory physiology course. Student surveys assessed their experiences using NUDGE and other resources. Results examine course performance in relation to student perceptions of resources and provide insight to the future use of resources to promote success in content and self-regulated learning in large, introductory physiology courses.

Poster #313**Using Drawing as an Active Learning Activity in Undergraduate Human Anatomy****Nizhoni Marasco, Southern Utah University, nizhonimarasco@yahoo.com****Co-Authors: Lance Forshee, Southern Utah University, lanceforshee@suu.edu, Nizhoni Marasco, Southern Utah University, nizhonimarasco@yahoo.com**

STEM students in large lecture courses encounter various difficulties including lower levels of engagement and course performance. To combat this, faculty employ active learning strategies as evidence suggests these strategies increase student retention, engagement, and lessen the achievement gap of underrepresented minorities. In SUU's Physiology and Anatomy courses, we are working toward implementing active learning components. Across two semesters, we gathered data from students to identify this strategies efficacy. One section of each class implemented activities focused on students drawing the content covered while the others remained a traditional lecture. Our poster presentation will report the implementation of this strategy.

Poster #314**Use of Mannequins to Aid in Teaching the Human Anatomy Laboratory****Alexis Mathews, Weber State University, alexiswanlass1@mail.weber.edu****Co-Authors: Chanel Ross, Weber State University, chanelross@mail.weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Teaching anatomic surface regions and sense fields can be challenging, particularly for undergraduate teaching assistants. Rather than relying on unidimensional pictures, we employed fashion mannequins in our anatomy laboratory in effort to improve these lessons. Removable tape was used to identify body surface regions, after which, the tape was removed for quiz and exam purposes. Skin sense fields were identified through the use of different colored paints. Undergraduate lab instructors found these methods to be particularly helpful in conveying the information to their students. In conclusion, the use of mannequins provides a novel method to immerse students in anatomic pedagogy

Poster #315**KHFAC Nerve Blocking in Frog Sciatic Nerves****Shane Mausolf, The University of Texas at San Antonio, smausolf97@gmail.com****Co-Authors: Eddie Hernandez, The University of Texas at San Antonio, hector.hernandez@utsa.edu, Zin Htway, California State University Channel Islands, dr.zin.htway@gmail.com**

Electrical nerve stimulation is an emerging treatment for muscular pain alleviation. Kilohertz frequency alternating current (KHFAC) nerve blocks have shown to effectively block the selected nerve with minimal adverse effects. Under certain conditions, a KHFAC block may provoke a depression of nerve conduction that persists post-treatment, perhaps due to an accumulation of metabolic products that inhibit immediate nerve conduction recovery. Our study will measure the concentration of metabolic products after nerve block to determine if the concentrations changes would warrant nerve deactivation. *Rana temporaria* were pithed and sciatic nerves placed between two stimulating electrodes to collect compound action potentials to compare nerve conduction blocks between experimental and control groups.

Poster #316**Wikipedia as a Resource for Teaching Human Anatomy****Robert McCarthy, Benedictine University, rmccarthy@ben.edu**

Since its inception in 2001, the quality of Wikipedia entries has greatly improved to the point where entries for certain topics rival traditional encyclopedia entries in quality. To formally evaluate if Wikipedia could be used as a course resource for undergraduate human anatomy, I critically examined 968 anatomy Wikipedia entries on the basis of accuracy, nuance, clarity, and informativeness, and assessed coverage by comparing lists of high- and low-quality articles to course syllabi and HAPS Anatomy Learning Outcomes. Although there are a few subject areas where it excels, Wikipedia has a long way to go to replace an anatomy textbook.

Poster #317**Investigating the Domestication Syndrome: A Study for the Human Anatomy Laboratory****Karen McMahon, The University of Tulsa, karen-mcmahon@utulsa.edu**

Domestication Syndrome is the shared physical appearance of domesticated animals when compared to their wild relatives. Students compare the skulls of ancestral wolves to dogs, their domesticated counterparts, to determine the changes that characterize domestication. Students then examine and compare the skull of Neanderthal to that of a modern human for these same features to determine if domestication has shaped the evolution of modern humans as recent research has suggested. The exercise ends with an explanation on how modification of neural crest cells accounts for the characteristics of domestication and how self-domestication was advantageous in the development of human society.

Poster #318**The Anatomy of Lab: Factors Affecting, Causes of, and Student Motivations for Leaving Anatomy Lab Courses Early****Sarah Monson, Southern Utah University, sarahmonson14m@gmail.com****Co-Authors: Lance Forshee, Southern Utah University, lanceforshee@suu.edu**

SUU has a cadaver based anatomy lab allowing students to attend multiple labs. Students, however, do not take advantage of this and leave lab early or do not attend additional review sessions. Early research suggests those who leave early score lower in the course than those who stay the whole time or those who come extra lab sessions. Extra attendance of these increases overall grades from .5% to .7% per session. To explore this, researchers administered a survey to identify the factors affecting their lives and the course. Our poster will present our continued efforts and results toward this.

Poster #319**"Meet the Patient": A Novel Case Based Teaching Format for the Basic Sciences****Sabyasachi Moulik, Florida International University, smoulik@fiu.edu****Co-Authors: Keith Shopa, Florida International University, kshop002@med.fiu.edu, Frances De La Camara, Florida International University, fdela008@med.fiu.edu, Diane Krieger, Florida International University, dr.krieger@endofl.com, Rebecca Lyn Toonkel, Florida International University, rtoonkel@fiu.edu, Gagani Athauda, Florida International University, gathauda@fiu.edu**

Student evaluations suggest a preference for the involvement of real patients in case-based learning during preclinical medical education. In this study we evaluated student satisfaction and preferences regarding the participation of real patients in the pre-clinical Endocrine System course. 'Meet the Patient' interactive case sessions were structured around real patients, each with a different endocrine condition. We found that >90% students agreed or strongly agreed that these sessions helped better understand pathophysiology of disease processes, disease diagnosis, and management. In conclusion, real patient integration in preclinical medical education is a student preferred and effective method of solidifying key physiological concepts.

Poster #321**Impact of On-line and In-Class Activities on Class Average in Anatomy and Physiology in Nursing Students****Raj Narnaware, MacEwan University, narnawarey@macewan.ca****Co-Author: Paul Chahal, MacEwan University, chahalp@macewan.ca**

Anatomy and physiology are considered the foundational courses and essential components in medical, nursing and other health-related curriculum. Previous studies have discussed the indispensable importance of these courses, yet debates arise regarding the most effective teaching method and the impacts of these methods on students' knowledge improvement in these courses. Using an array of knowledge testing including on-line, in-class quizzes and student-interactive approaches, the present study reveals that these methods significantly increased their mean class average of mid-term and final examinations.

Poster #322**A Potentially Lower-Cost Alternative to Cadaver Immersion Tanks for Long-Term Cadaver Storage****Thomas Odenwalder, Weber State University, thomasodenwalder@weber.edu****Co-Authors: Kelton Friedel, Weber State University, keltonfriedel@mail.weber.edu, Brian Chung, Weber State University, brianchung@weber.edu**

Storage of prosected cadavers is challenging due to the size and costs of cadaver immersion tanks, and many programs resort to spraying wetting agent instead. We sought a lower cost alternative to immersion tanks by collaborating with our peer College of Engineering, Applied Science & Technology and we have designed a potentially viable, long-term cadaver storage unit that combines an automated fluid spray and recycling system on a presentation table that uses our current cadaver gurneys. This collaboration can be produced by engineering students as a Senior Project while coupling significant financial savings to ease of long-term cadaver storage.

Poster #323**Acting Out Negative Feedback in Hormone Pathways****Kjerstin Owens, Bemidji State University, kjerstin.owens@bemidjistate.edu****Co-Authors: Amanda Kooiker, Bemidji State University, amanda.kooiker@live.bemidjistate.edu, Brooke Tader, Bemidji State University, brooke.tader@live.bemidjistate.edu**

We created a kinesthetic learning activity in a 1000-level Anatomy & Physiology lab to enhance student's understanding of negative feedback pathways in the endocrine system. Students were assigned roles as a hormone or gland in one of three different hormone pathways in which they had to move throughout the room to stimulate or inhibit secretion of hormones from other glands. They then worked together to draw negative feedback loops and interpret mock animal experiments based off of their learning activity. This activity helped student relate negative feedback pathways to lecture material and gave them a better understanding of the endocrine system.

Poster #324**An Acute Bout of Exercise Improves Mood and Enhances Trust****John Pellegrini, St. Catherine University, jjpellegrini@stkate.edu****Co-Authors: Sara Brakke, St. Catherine University, srbrakke@stkate.edu, Ngozika Ezenagu, St. Catherine University, ncezenagu@stkate.edu, Maggie Singerhouse, St. Catherine University, maggiejsingerhouse@gmail.com**

We examined if a brief session of exercise elevates mood or judgments of the trustworthiness of others. Thirty female subjects each completed two trials, only one of which involved 20 minutes of moderate exercise on a stationary bicycle. At the conclusion of the twenty minutes, subjects completed a brief Profile of Mood States and judged the trustworthiness of ten faces in photos. Participants demonstrated higher levels of positive moods and lower levels of negative moods with exercise. Judgments of the trustworthiness of others were also higher in the exercise condition. Participants' mood scores correlated with their trust scores after exercise.

Poster #325**Physical Therapy and Regenerative Medicine: Current Knowledge and Future Prospects****Vance Pounders, Tennessee State University, poundersvance@gmail.com****Co-Authors: Libby McArthur, Tennessee State University, libby.mcarthur94@gmail.com, Julian Rinehart, Tennessee State University, jrinehart0526@gmail.com, Ryan McQueen, Tennessee State University, ryanmcqueen89@gmail.com, Edilberto Raynes, Tennessee State University, eraynes@tnstate.edu, Melinda Roca-Menchavez, Physical and Occupational Therapy Consultancy Services, melindarpt1210@gmail.com**

Pathologies affecting the central nervous system (CNS) leave patients with life-altering disabilities. Research demonstrates that regenerative medicine (RM) and physical therapy (PT) techniques can provide structural and functional improvements; however, there is limited research evaluating the combined approach. The purpose of the study was to evaluate the efficacy of using the combination of RM and PT and its impact on therapeutic outcomes for patients with CNS disorders. Using PubMed and Google Scholar, a systematic review was conducted and ranked using the Oxford Levels of Evidence. We surmised that combination of RM and PT could facilitate treatment of CNS injuries.

Poster #326**The One2One - Evaluating the Efficacy of a Structured Oral Assessment****Matthew Ramer, Humber College, matthew.ramer@humber.ca****Co-Author: Erin Spicer, Western University London Health Sciences Center, spicer.erin@gmail.com**

Structured oral exams result in better student examination scores, but there lacks quantitative evidence supporting knowledge retention, and student satisfaction with this format remains anecdotal. One2One Assessments, during which students present prepared answers to an evaluator, are anticipated to improve student retention of content while being positively rated by students. At semester's end, multiple choice questions will assess knowledge gained in the One2One as compared to control content. Student satisfaction will be rated using quantitative scales and thematic analysis. The One2One is a valuable tool in assessing student knowledge and results in positive student rating of the education tool.

Poster #327**Teaching A & P Abroad - Lessons for Working With ESL Students****Vicky Rands, Salt Lake Community College, vicky.rands@slcc.edu**

Teaching Physiology to international students in China for 2 years, I learned a lot about use of the English language. Students from across the Far East and India attend Medical School in China where classes are taught in English. This mix of cultures with a variety of first languages emulates our classrooms in America. From funny mishaps to careful wording on test questions, this poster provides helpful suggestions about word use and accommodations for ESL students in your classroom.

Poster #328**The Cardiovascular Effects of Digitalis on Rana Temporaria after Photoperiod Acclimatization****Grace Rojas, The University of Texas at San Antonio, grace.rojas@utsa.edu****Co-Author: Eddie Hernandez, The University of Texas at San Antonio, hector.hernandez@utsa.edu**

Currently, there is no diversity in Digitalis administration for patients with congestive heart failure. And, although Digitalis is considered safe, it has a very narrow therapeutic window. Light exposure, which is required for vitamin D synthesis and calcium reabsorption, for these patients has not been studied to date. Dosage diversity may be required for people living in areas of the country with shorter/longer days in order to achieve therapeutic efficacy. Our study will test the efficacy of Digitalis after a photoperiod acclimatization to determine if the therapeutic dose would require adjustment with lower light exposures. Rana temporaria were pithed and the heart sutured to collect heart contractility data and then compared to the control group.

Poster #329**Using Science Literacy to Increase K-12 Participation Across Diverse Populations****Amanda Rosenzweig, arosen1818@aol.com**

Science Teacher Technology Training (ST3) focuses on providing meaningful experiences in sciences, across all age groups, with emphasis on Anatomy and Physiology. A large focus of ST3 focuses on developing science teachers' knowledge, skills, and providing them the tools to implement STEM lessons in the K-12 classroom. Educators are the key to improving students understanding of STEM and fostering the student's interest. ST3 helps provide the additional resources to carry out innovative ideas that benefit the students, increase their participation in sciences. Student success in science will increase, if they can develop content knowledge and have hands-on experiences.

