Exploring Anatomy & Physiology in the Laboratory series of lab manuals is designed to actively engage your students in the process of learning the details of human anatomy and physiology. These beautifully illustrated, clearly written, and affordably priced lab manuals use an innovative, interactive approach to ensure your students gain a deep understanding of anatomy and physiology. Each series title is available for customization, or can be bundled with any of our photographic atlases, dissection guides, or study guides. On average, our books are priced 40% less than those of our competitors.

This book is intended for a two-semester anatomy and physiology sequence of lab courses typically occupied by pre-nursing students.

**Features Include**
- Pre-Lab Exercises
- Model Inventories
- Full-color illustrations and photography
- Focused activities
- Check Your Recall/Check Your Understanding

This book is intended for a one-semester anatomy and physiology lab course servicing allied health programs.

**Features Include**
- Pre-Lab Exercises specific to one-semester course
- Checklist boxes of most important structures
- Full-color illustrations and photography
- Pronunciation Guide
- Single Unit Quiz at the end of each chapter

This book is intended for a one-semester anatomy-only laboratory course.

**Features Include**
- Pre-Lab Exercises of anatomical structures
- Model Inventories and pronunciation guide
- Full-color illustrations and photography
- Focused activities
- Check Your Recall/Check Your Understanding
Table of Contents

Welcome from Peter English, HAPS Executive Director .................................................. 5
Letter from the Mayor of Atlanta .................................................................................... 6
About HAPS .................................................................................................................. 7
HAPS Presidents and Conference Coordinators .............................................................. 8
HAPS Board of Directors ............................................................................................... 9
HAPS Committees ......................................................................................................... 10
Exhibitors ........................................................................................................................ 13
Sponsors ......................................................................................................................... 22
HAPS President’s Initiative Sponsorship ......................................................................... 23
HAPS Institute .................................................................................................................. 24
HAPS Foundation 2K & 5K Fun Run/Walk .................................................................... 26
HAPS-Thieme Excellence in Teaching Award .................................................................. 27
Schedule of Events ......................................................................................................... 28
Hotel Layout .................................................................................................................... 32
Update Seminar Speakers ............................................................................................... 33
Poster Abstracts ............................................................................................................... 50
Letter from Georgia Tech ............................................................................................... 68
Georgia Tech Campus Map .............................................................................................. 69
Workshop Schedules and Abstracts ................................................................................ 70
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Welcome to HAPS 2016!

Atlanta is an exciting location for our 30th Annual Conference, and we are going to do our best to make it a conference to remember! This is going to be a wonderful conference with exciting activities for the seasoned HAPS attendee as well as for the first timer.

The real strength of HAPS is its members, and nothing highlights that fact more than bringing a big bunch of HAPS members together! There is a wealth of knowledge, camaraderie, and just plain fun to be had this week. This year we have an impressive array of Update Seminars, three poster sessions, as well as a return of the successful Synapse! activity that we tried for the first time last year. On Tuesday and Wednesday we’ll move from the Hyatt to Georgia Institute of Technology (known to many as Georgia Tech) and have nearly 80 workshops. Some will even earn graduate credit participating in HAPS-I courses.

The Synapse! activity may be new to many HAPS members. It is a fun activity in which presenters give a five-minute talk using an auto-advancing powerpoint presentation. We will have seven of these talks back-to-back in a way that highlights not only the knowledge of the presenters, but also the wide array of teaching styles.

Synapse! is one of many aspects of the HAPS Annual Conference that has stemmed from member suggestions. This year the Annual Conference is not over the Memorial Day weekend, which is another suggestion that we are trying out. Do you have an idea of how to make HAPS even better? Are you interested in being more involved in HAPS? If so, just let me or a member of the HAPS leadership know, and we will welcome your ideas and participation.

I will be available throughout the conference, and I hope to welcome you in person. In addition to being the HAPS executive director, I am also a fellow physiology instructor, so we will surely have something to share with each other.

On behalf of all of the HAPS staff, I want to welcome you to HAPS 2016 in Atlanta and share our sincere hope that you have a great experience while you are here.

Sincerely,

Peter English, Ph.D.
Executive Director
March 23, 2016

Greetings:

As Mayor of the City of Atlanta, it is my pleasure to welcome the Human Anatomy & Physiology Society (HAPS) as you host your 2016 Annual Conference.

This year’s meeting brings together attendees from all over the country to participate in events and sessions that further the development of human anatomy and physiology instruction at colleges, universities, and related institutions. I salute the attendees of the HAPS 2016 Annual Conference for working diligently to be at the forefront of their profession. I am confident this meeting will provide your members with an important forum to network, empower and innovate.

While in our city, I encourage attendees to explore the many attractions Atlanta has to offer including: the Dr. Martin L. King Jr. Center, the Georgia Aquarium, the World of Coca-Cola, CNN Center, Centennial Olympic Park, Woodruff Arts Center, Atlanta Botanical Garden, Children’s Museum of Atlanta, the National Center for Civil and Human Rights, and many more. We invite you to share in our Southern hospitality, sample cuisine at our many fine restaurants and enjoy the rich and diverse heritage of our city.

On behalf of the people of Atlanta, I wish all of the participants an exciting event.

Sincerely,

Mayor Kasim Reed
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. The Cadaver Use Committee will meet over lunch on Monday and the remainder of committees will meet over lunch on Tuesday. 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.

**HAPS Board of Directors 2015 – 2016**

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A list of contact information can be found on the governance area of the website.  
http://www.hapsweb.org/?page=HAPSGovernanceHome
HAPS Presidents & Conference Coordinators

Current President
Betsy Ott, 2015-2016

President Elect
Terry Thompson, 2016-2017

Past Presidents
Tom Lehman, 2014-2015
Valerie O’Loughlin, 2013-2014
Dee Silverthorn, 2012-2013
Don Kelly, 2011-2012
Caryl Tickner, 2010-2011
John Waters, 2009-2010
Kevin Petti, 2008-2009
Margaret Weck, 2007-2008
Joseph Griswold, 2006-2007
Frederic Martini, 2005-2006
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 Steadman, 1989-1990

This Year
2016 – Atlanta, GA (Kyla Ross & Adam Decker)

Coming Attractions
2017 - Salt Lake City, UT (Mark Nielsen)

Previous HAPS Conferences
2015 - San Antonio, TX
(Anita Moss & Jason LaPres)
2014 – Jacksonville, FL (Lourdes Norman)
2013 – Las Vegas, NV (Kebret Kebede)
2012 – Tulsa, OK (Karen McMahon)
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, NN (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
2015 - 2016

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Past President
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President-Elect
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Jon Jackson
HAPS Committees  
2015 - 2016 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 Monday or Tuesday, 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.

Animal Use Committee
Christie Canady
We are charged with developing, reviewing, and recommending policies and position statements on the use of animals in college-level A&P instruction.

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

Curriculum & Instruction Committee
Hiranya Roychowdury
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.

Cadaver Use Committee
Melissa Carroll
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.

Annual Conference Committee
Ellen Lathrop-Davis
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.

Executive Committee
Betsy Ott
We are comprised of the top administrators of HAPS, setting policies and governance of the Society.
HAPS Committees
2015 - 2016 Committee Chairs

Foundation Oversight Committee
Don Kelly & Bob Crocker
We establish and manage endowed funds for the Society, oversee the activities and operations of the HAPS Foundation, and administer the HAPS Grants and Scholarship Program.

Membership Committee
Kyla Ross
We work to increase HAPS general membership by maintaining ties with current members, creating awareness of HAPS’ value, and introducing HAPS to potential members.

Nominating Committee
Terry Thompson
We assemble a list of qualified candidates for election to the HAPS Board of Directors.

2016 Conference Committee
Adam Decker & Kyla Ross
We coordinated the 2016 Annual Conference in Atlanta, GA.

HAPS Educator Committee
Kerry Hull
We serve as the editorial board of the HAPS Educator, a scholarly journal published by HAPS three times per year. Committee members guide the development of the journal, solicit submissions, and review submitted articles.
HAPS Committees
2015 - 2016 Committee Chairs

Presidents-Emeriti
Advisory Board
Valerie O’Loughlin
We are comprised of past presidents of HAPS, providing advice and a historical perspective to the Board of Directors upon request.

Steering Committee
Ron Gerrits
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.

Safety Committee
Yuli Kainer & Neal Schmidt
We promote safety in the A&P laboratory with the HAPS Safety Guidelines and through the publication of Spotlight on Safety articles and Safety Case Studies.

Testing Committee
Jennifer Burgoon & Valerie O’Loughlin
We develop, maintain, and manage the HAPS comprehensive exam. We are working on developing a new anatomy-only exam that aligns with learning outcomes specific to human anatomy courses.

Many of the committees will have meetings during the annual conference, as well as presenting 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!
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BIOPAC Systems ..................................................................................................................Tables 43-44
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The HAPS Foundation was established so that donors could enhance the quality of Human A&P instruction by making tax-deductible contributions to projects that support professional development programs. The Foundation also provides money for other scholarships and awards to our members: Robert Anthony Scholarship Fund, Adjunct Faculty Scholarship Fund, Faculty Grant Award, Student Grant Award, HAPS-I Scholarship, HAPS Graduate Student/Postdoctoral Travel Award, The HAPS-Thieme Excellence in Teaching Award, and The ADInstruments Sam Drogo Technology in the Classroom Award.

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ImagineeringArt .................................................................................................................................Table 18

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iWorx Systems, Inc .................................................................................................................. Tables 32-33

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DON’T FORGET TO ATTEND THE HAPS COMMITTEE LUNCH MEETINGS!

MONDAY:  Hyatt Regency Atlanta, 1:00 – 1:30 PM
Cadaver Use Committee – Kennesaw Room

TUESDAY:  Georgia Institute of Technology Campus, 12:45 – 1:30 PM
Animal Use Committee – IC 103
Communication Committee – IC 105
Conference Committee – IC 107
Curriculum & Instruction Committee – IC 109
Foundation Committee – IC 111
HAPS Educator Committee – IC 113
Membership Committee – IC 115
Safety Committee – IC 119
Testing Committee – IC 205
HAPS President’s Initiative

McGraw Hill Education & Wiley

The Human Anatomy & Physiology Society wishes to thank McGraw Hill Education and Wiley for their generous donations to the HAPS President’s Initiative.
Welcome to the
Tenth Season of HAPS Institute!

HAPS Institute is the branch of HAPS that offers online courses for graduate credit or professional development. Throughout the year, participants have the opportunity to explore a variety of concepts at a deeper level and in a variety of flexible formats tailored to the busy schedule of working A&P professors.

HAPS-I focuses on concepts that are hard to understand, hard to learn, and hard to teach. Our short courses include both subject-specific content as well as practical teaching and learning methodology.

Participants who successfully complete HAPS-I courses earn either graduate biology credit through Alverno College in Milwaukee, WI, or choose to earn professional development certificates.

This year we have two courses that take advantage of the face-to-face possibilities that the Annual Conference affords. This is in addition to the Anatomia Italiana travel course that we have been fortunate to offer for each of the past three years.

Summer Courses for 2016

Writing Case Studies for Teaching A&P: Pathophysiology and Physiology
(2 Credits) May 15 – July 24, 2016
Dr. Brian Shmaefsky
Lone Star College – Kingwood

This course will provide scientific and pedagogical background for faculty to design effective teaching case studies for allied health, anatomy and physiology, histology, molecular biology, and pathology courses. Students enrolled in the human sciences typically enter career fields that require the analytical interpretation of dynamic situations in clinical and research settings. Case studies are stories used as a teaching tool to show the application of a theory or concept to real situations. A particular case study is dependent on the goal it is meant to fulfill. Cases can be fact-driven and deductive where there is a correct answer or they can be context driven where multiple solutions are possible outcomes. A major advantage of teaching with case studies is that the students are actively engaged in figuring out the principles of A&P by extracting relevant content needed to resolve the case. In the most straightforward application, the presentation of the case study establishes a framework for student analysis. A case study provides enough information for the students to figure out solutions and then identify how to apply those solutions in other similar situations. Instructors may choose to use several cases so the students can identify both the similarity and differences among cases.

Teaching Central Nervous System Concepts Using Diagnostic Radiology and Case Studies
(2 credits) May 21 – July 8, 2016
Carmen Eilertson
Georgia State University

Students enrolled in college level Anatomy and Physiology Courses are required to learn brain and spinal cord anatomy and function. This course will help you develop cases incorporating radiology of the CNS into your teaching portfolio. Students find this method of teaching to be meaningful because they learn how to read radiograms and correlate their analysis with patient symptoms. It is a perfect way to integrate anatomy with physiology and teach valuable diagnostic skills at the same time. Most of your students will enter the health care field and will benefit from learning clinical problem solving skills early in their academic development. The cases developed as part of this course can be used as in class activities, enhancements to your current lecture PowerPoints, or as clicker quizzes or exam questions.

continued on next page
Why would you want to participate in HAPS-I courses?

Because you want to . . .

• Become a more effective teacher
• Brush up on a particular topic
• Get documented credit for your experience
• Gain access to expert faculty, presenters, and top-notch resources
• Strengthen your credentials in teaching A&P
• Improve chances for funding travel to a HAPS Conference
• Show students that you care about learning
• Learn new ways to teach the topics of A&P
• Enjoy the opportunity to contribute to a peer-reviewed publication

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

Great! 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@hapsconnect.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.”
JOIN US FOR THE
2K & 5K FUN RUN/WALK
TO SUPPORT THE HAPS FOUNDATION!

When: Monday, May 23, at 7 AM
Start and finish in front of the Hyatt Regency
$20 registration fee, $15 if you pre-registered
Prizes for best times and best spirit!

For further information and to register, stop by the HAPS Foundation table just outside the Exhibitor Hall.

RULES:
1. Register at the HAPS Foundation table for the 2K or 5K.
2. Show up outside the Hyatt Regency Atlanta Monday morning before 7:00 a.m.
3. Lap times will be recorded.
4. Finishers will be entered into a drawing for a grand prize. The prize will be distributed at the HAPS Membership Meeting at 9 AM (must be present to win).
5. Fun and exercise will be had by all!

Through its Foundation, HAPS awarded 13 grants and scholarships totaling $7585 to deserving HAPS members this year. These awards are funded primarily by member donations to the HAPS Foundation. Please visit the Foundation table in the Centennial Foyer to learn more about the eight categories of grants and scholarships we fund. You may qualify for one!

Please help us continue to support our colleagues by making a donation or pledge. No amount is too small (or too large)! You can donate today at the Foundation table or on the HAPS Foundation webpage at any time http://www.hapsweb.org/?page=HAPSFoundation
The Human Anatomy and Physiology Society and Thieme Publishers are excited to announce that Professor Mary Tracy-Bee is the winner of the 2016 HAPS-Thieme Excellence in Teaching Award.

The award was established in 2015 in a partnership between HAPS and Thieme. Both HAPS and Thieme are dedicated to supporting the best A&P teachers in the world, and established this award as a way of recognizing these amazing educators. Each year colleagues nominate each other for this award, and each year a committee of distinguished HAPS members go through the agonizing process of narrowing the field and choosing a winner.

The award includes funds to attend the HAPS Annual Conference in Atlanta, GA, May 21-25, 2016 as well as complimentary registration. In keeping with the philosophy of the HAPS Annual Conference, Mary will share her expertise by giving the HAPS-Thieme Excellence in Teaching Workshop.

The 2016 winner Mary Tracy-Bee is a Professor of Anatomy at University of Detroit Mercy where she has been teaching anatomy to graduate students as well as undergraduate biology students since 1999. She has also served as an adjunct professor at Oakland University and Wayne State University where she has taught medical students, other graduate health professional students and many undergraduate pre-professional students. Mary holds appointments at three hospitals where she reviews anatomy with residents from many programs including general surgery, orthopedic surgery, GI, ENT, OBGYN, OMM and neurology.

As might be expected, Mary has earned 24 other teaching and research awards including the Teaching Excellence Award from Oakland University and Educator of the Year from Wayne State University Physician Assistant Program.

Mary has published three anatomy texts and workbooks as well as e-books and many journal articles. Her research involves engaging students in interactive anatomy education and investigating age related changes in the morphology of the common carotid artery.

When not engaged in excellent teaching, Mary enjoys traveling, yoga, tennis, training for triathlons and spending time with her three children and extended family.

*Best Practices for Teaching Effectiveness, Student Inspiration and Classroom Joy!*

As experienced educators, we have learned first hand the importance of creating a teaching style that engages our students. Gone are the days of the classroom where facts were simply stated. Now is the time where we aim to inspire and teach critical thinking and compassion. Many of us accomplish this through service learning, peer-feedback, educational games and crafts, Thieme atlases, and discussing clinical vignettes. This presentation will focus on activities that help form inspired, smart students who want to be in our classroom. Come to hear about some tried-and-true activities and be prepared to share some of your own.
## Saturday, 21 May

*Hyatt Regency Atlanta*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>9:00 AM – 5:00 PM</td>
<td>Exhibitor Set up: Centennial I</td>
</tr>
<tr>
<td>9:00 AM – 12:00 PM</td>
<td>Board of Directors Meeting: Edgewood</td>
</tr>
<tr>
<td>9:00 AM – 12:00 PM</td>
<td>Steering Committee Meeting: Fairlie</td>
</tr>
<tr>
<td>12:00 PM – 1:30 PM</td>
<td>Board of Directors and Steering Committee Luncheon: Lenox</td>
</tr>
<tr>
<td>1:00 PM – 6:00 PM</td>
<td>Registration: Centennial Foyer</td>
</tr>
<tr>
<td>1:30 PM – 4:00 PM</td>
<td>Board of Directors and Steering Committee Meeting: Fairlie</td>
</tr>
<tr>
<td>4:00 PM – 5:30 PM</td>
<td>HAPSconnect Training: President’s Suite</td>
</tr>
<tr>
<td>6:45 PM – 8:30 PM</td>
<td>Registration: Regency V</td>
</tr>
<tr>
<td>7:00 PM – 9:00 PM</td>
<td>Welcome Reception: Regency V</td>
</tr>
</tbody>
</table>
Sunday, 22 May  
Hyatt Regency Atlanta

<table>
<thead>
<tr>
<th>Time</th>
<th>Event description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 AM – 5:00 PM</td>
<td>Registration: Centennial Foyer (closed from 12:00 PM – 1:00 PM)</td>
</tr>
</tbody>
</table>
| 7:30 AM – 8:30 AM | First-timers’ Breakfast: Regency V  
*Sponsored by ADInstruments and McGraw-Hill Education* |
| 7:30 AM – 8:30 AM | Second-timers’ Breakfast: Regency VI  
*Sponsored by Howard Hughes Medical Institute* |
| 7:30 AM – 8:30 AM | Continental Breakfast (for all other attendees): Centennial II                    |
| 7:30 AM – 6:00 PM | Exhibits: Centennial I  
(Exhibits are closed from 12:00 PM - 1:00 PM)                                    |
| 8:30 AM – 8:45 AM | Welcome and Opening Remarks: Centennial II                                       |
| 8:45 AM – 9:45 AM | Update Seminar I: Centennial II  
*Ann Zumwalt,* Boston University School of Medicine  
*Sponsored by the American Association of Anatomists*  
“Using Gaze Tracking to Document Learning” |
| 9:45 AM – 10:45 AM | Refreshment Break & Exhibits: Centennial I  
Poster Session 1: Centennial Foyer – presenters available to discuss their posters – Must remove posters by 12 PM |
| 10:45 AM – 11:45 AM | Update Seminar II: Centennial II  
*Lacy Alexander,* Penn State University  
*Sponsored by the American Physiological Society*  
“Human Skin as a Model Circulation for Examining Mechanisms of Microvascular Dysfunction” |
| 11:45 AM – 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: Centennial II  
*Young-Hui Chang,* Georgia Institute of Technology  
*“Walk This Way: How Humans and Other Animals Use Their Legs to Get From Here to There”* |
| 2:15 PM – 4:15 PM | Refreshment Break & Exhibits: Centennial I                                       |
| 2:15 PM – 3:15 PM | Poster Session 2: Centennial Foyer – presenters available to discuss their posters – Must remove by 5 PM |
| 3:15 PM – 4:00 PM | Synapse HAPS!: Centennial II                                                     |
| 4:15 PM – 5:15 PM | Update Seminar IV: Centennial II  
*Sarah Greene,* Morehouse School of Medicine  
*Sponsored by American Association of Clinical Anatomists*  
“Wrapping Our Brains Around the Brain: Teaching Three-Dimensional Neuroanatomy” |
<p>| 5:15 PM – 6:00 PM | Drinks with Exhibitors!: Centennial II                                        |
|               | Free Night!                                                                     |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:00 AM – 8:30 AM</td>
<td><strong>HAPS Foundation Walk-Run:</strong> Participants meet outside the Hyatt Regency Atlanta main entrance.</td>
</tr>
<tr>
<td>7:30 AM – 8:30 AM</td>
<td><strong>Continental Breakfast:</strong> Centennial I</td>
</tr>
<tr>
<td>7:30 AM – 5:00 PM</td>
<td><strong>Exhibits:</strong> Centennial I (Exhibits are closed from 12:00 PM – 1:00 PM)</td>
</tr>
<tr>
<td>8:00 AM – 5:00 PM</td>
<td><strong>Registration:</strong> Centennial Foyer (Closed from 12:00 PM – 1:00 PM)</td>
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<tr>
<td>8:30 AM – 9:45 AM</td>
<td><strong>HAPS Annual General Membership Meeting:</strong> Centennial II</td>
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<tr>
<td>9:45 AM – 10:45 AM</td>
<td><strong>Refreshment Break &amp; Exhibits:</strong> Centennial I</td>
</tr>
<tr>
<td>10:45 AM – 11:45 AM</td>
<td><strong>Update Seminar V:</strong> Centennial II</td>
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<tr>
<td></td>
<td><strong>Darin Carroll, Center for Disease Control</strong></td>
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<tr>
<td></td>
<td><strong>Sponsored by American Society for Microbiology</strong></td>
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<td></td>
<td>“Sometimes There are Zebras: Challenges in the Investigation of Emerging Zoonotic Diseases”</td>
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<tr>
<td>11:45 AM – 1:30 PM</td>
<td><strong>Lunch on your own</strong></td>
</tr>
<tr>
<td>1:00 PM – 1:30 PM</td>
<td><strong>HAPS Cadaver Use Committee Meeting:</strong> Kennesaw Room</td>
</tr>
<tr>
<td>1:30 PM – 2:30 PM</td>
<td><strong>Update Seminar VI:</strong> Centennial II</td>
</tr>
<tr>
<td></td>
<td><strong>Charlie Benson, Georgia State University</strong></td>
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<td></td>
<td><strong>Susanna Greer, American Cancer Society</strong></td>
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<tr>
<td></td>
<td>“Cancer Immunotherapy: From Bench to Bedside”</td>
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<tr>
<td>2:30 PM – 4:00 PM</td>
<td><strong>Refreshment Break &amp; Exhibits:</strong> Centennial I</td>
</tr>
<tr>
<td>2:45 PM – 3:45 PM</td>
<td><strong>Update Seminar VII:</strong> Centennial II</td>
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<td></td>
<td><strong>James Ross, Axion Biosystems</strong></td>
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<tr>
<td></td>
<td>“Unlocking the Body’s Electrical Secrets: Exploring Complex Heart and Brain Physiology in the Culture Dish”</td>
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<tr>
<td>4:00 PM – 5:00 PM</td>
<td><strong>Exhibits and door prizes:</strong> Centennial II</td>
</tr>
<tr>
<td>6:00 PM – 9:00 PM</td>
<td><strong>HAPS Social (for all participants): Regency V</strong></td>
</tr>
</tbody>
</table>
**Tuesday, 24 May**  
*Georgia Institute of Technology*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>7:00 AM – 9:00 AM</td>
<td>Transportation to Georgia Institute of Technology</td>
</tr>
<tr>
<td>8:15 AM – 8:45 AM</td>
<td>Welcome Breakfast</td>
</tr>
<tr>
<td>9:00 AM – 12:15 PM</td>
<td>Workshops</td>
</tr>
<tr>
<td></td>
<td>Session 1: 9:00 – 10:30 AM (90 minutes)</td>
</tr>
<tr>
<td></td>
<td>Session 2: 10:45 AM – 12:15 PM (90 minutes)</td>
</tr>
<tr>
<td>12:15 PM – 1:45 PM</td>
<td>Lunch (box lunches are provided)</td>
</tr>
<tr>
<td></td>
<td>Sponsored by Pearson</td>
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<tr>
<td></td>
<td>Committee Meetings – 12:45 – 1:30 PM</td>
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<tr>
<td></td>
<td>• Animal Use Committee – IC 103</td>
</tr>
<tr>
<td></td>
<td>• Communication Committee – IC 105</td>
</tr>
<tr>
<td></td>
<td>• Conference Committee – IC 107</td>
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<tr>
<td></td>
<td>• Curriculum &amp; Instruction Committee – IC 109</td>
</tr>
<tr>
<td></td>
<td>• Foundation Committee – IC 111</td>
</tr>
<tr>
<td>1:45 PM – 4:00 PM</td>
<td>Workshops</td>
</tr>
<tr>
<td></td>
<td>Session 3: 1:45 – 2:45 PM (60 minutes)</td>
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<tr>
<td></td>
<td>Session 4: 3:00 – 4:00 PM (60 minutes)</td>
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<tr>
<td>4:00 PM</td>
<td>Bus transportation back to hotel</td>
</tr>
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</table>

