WORKSHOPS SPONSORED BY:

MAY 25 - 30, 2013

Roll the Bones!

27TH ANNUAL CONFERENCE
MAY 25 - 30, 2013

Promoting Excellence in the Teaching of Human Anatomy and Physiology
**Exploring Anatomy & Physiology in the Laboratory, Second Edition**

Erin C. Amerman  
© 2013  
736 Pages  
Loose-leaf  
Three-hole drilled  
Full-color  
E-book available  
ISBN: 978-1-61731-056-0

This comprehensive, beautifully illustrated, and affordably priced manual is appropriate for one- or two-semester anatomy and physiology laboratory courses. Through focused activities and by eliminating redundant exposition and artwork found in most primary textbooks, this manual complements the lecture material and serves as an efficient and effective tool for learning in the lab.

**Be Prepared**  
Pre-Lab Exercises encourage students to actively prepare for the lab.

**Be Organized**  
Model Inventories provide easily referenced lists of anatomical structures that students are responsible for identifying. These lists help students catalog the specimens they see in the lab.

**Be Focused**  
Illustrations and Photography. There are 200 new and revised illustrations in this edition, providing a more detailed view of anatomical structures.

**Be Active**  
Focused Activities, such as tracing, labeling, and coloring exercises, promote active learning to help students retain what they are learning in the lab.

**Be Sure**  
Check Your Understanding questions ask students to use the information they have learned to answer critical thinking questions.

**Be Aware**  
Suggested Student Price  
$84.95.  
(Approximately 40% less than our competitors)
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THE HUMAN BODY

designed for your student body

Come see how Elsevier makes A&P easier for you and your students, check out the latest A&P products, and get your picture taken in our photo booth!

BOOTH 31.
Welcome to HAPS Las Vegas!

This is my first HAPS Annual Conference, but I know that many of you are long-time HAPS members who have all done this before. I look forward to learning the ropes from those of you with all the experience and sharing the first time experience with those of you who are new like me. Whether you are a first-timer like me or an old hand, welcome to Las Vegas!

The real strength of HAPS is its members, and nothing highlights that fact more than getting a big group of HAPS members together! We have an impressive array of six Update Seminars planned for Sunday and Monday, more posters than ever before, and almost 140 workshop presentations at Nevada State College on Tuesday and Wednesday. And some of you are earning graduate credit by taking part in the in-person phase of your HAPS Institute courses. There is a wealth of knowledge, camaraderie, and just plain fun to be had this week, and if that is not enough there is always Las Vegas just outside the door!

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 teacher, so we will surely have something to share with each other. I would love to hear your thoughts: do you have ideas of how to make HAPS even better, how to expand our wonderful group, or how you can be more involved? Let me know!

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

Sincerely,

Peter English, Ph.D.
HAPS Executive Director
Dear Attendees,

Welcome to America’s most dynamic city – Las Vegas! You could not have chosen a better City to hold the HAPS conference, and I am convinced that once you get a taste of what Las Vegas has to offer, you will definitely be back. As the Mayor of this great City, I am delighted to tell you why Las Vegas is the place to live, work and play!

Las Vegas continues to capture the world’s imagination as the City where anything is possible. With world-class hotels, award-winning restaurants, luxurious spas, fantastic shopping, the finest golf courses and spectacular entertainment, Las Vegas remains one of the most electrifying destinations in the world.

While attending the conference at the Mirage Hotel Las Vegas, it is my hope that you will have a chance to explore Downtown Las Vegas, an area of our City that is undergoing a dramatic renaissance. It is evolving into a vibrant place for living, working, entertainment and the arts. Downtown Las Vegas is comprised of an enticing mix that includes:

- The neon-drenched excitement of the Fremont Street Experience, visited by over 21 million people each year.
- Multi-million dollar casino and hotel renovations and expansions.
- Fremont East Entertainment District featuring trendy new gathering places for dining, dancing, cocktails and enjoyment.
- An emerging eclectic mix of live-in artists and galleries known as the 18b Arts District.
- The World Market Center, a state-of-the-art home furnishings trade show complex with over 5 million square feet, has merged with another furniture complex in North Carolina and will now be called the International Market Center. The facilities in Las Vegas and North Carolina encompass 13 buildings, with 10.6 million square feet of furniture showrooms.
- Symphony Park, a phenomenal 61-acre planned development anchored by two key projects, the Cleveland Clinic Lou Ruvo Center for Brain Health, designed by renowned architect Frank Gehry, and The Smith Center for the Performing Arts, Las Vegas’ first world-class performing arts facility. Symphony Park will also be the planned future home of The Charlie Palmer, a luxury boutique business hotel; a first-class casino/hotel with significant retail space; abundant street-side retail offerings; a two-acre park; and an estimated 1000 urban style residences.
- The Neon Museum Boneyard holds over 100 donated and rescued signs. Signs featured date from the late 1930s through the early 90s and represent motels, local businesses, and celebrated casino resorts from throughout the Las Vegas Valley.

Again, welcome to fabulous Las Vegas! Best wishes for an enjoyable stay in our fine City.

Sincerely,

Carolyn G. Goodman
Mayor, City of Las Vegas
NEW for 2013!
A.D.A.M. Interactive Anatomy Student Lab Activity Guide and A.D.A.M. On-Demand

A.D.A.M. now offers new resources for any allied health, anatomy, physiology, medical training and continuing education programs.

A.D.A.M. Interactive Anatomy online Student Lab Activity Guide Bundle
A.D.A.M. and Wolters Kluwer, Lippincott Williams & Wilkins have teamed up to produce a Lab Guide to supplement A.D.A.M. Interactive Anatomy online. Complete with lab exercises, assessments and color-graphics, this guide will help bring the material to life, make the content more meaningful, and place students on the path to mastery of human anatomy and physiology.

A.D.A.M. On-Demand®
It’s the most comprehensive library of off-the-shelf allied health courses for anatomy, physiology and allied health programs. With more than 150 courses that can be delivered to your learners on multiple platforms and devices, A.D.A.M. is your complete curriculum provider!

A.D.A.M., a business unit of Ebix, is the most credible source of healthcare information and medical education for education institutions, healthcare organization, hospitals and the pharmaceutical industry.
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. 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. A variety of HAPS committees will hold meetings over the lunch hour on the first day of workshops (Tuesday, May 28). A complete list of committees will be available at registration and look for the poster that describes each committee's functions. 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 2012-2013**

President: Dee Silverthorn  
Past-President: Don Kelly  
President-Elect: Valerie O’Loughlin  
Secretary: Lucia Tranel  
Treasurer: Elizabeth Becker  
Central Regional Director: Pat Bowne  
Eastern Regional Director: Javni Mody  
Southern Regional Director: Jason LaPres  
Western Regional Director: Anne Geller  

Executive Director: Peter English  
Business Manager: Shanan Molnar  
Membership Coordinator: Robin Hurst  
Membership Coordinator: Kim Gable
HAPS Presidents & Conference Coordinators

Past Presidents
Richard Steadman, 1989-1990
Virginia Rivers, 1991-1992
Gary Johnson, 1992-1993
Sandra Grabowski, 1993-1994
Wayne Carley, 1994-1995
Robert Antony, 1995-1996
Karen LaFleur-Stewart, 1996-1997
Kevin Patton, 1997-1998
Steve Trautwein, 1998-1999
Christine Martin, 1999-2000
Henry Ruschin, 2000-2001
William Perrotti, 2001-2002
Michael Glasgow, 2002-2003
Philip Tate, 2003-2004
Sandra Lewis, 2004-2005
Frederic Martini, 2005-2006
Joseph Griswold, 2006-2007
Margaret Weck, 2007-2008
Kevin Petti, 2008-2009
John Waters, 2009-2010
Caryl Tickner, 2010-2011
Don Kelly, 2011-2012

Current President
Dee Silverthorn, 2012-2013

Previous HAPS Conferences
1987/1988 – River Grove, IL (Robert Anthony)
1989 – Reno, NV (Virginia Rivers)
1990 – Madison, WI (Gary Johnson)
1991 – Greenville, SC (Karen LaFleur-Stewart)
1992 – San Diego, CA (Shirley Mulcahy)
1993 – Beaumont, TX (Wayne Carley)
1994 – Portsmouth, NN (Pam Langley)
1995 – St. Louis, MO (Kevin Patton)
1996 – Portland, OR (John Martin)
1997 – Toronto, ON, Canada (Henry Ruschin)
1998 – Fort Worth, TX (Theresa Page)
1999 – Baltimore, MD (Robert Smoes)
2000 – Charlotte, NC (Nishi Bryska)
2001 – Maui, HI (Frederic Martini)
2002 – Phoenix, AZ (Philip Tate)
2003 – Philadelphia, PA (Lakshmi Atchison)
2004 – Calgary, AB, Canada (Izak Paul)
2005 – St. Louis, MO (Margaret Weck)
2006 – Austin, TX (Mary Lou Percy)
2007 – San Diego, CA (Kevin Petti)
2008 – New Orleans, LA (Judy Venuti)
2009 – Baltimore, MD (Ellen Lathrop-Davis)
2010 – Denver, CO (Terry Harrison)
2011 – Victoria, BC, Canada (Peggy Hunter)
2012 – Tulsa, OK (Karen McMahon)

This Year
2013 – Las Vegas, NV (Kebret Kebede)

Coming Attractions
2014 – Jacksonville, FL (Lourdes Norman & Steve Wood)
HAPS Committees
2012-2013 Committee Chairs

HAPS has a number of committees that deal with a wide variety of topics within the Society. Below are the chair and a brief description of each committee. Look for the committee chairs throughout the conference and learn more about what HAPS has to offer (First-Timers will be seeking them out as part of the Scavenger Hunt).

**Animal Use Committee**
*Nick Despo*

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

**Cadaver Use Committee**
*Christine Eckel*

We engage in issues pertinent to development and maintenance of cadaver labs for undergraduate and graduate programs as well as development of questionnaires to provide information for HAPS members.

**Communication Committee**
*Pat Bowne*

We encourage communication and outreach within the Society as well as outward to non-members and potential members through various social media outlets.

**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.

**Curriculum & Instruction Committee**
*Ron Gerrits*

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.

**Executive Committee**
*Dee Silverthorn*

We are comprised of the top administrators of HAPS, setting policies and governance of the Society.
<table>
<thead>
<tr>
<th>Committee Name</th>
<th>Chair Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Oversight Committee</td>
<td>Mike Kopenits &amp; Bob Crocker</td>
</tr>
<tr>
<td>HAPS-EDucator Committee</td>
<td>Sarah Cooper &amp; Jenelle Malcos</td>
</tr>
<tr>
<td>HAPS-Institute Committee</td>
<td>Peter English</td>
</tr>
<tr>
<td>Marketing Committee</td>
<td>Elizabeth Hodgson</td>
</tr>
<tr>
<td>Membership Committee</td>
<td>Elizabeth Pennefather-O’Brien</td>
</tr>
<tr>
<td>Nominating Committee</td>
<td>Valerie O’Loughlin</td>
</tr>
</tbody>
</table>

**Foundation Oversight Committee**
Mike Kopenits & 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.

**HAPS-EDucator Committee**
Sarah Cooper & Jenelle Malcos

We create the quarterly online publication, the HAPS-EDucator. Committee members solicit articles about teaching or other relevant topics, edit, proofread, and determine what new content might be of benefit to our members.

**HAPS-Institute Committee**
Peter English

We organize short graduate courses and other continuing professional education opportunities for HAPS members.

**Marketing Committee**
Elizabeth Hodgson

We create and sustain relationships between HAPS and scientific and publishing exhibitors.

**Membership Committee**
Elizabeth Pennefather-O’Brien

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**
Valerie O’Loughlin

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

*2012-2013 Committee Chairs... continued*

<table>
<thead>
<tr>
<th>Presidents-Emeriti Advisory Board</th>
<th>Safety Committee</th>
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<tbody>
<tr>
<td>Caryl Tickner</td>
<td>Joseph Olubadewo</td>
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<td></td>
<td></td>
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<tr>
<td>We are comprised of past</td>
<td>We promote laboratory safety awareness in the A&amp;P laboratory. We continue to revise and update the HAPS Safety Guidelines and are preparing a collection of case studies about A&amp;P laboratory safety for publication.</td>
</tr>
<tr>
<td>presidents of HAPS, providing</td>
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<td>advice and a historical</td>
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<td>perspective to the Board of</td>
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<td>Directors upon request.</td>
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<tr>
<th>Steering Committee</th>
<th>Testing Committee</th>
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<tbody>
<tr>
<td>Tom Lehman</td>
<td>Curtis DeFriez &amp; Eric Sun</td>
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<td></td>
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<tr>
<td>We provide communication among</td>
<td>We develop, maintain, and manage the HAPS comprehensive exam. We are working on developing an online exam and aligning the exam to the student learning outcomes established by the C&amp;I Committee.</td>
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<tr>
<td>the various committees of HAPS</td>
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<tr>
<td>and enhance the ability of the</td>
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<td>committees to collaborate in</td>
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<td>furthering the aims of the</td>
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<tr>
<td>Society.</td>
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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!
HAPS would like to recognize and thank all of our conference exhibitors, sponsors, and advertisers. Their generous support makes the HAPS 27th Annual Conference possible.