Poster #330**Does Cooperativity in Groups Enhance Metacognition and Self-Efficacy Among Students in Human Anatomy & Physiology Class that Lead to Less Anxiety and Better Performance in Tests?****Hiranya Roychowdhury, New Mexico State University - Dona Ana CC, hroychow@nmsu.edu****Co-Author: Ron Gerrits, Milwaukee School of Engineering, gerrits@msoe.edu**

Students enrolling in Anatomy and Physiology courses, especially in community colleges, are often underprepared in many different aspects and have lower course completion rates. This study, undertaken under the NSF funded CAPER project, addressed question whether mandated group study would enhance student self-efficacy and improve student performance during the semester and in the semester-end final exam. The methodology followed in this study during the Spring 2019 semester, and the results – both qualitative and quantitative– as obtained will be presented.

Poster #331

Influence of Student Preconceptions on Engagement and Learning in an Introductory Medical Science Course

Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk

Co-Author: Michael Scholz, University of Aberdeen

Transition from school to university requires adapting to self-responsible learning and establishing and maintaining engagement. Engagement is influenced by various personal/institutional parameters but also preconceptions. When students assume they have good knowledge about a subject it may negatively impact on engagement. They may not feel the need to study as hard and effectively for such topics. This is particularly relevant for subject areas which show discrepancies between scientific knowledge and public understanding since this can be full of misconceptions (i.e. nutrition). Identifying and highlighting preconceptions allowed us to increase student engagement and has improved learning outcomes.


Poster #332

Students Work in Groups to Create and Peer-Evaluate Newsletters Informing about Latest Developments Pertaining to Gut Microbiome Populations and Human Health

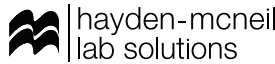
Joanne Savory, University of Ottawa, joanne.savory@uottawa.ca

Co-Author: Jacqueline Carnegie, University of Ottawa, jcarnegi@uottawa.ca

A challenge with large undergraduate classes is the provision of opportunities to construct educational documents and obtain individualized feedback on those endeavors. While summative examinations assess knowledge, assignments involving research, critical thinking and self-reflection promote communication skills and creativity. For 4% of their final mark, students worked online (Brightspace) in groups of 5 to develop a newsletter containing educational information and latest developments linking gut bacterial populations to aspects of human health. One group member (Editor) compiled the final product. Following submission, each group evaluated and provided constructive feedback on a newsletter created by another group (1% of final grade).

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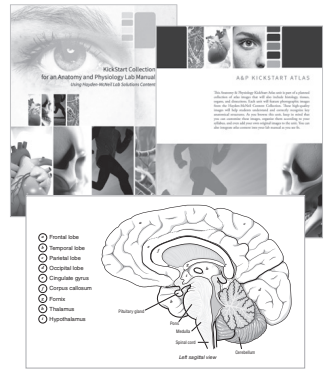
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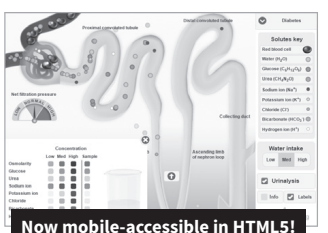
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HAPS Committee Posters

Can You DIG It? Diversity and Inclusion Taskforce Membership Survey

Kathy Burleson, Hamline University, kburleson01@hamline.edu

Co-Authors: Diversity and Inclusion Goals Task Force Members

Who are HAPS members? How well does HAPS create inclusive environments? The Diversity and Inclusion Goals (DIG) Task Force plans to survey the HAPS membership to better understand who we are as an organization and identify areas of need. We will discuss our survey design and what the data will be used for, as well as provide an opportunity for members to give feedback. Informed by data from a broad membership base, our goal is to develop best practices, resources, and professional development for inclusive education in anatomy and physiology.

The HAPS Educator: Where to Publish Everything A&P

Kerry Hull, Editor in Chief, HAPS Educator Editorial Board, editor@hapsconnect.org

The HAPS Educator is the peer-reviewed journal of HAPS, publishing educational research articles, topic updates, and class-tested teaching techniques and activities. Come by the poster to see some of our latest articles and to learn about authorship and reviewing opportunities.

HAPS Fundraising Honor Roll

Jon Jackson, Burrell College of Osteopathic Medicine, jjackson@bcomnm.org

Co-Authors: Stacey Dunham, Indiana University, dunhams@indiana.edu, Elizabeth Granier, St. Louis Community College, egraniem@stlcc.edu, Kirby Swenson, Middle Georgia State University, kirby.swenson@mga.edu, Arindam Basu, Penn State Brandywine, aub54@psu.edu

The poster honors HAPS Authors and other large-gift sponsors who support at a high level, thus making things HAPpen for HAPS. We invite you to stop by the poster and join them in supporting HAPS, and join us in thanking ALL of our donors!

Summary of the Activities of The Laboratory Safety and Animal Use Committee

Richard Simons, SUNY Schenectady County Community College, rrsimons60@gmail.com

Examples of the spread sheets used to gather data from committee members will be presented along with summaries of the data that has been collected.

Cadaver Use Committee

Cindy Wingert, Cedarville University, cwingert@hapsconnect.org

The HAPS Cadaver Use Committee recognizes that a significant population within the HAPS membership has very little or sometimes no cadaver dissection experience. In response to the perceived need/interest amongst the HAPS membership, the Cadaver Use Committee is developing a human cadaver dissection mentorship program. Specifically, we are soliciting member interest and need in this program. Additionally, we are looking to identify individuals that can serve as mentors. The role of the mentor will be better defined as we continue to collect information from the members through virtual town-hall meetings and a survey to determine member interest by location, limiting factors in cost, and the type of mentorship relationship that will provide the most value added. Long-term we would like this dissection mentorship program to fulfill the pillars of a faculty's academic career. Our goal is to develop a mentorship program that will not only enrich the quality of teaching, but also bolster faculty promotion, tenure, and service.

May 2019


Dear HAPSters,

It is an honor to welcome you to the 33rd Annual Conference of the Human Anatomy & Physiology Society. The University of Portland is excited to partner with HAPS to bring together experts in teaching and research for a meaningful time of intellectual and community engagement. We are glad that you are here and we hope you enjoy your time in the beautiful Pacific Northwest.

The University of Portland is an independently governed Catholic university guided by the Congregation of Holy Cross. At UP, we address significant questions of human concern through disciplinary and interdisciplinary studies of the arts, sciences, and humanities, and through studies in majors and professional programs at the undergraduate and graduate levels. As a diverse community of scholars dedicated to excellence and innovation, we pursue teaching and learning, faith and formation, service and leadership in the classroom, residence halls, and the world. Because we value the development of the whole person, the University honors faith and reason as ways of knowing, promotes ethical reflection, and prepares people who respond to the needs of the world and its human family.

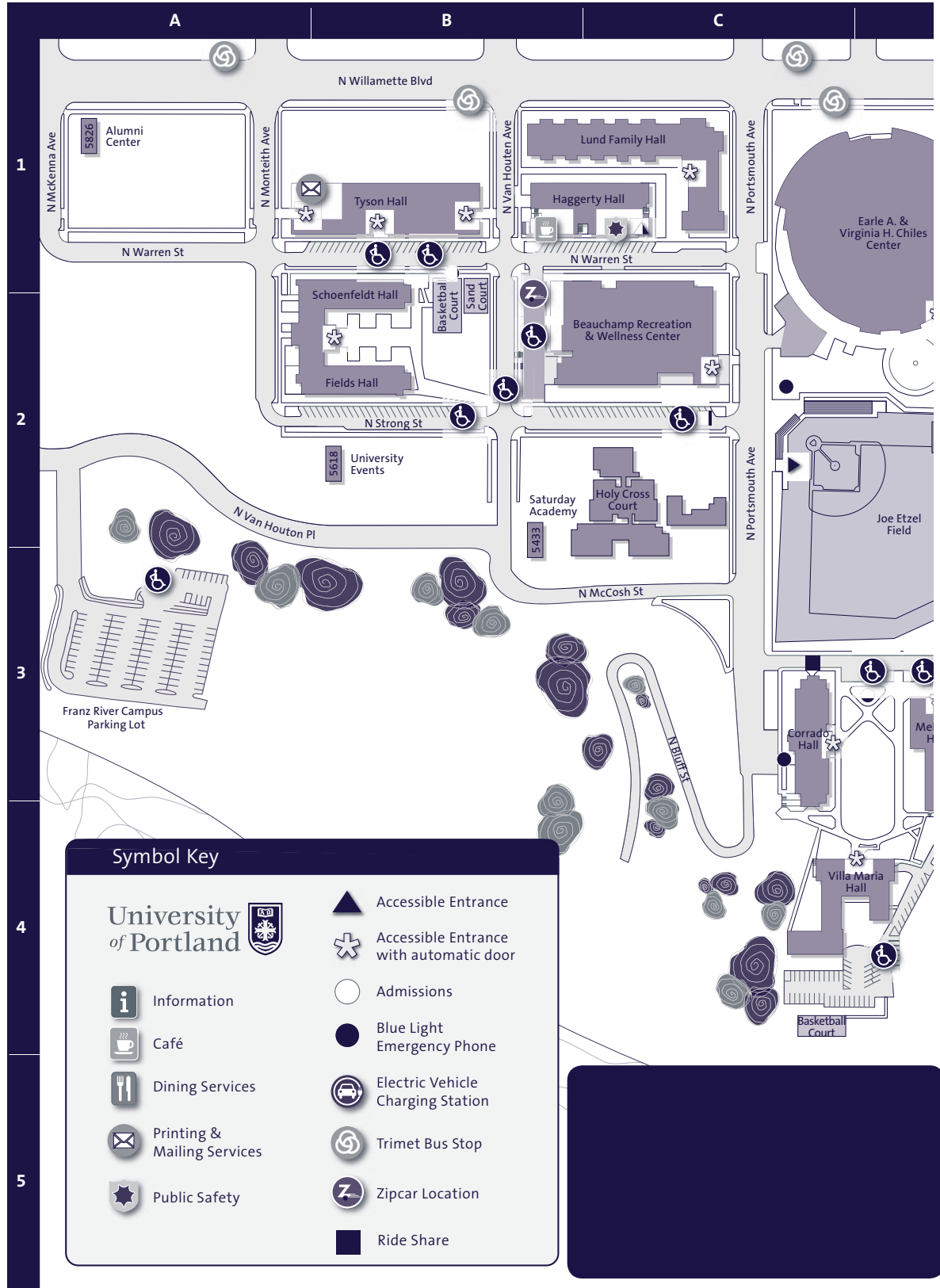
The University of Portland's mission and the program planned for this year's HAPS Conference share many similarities. Both seek to support excellence among teachers and scholars through collaboration and community-building. The update speakers, many of whom hail from excellent institutions of higher education in the Portland area, will inspire attendees to think critically and globally about the role of science in improving human health. Other presenters will inspire attendees to engage in deep analysis and discussion about the intersection of science and society. And finally, the workshop presentations will provide teachers and scholars with an opportunity to engage with questions that are top-of-mind in higher education today, such as making classrooms more inclusive, assisting faculty with professional development, and enhancing the role of technology in the classroom.

It is my hope that you have a successful conference and that you enjoy your time here in Portland. Once again, welcome!