**Wednesday, 25 May**  
*Georgia Institute of Technology*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>7:00 AM – 9:00 AM</td>
<td>Transportation to Georgia Institute of Technology</td>
</tr>
<tr>
<td>8:00 AM – 8:30 AM</td>
<td>Breakfast</td>
</tr>
<tr>
<td>8:30 AM – 12:00 PM</td>
<td>Workshops</td>
</tr>
<tr>
<td></td>
<td>Session 5: 8:30 – 9:30 AM (60 minutes)</td>
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<tr>
<td></td>
<td>Session 6: 9:45 – 10:45 AM (60 minutes)</td>
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<tr>
<td></td>
<td>Session 7: 11:00 AM – 12:00 PM (60 minutes)</td>
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<tr>
<td>12:00 PM – 1:00 PM</td>
<td>Lunch (box lunches are provided)</td>
</tr>
<tr>
<td>1:00 PM – 2:00 PM</td>
<td>Workshops</td>
</tr>
<tr>
<td></td>
<td>Session 8: 1:00 – 2:00 PM (60 minutes)</td>
</tr>
<tr>
<td>2:00 PM</td>
<td>Bus transportation back to hotel</td>
</tr>
</tbody>
</table>
Hotel Layout

An interactive version of this map is available in the HAPS 2016 App.
Imagine a limitless virtual anatomy experience where every student interacts with real patient data. BodyViz 3D visualizations of MRI/CT data provides students a detailed look inside the human body and gives customers the power to design unique classrooms, labs, lecture halls, and collaborative spaces.

How will you use the world’s most scalable 3D MRI/CT anatomy visualization tool?

Anatomy education should be by nature interactive...Give it life.
Using Gaze Tracking to Document Learning

Abstract: Anatomy learning is typically documented through assessments such as written or practical examinations. These types of assessments are inherently biased toward the examination-writer’s perspective of topic relevance. However, numerous studies on learners in a wide variety of fields have established that the gaze patterns of experts are different (more efficient and focused) than are those of less experienced observers. The studies presented in this session explore whether gaze tracking can be used to objectively document students’ learning trajectories when learning anatomy, a highly visual field. The results of the studies provide insight into the pattern with which students visually interact with anatomical images before, immediately after, and many months after an intensive medical gross anatomy course.

BIO: Dr. Ann Zumwalt is an Associate Professor of Anatomy and Neurobiology at Boston University School of Medicine. She runs the medical Gross Anatomy course for that school and is actively involved in teaching clinical anatomy topics in the BUSM clerkship rotations. Her research focuses on investigating and measuring changes in perception as individuals transition from naive learners to more experienced to experts. She is interested whether it is possible to non-invasively but objectively document changes in learner perception during the learning process.
Human Skin as a Model Circulation for Examining Mechanisms of Microvascular Dysfunction

Abstract: This session will explore the human cutaneous circulation as a model for examining mechanisms that underly microvascular dysfunction in humans with aging and common diseases that accompany aging. Experimental techniques including the use of thermal and pharmacological stimuli, combine with traditional biochemical approaches will be presented. Novel gasotransmitter based signaling and intervention strategies that improve vascular health will also be discussed.

BIO: Dr. Alexander is an Associate Professor of Kinesiology at Penn State University. She is an expert in the neurovascular control mechanisms regulating skin blood flow and mechanisms underlying microvascular dysfunction in human aging, essential hypertension, and atherosclerotic vascular disease. Dr. Alexander uses in vivo and in vitro approaches to study the effects of vascular pathology on microvascular functions in humans. She has contributed substantially to the literature in this area with publications in the Journal of Physiology, The American Journal of Physiology, The Journal of Applied Physiology, and Hypertension. She has received merit based awards from both the American Physiology Society and the American College of Sports Medicine for her work in microvascular control and integrative physiology including the Exercise and Environmental Physiology Section New Investigator Award in 2011. Dr. Alexander has maintained a continuous record of extramural funding with grants from the National Institutes of Health (NIH), the National Dairy Management Council, and other industry sponsors. Her current NIH grant (R01 HL093238-06-10) focuses on the role of hydrogen sulfide as a gasotransmitter in the microcirculation of humans with essential hypertension.

Notes:
Update Seminar III: Centennial II

Sunday, May 22nd from 1:15 PM – 2:15 PM

Young-Hui Chang
Associate Professor
Georgia Institute of Technology
Atlanta, Georgia
yh.chang@ap.gatech.edu

Walk This Way: How Humans and Other Animals Use Their Legs to Get From Here to There

Abstract: We all know how to walk, but do we know how we walk? The ability to walk and run (i.e., legged locomotion) is such a fundamental human behavior, that it often surprises people how little we, as scientists, understand it. On the one hand, walking is so simple that a toddler can master much of the behavior by 2 years of age. Yet, the best walking robots today are still a far cry from the abilities of their human counterparts. Our lack of understanding becomes painfully clear when the body breaks down through disease or injury and we are faced with the daunting task of rehabilitation to relearn this fundamental human activity. As is often the case in science, inspiration and understanding legged locomotion often comes from unexpected sources. What can penguin waddling or gibbon brachiation tell us about human walking? In addition to clinically driven studies on humans, much of what we know about legged locomotion comes from curiosity-driven, basic research of animal locomotion and lessons learned from accompanying engineering studies to develop legged walking machines. In this presentation, Young-Hui Chang, Associate Professor of Applied Physiology at Georgia Tech, will discuss the science of ‘how we get from here to there’. He will give particular attention to the benefits of a comparative approach for understanding general physiological principles across species while using interdisciplinary methods from anatomy, physiology and engineering.

BIO: Young-Hui Chang studied mechanical and aerospace engineering as an undergraduate at Cornell University. He stayed at Cornell to do a Master of Science degree in animal physiology within the Department of Anatomy in the College of Veterinary Medicine. There he studied the comparative biomechanics of brachiating gibbons, jumping vampire bats, and running horses. He also participated in developing physiology laboratory exercises for high school students through the Cornell Institute for Biology Teachers. He then completed his doctorate in the Department of Integrative Biology at the University of California, Berkeley researching the biomechanics of human running under unusual circumstances such as microgravity. As a graduate teaching assistant at Berkeley, Young-Hui taught introductory biology, biomechanics, and was the head teaching instructor for the vertebrate physiology labs. Embracing the comparative approach, over the past 22 years, Young-Hui has studied the locomotion of a variety of other animals including elephants, rats, cats, flamingos, and penguins. Today, Young-Hui is an Associate Professor in the School of Applied Physiology at the Georgia Institute of Technology and teaches clinical gait analysis in the Prosthetics and Orthotics program. He directs the Comparative Neuromechanics Lab and has a broad interest in understanding the neural and biomechanical control of legged locomotion in humans and other animals.
Update Seminar IV: Centennial II

Sunday, May 22nd from 4:15 PM – 5:15 PM

**Sarah Greene**

*Sponsored by American Association of Clinical Anatomists*

Assistant Professor
Morehouse School of Medicine
Atlanta, Georgia
sgreene@msm.edu

*Wrapping Our Brains Around the Brain: Teaching Three-Dimensional Neuroanatomy*

Abstract: The brain is a complex organ that requires 3-dimensional (3D) understanding to interpret its structure and function. However, some of the most frequently utilized methods for studying the brain in clinical and research settings, such as MRI and CT, rely on 2-dimensional (2D) images. The ability to transition from 3D anatomical relations to 2D images presents unique challenges, especially for novice students enrolled in neuroanatomy and neuroscience courses. Some students might default to lengthy memorization techniques to demonstrate their knowledge of coronal, sagittal, and axial planes of view, rather than acquiring an in depth understanding of anatomical relationships and how one should expect to identify and recognize structures within different sections of the brain. There are many techniques available to assist with this, such as laboratory models or computer tools. Some tools created for research purposes may also be useful in educational settings. The effectiveness of utilizing two freely available, open source research software tools for teaching 3D neuroanatomy will be discussed.

BIO: As an undergraduate student, Dr. Greene studied health science at Johnson State College (Johnson, VT) and medical biology at the University of New England (Biddeford, ME). During this time, she developed strong interests in both teaching in the anatomical sciences and research in Alzheimer’s disease. She went on to earn her Ph.D. in the Department of Anatomy and Neurobiology at Boston University School of Medicine (BUSM). Her research at BUSM focused on studying neuroimaging and neuropsychological biomarkers for Alzheimer’s disease. She also participated in the Vesalius Program, where she received training to become an educator in the biomedical sciences.

Dr. Greene began her academic career as a lecturer and laboratory instructor in Gross Anatomy in the Department of Cell Biology at the University Of Massachusetts Medical School, and then went on to become an assistant professor in the Department of Neurological Sciences at the University of Vermont, where she also directed the Anatomical Gift Program. Dr. Greene is currently an Assistant Professor in the Department of Pathology and Anatomy at the Morehouse School of Medicine in Atlanta.

Throughout her career, Dr. Greene has been dedicated to education and educational research in the anatomical sciences, which has included developing methods for making the most complex material easier to understand. One such project has been to bring the computer programs she utilized in her Alzheimer’s disease research from the bench to the classroom to teach three-dimensional neuroanatomy.
Sometimes There are Zebras: Challenges in the Investigation of Emerging Zoonotic Diseases

Abstract: I will talk about the emerging and re-emerging pathogens and the challenges of zoonotic disease outbreak investigations including both work in the field as well as the preparation and protocols for deployment to work in resource limited situations.

BIO: I am currently the Director of the Environmental Safety and Health Compliance Office within the Office of Safety Security and Asset Management at the CDC. I am also the Chair of the CDC Atlanta Institutional Animal Care and Use Committee. I have 14 years of experience in organizing (scientific oversight, planning, and logistics) and participating in domestic and international expedition (outbreak) field and laboratory operations involving investigations of emerging viral zoonotic diseases including: Ebola virus, Machupo virus ( Arenavirus, Bolivan hemorrhagic fever), Nipah virus, White water arroyo virus ( Arenavirus), Sin Nombre Hantavirus, Monongahela hantavirus, Rio Mamore hantavirus, Laguna Negra hantavirus, Lyssaviruses, Monkeypox, Tanapox, and SARS associated Coronavirus. I have extensive experience working on and coordinating domestic and international outbreaks of several emerging diseases including one or multiple field outbreak investigations in: Bangladesh, Gabon, Ghana, Republic of Congo, Democratic Republic of Congo, Kenya, Bolivia, Peru, Honduras, Mexico, and the Republic of Georgia. I have experience working on both in vitro and in vivo studies in Biological Safety Levels 1-4 including the planning, oversight, and participation in lab animal studies and drug and vaccine trials for novel prophylaxis and treatment development and currently oversee training of program staff of biosafety procedures relevant to high containment work. I have authored and co-authored more than 70 publications in scientific journals and texts dealing with topics ranging from ecology and evolutionary biology for vertebrates, to the virulence, emergence, and transmission of viral zoonotic diseases, and the development of safety protocols.
Update Seminar VI: Centennial II
Monday, May 23rd from 1:30 PM – 2:30 PM

Charlie Garnett-Benson

Assistant Professor, Department of Biology
Georgia State University
Atlanta, Georgia
cgarnettbenson@gsu.edu

Cancer Immunotherapy: From Bench to Bedside

Abstract: Cancer Immunotherapy uses the natural ability of the immune system to recognize and eliminate cancerous and abnormal cells. This approach was rated as the Scientific Breakthrough of the Year by Science magazine in 2013. Currently, it has been identified as one of the areas of focus for investment through the new National Cancer Moonshot initiative led by Vice-President Biden (https://www.whitehouse.gov/the-press-office/2016/02/01/fact-sheet-investing-national-cancer-moonshot). During this session, Charlie Garnett-Benson will talk about the main players of the immune system that are responsible for the control and elimination of cancer cells. Susanna F. Greer will talk about some of the exciting cancer immunotherapy projects funded by the American Cancer Society (ACS) and why the ACS views cancer immunotherapy as a critical area of research investment.

BIO: Charlie Garnett-Benson received her Ph.D. in Immunology & Molecular Pathogenesis at Emory University, where her research concentrated on the molecular dynamics of adenovirus persistence/latency in naturally infected human lymphocytes. She completed a postdoctoral fellowship in the Laboratory of Tumor Immunology and Biology (LTIB) at the National Institutes of Health. During that time she was the recipient of Cancer Research Training Award Fellowship from the National Cancer Institute for her work investigating the integration of recombinant tumor vaccines with other therapeutic modalities, such as radiation, chemotherapy, cytokines and Toll-like receptor agonists as a novel approach to cancer immunotherapy. Charlie obtained a tenure-track faculty position at Georgia State University in June 2010 where her research group focuses on defining the mechanisms of enhanced immune attack against sub-lethally irradiated carcinoma cells. The impact of irradiated tumor cells on cytotoxic T cell function and T REG cell activity is under investigation. Furthermore, her research explores the potential use of sub-lethal doses of radiation to specifically enhance immunotherapy strategies and will extend the use of radiation in new directions. These mechanisms will be particularly important against tumor cells that have become radio-resistant, as well as when radiation dose is limited by toxicity.

Notes:
Update Seminar VI: Centennial II
Monday, May 23rd from 1:30 PM – 2:30 PM

Susanna Greer

Director, Clinical Research and Immunology
American Cancer Society
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Cancer Immunotherapy: From Bench to Bedside

Abstract: Cancer Immunotherapy uses the natural ability of the immune system to recognize and eliminate cancerous and abnormal cells. This approach was rated as the Scientific Breakthrough of the Year by Science magazine in 2013. Currently, it has been identified as one of the areas of focus for investment through the new National Cancer Moonshot initiative led by Vice-President Biden (https://www.whitehouse.gov/the-press-office/2016/02/01/fact-sheet-investing-national-cancer-moonshot). During this session, Charlie Garnett-Benson will talk about the main players of the immune system that are responsible for the control and elimination of cancer cells. Susanna F. Greer will talk about some of the exciting cancer immunotherapy projects funded by the American Cancer Society (ACS) and why the ACS views cancer immunotherapy as a critical area of research investment.

BIO: Susanna F. Greer, Ph.D., is the National Director of the Clinical Cancer Research, Nutrition and Immunology Program at the American Cancer Society. Previously, Dr. Greer was a tenured Associate Professor of Immunology at Georgia State University (GSU) where she was Director of the Interdisciplinary Molecular Basis Area of Focus and a Georgia Cancer Coalition Distinguished Cancer Scholar. Dr. Greer’s research at GSU focused on epigenetic mechanisms which allow tumor cells to avoid detection by the immune system, enabling cancer growth and metastasis. Dr. Greer completed her doctorate in Immunology at the University of Alabama at Birmingham and her postdoctoral studies at the University of North Carolina at Chapel Hill. Dr. Greer is also President of Greer Consulting, Science Speak Easy, where she serves as a professional science communicator. Through her consulting firm, Dr. Greer helps facilitate communication between scientists and lay audiences based on identification of shared goals, benefit analysis, and non-technical delivery.

NOTES:
Update Seminar VII: Centennial II

Monday, May 23rd from 2:45 PM – 3:45 PM

James Ross

Chief Technology Officer
Axion Biosystems
Atlanta, Georgia
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Unlocking the Body’s Electrical Secrets:
Exploring Complex Heart and Brain Physiology in the Culture Dish

Abstract: Patient-specific adult stem cell technology is changing the way we assess physiology, allowing scientists and physicians to capture complex human systems on the benchtop. Increasingly, any cell type can be made to order, facilitating the re-creation of functional disease symptoms in a culture dish (e.g., the synchronous neural activity of epilepsy or the prolonged repolarization of Long-WT syndrome). This talk will present the opportunities and challenges of this powerful new cell technology, which is rapidly changing the scientific, medical, and regulatory landscape.

BIO: Jim Ross is the Chief Technology Officer (CTO) and co-founder of Axion Biosystems, maker of neural interfacing technology that monitors and controls electrically active cells. Jim leads cross-disciplinary projects that combine electronics with biology to develop simple-to-use tools for life science instrumentation, medical diagnostics, and bioelectronics medicines. Dr. Ross received a Bachelor of Science degree in Electrical Engineering from Louisiana State University and a Doctorate in Biomedical Engineering from Georgia Tech.

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Poster Presentation Abstracts

Poster Session 1 – Centennial Foyer, Sunday, May 22 (set up by 8:30 AM; present 9:45 AM – 10:45 AM; breakdown by 12 PM)

Poster 101
Lakshmi Atchison, Chestnut Hill College, latchiso@chc.edu
*Sponsored by MaLa Scientific*
Human Skin Model: Think Inside the Box! A Novel Educational Model to Grasp the Complexity of Skin and its Components
Students fail to grasp the complexity of skin and believe it is only two or three layers thick rather than the actual forty layers. Our model addresses this shortcoming by using a plastic box and precut papers representing various skin layers. Cell types of skin are drawn to represent specific strata. Hairs through sweat pores are represented by camel hairs, and blood capillaries and subcutaneous fat by color quilts or cotton balls. The model teaches the (1) complexity of skin structure, (2) identification of various skin layers, (3) location of proteins and pigments, and (4) physiology of our integumentary system.

Poster 102
J. Bradley Barger, Indiana University, Jbbarger@indiana.edu
Co-Presenter: Barbie Klein, Indiana University, barbklei@umail.iu.edu
Prosections in a Medical Gross Anatomy Laboratory Course
With changes in anatomy curricula, shortening laboratory hours, and an emphasis on integration with other courses, instructor-produced prosections can be a valuable tool for maximizing laboratory effectiveness. We were able to introduce prosections into a lab with limited space, time, and access to cadavers. Benefits of this new plan have been seen in instructor preparation for teaching, student communication, and student dissection skills.

Poster 103
Scott T Barton, University of California San Diego School of Medicine, stbarton@ucsd.edu
Co-Presenters: Mary Tracy-Bee, University of Detroit Mercy, tracyma@udmercy.edu, Noor Hamka, University of Detroit Mercy, Jordan Zurke, University of Detroit Mercy
Multi-campus, Multi-year Investigation of Common Carotid Artery Morphology
The common carotid artery is an important vessel carrying blood from the thorax to vital head and neck structures. In addition, its diameter is known to be related to vascular pathologies. Our study investigated the relationship of the size of the common carotid artery versus age of death. A significant and positive correlation was identified bilaterally in the diameter of the common carotid arteries in relationship to age of death in human cadavers ranging from 24 to 101 years old (p=0.02). Related research has found that the diameter of the common carotid artery has been associated with the occurrence and severity of strokes. This may provide insight into circulatory-related procedures in the cervical region or may be indicative of a related genetic predisposition to a higher vascular flow.

Poster 104
Christopher Brandon, Georgia Gwinnett College, cbrandon@ggc.edu
Co-Presenter: Bagie George, Georgia Gwinnett College, bgeorge@ggc.edu
Peer Instruction as a Teaching Tool: A Research-Based Approach to Pedagogy in Human Anatomy & Physiology
Peer instruction is an evidenced-based, interactive teaching method that can be used in a variety of disciplines. It is a student-centered approach that involves eliminating the standard lecture-based pedagogy and focuses on the actual application of the learning process through peer instruction into the classroom. In this pilot study we have incorporated peer instruction in our Anatomy & Physiology II classes and compared this with normative classroom pedagogy with overall classroom GPA as an indicator of success. Here we show that overall grade point averages from two different A&P II classes improved 17.5% and 15.4%, respectively in one subject area.
Effects of Aqueous Root Extract of Daucus Carota (Carrot) On Lead-Nitrate Induced Damage on the Hippocampus of Wistar Rats

Lead is a naturally occurring metal in the earth's crust which could cause environmental pollution and a metabolic poison, having much toxic effects on the living. Caucus Carota root is common commodity use for nutritional supplement and traditional medicine. The purpose of this research was to evaluate the possible effects that Ducus Carota could have on lead induced hippocampal damage. Eight Wıstar rats were used for this study and divided into four groups of two Wistar rats per group. Group I was the control that received distilled water only; group II received 240mg/kg of lead nitrate; group III received 240mg/kg of lead nitrate plus 800mg/kg of Daucus Carota extract and group IV received 240mg of lead nitrate plus 30mg/kg of succımer for duration of two weeks. Our histological results suggested that Daucus Carota extract had protective effects on lead induced damage on the hippocampus, which was similar to that seen on the standards drug, succımer. Based on our observations, we concluded that Daucus Carota extract had protective effects on the hippocampus of Wistar rats and hence could be employed in the management of lead poisoning.

Efficient Online Assignment Approach for Large Classes Engages Students, Promotes Deeper Understanding of Physiology, Develops Presentation Skills, and Supports Instantaneous Provision of Feedback

Students welcome opportunities to demonstrate their creativity and higher learning skills through assignment completion for credit. Challenges facing instructors of large classes include the time required to assess submissions and provide individualized feedback. In this project, 300 students (randomly assigned to one of five timely questions pertaining to the cardiovascular system) each submitted a PowerPoint presentation (10 slides maximum) via the Assignment function of Blackboard Learn. A comment box provided space for typed provision of slide-specific feedback (strengths/weaknesses), following which a single mouse click instantly sent the grade plus feedback directly to the student while placing the score in Gradebook.