**OUR SPONSORS**

ADInstruments, Inc.
American Association of Anatomists (AAA)
American Association of Clinical Anatomists (AACA)
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American Society for Microbiology (ASM)
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Morton Publishing Co.
Pearson Education
POGIL
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**OUR EXHIBITORS**

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Amirsys, Inc.
Anatomy in Clay® Learning System
Animallearns
Backyard Brains, Inc.
BIOPAC Systems, Inc.
Blausen Medical Communications, Inc.
bluedoor LLC
BrainSpin (anatomyEXPERT)
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eScience Labs Inc.
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New York Chiropractic College
OpenStax College/Rice University
PASCO Scientific
Primal Pictures, LTD
Skulls Unlimited
STAT!Ref
SynDaver Labs
Thieme Medical Publishers
Top Hat Monocle Corp.
Touch of Life Technologies
Vernier Software and Technology
Visible Body
Welcome to the Seventh Season of HAPS Institute!

HAPS Institute (HAPS-I) offers participants 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. Final course projects may be written for publication and submitted to HAPS-Educator or other journals.

Participants who successfully complete HAPS-I courses earn graduate biology credit through Alverno College in Milwaukee, Wisconsin.

There are two 2-hour semester graduate credit courses coordinated with the 27th Annual Conference! More courses are planned for Summer and Fall 2013 and will be announced as they are finalized.

**Cadaver Anatomy and Embryology of the Abdominal and Thoracic Cavities**  
(2 credits)  
Dr. Melissa A. Carroll, University of Texas at El Paso  
Afternoon workshop (1/2 day) to be held on Tuesday, May 28

Cadaver courses have been particularly popular at the HAPS Annual Conference, and this course is designed to challenge and strengthen college-level instructors’ current understanding of abdominal and thoracic anatomy. Previously dissected cadaveric specimens will be available to review the anatomical organization of the thorax and the abdomen. The integration of embryological concepts will also enhance the review of normal cadaveric anatomy. Basic embryological development and gestational milestones will be introduced with current journal articles that outline clinical application of these concepts. Participants should walk away enriched with clinical significance of embryological development and the body cavities.

**Molecular and Cellular Basis of Human Disease**  
(2 credits)  
Dr. Brian R. Shmaefsky, Lone Star College - Kingwood  
Morning workshop (1/2 day) to be held on Tuesday, May 28

The last two decades have seen ground-breaking advances in basic and medical research, from the sequencing of the human genome to the identification of over 15 million human DNA variations, to the use of those variations to track down elusive disease genes and epigenetic factors. The wealth of genomic, proteomic, and epigenetics information combined with cutting-edge technologies has changed our understanding of human disease. This course will examine the cellular, molecular, epigenetic basis of endocrine diseases as a model that connects the cellular processes with the physiology and pathophysiology at the tissue and whole organ level. This course uses case studies and current literature reviews in a hybrid format and will require online coursework and one face-to-face workshop at the HAPS conference. The content of the course is directly applicable to those teaching classes ranging from introductory human anatomy and physiology to upper level courses in physiology. This course is designed to facilitate your teaching as well as update your content knowledge.

Participants in all HAPS-I courses produce a final project (for example, a case study or review article) that is reviewed by peers in the course and may be published in a professional publication.
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 (Did you know there are HAPS-I scholarships?)
- 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 haps.exec@gmail.com with your comments, questions, or suggestions.

There’s also plenty of information about HAPS Institute on the HAPS website – look for the tab called “Continuing Education.”

<table>
<thead>
<tr>
<th>HAPS Institute 2013 Sponsors</th>
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<tr>
<td>CONTRIBUTING SPONSOR</td>
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<tr>
<td>American Association of Anatomists (AAA)</td>
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<tr>
<td>SCHOLARSHIP SPONSOR</td>
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<td>Morton Publishing</td>
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<td>ACADEMIC PARTNERS 2013</td>
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<tr>
<td>Alverno College (Milwaukee, WI)</td>
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<td>American Association of Anatomists (AAA)</td>
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<td>American Association of Clinical Anatomists (AACA)</td>
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<td>American Physiological Society (APS)</td>
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<td>American Society of Microbiology (ASM)</td>
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<td>Nevada State College (Henderson, NV)</td>
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Join Us for the
HAPS POKER WALK

To support the HAPS Foundation

When: Monday, May 27th at 7 am
Start and finish in the Mirage Lobby
$10 registration fee
Prizes for top poker hands, and more!

For further information and to register, stop by the HAPS Foundation table in the Exhibitor Hall

Rules:
1. Each walker completes the course by picking up a poker chip at 4 stations along the poker walk course.
2. The course begins at the Mirage Lobby, where participants receive a clue as to where the next station will be.
3. At each station, a new clue will be presented about the next station.
4. Once 4 poker chips are picked up, the walker returns to the Mirage lobby, where s/he is dealt a poker hand (5-card draw poker rules).
5. For an additional donation, a walker may exchange a card.
6. If there are ties for best hand, cards will be drawn for 1st and 2nd place.
## HAPS 27th Annual CONFERENCE
May 24 – May 30, 2013

### Schedule of Events

#### Friday, 24 May
**The Mirage Hotel**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>5:00 PM - 8:00 PM</td>
<td>Executive Committee Meeting: President’s Suite</td>
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#### Saturday, 25 May
**The Mirage Hotel**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</table>
| 9:00 AM – 12:00 PM| Board of Directors Meeting: Martinique A  
                      Steering Committee Meeting : Martinique B                                           |
| 9:00 AM – 5:00 PM| Exhibitor Set-up: Grand Ballroom E-F-G-H                                                |
| 1:00 PM – 6:00 PM| Registration: Registration Desk 1 (across from the Terry Fator Theatre)                 |
| 12:00 PM – 1:30 PM| Board of Directors and Steering Committee Luncheon: Jamaica A&B                          |
| 1:30 PM – 4:00 PM| Board of Directors and Steering Committee Meeting Jamaica A&B                             |
| 4:30 PM – 5:30 PM| HAPS Institute Course Orientation : Grand Ballroom B  
                      (registered course participants only)                                              |
| 8:00 PM – 10:00 PM| Welcome Reception: Montego Room  
                      Silver Sponsor by McGraw-Hill  
                      Registration will be open during the welcome reception                         |
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Details</th>
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<tbody>
<tr>
<td>7:00 AM – 12:00 PM</td>
<td>Registration: Registration Desk 1 (across from the Terry Fator Theatre)</td>
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<tr>
<td>1:00 PM – 5:00 PM</td>
<td>First-timers’ Breakfast: St. Croix A&amp;B</td>
<td>Sponsored in part by ADInstruments</td>
</tr>
<tr>
<td>7:30 AM – 8:30 AM</td>
<td>Continental Breakfast: Grand Ballroom F-G-H (for all other attendees)</td>
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<tr>
<td>7:30 AM – noon</td>
<td>Exhibits – Grand Ballroom F-G-H</td>
<td>Closed from noon-one PM</td>
</tr>
<tr>
<td>8:30 AM – 8:45 AM</td>
<td>Welcome and Opening Remarks: Grand Ballroom A</td>
<td></td>
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<tr>
<td>8:45 AM – 9:45 AM</td>
<td>Update Seminar I: Grand Ballroom A</td>
<td>Sponsored by American Association of Anatomists</td>
</tr>
<tr>
<td></td>
<td>“Extreme Makeover - Anatomy Edition: How a paradigm shift in pedagogy re-built and re-tooled anatomy into an essential clinical science at a medical school and undergraduate institution”</td>
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</tr>
<tr>
<td>9:45 AM – 10:30 AM</td>
<td>Refreshment Break &amp; Exhibits: Grand Ballroom F-G-H</td>
<td>Session 1 presenters available to discuss their posters</td>
</tr>
<tr>
<td></td>
<td>Poster session 1 (Session 1 presenters available to discuss their posters)</td>
<td>Posters will be divided into 3 groups and presenters will be present during only one of the 3 poster sessions.</td>
</tr>
<tr>
<td>10:30 AM – 11:30 AM</td>
<td>Update Seminar II: Grand Ballroom A</td>
<td>Sponsored by POGIL</td>
</tr>
<tr>
<td>11:30 AM – 1:30 PM</td>
<td>Lunch on your own</td>
<td>Exhibits closed 12-1</td>
</tr>
<tr>
<td>1:30 PM – 2:30 PM</td>
<td>Update Seminar III: Grand Ballroom A</td>
<td>Sponsored by American Physiological Society</td>
</tr>
<tr>
<td></td>
<td>Hannah Carey, Ph.D., University of Wisconsin, Madison, WI</td>
<td>“Unraveling Mysteries of Hibernation: From Basic Science to Biomedical Applications”</td>
</tr>
<tr>
<td>2:30 PM – 3:15 PM</td>
<td>Refreshment Break &amp; Exhibits: Grand Ballroom F-G-H</td>
<td>Session 2 presenters available to discuss their posters</td>
</tr>
<tr>
<td>3:15 PM – 4:15 PM</td>
<td>Update Seminar IV: Grand Ballroom A</td>
<td>Sponsored by American Society of Microbiology</td>
</tr>
<tr>
<td></td>
<td>Maria Marco, Ph.D. University of California, Davis, CA</td>
<td>“Feeding our beneficial microbes: pre- and pro-biotics and gut health”</td>
</tr>
<tr>
<td>5:30 PM – 8:00 PM</td>
<td>Sunday night event: BeatleShow! at Planet Hollywood at 5:30 pm with dinner package at Spice Market Buffet</td>
<td><a href="http://vegasshows.rezgo.com/details/41941/BeatleShow-at-Saxe-Theater">http://vegasshows.rezgo.com/details/41941/BeatleShow-at-Saxe-Theater</a></td>
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</table>
## Monday, 27 May
*The Mirage Hotel*

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>7:00 AM – 8:45 AM</td>
<td><em>Poker walk-run leaving from the hotel</em></td>
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<tr>
<td>7:30 AM – 9:00 AM</td>
<td><strong>Continental Breakfast:</strong> Grand Ballroom F-G-H</td>
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<tr>
<td>8:00 AM – 1:00 PM</td>
<td><strong>Registration:</strong> Registration Desk 1 (across from the Terry Fator Theatre)</td>
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| 7:30 AM -noon  
1:00 – 5:15 PM | **Exhibits:** Grand Ballroom F-G-H                                    |
| 9:00 AM – 10:30 AM | **HAPS Annual Membership Meeting:** Grand Ballroom A                  |
| 10:30 AM – 11:00 AM | **Refreshment Break & Exhibits:** Grand Ballroom F-G-H  
**Posters** (Presenters not scheduled during this short break.)|
| 11:00 AM – noon   | **Update Seminar V:** Grand Ballroom A  
Ayalew Tefferi, M.D., Professor, Hematology and Oncology  
Mayo Clinic, Rochester, MN  
“Molecular Targeted Therapy in Hematology and Oncology” |
| Noon- 2:00 PM     | **Lunch on your own**  
Exhibits close for lunch from noon-1:00 PM                            |
| 2:00 PM – 3:00 PM | **Update Seminar VI:** Grand Ballroom A  
Marios Loukas, MD, PhD, Anatomical Services  
St. George’s University, Grenada, West Indies  
*Sponsored by American Association of Clinical Anatomists*  
“Translational Anatomy Research, Quo Vadis” |
| 3:00 PM – 4:00 PM | **Refreshment Break & Exhibits:** Grand Ballroom F-G-H  
**Poster session 3** (*Session 3 presenters available to discuss their posters*) |
| 4:00 PM – 5:00 PM | **Exhibits and door prizes:** Grand Ballroom F-G-H                    |
| 6:00 PM – 9:00 PM | **HAPS Social (for all participants):** Montego Room  
*Silver Sponsor by Wiley* |