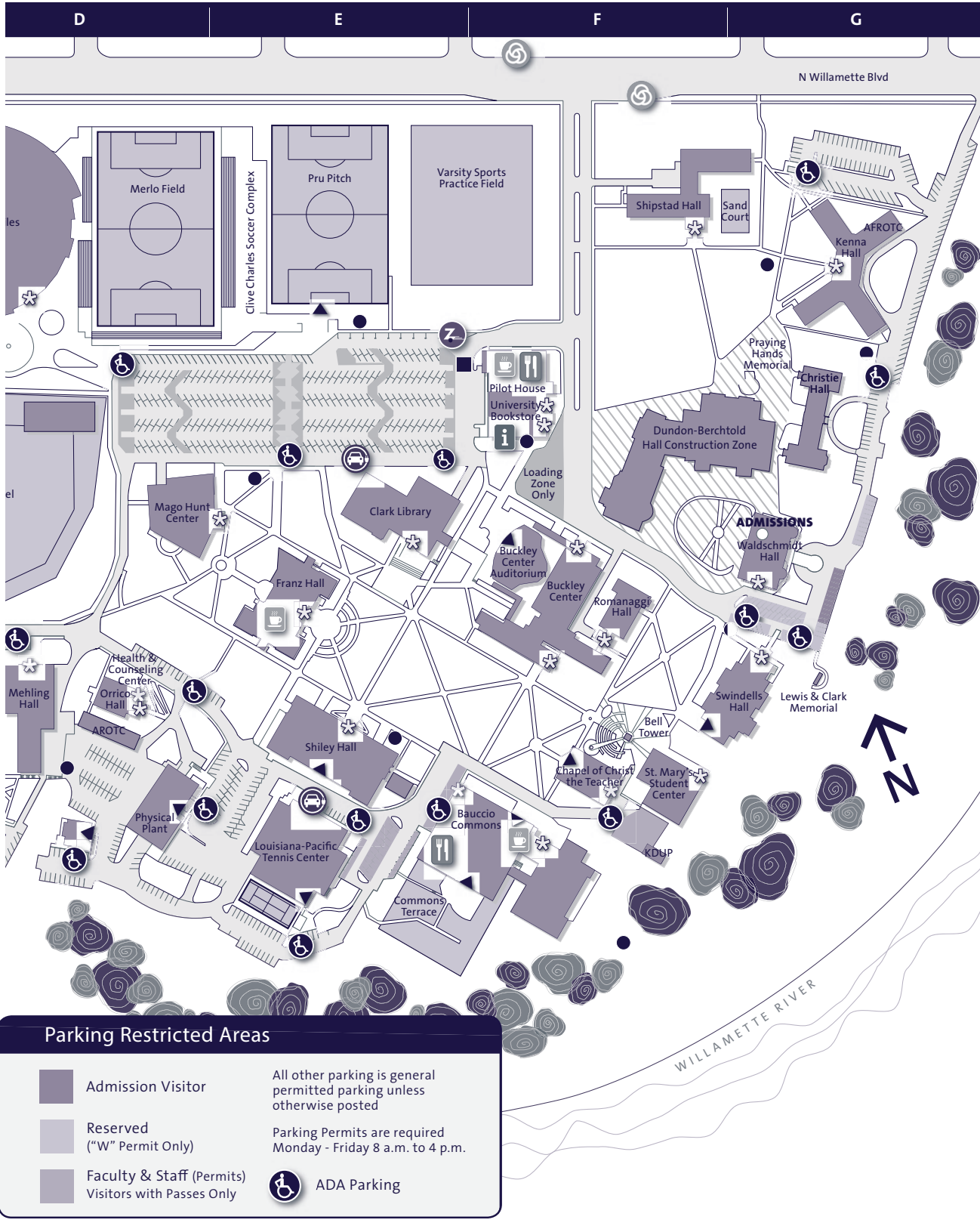
Sincerely,

Rev. Mark L. Poorman, C.S.C., Ph.D.
President, University of Portland

University of Portland

Alumni Center	A-1	Chapel of Christ the Teacher	F-4	Etzel Field
AROTC	D-3	Chiles Center	D-1	Fields Hall
Bauccio Commons	F-4	Clark Library	E-2	Franz Hall
Beauchamp Recreation & Wellness Center	C-2	Clive Charles Soccer Complex	E-1	Haggerty Hall
Bell Tower	F-3	Corrado Hall	C-3	Health & Counseling Center
Buckley Center	F-3	Dundon-Berchtold Hall	F-2	Holy Cross Court
Buckley Center Auditorium	F-3			KDUP



C-2	Kenna Hall AFROTC	G-1	Pilot House	F-2	St. Mary's Student Center	F-4
B-2	Lund Family Hall	C-1	Physical Plant	D-4	Swindells Hall	G-3
E-3	Louisiana-Pacific		Romanaggi Hall	F-3	Tyson Hall	B-1
C-1	Tennis Center	E-4	Saturday Academy	B-2	University Bookstore	F-2
D-3	Mago Hunt Center	D-2	Schoenfeldt Hall	B-2	University Events	B-2
C-2	Mehling Hall	D-3	Shiley Hall	E-3	Villa Maria Hall	C-4
F-4	Orrico Hall	D-3	Shipstad Hall	F-1	Waldschmidt Hall	G-3



WORKSHOPS-AT-A-GLANCE SATURDAY (A) MAY 25, 2019

Session 1 8:30 AM – 9:30 AM	Session 2 9:45 AM – 10:45 AM	Session 3 11:00 AM – 12:00 PM	Session 4 1:15 PM – 2:15 PM	Session 5 2:30 PM – 3:30 PM
A101 (Shiley 101) Sponsored by Carolina Biological Supply Hands-On Exploration of Heart Structure and Function	A201 (Shiley 101) Promoting Active Learning in a Large Classroom Setting	A301 (Shiley 101) An Open Lab Model for Improving Student Grades and Confidence	A401 (Shiley 101) Teaching Metabolism Through Fad Diets	A501 (Shiley 101) Engaging Students and Making A&P Classrooms Inclusive: 21 Strategies to Structure Classroom Interactions and Promote Student Success
A102 (Shiley 123) We Got Engaged! Promoting Active Learning in A&P Classrooms	A202 (Shiley 123) Adapting Objective Structured Practical Examinations (OSPE's) to Assess Laboratory Science Skills	A302 (Shiley 123) Writing Squares	A402 (Shiley 123) A&P Labs You Cannot Beat: A Coordinated Multilevel Strategy	A502 (Shiley 123) Utilizing Active Learning Techniques to Engage Students and Improve Academic Performance in Anatomy and Physiology Courses
A103 (Shiley 124) The Anatomy and Neuroanatomy of Incontinence	A203 (Shiley 124) Connecting Art and Anatomy in Italy	A303 (Shiley 124) Utilizing Virtual Reality in Undergraduate Anatomical Education	A403 (Shiley 124) Sponsored by the HAPS Exam Program HAPS Exam Program Update: Introducing a New and Improved Testing Platform, the Stand-Alone Anatomy Exam, and the Revised A&P Learning Outcomes!	A503 (Shiley 124) The A&P Teacher-Coach: Lessons from a Hybrid Class
A104 (Shiley 301) Getting Started in Discipline-Based Education Research in Your A&P Classroom	A204 (Shiley 301) Rethinking How We Teach Muscle Fatigue, Incorporation of New Ideas for Educational Labs	A304 (Shiley 301) Homeostasis is Only Half the Story: Navigating Between Stasis and Change-Generating (Hence Life-Threatening) Growth and Reproduction. (Special Focus: Emerging Osteocalcin Stories)	A404 (Shiley 301) Sponsored by McGraw Hill Higher Education My Students Come Underprepared and This is How I Handle It	A504 (Shiley 301) Paging Dr. Darwin: Using Evolution to Explore Human Health
A105 (Shiley 319) Blood Pressure Regulation Made Easy	A205 (Shiley 319) The Physiology of Marijuana	A305 (Shiley 319) Hormone Fundamentals Part A: Using Case Studies and Active Learning Activities to Teach the Complexities of the Endocrine System	A405 (Shiley 319) Hormone Regulation Part B: Using Case Studies and Active Learning Activities to Teach the Complexities of the Endocrine System	A505 (Shiley 319) Sex and Gender in the A&P Classroom
A106 (Franz 6) Sponsored by Wiley Incorporate Just In Time Teaching/Learning in HAP with MasteryPaths	A206 (Franz 6) Sponsored by HAPS & ADInstruments Align Your Design: The Art of Mapping Content to Your Learning Outcomes	A306 (Franz 6) More than Hysteria: Understanding Sexism in Medicine	A406 (Franz 6) Sam Drogo Award Winner Presentation The Amazing Functions of the Vestibular System	A506 (Franz 6) Marrying the Basic and Clinical Sciences: Interprofessional Teaching and Learning
A107 (Franz 15) Celebrating the Ultimate Body of Work: Embracing the Humanities to Incite Wonder of the Human Body Within Students Majoring Outside the Sciences and Pre-Health Tracks	A207 (Franz 15) Putting Inclusive Curricula Into Action: Implementation Advice from A&P Students, Instructors, and Web Resources	A307 (Franz 15) Bringing Lab to Lecture: The Story of a Flipped Classroom	A407 (Franz 15) Active Learning Environments	A507 (Franz 15) Prescription to Breaking Down College Barriers: Accessing College Anatomy & Physiology Curriculum in High School to Build the Healthcare Pipeline
A108 (Franz 26) Sponsored by McGraw Hill Higher Education Best Practices for Teaching Online Anatomy & Physiology Courses	A208 (Franz 26) Blending Teaching and Technology: Strategies for Effective Student Learning	A308 (Franz 26) Using Learning Progression Frameworks and Assessments to Improve Principle-Based Physiology Instruction	A408 (Franz 26) The NSF & HAPS CAPER Project: Research in Community College A&P Classrooms	A508 (Franz 26) Billion-Dollar Ducks and the Quest to End Magical Thinking
A109 (Franz 34) Large Organizations' Codes of Ethics, a Template for HAPS	A209 (Franz 34) Curriculum, Core Concepts, and Cooperation: PMIG	A309 (Franz 34) Neuroscience for Undergraduates	A409 (Franz 34) Understanding Group Dynamics: The Foundation of Teamwork Know the Characters in the Kingdom	A509 (Franz 34) How to Set-Up and Utilize a Supplemental Instructor Program in an Introductory Human Physiology Class
A110 (Franz 206) Navigating the Speed Bumps in A&P Instruction	A210 (Franz 206) Hands On Renal A&P Lab: Making "Urine" from "Blood"	A310 (Franz 206) Using Clinical SOAP Progress Notes in the Undergraduate Classroom to Learn About Diseases and Illnesses	A410 (Franz 206) Seeing Anatomy Through a Different Lens	A510 (Franz 206) Analysis by Analogy: How to Bring Concepts Closer to Your Students
A111 (Franz 214) Making Blood Donation Easy	A211 (Franz 214) Schematics: Building from Basics	A311 (Franz 214) iBooks Bring Interactivity and Success to Anatomy and Physiology	A411 (Franz 214) Sponsored by HAPS Diversity and Inclusion Goals Task Force DIGing Deeper: Diversity and Inclusion in HAPS	A511 (Franz 214)
A112 (Franz 223) Sponsored by ADInstruments, Inc. Play Student for a Session! Get a Hands-On Trail of Lt LabStation for A&P	A212 (Franz 223) Using Video Clips from Harvard Cell Video in PowerPoint Presentations	A312 (Franz 223) Sponsored by Macmillan Learning Developing Your Own Lab Curriculum is Easier Than You Think!	A412 (Franz 223) Sponsored by 3D4Medical Translation to Online Anatomy Education: Choosing and Integrating a 3D Anatomy Application	A512 (Franz 223) Stimulation of Visible Thinking of A&P Students Through the Integration of Technology in the Didactic Curriculum
A113 (Franz 231) Sam Drogo Award Winner Presentation Evidence-Based Course Development in Medical Science	A213 (Franz 231) Dissection of the Female Hemipelvis	A313 (Franz 231) Sponsored by HHMI BioInteractive HAPifying BioInteractive Resources I		A513 (Franz 231) Sponsored by HHMI BioInteractive HAPifying BioInteractive Resources II