Correlation of Active Learning Activities to Participation and Concept Retention

Students often struggle to retain key physiology concepts when these topics are presented solely in a traditional lecture format. We incorporated two types of active learning activities into a lecture based human physiology course: low level recall questions using clicker technology embedded within lectures and full day class sessions using activities with questions progressing from low to high level. Participation in activities was encouraged by offering bonus points for full participation throughout the semester. We measured participation in each activity and found that a high percentage (82-94%) of students were engaging in the activities. Exam questions were designed to specifically test concepts reinforced by each type of activity and correlation between participation in active learning activities and concept retention was assessed. On the first exam, the proportion of non-participating students who answered exam questions correctly was significantly higher than the proportion of participating students. Given the high percentage of participation, this suggests self-selection of students who believe they understand the concepts not participating in the activities. We will investigate if this difference in persists for the remaining three exams in the course.

The Pedagogical Value of Mobile Devices and Content-Specific Application Software in the A&P Lab

We assessed the pedagogical value of using mobile devices and content-specific application software to stimulate active learning and retention of course content in the Anatomy and Physiology laboratory. Four topics were examined: Tissues, Skeletal System, Muscle System, and Heart. Students in the “experimental” lab sections used mobile devices and apps, whereas students in the “control” lab sections used the assigned “traditional” lab manual as the major learning resource. Data generated via quizzes and tests, as well as by self-assessment questionnaires, provided information about the pedagogical effectiveness of mobile devices in the laboratory.
**Poster 109**
Ron Gerrits, Milwaukee School of Engineering, gerrits@msoe.edu

**The HAPS Committees: What Do They Do & How Do I Get Involved?**
HAPS has a number of committees that serve to benefit the organization and its members. Many of the committees offer opportunities for members to become involved in projects that benefit A&P instructors at all levels. This poster reviews some of the committees, their main goals and current project. It also provides information on how you can get involved. Even more information can be found in the conference program as well as online. The HAPS committees are a great place to learn more about the Society, develop your own skills as a professional, and help others to grow as instructors. Join us now.

**Poster 110**
Kerry Hull, Bishop’s University, khull@ubishops.ca
Co-Presenter: Jon Jackson, Institute for Philosophy in Public Life, jcksn@mac.com

**The HAPS Retention / Pre-Requisite Survey**
Each fall, over 500,000 undergraduates take A&P courses; HAPS members teach a significant percentage of these students. Despite understanding things like compensated renal acidosis, we don’t have a holistic grasp of success rates in A&P classes. Nor do we have data to determine whether or not pre-requisite requirements positively impact student success. So, on behalf of HAPS, we’ve created a survey where you’re asked to report your student outcomes in A&P. This survey hopes to inform us on national norms for success rates, and provide data that may help direct policy or curricular decisions for allied health education.

**Poster 111**
Kerry Hull, Bishop’s University, kerry.hull@ubishops.ca
Co-Presenters: Zoe Soon, University of British Columbia Okanagan, zoeanne.soon@ubc.ca, Rachel Hopp, Ph.D., Bellarmine University, and The Members of the HAPS Educator Committee

**The HAPS Educator Journal: Your Resource for Innovative Teaching Techniques and Current Topics of Interest**
The HAPS-Educator, the peer-reviewed, academic journal of HAPS fosters teaching excellence and pedagogical research in anatomy and physiology education. The HAPS Educator publishes three times annually. Articles include topic updates, educational research, and perspectives on teaching. The Educator promotes professional development and encourages collaborations between HAPS members. This poster illustrates how to select the best publication vehicle (Educator, Blog, or Edu-Snippet) and outlines the Educator’s submission and peer review processes. It also highlights the benefits of volunteering for the HAPS Educator committee, which serves as the journal’s editorial board. Visit the HAPS Educator website for additional information, at [http://www.hapsweb.org/?page=hapsed_home](http://www.hapsweb.org/?page=hapsed_home)

**Poster 112**
Augusthy Kulakkattolickal, Harold Washington College, augusthyk@gmail.com

**Complications of Undetected Adrenal Insufficiency in a Newborn child**
My daughter Sarah who was born in 2007 needed oxygen at birth and was discharged on the 3rd day. She became fatigued and hypoglycemic in 13 days and was admitted to the emergency. Tests revealed that she had adrenal insufficiency. She came out of the coma with major health setbacks such as brain damage, developmental delays, seizures, cortical blindness and the overarching adrenal problem. Today, she is wheel-chair bound and is fed through a G-Tube. Because she never walked, the head of her femur and the acetabulum never developed well. She has undergone a major hip surgery and is recovering.

**Poster 113**
Alicja K. Lanfear, Middle Tennessee State University, alicja.lanfear@mtsu.edu
Co-Presenters: Angelique M. Troelstrup, Middle Tennessee State University, Angelique.Troelstrup@mtsu.edu, Cindi Smith-Walters, Middle Tennessee State University, Cindi.Smith-Walters@mtsu.edu

**Modified Think-Pair-Share as a Strategy to lower D-F-W Rates in Undergraduate A&P Lecture**
This poster describes the use of several active learning techniques in Anatomy and Physiology I lecture sections in order to lower D-F-W rates. When questioned students indicated they were very satisfied or satisfied regarding the usefulness, engagement, and timing of the strategy. Student responses coupled with an eight percent decrease in the D-F-W rate suggests that this is an effective, easily implemented modification to current instruction.
Poster 114
Mackenzie Loyet, Midwestern University, mloyet@midwestern.edu
Student Attitudes Toward Dissection and the Prevalence of Cadaver Naming in First Year Medical and Dental Students
Studies have shown that cadaver naming is a common coping mechanism used by medical students (William et al, 2015). The goal of this study was to explore and compare the prevalence of cadaver naming among first year medical (n=84) and first year dental students taking Gross Anatomy. Survey results show 70.2% of medical students chose to name their cadavers, while 66.7% would have liked to have known their cadaver’s real first name. Additionally, dissection labs involving the hands and face were considered the most difficult to complete. This project will compare both medical and dental student perceptions of dissection labs.

Poster 115
Raj Narnaware, MacEwan University, NarnawareY@macewan.ca
Co-Presenters: Meagan LaRiviere, MacEwan University, Meagan.lariviere@macewan.ca, Chun Yan Zhang
*Sponsored by Anatomage*
Three Dimensional (3D) Virtual Human Cadaver, Anatomage: An Effective Teaching Tool for Human Anatomy
In an attempt to explore the innovative ways to introduce the knowledge of the human body in terms of its structures and functions, we have first time introduced three dimensional (3D) virtual human cadaver, Anatomage in our human anatomy classes, and discuss whether the use of Anatomage enhances the understanding/knowledge of the human body as determined by their class average with or without using anatomage. We have observed that the use of Anatomage in their teaching significantly increase their class average. Moreover, we also discuss the limitations and advantages of Anatomage as an effective teaching tool to teach human anatomy.

Poster 116
Eteudo Albert Nkereuwem, Ebonyi State University, eteudoan@yahoo.com
Co-Presenter: Umezuruike Benjamin, Ebonyi State University, umez@yahoo.com
The Sonographic Measurement of Renal Dimensions and its Correlation with Anthropometric Variables in Apparently Healthy Adults in Abakaliki
A prospective observational study was conducted in Ebonyi State University Abakaliki. Renal dimensions were sonographically measured in (640) males and 520 females), between 18 and 36 years of age. The anthropometric variables that included age, weight and height, were measured with body mass index (BMI) calculated. The means right kidney length and left kidney length were 10.4 + 0.7 cm and 10.9 + 0.7 cm respectively. Right kidney width and left kidney width were 4.4 + 0.4 cm and 4.7 + 0.3 cm respectively. It also observed that mean age of 21.8 ± 2.6 years, mean height of 169.2 ± 8.5, mean weight of 62.1 ± 10.2 kg, the means body mass index (BMI) of 21.7 ± 3.4 kg/m². It was generally observed that there was a significant difference between the right and left kidney dimensions. The left kidney was longer and wider than the right kidney. There was a significant positive correlation between height and weight. There was also a significant positive correlation between age, body mass index (BMI) and renal dimensions, but with the exception of left kidney width where there was no correlation. The left kidney significantly longer and wider than the right kidney, and the kidneys in males longer and wider than the kidneys in females. There was a significant positive correlation between renal dimensions and anthropometric variables, but with the exception of age and body mass index (BMI), that have no correlation with the left kidney width.

Poster 117
Kenan Öztürk, Suleyman Demirel University, kenanozt@hotmail.com
Co-Presenters: Ozan Turamanlar, Afyon Kocatepe University, ozanturamanlar@hotmail.com, Erdal Horata, Afyon Kocatepe University, erdalhorata@hotmail.com, Mehtap Beker Acay, Afyon Kocatepe University
Morphometric Assessment of Sella Turcica Through CT Scan in Turkish Population
It is important to know the size of sella turcica both in normal population and in varying sizes according to decades in order to interpret the size of pathologic sella turcica. Our aim was to assess the morphometry of sella turcica in our population and to compare with the literature. 101 cases were included in the study. The length, width, heights, area, depth and antero-posterior diameter of sella turcica were measured. In conclusion, no significant difference was determined in terms of decades. We believe that our study will contribute to the clinical evaluation. Keywords: Sella turcica, CT, Morphometr.
Poster 118
Kenan Öztürk, Suleyman Demirel University, kenanozt@hotmail.com
Co-Presenters: Yücel Gönül, Afyon Kocatepe University, yucel94@hotmail.com, Serdar Oruç, Afyon Kocatepe University, serdaroruc1974@yahoo.com.tr, Mehtap Beker Acay, Afyon Kocatepe University, mehtapacay@gmail.com, Önder Cartıllı, Afyon Kocatepe University, dr.onderc@hotmail.com

A Fenestration of Posterior Cerebral Artery: Case Report
A 62-year-old male patient with dizziness imbalance with blackened eyes and walking stumble complaints departing for a week, was admitted to the Neurology Department of Afyon Kocatepe University Faculty of Medicine. There was no feature of medical and family history. Laboratory tests were normal. Fenestration was detected on the P1 segment of the left posterior cerebral artery (PCA) by cranial computed-tomography angiography (CTA). Fenestration of PCA may cause several clinical disorders such as visual field defects, reduced pain-touch sensation, deep sensation disorder, alexia, Gerstmann’s syndrome, memory impairment, agitation and delirium. We think that detection of PCA fenestration is very important. Keywords: Fenestration, PCA, CTA.

Poster 119
John Robertson, Westminster College, robertjc@westminster.edu

Introducing Concepts of Health-Care Professionalism in an A&P Class
In health care, professionalism describes knowledge and technical skill, but also encompasses values and behaviors relating to altruism, integrity, compassion, collaboration and respect for others. Professionalism is increasingly cited as an important attribute in the selection, training and effectiveness of clinicians. Traditional A&P course content offers limited opportunity to address many dimensions of professionalism. This poster describes activities introducing ethical, interpersonal and social aspects of health care professionalism into an A&P class. Individual and group case study analysis, development of personal statements, peer review, and film analysis and discussion are described and student evaluation of the activities are presented.

Poster 120
Nicole Sacdalan, Southern Adventist University, nicolesacdalan@southern.edu
Co-Presenters: Rick Norskov, Southern Adventist University, wnorskov@southern.edu, Aaron Corbit, Southern Adventist University, acorbit@southern.edu

PASS: Peer Assisted Study Sessions for Anatomy and Physiology I
Science introductory courses often contain difficult material and are presented to incoming freshmen. Because of these circumstances, high DWF (drop, withdrawal, fail) rates are associated with these classes. PASS (Peer Assisted Study Sessions) is a program implemented in these classes in efforts to lower the DWF rates. In PASS sessions, a student leader who has taken and done well in a previous class helps reinforce difficult concepts in one hour meetings with enrolled students. This poster will present an analysis of the effect of PASS sessions on student academic performance in entry level Anatomy and Physiology classes over two semesters.

Poster 121
Emily Scriven, Southern Adventist University, emilyscriven@southern.edu
Co-Presenters: Harold Mayer, Southern Adventist University, hmayer@southern.edu, Timothy Blair, Family Nurse Practitioner, tblair@southern.edu

Improving Metabolism with Diet Restrictions and Exercise Modifications
Our study focused on health and fitness levels of overweight and obese women randomized into three groups: low, moderate, or high intensity walking exercises. Additionally, subjects were prescribed a reduced-calorie, vegan diet according to personal resting metabolic rate. Testing measures were VO2 max, resting metabolic rate, and hydrostatic water weighing at the beginning and end of the study. Preliminary results show that all exercise programs with diet modifications improved the quality of life. Therefore, for those in high health risk categories: a controlled diet and exercise modifications demonstrated an improvement in metabolism efficiency.

Poster 122
Zoe Soon, University of British Columbia Okanagan, zoeanne.soon@ubc.ca
Co-Presenters: Melanie Robles, University of British Columbia Okanagan, melanie.anne@hotmail.com, Stephanie McKeowen, University of British Columbia Okanagan, stephanie.mckeowen@ubc.ca

Pathophysiology Models: I’ll Never Forget the First Time I Saw You!
This year, I piloted pathophysiology plastic model scavenger hunt activities around campus with my 3rd year pathophysiology class as a way to “flip and gamify my classroom”. This extended the learning time beyond lecture hours. Each model activity consisted of the detailed model, the accompanying model card explaining various aspects of certain pathologies, and a vocabulary puzzle designed to incorporate all of the key vocabulary words from class. This poster details the pedagogical research results obtained gauging student engagement, the effectiveness of this educational activity, including its various merits and drawbacks.
Poster 123
Ni Song, Lamar State College - Orange, nsong@lsco.edu
A Plan of Reading Enhanced Anatomy & Physiology Lectures
Anatomy & Physiology I is the gate-keeping course taken by freshmen here at Lamar State College - Orange. Student success rate in this course has been historically low. It has been identified that many students have significant trouble in reading and comprehending the Anatomy & Physiology textbook. With the goal of increasing student success through improving their reading skills, I have developed a plan to redesign my Anatomy & Physiology lectures into reading-enhanced lectures. These lectures will incorporate the teaching of the essential reading strategies, and reading-embedded assignments and exams. Pre- and post- reading tests will be administered to measure reading specific student learning outcomes.

Poster 124
Molly Theus, Southern Adventist University, mollytheus@southern.edu
Co-Presenter: Valerie Lee, Southern Adventist University, ylee@southern.edu
Comparative Analysis of Comprehension of Non-content Specific Collegiate Vocabulary
In the HAPS community there is a documented phenomenon appearing to show a lack of mastery in non-content specific collegiate vocabulary in Anatomy and Physiology students. This research seeks to investigate possible causation and propose a solution using the microcosm of Southern Adventist University students. A knowledge-based questionnaire will be distributed to six subpopulations composed of lower and upper division Biology, nursing and non-science major students. The questionnaire will be comprised of two parts: a section on background and reading habits, and a section with twenty multiple choice vocabulary questions. The results will be compiled into a comparative analysis.

Poster 125
Cuc Kim Vu, St. Catherine University, ckvu@stkate.edu
Infusion of Critical Skills
We have developed a General Anatomy and Physiology course that contains critical skills embedded within the course. The infusion of critical skills include work in developing sound strategies for critical thinking in the sciences (scientific literacy), reading textbooks, mastering vocabulary, using cognitive maps, lecture note-taking and test preparation. Teaching and assessment of these skills take place directly in lecture and lab. The infusion of critical skills into the course allows for 1) the application of academic skills specifically towards Anatomy and Physiology, 2) high expectation and increase rigor of course, and 3) removal of developmental course paired with Anatomy and Physiology (previous model).

Poster Session 2 – Centennial Foyer, Sunday, May 22 (set up by 1 PM; present 2:15 PM – 3:15 PM; breakdown by 5 PM)

Poster 201
E.E. Besong, Ebonyi State University, enohbesong@gmail.com
Co-Presenters: Balogun Morufu E., Ebonyi State University, marufbalogun@yahoo.com, Folawiyo Moshood A., Ebonyi State University, moshofola03@gmail.com
Biochemical Studies of Ethanolic Fruit Extract of Adenopus Breviflorus in Male Albino Wistar Rats
Toxicological studies of ethanolic fruit extract of Adenopusbreviflorus (EEAB) and the effect on the histology of the liver tissues was investigated. Thirty male albino rats were used in this study, divided into 5 groups of 6 rats each. Rats in group 1 received 2ml/kg distilled water, groups 2, 3, 4 and 5 received 500, 1000, 2000 and 4000 mg/kg/ b.w.t/day of EEAB orally over a period of 56 days respectively. Liver and blood samples were collected and biochemical indices determined in the serum using standard techniques. Data were subjected to one-way ANOVA and the level of significance was at P>0.05. The extract significantly increased (P>0.05) the serum levels of urea, creatinine, total bilirubin, ALP, ALT and AST in all the treatment groups. However, a significant decreased was observed in the serum level of albumin, globulin, and total protein in all treated groups except in group 2. Routine histological study revealed features of hepatotoxicity. Ethanolic extract of A. brevifloruspredisposesthe animals to adverse effects.
Poster 202
Cemil Bilkay, Suleyman Demirel University, cemibilky@hotmail.com
Co-Presenters: Ahmet Orhan Çelik, Suleyman Demirel University, aorhancelik@gmail.com, Kayan M, Suleyman Demirel University, drkayan32@hotmail.com, Demirtaş H, Suleyman Demirel University, demhakan@yahoo.com, Kara M, Suleyman Demirel University, raddrkara38@hotmail.com, Umul A, Suleyman Demirel University, ayseumul@sdu.edu.tr, Çetinkaya G, Suleyman Demirel University, drgürselcetinkaya@yahoo.com

The Distribution of Brain Ventricle System Measurements in Terms of Age Groups
Cranial MR is the most reliable evaluation for the assessment of ventricles. Ventricular extensions are assessed visually according to age groups or other parenchymal findings, however, there is no standard values for ventricles in literature. 352 cases were included in the study. Angle, width, length, diameter and area of ventricles were measured. While there is no difference in coronal-callosal angle and mamillo-pontine distance in terms of decades, significant differences in lateral ventricle angle, Evan’s index, aquaduct diameter and area, the width of third ventricle and the distances of fourth ventricle in transvers and sagittal series were observed. Keywords: Ventricle, MR.

Poster 203
Cemil Bilkay, Suleyman Demirel University, cemibilky@hotmail.com
Co-Presenters: Ahmet Dursun, Suleyman Demirel University, dr.ahmetdursun@hotmail.com, Gülnur Özgüner, Suleyman Demirel University, ozgunerg@hotmail.com, Kenan Öztürk, Suleyman Demirel University, kenanozt@hotmail.com, Büşra Candan, Suleyman Demirel University, bsr_sakalli@hotmail.com, Osman Sulak, Suleyman Demirel University, omsansulak@yahoo.com

Morphometric Study of Articular Surfaces of Tibia and Fibula and Localization of Gerdy Tubercle in Tibia
Constituting the leg skeleton in human, the anatomic characteristics of tibia and fibula are important for some clinical fields. In this study, articular surfaces of a total of 25 tibia and 10 fibula, the area of Gerdy tubercle were measured by using Image J. The distance of centroid of Gerdy tubercle from the upper surface of tibia’s condylus lateralis, its shortest distance from the midline of tibia, and the area of Gerdy tubercle were measured. We believe that the localization of the Gerdy tubercle is important for clinicians. Keywords: Gerdy tubercle, tibia, fibula.

Poster 204
Carol A. Britson, University of Mississippi, cbritson@olemiss.edu
Co-Presenter: Anna E. O’Connor, University of Mississippi, aeoconno@go.olemiss.edu

Analysis of Joint Dysfunction During an Aging-simulation, Laboratory Exercise for Allied Health Students
We present a joint-dysfunction simulation lab activity for Human Anatomy and Physiology students. This simulation allows students to experience some of the physical limitations of aging, specifically arthritis, by asking them to perform activities of daily living (ADLs) while wearing simulation equipment to inhibit their range of movement. The lab also serves as a sensitizing exercise for allied health students who will be working with the elderly in their future professions. Students experienced significant (p<0.001) increases in time-to-task for ADLs (opening a pill bottle, tying shoes, etc.) and self-reported significant increases (p<0.001) in understanding of difficulties encountered by the elderly.

Poster 205
Sally Jo Detloff, Benedictine University, b2179540@ben.edu
Co-Presenters: Robert McCarthy, Benedictine University, rmccarthy@ben.edu, Domenick P. Addesi, D.A. Tool & Machine, Inc., dpaddesi@datoolinc.com, Albert Coritz, Electron Microscopy Sciences, acoritz@emsdiasum.com, Daniel Olson, Northern Illinois University

Using An Embedded Pelvis To Help Students Uncover the Mysteries of the Pelvic Cavity
Beginning anatomy students often struggle with comprehending structures and relationships within the pelvic cavity and perineum because these regions are difficult to appreciate on cadavers. Using 2014 HAPS Student Grant award funding, I dissected a pelvis and we embedded it in acrylic for use as a visual aid in anatomy classes. We are currently testing the efficacy of this model for improving student understanding of pelvic anatomy by comparing scores on lecture and practical exam questions in anatomy sections using the model to those who are not. Preliminary results suggest that targeted instruction using this new model improves student learning.
Poster 206
Noble Donkor, Burman University, ndonkor@burmanu.ca
Cardiovascular and Type 2 Diabetes Risk Factors in Liberian Nurses
Cardiovascular disorders and type 2 diabetes are fast growing global health burdens, especially in low and middle income countries. Because of the financial and social impact of these diseases, investigating the relationships of their risk factors among the frontline health workers is important to increase understanding of the diseases. Results of such studies can be useful in the advancement of public health policy and controlling of the diseases. I report on the outcomes of a study to assess the risk factors of these diseases among 95 Liberian nurses (63 females and 32 males).

Poster 207
Marosh Furimsky, Westminster College - Pennsylvania, furimsmm@westminster.edu
Making Connections Early in an Undergraduate Physiology Lab
The typical outcomes of an undergraduate physiology course include not only a firm understanding of the functions of the body, but also the development of appropriate lab skills. As an introduction, respiratory sinus arrhythmia (RSA) serves as a meaningful example to demonstrate how the circulatory, respiratory and nervous systems contribute to natural fluctuations in heart rate. The very first lab session is the perfect opportunity to introduce students to data acquisition equipment using finger pulse plethysmography, while also exposing them to a phenomenon which highlights the integration of different organ systems in the human body.

Poster 208
Ethel J. Gordon, Salem State University, egordon@salemstate.edu
Co-Presenter: David E. Mercer, Salem State University, dmercer@salemstate.edu
Analysis of Innovative Course Tools in a Non-Majors Human A & P Course
Our Biology Department has a complex mission of guiding and educating our own students as well as teaching courses that are required by other departments. We created a variety of innovative in-class and online activities for our one-semester A & P course. Some examples are small group Q & A sessions and student-defined key words combined with concept mapping. We developed an anonymous survey to assess the efficacy of these tools. Our goal was to understand which learning tools were most effective in reaching this student population and to be more proactive in supporting the mission of other departments.