*(Schedule continued on next page)*
**Tuesday, 28 May**  
At Nevada State College, Henderson, NV

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<tr>
<td>8:00 AM – 9:00 AM</td>
<td>Transportation to Nevada State College</td>
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| 9:00 AM – 9:30 AM | Welcome  
*Sponsored by Nevada State College* |
| 9:30 AM – 12:30 PM | Workshops                                    |
| 12:30 PM – 1:30 PM | Lunch (box lunches are provided)  
*Sponsored by Pearson  
Committee Meetings* |
| 1:30 PM – 4:30 PM | Workshops                                    |
| 4:00 PM       | Bus transportation back to hotel             |

**Wednesday, 29 May**  
At Nevada State College, Henderson, NV

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<tr>
<td>8:00 AM – 9:00 AM</td>
<td>Transportation to Nevada State College</td>
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</table>
| 8:45 AM – 9:30 AM | Breakfast  
*Sponsored by Nevada State College* |
| 9:30 AM – 12:00 PM | Workshops                                    |
| 12:00 PM – 1:00 PM | Lunch (box lunches are provided)              |
| 1:00 PM – 4:00 PM | Workshops                                    |
| 4:00 PM       | Bus transportation back to hotel             |

**Thursday, 30 May**  
*Optional Day Trips – Hoover Dam and Grand Canyon tours available through Grand Canyon Tours*  
Update Seminar 1: Grand Ballroom A
Sunday, May 26 from 8:45 - 9:45 AM

Jonathan J. Wisco, Ph.D.
Sponsored by American Association of Anatomists

Assistant Professor of Pathology and Laboratory Medicine
Brigham Young University, Provo, UT
jjwisco@gmail.com
http://faculty.pathology.ucla.edu/institution/personnel?personnel_id=212287

Extreme Makeover - Anatomy Edition: How a paradigm shift in pedagogy re-built and re-tooled anatomy into an essential clinical science at a medical school and undergraduate institution

Abstract: Much has been said about, and speculated on, the effect medical sciences curriculum changes have had, and will continue to have, on gross anatomy pedagogy. In the ten years since major curriculum change was implemented at the David Geffen School of Medicine at UCLA, gross (and microscopic) anatomy pedagogy have transformed from isolated courses into themes integrated into systems based units. Although administrative policies provided the initial impetus for pedagogical transformation, in recent years, incorporation of clinical instructors into the laboratory experience has fostered multi-disciplinary teaching partnerships that provide contextual learning experiences for students. The paradigm shift from dissection to prosection pedagogy, the integration of clinically relevant anatomy through radiology and acute care, the development of interactive, online learning tools, and an upgrade in classroom technology have influenced our ability to provide advanced anatomical sciences instruction throughout all four years of undergraduate medical education. At Brigham Young University, we are scaling the best, most salient elements of anatomical sciences education at UCLA to an undergraduate anatomy program that serves nearly 2000 students per year. This year we are implementing a modified Problem Based Learning paradigm to several of our lecture sections of 200 students each, and using social media to encourage discussions during and outside of class time. We discuss our experiences of pedagogy transformation at UCLA and BYU and our vision for moving forward with anatomical sciences education.

Jonathan J. Wisco, Ph.D., Associate Professor, Physiology and Developmental Biology, Neuroscience Center, Brigham Young University; Adjunct Associate Professor, Division of Integrative Anatomy, Department of Pathology and Laboratory Medicine, David Geffen School of Medicine at UCLA; jjwisco@byu.edu

continued on next page
Jonathan J. Wisco, PhD is Associate Professor in the Department of Physiology and Developmental Biology, and in the Neuroscience Center, at Brigham Young University (BYU). He is also Adjunct Associate Professor in the Division of Integrative Anatomy, Department of Pathology and Laboratory Medicine, David Geffen School of Medicine at UCLA. He is Director of the Laboratory for Translational Anatomy of Degenerative Diseases and Developmental Disorders at both BYU and UCLA. Dr. Wisco completed his predoctoral training with Dr. Douglas Rosene in the Laboratory for Cognitive Neurobiology, Department of Anatomy and Neurobiology, Boston University School of Medicine. While there he also trained in the disciplines of anatomy, histology, neuroscience, embryology, neuropharmacology and cell biology. Dr. Wisco then completed a postdoctoral fellowship in radiology with Dr. Gregory Sorensen at the Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital/Harvard University/Massachusetts Institute of Technology. He currently serves in various capacities with the American Association of Clinical Anatomists, American Association of Anatomists, and International Association of Medical Science Educators. Dr. Wisco is the recipient of three Golden Apple Awards for Teaching Excellence by the UCLA Chapter of the American Medical Student Association in 2008, 2009 and 2011. He also received PBL Tutor of Excellence recognition at UCLA from 2006-2012. He is the 2013 recipient of the American Association of Anatomists Basmajian Award. In addition, Dr. Wisco has published in Proceedings of the National Academy of Sciences, Philosophical Transactions of the Royal Society, Annals of Neurology, and other journals for the disciplines of clinical anatomy, neuroscience, radiology, psychiatry, anesthesia, cardiology, head and neck surgery, and anatomy education. Dr. Wisco’s research interests include histological validation of imaging biomarkers for Alzheimer’s disease, anatomical validation of new surgical and radiological procedures, and improving anatomy education for medical students. In addition, Dr. Wisco directs Anatomy Academy, an elementary school outreach and research program that teaches anatomy, physiology and nutrition concepts to 5th grade students as part of their physical education program in Los Angeles, CA and Salt Lake City, UT schools. The program is integrated with language arts to encourage self-reflection on health issues. Anatomy Academy aims to combat the obesity epidemic through educational intervention, and is a multi-institutional and multi-disciplinary collaboration between the disciplines of medicine, dentistry, nursing, public health, public policy and education.

Notes:
Process Oriented Guided Inquiry Learning (POGIL): A Student-Centered Approach to Science Instruction

Abstract: Process Oriented Guided Inquiry Learning (POGIL) is a student-centered group learning approach to science instruction based on research on how students learn best. In a POGIL learning environment, students work in small groups using specially designed activities that guide them to construct key concepts and deepen their conceptual understanding of that content. At the same time, the POGIL learning environment is designed to consciously promote important process skills such as teamwork, problem solving, and critical thinking. POGIL approaches have been widely implemented in a variety of science courses at both the high school and college levels. This presentation will provide insight into the fundamental principles of POGIL and will include presentation of student outcome data concerning POGIL's effectiveness.

Rick has a B.A in chemistry from Williams College and a Ph.D. in physical chemistry from Stanford University. He is currently Professor of Chemistry at Franklin & Marshall College. He is the both a Principal Investigator and Project Director for The POGIL Project and the Project Coordinator for the Middle Atlantic Discovery Chemistry Project (MADCP). Rick has been using a guided inquiry approach to teaching chemistry since 1994, and is the co-author of POGIL materials for general chemistry and physical chemistry. In addition, he has developed guided inquiry experiments for use in the general chemistry laboratory. He has organized numerous symposia at national ACS and BCCE meetings concerning POGIL (and active learning more generally) throughout the chemistry curriculum, and has given dozens of presentations, posters, and workshops on POGIL. He is also coauthor of several journal articles and book chapters concerning POGIL, and the co-editor of the ACS Symposium Series volume: *Process Oriented Guided Inquiry Learning.*
Unraveling Mysteries of Hibernation: From Basic Science to Biomedical Applications

Abstract: Hibernation in mammals is a dynamic period characterized by extreme fluctuations in body temperature, metabolism and organ function as animals cycle into and out of the torpid state. This presentation will describe the features that characterize the annual hibernation cycle in mammals, and its potential to produce novel insights into both basic animal biology and biomedicine. Hibernating mammals fatten during the summer months, then cease feeding as winter approaches and their physiology shifts to a primarily lipid-based metabolism. In response to the winter fast, the gastrointestinal tract undergoes substantial atrophy which conserves energy and protein stores, yet it retains the cellular machinery to digest and absorb nutrients. The gut lumen is also home to trillions of microbes that have complex, mutualistic relationships that benefit both members of the symbiosis. To meet their metabolic needs, most gut microbes rely on dietary components that escape digestion and to a lesser extent, endogenous substrates such as nutrients in shed epithelial cells and mucus. Host diet is thus a major factor that regulates the diversity and abundance of the microbiota. Hibernating mammals provide a unique perspective on the evolution of host-gut microbe symbioses because of their natural cycles of extreme dietary change. Hibernators also have remarkable resistance to injury in experimental models of stress and trauma, including cold and warm ischemia-reperfusion injury, and hemorrhagic shock. Studies in the Carey laboratory and others around the world are working to unravel the mechanisms responsible for hibernation-induced stress resistance, and translate that knowledge to medical applications that help humans and other animals.

Hannah Carey is a Professor in the Department of Comparative Biosciences at the University of Wisconsin School of Veterinary Medicine. She received her undergraduate degree in Biological Sciences at the State University of New York at Binghamton, and her Ph.D. degree in Zoology from the University of California, Davis. Dr. Carey’s doctoral dissertation research was carried out at the University of California’s White Mountain Research Station, where she studied feeding and nutritional ecology of marmots. Dr. Carey received postdoctoral training in intestinal transport physiology at the University of Nevada School of Medicine and subsequently at the Ohio State University College of Medicine.

Dr. Carey’s research interests are in the areas of gastrointestinal physiology and hibernation biology. Her research program uses hibernating mammals as models for adaptation to extreme changes in physiology and nutrition, and the translation of hibernation biology to biomedicine, including organ preservation, intestinal ischemia-reperfusion injury and severe blood loss. Current studies in her laboratory focus on the
symbiosis between mammalian hibernators and their gut microbes. Dr. Carey’s research has been funded by the National Institutes of Health, the National Science Foundation, the US Department of Agriculture, the US Army Research Office and the Defense Advanced Research Projects Agency.

Dr. Carey has served on numerous committees and in leadership roles in the American Gastroenterological Association and the American Physiological Society (APS). She was a member of the APS Council and was APS President from 2007-2008. She served on one of the working groups of the National Commission on Digestive Diseases in 2006-2007. Dr. Carey is the North American Editor of the Journal of Comparative Physiology B, is on the editorial board of the American Journal of Physiology: Gastrointestinal and Liver Physiology and is a consulting editor for Physiology and Journal of Applied Physiology. Dr. Carey was a Program Director at the National Science Foundation from 2010-2011, working in the Division of Integrative Organismal Systems within the Biology Directorate. Dr. Carey currently serves as Director of the UW-Madison Biotron, a facility that provides controlled environment and ambient housing space for plant and animal research and for food and materials testing, for campus investigators and outside industries.

Notes:
Feeding our beneficial microbes: pre- and pro-biotics and gut health

Abstract: Diet has a significant influence on the composition and functional attributes of our gut-associated microbes. Prebiotic carbohydrates and dietary probiotic bacteria offer unique opportunities to elucidate the mechanisms that determine how diet influences host-microbe and microbe-microbe interactions in the mammalian intestine. We have been applying these principles to investigate the effects of diet and food delivery matrices on the intestinal performance of probiotic Lactobacillus. Our findings show that diet and specific dietary components (e.g. prebiotics) alter the physiological and immunomodulatory effects conferred by bacteria in the intestine. Outcomes of this work are important for improved clinical approaches and food products designed to optimize benefits to human health.

Maria Marco is an Assistant Professor in The Department of Food Science & Technology at The University of California, Davis. She received her BS in microbiology from The Pennsylvania State University and PhD studying plant-microbe interactions at The University of California, Berkeley. She then worked as postdoc and research scientist leading fundamental and applied research for the food industry at NIZO food research and TI Food & Nutrition, The Netherlands. Her laboratory at UC Davis is focused on the genetics, ecology, and host-microbe interactions of lactic acid bacteria in food systems and the human digestive tract. The broad objective of her lab is to understand the mechanisms by which beneficial microbes improve foods and human health. Her work is funded by federal and state agencies and she is collaborating with domestic and international food companies on topics related to food safety, food production, and gut health.
Ayalew Tefferi, M.D.

Professor, Hematology and Oncology
Mayo Clinic. Rochester, MN
Tefferi.Ayalew@mayo.edu
http://mayoresearch.mayo.edu/staff/tefferi_a.cfm

Molecular Targeted therapy in hematological malignancies

Abstract: The talk will include overview of advances in the molecular pathogenesis of hematological malignancies and identification of molecular drug targets.