WORKSHOPS-AT-A-GLANCE SUNDAY (B) MAY 26, 2019

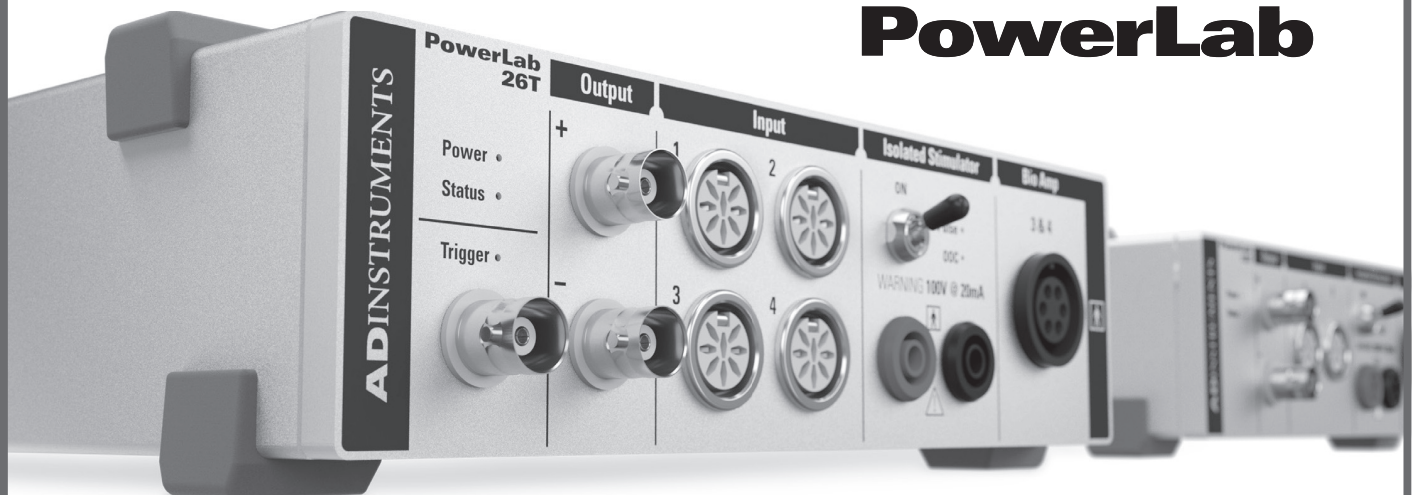
Session 1 8:30 AM – 9:30 AM	Session 2 9:45 AM – 10:45 AM	Session 3 11:00 AM – 12:00 PM	Session 4 1:15 PM – 2:15 PM	Session 5 2:30 PM – 3:30 PM
B101 (Shiley 101) A Native American Perspective on Medicine, Donors, and Dying	B201 (Shiley 101) Play with your Pedagogy! The Use of Game-Based Exam Review Sessions to Teach Retrieval Practice	B301 (Shiley 101) Hands-On Nephron Bead Exercise	B401 (Shiley 101) Wait, Wait! Don't Tell Me! – HAPS Style	B501 (Shiley 101) "It's a Bird. It's a Plane. No, It's SuperAnatomy." Teaching Anatomy with the Help of Superheroes
B102 (Shiley 123) Gail Jenkins Excellence in Teaching Workshop Learning Anatomy and Physiology by Acting Out Physiological Mechanisms and Playing Games	B202 (Shiley 123) Are We Helping Those Who Really Need It?	B302 (Shiley 123) Getting Off to a Great Start – First Day of Class Success	B402 (Shiley 123) The Zombie Project: Using the Popularity of Zombies to Teach Nervous System Structure and Function	B502 (Shiley 123)
B103 (Shiley 124) Sponsored by Visible Body Teaching with 3D Technology in an Easy and Affordable Way	B203 (Shiley 124) Sponsored by Carolina Biological Supply Teaching Online Lab Science Courses: Challenges and Solutions	B303 (Shiley 124) Sponsored by BIOPAC Systems, Inc. Engage Students in the Classroom with BSL	B403 (Shiley 124) Cardiovascular System Teaching Tips LOL! (Learning Outcome Linked!)	B503 (Shiley 124) Sam Drago Award Winner Presentation Using Inexpensive Technology to Connect with Students and Enhance Learning
B104 (Shiley 301) Scaffolding Assignments to Promote Higher Order Skill Development in Anatomy and Physiology	B204 (Shiley 301) Reorganizing a Physiology Course Through Core Principles: The Way Forward?	B304 (Shiley 301) Sponsored by Gale, A Cengage Company Integrate Interactive, 3D Tools in Human Anatomy Courses and Curriculum	B404 (Shiley 301) Sponsored by Vernier Software & Technology Let's Get Physical: Human Physiology Experiments	B504 (Shiley 301)
B105 (Shiley 319) This is NOT a Trick Question: Writing Good Multiple Choice Questions	B205 (Shiley 319) But Professor Why...	B305 (Shiley 319) Spice Up Your Anatomy and Physiology Labs	B405 (Shiley 319) The Vagina Dialogs: Inclusive Strategies for Talking about Reproductive Anatomy	B505 (Shiley 319) Running Concept Lists: A Simple Strategy to Identify, Connect, and Apply Core Concepts of Anatomy & Physiology
B106 (Franz 6) Origami Meets Physiology: Building Understanding with Paper Models	B206 (Franz 6) Cheating 101. Predictions and Solutions	B306 (Franz 6) Bringing the Skeletons Out of the Closet	B406 (Franz 6) Teaching Neuroanatomy Through Clinical Cases	B506 (Franz 6) ABOs of Blood Type
B107 (Franz 15) When Bigger is Better: Using Large A&P Classes to Increase Your Scholarship	B207 (Franz 15) Creative A&P Assessment	B307 (Franz 15) Achoo! Part 1 Allergies, Asthma and Hypersensitivities	B407 (Franz 15) Achoo! Part 2 Allergies, Asthma and Hypersensitivities	B507 (Franz 15) Sponsored by HAPS More of Our Favorite Histology Challenges
B108 (Franz 26) Role Playing: Gee, I wish I was a Protein. Or I Wish I Was a G Protein. Either Works!	B208 (Franz 26) Disagreement to Dialogue: How to Turn Opposition into Opportunity	B308 (Franz 26) Creating Great CVs and Effective Cover Letters	B408 (Franz 26) Wake Up with Anatomy Academy! Pre-Professional Health Sciences Service-Learning in Autism Spectrum Elementary School Classrooms Inspires Deeper Learning for All Students	B508 (Franz 26) Robert Anthony Award Winner Presentation Conquering Anatomy and Physiology Program Leads to Higher Scores
B109 (Franz 34) Light Board and Adaptive Learning Pedagogy in a Completely Online Anatomy & Physiology Course, and a Nursing Entrance Exam Course	B209 (Franz 34) Collaborative Activities in Lecture and Lab	B309 (Franz 34) Acting it Out: Nervous and Endocrine System Signaling Including Protein-Ligand Interactions	B409 (Franz 34) Deeper Learning in A&P Using Core Principles, Case Studies, and Concept Maps	B509 (Franz 34) It's a Small World After All – A&P Pen Pals in the Lab
B110 (Franz 206) Finding Math in Anatomy & Physiology	B210 (Franz 206) Creative Classroom Activities for Epidemiology and Digestion	B310 (Franz 206) What's the Big Idea Here?	B410 (Franz 206) The Anatomy of Outreach: Engaging K-12 and Undergraduate Students in Anatomy Content to Increase Health Awareness and Incentivize Pursuit of Careers in the Health Sciences	B510 (Franz 206) Sponsored by Anatomy in Clay Learning System Hands-On Anatomy – Breathing Life into a Maniken Model
B111 (Franz 214) Introducing Writing Skills Assignments into the A&P Classroom	B211 (Franz 214) While You Were Sleeping... : An Interrupted Case Study on Obstructive Sleep Apnea	B311 (Franz 214) Is Education as Straightforward was Helping Students Expand their Common Sense Toolbox?	B411 (Franz 214) Packaging an Undergraduate Cadaver Laboratory for High School Field Trips	B511 (Franz 214) Sponsored by McGraw Hill Higher Education Using Digital Assets in Your A&P Course
B112 (Franz 223) Creative Mastery of Learning Projects in the Lab and Going Paperless in the A&P Lab	B212 (Franz 223) Lights! Camera! Action!			B512 (Franz 223) Sponsored by HC Simulation, LLC Using JustPhysiology for Case-Based Learning of Respiratory Physiology

Don't forget to attend the HAPS Committee meetings! Become more involved with HAPS by joining a committee!

Saturday, May 25: University of Portland Campus, 12:30 – 1:00 PM

- Cadaver Use Committee – Shiley 101
- Communication Committee – Shiley 123
- Conference Committee – Shiley 124
- Curriculum & Instruction Committee – Shiley 301
- Diversity & Inclusion Group Task Force – Shiley 319
- Fundraising Committee – Franz 6
- Grants & Scholarships Committee – Franz 15
- Membership Committee – Franz 26
- Safety/Animal Use Committee – Franz 34

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Workshop Abstracts

Saturday, Session 1

**A101 (Shiley 101) - Hands-On Exploration of Heart Structure and Function
Jennifer Baker, Carolina Biological Supply Company, jennifer.baker@carolina.com
Sponsored by Carolina Biological Supply Company**

Use fun hands-on activities to guide student through the anatomy and physiology of the human heart. Explore heart through modeling. Find out how to challenge your students to make connections between structure and function.

**A102 (Shiley 123) - We Got Engaged! Promoting Active Learning in A&P Classrooms
Lindsay Biga, Oregon State University, lindsay.big@oregonstate.edu, Devon Quick, Oregon State University, devon.quick@oregonstate.edu**

In this workshop, participants will explore curricular changes needed to implement active learning in combined Anatomy and Physiology courses (200 and 300 level). Active learning is an adaptable practice which promotes inclusion by allowing students to work at their own pace, include their unique thoughts and share their voices in the classroom. Presenters will provide examples of their interactive classroom exercises and describe how they adapted and created these resources for use in their large (200-500 seat) classrooms. Presenters will also share data regarding student attitudes toward active learning and course design adjustments that facilitate success in this setting.

**A103 (Shiley 124) - The Anatomy and Neuroanatomy of Incontinence
Melissa Carroll, DeSales University, melissa.carroll@desales.edu**

Undergraduates with an interest in medical or allied health professions should understand the complex nature of urinary and fecal incontinence to best care for their future patients. The intent of this workshop is to provide the connection between micturition, defecation and continence through exploring the foundational knowledge and current evidence regarding pelvic anatomy. Including an appropriate classification and terminology for pelvic floor muscles and the neuroanatomy of incontinence. Providing this real-world clinical example may be useful and adapted for an undergraduate A&P course to help students think towards application and analysis of anatomical concepts and potential imbalanced consequences.

A104 (Shiley 301) - Getting Started in Discipline-Based Education Research in Your A&P Classroom

Justin Shaffer, Colorado School of Mines, jshaffer@mines.edu

Many instructors are interested in rigorously assessing their classrooms and students, but may not have the time/knowledge/incentive to do so. In this workshop, participants will learn the basics to conducting an educational research study, including study design, data analysis methods, publishing your results, forming collaborations, and common pitfalls. Participants will develop an outline of a research study to conduct at their home institution, will get feedback on their design from other participants, and will meet other instructors who can help form the basis of future collaborations.

**A105 (Shiley 319) - Blood Pressure Regulation Made Easy
Tanya McVay, Oregon Institute of Technology, tanya.mcvay@oit.edu**

Blood pressure regulation is a challenging topic for students learning cardiovascular physiology as there are multiple factors involved. Incorporation of clinical perspective and the use of simple formulas has proved to be an effective teaching method at Oregon Tech. Discussion includes regulation of cardiac output and peripheral vascular resistance, as well as their effects on the systemic blood pressure. Common causes and treatment of hypertension are also addressed in this presentation.

A106 (Franz 6) - Incorporate Just In Time Teaching/Learning in HAP with MasteryPaths

Amanda Rosenzweig, Delgado Community College, arosen@dcc.edu

Sponsored by Wiley

MasteryPaths allow the instructor to identify activities for each student's learning path and differentiate assignments for required learning and optional learning. Instructors can allow students to choose their own path by providing a variety of assignments and content pieces. MasteryPaths are designed to use differentiated assignments that will target activities based on student performance. These assignments automatically become available to the students based on parameters created by the instructor.

A107 (Franz 15) - Celebrating the Ultimate Body of Work: Embracing the Humanities to Incite Wonder of the Human Body Within Students Majoring Outside the Sciences and Pre-Health Tracks

Edgar Meyer, University of Mississippi Medical Center, emeyer@umc.edu

Many anatomy students major in sciences, pursue healthcare professions, or both. Often, anatomy classes include students in non-science majors who need to complete graduation requirements. Nevertheless, the body is arguably nature's greatest masterpiece, having inspired poets, artists, and historians for centuries. How can anatomy curricula apply humanities to engage students lacking scientific passions? What worldly connections can propel students to marvel at their anatomical architecture? This workshop will incorporate non-science publications celebrating the human body. Attendees will discuss classroom techniques they can use to inspire their scientifically and non-scientifically inclined students to love the human form as life's greatest accomplishment.

A108 (Franz 26) - Best Practices for Teaching Online Anatomy & Physiology Courses

Nahel Awadallah, Nash Community College, nwawadallah755@nashcc.edu

Sponsored by McGraw Hill Higher Education

Teaching online A&P is challenging. Presentation includes options such as connect, A&P Revealed videos & animations, virtual cadaver, assessment aligned to HAPS objectives, and exam proctoring for at home and online exams. Best practices and resources will be shared to enhance the teaching/learning experience for online and traditional courses. In summary, a comparison of online vs. traditional courses will be presented discussing my experience as I aligned the courses to make them comparable.

A109 (Franz 34) - Large Organizations' Codes of Ethics, a Template for HAPS

Dani Waters, Penn State University, dnh1@psu.edu, John Neiseser, Penn State University, jpneisser@gmail.com

Many professional organizations publish a code of ethics that outlines their ethical principles. A code of ethics is based on the values and beliefs that an organization believes their members should follow, as well as consequences when members act unethically. Professional organizations similar to HAPS publish statements on ethics regarding research, teaching, harassment, and diversity. During this workshop, we will present to you codes of ethics from other organizations and case studies of ethical dilemmas. While HAPS does not currently have a code of ethics, we believe this could be a first step in creating one.

A110 (Franz 206) - Navigating the Speed Bumps in A&P Instruction

Chasity O'Malley, Nova Southeastern University, comalle0@nova.edu

While instruction in Human Anatomy and Physiology is a rewarding journey, there are often speed bumps along the way. Those speed bumps can either help you focus and slow down, to make minor corrections, or derail your efforts. This workshop will cover the top 10 speed bumps in A&P and provide strategies for staying the course and enjoying the ride. Topics will include student motivation, faculty burnout, lack of time, and engagement, among others. Information presented will be applicable to online, hybrid, and face to face lecture and labs in Human Anatomy and Physiology.