Poster 209
Kristen L. Hutchins, Howard Payne University, khutchins@hputx.edu
Integrative Learning: The Physiology of Death by Crucifixion
The method of death by crucifixion commonly used 2000 years ago was a slow, painful process affecting multiple organ systems of the body. Scholars have argued over the actual cause of death for the victims. Which medical hypothesis is the best explanation--cardiac rupture, hypovolaemic shock, acidosis, asphyxia, or something else? This poster presents an integrative project used at the end of a 2-semester anatomy and physiology course in which students revisit what they’ve learned about various organ systems to reason and develop their own conclusion about the most likely cause of death.

Poster 210
Polly Husmann, Indiana University School of Medicine, phusmann@indiana.edu
Co-Presenter: Valerie D. O’Loughlin, Indiana University School of Medicine, vdean@indiana.edu
VARK Styles & Study Habit Preferences in an Undergraduate Anatomy Class
Students identify as learners based on visual, auditory, reading/writing, and kinesthetic (VARK) categories; yet recent evidence questions the validity of these styles. We evaluate how students’ study habits align with their VARK preferences and whether this affects outcomes. Students in an undergraduate anatomy course completed a VARK assessment early in the semester and a survey of study habits near the end. Results found no correlations between the VARK assessments and study habits. There was also no effect on final grades based on interactions between VARK and study habits. This research casts further doubt on the validity of VARK learning styles.
Poster 211
Michael O Ibiwoye, Southern University at New Orleans, mibiwoye@suno.edu
Co-Presenters: Joseph O Olubadewo, Southern University at New Orleans, JOlubadewo@suno.edu, Daniel Crooks, FRCPath.

Anti-human Brain Vascular Endothelia-Specific Monoclonal Antibodies Detect Aberrant Vascularization Associated with Chronic Active Multiple Sclerosis Plaques in the Human Model System

Recent studies suggest that brain angiogenesis is an important component of multiple sclerosis lesions and may be a potential target for treatment of the disease. We employed a panel of blood vessel-specific mouse monoclonal antibodies raised against normal human whole temporal lobe homogenates to study changes in vascular immunoreactivity and morphological features in cerebral tissue obtained from two clinically and neuropathologically confirmed cases of chronic active multiple sclerosis. Intensely immunoreactive blood vessels and presumed newly formed vascular sprouts endothelial filopodia were more frequently detected within active multiple sclerosis plaques than in adjacent normal white matter and normal control brain sections. We observed strongly reactive vascular sprouts in whole vessels isolated from cerebral tissue containing active plaques, but not in vessels isolated from the control brain. These findings suggest increased endothelial proliferation within the active multiple sclerosis plaques and may be part of the brain inflammatory response to this disease. This approach may lead to a better understanding of the pathogenesis and novel therapeutic strategies for multiple sclerosis.

Poster 212
Adrian Isaza, Galen College, aisaza@galencollege.edu

The Use of Flow Charts as an Ancillary Tool to Teach Physiological Mechanisms

In 1988, Meursing, et al. conducted a study in which general nurses without previous training in psychiatry were instructed, over a period of thirteen hours, in the use of eight flow-charts for the identification and management of mental health conditions. Seventy-eight of the 105 patients (74%) were identified and treated correctly by the nurses. A total of 32 mistakes were made, 17 of which were due to the nurses and 15 to defects in the flow-charts. In 2014, Conway, et al, conducted a study in which a flowchart was designed to help students select the appropriate base for an ointment. Prior to implementation of the flowchart, 51 of 101 students selected the correct base. After implementation, 169 of 212 students selected the correct base. This study concluded that use of a flowchart to select an ointment base improved student performance when used in the context of a dry laboratory assignment.

Poster 213
Augusthy Kulakkattolickal, Harold Washington College, Chicago, augusthyk@gmail.com

Prerequisite Knowledge Assessment Test for Biology 226 (Human Anatomy and Physiology I)

A Prerequisite Knowledge Assessment Test (PKAT) consisting of 100 multiple choice questions based on Biology 121-Cellular/Molecular Biology, the prerequisite for Biology 226 was administered on the first day of class to 822 students enrolled in Biology 226 from Fall 2012-Spring 2016. Out of the 822 students, 62.62% had the prerequisite and 37.38% did not have the prerequisite. The PKAT scores of the 822 students ranged from 23% to 77%, the average being 48.3%. Students who scored 40% or higher on the PKAT obtained a C or better in Biology 226, with a regular course load.

Poster 214
He Liu, Gannon University, liu017@gannon.edu
Co-Presenter: Mary Vagula, Gannon University, vagula001@gannon.edu

Improved Protocol of Cortisol Determination in Saliva for Undergraduate Teaching

In this study, we modified and improved the experimental protocol of a physiology lab activity on the determination of salivary cortisol concentration. In order to better suit an undergraduate lab, various key steps in the protocol were adjusted to improve the efficiency of the experiment and shorten the time needed to complete the lab activity without compromising the accuracy in the cortisol measurement. We present here the learning objectives of this lab, the detailed modified protocol, and the assessment of student learning outcomes.

Poster 215
Elizabeth Paiva, Southern Adventist University, epaiva@southern.edu
Co-Presenters: Valerie Lee, Southern Adventist University, vlee@southern.edu, Aaron Corbit, Southern Adventist University, acorbit@southern.edu

Correlations Between Active Learning Style Preference and Grade, Ethnicity, and Gender

Research shows that active learning (AL) strategies increase student performance in science, technology, engineering, and mathematics (STEM) courses, but does which AL strategy a teacher use matter and do student preferences change over the course of a semester? Six active learning strategies were used in a second semester lower level Anatomy and Physiology and in an introductory non-major Biology course. A pre-class and post-class survey asked students to rank these AL activities from 1-6 in terms of usefulness and level of enjoyment. This study will identify possible correlations between pre- and post-class ranking preferences and grade, ethnicity, and gender.
Poster 216
Andrew Petto, University of Wisconsin-Milwaukee, aipetto@uwm.edu
Co-Presenters: Lucas Gauthier, University of Wisconsin-Milwaukee, Gauthi25@uwm.edu, James Menor, University of Wisconsin-Milwaukee, jmenor@uwm.edu, Nicholas Wohkittel, University of Wisconsin-Milwaukee, jwohkitt2@uwm.edu
M Sternalis: Function, Evolution, and Development
A routine dissection in the gross anatomy teaching laboratory uncovered a superficial band of muscle overlying the lateral edge of the sternum and adjacent costochondral cartilages in an 87yo female. The 3cm wide flat parallel band extended 18cm from near the xiphoid process to the sternoclavicular joint on the left side. M sternalis, though variable in appearance and frequency in human populations can be related to similar muscles in other primates, ungulates, and other vertebrate lineages by location, attachments, and innervation. Developmental and functional studies in other species provide a framework for evaluating this muscles as vestigial, atavistic, or idiosyncratic.

Poster 217
Amanda Pierman, The Benjamin School, amanda.pierman@thebenjaminschool.org
“Sing Your Anatomy”
How do you keep your students’ interest? How can you avoid the dreaded glazed-eye look? Have students learn their anatomical terms in a fun, memorable and engaging way with a “sing your anatomy” assignment.

Poster 218
Karen E. Plucinski, Missouri Southern State University, plucinski-k@mssu.edu
Co-Presenters: Donna Johnson, Missouri Southern State University, johnson-d@mssu.edu, Stephanie Hopkins, Missouri Southern State University, Hopkins-s@mssu.edu
SI on a Shoestring: Collaboration in Funding Helps Increase Student Success in Human Anatomy and Physiology I Classes
Innovative collaboration between the Student Success Center and the departments of Biology and Kinesiology helped fund Missouri Southern State University’s (MSSU.edu) first Supplemental Instruction (SI) program. Because of the high enrollment of students, coupled with decreased student success, two Bio 121 Human Anatomy and Physiology I classes were chosen to pilot a SI program that was funded by a reallocation of resources from the Kinesiology department’s student worker budget line to compensate an undergraduate SI leader. Continued reinforcement from the department head as well as the instructor was instrumental in encouraging student participation in the program. Preliminary results showed differences in student participation between sections, increased student success of SI participants as compared to non-participants, and increased overall satisfaction with the classroom experience of participants.

Poster 219
Laurel Roberts, University of Pittsburgh, laurelb@pitt.edu
Co-Presenter: Suzanna Gribble, University of Pittsburgh, sgribble@pitt.edu
Building on a Strong Foundation: Developing a High-quality Anatomy Lab
We offer an upper level (human) physiology lab. The course requires intro bio lab as a pre-req and the Human Physiology lecture as a co-req. The lab uses computer-linked hardware and our mannikin simulation center (WISER) to train students in measuring body parameters in health and disease. Most of the course grade is based on group projects that students design and perform based on these experiences and exploration of primary literature. We will be offering an anatomy lab next year and are seeking ideas as to how to create a comparable experience for our students.

Poster 220
Mary G. Scott, Dodge City Community College, mscott@dc3.edu
Blended Learning in the College Anatomy and Physiology Classroom
2 year comparison of exam scores after flipping or switching to a blended style. Results support other research, but also shows that the students benefiting most may be those in the bottom half of the class.

Poster 221
Melissa Taylor, Indiana University-Bloomington, taylomel@iupui.edu
A Look at Types of Questions Asked in Gross Anatomy Lab: An Analysis at Indiana University-Bloomington School of Medicine
First year medical students at the Indiana University School of Medicine-Bloomington answered two types of questions on their anatomy practical exams: pure identification questions and steeplechase questions. This study looked at the number of correct responses for those two classifications of questions on the six different lab exams the students took throughout their year-long anatomy course. It was found that steeplechase questions represented between 8% and 26% of the entire anatomy lab exam. It was also found that the majority of students actually answered the steeplechase questions correctly, and there were a few questions that the entire class answered correctly.
Poster 222
Mary Tracy-Bee, University of Detroit Mercy, tracyma@udmercy.edu
Co-Presenters: Ami Patel, University of Detroit Mercy, Houda Hamadeh, University of Detroit Mercy
Long Term Investigation of Duodenal Papillo Morphology and Quantitative Relationships
Investigative procedures of the duodenum require injection into the major duodenal papilla or observation of nearby anatomical structures. As a result, a solid understanding of the distances of the major duodenal papilla to both the pyloris and the minor duodenal papilla is essential when examining in this region. In four-year study of thirty cadavers, distances between these landmarks were quantified. The 2 cm distance from the major to the minor duodenal papilla is significantly shorter than what has been previously recorded in most textbooks and journals (p<0.05). This study provides insight into the accurate distances of the duodenal structures.

Poster 223
Khaid Uddin, Harold Washington College, Chicago, IL, kuddin@ccc.edu
Connecting Classroom to Community
Students, at a community college, participate in a public health project: “Healthy Heart”. Participation in this public health project is part of a biology course: Human Structure and Function. Students learn anatomy and physiology of cardiovascular system in class-room and explore the application of the basic knowledge of this system to human health through a public health project. The assessment of learning outcomes of this civic engagement project are presented for further improvements in the designing of such project based learning activities that focus on community awareness.

Poster 224
Charity F. Upson-Taboas, Indiana University, cupson@indiana.edu
Co-Presenter: Valerie O’Loughlin, Indiana University, vdean@indiana.edu
Impact of Computer Assisted Instruction in Learning Cardiovascular Embryology
Human cardiovascular embryology is a challenging subject because texts typically use 2-dimensional images to illustrate 3-dimensional processes, making it difficult for students to understand developments. Because students must conceptualize a series of complex events that occur over time, several web-based animations were created by one of the authors (VO) and others at Indiana University. Pretest/posttest assessments were used to evaluate the impact of the animations for users’ understanding of the material. Data showed significant improvement of users’ scores. This research highlights the positive implications of computer assisted instruction for learning complicated developments of cardiovascular embryology and human anatomy in general.

Poster 225
H. D. Yassa, Beni-Suef University, hanan_yassa2000@yahoo.com
Co-Presenters: M. E. Ibrahim, Cairo University, emadibrahim1000@gmail.com, S. M. Abdelsalam, Beni-Suef University, sahar.abdelsalam.999@gmail.com, N. T. Ahmed, Beni-Suef University
The Relationship Between Sagittal Curvature and Extensor Muscle Volume in Lumbosacral Region: A Morphological and Radiological Study in Egyptian Population
Lumbar lordosis, is an important and decisive factor in flexibility of the vertebral column during different movements. Low back pain (LBP) affects up to 80% of people at some time during their lives due to several factors. Magnetic resonance images of 200 subjects were used in the present study to evaluate the correlation between angle of lower lumbar curvature of the vertebral column and extensor muscle volume (size) in both normal and pathological (with persistent LBP) individuals in different age groups. Significant positive correlation was found between the angle of lumbar curvature and the muscle size in most groups.

Poster Session 3 – Centennial Foyer, Monday, May 23 (set up by 8:30 AM; present 9:45 AM – 10:45 AM; breakdown by 12:00 PM)

Poster 301
Tim Bradshaw, Polk State College, tbradshaw@polk.edu
Co-Presenter: Emily Bradshaw, University of Central Florida, emily.bradshaw@ucf.edu
Regional vs. Sequential Approach to Teaching Musculoskeletal Systems
In an Anatomy and Physiology course, students are tasked with learning the names and locations of bones and muscles. In an effort to offer a more interdependent view of the body, these topics were mixed, with bones and muscles presented together based on regions as opposed to sequentially. This study examines the effectiveness of this strategy based on student exam scores. The exam format was a lab practical with the same questions used for groups taught by region and those taught sequentially. Results from a student’s t-test indicates no difference in scores between the two groups.
Poster 302
Carol A. Britson, University of Mississippi, cbritson@olemiss.edu
Co-Presenter: Kelsey C. Hillhouse, University of Mississippi, khillho@go.olemiss.edu
Bring Your Own Device Initiative to Improve Engagement and Performance in Human Anatomy and Physiology Laboratories
At the University of Mississippi, just 4.93% (2014) and 6% (2015) of Human A&P students responding to an informal, opinion survey stated that their favorite lab activity was using microscopes. To increase students’ interest and engagement with microscopy and tissue examination, we purchased adapters that simultaneously connect students’ smartphones to the ocular lens of a microscope. Aggregate scores (i.e., percent correct) for tissue questions on lab practicals in spring 2016 (with adaptors) and spring 2015 (without adaptors) were compared to assess effectiveness of the adaptors as were Likert surveys to assess student’s levels of engagement.

Poster 303
Keely Cassidy, Indiana University, kmcassid@indiana.edu
“Death, Donation, and Dissection”: The Development of an Undergraduate Course About Human Body Donors in Education
Thousands of undergraduate students enroll in anatomy and physiology courses across the United States every semester. Most of these novice learners encounter human cadaveric donors as part of their coursework in textbook images, multimedia resources, or the laboratory. But the factors and logistics that go into the choice to donate ones body to science education and the utility of this gift in the classroom are often unclear to students. This seminar-style readings and discussion course was developed to provide historical and contemporary perspectives on end-of-life issues, the donation process, and the multitude of educational benefits provided by human body donors.

Poster 304
Patricia Clark, Indiana University-Purdue University Indianapolis, patclark@iupui.edu
Co-Presenters: Erika Huber, Indiana University-Purdue University Indianapolis, erihuber@iupui.edu, Mark Minglin, Indiana University-Purdue University Indianapolis, mminglin@iupui.edu
CARE Model: An Early-alert System for Student Success in N217: Human Physiology
The CARE Model promotes better student preparation for academic success. CARE was developed by and is implemented under the guidance of the IUPUI Bepko Learning Center. The facilitation of CARE is a cooperative effort among course academic mentors, CARE facilitators, and faculty. CARE identifies underprepared students, assesses their needs, develops a response plan, and evaluates their progress. Students may also be referred to additional IUPUI student support services. Initial results indicate intervention with N217 students is successful in the first six weeks of the course and fosters improved scores and a decrease in the DFW rate for the semester.

Poster 305
Dave Darda, Central Washington University, dardad@cwu.edu
Oddball Anatomical Structures and the Stories They Tell – Bringing Evolution into A&P
Why were Andy Rooney’s eyebrows so out of control? What good is the human tailbone? What function, if any, does the uvula have? Why do human testes move from the protective environment of the abdomen to the relatively hostile environment of the scrotum? It’s questions like these that my students have asked me for years. What I’ve come to realize is that most of these seemingly “oddball” anatomical structures have a story to tell - often an evolutionary one – and can serve as a way to engage students in the broader questions of the evolution of human form.

Poster 306
Tejendra Gill, University of Houston, tgill@uh.edu
Co-Presenter: Alexandra Ulmet, University of Houston
*Sponsored by BodyViz*
Digital Tools for Learning Anatomy to Enhance Student Performance in Undergraduate Lab Courses
Several digital tools are now available in the market to help students study and understand the human anatomy. These supplemental resources are useful from both instructional and learning perspectives. Students find them thought-provoking, hands-on experiences in a virtual environment. An attempt has been made to highlight the usefulness of one such digital tool in establishing a connection between what a student sees on the screen with the real world scenario. This paper discusses the concept and advantages of using a sophisticated tool, BodyViz, which allows stereoscopic visualization of 3D images of CT scans, in assessing feasibility of embolization of a tumor in a clinical situation.
Poster 307
Katey Hughes, Columbus State University, hughes_kathleen1@columbusstate.edu
Modifying Peer-Assisted Learning Program: Impact on Session Attendance
I use peer-assisted learning in my A&P courses to foster student learning and understanding of content. The peer leader meets weekly with the instructor and offers optional discussion sessions with planned activities. One drawback to the program is low attendance. To address this challenge, I implemented an incentive system and posted meeting times on the course schedule. The course with the earned points and prescheduled sessions had a significantly higher peer leader session attendance rate compared to the previous course (11.0+/-0.5 vs. 3.5+/-0.5, p<0.0001). Students evaluated the program at the end of the semester.

Poster 308
M.O. Ibiwoye, Southern University at New Orleans, mibiwoye@suno.edu
Co-Presenter: J.O. Olubadewo, Southern University at New Orleans, JOlubadewo@suno.edu
Anti-human Brain Vascular Endothelia-specific Monoclonal Antibodies Detect Aberrant Brain Vascularization Associated with Chronic Active Multiple Sclerosis Plaques in the Human Model System
Recent human and animal studies suggest that brain angiogenesis is an important component of multiple sclerosis lesions and may be a potential target for treatment of the disease. We employed a panel of blood vessel-specific mouse monoclonal antibodies raised against normal human whole temporal lobe homogenates to study changes in vascular immunoreactivity and morphological features in cerebral tissue obtained from two clinically and neuropathologically confirmed cases of chronic active multiple sclerosis. Intensely immunoreactive blood vessels and presumed newly formed vascular sprouts were more frequently detected within active multiple sclerosis plaques than in adjacent normal white matter and normal control brain sections. We observed strongly reactive vascular sprouts in whole vessels isolated from cerebral tissue containing active plaques, but not in vessels isolated from the control brain. These findings suggest increased endothelial proliferation within the active multiple sclerosis plaques and may be part of the brain inflammatory response to this disease. This novel approach may lead to a better understanding of the pathogenesis and more effective therapeutic strategies for multiple sclerosis.

Poster 309
Barbie Klein, Indiana University, barbklei@indiana.edu
Teaching with Tablets: Comparing Undergraduate Perceptions of PowerPoint Slides to a Dynamic Digital Whiteboard in a Human Anatomy Laboratory
Research indicates actively illustrating concepts simultaneously with students promotes engagement and retention. A tablet was projected onto screens in lab to simulate a whiteboard and slides were converted to PDFs. An application was used to write, draw, highlight, and type onto the PDFs with a stylus. Students were invited to participate in an anonymous survey and interviews with colleagues using tablets in their labs were coded for themes. Most students enjoyed the interactivity of the digital whiteboard, stated it improved attention, made it easier to follow along, and slowed down the pace of the lecture as compared with traditional PowerPoint.

Poster 310
Soma Mukhopadhyay, Augusta University, smukhopadhyay@gru.edu
Significance of Gene Expression: Bringing the Evolutionary Perspective as an Invigorating tool for Better Understanding of Human Anatomy and Physiology
Modern molecular techniques of genomics and proteomics have opened a new horizon into the understanding of physiological functions in the light of genetic changes throughout human evolution. Due to this, the students in Human Anatomy and Physiology are being introduced to the concept of how differences in gene sequences and gene expression throughout the evolution aids in better understanding of physiology, human health, susceptibility to disease, and behavior. Furthermore, recent discoveries about gene sharing between anatomically modern humans and the archaic humans like Neanderthals and Denisovans are being used to explain survival advantages and disadvantages in the different geographical location.
Poster 311
Andrew J Petto, University of Wisconsin-Milwaukee, aipetto@uwm.edu
Co-Presenters: Jamison C Bryant, University of Wisconsin-Milwaukee, jbryant@uwm.edu, Sarah Tighe, University of Wisconsin-Milwaukee, smtighe@uwm.edu, Sara Hutchins, University of Wisconsin-Milwaukee, hutchi63@uwm.edu, Peder Ohlrogge, University of Wisconsin-Milwaukee, pohlrogg2@uwm.edu, Anders Hendricks, University of Wisconsin-Milwaukee, hendri79@uwm.edu, Julie Dwyer, University of Wisconsin-Milwaukee, jdwyer@uwm.edu

Modeling Human Structure and Function: Useful Demonstrations for Promoting Understanding in the Classroom and Clinic
Teaching and clinical settings commonly display anatomic models to illustrate structure and function (and often dysfunction) in the body. Some models are representational, providing a realistic view of relevant anatomy; others are conceptual, providing a realistic view of the way(s) things work (or break). Using familiar materials for models can be effective in an academic setting (classrooms, laboratories, study groups) or a clinical setting (patient education sessions, individual client visits, home-care settings). These examples are from peer-to-peer presentations where they were used to demonstrate how gross anatomic complexes function … and malfunction.

Poster 312
Nicole Pinaire, St. Louis College of Pharmacy, Nicole.Pinaire@stlcop.edu
Co-Presenters: Dayton J. Ford, St. Louis College of Pharmacy, Dayton.Ford@stlcop.edu, Jamie Kleine, St. Louis College of Pharmacy

The Impact of Two-Stage Cooperative Testing on Student Learning of Human Physiology Concepts
Two-Stage Cooperative Testing combines group learning with “the testing effect” (Roediger & Karpicke). Three groups of students enrolled in an introductory Human Physiology course were tested by using the Two-Stage Cooperative Testing method or via traditional testing methods. At the end of the semester, all students took the HAPS comprehensive exam. We determined that the Two-Stage Cooperative Testing group scored significantly higher (p ≤ 0.05) than the two traditionally-tested groups. These results suggest that taking exams individually, then taking the same exam with a learning group, and then restudying the material enhances student ability to retain facts and concepts long-term.

Poster 313
Catrin Pittack, Bastyr University, cpittack@bastyr.edu

Two Easy Models Students can Make to Help Them Understand Abdominal Anatomy and Embryology
In an effort to support student understanding of the structures in the abdominal cavity, two simple embryological models can be made using paper and a nylon sock. These models are effective in the classroom, help students visualize gut rotation, emphasize how embryology can help explain the relationship of viscera to the peritoneal specializations, and promote understanding of congenital malformations. The complete design of these models and assessment of student understanding of this region, will be presented in this poster.

Poster 314
Robert S. Rawding, Gannon University, rawding001@gannon.edu

Sleep: I Need How Much? A Review from the National Sleep Foundation Panelist
The HAPS Board of Directors, in 2014, selected me as the HAPS liaison to participate in a 10-year literature review of sleep time journal articles to make a recommendation for appropriate sleep times in nine age groups. This is a poster summary of that work.