Ayalew Tefferi, MD was born in Addis Ababa, Ethiopia and migrated to the United States in 1982 after completing his medical school education at the University of Athens in Greece. Dr Tefferi received his hematology training at the Mayo Clinic in Rochester, Minnesota before joining the staff at the Mayo Clinic College of Medicine, division of hematology in the department of medicine. He is currently a full professor in hematology and internal medicine.

Dr Tefferi is primarily engaged in direct patient care. His clinical and laboratory interests focus on myeloid disorders including polycythemia vera, essential thrombocythemia, myelofibrosis, chronic myeloid leukemia, myelodysplastic syndrome, acute leukemia, and the atypical myeloproliferative disorders including hypereosinophilic syndrome and systemic mastocytosis. His academic and research achievements have been copious and include over 800 publications including books, book chapters, original articles, reviews, editorials, letters, and abstracts. Dr Tefferi serves as an associate or section editor for the Mayo Clinic Proceedings, Leukemia, American Journal of Hematology, and European Journal of Hematology. He also participates in the editorial board of several journals including Blood, Cancer, Leukemia Research, Acta Haematologica, and Leukemia and Lymphoma. Dr Tefferi has given more than 500 national and international invited lectureships and serves as faculty for the annual Hematology and Oncology Board review courses at George Washington University in Washington, DC, Harvard in Boston, and MD Anderson Cancer Center in Houston Texas.

NOTES:
Translational Anatomy Research, Quo Vadis

Abstract: Translational research continues to be an underinvestigated area of science. One discipline that has had scant attention by those who practice translational research is gross anatomy. As a clinician and anatomist, the author has experienced success with a reverse translational research model. This paradigm identifies surgical problems and in the anatomy laboratory and with international collaboration, investigates ways of answering these issues. The goal of such research is to improve patient outcomes in an expedited manner. The author reviews his 20 year experience with identifying common clinical and surgical issues and addressing them with gross anatomic investigation.

Dr. Marios Loukas received his medical degree from Warsaw University School of Medicine, and a PhD from the Institute of Rheumatology at the Department of Pathology in Warsaw, Poland. He held a post-doctoral position at Ulm University Clinic in Germany in arteriogenesis and angiogenesis projects.

He began his academic career at Harvard Medical School where he served as lecturer and lab instructor for the Human Body Course. In 2005 he joined St. George's University in Grenada. He is currently a professor and Chair of the Department of Anatomical Sciences and assistant Dean of Basic and Allied Health Sciences. Under Dr. Loukas’s leadership, the department of Anatomical Sciences developed a unique division of Ultrasound in Medical Education that instructs faculty members how to teach ultrasound to medical students and residents, and how to provide effective continuing medical education (CME) courses.

Recently, Dr. Loukas was appointed Dean of Research for the School of Medicine at St. George’s University. One of his main responsibilities is to develop a transdisciplinary research infrastructure to support translational research and to bridge basic science and clinical departments with the aim of enhancing student research and publications.

Dr. Loukas’ research has been continuously funded from St. George’s University. He has been the recipient of numerous teaching research awards such as the 2007, Herbert M. Stauffer Award from the Association of University Radiologists and the Harvard Excellence in Tutoring Award from Harvard Medical School.

Dr. Loukas has published more than 465 papers in peer reviewed journals, authored 12 books, which include Gray’s Anatomy Review, Gray’s Clinical Photographic Dissector of the Human Body, McMinn and Abrahams’s Clinical Atlas of Human Anatomy 7th edition and authored 14 chapters in various medical and surgical books. He has also served as an editor and co-editor in 12 journals and reviewer for more than 40 journals. His scientific interests are on surgical anatomy and technique and cardiovascular pathology. Recently, his focus has been directed toward issues of integrated curriculum and faculty development in medical education with an emphasis on simulation and technology and effective teaching and testing.
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Visit the Pearson Booth in Las Vegas!

Meet Dee Silverthorn!
2013 HAPS President and author of
Human Physiology: An Integrated Approach, 6e
During the break on Sunday, May 26 | 9:45 AM – 10:30 AM

Grab your coffee and meet our authors at the Pearson booth!
Sunday, May 26 at 7:30 – 8:30 AM and Monday, May 27 at 7:30 – 9:00 AM

- Katja Hoehn, Human A&P, 9e; A&P, 5e
- Lori Smith, Human A&P Lab Manuals; PhysioEx™ 9.1
- Lori Garrett, Get Ready for A&P, 3e; MyReadinessTest for A&P
- Nora Hebert, Practice Anatomy Lab (PAL) 3.0; PAL 3.0 Lab Guide
- Ruth Heisler, Practice Anatomy Lab (PAL) 3.0; PAL 3.0 Lab Guide
- Bob Tallitsch, Human Anatomy, 7e
- Mike Timmons, Human Anatomy, 7e
- Bill Ober, Visual A&P; Illustrator on all Martini titles
- Claire Garrison, Illustrator on all Martini titles
- Cindy Stanfield, Principles of Human Physiology, 5e

Enter Pearson’s fifth annual art contest and compete to win an iPad® mini!
Starts Sunday, May 26 at 7:30 AM; ends Monday, May 27 at 4:00 PM
Your rendering of an anatomy or physiology concept could win you an iPad mini. Guidelines and supplies will be provided at the booth. The winner will be announced on Monday, May 27 at 4:00 PM along with the exhibitor door prizes.
Poster Presentation Abstracts

This year we have a record number of poster presenters. Posters will be displayed on Monday and Tuesday, but the poster presenters will be at their posters for the times listed below.

Poster Session 1 – Grand Ballroom F-G-H
Sunday May 26: 9:45 – 10:30 AM

Lindsay Barone
University of Wisconsin-Milwaukee, Milwaukee WI
imbarone@uwm.edu
Co-Presenter: Andrew Petto, aipetto@uwm.edu
Teaching human anatomy: an evolutionary perspective
Beginning students in anatomy & physiology are often overwhelmed with new material and struggle to organize the volume of information. Teaching and learning research in biology and other disciplines makes it clear that students learn disciplinary content better when it is presented in the context of the organizing theories of the discipline. In most A&P textbooks, the fundamental organizing theory of biological evolution is conspicuously absent, depriving students of an effective framework for learning. This presentation demonstrates how to apply an evolutionary perspective to human anatomy using the example of human dentition. Beginning with comparative anatomy of the form, arrangement, and development of human dentition, we show how to construct a cladogram of the nested hierarchy of traits that illustrate the phylogenetic relationships among species. From this example, we demonstrate the importance of understanding evolutionary relationships when learning and teaching modern human anatomy. Teaching human anatomy from an evolutionary perspective can be both effective and informative—both for helping students to learn anatomy better and to understand the role of the evolutionary history of our species in shaping contemporary human form and function.

Tynan Becker
tabecker@alaska.edu
New York Chiropractic College
Co-presenter: Steven Becker, srebecker@alaska.edu, University of Alaska, Fairbanks, AL
Using cultural examples to build relevancy in human anatomy and physiology courses
Beginning in 2006 the National Academy of Sciences, including the National Institutes of Health and the National Science Foundation, began an initiative to promote increased diversity in the education and training of professionals in the fields of science, technology, engineering and math. Despite these efforts minority populations remain underrepresented in today’s medical and scientific workforce. Cultural differences of worldview, learning styles, and modes of communication are seen as contributing to the low rate of student success in scientific fields. The cultural disconnect between the presentation of scientific material in textbooks and classrooms and the worldviews and experiences of minority students can often lead to a lack of relevancy and immediacy for the student, which compounds with long-held biases that X minority group is “no good at science”. Science educators working with minority students face the challenge of presenting scientific material in a way that fosters relevancy and immediacy. This poster presents some pedagogical tools to build cultural relevancy, and provides examples of using cultural references within the context of a human anatomy and physiology course for Alaska Native students.

Daniel Belliveau
Western University, London, ON, Canada
dbelliveau@uwo.ca
Co-Presenters: Cortney Hanna, channa27@uwo.ca, Sonya Van Nuland, svannula@uwo.ca
Exploring the use of competition-based technologies in the classroom
Whether students are competing with others for scholarships or spots in medical schools or competing against themselves for higher grades on examinations, the competitive nature of post-secondary education is undeniable. The literature regarding the use of competition in a classroom setting is often described as being an effective motivator for success, both amongst students and self-within. We will be exploring the effectiveness of an online game based tournament that is competitive in nature. Students are paired randomly and compete head-to-head against each other in an effort to answer questions with both speed and accuracy. 1.0 mark is assigned for each correct answer and an additional 1.0 mark is awarded to the

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participant with the faster response time. Students will then be ranked amongst their peers. We want to determine if the use of game based competition encourages students to familiarize themselves with course material prior to the exam, as well as investigate if knowing oneâ€™s rank among the participants prior to the examination will affect student motivation. Preliminary data shows that students find the tournaments both engaging and motivating. Students enjoy the competitive nature of the tournaments and appreciate being able to prioritize their time reviewing exam material based on their achievement in the tournament. We anticipate that the tournaments will encourage students not only prioritize their studying, but to also exercise the self-within competition that is the basis for personal achievement on exams.

Jennifer M. Burgoon  
The Ohio State University, Columbus, OH  
jennifer.burgoon@osumc.edu  
Co-Presenter: Melissa M. Quinn, quinn.269@osu.edu  

**Learning anatomy through dissection: graduate student involvement in a full-body dissection course for undergraduate students**  
In an effort to provide additional opportunities for anatomy graduate students to advance, apply, and reflect on their developing teaching skills, a two-semester teaching practicum course was designed to meet the needs of the graduate students, as well as the division. During the spring semester, graduate students with an interest in teaching register for one credit of teaching practicum and help design, organize, and prepare for an undergraduate human anatomy dissection course to be conducted during the summer session. During the summer, the graduate students register for a second credit of teaching practicum and serve as the primary instructors for the course, being assigned a team(s) of four undergraduate students and a cadaver(s) to fully dissect under the direction of the graduate student. The cadavers dissected during this course are being prepared for use in future undergraduate anatomy courses that utilize procured cadavers in the laboratories and will be the cadavers a number of the graduate students will use in their future teaching opportunities. During the summer dissection course, the graduate students also share in duties such as delivery of pre-laboratory presentations that serve as an overview to begin the laboratory sessions. The graduate students write daily in a journal after each class to reflect on their teaching answering such questions as ‘what do I do well’ and ‘where can I improve’, as well as provide a final reflection on the student evaluations of their teaching at the end of the course.

Janet Casagrand  
University of Colorado, Boulder, CO  
Janet.Casagrand@colorado.edu  

**Effectiveness of in-class worksheet activities for improving learning of electrochemical forces and equilibrium potentials**  
One especially challenging set of concepts for physiology students to grasp is electrochemical forces, equilibrium potentials, and ion flow. These concepts provide the basis for understanding electrical signaling in the body (e.g., membrane potentials and changes in membrane potential due to the ion flow that results from electrochemical forces). Difficulty in understanding these fundamental concepts can consequently act as an instructional bottleneck for students to progress in their understanding of nervous system function. In Spring 2010, I taught a large, upper division Human Physiology course. These core concepts were introduced in lecture. Students then practiced with the concepts several in-class clicker questions and out-of-class homework questions. However, in talking with students and looking at their exam performance I realized they were not grasping the concepts as well as I would have liked. The next two semesters, I incorporated in-class worksheet activities on these concepts to see if they could improve learning. The worksheet was designed to be completed in-class, so I or the undergraduate teaching assistants could provide feedback and answer questions. Student reaction to the worksheets was very positive, but did they improve learning? Was it worth the loss of lecture time? To determine this, I administered in-class clicker questions before and after the worksheet activity, and also quantified exam performance for semesters with and without the worksheet activity. The results indicate that the activities did significantly improve learning both immediately after the activity, as well as several weeks later on the exam.

Michel Désilets  
University of Ottawa, Ottawa, ON, Canada  
mdesilet@uottawa.ca  
Co-Presenter: Yanic Legault, yanic.legault.1@ulaval.ca, Anissa Hamel, ahamel060@uottawa.ca  

**Self-Learning Physiology through the Use of Integrated Virtual Laboratories**  
Teaching of physiology to large-size classes is often done in a purely theoretical manner, without hands-on labs to apply and consolidate the acquired knowledge. This problem can be alleviated by the use of integrated simulation programs, such as “HumMod” (University Of Mississippi Medical center) and web-Human (Skidmore College). By allowing flexibility in setting the physiological parameters and in designing the experimental protocols, these programs further constitute potentially valuable self-learning tools. The project consisted of developing such self-conducted virtual labs that could complement the

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formal lectures and allow further exploration of human physiology. Various simulations related to cardiovascular physiology were initially presented as specific observations that students had to explain after planning and conducting their own experiments. Examples of questions: Explain the observed increase in pulse rate induced by exercise, by hemorrhage, by hyperthermia. In addition to evaluations of lab reports, surveys were conducted to assess students’s interest and perception of the virtual labs. Overall, the majority of the students (n = 470) agreed that the virtual labs enhanced their comprehension of physiology and stimulated their interest. A significant portion of them further contemplated a future use of the virtual labs for their own personal formation. Thus, the self-conducted virtual labs proved to enhance the comprehension of physiology while creating a genuine interest for experimental physiology.