A111 (Franz 214) - Making Blood Donation Easy

Frances Moore, Patrick Henry Community College, fmoore@patrickhenry.edu, Jeffrey Hollar, Lord Fairfax Community College, jhollar@jfcc.edu

Some students have a really hard time understanding which blood type can donate safely to another blood type. After seeing one of my students get really frustrated, I knew I had to find a way for it to make sense. I came up with an easy hands-on way of demonstrating the concept. After showing her a simple model, she was elated that it finally made sense. Come and make your own demonstration to take home with you. It can also be reproduced, so that students can have their own visual.

A112 (Franz 223) - Play Student for a Session! Get a Hands-On Trial of Lt LabStation for A&P

Rachel House, ADInstruments, Inc., r.house@adstruments.com

Sponsored by ADInstruments, Inc.

Join us to pop on sticky electrodes and get a hands-on trial of our latest lab-based teaching solution, Lt LabStation. During lab, students can record their own biological signals using the PowerLab data acquisition system and analyze their signals within Lt LabStation's modern interface – no internet or complicated servers required! As educators, you'll have online access to an authoring platform where you can create new content from scratch, or customize lessons from our library of high quality pre-labs and experiments. Join us to see how Lt LabStation can allow you to run labs without headaches.

A113 (Franz 231) - Evidence-Based Course Development in Medical Science

Sophie Feng, Nebraska Methodist College, sophie.feng@methodistcollege.edu

Sam Drogo Award Winner Presentation

The use of evidence-based methods is becoming increasingly important for many different disciplines and the field of education is no different. We provide an evidence-based pillars and checklist for education excellence, along with reflective journaling implementation in Anatomy and Physiology courses. Students learning outcomes have been successfully measured and met.

Saturday, Session 2

A201 (Shiley 101) - Promoting Active Learning in a Large Classroom Setting

Jennifer Burgoon, The Ohio State University, jennifer.burgoon@osumc.edu

There is a perception that within a large enrollment anatomy and/or physiology course, students cannot be engaged in active learning. How do we as faculty change this paradigm and promote active learning in a large classroom setting? This workshop will discuss organizational schemes and designs that modify the traditional lecture in order to engage students and foster active learning environments, along with a discussion of barriers to these enhancements. Open forum discussion of personal experiences and approaches among workshop attendees is highly encouraged.

A202 (Shiley 123) - Adapting Objective Structured Practical Examinations (OSPE's) to Assess Laboratory Science Skills

Derek Scott, University of Aberdeen, d.scott@abdn.ac.uk

Objective Structured Practical Examination (OSPE) assessments of theoretical, practical and problem-solving skills at multiple stations are used in clinical assessment to examine practical skills. Although medical science disciplines rarely use this successful assessment style, we have adapted this format to formally examine a wide range of communication and science laboratory practical skills to prepare students for research projects and enhance employability. We have steadily expanded the range of skills being assessed by varying the stations used. This session will introduce the concepts involved and discuss the advantages and disadvantages of setting up and delivering structured practical exams for physiology courses.

**A203 (Shiley 124) - Connecting Art and Anatomy in Italy
Kevin Petti, San Diego Miramar College, kpetti@sdccd.edu**

Italy's medieval universities established the study of human anatomy for physicians. To heighten their art, Renaissance masters clandestinely conducted human dissection. The Connection Between Art and Anatomy in Italy is beautifully demonstrated by the genius of Michelangelo. Indeed, the wooden crucifix he carved in gratitude for secret access to corpses from a convent's hospital still hangs in the Basilica of Santo Spirito in Florence. This talk examines the nexus between art and anatomy, the history of anatomy education in the university, and how this story is unique to the Italian peninsula. Also discussed is how to live this experience (and earn HAPS-I credit too) by traveling from Rome to Florence to Venice with Dr. Petti in Summer 2020 when for the first time in five years he offers his popular Anatomia Italiana program.

A204 (Shiley 301) - Rethinking How We Teach Muscle Fatigue, Incorporation of New Ideas for Educational Labs

James Clark, Manchester Community College, jclark@manchestercc.edu
Significant developments in the understanding of muscle physiology have occurred in the last century. However, misconceptions are still finding their way into undergraduate and graduate instruction. The purpose of this presentation is to provide an up-to-date understanding of muscle fatigue and hopefully dispel misconceptions that remain in the available educational resources. Along the way we will examine the role of the size principle in allowing muscles to become excited and the role of central drive in initiating contraction and sustaining muscle tension in an educational laboratory setting.

A205 (Shiley 319) - The Physiology of Marijuana

Tom Lehman, Coconino Community College, tom.lehman@coconino.edu
Students are coming to us with questions about the effects of marijuana on the body and possible health effects, and we should be ready to give them accurate answers. This presentation will describe some of the basic differences between CBD and THC, discuss the process of butane hash oil, and demonstrate some of the physiologic effects that may occur in people exposed to these materials.

A206 (Franz 6) - Align Your Design: the Art of Mapping Content to Your Learning Outcomes

Arianna Boulet, ADInstruments, Inc., a.boulet@adinstruments.com
Sponsored by HAPS and ADInstruments, Inc.
Ensuring learning activities are engaging and aligned with academic standards is hard! HAPS has a new set of anatomy-only learning outcomes, so why not learn how to use them effectively? In this hands-on workshop, we'll use a free content design template that brings a structured approach to creating captivating content. We'll apply HAPS anatomy learning outcomes to the template and practice designing focused, student-centered activities that meet your needs. Join us to pick up your template and get a taste for how mapping out goals, key activities, and delivery strategies can leave you with organized and engaging learning solutions.

A211 (Franz 214) - Schematics: Building from Basics

Stephanie Bostrom, Marietta College, slb008@marietta.edu

A picture is worth a thousand words, and many of our anatomical illustrations are wonderful. But sometimes the level of detail can get in the way of grasping the basics. I've found success in teaching complicated concepts like neural pathways and blood flow by starting with simple schematics, and building upon these basics to help students grasp the individual parts and the overall picture. I'll show examples of schematics I've developed, and a few variations students have adapted to facilitate their learning.

A212 (Franz 223) - Using Video Clips From Harvard Cell Video in PowerPoint Presentations

Robert Leopard, Monroe Community College, rleopard@monroecc.edu

The workshop will tie student learning outcomes to material presented in the Harvard Cell Videos and offer instruction in saving, editing, and using video clips in PowerPoint presentations. People are invited to bring thumbs to receive a copy of the presentation.

A213 (Franz 231) - Dissection of the Female Hemipelvis

Mark Cook, University of Minnesota, cookx072@umn.edu

The pelvic cavity is one of the more difficult regions of the body for students to understand due to the complexity of the structures found there. This is especially true when it comes to the blood vessels and nerves in the pelvis, and their relationship to surrounding structures. Anatomical atlases illustrating pelvic structures can be difficult to understand without having the step-by-step dissection context. In this presentation, a video recording of a step-by-step dissection of a hemisected female pelvis will be shown, with reference to common surgical procedures in females.

Saturday, Session 3

A301 (Shiley 101) - An Open Lab Model for Improving Student Grades and Confidence

Stephanie Wallace, Texas Christian University, stephanie.wallace@tcu.edu, Sophia Garcia, Texas Christian University, sophia.garcia@tcu.edu, Melissa Countryman, Texas Christian University, m.a.countryman@tcu.edu

Peer led instruction is a well-documented, evidence-based instructional strategy. Utilizing an undergraduate (peer) teaching assistant for open lab and practice practical exams had a significant impact on student grades and confidence across one university's anatomy and physiology program. Join us for a discussion on the model, logistics, pre and post implementation data, and lessons learned. The teaching assistant will present her experience from a student perspective. Participants are encouraged to share their own experiences with open lab models and teaching assistants.

A302 (Shiley 123) - Writing Squares

Members of the HAPS Educator Editorial Board

Sponsored by HAPS Educator

The purpose of this workshop is to form small groups of HAPS members interested in the writing process. Small groups would be created to allow members to work together on ideas related to Educational Research, Perspectives in Teaching, and/or Current Topics in Anatomy and Physiology. Mentor/Mentoree and/or co-authorship opportunities could arise and help translate to more potential articles submitted to future HAPS Educator Publications.

A303 (Shiley 124) - Utilizing Virtual Reality in Undergraduate Anatomical Education

Kevin Flaherty, Augustana College, kevin.v.flaherty@gmail.com, Benjamin Karger, Augustana College, benjaminkarger15@augustana.edu

Computing cost decreases and anatomical software advances establish the use of virtual reality (VR) as a powerful supplement to traditional anatomical teaching. We present a model for using VR as a study aid in undergraduate anatomy and provide a guide to building a VR system for.

A304 (Shiley 301) - Homeostasis is Only Half the Story: Navigating Between Stasis and Change-Generating (Hence Life-Threatening) Growth and Reproduction. (Special Focus: Emerging Osteocalcin Stories)

David Temme, University of Utah, temme@biology.utah.edu

Physiologists commonly discuss homeostasis since keeping things the same via counteracting responses underscores every organism’s survival. Yet, extant life forms continue to persist via reproducing faster than they fall apart, and all aspects of growth and reproduction involve survival-disrupting change. Hence, one of life’s most fundamental tradeoffs is: Individuals need to be alive to reproduce, yet all aspects of reproduction strive to kill them. Here I explore aspects of how individuals navigate between change and stasis, dedicating special focus to more recent discoveries of the role played by osteocalcin, a signal molecule released from remodeling bone.

A305 (Shiley 319) - Hormone Fundamentals Part A: Using Case Studies and Active Learning Activities to Teach the Complexities of the Endocrine System

Donika Rakacolli, Edgewood College, drakacolli@edgewood.edu, Marisol Lopez, Edgewood College, melopez@edgewood.edu

The endocrine system tends to be challenging for students to master. In this workshop, we will explore the use of case studies and active learning techniques to engage students and enhance their understanding of this complex system. This is the first of a two-part workshop on hormones. We will share an activity focused on the different mechanisms of action of steroid versus amino acid-based hormones. We will also feature an activity on the role of melatonin in affecting circadian rhythms and wellness. These activities are designed to increase student comprehension and critical thinking, while making learning fun, active, and relevant.

A306 (Franz 6) - More than Hysteria: Understanding Sexism in Medicine

Mackenzie Loyet, Midwestern University, mac22loyet@gmail.com

Historically, women have been ignored, understudied, and often misdiagnosed in the field of medicine. Medical research has neglected diseases that disproportionately affect women and ignored differences in symptoms between the sexes. Biases exist especially in the treatment of heart attacks, autoimmune disorders, and pain management. This workshop will provide an overview of the historical context of this sexism and how it affects modern day medicine. We will explore clinical cases that highlight this bias and discuss how to incorporate these concepts into your own lectures and classes.

A307 (Franz 15) - Bringing Lab to Lecture: The Story of a Flipped Classroom

Hilary Becker, Montana State University, hilary.becker@montana.edu

Active participation and engagement from all students in lecture when using active learning strategies like think-pair-share, small group discussions, and turn and talk can be challenging. But during lab, more students are willing to engage, ask questions, and be involved in group learning. This workshop will explore how at Montana State University, the one-term Anatomy and Physiology class, using a flipped classroom model, uses lab-style activities to enhance student engagement during lecture. This workshop will also discuss the process of creating and implementing this unique active learning environment.

A308 (Franz 26) - Using Learning Progression Frameworks and Assessments to Improve Principle-Based Physiology Instruction

Jack Cerchiara, University of Washington, jackc44@uw.edu, Jenny McFarland, Edmonds Community College, jmcfarla@email.edcc.edu, Mary Pat Wenderoth, University of Washington, mpw@uw.edu

Understanding how rules and principles structure disciplinary reasoning is key to the transition from novice to expert across disciplines. A learning progression describes student learning as it unfolds into successively more sophisticated ways of reasoning. Learning progressions can help reform teaching because they integrate instruction, learning outcomes and assessment. Workshop participants will explore how we can use learning progressions to improve students' principle-based reasoning in physiology. Participants will use principles to reason about problems in anatomy and physiology, as well as use learning progression frameworks to illuminate students' ideas about principle-based reasoning in biology and inform instruction in the classroom.

A309 (Franz 34) - Neuroscience for Undergraduates

Hui-Yun Li, Oregon Institute of Technology, huiyun.li@oit.edu

The success of teaching introductory neuroscience for undergraduates relies on the way how it is taught and what is emphasized. Students are always fascinated by how we sense, move, feel, and think. The goal of the presentation is to introduce the curriculum of "Neuroscience" taught at Oregon Tech from building a strong base of general knowledge in neurobiology to exploring the cellular and molecular basis of brain development and learning and memory. Wiring the brain will be elaborated as an example by discussing the mechanisms used during brain development as well as current view of brain connection (Human Connectom Project).