Poster 315
Peter Reuter, Florida Gulf Coast University, preuter@fgcu.edu
Co-Presenters: Alexander Britton, Florida Gulf Coast University, Bailey Murray Bundy, Florida Gulf Coast University, blbundy8891@eagle.fgcu.edu, Stacy Gering, Florida Gulf Coast University, slgering2904@eagle.fgcu.edu

Are Male & Female Students with a Masculine 2D:4D Ratio More Likely to be Involved in Athletic Activities that Require Above Average Hand Grip Strength?
Differences in the ratio between the index (2D) and ring finger (4D) between men and women are caused by a difference in exposure to testosterone or sensitivity to testosterone during the first few months of fetal development. A preliminary study we did last year, found some evidence of a correlation of the 2D:4D ratio and athletic activity, e.g., softball players had a lower, i.e., more masculine 2D:4D ratio than female runners. Our current study collected personal and anthropometric data as well as information on sports the study participants are involved in, and the way they practice, from male and female students on university teams and sports clubs. We used this information to compare to a control group where we collected the same information from students not active in a university team or sports club.
Poster 316
Peter Reuter, Florida Gulf Coast University, preuter@fgcu.edu
Co-Presenters: Christopher A. Gonzalez, Florida Gulf Coast University, cagonzalez0414@eagle.fgcu.edu, Nils-Otto Jaasko, Florida Gulf Coast University, najaasko6730@eagle.fgcu.edu
Correlation of 2D:4D Ratio, Vital Lung Capacity and Athletic Activity in Male and Female Students
Men consistently have a lower 2D:4D ratio across ethnic groups than women. There are studies looking at differences in athletic performance, however, none of the studies looked at basic anatomical differences that could explain these differences. For example, we do not know if vital capacity differs in men and women depending on their 2D:4D ratio. If yes, this could explain some differences in cardiovascular fitness and why some men/women are better suited for endurance sports than others. Our study collected personal and anthropometric data, as well as information on sports they play and the way they practice from more than 200 students male and female students on university teams and sports clubs.

Poster 317
Peter Reuter, Florida Gulf Coast University, preuter@fgcu.edu
Co-Presenters: Grant Grabarczyk, Florida Gulf Cost University, ggrabarczyk5470@eagle.fgcu.edu, Alecia Sabourin, Florida Gulf Cost University, afsabourin7593@eagle.fgcu.edu
Is There a Correlation Between Beighton Score, Handgrip Strength in Males and Females and 2D:4D Ratio?
Joint hypermobility, i.e., the ability of a joint to move beyond what is considered the normal range of motion for that joint, is based on congenital variations of collagen. Differences in the ratio between the index (2D) and ring finger (4D) between men and women are caused by a difference in exposure to testosterone or sensitivity to testosterone during the first few months of fetal development. To our knowledge our study involving more than 300 participants will be the first one to look into a possible correlation of hypermobility and 2D:4D ratio and what effect either or both of them combined have on hand grip strength.

Poster 318
Peter Reuter, Florida Gulf Coast University, preuter@fgcu.edu
Co-Presenters: Christian Dalton Clark, Florida Gulf Cost University, cdclark9417@eagle.fgcu.edu, Kaylee Fichthorn, Florida Gulf Cost University, krfichthorn9132@eagle.fgcu.edu
Are People with a Beighton Score of Greater than 6 More Likely to Suffer from Joint or Muscles Injuries than People with a Beighton Score of Less than 5?
Hypermobility in joints refers to the ability of a joint to move beyond what is considered the normal range of motion for that joint. The severity of hypermobility is measured with the Beighton score, with a score above 6 indicating hypermobility. Studies have looked at a relationship between hypermobile joints and certain incidences of joint sprains, dislocations and arthralgias, but joint hypermobility has not been definitively proven as a pathological condition in itself. Our study collected personal and anthropometric data as well as information on the past medical history of more than 300 students and their families to see if people with a high Beighton score are more likely to suffer from musculoskeletal injuries.

Poster 319
Krista Rompolski, Drexel University, klr94@drexel.edu
Co-Presenters: Mary Flynn, Drexel University, mf28@drexel.edu, Michael Kirifedes, Drexel University, mlk56@drexel.edu, Sinclair Smith, Drexel University, sas86@drexel.edu
Are There Predictors of Success in Anatomy and Physiology? A Tale of Two Majors
Health Science faculty members teach an A&P course series with labs to all Drexel U. students. Nursing and Health Science students are instructed separately, but with identical content and assessment. However, Nursing majors take the course series during their freshman year, while Health Science students take it their sophomore year, after taking 3 Biology and 3 Chemistry courses. Health Science students consistently seem to perform better in Anatomy and Physiology. It is unclear whether this is due to the year of sciences they complete before A&P, differences in admissions criteria or other factors not easily quantified. The purpose of this study is to compare the Nursing and Health Science students on their earned grades in the A&P course series, and determine what impact admissions criteria or prerequisite courses have on their success. Understanding why certain cohorts of students perform better than others despite identical course delivery can aid in the curriculum development of the student’s entire plan of study, and can help A&P instructors manage expectations of students’ preparation for the study of Anatomy and Physiology.
Poster 320
Melvin F. Simoyi, Heritage University, simoyi_m@heritage.edu
Co-Presenters: Brenda Martinez, Heritage University, martinezB7@heritage.edu, Estefania Jimenez-Lopez, Heritage University, jimenezE4@heritage.edu

The Effects of Sustained Inspiration and Expiration on Heart Rate to Elucidate the Physical Mechanics of Sinus Arrhythmia
This project investigated the physical effects of the respiratory cycle on heart rate. The objective was to determine what effect thoracic pressure changes have on heart rate. Four healthy subjects, 2 male and 2 female ranging in age from 22 to 43 took maximum inspiration, held it for 10 - 15 seconds and maximum expiration and held for similar time while breathing through a spirometer flow head. Each treatment was repeated 5 times and heart rate was monitored through a plethysmograph placed on the volar surface of the subject’s middle finger. Both maximum inspiration and expiration significantly increased heart rate.

Poster 321
Zoe Soon, University of British Columbia Okanagan, zoeanne.soon@ubc.ca
Co-Presenters: Balraj Khakh, University of British Columbia Okanagan, bkhakh09@hotmail.com, Mike Ho, mh0408@gmail.com, Stephanie McKeown, Okanagan Planning & Inst. Research, stephanie.mckeowen@ubc.ca

Involve Me and I Learn! Gauging Student Reactions to Hand-held Electronic Device Use Inside and Outside of Class, Compared to Paper Activities, and Group Tutorials
Is the texting generation ready to go paperless? Can learning be extended out of the classroom through electronics? Or through peer-led tutorials? Are students wanting to learn things independently or in a group? A large first-year anatomy and physiology class answers these questions for us. This study investigates the effectiveness of introducing student engagement tools such as electronically-delivered Learning Catalytics and MasteringAandP, in-class paper activities, and tutorials. Student reflections were collected for all three activity types over the course of two terms, and correlations were made between student participation, enjoyment and engagement levels, as well as actual learning gains.

Poster 322
Neveen Suliman, University of Illinois-Chicago, nsulim2@uic.edu
Co-Presenters: Jane R. Marone, University of Illinois-Chicago, janem@uic.edu, Alison F. Doubleday, University of Illinois-Chicago, adouble@uic.edu, Shivam Thakkar, University of Illinois-Chicago, scthakkar217@gmail.com

Information Acquired Visually, not Aurally, is Affected by Social Media Interruption During Lecture
Social media (SM) interruption during lecture is associated with poor academic performance. The effect of interruption on acquisition of information presented visually and aurally is unknown. Fifteen anatomy/physiology students viewed a recorded lecture while note-taking. Control students (n=7) listened continuously; SM students (n=8) accessed Facebook during lecture. SM students scored significantly lower than controls (62.5±24.0% vs. 91.2±7.8%, P=0.01) on an open-note quiz. SM students scored significantly lower than controls (32.5±21.2% vs. 94.3±9.8%, P=0.00) on visually presented information, but not on aurally presented information (77.5±31.0% vs. 94.3±15.1% P=0.22). SM interruption may impact information acquired visually more than aurally during lecture.

Poster 323
Mary Vagula, Gannon University, vagula001@gannon.edu
Co-Presenter: He Liu, Gannon University, liu017@gannon.edu

Enhancing the Learning Experiences of Undergraduate Students through Prerecorded Video Lectures
To enhance the learning experiences of undergraduate students enrolled in Physiology Laboratories we provided them with prerecorded video lectures in five physiology lab classes. Quizzes were conducted to ensure students’ preparedness by watching these video lectures. Additionally, another five lab classes using traditional lectures were conducted to compare the efficacy of these video lectures. Students’ performance in exams were compared and their feedback was collected through an anonymous survey. Although the correlation between students’ use of the prerecorded material and their grades appeared to be weak, students gave overwhelmingly positive feedback on the video lectures, suggesting that their confidence in the subject improved significantly.
Case-studies were developed to spur discussion and help students learn to apply recently obtained content of anatomy to solve “real life” problems. “Authentic Learning” occurs when students have a meaningful experience to enhance their learning. Also, working in small groups, students with more abilities can demonstrate effective practices to students with less problem-solving ability. Construction of the cases is a deliberate process - successful outcomes depend on a large number of considerations. From our experience, we have become aware of quite a number of tips and pitfalls to consider in the creation of a successful and productive discussion session.

Electromechanical delay (EMD) is the time between the motor unit electrical stimulation and the initiation of force production from muscle contraction. Previous studies have reported increased EMD in older adults compared with young individuals. Such increases in EMD during muscle contraction would plausibly increase total reaction time of muscle to maintain balance. Therefore, an age-related increase in gluteus medius EMD is a likely mechanism underlying increased falls risk in older adults. We hypothesized that a single session of coordinated muscle contraction speed training would increase gluteus medius EMD, but after one month of training, EMD would be decrease.

Clavicle is the most frequently fractured bone in human skeleton. Midclavicular fractures treated non-operatively showed higher rate of non-union or malunion. Operative treatment by external fixation may be cosmetically displeasing and uncomfortable, while internal fixation showed highest cure rate. The present work studied morphological features of the clavicle, among Egyptians. CT scans with coronal and sagittal reformatting and 3D reconstruction were performed on fifty subjects. Measurements of different parameters of the clavicles were taken. Data could be used to determine whether the anatomy of the clavicle and its medullary canal were amendable for intramedullary fixation in case of midshaft fractures.
SYNAPSE

SYNAPSE is back again this year. This event is a fast-paced series of 5-minute talks given by fellow HAPS experts. Each talk includes a presentation in which the slides move forward without any input by the presenter. The presenter sets the initial timing, but has no control during the talk. At the 5-minute mark the slides go to black and the next presenter stands up and begins.

The Topics and Presenters are:

- **Kerry Hull - Lactic Acid, Friend or Foe?**
  You thought you knew all about lactic acid and muscle fatigue, but do you? Is it a metabolic villain, an innocent bystander, or a bit of both?

- **Mark Nielsen - Muscle Patterns in the Body Wall**
  Did you know that the external oblique muscle is two distinct muscles and that the superficial part of the muscle is homologous with the levator scapulae, pectoralis minor, rhomboids, and serratus anterior muscles.

- **Robin McFarland - Human Ancestors, Exercise, and the Brain**
  This presentation will focus on connections between recent brain research and exercise and patterns of activities of our hominin ancestors.

- **Kevin Petti - A Picture is Worth A Thousand Words!**
  Are our students truly understanding the illustrations we use in anatomy and physiology education? This talk explores ideas about how to best utilize images when teaching complex topics.

- **Judi Nath - More Than You Bargained For: RAAS and the Transcending Role of ACE Inhibitors**
  You thought you knew the relationship between the renin-angiotensin-aldosterone system (RAAS) and angiotensin-converting enzyme (ACE) inhibitors for the treatment of hypertension, but really, the role of ACE inhibitors transcends their ability to lower blood pressure.

- **Dee Silverthorn - Isosmotic is Not Always Isotonic**
  You thought you knew the difference between osmolarity and tonicity, but do you? (Many resources, including the web and a prominent medical-surgical nursing book, have it wrong.)
NYCC’s Master of Science in Human Anatomy and Physiology Instruction (MSHAPI) program is uniquely designed for those with science education, biology and professional healthcare degrees. The course of study builds on existing anatomy and physiology knowledge base, transforming the student into an exceptional A&P instructor for the undergraduate level of higher education.

This master’s degree program is offered online, providing all the advantages of the online educational environment important to advanced learners including an asynchronous format to accommodate working professionals. It has components that:

- Assure competency over the entire spectrum of undergraduate anatomy and physiology instruction
- Provide a sound foundation in instructional theory and practices
- Allow for a measure of specialization through selection of elective courses

Contact the Admissions Office at 800-234-6922 or visit us at nycc.edu.

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April 12, 2016

Dear Attendees to the 2016 meeting of the HAPS,

On behalf of the Schools of Applied Physiology and Biology and the College of Sciences, it is my pleasure to welcome you to the campus of Georgia Tech for the 30th Annual Conference of the Human Anatomy and Physiology Society. Your conference organizers, Drs. Kyla Ross and Adam Decker, have arranged an outstanding program for you.

The teaching of anatomy and physiology is becoming increasingly important to prepare students for careers in basic research, clinically related disciplines and sport science. The Human Anatomy and Physiology Society plays a critical role in this pursuit by promoting excellence in teaching and providing excellent guidelines for course content. We are delighted to be able to partner with the Society and provide an attractive venue for this year’s meeting.

We look forward to meeting you in May!

Sincerely,

T. Richard Nichols, Ph.D.
Professor and Chair
tm@gatech.edu
## WORKSHOPS-AT-A-GLANCE TUESDAY (MAY 24, 2016)

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 Minutes</td>
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<td>9:00 AM - 10:30 AM</td>
<td>10:45 AM - 12:15 PM</td>
<td>1:45 PM - 2:45 PM</td>
<td>3:00 PM - 4:00 PM</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>101 (Room IC 109)</th>
<th>201 (Room IC 109)</th>
<th>301 (Room IC 109)</th>
<th>401 (Room IC 109)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving Science Writing Skills through Calibrated Peer-Review</td>
<td>You Say ba-NAN-ah, I Say bah-NAH-na</td>
<td>Sponsored by BIOPAC Systems, Inc</td>
<td>Giant Bodies – A History of Pituitary Giants and their Glands</td>
</tr>
<tr>
<td>102 (Room IC 113)</td>
<td>202 (Room IC 111)</td>
<td>302 (Room IC 111)</td>
<td>402 (Room IC 111)</td>
</tr>
<tr>
<td>I Know What Your Students Did Last Semester</td>
<td>Sponsored by HAPS</td>
<td>Sponsored by Anatomy in Clay* Learning Systems</td>
<td>Sponsored by eScience Labs, LLC</td>
</tr>
<tr>
<td>103 (Room IC 115)</td>
<td>203 (Room IC 113)</td>
<td>303 (Room IC 113)</td>
<td>403 (Room IC 113)</td>
</tr>
<tr>
<td>Ultrasound in Teaching Anatomy and Physiology</td>
<td>Got Pre-Load? Exploring the Challenges of Teaching CV Physiology</td>
<td>Sponsored by Visible Body</td>
<td>Students Master a Normal or Pathologic Process by Building a 3D Model</td>
</tr>
<tr>
<td>104 (Room IC 209)</td>
<td>204 (Room IC 209)</td>
<td>304 (Room IC 115)</td>
<td>404 (Room IC 115)</td>
</tr>
<tr>
<td>Reducing Cognitive Load in Multimedia Presentations</td>
<td>Using Our Brains to Facilitate Lab Terms: Recognizing Strengths in Ourselves and Our Students to Understand Group Dynamics and Inspire Successful Team Work</td>
<td>Increase Active Learning in the Anatomy Lab by Using Mobile Devices with Histology and Anatomy Apps</td>
<td>An In-House Atlas Enhances Histology Learning</td>
</tr>
<tr>
<td>105 (Room IC 211)</td>
<td>205 (Room IC 211)</td>
<td>305 (Room IC 209)</td>
<td>405 (Room IC 209)</td>
</tr>
<tr>
<td>Add Drama to Your Classroom – Great Kinesthetic Activities for Students</td>
<td>The Good, the Bad, and the Ugly for Multiple Choice Question Writing and Item Analysis</td>
<td>Sponsored by McGraw-Hill Education</td>
<td>Metacognition – Getting Students Involved in Their Own Learning Process</td>
</tr>
<tr>
<td>106 (Room IC 213)</td>
<td>206 (Room IC 213)</td>
<td>306 (Room IC 213)</td>
<td>406 (Room IC 211)</td>
</tr>
<tr>
<td>Sponsored by Howard Hughes Medical Institute</td>
<td>Sponsored by Howard Hughes Medical Institute</td>
<td>Membrane Transport and Membrane Potential to Get your Students Active in Lab</td>
<td>Simulation as a Pedagogical Approach in Pre-Professional Physiology</td>
</tr>
<tr>
<td>“Wait, how many genes?” HHMI BioInteractive Resources for Teaching Cancer Biology in the Era of Genomics</td>
<td>The Many Roles of Skin</td>
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<tr>
<td>107 (Room IC 217)</td>
<td>207 (Room Clough 487)</td>
<td>307 (Room IC 217)</td>
<td>407 (Room IC 213)</td>
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<tr>
<td>So Much Digital... So Little Time, Choosing and Organizing Your Digital Learning Resources</td>
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<td></td>
</tr>
<tr>
<td>108 (Room IC 219)</td>
<td>208 (Room IC 105)</td>
<td>308 (Room IC 219)</td>
<td>408 (Room IC 217)</td>
</tr>
<tr>
<td>Civic/Service Engagement Learning Model for STEAM Courses at an HBCU/HSI College</td>
<td>Sponsored by ADInstruments</td>
<td>A Model Idea: Round-Robin Student Review of Pre-Lab Exam Study Materials</td>
<td>The Use of Flow Charts as an Ancillary Teaching Tool for Physiological Mechanisms</td>
</tr>
<tr>
<td>109 (Room Clough 487)</td>
<td>209 (Room IC 107)</td>
<td>309 (Room IC 105)</td>
<td>409 (Room IC 219)</td>
</tr>
<tr>
<td>Making the First Day Interactive and Engaging</td>
<td>Yoga Anatomy Workshops for Kinesthetic Learners</td>
<td>Teaching Central Nervous System Concepts Using Diagnostic Radiology and Case Studies</td>
<td>Engineering Simple Laboratory Devices to Help Introductory Students Learn Core Concepts of Physiology</td>
</tr>
<tr>
<td>110 (Room IC 105)</td>
<td>210 (Room Clough 475)</td>
<td>310 (Room IC 205)</td>
<td>410 (Room IC 105)</td>
</tr>
<tr>
<td>Anatomia Italiana: Art and Anatomy in the Italian Renaissance</td>
<td>Austin Community College’s Modularized Flipped Curriculum</td>
<td>Sponsored by Pearson</td>
<td>Sponsored by HAPS</td>
</tr>
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<td></td>
<td></td>
<td>Best Practices for Getting Started with MasteringA&amp;P</td>
<td>It’s Time to Start Using the HAPS A&amp;P Comprehensive Exam: The 2016 Update</td>
</tr>
<tr>
<td>111 (Room IC 211)</td>
<td>311 (Room Clough 475)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sponsored by Draw It to Know It Use Drawing to Improve Learning Engagement!</td>
<td>Sponsored by ADInstruments</td>
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<td>ECG: Using LabTutor to Develop and Implement an Inquiry-based ECG Experiment</td>
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</tr>
</tbody>
</table>

- **Committee Meetings**: 12:45 PM to 1:30 PM. Check the schedule on page 22 for the room locations.
## WORKSHOPS-AT-A-GLANCE  WEDNESDAY (MAY 25, 2016)