Mark Hubley  
Prince George’s Community College, Largo, MD  
mhubley@pgcc.edu  
Co-Presenter: Bekki Zeigler, zeiglebx@pgcc.edu  
Using computers to replace microscopes in the anatomy and physiology laboratory  
Students of anatomy and physiology have traditionally used microscopes to study tissues. While we value microscopy, our department had various concerns about using microscopes in the A&P laboratory. These concerns include (1) costs to the department to maintain microscopes and slides, and (2) time spent helping students use their microscopes. The heads of our allied health and nursing departments told us that microscopy is a skill of little use in the careers of the majority of our students. Thus, our department considered replacing microscopes with computers for online viewing of digital images. In fall 2008, half of A&P I classes continued the use of microscopes in the laboratory; the other half used computers. Student performances on exam questions related to histology were compared, and no significant differences were observed between the two groups. We surveyed students’ attitudes about the histology portion of the laboratory, and again no significant differences were observed. Given these results, the department discontinued the use of microscopes in the A&P curriculum in 2009. The primary justification was cost savings. The switch from microscopes to computers also freed the staff from time spent maintaining microscopes and slides used for A&P. Although some faculty had regrets, most adapted quickly and enjoy discussing histology without the distraction of students having difficulties operating microscopes. Four years after the change, the department is satisfied with the results.

Vasily Kolchenko  
New York City College of Technology, Brooklyn, NY  
vkolchenko@gmail.com  
Co-Presenter: Olufemi Sodeinde, osodeinde@citytech.cuny.edu  
A model of faculty collaboration: the departmental Instructor’s Guide for undergraduate Anatomy and Physiology labs  
The need for instructional improvements in undergraduate Anatomy and Physiology labs presents a challenge, especially in multiple-section courses. Additional modification requests by Nursing and Radiology Technology programs made our curricular and pedagogical review more urgent and specific. NSF-funded institutional i3 project for STEM lab enhancement stimulated the effort to develop the departmental Instructor’s Guide that brought together Anatomy and Physiology faculty and summarized their pedagogical expertise. We developed the template for the weekly Instructor’s Guide and collaborated on sharing instructional materials and resources and identifying potential problems and best practices in the labs. The collaboration focused faculty attention on lab improvement and generated productive forms of professional development. It helped us modify and enrich our teaching routines and make student lab experiences more engaging and efficient. It also rekindled the spirit of inquiry and experimentation in the classroom and brought up unexpected questions about updating our curriculum. The Guide is course-specific and follows the existing syllabus. It is disseminated online and continuously updated. The model of faculty collaboration was also utilized by Microbiology and General Biology instructors at City Tech.

Augusthy Kulakkattollickal  
Harold Washington College, Chicago, IL  
Augusthyk@gmail.com  
Customizing teaching anatomy and physiology to students who do not have the required prerequisite biology course  
Every semester, I face the challenge of teaching students who get enrolled in Anatomy and Physiology I (Biology 226) course at the City Colleges of Chicago without having the recommended prerequisite course (Biology 121-Cellular and Molecular Biology with lab). Based on the data collected through a Prerequisite and Career Goal Survey conducted in six classes on the first day of class during past two semesters, only 52.94% students had the prerequisite. Students coming from outside the City College Systems claim that their biology course elsewhere is equivalent to Biology 121. On the first day of class, I assess their knowledge in biology by conducting a Prerequisite Knowledge Assessment Test (PKAT). PKAT consists of 100 customized multiple choice questions from various topics covered in Biology 121. I motivate students assuring that 10% of the points they

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earn in PKAT will be added as extra credit to the final total at the end of the semester. Based on the PKAT tests of 184 students, the scores ranged from 29% to 77%. The average score was 48.3%. The results of the career goal survey of 187 students conducted on the first day of class during fall 2012 and spring 2013 semesters showed that they had 21 different career goals. Their five major goals in priority were 54.55% Nursing, 11.76% Medical School, 6.42% Physician Assistant Program, 4.81% Physical Therapy and 4.81% Pharmacy. The PKAT test scores and the survey results help me plan my instruction by maintaining the set high standards for my students.

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Co-Presenters: Tom Samiric, T.Samiric@latrobe.edu.au, John Schuijers, J.Schuijers@latrobe.edu.au

**Using case studies to develop deeper learning of physiology theory**
Case studies are a widely used technique for developing and reinforcing active learning. We report on our experience of promulgating a series of inter-connected case studies undertaken by students in small groups during weekly workshop classes. The questions associated with the case studies required students to apply knowledge previously presented in lectures/texts in order to work towards a higher order of understanding of key physiology concepts. This was assessed by developing intermittent case study assessments each with questions designed to measure three tiers of learning: recall, application and critical thinking. We also report on the methods we used to improve student performance throughout the case studies and associated assessments.

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**Diagnostic Teaching in the Anatomy Lab**
Even with tried-and-true lessons, students sometimes struggle to master basic material that is required as a foundation for ultimate success in a course. For students in the Anatomy and Physiology 1 laboratory, one of the major objectives is to recognize and identify successfully the tissues of the human body so that they can apply these skills to understand the cellular basis of human form and function. For students persistently struggling to succeed in meeting this objective, we implemented a process known as diagnostic teachings. In this process, instructors observe students as they attempt to solve problems focused on the course objectives, asking questions to understand how students are choosing what information is relevant and how they are applying it to the problem at hand. Instructors do not correct the errors per se, but ask focused questions to help students identify the issues that are at the basis of their poor performance. Sometimes the issue is a lack of knowledge, but other times it is the need to develop a strategy for recognizing appropriate resources and applications and to learn how to implement them; in other words, developing a student’s plan of action for mastering the material. This student-centered practice’s helping students to focus on how they learn and understand the materials improved quiz and exam performance significantly. Instructors also used the feedback to modify some of the instructional practices in the lab section.

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Co-Presenters: Mary Bee, bee@oakland.edu, Rami Nazar, University of Detroit Mercy, Detroit, MI

**Experiential learning as a mechanism to drive learning in the classroom**
Service learning is a form of project-based learning that enhances the student’s assimilation and integration of the course material in a way that is not possible in the classroom. In service learning, the motivation for taking ownership of the project is the act of helping other people, which is relevant to students in health care fields. Our service learning project involved university students presenting anatomy material from their lecture course to high school and middle school students in the urban environment. The program was very successful. University students gained experience in presentation skills, an appreciation for teaching in the urban environment, and the depth of knowledge that only comes from teaching. Students in the client institutions were able to see that the material taught in their course is relevant and valued outside of their classroom and that people from different ethnic and social economic groups can work together to accomplish something worthwhile. Urban students at the client institution scored significantly higher.
Melissa M. Quinn  
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Co-Presenter: Jennifer M. Burgoon, jennifer.burgoon@osumc.edu  

Learning anatomy through dissection: undergraduate student involvement in a full-body dissection course  
In a typical undergraduate anatomy curriculum, there are not many opportunities available for students to perform a full-body human dissection. Many anatomy courses offered to undergraduates do not have a laboratory component, have a laboratory component but utilize only models and/or cat dissections, or have a laboratory component with access to only prosected human cadavers. During the fall and spring semesters at The Ohio State University, undergraduate students registered for anatomy courses have the opportunity to work with prosected cadavers but a question asked often has been, “Is there any opportunity for us to do a dissection?” It was from this ongoing student request that during the summer session of 2011, an undergraduate summer dissection course was first implemented to provide selected undergraduate students, in groups of four, the opportunity to prepare the following academic year’s fully prosected cadavers. To be a participant in the summer dissection course, students had to go through an application process and, once selected, were instructed by an anatomy graduate student as they completed a full body dissection. Students met for class 9 hours a week for over 5 weeks to prepare the cadavers. The course included students in health related majors, many of whom were interested in attending professional school (e.g. medical or dental school) or graduate school. The course was offered again in the summer of 2012 with a noticeable increase in student applications and is currently being prepared for the summer of 2013.

John Robertson  
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A Peer Education Project in an Anatomy and Physiology Course  
This poster describes a peer-education activity in which small groups of students focus on biomedical issues that have a strong relation to Anatomy & Physiology course content. Student groups first select and research an appropriate issue (e.g., use of tanning beds, HPV vaccination). They then develop and administer a survey to assess peer knowledge of and attitudes toward the specific issue and underlying biology. After collecting data, groups analyze and interpret findings, with an emphasis on considering how understanding and attitudes impact clinical dimensions of the issue. Groups must devise specific strategies to help effectively provide information on the issue in light of their results. Students produce posters of their work that they present in a public forum. Assignment goals include: 1) reinforce course themes and material, 2) synthesis and integration of information in a clinically relevant framework, and; 3) engage in creative professional collaboration. In addition to elaborating on outcomes and providing a detailed overview of the assignment, examples of group projects and results will be presented. Also included are results of assessment of student reaction to the project, including perceived value as part of an A&P course.

Heather Rudolph  
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Using the past to teach the future: analyzing runaway slave advertisements as an indicator of health and welfare of antebellum slaves  
John, an African slave, ran away from the jail in Twiggs County, Georgia, in 1838. Bearing the scars of whipping, this “very smart” man elected to escape a jail and take the chance of regaining the freedom he lost upon being declared a slave. John’s story, unfortunately, is not a new one. The plight of slaves as shown by runaway advertisements posted in the newspapers has been analyzed to determine many details about the runaways. Age, sex, occupation, who travelled together, and where they started in their running are examples of these details (Costa, 2001; Schäfer, 1981). In contrast to previous analyses, this research project focuses on an untapped analysis of these ads to determine the health and welfare of runaway slaves and enslaved people in general, in the antebellum South. The primary source to be analyzed is newspaper advertisements for runaway slaves from Baldwin County, Georgia, in the antebellum era. Secondary sources included journal articles on reading and interpreting runaway slave advertisements, articles and book chapters on slave buying and on slave health maintenance, an autobiography of an escaped slave and a journal of a plantation owner’s wife while living on a cotton and rice plantation in Georgia. Advertisements for twenty-six runaways were examined to establish their health and welfare from characteristics mentioned in the ads. This historical information can be used to teach anatomy and physiology students today because it is a way of applying the terminology and concepts learned in classes to real people, like John’s, situations.

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### Using videos to understand difficult concepts

To help students understand tough concepts, short videos are often used in class to create a visual of the concept and to show how concepts are connected. Students in Anatomy & Physiology II created videos to help them understand difficult concepts, which allowed for reinforcement and broadening of the course concepts. The topics covered in the videos were osmosis, the bones of the skeletal system, and the layers of the skin. Each group was tasked with creating a video that compared the concept to something they would encounter outside of the classroom. Feedback was collected via anonymous survey. 100% of the students in the class felt that their understanding of the topic covered in the video increased by watching each of the videos. When asked if this project should be used in future classes, again this was met with 100% agreement. One of the comments received in response to keeping the video project in future classes was as follows: “It was effective because everyone had to do research on the topic which made us learn a lot more.” Feedback in response to if making the video was helpful included, “Although watching the videos was helpful, making them was what really helped me. Focusing on one topic and coming up with a way to illustrate it really reinforced it in my mind.” Not only will these videos be shown to future Anatomy & Physiology classes when the concepts come up but also in other classes when the course material overlaps.