A310 (Franz 206) - Using Clinical SOAP Progress Notes in the Undergraduate Classroom to Learn About Diseases and Illnesses

Wayne Chang, Golden West College, wchang@gwc.cccd.edu

This workshop introduces a popular assignment in my Anatomy, Physiology and A&P courses that has students dreaming about their future careers all while learning about diseases and illnesses. The SOAP notes format is frequently used in medical records to describe events when clinicians meet with patients. This workshop describes how this has been adapted for use in the undergraduate classroom both as a presenting tool and as assignments for students seeking to enter not only medicine, nursing and pharmacy programs, but also physical therapy, ultrasound, and even mortuary science fields. Guidance for instructors without clinical experience will be provided.

A311 (Franz 214) - iBooks Bring Interactivity and Success to Anatomy and Physiology

Merideth Sellars, Columbus State Community College, msellars@csc.edu, Julie Posey, Columbus State Community College, jposey@csc.edu

This presentation will demonstrate a complement of unique digital books for students taking Anatomy and Physiology. The innovative and pioneering books allow teaching to be engaging, exciting and interactive, both in the traditional setting and web. The content is student driven, downloadable and collaborative, giving easy access to all. Data indicates success, both from an academic perspective and student experience. The classroom and technology merge beautifully, and the way in which the material can be delivered is forever changed. Let us show you this tailor-made resource that we think exceeds anything previous open resources has offered for anatomy and physiology.

**A312 (Franz 223) – Developing Your Own Lab Curriculum is Easier Than You Think!
Nick Butkevich, Schoolcraft College, nbutkevi@schoolcraft.edu**

Sponsored by Macmillan Learning

Affordability and relevance of A&P lab course materials is paramount for students and instructors. Have you ever thought about developing your own materials for the A&P laboratory? We will share information on how the development of a customized laboratory manual has transformed the lab curriculum and laboratory experience for students at Schoolcraft College. Session will include benefits of customization, best practices, and time management strategies to assist instructors as well as information on available resources to start the development process.

A313 (Franz 231) - HAPifying BioInteractive Resources I

Melissa Csikari, HHMI BioInteractive, csikarim@hhmi.org, Patrick Cafferty, Emory University, pcaff@emory.edu, Shannamar Dewey, Butte College, deweysh@butte.edu, Maria Florez, Lone Star College - Cy Fair, maria.florez@lonestar.edu, Tim Grogan, Valencia College, tgrogan@valenciacollege.edu, Rachel Hopp, University of Louisville, rmhopp01@louisville.edu, Juanita Jellyman, Cal Poly Pomona, jkjellyman@cpp.edu, Soma Mukhopadhyay, Augusta University, soma.mukhopadhyay.08@gmail.com, Christy Parker, Finger Lakes Community College, christine.parker@ficc.edu, Laurel Roberts, University of Pittsburgh, laurelb@pitt.edu
Sponsored by HHMI BioInteractive

Come and explore several different HHMI BioInteractive resources that have been modified by members of the HAPS community and learn how you can effectively implement them in your A&P courses. In this workshop, members of the 2019 HHMI BioInteractive & HAPS Faculty Mentoring Network will share their activities based on the Biology of Skin Color, Sex Verification, and Electrical Activity of Neurons resources. During the workshop, you will get a brief introduction of each activity and then we will break into smaller groups where you can dive deeper into the resource you want to explore further.

Saturday, Session 4

A401 (Shiley 101) - Teaching Metabolism Through Fad Diets

Patricia Visser, Jackson College, patricia_visser@jccmi.edu

Students are often overwhelmed by metabolism, but teaching it based on the science (both good and bad) of fad diets has been a great way to get students to engage more deeply in the material. This workshop will look at ways I've integrated fad diet information into my classes, an overview of metabolism chemistry and the science behind recent fads.

A402 (Shiley 123) - A&P Labs You Cannot Beat: A Coordinated Multilevel Strategy

Lloyd Parratt, Oregon Institute of Technology, smitty.parratt@gmail.com, HuiYun Li, Oregon Institute of Technology, hui-yun.li@oit.edu, Rosalind McClure, Oregon Institute of Technology, rosalind.mcclure@oit.edu, Tanya McVay, Oregon Institute of Technology, tanya.mcvay@oit.edu, Tom Taylor, Oregon Institute of Technology, tom.taylor@oit.edu

Five of our Oregon Tech professors will share with you our coordination of four levels of Anatomy and Physiology lab instruction. The labs use common resources. These include four cadavers, unpreserved pig hearts and eyes sufficient for one specimen per two students, a wide variety of anatomical and embryological models, and materials for various interactive physiology labs. The Anatomy and Physiology program also partners with Medical Imaging with the cadavers and heart specimen imaging. High school anatomy and physiology students from around Oregon visit Oregon Tech to learn from the cadavers and pig hearts and eyes.

A403 (Shiley 124) - HAPS Exam Program Update: Introducing a New and Improved Testing Platform, the Stand-Alone Anatomy Exam, and the Revised A&P Learning Outcomes!

Valerie O’Loughlin, Indiana University, vdean@indiana.edu, Jennifer Burgoon, The Ohio State University, jennifer.burgoon@osumc.edu

Sponsored by the HAPS Exam Program

The HAPS Exam Program has been busy! We’ve moved the comprehensive A&P exam to a new and easier to use testing platform, and have begun piloting the two versions of a stand-alone human anatomy exam. Learn more about the platform, these exams and how you can utilize the exams in your own classes. In addition, our task force revised and updated the HAPS A&P learning outcomes, and they are ready for all to use! We will explain the reasons for and process of this learning outcome revision, and why the HAPS Learning Outcomes are now better than ever!

A404 (Shiley 301) - My Students Come Underprepared and This is How I Handle It

Stephen Sullivan, Bucks County Community College, stephen.sullivan@bucks.edu

Sponsored by McGraw Hill Higher Education

One of the biggest challenges A&P instructors face is student preparedness. Many of us have students that are underprepared for our A&P course, class, lab, and/or exams. I use a few digital tools, both formative and summative that minimize this issue with most of my students. I can use data from their learning to pinpoint their challenges so I can provide focused resources - making class time and office hours more productive and consultative.

A405 (Shiley 319) - Hormone Regulation Part B: Using Case Studies and Active Learning Activities to Teach the Complexities of the Endocrine System

Deborah Yañez Sharp, Edgewood College, deborahsharp@edgewood.edu, Brenda del Moral, Edgewood College, bdelmoral@edgewood.edu

The endocrine system tends to be challenging for students to master. In this workshop, we will explore the use of case studies and active learning techniques to engage students and to enhance their understanding of this complex system. This is the second of a two-part workshop. We will model how to use case studies to teach hormone regulation and the consequences of imbalance, including stimulation and feedback mechanisms under both normal and abnormal conditions. These activities are designed with the intent of increasing student comprehension and critical thinking, while simultaneously making learning fun, active, and relevant.

A406 (Franz 6) - The Amazing Functions of the Vestibular System

Shawn Macauley, Muskegon Community College, shawn.macauley@muskegoncc.edu
Sam Drogo Award Winner Presentation

Often touted as the sixth sense, balance is the least appreciated special sense. This presentation will review vestibular function and the etiology of common vestibular disorders. Dr. Macauley will discuss his challenges of living with a complete bilateral vestibular loss as well as the effects of vestibulopathies on balance, vision, reflexes, and memory. Finally rehabilitation approaches and emerging treatments, such as vestibular implants and biofeedback, will be introduced.

A407 (Franz 15) - Active Learning Environments

Julie Cooke, University of Canberra, julie.cooke@canberra.edu.au, Disa Smee, University of Canberra, disa.smee@canberra.edu.au

Join the Australians to discover active learning opportunities that facilitate student engagement with A&P content. This hands-on workshop allows attendees to participate in two specifically designed practical tasks focusing on bone identification (Bone up on ya Bones!) and endocrine physiology. These unique tasks are effective for larger groups, easily scalable and well received by students. They can be scaffolded as required increasing the level of understanding. Upon completion of this workshop participants will have the tools to be able to implement these tasks in their own teaching space.

A411 (Franz 214) - DIGging Deeper: Diversity and Inclusion in HAPS
Kathy Burleson, Hamline University, kburleson01@hamline.edu, Krista Rompolski Taney, Drexel University, krom@hapsconnect.org, Melvin Simoyi, Heritage University, msimoyi@hapsconnect.org, Theodore Smith, Indiana University School of Medicine - Bloomington, tsmith@hapsconnect.org, Jacqueline Van Hoomissen, University of Portland, jvan@hapsconnect.org, Jonathan Wisco, Boston University, jwisco@hapsconnect.org

Sponsored by the HAPS Diversity and Inclusion Goals Task Force

If you want to learn more about diversity and inclusion in anatomy and physiology, and explore how to dig into the work, attend this session! In this workshop, you will learn what the Diversity and Inclusion Goals task force is doing, and discuss ways we can promote diversity and inclusion among the HAPS community and in our classrooms. All ideas, concerns and questions are welcome.

A412 (Franz 223) - Translation to Online Anatomy Education: Choosing and Integrating a 3D Anatomy Application

Kathryn Havens, University of Southern California, kate.havens@gmail.com

Sponsored by 3D4Medical

The translation of traditional residential anatomy courses to hybrid or online formats create an instructional challenge for programs to maintain continuity of content and course objectives while reimagining learning modalities. The purpose of this workshop is to describe the translation of a Musculoskeletal Anatomy course in a Doctor of Physical Therapy curriculum, with an emphasis on the choice and implementation of a digital anatomy application, Complete Anatomy by 3D4Medical. The challenges and solutions to the translation process, implementation and integration of the app into the online curriculum, and features and demonstration of the chosen app will be presented.

Saturday, Session 5

A501 (Shiley 101) - Engaging Students and Making A&P Classrooms Inclusive: 21 Strategies to Structure Classroom Interactions and Promote Student Success

Jeff Schinske, Foothill College, schinskejeff@fhda.edu, Monica Cardenas Guzman, West Valley College, monica.121@gmail.com, Jeanie Chen, Foothill College, jeaniechen22@gmail.com, Canaan Muluneuh, Foothill College, cannanbelete@gmail.com

Teaching diverse populations of students requires instructors to craft inclusive and equitable learning environments. However, this can sometimes seem like a lofty goal with few concrete strategies for getting started. In this interactive workshop, participants will experience a simulation of a classroom activity as the basis for discussing how students experience the same classroom environment differently from one another. Participants will then self-assess their current awareness of 21 equitable teaching strategies requiring minimal preparation to implement. Finally, participants will identify those strategies that could be immediately implemented to promote fairness and increase access to learning for all students.

A502 (Shiley 123) - Utilizing Active Learning Techniques to Engage Students and Improve Academic Performance in Anatomy and Physiology Courses

Nicole Palenske, Central College, palensken@central.edu, Ellen DuPre, Central College, dupree@central.edu

The focus of this workshop will be demonstrations and discussions of active learning methods developed and/or adapted by instructors to improve student engagement with the material and to improve academic performance. Attendees in the workshop will participate in several short learning activities that can be easily incorporated into lecture and/or labs. Instructors for this workshop will discuss how “flipping” their courses has positively impacted student learning by creating the opportunity to reinforce concepts and freeing up time to conduct deeper exploration of selected topics making the material more applicable to students. It has also produced renewed excitement for the instructors.

A508 (Franz 26) - Billion-Dollar Ducks and the Quest to End Magical Thinking

Erin Amerman, Florida State College Jacksonville, ecamerman@aol.com, Lourdes

Norman-McKay, Florida State College Jacksonville, Inorman@fscj.edu

To effectively foster critical thinking in students, we must understand the antithesis to it—magical thinking. Join us for an exploration of the whacky ways magical thinking influences not only medicine and public health, but also education. Caution: Here there be...ducks! We'll tackle the billion-dollar ducks of homeopathy and slay other legendary pseudoscience foes as we arm you with practical tools to both recognize the features of magical thinking and brew the elixir of critical thinking with your A&P students. Get ready to venture into the classroom (or even a dinner party) to combat pseudoscience and science denialism!

A509 (Franz 34) - How to Set-Up and Utilize a Supplemental Instructor Program in an Introductory Human Physiology Class

James Davis, Indiana State University, james.davis@indstate.edu

Introductory human physiology courses are generally taught in large-classroom settings. However, research has shown that student outcomes are worse in large classroom settings compared to small classroom settings. One possible strategy that can be used to improve student outcomes in a large-classroom setting is by reducing the instructor to student ratio. This can be done by utilizing undergraduate students as peer assistants inside and outside of the classroom. This workshop will go over how to set-up and use these undergraduate students to ultimately improve student outcomes.