<table>
<thead>
<tr>
<th>Session 5</th>
<th>Session 6</th>
<th>Session 7</th>
<th>Session 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Minutes</td>
<td>60 Minutes</td>
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<tr>
<td>8:30 AM – 9:30 AM</td>
<td>9:45 AM – 10:45 AM</td>
<td>11:00 AM – 12:00 PM</td>
<td>1:00 PM – 2:00 PM</td>
</tr>
<tr>
<td><strong>501 (Room IC 109)</strong>&lt;br&gt;Managing Incivility in Your Classroom</td>
<td><strong>601 (Room IC 109)</strong>&lt;br&gt;Sponsored by Synderlab Labs&lt;br&gt;The Transformation of Cadaver Dissection Using Video Prosections of a Cadaver and a Synthetic Cadaver</td>
<td><strong>701 (Room IC 109)</strong>&lt;br&gt;Four Years Flippin': The Good, the Bad, and the Ugly</td>
<td><strong>801 (Room IC 109)</strong>&lt;br&gt;Using Fun Activities to Learn About the Function of the Organelles</td>
</tr>
<tr>
<td><strong>502 (Room IC 111)</strong>&lt;br&gt;Using Whiteboards to Facilitate Critical Thinking and Deep Learning in Small Groups</td>
<td><strong>602 (Room IC 111)</strong>&lt;br&gt;Sponsored by AnatomyHive&lt;br&gt;Stop Testing in the Stone Age: Exam App for Anatomy Labs; Classroom Flipping and Student Engagement</td>
<td><strong>702 (Room IC 111)</strong>&lt;br&gt;Sponsored by Anatomy in Clay*&lt;br&gt;Learning System&lt;br&gt;Move into Success</td>
<td><strong>802 (Room IC 111)</strong>&lt;br&gt;Game-based Learning and Student Motivation</td>
</tr>
<tr>
<td><strong>503 (Room IC 113)</strong>&lt;br&gt;Sponsored by Carolina Biological Supply&lt;br&gt;Online Science Courses Without Sacrificing the “Hands-On” Component</td>
<td><strong>603 (Room IC 113)</strong>&lt;br&gt;Sponsored by eScience Labs, LLC&lt;br&gt;Fostering Authentic Anatomy and Physiology Laboratory Experiences for Online Learners</td>
<td><strong>703 (Room IC 113)</strong>&lt;br&gt;Anatomy and Physiology and Glitter: Open-Ended Creative Assignments Amp Up Student Learning and Engagement</td>
<td><strong>803 (Room IC 113)</strong>&lt;br&gt;Sponsored by McGraw-Hill Education&lt;br&gt;From student to Text: How Data is Changing Content Development</td>
</tr>
<tr>
<td><strong>504 (Room IC 209)</strong>&lt;br&gt;The Biology of Sex: Myths and Facts</td>
<td><strong>604 (Room IC 115)</strong>&lt;br&gt;Full STEAM Ahead: All Aboard</td>
<td><strong>704 (Room IC 115)</strong>&lt;br&gt;A &quot;Less is More&quot; Approach to Technology in the Classroom</td>
<td><strong>804 (Room IC 115)</strong>&lt;br&gt;Strategies for Teaching A&amp;P to Best Meet the Needs of Nursing Education</td>
</tr>
<tr>
<td><strong>505 (Room IC 211)</strong>&lt;br&gt;Classroom Assessment Techniques (CATs)&lt;br&gt;Made Simple: How You Can Quickly Assess Student Understanding and Inspire Active Learning in the Classroom</td>
<td><strong>605 (Room IC 209)</strong>&lt;br&gt;Sponsored by Pearson&lt;br&gt;MasteringA&amp;P and MyReadinessTest: A First-Timer’s Guide</td>
<td><strong>705 (Room IC 209)</strong>&lt;br&gt;The One-Semester A&amp;P Student: Overcoming the Challenge of Being Underprepared</td>
<td><strong>805 (Room IC 209)</strong>&lt;br&gt;Understanding Tubes</td>
</tr>
<tr>
<td><strong>506 (Room IC 213)</strong>&lt;br&gt;Sponsored by Howard Hughes Medical Institute&lt;br&gt;Understanding Alzheimer’s Disease through Virtual Exploration</td>
<td><strong>606 (Room IC 211)</strong>&lt;br&gt;Learning How to Learn in A&amp;P</td>
<td><strong>706 (Room IC 211)</strong>&lt;br&gt;Building Community and Creating Authentic Learning Opportunities</td>
<td><strong>806 (Room IC 211)</strong>&lt;br&gt;From the A&amp;P Lab to the Museum: The Art of Damien Hirst</td>
</tr>
<tr>
<td><strong>507 (Room IC 217)</strong>&lt;br&gt;Journaling in Classroom</td>
<td><strong>607 (Room IC 213)</strong>&lt;br&gt;Using Repeated Low Stakes (Formative) Assessment to Maximize Student Learning in your Courses</td>
<td><strong>707 (Room IC 213)</strong>&lt;br&gt;Thinking About Thinking: How Does Metacognition Impact Student’s Performance and Perception of their Learning Experience?</td>
<td><strong>807 (Room IC 213)</strong>&lt;br&gt;Changing Traditional Face-to-Face A&amp;P I and II into Blended Online (Hybrid) Classes</td>
</tr>
<tr>
<td><strong>508 (Room IC 219)</strong>&lt;br&gt;Potential Pandemic H5N1 Influenza Virus Update, with an Immunological Twist</td>
<td><strong>608 (Room IC 217)</strong>&lt;br&gt;Incorporating 21st Century Skills Into A Human Physiology Course</td>
<td><strong>708 (Room IC 217)</strong>&lt;br&gt;When a Picture is NOT Worth a Thousand Words</td>
<td><strong>808 (Room IC 217)</strong>&lt;br&gt;I Don’t Think they Hear What I am Saying! How to Help Students Conceptualize Difficult Material</td>
</tr>
<tr>
<td><strong>509 (Room Clough 487)</strong>&lt;br&gt;Animal Bones Challenge</td>
<td><strong>609 (Room IC 219)</strong>&lt;br&gt;Lab Assessment Techniques</td>
<td><strong>709 (Room IC 219)</strong>&lt;br&gt;Design, Implementation, and Assessment of a High Structure Undergraduate Human Anatomy Course</td>
<td><strong>809 (Room IC 219)</strong>&lt;br&gt;A History of Women in Anatomy: Nuns, Criminals, Midwives</td>
</tr>
<tr>
<td><strong>510 (Room IC 105)</strong>&lt;br&gt;Conscience in Crisis: the Nazi Academics</td>
<td><strong>610 (Room IC 105)</strong>&lt;br&gt;Sponsored by ADInstruments&lt;br&gt;Taking the Lab to the Cloud: Using Lt as a Learning Platform for Large Enrollmen Lab Courses</td>
<td><strong>710 (Room IC 105)</strong>&lt;br&gt;Sponsored by ADInstruments&lt;br&gt;Don’t be Passive – Active your Lessons!</td>
<td><strong>810 (Room IC 105)</strong>&lt;br&gt;Five Simple Ways to Humanize your Online Course</td>
</tr>
<tr>
<td><strong>511 (Room IC 205)</strong>&lt;br&gt;Weird and Wacky Methods to Torture A&amp;P Students – Ideas for Active Learning</td>
<td><strong>611 (Room IC 205)</strong>&lt;br&gt;Ok, I’ve Flipped, but it Doesn’t Always Look Pretty – the Mechanics of Classroom Management</td>
<td><strong>711 (Room IC 205)</strong>&lt;br&gt;A Simple Tool to Encourage Effective and Voluntary Student Use of Learning Outcomes</td>
<td><strong>811 (Room IC 103)</strong>&lt;br&gt;3D Printing of Anatomical Models to Increase Student Engagement in Education</td>
</tr>
<tr>
<td><strong>512 (Room 103)</strong>&lt;br&gt;Sponsored by the HAPS-Thieme Excellence in Teaching Award&lt;br&gt;Best Practices for Teaching Effectiveness, Student Inspiration and Classroom Joy!</td>
<td><strong>612 (Room IC 107)</strong>&lt;br&gt;Students with Blindness and Visual Impairments in the College Biology Laboratory</td>
<td><strong>712 (Room Clough 475)</strong>&lt;br&gt;PowerPoint Beyond the Basics</td>
<td><strong>812 (Room IC 103)</strong>&lt;br&gt;What we Teach in High School A&amp;P</td>
</tr>
<tr>
<td><strong>513 (Room IC 107)</strong>&lt;br&gt;Reaching Student of Low Social &amp; Cultural Support through Active Learning A&amp;P II</td>
<td><strong>613 (Room IC 107)</strong>&lt;br&gt;DaVinci to Teach Anatomy</td>
<td></td>
<td><strong>813 (Room IC 107)</strong>&lt;br&gt;DaVinci to Teach Anatomy</td>
</tr>
</tbody>
</table>
Tuesday, Session 1

101 (Room IC 109) - Improving Science Writing Skills through Calibrated Peer-Review - 90 Minutes
Chad Wayne, University of Houston, cwayne@uh.edu
Writing is one of the cornerstones of the sciences. A calibrated peer-review system coupled with a well-designed writing assignment teaches students to think critically, analyze data, organize, and appropriately analyze and critique the works of their peers while preparing them to enter into the scientific and health associated professions where they will need to use these skills. This talk will focus on how to design, create, and implement a calibrated peer-review writing assignment for use in the STEM classroom.

102 (Room IC 113) - I Know What Your Students Did Last Semester - 90 Minutes
Jason LaPres, Lone Star College - CyFair, texashapster@yahoo.com
Subject matter experts gain valuable insight from the feedback students provide when they report a problem with online homework. These comments tell us a lot about what type of students we have, how they learn, and how we can help them. This presentation will center around the student feedback and how it can impact your teaching and learning.

103 (Room IC 115) - Ultrasound in Teaching Anatomy and Physiology - 90 Minutes
Richard A. Hoppmann, University of South Carolina, Richard.Hoppmann@uscmed.sc.edu, Floyd E. Bell, III, University of South Carolina, Floyd.Bell@uscmed.sc.edu
The University of South Carolina has been using ultrasound to enhance Anatomy and Physiology education for medical students since 2006. We recently partnered with the College of Education in a program to teach middle and high school science teachers basic ultrasound to use in their classrooms. The first part (~30 minutes) of this workshop will be a didactic overview of the use of ultrasound in these settings. It will include an example of a case based learning activity. The second part (~60 minutes) will be a hands-on session where participants get to perform ultrasound scans.

104 (Room IC 209) - Reducing Cognitive Load in Multimedia Presentations - 90 Minutes
Jeff Hollar, Lord Fairfax Community College, jhollar@lfcc.edu
As an adjunct faculty member of the New York Chiropractic College (NYCC) Master of Science in Human Anatomy and Physiology Instruction (MSHAPI) Program teaching the Urinary System, Acid/Base Balance, Reproductive System, and Development/Inheritance course, I have become acutely aware that many instructors, even veteran ones, overload their multimedia presentations with content which inadvertently creates cognitive overload for the students. I will share what cognitive science and educational research tells us about how this impacts effective and meaningful learning, and then we will explore ways to incorporate methods to reduce the overload in your own multimedia teaching.

105 (Room IC 211) - Add Drama to Your Classroom - Great Kinesthetic Activities for Students - 90 Minutes
John Koch, jckoch45@verizon.net, Ewa Gorski, Community College of Baltimore County, egorski@ccbcmd.edu, Robin McFarland, Cabrillo College, romcfarl@cabrillo.edu, Javni Mody, Anne Arundel Community College, jmody@aacc.edu, Terry Thompson, Wor-Wic Community College, tthompson@worwic.edu, Carol Veil, Anne Arundel Community College, cbveil@aacc.edu
Get your students up and out of their seats for an insider’s view of some challenging A&P content. Microscopic structures and molecular processes can be abstract and difficult for students to comprehend. In this workshop presenters will direct attendees (as “students”) in some creative kinesthetic activities to enhance understanding of a number of such structures and processes. Attendees will be provided with instructor’s notes, so they can direct their own students in these A&P performances. Attendees are sure to leave with fun and enlightening activities that will liven up the classroom and improve student learning.
106 (Room IC 213) - “Wait, how many genes?” HHMI BioInteractive Resources for Teaching Cancer Biology in the Era of Genomics - 90 Minutes
Javier Robalino, Howard Hughes Medical Institute, robalinoj@hhmi.org
*Sponsored by Howard Hughes Medical Institute*
Genomics is increasingly revealing the genetic complexity of cancer. This complexity challenges our ability as educators to help students grasp an accurate and relevant understanding of the biology of cancer. This workshop will showcase classroom activities for teaching the link between mutations, the cell cycle, and cancer. HHMI BioInteractive’s educational materials use real data from patients to help students appreciate the complex and heterogeneous nature of cancer. Participants will receive classroom-ready resources to teach this important concept using active learning strategies.

107 (Room IC 217) - So Much Digital... So Little Time. Choosing and Organizing Your Digital Learning Resources - 90 Minutes
Steve Sullivan, Bucks County Community College, stephen.sullivan@bucks.edu
*Sponsored by McGraw-Hill Education*
There is a wide array of digital learning resources available to A&P students today. Right at our fingertips, we have interactive adaptive reading assignments, tutor videos, lab prep, social media, lecture capture, high-level homework assignments, case studies, etc. etc. It overwhelms us, and especially our students. Let me show you how I’ve organized my use of these tools over the years for traditional, hybrid, and online courses.

108 (Room IC 219) - Civic/Service Engagement Learning Model for STEAM courses at an HBCU/HSI College - 90 Minutes
Solomon Nfor, St. Philip’s College, snfor@alamo.edu, Jo D. Duncan, St. Philip’s College, jduncan36@alamo.edu
Participants will be given an opportunity to design a community based project in STEAM. The proposal is one that has a two day training program design (BUT will be abbreviated for this workshop). By sharing the practices at this HBCU/HSI college, participants will have an idea of what has worked for this college and why it could be applicable in their institution.
Participant Outcomes: 1) Designing a substantial community-focused component white all students participate 2) Integrating learning assessment into engaged civic learning 3) Deal framework for critical reflection

109 (Room Clough 487) - Making the First Day Interactive and Engaging - 90 Minutes
Tom Lehman, Coconino Community College, tom.lehman@coconino.edu
First impressions set the tone for the entire course. Make the most of that first day. Come learn some simple techniques for the integration of group collaboration, terminology usage, and microscopy and model experience. Stations include “That’s a banana?”, “Where’s McBurney?”, “What color’s the nucleus?”, “Which way’s up?”, and “Build a Golgi.” Your students will leave that day with applicable knowledge, an idea of what to expect in the course, and the desire to come back for more.

110 (Room IC 105) - Anatomia Italiana: Art and Anatomy in the Italian Renaissance - 90 Minutes
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 examined anatomy through human dissection. The profound connection between art and science is best 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 will examine the nexus between art and science, and the history of anatomy education in the university. Participants in this workshop are invited to also enroll in a workshop immediately following that will present a curriculum you can use in international programs you wish to develop.
111 (Room IC 211) - Use Drawing to Improve Learning Engagement! - 60 Minutes
Adam Fisch, Draw it to Know it - Medical Sciences, fisch@drawittoknowit.com, Amy Harris, Draw it to Know it - Medical Sciences, harris@drawittoknowit.com
*Sponsored by Draw It to Know It*
In the PowerPoint era, memorization has trumped true learning. See how, with Draw it to Know it, your students master core subject matter prior to class and show up primed and ready to learn – no matter what your teaching style. Draw it to Know it takes the classic approach to anatomy and physiology education and revitalizes it for the modern classroom with efficient and effective drawing-based tutorials, quizzes, and state-of-the-art analytics. Create study plans and track students’ performance so you know, before stepping into the classroom, what they struggled with so you can use class time effectively.

Tuesday, Session 2

201 (Room IC 109) - You say ba-NAN-ah, I say bah-NAH-na - 90 Minutes
Ken Saladin, Georgia College, ksaladin2@windstream.net
How do YOU pronounce “mediastinum,” “apoptosis,” or “conjunctiva”—as you were taught orally, or as a dictionary says they “should” be pronounced? Are you sure you’ve been teaching your students correctly? What defines correct pronunciation, anyway? The presenter will show slides of alternative, correct and incorrect pronunciations of common A&P terms. Participants will vote on how you think each word should be pronounced, then dictionary-sanctioned pronunciations will be revealed. Revealing differences of opinion will serve as a springboard for discussion of variations in pronunciation, how we learn pronunciation, oral tradition in A&P, and disparities between common practice and dictionary recommendations.

202 (Room IC 111) - Focus Group on HAPS Student Learning Outcomes: Come Share Your Insights - 90 Minutes
C&I Committee (Kathy Burleson, Christie Canady, Hiranya S. Roychowdhury)
*Sponsored by HAPS*
The Curriculum and Instruction Committee is in the process of reviewing and updating the HAPS Learning Outcomes for two-semester undergraduate Human Anatomy and Physiology courses. If you teach, plan to teach, or have ever taught this course sequence, this session is for you. If you use or are interested in using the HAPS Comprehensive Exam, it is directly related to the HAPS Learning Outcomes. How do you use the HAPS Learning Outcomes in your course design and syllabus? Regardless of the extent to which you use them, your input will be extremely valuable. Come find out what others are getting out of the HAPS Learning Outcomes, share your thoughts with fellow HAPSters, and guide us in this important review process.

203 (Room IC 113) - Got Pre-Load? (Exploring the Challenges of Teaching CV Physiology) - 90 Minutes
Heiko (Gary) Heisermann, Winona State University, gheikoHAPSter@gmail.com
The Cardiovascular System involves many subtle interactions of blood, blood vessels, and the heart. Student often struggle to appreciate the details of the physiology of this system, while at the same time learning it’s anatomy. In this interactive, discussion-focused workshop we will explore different strategies for organizing and presenting the cardiovascular system to A&P students. After a short introduction, participants in small groups will discuss the major concepts and themes associated with this system, and compare various approaches to helping students’ master cardiovascular physiology. Bring your questions, ideas, teaching strategies, and/or student activities to share.
204 (Room IC 209) - Using Our Brains to Facilitate Lab Teams: Recognizing Strengths in Ourselves and Our Students to Understand Group Dynamics and Inspire Successful Team Work - 90 Minutes
Cheryl Purvis, Nova Southeastern University, cpurvis@nova.edu, Yuri Zagvazdin, Nova Southeastern University, yuri@nova.edu
Creating a working team in the lab is an integral component in education and can be the key to success in life. As part of their training, we expect students to be able to work in groups. However, personality clashes often undermine the learning environment. To be effective facilitators and foster healthy group dynamics, we must learn to appreciate and evaluate different personality types. Participants will identify their own strengths, assess their individual characteristics and discuss how to create a positive environment for teamwork. This workshop will help us inspire our students to become leaders in their own unique way.

205 (Room IC 211) - The Good, the Bad, and the Ugly for Multiple Choice Question Writing and Item Analysis - 90 Minutes
Jennifer Marie Burgoon, The Ohio State University, jennifer.burgoon@osumc.edu, Melissa Marie Quinn, The Ohio State University, melissa.quinn@osumc.edu
With increasing class sizes and the need to quickly return exam scores, more instructors are utilizing some form of multiple choice exams in their courses. Composing effective multiple choice questions is not an easy task and requires some time and effort. Poorly written multiple choice questions can be confusing and frustrating for students. Therefore it is important to learn guidelines to improve the quality of and to practice composing appropriate multiple choice questions. This workshop is designed to help identify the guidelines for constructing effective multiple choice questions, evaluating existing multiple choice questions, and modifying flaws.

206 (Room IC 213) - The Many Roles of Skin - 60 Minutes
Melissa Csikari, Howard Hughes Medical Institute, csikarim@hhmi.org
*Sponsored by Howard Hughes Medical Institute*
Skin is the largest organ of the human body, but it is often unappreciated by students. This workshop will highlight several free activities on the biology of skin color to answer that ever-present question, “Why should I care?” These materials will translate students’ general knowledge from introductory biology to the content covered in Anatomy and Physiology courses. The resources presented will introduce why so many skin colors exist, the role of skin in the synthesis of Vitamin D and the protection of folate, skin cancer, and homeostasis.

207 (Room Clough 487) - Inexpensive Hands-On Activities to Reinforce Basic Physiological Principles - 90 Minutes
Vicki Abrams Motz, Ohio Northern University, v-motz@onu.edu, Rema Suniga, Ohio Northern University, r-suniga@onu.edu, Jacqueline Connour, Ohio Northern University, j-connour@onu.edu
For many reasons, physiological aspects of A&P labs are often presented as simulations. While simulations effectively convey concepts, hands-on activities promote more active student engagement. Recycled soda bottles supplemented with other inexpensive readily available supplies are used to create working models illustrating concepts such as filtration at the glomerulus with reabsorption at the PCT, flow regulation by heart valves, negative pressure of inhalation, and fluid conduction of sound waves in the inner ear. Activities demonstrate basic properties, then allow for deeper student exploration. Participants will be guided through model construction and provided with handouts.
208 (Room IC 105) - Anatomia Italiana: A Curriculum Guide to Connecting Art and Anatomy in Italy - 90 Minutes
Kevin Petti, San Diego Miramar College, kpetti@sdccd.edu, Wes Colgan, ADInstruments Inc., w.colgan@adinstruments.com
*Sponsored by ADInstruments*

Since 2012 I have taught courses Connecting Art and Anatomy in Italy for HAPS-I, and San Diego State University. Many HAPS members want to develop their own international programs, but struggle with curriculum development. In this workshop I will demonstrate the online curriculum I’ve developed on the ADInstruments Lt platform. This highly interactive curriculum is available for adoption, and will dramatically reduce the course development workload. This curriculum is also suitable for interdisciplinary art/science courses that do not require international travel, perhaps as an honors component of an anatomy course. Ideally, participants in this workshop will also attend my preceding workshop Anatomia Italiana: Art and Anatomy in the Italian Renaissance.

209 (Room IC 107) - Yoga Anatomy Workshops for Kinesthetic Learners - 90 Minutes
Megan Sugrue, Indiana University, mksugrue@indiana.edu, Barbie Klein, Indiana University, barbklei@indiana.edu, Mackenzie Loyet, Midwestern University, mlloyet@midwestern.edu

Integrating lecture and laboratory material from a human anatomy course can be difficult for kinesthetic learners. In this hands-on session, we will lead you through the creation and evolution of yoga anatomy workshops where yoga poses (asanas) and pose sequences (vinyasas) are used to review anatomical structures and system functions. We will guide you into basic yoga poses as we demonstrate the instructional dialogue used in our workshops. Participants are encouraged to wear loose-fitting clothing or active wear to the workshop.

210 (Room Clough 475) - Austin Community College’s Modularized Flipped Curriculum - 90 Minutes
Meg Flemming, Austin Community College, mflemmin@austincc.edu, Felix Villarreal, Austin Community College, fvillarr@austincc.edu, Florence Oxley, Austin Community College, foxley1@austincc.edu, Aglaia Chandler, Austin Community College, achandle@austincc.edu

The STEM pre-requisite courses for health science programs have long been a barrier to student success. In response, the Biology Innovation Lab at Austin Community College used a Department of Labor grant to redesign BIOL 1308, Biology Fundamentals, BIOL 2101/2304 Human Anatomy and BIOL 2404, Introduction to Anatomy & Physiology. The modularized course material creates a “flipped” approach with extensive in-class active learning opportunities. We will present examples of the modules, the hands-on activities and the data showing improved student success. Your tax dollars at work! The modules will be free of charge to any school wanting to adopt them starting in August 2016!

Tuesday, Session 3

301 (Room IC 109) - Best Practices for Conducting a Lab with the Biopac Student Lab - 60 Minutes
William McMullin, BIOPAC Systems, Inc., brentonp@biopac.com, Ken Graap, BIOPAC Systems, Inc., keng@biopac.com
*Sponsored by BIOPAC Systems, Inc.*

This workshop will provide attendees with hands-on instruction in conducting a lesson with the Biopac Student Lab (BSL) from beginning to end—including available pre-lesson activities and resources, equipment setup, lesson procedures, hints and techniques, and post-lesson processing. New BSL features such as customization using system preferences, the Curriculum Management System licensed feature, and several others will be illustrated. The workshop is ideal for current BSL users and for those contemplating future use of the Biopac Student Lab system. Light refreshments will be served.
302 (Room IC 111) - If I Only Had A Brain - 60 Minutes
Brandee Gillham, Morgan Community College/Sheridan College, Alyssa@anatomyinclay.com
*Sponsored by ANATOMY IN CLAY® Learning System,*
In this fun workshop you will discuss function and design of the intricate parts of the human brain and spinal cord and build it with the Anatomy in Clay® Learning Systems. Learn how this engaging method of learning can help your students retain what they have learned about the human body. AND...you will get to keep the brain you create!

303 (Room IC 113) - Visible Body 3D Human Anatomy Apps: Solutions for your Lecture and Lab - 60 Minutes
Robb Kneebone, Visible Body, robb.kneebone@visiblebody.com
*Sponsored by Visible Body*
Join Robb Kneebone as he takes you on a tour of our award-winning apps, Anatomy & Physiology and Human Anatomy Atlas, and get some great ideas for your flipped classroom and your lab! Visible Body’s 3D models, illustrations, and animations provide accurate, engaging solutions to help you teach human anatomy and physiology. Visible Body apps are robust and simple to use, based on a collection of more than 150 stunning animations and illustrations and more than 5,000 human body structures in real 3D. We provide site licenses and mobile access for educational institutions across the globe.

304 (Room IC115) - Increase Active Learning in the Anatomy Lab by using Mobile Devices with Histology and Anatomy Apps - 60 Minutes
Zvi Ostrin, Hostos Community College, zostrin@hostos.cuny.edu, Vyacheslav Dushenkov, Hostos Community College, vdushenkov@hostos.cuny.edu
The use of mobile devices in the Anatomy & Physiology Laboratory promotes active learning, increases student enthusiasm and engagement, and augments the retention of material. Mobile technology is highly effective as a pedagogical tool for individualized active learning because of the ease with which students can access information, visualize anatomical structures in 3-D, and clearly see histological specimens. This workshop will explore options, tips and best practices to integrate iPads into the Anatomy & Physiology Laboratory. The presenters will engage participants in a discussion about the criteria for selecting appropriate applications.