**Rema Suniga**  
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Co-Presenter: Vicki Motz, [v-motz@onu.edu](mailto:v-motz@onu.edu)

### Expanding student-based inquiry beyond the classroom

Proper implementation of student-based inquiry expands students’ experiences far beyond the classroom. Student-directed group research in the Medical Physiology laboratory at Ohio Northern University enhances critical inquiry through application of physiological concepts. With instructors’ guidance, students conduct a literature review on a current topic, submit a research proposal with IRB or IACUC paperwork, conduct experiments, analyze data and present findings to their classmates. Student groups are encouraged to present their research at scientific meetings. A group of students investigating the “Effects of Texting While Driving on Reaction Time” exemplify the far reaching outcome of such student research. Upon reading the published abstract of the podium presentation of this research at the Ohio Academy of Science (OAS) meeting, a member of the Ohio House of Representatives invited our students to report their results as testimony during hearings on legislation to ban texting while driving. After conducting a follow up study examining cardio-respiratory rates as a measure of stress during texting while driving, the students compiled the combined results into a manuscript recently published in The Ohio Journal of Science. A subsequent student group implemented creative manipulations to the ADI data acquisition system to more closely mirror the driving experience, to address the “Positional Effects of Texting While Driving on Reaction Time”. Their results will be presented at the 2013 OAS meeting. With continued mentoring, the critical thinking and communication skills that students acquire in this laboratory extend well beyond the classroom, thus, highlighting the importance of this learning tool.

**Poster Session 2 - Grand Ballroom F-G-H**  
**Sunday, May 26: 2:30– 3:15 PM**

**Benjamin Addicott**  
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University of Hawaii, Honolulu, HI

Co-Presenters: Marie Nguyen, [marie29@hawaii.edu](mailto:marie29@hawaii.edu), Patrick P. Pedro, [patrickp@hawaii.edu](mailto:patrickp@hawaii.edu)

### Common Celiacomesenteric Trunk Presenting with Mesenteric Ischemia: 2 Case Reports with a Review of the Literature

We present two cases demonstrating variant branching of the abdominal aortic trunk along with radiographic imaging and correlation to a common disease state. The first case is a 67 year old female who presents with abrupt onset of rapidly worsening abdominal pain. Computed Tomography demonstrated pneumatosis intestinalis with air in the hepatic portal system and superior mesenteric veins. A celiacomesenteric trunk (CMT) was noted to originate from the aorta at T12 replacing separate superior mesenteric artery (SMA) and Celiac Trunk (CT). The patient was taken for exploratory laparotomy which revealed a 60 cm length of ischemic bowel which was resected. The second case is an 88 year old gentleman with recurrent GI bleeding accompanied by severe abdominal pain. Enteroscopy revealed a dusky section of the proximal duodenum with bleeding duodenal ulcerations which are pathognomonic for chronic mesenteric ischemia. Angiography demonstrated CMT with high grade stenosis. The CMT was stented open improving flow and reperfusing the bowel. In each of these examples of mesenteric ischemia, CMT was noted as an incidental finding on CT. Collateral circulation between SMA and Celiac artery is an important safeguard protecting against mesenteric ischemia. CMT is a rare variation reported to occur.
in less than 1% of the population and is associated with an intrinsic loss of SMA-CT collateral circulation. These cases together with a review of literature and discussion of the embryologic development introduce a mechanism and provide anecdotal association between CMT and a predisposition to mesenteric ischemia.

Thomas Bahl  
[link to email]
Aquinas College, Grand Rapids, MI  
Co-Presenter: Timothy Carew, [link to email]

**Visual feedback, sex and quantitative motor unit recruitment**

During routine laboratory exercises where subjects attempt to quantitatively increase grip strength using the iWorx electromyological recording system, it had been observed that many subjects viewed the computer monitor, which displayed their generated electromyograms. Past studies have utilized visual feedback to examine regional differences in how human temporalsis and masseter muscles are activated. Related studies characterized single motor unit activities of hand musculature as well as therapeutic treatment for human masseter muscle control. The focus of the current study was to attempt to determine if visual input/feedback enhances an individual's ability to estimate quantitative increases in grip strength. Data from 60 (30 female and 30 male) healthy, right-handed subjects between the ages of 18 and 30 was analyzed. Half of each gender group (n=15) was permitted to view the computer monitor for possible visual input/feedback, while the other half was not. Each subject was asked to produce an initial baseline grip, then attempt to double and then triple the grip with each arm. Statistically insignificant results were obtained when comparing the visual input groups to the non-visual input groups. However, when comparing females to males within categories, some statistically significant differences were found. Females quantified their target grip increases (100% and 200%) more accurately than males in seven of the eight comparisons made. Also, males overestimated their target grips more often than females.

Thomas Bahl  
[link to email]
Aquinas College, Grand Rapids, MI  
Co-Presenter: Janine O’Donnell, [link to email]

**Sex, age, and quantitative motor unit recruitment**

The purpose of this study was to determine if there was a gender difference in the ability of individuals (ages 40 to 55) to quantitatively increase the intensity of grip strength in both their right and left hands. This age group was selected after findings from a previous study conducted at Aquinas College with younger individuals (ages 18-25) found that females were commonly more accurate at quantitatively increasing grip strength. In the current study, there were no significant differences found when comparing men and women who were asked to double or triple their initial grip strengths. Therefore, it was found that sex does not impact quantitative muscle control in fist clenching in 40- to 55-year olds. However, since these findings were not consistent with the previous study, it would seem aging does have some influence on muscle control.

Mary Bee  
University of Detroit Mercy/OUWBSOM, Detroit, MI  
[link to email]
Co-Presenters: Xavier Perez, [link to email], PaigeMcClelland, Detroit, MI

**Morphological variations in the mandible of Native Indian skulls from Texas**

The mandibular foramen is a hole on the medial surface of the lower jaw of humans, through which the inferior alveolar nerve passes. This nerve is targeted when anesthetizing the lower jaw, as required in many dental procedures. Our research investigated variability in the position of the mandibular foramen in male and female populations of Native American skulls. Sixty eight skulls from the Texas Archeological Research Laboratory collection in Austin, TX were digitally photographed and analyzed in a double blind study. While a significant difference was not identified in the ramus flexure (p=0.595), a significant difference in the ramus length and position of the foramen among all groups.

Mary Bee  
OUWBSOM/UDM, University of Detroit, Detroit, MI  
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Co-Presenters: Jamie Farrugia, [link to email], Parker Branch, University of Detroit Mercy

**Interprofessional Education: Human Anatomy course as a common ground for physical therapy and medical students**

The strength of our health professional students will only be as great as their ability to work with other members of the health care team. One of our top priorities as professors in biomedical sciences should be to provide our students opportunities for meaningful interactions with other health professionals as they learn about topics in medicine. This type of
collaborative learning is known as Interprofessional Education (IPE). IPE refers to the opportunity for learners from different fields to work collaboratively toward a common understanding as they concurrently learn with, from, and about each other. In 2010 the LCME set forth a directive that faculty should provide opportunities for interprofessional learning experiences. At our institution we grouped the first year medical students and the first year physical therapy doctoral students together for both anatomy lectures and laboratories during the musculoskeletal unit. In a qualitative study, students were asked about their thoughts on their involvement with their colleagues from the other field. We found that while students had both positive and negative experiences, overall students from both groups benefited from the experience.

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The M.S. in Human Anatomy & Physiology Instruction program: a progress report  
In January of 2011, the New York Chiropractic College, a fully accredited multi-disciplinary healthcare education institution, introduced a new graduate degree program: Master of Science in Human Anatomy and Physiology Instruction (MSHAPI), offered online to terminal healthcare degree holders and academic biologists teaching, or preparing to teach, anatomy and physiology (A&P) in the undergraduate college and university setting. The MSHAPI program consists of 36 credits, including 18 credits of Human Anatomy & Physiology Instruction, 12 credits of Instructional Theory and Practice, and 6 elective credits. The MSHAPI program leverages the A&P competencies acquired by the candidate in prior educational preparation by combining content expertise with instructional theory and practices. The first cohort graduated in December 2012. This study examines survey data reflecting student demographics, completion rate, and student evaluations of program design, delivery, and effectiveness.

Nicholas Despo  
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HAPS Position statement on animal use  
The Animal Use Committee is presenting the societies’ position statement on animal use. This statement was revised in light of current research in teaching pedagogy and of sensitivities of using animals in experimentation and approved by the Board of Directors last year. The poster will serve to inform attendees of the stance of the Society on the issue of animal use in teaching human anatomy and physiology, to gather reactions and responses to the statement as well as to serve as a site to distribute the Animal Use Committee Emergency Response Plan.

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Circumvallate papillae anatomy, zinc taste perception, and sexual dimorphism  
Circumvallate papillae (CvP), organs located on the posterior dorsum of the tongue, house a large proportion of taste buds along their circumference and are particularly important in gustation. A number of factors are known to affect the ability to taste; however, the anatomical characteristics of CvP have not been adequately examined. We performed in vivo endoscopy of 38 college students with an intraoral camera to assess the relationship between CvP anatomy and taste physiology. CvP characteristics were measured with ImageJ software. Mensuration of taste perception was accomplished by administering a 0.1% zinc sulfate solution to participants and then gauging their responses with a zinc taste test (ZTT) and visual analog scale (VAS). There was a significant correlation between CvP circumference and VAS scores (n=31, rs=-0.37, p= 0.04). The circumference of male (n= 11) CvP was found to be 24.70 Â± 3.96mm (Mean Â± SEM), whereas female (n= 19) CvP circumference was 36.45 Â± 2.91mm. There was a statistically significant difference between CvP circumference among sexes (t(28)=2.41, p=0.02). Although our preliminary data is limited by a small sample size, we have found CvP anatomy to correlate with zinc taste perception. We have also found CvP to be a potential sexually dimorphic trait.

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Differences between circumvallate papillae circumferences in different areas of the tongue  
Circumvallate papillae (CvP) are important in gustation; however, little is known about variations in CvP anatomy in different locations on the tongue. We performed intraoral photography in a sample of 38 college students to assess the relationship between CvP anatomy and taste physiology. The intraoral photographs of seven individuals were excluded because of poor
photographic quality. The circumference of the right anterolateral CvP (RCvP), the circumference of the left anterolateral CvP (LCvP), and the average circumference of the remaining intermediate CvP (ICvP) were calculated. The analysis of variance revealed a significant difference among the CvP groupings (F(2, 90)=8.64, p=0.0004). Paired t-tests were performed among pairs of groups. There was a significant difference between the RCvP and ICvP groupings (t(30)=4.97).

Ellen Ireland
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**Evaluation of possible agents creating positive selection for the ALDH2*2Tys mutation in Asia**

Many individuals across eastern Asia have a condition known as alcohol intolerance. This condition is caused by a point mutation in the aldehyde dehydrogenase 2 (ALDH2) gene, resulting in the greatly reduced ability to break down acetaldehyde produced during ethanol metabolism. Consuming ethanol results in great discomfort for homozygous individuals and an increase in deleterious alcohol related symptoms in heterozygotes. It is possible that the increased concentration of toxic acetaldehyde in the liver and blood may have a beneficial protective effect against pathogens that lack ALDH2 enzymes. It has also been proposed that poor ethanol metabolism may up regulate production of cytochrome P450, increasing resistance to environmental toxins, or that the benefit may come from conservation of other chemicals (such as vitamin A or serotonin) that ALDH2 can also metabolize. In order to get an idea of what kinds of environmental challenges were present when the mutation arose and spread, archeological information was used to assess where the first population to carry it resided. This information is then compared to other sources of spatial data about the modern patterns of infectious disease. Malaria is a strong candidate for the active selective agent.

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**Clinical anatomical studies on the thorax of the dog**

The purposes of the present study were how to use the normal anatomical pattern to be applied on the live dog thorax to establish the most clinical basics of the normal X-ray, ultrasonography and CT images of the thorax referring to their normal cross-sectional anatomy. Fifteen stray dogs of different ages and weights from both sexes were used for the dissection of the thorax after being bled were injected by the ordinary routine method of formalin preservation. A healthy under one year old dog was sacrificed with chloroform solution, the cadaver was placed in freezer in ventral recumbancy, the same position used for the scans, until solid, then after frozen the cadaver was placed on the table with band saw and serial transverse sections were cut at approximately 3 cm apart and were photographed immediately with the caudal surface toward the camera. The healthy dog was used for C.T. scans after physical examination and the dog were anaesthetized then supported in sternal recumbancy the whole body C.T. scan was made with a slice thickness of 1.5 cm apart intervals on the chest and 1 cm apart intervals on the heart. Echocardiography images were obtained from the recumbent side, the best reliable satisfactory images was obtained from the right lateral recumbancy. The computed tomography of the thorax consisted of eleven-photo C.T. images, arranged in four figures; frontal; cranial; middle and caudal mediastinal scanogram of dog in a sternal recumbency.