A510 (Franz 206) - Analysis by Analogy: How to Bring Concepts Closer to Your Students

Hisham Elbatarny, St. Lawrence College and Queen's University, helbatarny@sl.on.ca

The use of analogies has been found to be quite helpful in teaching different sciences including anatomy and physiology. They are valuable in explaining new and difficult concepts. In my teaching, I frequently include both structural and functional analogies and metaphors to engage my students and enhance their understanding of different topics. In this interactive workshop, I will introduce and share a number of new analogies which bring difficult concepts closer to students' understanding. My goal is to show the value of using them in a well-structured and categorized way for explaining new concepts in anatomy and physiology.

A512 (Franz 223) - Stimulation of Visible Thinking of A&P Students Through the Integration of Technology in the Didactic Curriculum

Vetaley Stashenko, Palm Beach State College, stashenv@palmbeachstate.edu

Are our students exhibiting the same kind of learning and logical thinking as we observed at the end of the last century? Are we ready to keep up with their ability to learn and adapt to the latest technologies, (especially if it is related to Gross Anatomy and Physiology)? Didactic Anatomy and Physiology teachings have recently started changing with highly effective uses of the latest advancements of technological educational tools, which have become essential to student's engagement, success, development of critical thinking abilities and especially, the expansion of the classroom outside the college campus. This presentation will discuss strategies, which we have implemented for the process of selecting the textbook, course software and hardware resulting in the improvement of grades, retention, and completion and mastery of the subject matter. The combination of visual approaches (text and digital) with the normal anatomically correct protected cadaver and specimens allowing students to interact with the subject study in a 3D environment anytime and anywhere with customized interactive assessments that maintain the continuity of learning between lectures and the laboratory. Additionally, this allows students to integrate basic scientific knowledge with clinical (personal) applications. Student's experiences and survey results will also be shared. Steps of our implementation process will also be discussed.

B104 (Shiley 301) - Scaffolding Assignments to Promote Higher Order Skill Development in Anatomy and Physiology

Heather Evans Anderson, Stetson University, hevansanderson@stetson.edu

Student-centered pedagogical approaches are known to promote higher order skill development and increase learning gains for students. However, implementing such approaches are time intensive for instructors, particularly with increasing class sizes and teaching loads. Here, I present a method of scaffolding assignments that has been successful for promoting learning in A&P courses. Students are presented with specific learning objectives and given a series of assignments with multiple opportunities to practice material before each exam. These assignments build from lower level skills, such as recall, to higher level analytical skills; which promotes critical thinking and improved performance on cumulative final exam.

B105 (Shiley 319) - This is NOT a Trick Question: Writing Good Multiple Choice Questions

Robin Hopkins, The University of Oregon, rhopkins@uoregon.edu, Josh Mangum, The University of Oregon, jmangum@uoregon.edu

This workshop will review best practices for organizing assessment and writing multiple choice questions. By the end of this workshop you will be able to: 1) align course learning objectives, assessment, and activities, 2) describe the different cognitive levels of learning objectives, 3) use best practices to create multiple choice questions, and 4) analyze exam results.

B106 (Franz 6) - Origami Meets Physiology: Building Understanding with Paper Models

Amy Bell, Phoenix College, amy.bell@phoenixcollege.edu

In this workshop you will learn how to create paper manipulatives to guide your students through tough physiological concepts. This paper modeling technique is adaptable to any level of content and scalable to any classroom size. With a simple model, your students can follow the movements of acetylcholine molecules across a neuromuscular junction or follow a drop of blood through the chambers of the heart. You can take a concept further by asking your students to alter a model to represent the effects of a particular disease. This modeling strategy can even be used for hybrid and online classes.

B107 (Franz 15) - When Bigger is Better: Using Large A&P Classes to Increase Your Scholarship

Peter Reuter, Florida Gulf Coast University, preuter@fgcu.edu

Teaching large A&P classes is challenging and time consuming. On the other hand, having large numbers of students can help faculty increase their scholarly output and set them up for promotion or tenure. The workshop will look at different ways faculty can profit from teaching large numbers of students. We will discuss examples from different areas, such as Scholarship of Teaching and Learning (SoTL), faculty-mentored research, and integrating research projects into the classroom.

B108 (Franz 26) - Role Playing: Gee, I Wish I was a Protein. Or I Wish I was a G Protein. Either Works!

Samuel O'Dell, Walters State Community College, srodell@ws.edu

This is a continued examination of role-playing, in which students adopt a role to play within a supplied scenario. By asking workshop participants to adopt roles in newly presented scenarios such as second-messenger systems, skeletal and smooth muscle contraction, and negative feedback in the endocrine system, participants should gain ideas for their own classroom use. At least one activity will be specifically geared to large lecture classes. Characteristics of successful role play exercises, ideas for scaling activities for larger and smaller class sizes, hints for designing or building physical props, and different levels of guidance will also be examined.

B202 (Shiley 123) - Are We Helping Those Who Really Need It?

Tirzah Birk, Ivy Tech Community College, Lafayette, tbirk1@ivytech.edu

One paradox of higher education is that students with the greatest need are least likely to persist. Do you know who those students are and what the literature says about how to best help them? Besides financial constraints, those least likely to persist in higher education are those with low family and peer support, and those who fail to connect socially. Research shows that classroom structure has both direct and indirect effects on student persistence. From assessments to student interactions, faculty play a vital role. Our research looks at student perception of active learning with relation to socioeconomic status.

B203 (Shiley 124) - Teaching Online Lab Science Courses: Challenges and Solutions

Shannon McGurk, Carolina Biological Distance Learning, shannon.mcgurk@carolina.com, Heather Stuart, Carolina Biological Distance Learning, heather.stuart@carolina.com

Sponsored by Carolina Biological Supply Company

Science education has been challenged by the demands and rapid growth of online education. One challenge is how to run lab sections of science courses online. Basic science can be taught online when accompanied by well-designed investigations that can be completed in the student's home. This session will include the experience of actively taking part in hands-on lab investigations developed for online science courses. These investigations have been designed for the off-campus setting while maintaining the college-level rigor.

B204 (Shiley 301) - Reorganizing a Physiology Course Through Core Principles: The Way Forward?

Sarah Hewitt, Mount Royal University, sahwitt@mtroyal.ca, Trevor Day, Mount Royal University, tday@myroyal.ca

We will explore the restructuring of a full-year physiology course around core principles as opposed to systems. Understanding core concepts is the key to understanding physiology. Too often, physiology courses focus on content, each system taught as a distinct entity, resulting in students fixating on "knowing" instead of "understanding", and not identifying common concepts across systems. In this workshop, we'll present our approach to redesigning the content to better highlight system integration and promote understanding instead of rote memorization. With some exercises and guided discussion, we'll solicit feedback on the design and the potential pitfalls of the proposed structure.

B205 (Shiley 319) - But Professor Why ...

Mark Nielsen, University of Utah, marknielsen@bioscience.utah.edu

In anatomy we often get asked the GOOD WHY QUESTIONS, questions that should be asked. For example, why is the sympathetic system thoracolumbar and the parasympathetic system craniosacral? Why do the posterior divisions of the lumbosacral plexus innervate the anterior muscles of the lower limb and vice versa? Why does the dorsal root have a ganglion and not the ventral root? I hope we do not give the boring response of "Oh, it is just because of genetics or that is just how it develops." Come prepared to learn and discuss the GOOD ANSWERS to these and many other questions.

B206 (Franz 6) - Cheating 101. Predictions and Solutions

Shawn Macauley, Muskegon Community College, shawn.macauley@muskegoncc.edu

Are you concerned about student cheating? In this workshop, Shawn Macauley will discuss how and why students cheat, examine characteristic and demographics of cheaters, and explore things we can all do to minimize cheating. He will provide strategies that you can use in your face-to-face and online classes that reduce cheating, promote learning, and provide a more equitable educational environment.

B211 (Franz 214) - While You Were Sleeping . . . : An Interrupted Case Study on Obstructive Sleep Apnea

Jeanette Hafey, Springfield College, jhafey@springfieldcollege.edu

An adequate amount of sleep has become an important consideration in evaluation overall health. Sleep disorders, such as Obstructive Sleep Apnea (OSA), have important safety and economic ramifications as well. Overall job performance, athletic endurance and military alertness, as well as safety in driving and operating machinery are all areas of concern as they may be affected by the cognitive impairment of having missed “a good night’s sleep”. This case study examines the anatomical and physiological changes which accompany OSA. Polysomnography recordings, performed during a “sleep study”, illustrate to students the changes in ECG, blood pressure, oxygen saturation, body movements, eye movements, EEG, and air flow during periods of apnea. The role of chemoreceptors in restoring normal breathing pattern is discussed. OSA as a risk factor in cardiovascular disease is evaluated. Obesity-related issues and hypercapnia as related to OSA are considered. CPAP therapy in restoring normal sleep patterns is suggested.

B212 (Franz 223) - Lights! Camera! Action!

Stephen Sullivan, Bucks County Community College, ssullivandc@gmail.com

Not enough class time to cover all the material? Teaching Online or Hybrid? Having a hard time finding quality online videos? Why not make your own videos in your teaching style and voice? Be it orientation or tutor-style, I’ve been doing that for over 10 years and I will share with you the mistakes I’ve made, the tools I’ve found, and what’s working for me.

Sunday, Session 3

B301 (Shiley 101) - Hands-On Nephron Bead exercise

Tom Lehman, Coconino Community College, tom.lehman@coconino.edu

Urine formation in the nephron is a difficult concept for students. I have created a hands-on activity that uses easily-obtainable items and helps students to understand the structures involved and how they contribute to the filtration of blood and formation of urine. In this workshop, we will diagram the nephron and learn the function of each component. Using beads to represent various elements of blood, we will see how these elements are filtered to produce healthy blood and leftover filtrate (urine). Using four short case studies, we’ll demonstrate how this system must adapt to different blood conditions.

B302 (Shiley 123) - Getting off to a Great Start - First Day of Class Success

Amanda Rosenzweig, Delgado Community College, arosen1818@aol.com

The expression, “You get one chance to make a first impression” really applies to the first-class meeting. This session focuses on practices to ensure a class gets off to a good start. Setting the tone for the course, especially one with the Anatomy and physiology rigor reputation, can provide an opportunity for students and faculty to get to know one another and ensure students look forward to the next meeting. Understand the difference between ice breakers and getting acquainted exercises. Participate in exercises that facilitate engagement. Discuss challenges and solutions to first day blues.

B308 (Franz 26) - Creating Great CVs and Effective Cover Letters

John Waters, The Pennsylvania State University, johnwaters@psu.edu, Valerie O'Loughlin, Indiana University, vdean@indiana.edu, Leslie Day, Northeastern University, l.day@northeastern.edu, Sandy Neps, Portland Community College, sandy.neps@pcc.edu, Elizabeth Pennefather-O'Brien, Medicine Hat College, eobrien@mhc.ab.ca

Whether we are just starting off or already well established in our careers, most of us will need to create a CV and cover letter. However, many people struggle with how to present themselves effectively and professionally. The workshop presenters have served as deans, department heads or program directors at small and large institutions and have read and critiqued hundreds of CVs and cover letters. We will share suggestions and guidelines, as well as some of the common errors we've seen. Attendees who bring their own CV and cover letter will have opportunities for peer review and feedback.

B309 (Franz 34) - Acting It Out: Nervous and Endocrine System Signaling Including Protein-Ligand Interactions

Maria Squire, The University of Scranton, maria.squire@scranton.edu

Hands-on activities have been shown to enhance student learning. I have been incorporating hands-on activities when I teach physiological principles such as nervous and endocrine system signaling, which students typically find challenging. Over the years and with ideas from previous HAPS presenters, I have developed exercises ranging from acting out protein-ligand interactions (messenger-receptor interactions) to acting out signaling between neurons and their effectors, endocrine glands and their effectors, and between neighboring cells (paracrine and autocrine signaling). These activities have been incorporated into both 100-level Human Anatomy and Physiology and 200-level Advanced Human Anatomy and Physiology courses.

B310 (Franz 206) - What's the Big Idea Here?

Margaret Weck, St. Louis College of Pharmacy, margaret.weck@stlcp.edu

A key step in backward course design is determining the central "Big Ideas" of a course. This workshop considers the elements of big ideas that are essential to rational course design. Participants will think about the structure of their current courses. Is the actual content being taught explicitly or implicitly organized into any larger, more meaningful whole? We will look at how the choice of big ideas can alter the sequence of instruction and assessment of student learning. Instructors will practice identifying potential big ideas and extrapolating how they might help students be more successful in traditionally difficult content areas.

B311 (Franz 214) - Is Education as Straightforward as Helping Students Expand their Common Sense Toolbox?

David Temme, University of Utah, temme@biology.utah.edu

Humans are "pattern crazy", in that our brains are always paying attention to what can and can't happen. We then use our current understanding of constraints and tradeoffs to navigate through our day-to-day life—and we tend to refer to shared aspects of this framework as "common sense". In this session I discuss the idea that education largely involves increasing the "terrain" through which students can successfully navigate by expanding their "common sense tool box". The examples discussed will lean more towards science/biology/physiology, yet I suspect the underlying ideas apply to all disciplines. Feedback will be welcomed!