305 (Room IC 209) - Effective Teaching and Learning: Overview of Research and Tools to Use to Reach the Millennial - 60 Minutes
Leslie Day, Northeastern University, l.day@neu.edu
*Sponsored by McGraw-Hill Education*
Do you wish your students were more motivated or came to class more prepared? Do you feel like you have tried everything, but they just don’t listen? Understanding the millennial generation of learners can help you improve student outcomes in your course. This presentation will discuss evidence-based research on the principles of learning and help you apply these principles in your class. Application of these principles into McGraw-Hill’s Smartbook will also be explored.

306 (Room IC 213) - Membrane Transport and Membrane Potential to Get your Students Active in Lab - 60 Minutes
Candi K. Heimgartner, University of Idaho, cheim@uidaho.edu, Shannon Gill, Indiana University, gillshan@umail.iu.edu
Do your kinesthetic and visual learners struggle with the aspects of basic membrane transport and how excitable cell membranes work with resting membrane potential? This hands on lab will outline how to get your students “excited” for membrane transport and potential by setting up visual cells using readily available candy pieces as models as well as provide an outline for building an interactive model. See how to get your students actively participating in lab and understanding what goes on behind the “cell scene”.
307 (Room IC 217) - An E-learning Approach to Spinal Cord Cross-Sectional Anatomy - 60 Minutes
Allison A. Foster, The Ohio State University, foster.941@osu.edu, Jennifer M. Burgoon, The Ohio State University, jennifer.burgoon@osumc.edu, Melissa M. Quinn, The Ohio State University, melissa.quinn@osumc.edu
A cross-sectional approach to human anatomy provides three potential benefits to students: An appreciation for anatomical organization, an insight to the complementary nature of anatomy and physiology, and the ability to apply these principles to medical imaging techniques. E-learning provides anatomy and physiology educators the opportunity to extend the learning environment past the classroom setting and reach students with different learning styles. Taking an e-learning and cross-sectional approach to spinal cord anatomy provides undergraduate students with easy access to fundamental principles underlying basic anatomical concepts and supports skills necessary for interpreting medical imaging modalities during professional school and beyond.

308 (Room IC 219) - A Model Idea: Round-Robin Student Review of Pre-Lab Exam Study Materials - 60 Minutes
Robert S. Rawding, Gannon University, rawding001@gannon.edu
We have established a series of “round robin” in-lab study exercises, in which students in small groups take turns identifying key structures, organ functions, etc. They rotate through 10-12 stations. We have seen an upturn on our lab exam scores, which seems to reflect a greater level of comprehension and ease the torment of rote memorization. Sample exercises will be part of the attendee handouts for this workshop.

309 (Room IC 105) - Teaching Central Nervous System Concepts Using Diagnostic Radiology and Case Studies - 60 Minutes
Carmen Eilertson, Georgia State University, ceilertson@gsu.edu
Interested in adding clinical case studies to your anatomy and/or physiology course? If so, then join us for a hands-on workshop that explores the nervous system through diagnostic radiology and case-based instruction. Those attending the workshop will learn how to integrate clinical data and radiology cases with course content. This workshop will also serve as a kick-start session for a new HAPS-I course. Those enrolling in the HAPS-I course will develop a portfolio of in-class activities, exam questions, and case studies. Join us to gain the tools and confidence you need to incorporate radiology cases into your course.

310 (Room IC 205) - Best Practices for Getting Started with MasteringA&P - 60 Minutes
Terry Austin, Temple College, taaustin@templejc.edu
*Sponsored by Pearson*
Are you just getting started with MasteringA&P? This session will introduce best practices for using MasteringA&P to help reinforce the content you cover in class. MasteringA&P is a continuously adaptive system, designed to give students a personalized learning experience from before students come to class to after they complete the homework assignment. Plus, MasteringA&P provides instructors with detailed individual and collective student work, allowing one-click insight into students’ learning. Professor Terry Austin from Temple College will share best practices for how to get started using MasteringA&P to complement course content.
311 (Room Clough 475) - ECG: Using LabTutor to Develop and Implement an Inquiry-Based ECG Experiment - 60 Minutes
Eileen Bush, Mohawk Valley Community College, ebush@mvcc.edu, Shannon Crocker, Mohawk Valley Community College, scrocker@mvcc.edu, Donald Kelly, Mohawk Valley Community College, dkelly@mvcc.edu, Wes Colgan, ADInstruments, w.colgan@adinstruments.com
*Sponsored by ADInstruments*
This is a demonstration of a customized laboratory exercise used at MVCC that demonstrates ECG data collection and cardiac electrophysiology. Using an ADInstruments data acquisition system, participants will participate in a guided inquiry oriented around collecting and analyzing human ECG data. In small groups participants will actively predict and test their hypotheses about ECG variables during a variety of changes in position and activities. This demonstration will also show the steps in planning, customization, developing, and deploying the ECG exercise using ADInstruments data acquisition software and Lab Author.

Tuesday, Session 4

401 (Room IC 109) - Giant Bodies — A History of Pituitary Giants and their Glands - 60 Minutes
Jon Jackson, Institute of Philosophy in Public Life, jcksn@mac.com
This workshop reviews our changing understanding of the endocrine system through the lens of the pituitary gland, and pituitary giants in particular. It examines stories of physicians and the earliest documented giants they studied. We’ll examine how society gawks at and even exhibits giant bodies after their deaths, on a historical romp that includes everything from rooster testes to PT Barnum to The Princess Bride. Lastly, we’ll will challenge one another to place our natural curiosity of the unusual in context with reverence and respect for the history and humanity of the really big people among us.

402 (Room IC 111) - Comparative Study of Anatomy and Physiology Courses Taught by Fulltime and Affiliate Instructors - 60 Minutes
Nahel Awadallah, Johnston Community College, nwawadallah@johnstoncc.edu
*Sponsored by eScience Labs LLC*
The study will compare success rates of students who took traditional, hybrid and online anatomy and physiology courses. In addition, many strategies to combat grade inflation by affiliate instructors will be presented. Data offered will illustrate the effectiveness of these strategies. Experiences with standardization efforts and associated challenges are part of the topic.

403 (Room IC 113) - Students Master a Normal or Pathologic Process by Building a 3D Model - 60 Minutes
Deborah J. Merritt, University of Hawaii at Manoa, dmerritt@hawaii.edu
This alternative to written extra credit projects allows students, individually or in groups of 2, to produced 3D models, sans labels, on topic of their choice to educate fellow students. This opportunity uses both the “artistic” and the “critical and analytical” cerebral cortex. The rubric and logistics that have evolved over the years to ensure project originality, depth of understanding, appropriate choice of media, and avoidance of procrastination and plagiarism from the internet will be shared as will pictures and videos of successful and some (surviving) unsuccessful student projects.
404 (Room IC 115) - An In-House Atlas Enhances Histology Learning - 60 Minutes
Dr. Hisham S. Elbatarny, St. Lawrence College & Queen’s University, Helbatarny@sl.on.ca
In a recent study, we demonstrated that the projection of real-time slide images, using a light microscope with built-in camera, significantly improved histology learning. We expanded on this technology and developed an in-house histology atlas, enabling students to view specimens outside the lab. In this current study, we evaluated the effectiveness of this atlas by comparing students’ scores on histology quiz in year 2014 (no atlas), with those of 2015 (atlas provided). We found students in 2015 achieved significantly higher scores on this quiz. We conclude the independent review facilitated by the take home atlas enhances students’ understanding of histology.

405 (Room IC 209) - Metacognition - Getting Students Involved In Their Own Learning Process - 60 Minutes
Kerry Hull, Bishop’s University, khull@ubishops.ca, Rachel Hopp, Bellamine University, rhopp@hapsconnect.org
Metacognition, or thinking about thinking, involves conscious monitoring of one’s knowledge and skills. Students engaged in metacognition are able to figure out what they already know and devise strategies to learn what they need to know. This session will discuss in-class and out-of-class metacognitive strategies that can help students maximize their learning. Since these strategies require more cognitive effort than the traditional “reread and review” study techniques, we will also discuss methods to promote student buy-in. Participants will leave the session with a toolkit of ideas for promoting metacognition in the classroom and in faculty development seminars.

406 (Room IC 211) - Simulation as a Pedagogical Approach in Pre-Professional Physiology - 60 Minutes
Ann Massey, Emory University, ann.massey@emory.edu, Kate Moore, Emory University, kmmoor4@emory.edu, Kelly Fullwood, Emory University, kelly.m.fullwood@emory.edu
Medical and healthcare professions education is changing rapidly in an attempt to provide greater numbers of practitioners to meet increasing demand. Simulation, in a variety of forms, provides a safe, effective and cost-efficient means for students to gain clinical experience and insight. Pre-professional students can also benefit from real-world scenarios that allow them to experience physiological principles in a clinical setting. In this workshop, we’ll explore various types of simulators and their uses in professional nursing education. We’ll demonstrate a scenario developed for first- or second-semester Anatomy and Physiology students using a high-fidelity manikin.

407 (Room IC 213) - Draw to Learn in the Anatomy Laboratory - 60 Minutes
Michael Wood, Del Mar College, mwood@delmar.edu
Professor Michael G. Wood has been getting his students to draw in the A&P lab for over 30 years. In this workshop, he will share strategies for incorporating drawing in the A&P lab as a way to engage students in the learning process and promote a deeper understanding of anatomical structures and physiological processes. Anyone can draw - no artistic abilities required!
408 (Room IC 217) - The Use of Flow Charts as an Ancillary Teaching Tool for Physiological Mechanisms - 60 Minutes
Adrian Isaza, Galen College of Nursing, aisaza@galencollege.edu
In 1988, Meursing, et al. conducted a study in which general nurses without previous training in psychiatry were instructed, over a period of thirteen hours, in the use of eight flow-charts for the identification and management of mental health conditions. Seventy-eight of the 105 patients (74%) were identified and treated correctly by the nurses. A total of 32 mistakes were made, 17 of which were due to the nurses and 15 to defects in the flow-charts.(1) In 2014, Conway, et al, conducted a study in which a flowchart was designed to help students select the appropriate base for an ointment. Prior to implementation of the flowchart, 51 of 101 students selected the correct base. After implementation, 169 of 212 students selected the correct base. This study concluded that use of a flowchart to select an ointment base improved student performance when used in the context of a dry laboratory assignment. (2)

409 (Room IC 219) - Engineering Simple Laboratory Devices to Help Introductory Students Learn Core Concepts of Physiology - 60 Minutes
Murray Jensen, University of Minnesota, msjensen@umn.edu
Providing entry-level human anatomy and physiology students with suitable hands-on and engaging lab activities is often restricted by cost and complexity. At the University of Minnesota, we collaborated with undergraduate engineering students to develop simple and inexpensive mechanical models for use in the physiology classroom and laboratory. To date, the engineering students have constructed devices that model the concepts of homeostasis, active transport, blood flow through systemic and pulmonary circuits, and the cardiac conduction system. During the development and design process, engineering students were restricted to using only inexpensive and common materials that could be from local hardware stores.

410 (Room IC 105) - It’s Time to Start Using the HAPS A&P Comprehensive Exam: The 2016 Update - 60 Minutes
Jennifer Marie Burgoon, The Ohio State University, jennifer.burgoon@osumc.edu, Valerie Dean O’Loughlin, Indiana University, vdean@indiana.edu
*Sponsored by HAPS*
Have you wondered if the HAPS A&P Comprehensive Exam is a good measure of student A&P knowledge and if it would work for your institution? Wonder no more! This secure, online exam has been analyzed by psychometricians and exam questions were refined by A&P content experts. The current exams have demonstrated excellent reliability and validity, and we have data from multiple institutions to compare to your school. At our workshop, we will discuss psychometric analyses of the exam, how schools may utilize the exam, how you can order the exam, and development plans for future exams (e.g., anatomy-only, physiology-only).

411 (Room IC 205) - Histopathology: for Undergraduates? - 60 Minutes
Nina Zanetti, Siena College, zanetti@siena.edu
Can histopathology be used to help students learn topics taught in undergraduate A & P courses? To explore this question, we’ll examine photomicrographs of actual pathological specimens and will see how they provide easily understood correlations between histopathology and basic topics such as mitosis, histology, organelles, and embryology. We’ll consider how histopathological correlations can aid in visual learning and understanding of material. Participants will also have an opportunity to explore resources available through the HAPS Histology Challenge and to design classroom activities that use these resources (micrographs and case studies).
412 (Room IC 107) - Incorporating a Modified “Interteaching” Methodology into Anatomy & Physiology Lecture Settings - 60 Minutes
David Mercer, Salem State University, dmercer@salemstate.edu

Interteaching is a technique developed by behavioral analysts to promote deeper student learning by encouraging student teaching. Several studies demonstrate improved student test scores when compared to traditional lecture methods in diverse fields of study. This workshop will describe interteaching in its original format, its use in an Anatomy and Physiology course, the improvement in test scores compared to lecture only classes, and the limitations when used in its original form. In addition, the workshop will introduce modifications made to the interteaching technique to make it more engaging and acceptable for students in learning the complex concepts of human physiology.

413 (Room Clough 475) - JustPhysiology: an Online Simulation of Human Physiology for Experiential Learning - 60 Minutes
Robert L. Hester, HC Simulation, LLC, robert@justphysiology.com, David Julian, University of Florida, djulian@ufl.edu
*Sponsored by HC Simulation*

Understanding the integrative aspects of human physiology can be challenging for undergraduate, graduate and medical students. Justphysiology.com is a browser-driven, cloud-based human physiology simulation developed over 45 years to address precisely that problem. JustPhysiology provides over 30 simulation exercises, spanning cardiovascular, respiratory, renal, metabolic, and integrative physiology. Students can control the simulations to observe a variety of physiological responses over different time scales, and to explore relationships between physiological variables. Workshop participants will learn to use JustPhysiology and see how it has been used with undergraduates in classroom and online learning environments at the University of Florida.

Wednesday, Session 5

501 (Room IC 109) - Managing Incivility in Your Classroom - 60 Minutes
John R Waters, Penn State University, johnwaters@psu.edu

Educators must sometimes deal with students who are rude, disruptive, or even dangerous. These situations challenge teachers to address the issue promptly and professionally. Using case studies based on real world situations, we will discuss student behaviors that range from annoying to threatening, how one might address these behaviors inside and outside the classroom, and the resources available to faculty at different institutions.

502 (Room IC 111) - Using Whiteboards to Facilitate Critical Thinking and Deep Learning in Small Groups - 60 Minutes
Louis ("Tres") Kutcher, Univ. of Cincinnati, Blue Ash College, louis.kutcher@uc.edu

Students often find Anatomy & Physiology courses conceptually challenging. Teaching A&P using an organ-systems approach provides a logical organization for the body, but individual systems remain complex, with many interrelated parts. Using low-tech whiteboards in a group learning environment makes visible the student’s conceptions, and misconceptions, of physiological processes. A survey of student perceptions on this technique indicates they were motivated to prepare for class and they appreciated learning from their group’s (and other group’s) presentations. This hands-on workshop will explore the mechanics of directing group work using small whiteboards and discuss the pedagogical underpinnings of this technique.
503 (Room IC 113) - Online Science Courses Without Sacrificing the “Hands-On” Component - 60 Minutes
Stephanie Songer, Carolina Biological Supply Company, ashley.faucette@carolina.com
*Sponsored by Carolina Biological Supply*
Science education has been challenged by the rapid growth of online instruction. Using lab kits as part of a hands-on approach to online science avoids the sacrifice of student engagement. We will explore ideas to adopt and adapt a hands-on, inquiry model for online science labs that achieve essential lab skills and learning outcomes. Participants will actively take 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.

504 (Room IC 209) - The Biology of Sex: Myths and Facts - 60 Minutes
Nanette J. Tomicek, Penn State, njt128@psu.edu
Think you know it all? Or heard it all? Come to explore common misconceptions regarding the biology of sex. Student inspired questions will include: Can Mountain Dew serve as an effective birth control? What is the best aphrodisiac? Will hormone replacement therapy kill me? We will also take a look at some dated topics commonly appearing in text books. Faculty, are you still teaching the body fat and fertility hypothesis? Do you classify heart disease as a man’s disease? Are condoms and vasectomy are the only types of male birth control? Lecture based workshop with opportunity for discussion.

505 (Room IC 211) - Classroom Assessment Techniques (CATs) Made Simple: How You Can Quickly Assess Student Understanding and Inspire Active Learning in the Classroom - 60 Minutes
Valerie Dean O’Loughlin, Indiana University, vdean@indiana.edu
CATs are not just cute, furry animals. Classroom Assessment Techniques (CATs), first compiled and presented by Angelo and Cross, are formative assessment tools that will allow you to assess student learning and understanding prior to the exam. In this workshop, I will introduce you to different examples of CATs, how you can use them in any size classroom, and provide you with data about how CATs transformed learning in a large undergraduate anatomy class. We will brainstorm how you can develop and utilize CATs in your own classroom. Come join the fun!

506 (Room IC 213) - Understanding Alzheimer’s Disease through Virtual Exploration - 60 minutes
Melissa Csikari, Howard Hughes Medical Institute, csikarim@hhmi.org
* Sponsored by Howard Hughes Medical Institute*
It is estimated that 5.3 million Americans currently have Alzheimer’s disease. Use HHMI BioInteractive’s new engaging interactive to help students understand the complexity of this disease, improve their scientific thinking, and see how medicine and basic research are working together to treat Alzheimer’s. Students will analyze and interpret evidence from studies on Alzheimer’s disease to formulate a hypothesis regarding 1) the cause of the disease and 2) the target for a treatment. Throughout the exploration, students will investigate data collected from a variety of sources, including: pathology, biochemistry, genetics, DNA sequencing, and cell biology. After gaining an understanding of the mechanism of disease, they will explore treatment options based on data from clinical trials.

507 (Room IC 217) - Journaling in Classroom - 60 Minutes
Hiranya S. Roychowdhury, NMSU-Dona Ana Community College, Hroychow@nms.edu
Journaling is a powerful tool in organising thoughts and reflecting on events of the day. I use journals as a part of “writing across the curriculum” strategy that has yielded some interestingly encouraging results in my A&P classroom. This provides a platform to scaffold ideas even as the students listen and take notes. Used as a reflective exercise following class discussion, formative tests, and lectures, this process has proved to be very effective in augmenting their thinking skills. This workshop will show how we can use it in every class.
508 (Room IC 219) - Potential Pandemic H5N1 Influenza Virus Update, with an Immunological Twist - 60 Minutes
Sandy Lewis, Pierce College, WA, profilewis55@comcast.net
Abstract: Use this highly relevant topic to enhance your immunology unit! The presentation will focus on the H5N1 influenza virus; virus subtypes; characteristics; potential as a pandemic virus; current global movement; the history of pandemics with a focus on the Great Influenza Pandemic of 1918-19; comparison between a pandemic influenza virus and the annual influenza viruses; and progress in vaccine preparation and stockpiling for this particular virus. Video clips of the 1918-19 pandemic will be included. This presentation topic was well received at the Melbourne HAPS Regional Conference in December.

509 (Room Clough 487) - Animal Bones Challenge - 60 Minutes
John Koch, retired from John Tyler Community College, jckoch45@verizon.net
Enjoy some hands-on anatomical sleuthing and gain a little insight too. Using only your knowledge of human skeletal anatomy and the similarities between human and animal skeletons, see how many animal bones and their features you can name. Attendees will rotate through lab practical stations composed of a variety of actual bones from turkeys, pigs, cows, elk, bison and humans. Upon completion answer keys will be available and questions/comments welcomed.

510 (Room IC 105) - Conscience in Crisis: the Nazi Academics - 60 Minutes
Aaron Fried, Mohawk Valley Community College, afried@mvcc.edu
Anatomists benefited from the Nazis. Universities accepted bodies from political prisons. Prisoners executed for espionage were being used for teaching and research. Academics were flourishing with a large supply of cadaver materials for research and teaching. After World War II, most who worked the Nazi camps were tried as war criminals while the academics kept working without rebuke, often using the source materials gained unethically. This workshop will examine the history of academic anatomists under the Nazis. How should these specimens have been dealt with? What do you do with the knowledge gained from experiments and work with these tissues?

511 (Room IC 205) - Weird and Wacky Methods to Torture A&P Students - Ideas for Active Learning - 60 Minutes
Nichole Warwick, Clatsop Community College, nwarwick@clatsopcc.edu
Active learning strategies may be good for our students, but students can feel uncomfortable or even that they are being tortured. Additionally, active learning can press the limits of classroom time forcing the instructor to choose between formal lecture and hands on activities. Do the student’s need us to explain the text book to them, or do they benefit from activities? What is best? I plan to share some of the things I developed and use to facilitate active learning allowing me to move away from traditional lecture and improve student comprehension.

512 (Room IC 103) - Best Practices for Teaching Effectiveness, Student Inspiration and Classroom Joy! - 60 Minutes
Mary Tracy-Bee, University of Detroit Mercy, tracyma@udmercy.edu
*Sponsored by the HAPS-Thieme Excellence in Teaching Award*
As experienced educators, we have learned first hand the importance of creating a teaching style that engages our students. Gone are the days of the classroom where facts were simply stated. Now is the time where we aim to inspire and teach critical thinking and compassion. Many of us accomplish this through service learning, peer-feedback, educational games and crafts, Thieme atlases, and discussing clinical vignettes. This presentation will focus on activities that help form inspired, smart students who want to be in our classroom. Come to hear about some tried-and-true activities and be prepared to share some of your own.
513 (Room IC 107) - Reaching Students of Low Social & Cultural Support through Active Learning in A&P II - 60 Minutes
Valerie Lee, Southern Adventist University, vlee@southern.edu

Students with low social and cultural support are already disadvantaged so they are more likely to be helped by active learning techniques. Since Anatomy and Physiology courses are the gateway for students to enter Allied Health professions, four lectures of a one semester combined A&P II course were flipped. These lectures were replaced by two NSF case studies and two diagnostic games. This study used pre- and post-class surveys to compare student engagement, grit, social-belonging, and more. Students were separated into high and low cultural support groups from survey responses based on Wells 2008 segregation of social and cultural capital.

Wednesday, Session 6

601 (Room IC 109) - The Transformation of Cadaver Dissection Using Video Prosections of a Cadaver and a Synthetic Cadaver - 60 Minutes
Terence Mitchell, Campbell University School of Osteopathic Medicine, tmitchell@campbell.edu, Mark Xavier VanCura, Campbell University School of Osteopathic Medicine, vancura@campbell.edu
*Sponsored by Syndaver Labs*

To ascertain the value in utilizing Syndaver, a synthetic cadaver, to teach gross anatomy, a dissection of the gluteal region was filmed on a Syndaver and a donor cadaver. Video dissections of the Syndaver and donor cadaver were shown to first year medical students the week prior to a gross anatomy examination. After the exam, a questionnaire was given electronically to each student assessing their subjective value of the utilization of this tool for study purposes. We will discuss the results as they highlight the value of incorporating a new technology as an adjunct to traditional donor cadaver dissection.

602 (Room IC 111) - Stop Testing in the Stone Age: Exam App for Anatomy Labs, Classroom Flipping and Student Engagement - 60 Minutes
David Vogelsang, EducationHive LLC “AnatomyHive”, david@anatomyhive.com
*Sponsored by AnatomyHive*

Stop grading handwritten, fill-in-the-blank practical exams. Get out of the A through E, bubble sheet box. Flip your classroom and engage your students in lecture. AnatomyHive is an exam app created for anatomy labs, but can solve any of your testing needs. Pin your practical exam like you normally would, and students can use any WIFI enabled device to take your exam in the lab. Exams are graded instantly and actionable statistics are generated. Flip your classroom and spice up your lecture using embedded YouTube videos and high quality images. For more information, visit www.anatomyhive.com.