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**McGraw-Hill LearnSmart Labs beta software for blood: student perceived learning benefits**

Anatomy and physiology (A&P) courses are a stable in science education. Students historically engage in hands-on activities such as dissection and physiology experiments. In recent years, publishers have developed virtual laboratory software to supplement or replace traditional A&P lab activities. The resulting question is whether such virtual lab software products are educationally effective. This pilot study examined learning effectiveness resulting from the McGraw-Hill LabSmart Beta software for Blood. Specifically, 40 students from three A&P courses used the LabSmart software and completed a valid and reliable quantitative instrument called the CAP (cognitive, affective, psychomotor) Perceived Learning Scale and an associated attitudinal survey. Students reported that the LabSmart software significantly increased their cognitive learning over a similar course without the software but reported no such differences in affective or psychomotor learning. The study also found that males using the software reported significantly higher cognitive and psychomotor learning than females but that the overall learning (Total CAP) difference wasn’t significant. Learning occurred at higher levels when instructors trained the students in LabSmart use; however, merely using the software tutorials didn’t achieve the same results. These results imply that the
McGraw-Hill LabSmart software can be an effective tool to help students learn cognitively about hematocrit, blood type, and hemoglobin analysis but doesn’t necessarily result in corresponding affective or psychomotor gains. Additionally, the effectiveness of the software is dependent in part on the instructor’s engagement with the software. Further studies should be conducted to determine which facets of the software have the greatest learning effects.

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Current Events in the HAPS Committees
Would you like to learn more about what’s going on in HAPS? Would you like to pursue your interests within one of our committees? There are sixteen (16) committees in HAPS, each focused on specific projects or directives within the Society. Many of the committees offer opportunities for you to become involved in projects that you may find very rewarding and enriching. This poster offers a few examples of current and upcoming projects for our various committees. Keep an eye out for our committee Chairs (look for the bulls-eye buttons); you can get some great one-on-one time with them and learn how you can help us and help yourself. Even more, you can read about the committees in the conference program and online. The HAPS Committees are a great place to learn more about the Society, develop your own skills as a professional, and help others grow as instructors. Join us now.

Vuvi Nguyen
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Extensor Indicis Brevis: A Rare Anatomical Variant of the Upper Limb
During a routine cadaveric dissection, a rare anatomical variant was found on a 74-year-old male cadaver. This variant is described as an extensor indicis brevis muscle and was located on the dorsum of the hand of the left upper limb. The extensor indicis muscle normally originates from the posterior surface of the distal third of the ulna and the interosseous membrane of the forearm. However, this variant had no muscle body present in the forearm. Instead, the muscle was found exclusively on the dorsum of the left hand. It had an origin from the posterior surface of the scaphoid bone. This anomaly was found unilaterally. The extensor indicis muscle on the right forearm of this cadaver had a normal origin from the ulna and interosseous membrane. Both the extensor indicis brevis on the dorsum of the left hand and the extensor indicis muscle of the right forearm had normal insertions into the extensor expansion of the 2nd digit. The earliest known case report of this anatomical anomaly was found in a 19-year-old male patient in 1961 (Bingold). Other reports have indicated the extensor indicis brevis is often found bilaterally. Diagnosis of patients with this rare variant has occurred from complaints of pain and swelling in the dorsum of the hand, often leading to its discovery during surgery. From the initial description of the extensor indicis brevis, reports indicate the rarity of this anatomical variant to be found in approximately 0.6% to 2.6% of specimens.

John Pattillo
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The LEDAxon: An open-source, interactive model for demonstrating action potential conduction
The generation and conduction of action potentials involves rapid changes in multiple physiological parameters across both time and membrane space. Thus the physiology of axons is often difficult for students to visualize accurately. This presentation describes the development of a dramatic physical model of the axon suitable for both in-class demonstrations and individual student use. The model uses a 5-meter strip of red-green-blue light emitting diodes (RGB LEDs) to represent an axon. Various physiological parameters can be represented by changes in the intensity and/or color of LEDs. For example, the propagation of voltage changes during action potential conduction can be seen as a wave of light traveling down the length of the strip, changing in both color and intensity. The LED strip is controlled by an inexpensive, single-board computer (raspberry.pi.org) running Neuron simulation software (neuron.yale.edu). Thus, the visualization provided by the strip is the result of a research-grade numerical simulation. The effects of changing conditions such as axon diameter, temperature, myelin sheath, and various pathologies can easily be demonstrated by changing simulation parameters. The model is portable, easy to use, and can be built using entirely off-the-shelf parts. The design, construction, and use of the model and accompanying software are described.
John Schuijers  
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Co-Presenters: Stuart McDonald, Stuart.McDonald@latrobe.edu.au, Tom Samiric

**The development of a new physiology and anatomy stream within an existing Bachelor of Health Sciences course**

Whereas physiology and anatomy are commonly taken as core subjects within many medical, allied health and science courses, University degrees which concentrate on both anatomy and physiology as the major and minor areas taken throughout all three years of the course are uncommon. Here we describe the development and construct of the physiology and anatomy stream within a three year Bachelor of Health Sciences course. Physiology and anatomy subjects form the basis of two of the eight first year level subjects, six of the eight second year level subjects and four of the six third year level subjects. We describe how the subjects each have specific learning outcomes that collectively meet the core graduate attributes set out by the course advisory group and required by the University faculty.

**Poster Session 3 - Grand Ballroom F-G-H**

**Monday, May 27: 3:00- 4:00 PM**

Marianne Baricevic  
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**A summer bootcamp workshop improves student grades and retention in Anatomy & Physiology**

Anatomy & Physiology students often become extremely overwhelmed early in the semester due to the volume and intensity of the course content, as well as the general college experience. A voluntary summer bootcamp workshop was offered to all incoming Anatomy & Physiology I students in the summer before the start of the fall 2012 semester. The workshop was designed to introduce basic introductory concepts of Anatomy & Physiology so that the beginning of Anatomy & Physiology I was not as intimidating. The workshop consisted of 5 individual sessions, each running 2-4 hours during the week of August 20-24, 2012. Students were encouraged to attend all sessions. For students who were unable to attend the on-campus workshop, but were interested in participating, a parallel online workshop on the college LMS was also available throughout the month of August, 2012. Approximately 140 of the 320 enrolled Anatomy & Physiology I students registered to participate in the workshop. The workshop was very well-received and student surveys, exam grades and final semester grades indicate that it was effective in increasing student success and retention in Anatomy & Physiology I.

Jacqueline Carnegie  
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Co-Presenter: David Cook. dcook082@uottawa.ca

**Student-identified challenges in A & P: tackling the tough stuff**

Undergraduate anatomy and physiology (A&P) curricula are largely instructor-driven in terms of the in-class time and teaching strategies devoted to each topic. Despite a wealth of online tools, learning challenges do still exist for some students tackling A&P for the first time. Contributing factors may include large class sizes and/or inadequate prior education. While instructors can frequently identify complex topics and adjust their teaching accordingly, their familiarity with the subject matter may interfere with recognition of gaps in student understanding. This project was designed to identify A&P topics most commonly found troublesome by students with the goals of modifying in-class instruction and providing guidance for self-directed learning to address those deficits. Students (n=168) enrolled in the first term of A&P completed an optional assignment in which they identified a topic that continued to be challenging following its presentation during lecture, summarized steps taken to try to improve understanding, and suggested in-class strategies to promote comprehension. Topics most frequently identified included multi-step processes such as resting membrane potential, action potential generation, the sliding filament mechanism of muscle contraction, and the cardiac cycle. On a positive note, 76% of students followed up with textbook reading and 51% accessed online learning resources provided by the instructor and/or textbook publisher. However, 24% did not report reading the textbook and 34% searched online resources via Google and YouTube rather than using their own course-specific learning tools. Despite extensive in-class use of animations and videos, 53% of students requested more of these visual tools during lectures.
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Embryology in the medical curriculum: student study approaches, attitudes, and beliefs
Medical students are inundated with vast amounts of knowledge, but the neglect of traditional subjects such as human embryology is becoming more prevalent. This may be attributed to pressure placed on schools to fit an increasing wealth of information into decreasing contact hours. It is rare to find an emphasis placed upon embryology, and even more uncommon to encounter an associated laboratory. As a result many first year medical students view embryology as an afterthought and intend memorization to be sufficient for exams. Although they agree that a foundation of embryology assists in understanding gross anatomy, students find it difficult to comprehend and are often discouraged by its piecemeal dispersion into various anatomy and physiology courses. With more drastic changes on the horizon for medical curriculum, embryology will be forced to either validate its place within this crowded arena or fade away. To investigate these issues, a mixed methods survey was implemented before and after the head and neck embryology component of a gross anatomy course to examine student study approaches, attitudes, and beliefs. Students elucidated their previous experiences with embryology, studying resources and group composition, aspects of embryology they find most interesting and most frustrating or confusing, and their level of agreement with statements regarding embryology in anatomy and physiology education and its relevance in modern medicine. By investigating student study approaches, attitudes, and beliefs toward embryology, instructors and medical curriculum advisory committees will be better equipped to position this subject appropriately and effectively within anatomy and physiology education.

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Assessment of Testing Methods in Human Anatomy Laboratory
Background: Human Anatomy Professors rely on slides, drawings, illustrations, models, and dissected specimens as teaching tools in the laboratory. In recent years there has been expanded use of substitutions or integration of the above with computer simulations, micrographs, illustrations, diagrams to facilitate the teaching process. These different materials and specimens appear to fall under two categories: 1) Hands on materials: Three dimensional models, microscope slides and dissected specimen 2) Interpretive graphics: Computer graphics, illustrations and micrographs The question is what method is most appropriate and effective in teaching and testing students in the laboratory? Purpose: The purpose of this study is to compare the effectiveness of the two different techniques used on laboratory exams to test a student’s understanding of Human Anatomy. Design: Seventy two Human Anatomy students participated in this study. Students were blinded to the experiment. Four laboratory exams were given with a total of 178 questions. Half (89) of the questions at stations were hands on material and half (89) interpretive graphics. Results: Although students did perform better on the subcategories of hands-on histologic slides and dissected specimens, overall there was no significant difference in the percent of questions answered correctly by students for the two methodologies (P > .05). Also students did not have a preference of one method of testing over another. Conclusion: Results of our prospective study suggest that carefully selected interpretive graphics appear to be an appropriate teaching and testing tool in the Human Anatomy laboratory.

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Involving medical students in teaching anatomy to health sciences students: a mutual benefit
The project consisted of having second year medical students participate as anatomy lab demonstrators for undergraduate students enrolled in large-size classes of anatomy and physiology. The main objectives were: 1) to give students in health sciences, including nursing, the opportunity to complement their theoretical formation with human anatomy labs, 2) to allow medical students to consolidate their knowledge of anatomy, 3) to encourage inter-professionalism among medical and other health-related students. Optional anatomy labs were taken by some 220 Health Sciences students. Groups were divided into 8-10 students and each group was assigned to a medical student. Duration of the labs: 90 minutes. Systems studied: mainly musculoskeletal anatomy, with an overview of neuroanatomy. Surveys from Health Sciences students showed that the vast majority of them (97%) considered that the activity enhanced their learning of anatomy. Furthermore, 93% of them appreciated the demonstration by their assigned medical student, and 87% considered that this interaction has allowed a better understanding of medical studies in general. Responses of the participating medical students showed a similar consensus: all of them have appreciated their experience and considered that it consolidated their own knowledge of

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anatomy. Further, they all confirmed that the activity triggered discussions on medical studies. In conclusion, the project has demonstrated the feasibility, relevance and very strong student support of the integration within health sciences courses of optional anatomy labs presented by medical students. This project was supported by the Consortium National de Formation en Santé (CNFS) of Canada.

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The role of class attendance on student performance in an Anatomy & Physiology I course
At South Texas College, the two sequences of the Anatomy & Physiology course meet twice per week for 2 hours and 50 minutes per session. Given the long class hours and 16-week long semester, attendance is a big concern for students. As an incentive to attend class, I allocated 50 points (5%) of the total grade to class attendance. I deduct 2 points if a student is 15 minutes late, 3 if 30 minutes late, 4 if half the class missed and 5 if absent.

The purpose of this investigation is to understand the relationship between attendance and student performance. A total of 201 students over a period of four semesters were studied. There was a significant correlation between attendance and the final course grade with $r = 0.56$ (p<.01). At 8 weeks, the attendance scores for students with grades A through F were 47.1, 45.4, 40.6, 40.2 and 39.1 respectively. There was no significant difference between students with grades A and B and between students with grades C and D. However, there was a significant difference between students with grades B and C (p<.01). At 16 weeks, the attendance scores for students with grades A through F were 41.7, 37.8, 28.0, 24.9 and 21.2 respectively and the difference is significant (p<.01).