B406 (Franz 6) - Teaching Neuroanatomy Through Clinical Cases

James Munoz, Nova Southeastern University, james.munoz@nova.edu

Learning neuroanatomy can be a daunting task for many students. Presenting brief case studies may help students (1) better understand the relationship between structure and function, (2) recognize how pathology affects behavior, and (3) encourage further discussions. This workshop will focus on several case studies with the intention of creating a more meaningful learning experience.

B407 (Franz 15) - Achoo! Part 2 Allergies, Asthma and Hypersensitivities

Tynan Becker, University of Alaska Fairbanks, tabecker@alaska.edu

Allergies in the more developed countries are on the rise and allergies present a topic of great interest to A&P students. This workshop is a review and update of hypersensitivities type II & III. A brief review of innate immune cell functions and complement will lay the foundation of the lecture. Both these hypersensitivities are due to antibody-antigen complexes that form during an immune response, but have differing outcomes. The discussion of type II hypersensitivity will use hemolytic anemia and Goodpasture's syndrome as examples. The mechanisms underlying rheumatoid arthritis and glomerulonephritis will illustrate type III.

B408 (Franz 26) - Wake up with Anatomy Academy! Pre-Professional Health Sciences Service-Learning in Autism Spectrum Elementary School Classrooms Inspires Deeper Learning for All Students

Jonathan Wisco, Boston University School of Medicine, jjwisco@bu.edu

We demonstrate that paraprofessional teachers who have formed a trusting learning relationship with autism spectrum children have a significant influence on the dynamics of the learning environment. An engaged curriculum synergizes the learning experience for both children and paraprofessionals. Anatomy Academy provides a service-learning opportunity for pre-professional students to teach children the importance of adopting a healthy lifestyle. We have found that autism spectrum children become highly engaged in the learning process when they are able to work with their paraprofessionals, whom we call Mentors, and have fun learning concepts of anatomy, physiology, and nutrition.

B409 (Franz 34) - Deeper Learning in A&P Using Core Principles, Case Studies, and Concept Maps

Paul Luyster, Tarrant County College, paul.luyster@tccd.edu

Recent studies have suggested that deeper learning can be fostered if the "core concepts," "general models," or "big ideas" of physiology are infused into undergraduate instruction. Many undergraduate students struggle with complex fundamental principles such as causal relationships, communication pathways, feedback loops, and homeostatic mechanisms. Case studies can help students identify and apply these principles to real-world applications, but beginning students can quickly become overwhelmed by pathophysiology. "Scaffolded" concept maps can help students organize complex case study information and use these principles to solve complex clinical problems. Following up on their Mega-ConceptMap presentation last year, Luyster and his students will discuss how they designed a new set of scaffolded, case study-based, concept-mapping assignments to help students understand and apply the core principles of physiology.

B505 (Shiley 319) - Running Concept Lists: A Simple Strategy to Identify, Connect, and Apply Core Concepts of Anatomy & Physiology

Kevin Patton, St. Charles Community College: NYCC School of Health Science & Education, kevin@lionden.com

Getting our A&P students to learn the basic facts is its own challenge. Getting them to understand the underlying principles—let alone to connect these core concepts into a useful framework—involves even tougher challenges. Among the successful strategies I've found to help students identify recurring and essential ideas of A&P and connect them into a coherent understanding of how the human body works is the simple method of running concept lists. What is it? How does it? What are some easy ways use this tool to promote student success? Come to this workshop and find out!

B506 (Franz 6) - ABOs of Blood Type

Pat Clark, Indiana University - Purdue University Indianapolis, patclark@iupui.edu

Physiology students are generally familiar with the concept of blood types. Although they may have a general knowledge of the A, B, O blood types, and in some cases the Rh factor, they don't often understand the basis or complexity of blood type. As a result, students may not understand the complexity of blood transfusions. In this workshop, we will take a deeper look at the chemistry of blood type and discuss types of transfusion reactions and some secondary health effects of blood type. Scenarios and case studies are used to promote student discussion and problem solving.

B507 (Franz 15) - More of our Favorite Histology Challenges

Nina Zanetti, Siena College, zanetti@siena.edu, Deborah Merritt, University of Hawaii at Manoa, dmerritt@hawaii.edu

Sponsored by HAPS

The Histology Challenge, a dynamic feature of the HAPS website, presents patient cases with photomicrographs of surgical specimens and an online blog where participants discuss and diagnose the disease. Cases cover a wide range of diseases, but also illustrate basic concepts in histology, histopathology and disease mechanisms. In this workshop, we will revisit our favorite cases, with questions and answers designed to simulate the discussion blog. We'll explore basic concepts behind each case, how the cases might be used in undergraduate courses, some of the behind-the-scene work that goes into producing the Challenge, and how YOU can get involved!

B508 (Franz 26) - Conquering Anatomy and Physiology Program Leads to Higher Scores

Steffie Tomson, University of St. Thomas, tomsons@stthom.edu

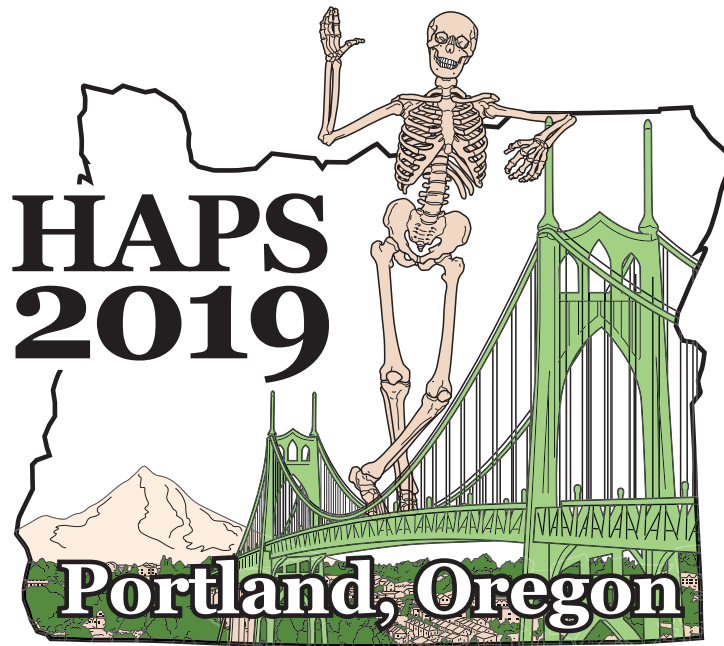
Robert Anthony Award Winner Presentation

The University of St. Thomas teaches A&P1 to incoming freshman on pre-health tracks who are not required to take biology as a prerequisite. In August 2018, I piloted a bootcamp called the Conquering Anatomy and Physiology Program (CAPP) to prepare these students for the rigor of the course. For the Fall semester, only 4% of CAPP students withdrew from A&P1, compared with 14% withdrawal rate overall. CAPP students also have a significantly higher average than non-CAPP students.

B509 (Franz 34) - It's a Small World After All – A&P Pen Pals in the Lab

Zoe Soon, University of British Columbia Okanagan, zoeanne.soon@ubc.ca

This workshop is designed for those that are interested in broadening their students' horizons culturally at the same time as facilitating student collaborations across the globe. It has been noted that while some of our students have the opportunity to travel during their degree and take part in international exchanges, many students simply don't have that opportunity. We propose setting up an on-line community of A&P instructors interested in having their students share anonymized class lab data, A&P fun facts, study tips, as well as points of interest regarding their city and country.



Thank You to our HAPS 2019 Annual Conference Committee!!!

Annual Conference Chair:

Jacqueline Van Hoomissen

Annual Conference Workshop Co-Coordinator:

Tom Taylor, Oregon Institute of Technology

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May 23

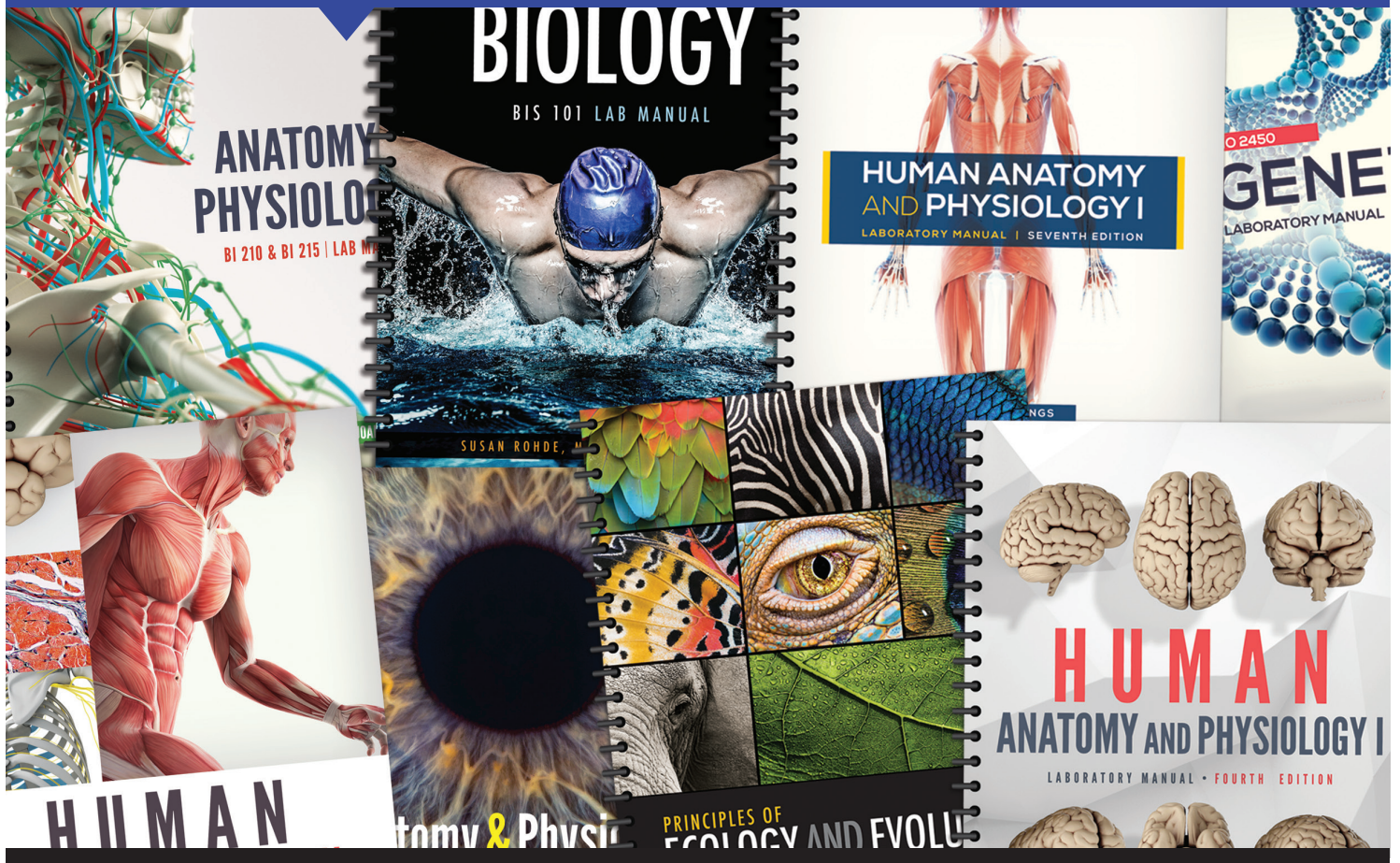
7:30 AM–8:00 AM	Juanita Jellyman Cal Poly Pomona	Order and Disorder in Sex Development
8:00 AM–8:30 AM	Michelle McDonald Baptist College of Health Sciences	Genetics, Immune System, and Cancer — A 3-Phase Lesson
10:00 AM–10:30 AM	Patrick Cafferty Emory University	Electrical Activity of Neurons
10:30 AM–11:00 AM	Liz Co Boston University	Case Study on Sickle Cell Disease and New Therapy Approaches
5:15 PM–5:45 PM	Corey Johnson Panola College	Teaching about Sickle Cell with Legos
5:45 PM–6:15 PM	Karen Clark Davenport University	Hemoglobin and Sickle Cell

May 24

9:45 AM–10:15 AM	Shannamar Dewey Butte College	Biology of Skin Physiology Connections
10:15 AM–10:45 AM	Laurel Roberts University of Pittsburgh	Using The Biology of Skin Color to Teach Endocrine Function
2:15 PM–2:45 PM	Soma Mukhopadhyay Augusta University	Understanding the Evolution of Skin Color
2:45 PM–3:15 PM	Rachel Hopp University of Louisville	Differences of Sexual Development

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