603 (Room IC 113) - Fostering Authentic Anatomy and Physiology Laboratory Experiences for Online Learners - 60 Minutes
Caitlin Runne-Janczy, eScience Labs LLC, esalvidrez@esciencelabs.com
*Sponsored by eScience Labs LLC*

Online education is becoming increasingly commonplace, particularly the transition to online science courses with a lab component. For anatomy and physiology instructors considering teaching online, questions such as, “What do students experience in an online laboratory course?” and “How do I effectively teach the scientific method and retain a hands-on approach in a home environment?” may seem daunting. However, it is possible to effectively teach anatomy and physiology online. In this seminar, the eScience Labs team will discuss their hands-on anatomy and physiology kit and curriculum, with a focus on maintaining a rigorous and safe laboratory experience at home.
604 (Room IC 115) - Full STEAM Ahead: All Aboard - 60 Minutes
Mia Ray, Trinity Washington University, raym@trinitydc.edu
Can the integration of Arts into an Anatomy and Physiology (AP) curriculum increase student learning and information retention? See how the humanities, film, sculpture and 3D design, integrated into the AP curriculum ignites students’ imagination through hands-on STEM projects. This technique allows the application of creative thinking, thereby unleashing innovation and reinforcing key concepts to improve understanding and information retention.

605 (Room IC 209) - MasteringA&P and MyReadinessTest: A First-Timer’s Guide - 60 Minutes
Shawn Macauley, Muskegon Community College, Shawn.Macauley@muskegoncc.edu
*Sponsored by Pearson*
This session will introduce participants to MasteringA&P and MyReadinessTest. MasteringA&P is an advanced online science tutorial and homework system that allows instructors to give students personalized attention outside of office hours. MyReadinessTest is a powerful online system designed to assess pre-A&P students’ proficiency in the foundational concepts needed for success in A&P courses and efficiently remediate gaps in targeted topics. Dr. Shawn Macauley will share results from using MyReadinessTest and MasteringA&P in his course, which will include an overview of creating homework assignments, reviewing student work, and exploring available teaching diagnostics to increase student success.

606 (Room IC 211) - Learning How to Learn in A&P - 60 Minutes
Da’Quan Craven, Georgia State University, dcraven2@student.gsu.edu, Emily O’Connell, Georgia State University, eoconnell2@student.gsu.edu, Brian Reid, Georgia State University, breid4@student.gsu.edu
Tired of poor student performance in A&P? If so, then come to this hands-on interactive workshop designed to explore techniques to improve student success. Many A&P students are new to college or science and struggle with learning large amounts of material. We will explore methods that students can use to organize and condense material while improving study techniques. We will use concept mapping, both on paper and with technology, through the use of apps and word processing programs. We will examine the importance of eye-catching color and visual schematics as a means of learning optimization. Join us to gain the tools required to be proficient in optimizing student success in A&P.

607 (Room IC 213) - Using Repeated Low Stakes (Formative) Assessment to Maximize Student Learning in your Course - 60 Minutes
Jon Jackson, Institute for Philosophy in Public Life, jcksn@mac.com
Several lines of research have indicated that for some subjects at least, low-stakes assessment with its emphasis on information retrieval and usage, can promote effective learning, even in strange and unfamiliar topic areas. This seminar will review the science behind such claims, and report on using these techniques to teach radiological anatomy in a one-semester Human Gross Anatomy course in an allied health setting. The workshop will conclude with an open discussion of the necessary logistics for adapting such practice into the variety of A&P courses in which HAPSters are involved.

608 (Room IC 217) - Incorporating 21st Century Skills Into A Human Physiology Course - 60 Minutes
Ann Caplea, Walsh University, acaplea@walsh.edu
Historically, biomedical sciences education has primarily focused on learning content. However, healthcare professions are now demanding higher levels of thinking, communicating and lifelong learning. The skills at the heart of being a lifelong learner include 21st century skills ( http://www.21stcenturyskills.org). Learning to learn includes critical thinking and problem solving, communication and collaboration, and creativity and innovation. This workshop will introduce participants to my Human Physiology course that uses problem-based learning (PBL) and team-based learning (TBL) strategies in the classroom. The use of directed case studies, individual and group readiness assurance tests (IRAT/GRAT), and a peer evaluation process will be presented.
609 (Room IC 219) - Lab Assessment Techniques - 60 Minutes
Stephanie Wallace, Texas Christian University, stephanie.wallace@tcu.edu, Molli Crenshaw, Texas Christian University, molli.crenshaw@tcu.edu
There are many different methods for assessing knowledge in the lab, and it can be difficult to determine which is the best for achieving learning outcomes. We will discuss the methods we have used and how effective they were at determining knowledge of lab material. We will also open the floor for discussion of other techniques.

610 (Room IC 105) - Taking the Lab to the Cloud: Using Lt as a Learning Platform for Large Enrollment Lab Courses - 60 Minutes
Aura Grundidge, University of Rhode Island, afgrundidge@uri.edu, Wes Colgan, ADInstruments, w.colgan@adinstruments.com
*Sponsored by ADInstruments*
In today’s teaching environment where many Universities rely heavily on graduate teaching assistants (or adjuncts) to staff large enrollment multi-section laboratories, having access to a tool that provides pre-lab uniformity across sections, while giving students opportunities to learn before, during and after laboratories is invaluable. During this workshop, we will discuss our experience using Lt in our Intro to Human Physiology labs (400 students, 17 lab sections). Participants will have the opportunity to run one of URI’s custom exercises using ADInstruments’ cloud based learning system, while experiencing the ease of authoring and deployment of pre, post and wet lab materials.

611 (Room IC 205) - Ok, I’ve Flipped, but it Doesn’t Always Look Pretty - The Mechanics of Classroom Management - 60 Minutes
Nichole Warwick, Clatsop Community College, nwarwick@clatsopcc.edu
Effort has been put forth recently to convince us to “flip” or use active learning strategies, but the individual class personality can create problems with implementation. One year an intuitive group will be your dream class, another may find us grid locked with concrete learners that have little buy in. I’d like to invite beginner, intermediate and experienced flippers to engage in round table discussion to address the challenges of classroom management.

612 (Room IC 107) - Students with Blindness and Visual Impairments in the College Biology - 60 Minutes
Barbara R. Heard, Atlantic Cape Community College, bheard@atlantic.edu
Students with blindness and visual impairments (BVI) often encounter obstacles participating in laboratory activities. Specific accommodations, such as audible equipment, projections of microscopic images, and Braille-labeled models, are being provided for students with BVI in the college biology laboratory. This workshop will examine the effectiveness of those specific accommodations based on data from a recent study that gathered the perceptions of students with BVI who have completed a college biology course, and of college biology instructors who have taught students with BVI.

Wednesday, Session 7

701 (Room IC 109) - Four Years Flippin’: The Good, the Bad, and the Ugly - 60 Minutes
Wendy Riggs, College of the Redwoods, wendy-riggs@redwoods.edu
There is a lot of chatter about the value of the flipped classroom in the biological sciences. After four years of using video lectures to completely flip the three courses I regularly teach (Human Anatomy, Human Physiology, and General Biology), I have a lot to say. This workshop will facilitate a conversation about the pros, cons, and CRAZIES of the flip.
702 (Room IC 111) - Move into Success - 60 Minutes
Brandee Gillham, Morgan Community College/Sheridan College, Alyssa@anatomyinclay.com
*Sponsored by ANATOMY IN CLAY® Learning System*

Build on our MANIKEN® models and learn how other amazing instructors are using this innovative and creative system to increase student success. In this fun, hands on workshop you will learn how to build the rotator cuff and muscles of facial expression out of clay. Building different types of muscles, muscle fibers and attachment sites with the Anatomy in Clay® Learning systems will help your students create lifelong retention of the importance and function of muscles in the human body. Come build with us!

703 (Room IC 113) - Anatomy and Physiology and Glitter: Open-Ended Creative Assignments Amp Up Student Learning & Engagement - 60 Minutes
Kristen M. Platt, University of Kentucky, platt.kristen@uky.edu

Glitter, glue, and glitz are not words typically associated with anatomy and physiology, but when creativity and science combine, exciting products can result. Undergraduate anatomy and physiology students were provided the opportunity to complete an open-ended assignment in the medium of their choice regarding the respiratory system. Students were given specific instructions to create a one page product discussing a clinically relevant topic; results will be discussed. In this workshop, participants will actively develop ideas for creative assignments in their own classroom using mixed media. In addition, participants will brainstorm and share alternative ways to add pizzazz to their pedagogy.

704 (Room IC 115) - A “Less is More” Approach to Technology in the Classroom - 60 Minutes
Benjamin Miller, Texas Wesleyan University, brmiller@txwes.edu, Robert (Bob) Eckstein, Warren Wilson College, eckstein@warren-wilson.edu

There is pressure to incorporate technology into the curriculum, aiming to achieve educational objectives, including the Anatomy and Physiology course competencies. The concept “less is more” minimizes one component and results in a greater final product. In this workshop, we will explore this idea through technology-free face-to-face delivery. Rather than inundating students with myriad technologies, we must remember the value of a genuine one-on-one relationship with our students. Our goal for this workshop is to present several approaches that we have used in the lecture and laboratory which have been shown to increase course competencies using more face-to-face content.

705 (Room IC 209) - The One-Semester A&P Student: Overcoming the Challenge of Being Underprepared - 60 Minutes
Suzanne Keller, Indian Hills Community College, Suzanne.Keller@indianhills.edu

The majority of one-semester A&P students are underprepared, and A&P will be the first college-level science class for many of these students. Study skills are often lacking. How do we prepare this student population to learn new vocabulary, understand tough A&P topics, and link concepts between systems all without sacrificing the material? Dr. Suzanne Keller has taught the one-semester A&P course for eight years and will share how she tackles these challenges. Attendees will get hands on so that everyone leaves with new ideas to implement.
706 (Room IC 211) - Building Community and Creating Authentic Learning Opportunities - 60 Minutes
Jacqlyn King, University of Oregon, jhyler@uoregon.edu
Student learning, persistence and retention improve when students have personal relationships within their academic community and opportunities for authentic learning. Given the physical design of classrooms and reality of larger class sizes, one might assume that a teacher-centered approach, where the instructor is viewed as the content expert and students assume the role of passive and invisible participants, is inevitable. During this workshop, we will share techniques to help you transform your classroom into an engaging experience where students have the opportunity to apply knowledge from their preparatory assignments and interact with their team of instructors and peers. You will leave this workshop with a new outlook on the community and engagement that can be established in a large (or small) classroom setting through the use of authentic preparatory assignments.

707 (Room IC 213) - Thinking about thinking: How Does Metacognition Impact Student’s Performance and Perception of their Learning Experience - 60 Minutes
April Richardson Hatcher, University of Kentucky, arich3@uky.edu
This workshop will characterize students’ learning techniques and perception of their learning experiences in a large undergraduate anatomy course. The course is divided into four units of systems-based anatomy. For each unit, students worked on a series of “Blue Book Assignments”, including reflections on how they studied (e.g., how many hours, methods) each module, drawings of key anatomical structures before/after class to reinforce the foundational content, and clinical applications of the material. Participants will follow the journey of 260 students throughout their semester of anatomy. We will actively discuss ways to encourage metacognitive practices in the classroom.

708 (Room IC 217) - When a Picture is NOT Worth a Thousand Words - 60 Minutes
Lori Garrett, Parkland College, LGarrett@parkland.edu
Research shows that images can promote deeper learning. However, research also shows that students often ignore images presented in their textbooks or in class, they undervalue the artwork, or they simply don’t understand it, which all translates into lost learning opportunities. What challenges do our students face when studying from images? Why are some images more effective than others? In this session, we will explore the questions and discuss ways to effectively incorporate images in our classes to promote visual literacy and increase learning.

709 (Room IC 219) - Design, Implementation, and Assessment of a High Structure Graduate Human Anatomy Course - 60 Minutes
Justin Shaffer, University of California, Irvine, j.shaffer@uci.edu
High structure courses that include pre-class content acquisition and assessments, in-class active learning exercises, and weekly review assignments have been shown to improve learning in biology courses, but are they suitable for teaching human anatomy? The goal of this study was to design, implement, and assess a high structure undergraduate human anatomy course at a large research university. This workshop will describe the teaching materials for this course, explore quantitative and qualitative assessment results, and suggest ways to implement high structure human anatomy courses at other institutions.
710 (Room IC 105) - Don’t be Passive - Activate your Lessons! - 60 Minutes
Ellen Miller, ADInstruments, e.miller@adinstruments.com, Wes Colgan, ADInstruments, w.colgan@adinstruments.com
*Sponsored by ADInstruments*
Interested in turning passive studying material into an active learning experience for your students? Increasingly, assessment researchers conclude that reading wordy documents is one of the lowest-value study techniques. In this workshop, we will build engaging and interactive lessons using ADInstruments Lt learning system. We’ll also discuss free resources available for you to make your materials into compelling content that has a positive impact on your students. Get tips and best practices for incorporating active learning approaches into your lessons, and explore how integrating study questions with immediate feedback enhances student learning outcomes.

711 (Room IC 205) - A Simple Tool to Encourage Effective and Voluntary Student Use of Learning Outcomes - 60 Minutes
Tynan Becker, University of Alaska Fairbanks, tabecker@alaska.edu
The use of Backwards Design has been established as an effective method for developing a course. A key component of the Backwards Design concept is the use of learning outcomes. In my classroom, I have observed that students are reluctant to use learning outcomes as a study guide. To remedy this, I created a simple tool that encouraged the voluntary and effective application of learning outcomes by students as a way to focus their learning. I will share my method and facilitate a discussion among participants that wish to share their efforts in encouraging students to use the learning outcomes.

712 (Room Clough 475) - PowerPoint Beyond the Basics - 60 Minutes
J. Ellen Lathrop-Davis, Community College of Baltimore County, elathrop@ccbcmd.edu
Ever consider spicing up your lecture PowerPoint presentations with animation? Ever wonder how to make videos for your online students using PowerPoint? Ever wonder how to decrease file size when your PowerPoint is huge? PowerPoint can do a lot while not causing the motion sickness some associate with other programs. Bring your own presentation to work on and learn how to add animation, transitions, videos, and sound and more to your presentations.

Wednesday, Session 8

801 (Room IC 109) - Using Fun Activities to Learn About the Function of the Organelles - 60 Minutes
Julia Schmitz, Piedmont College, jschmitz@piedmont.edu
Looking for fun and new ways to help your students learn about organelles’ functions? This workshop will engage the audience in different activities to teach about the organelles to their students. Participants in this workshop will partake in determining which object is representing which function and coming up with their own analogies. Activities include having the students come up with analogies of organelles to a city, finding objects to represent the functions of the organelles, and researching diseases that result in a malfunction of specific organelles. Interactive discussions will provide your students with an understanding of the interworkings of organelles.
802 (Room IC 111) - Game-Based Learning and Student Motivation - 60 Minutes
Alice Khin, University of Alberta, alice.khin@ualberta.ca, Upinder Singh, University of Alberta

I have been teaching physiology and pathophysiology to undergraduate nursing students for years. The class sizes are large and it is challenging to get students engaged with the course material. Recently, I changed my teaching from a traditional format to a blended learning design format. The blended format requires students to participate in an online game-based learning platform called 3D GameLab. This is a tool that enables instructors to design and share personalized learning paths for students. Quests vary in complexity from simple recall to higher level synthesis activities. Students are engaged and highly motivated and the failure rate is almost zero.

803 (Room IC 113) - From Student to Text: How Data is Changing Content Development - 60 Minutes
Michael Windelspecht, Appalachian State, michael@ricochetprod.com
*Sponsored by McGraw-Hill Education*

Students don’t know what they don’t know. This has implications across the entire learning ecosystem. From the classroom to the content developers, a considerable amount of time is dedicated to development of resources that anticipate the needs of the learner. Adaptive learning technologies are now providing the data that allows us to understand specific knowledge deficiencies. We will explore how data enhances the personalization of the remediation process, assists in the revision of content, and allows for the development of specific micro-learning resources that target the actual needs of the learner.

804 (Room IC 115) - Strategies for Teaching A&P to Best Meet the Needs of Nursing Education - 60 Minutes
Sally Aboelela, Columbia University School of Nursing, sa2242@columbia.edu

Many of us who teach anatomy and physiology are embedded within nursing departments or schools of nursing. Trained as basic scientists ourselves, we are presented with the challenge of making our courses approachable to students of diverse educational backgrounds, teaching our content effectively, and engaging student interest. Yet another challenge is how best to use the context of nursing education as a guide for course design, teaching approach, goal setting, and course evaluation. Through this workshop we’ll explore the particular nursing competencies our courses serve to develop, a specific approach to teaching anatomy & physiology I’ve developed over many years aimed at best meeting the needs of nursing students, and we’ll discuss how this approach can be applied to the courses you teach.

805 (Room IC 209) - Understanding Tubes - 60 Minutes
Mark Nielsen, University of Utah, marknielsen@bioscience.utah.edu

Tubular anatomy is a ubiquitous structural feature of the human body. In fact, early in the evolution of multicellular organisms tubes became essential features to connect the external environment, with its rich nutrient supply, to the internal milieu. With the evolution of the vertebrate body, tubes have taken on numerous functional roles related to this theme of environmental exchange, yet all tubes have the same basic structure. Our goal as teachers is to help our students see this basic tubular plan and understand how various modifications logically account for the structure-function interplay that is unique to each specific tube.

806 (Room IC 211) - From the A&P Lab to the Museum: The Art of Damien Hirst - 60 Minutes
John Robertson, Westminster College, robertjc@westminster.edu

Damien Hirst is a popular and polarizing artist who, over the past 25 years, has re-contextualized materials very familiar to A&P students and instructors in creative and provocative ways. A retrospective of Hirst’s work will be presented, focusing on his use of anatomical models and biological specimens to challenge some basic conceptions of art. His success as an artist and rise as a popular culture icon will be contrasted with criticism that has become increasingly associated with Hirst and his art. Uses of Hirst’s art in an A&P course, and student reactions to his work, will also be presented.
807 (Room IC 213) - Changing Traditional Face-to-Face A&P I and II into Blended Online (Hybrid) Classes - 60 Minutes

Brenda del Moral, Edgewood College, bdelmoral@edgewood.edu

Four years after changing face-to-face A&P classes to a hybrid online class structure, what has been the benefit to students and student learning? In this workshop, the presenter will explain how a traditional class was changed into a hybrid online course, which included keeping the 2-hour laboratory session, adding a 50-minute discussion, and removing the three, 50-minute weekly lectures. Most A&P content was moved online to Blackboard 9.1 with the use of Blackboard-embedded discussions, wikis, and blogs, as well as MasteringAP.com and free Web 2.0 tools and interactive videos. This is an example of blending curricula – no online lectures, only using instructor-created online assignments, case studies, and portfolios, as well as the plethora of freely available online A&P content. Analysis of grades and exam scores between these hybrid and traditional classrooms reveals an interesting picture of performance among different student populations and some surprising anecdotal results. Participants will be encouraged to share their feedback and interpretation of the assessment analysis.

808 (Room IC 217) - I Don't Think They Hear What I Am Saying! How to Help Students Conceptualize Difficult Material - 60 Minutes

Jennifer Regan, University of Southern Mississippi, Jennifer.Regan@usm.edu, Cinnamon VanPutte, Southwestern Illinois College, Cinnamon.VanPutte@swic.edu

How many times have you read answers on an exam and exclaimed “I never said THAT!”? Over our years of teaching Human Anatomy and Physiology we both share the feeling that our students are just not hearing what we are saying. However, what we have found is that it is not for their lack of trying, many of our students just do not have the framework for understanding difficult concepts. We will present several active learning exercises that we have found are useful in improving student learning, resulting in some learning opportunities for ourselves as well.

809 (Room IC 219) - A History of Women in Anatomy: Nuns, Criminals, and Midwives - 60 Minutes

Danielle C. Hanson, Indiana University, dchanson@indiana.edu

The stories of women in the history of anatomical exploration are often overshadowed by the well documented stories of male anatomists such as da Vinci and Vesalius. Nuns were dissected to look for holy signs imprinted within them, midwives held “secret knowledge” of the female anatomy, wax models were made to reveal the anatomy of the female body and pregnancy, and the anatomization of executed female criminals drew enormous crowds. Though often conducted outside of traditional medical contexts or not recorded in typical scientific or anatomical materials, these female contributions to anatomy are integral to understanding its complete history.

810 (Room IC 105) - Five Simple Ways to Humanize Your Online Course - 60 minutes

Camille Freeman, Maryland University of Integrative Health, cfreeman@muih.edu

Are you and/or your students worried that online courses feel impersonal and robotic? “Humanizing” your course can improve student learning and lead to a better experience for everyone involved. In this session, I’ll share my experiences humanizing two online physiology courses over the past two years. We’ll cover five quick and easy suggestions for those who would like to modify their own courses, with a few advanced strategies thrown in for good measure. Please plan to share your own experiences and ideas during this interactive session.
811 (Room IC 205) - 3D Printing of Anatomical Models to Increase Student Engagement in Education - 60 Minutes
Laura Sweet, Eastern Michigan University, Lsweet1@emich.edu, James J. Sweet, Eastern Michigan University, jsweet@emich.edu

3D printing is a new technology being utilized for students to be more hands on in learning A&P concepts, while also developing clinical skills. The authors of this proposal have utilized 3d printing in the classroom to support the unique learning styles of students. The significance of this proposal is to increase the awareness of educational technologies in the classroom and clinic. Additionally, the idea of using 3d printing in education allows for fiscal responsibility and also an increase in student engagement. It provides the educator an ability to develop a number of anatomical and related models inexpensively to help students with understanding.

812 (Room IC 103) - What We Teach in High School A&P - 60 Minutes
Carolyn Hess, School of Health Professions, DISD, cahess@dallasisd.org

The HAPS blog has often contained threads where frustrated post-secondary A&P instructors wonder, “why don’t these students have ANY background if they’ve taken “A & P” in high school?” This session is presented by a 20-year A&P high school teacher with a background in 3 school districts. I’ve seen the range of what is presented by different teachers, and I will offer some information about what may be taught in high school, what may not, and some explanation.

813 (Room IC 107) - DaVinci to Teach Anatomy - 60 Minutes
Caryn Babaian, Bucks County Community College, caryn.babaian@bucks.edu

The general background of the arts in anatomy and medicine are the basis for this lecture and workshop. Using the principles and drawing strategies of Leonardo DaVinci, we developed a course, workbook, and exercises that take full advantage of a student’s inherent often underdeveloped and underrated ability to draw. Focusing on transparency, rotation, and transverse section, and applying DaVinci’s universal appreciation of patterns in nature, we teach anatomy from a wholistic, whole brain pedagogy. The methods used in this book rely on the concept of the human body in context with all of nature. The story of human anatomy is presented as narrative. We invite educators to develop skills that allow them to better utilize anatomical models, complex and “fuzzy” topics in anatomy, physiology, and medicine, and to create a theatrical component to the lecture experience. Dr. Mangione is an expert on Leonardo, his life, and his anatomical notes and drawings. The lecture is interactive and involves drawing and visualizing.
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