The results show not only that class attendance has a significant effect on students’ performance, but also that there is a significant drop in attendance as the semester progresses for all students.

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Improving medical skills using Thiel embalmed cadavers?
Since 2004 the Laboratory of Anatomy of the Université du Québec à Trois-Rivières accommodates the medical students of the University of Montreal, for their hands-on experience in anatomy. Preclinical year students have access to the anatomy laboratory and specifically prospected specimen during the system related problem based learning courses. During the postgraduate curriculum, we have introduced the use of Thiel embalmed cadavers that give the advantage of preserved color and texture as well as flexibility of joints over a long period of time without the risk of infections. These specimen are used for teaching surgical approaches and techniques at various time during surgical residencies, and for continuous medical education workshops. Since the introduction, these cadavers have been appreciated by a variety of medical professionals and demands for access to these cadavers have grown exponentially. We present here several applications that are regularly taught in our laboratory as well as examples of clinical research projects done in our gross anatomy laboratory to show the advantages and the possibilities given by this embalming technique, particularly in relation to the formation of: a) plastic surgeons (flap transplants with vascular visualization, reconstruction), b) surgeons/orthopedics (endoscopy, laparoscopy), c) critical care teams (thoracic drainage, lumbar puncture, intubation, abdominal liquid scan – FAST), d) anesthesiologists (ultrasound guided regional anesthesia, development of nerve block techniques) and e) physiatrists (articular and bursa infiltration).

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Danish nurse students finds human anatomy and physiology important for work in the nurse profession, but need to know the practical use of it during their educational years
Nurse education in Denmark undertook great reforms in 2008 focusing on academizing education and hence enforcing the theoretical frame of nurses who are now entitled professional bachelors of nursing. Despite great effort among professors in human anatomy and physiology, students find courses in these subjects extremely difficult. In order to optimize teaching in these courses we carried out a questionnaire among first, second and third year students to obtain more detailed information about background of students compared to obtained notes in tests, and opinions about the subject. It turned out, that demographic factors of students such as age, number of kids, years since entrance examination was undertaken, whether students were in a relationship or not, were not important for their acquisition of the science subjects. Therefore these factors were unimportant for obtained notes in tests containing anatomy and physiology. On the other hand former education
in the health field made the perspective of anatomy and physiology clearer for nurse students and hence, especially tests containing practical cases from clinical periods meant higher notes for these students. Also students without practical experience or former education in the health field tended to obtain high notes if they during high school took level A classes of Biology, whereas high school levels of Math, Physics, and Chemistry had no influence of marks. All in all students tended to obtain highest notes in theoretical exams if they contained evaluation of practical situations in nursing. In general, students found anatomy and physiology very important for practical work in the nurse field, however, they also found it very difficult to acquire during education. We are now analyzing student interviews to get viewpoints deepened, and we plan to include clinical nurse trials in the teaching to get practical perspective on the subjects.

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Homeostasis in undergraduate physiology, ‘anatomy & physiology’ and biology textbooks
Physiology faculty regard homeostasis to be one of the most important core concepts students should understand and be able to apply. We examined ten undergraduate physiology and biology textbooks and evaluated how these texts introduce and use this core concept. We addressed the following questions: (1) does the textbook contain an identifiable introductory sections on homeostasis, (2) is the initial description complete and accurate (including both the language/terms and diagrams), (3) do subsequent chapters apply the ideas about homeostasis developed in the introductory section and reinforce the same terms and figures, and (4) to what extent are similar terms and figures used in different textbooks? Two preliminary findings are of interest. First, the language used to talk about homeostasis is inconsistent (even within the same textbook), often confusing and sometimes incorrect. Second, even when a suitable description of homeostasis is present, the same language and diagram(s) may not be used to reinforce student learning in describing homeostasis in organ system physiology. The consequences of these problems for student understanding and application of homeostasis are discussed. Supported by NSF grant DUE-1043443.

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PULSE Partnerships for Change: Moving from “Vision” to “Change” in Undergraduate Life Science Education
What will it take to bring about the necessary transformation of STEM higher education described in Vision and Change? PULSE (Partnership for Undergraduate Life Sciences Education) is a joint effort by National Science Foundation (NSF), National Institutes of Health (NIH) and Howard Hughes Medical Institute (HHMI) to stimulate systemic changes within biology departments at all types of post-secondary educational institutions, based upon the 2011 report Vision and Change in Undergraduate Biology Education and other calls for transformation of life sciences education. We have the change mandate (the problem). We have the change evidence (the solutions). We now must implement and institutionalize, specifically at the departmental level, teaching practices that provide for the 21st century Vision and Change learning outcomes. The PULSE Leadership Fellows are tasked with facilitating pathways to foster change in undergraduate life science education. This poster will share the PULSE action agenda and our work to date, facilitate communication with the broader biology undergraduate education community, including HAPS, in the PULSE community as we foster change. Supported by NSF, HHMI and NIH.

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The Development of two Anatomy and Physiology courses that allows students to complete their course requirements at home using eScience Labs
A two semester online Anatomy and Physiology 1 & 2 course was developed with complete online instructions. The lab portion is distributed a “Lab in a Box” provided by eScience. Students using eScience lab kits have the flexibility of online learning while completing comprehensive hands-on experiments at home. These experiments include dissections, blood typing, blood pressure, lung mechanics, bone and muscle identification, protein and enzyme analysis, histology, reflex testing, etc. eScience provides students with full-color lab manuals, customized kits, safety equipment, video instructions, animations and integration into an LMS. This course accommodates all learning styles giving the freedom students need to work at their own pace. Students are accessed by completing weekly material including discussions, comprehensive lab manual work, lecture and lab quizzes, lab reports, practicals, and lecture exams. The lab reports include pre- and post-lab questions as well as submission of pictures and videos of their experiments. The online lecture exams, lab practicals and course work are

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generated through McGraw Hill’s software. All graded content are timed and extended times provided for students who need accommodations. Student responses are positive and overwhelming. Students love the ability to work at their own pace, spend less time on travel, more quality time with their families and less out-of-pocket expenses. Students with test anxiety feel comfort and relaxed working in the privacy of their home. Pregnant students, full-time parents and students recovering from surgeries/illnesses can finish their coursework without taking a medical leave thus completing their course requirement.

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Analysis of strategies used by students taking a multiple-choice exam for undergraduate human anatomy
The study of anatomy lends itself well to visual study aids for examination preparation but there is little research examining the student construction of visual aids (sketching) as an anatomy test taking strategy. A retrospective analysis was performed on one set of multiple-choice exams completed by students enrolled in an undergraduate human anatomy course. Analysis was completed on the top quarter and bottom quarter of exams based on the student’s score for that exam. Each group consisted of 94 students. The exam papers were analyzed to see how the students marked on their exam sheets, such as eliminating answers, writing down notes, or making quick sketches to aid them in answering the questions. The researcher created the following categories of exam strategies: few or no marks on the paper, elimination of answers, indication of answer choice, indication of difficult questions, sketching, writing notes and highlighting in the question stem. Total counts were taken for each category. Elimination of answers was the most common strategy used by both groups of students. Most of the top performing students but less than half of the low performing students indicated their answer choices on the exam paper. Top performing students were also more likely to write down notes on the exam paper and to highlight key words in the question stem. Low performing students were more likely to not make any marks at all. The initial analysis seems to indicate that very few students utilized any type of sketching (5 total students, 4 from the low performing group) and relied on common test taking strategies such as eliminating answer choices. Further research should be done to examine the effects of sketching on an anatomy exam as a test taking strategy and to determine if it is beneficial on a multiple-choice anatomy exam.

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Each one, teach one: developing and publishing teaching resources
Maintaining professional development can be a daunting task with a full teaching load. Publishing, particularly without a funded research program, is difficult. Two online archives offer opportunities for peer-reviewed publishing of teaching resources. The BEN portal is an easy way to access digital education materials from multiple medical, biological and chemical online resources. The BEN Scholars Program trains and encourages faculty in the use of BEN and its dissemination to the wider teaching community and is sponsored by AAAS, The American Physiological Society and American Society for Microbiology. The iCollaborative (sponsored by the Association of American Medical Colleges) promotes the development of teaching resources based on the guidelines for the revised MCAT exam (MCAT2015). An example of the resources available on BEN is “Exploring Scientific Literature” a project developed by an undergraduate teaching assistant. The project was designed to make introductory students critical readers of primary scientific literature. While their performance on exam questions directly related to the article was low (66% v. 68% Exam 2 mean), we found that students were able to retain their ability to critically analyze graphical data throughout the rest of the course (81.8% v. 68% Exam 4 mean). The poster describes the project, which has been published by the HAPS Archive (a BEN collaborator), outlines the submission process for BEN and the iCollaborative, and presents ideas for collaborating with undergraduate teaching assistants.

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Comparing biology grades based on instructional delivery and instructor at a community college: face-to-face course versus online course
Through distance learning, the community college system has been able to serve more students by providing educational opportunities to students who would otherwise be unable to attend college. The need and purpose of the study addresses if there is a difference in students’ grades between face-to-face and online biology related courses and if there are differences in grades between face-to-face and online biology courses taught by different instructors and the same instructor. The study also addresses if online course delivery is a viable method to educate students in biology-related fields. The study spanned 14 semesters between spring 2006 and summer 2011. Data were collected for 6,619 students. For each student, demographic

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information, cumulative grade point average, ACT, and data on course performance were gathered. Student data were
gathered from General Biology I, Microbiology of Human Pathogens, Human Anatomy and Physiology I, and Human Anatomy
and Physiology II courses. Univariate analysis of variance, linear regression, and descriptive analysis were used to analyze the
data and determine which variables significantly impacted grade achievement for face-to-face and online students in biology
classes. The findings from the study showed that course type, face-to-face or online, was significant for Microbiology of
Human Pathogens and Human Anatomy and Physiology I, both upper level courses. Teachers were significant for General
Biology I, a lower level course, Human Anatomy and Physiology I, and Human Anatomy and Physiology II. However, in every
class, there were teachers who had significant differences within their courses between their face-to-face and online courses.
This study will allow information to be concluded about the relationship between the students’ final grades and class type,
face-to-face or online, and instructor. Administrators, faculty and students can use this information to understand what needs
to be done to successfully teach and enroll in biology courses, face-to-face or online.

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Assessing background knowledge for a physical therapy human anatomy course

Prior to entering the Doctor of Physical Therapy (DPT) program at Western Carolina University students are required to
complete 6-8 semester hours of human anatomy and physiology either as individual courses or as a combined A&P course
sequence. A Background Knowledge Probe was administered to incoming students to assess whether they had the
foundational knowledge of anatomy necessary for successful completion of the physical therapy department human anatomy
course (PT 821). The Probe, composed of 62 questions prepared by the instructor, was administered to students at the
beginning of fall semester 2012. The mean score on the Probe was 69% (SD = 9.016, n=32). Data were collected from
admissions applications to determine variables that might influence a student’s background knowledge. There was no
significant difference in performance on the Probe based on where the last prerequisite A&P course was completed (college/
university vs. community college). A Pearson correlation coefficient calculated for the relationship between the amount of
elapsed time since completing the last A&P prerequisite course and performance on the Probe revealed a significant negative
correlation (r(31) = -.398 p<.05). Students tended to perform more poorly on the Probe with greater time span since
completing the last A&P prerequisite course. When asked how they perceived their anatomy background before entering the
DPT program a majority of students (66%) felt their background was adequate but with some areas of weakness. Of the
remaining students, 28% felt their background might not be adequate and 6% felt confident that they were fully prepared for
the anatomy curriculum. Overall, students identified the nervous system (44%), integumentary system (28%), cell biology
(28%) and lymphatic system (22%) as areas of potential weakness.

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Bone compression experiments as a tool for introducing students to biomechanics

Advances in medicine, science, and technology have helped increase the average life expectancy of humans by three decades
over the past century. A field of biomechanics has helped engineers and scientists to design prosthesis devices to enhance
human life. Research in biomechanics has allowed us to understand limitations of the human body and has had profound
impact in design of vehicles for passenger protection, sports medicine, and space travel. Human bones are constantly subject
to external forces while walking, running, jumping, or falling. It is imperative to understand the types of forces that human
bones are subjected to and to know their ultimate strength. To introduce undergraduate college students to the subject of
biomechanics an experimental technique has been designed to determine compressive breaking load of the human femur.
The cortical section of the femur shaft is subjected to compression load until it fails. The failure mode and strength are then
determined. Students are then given information to help them design a replacement part. This poster details the entire
process and some results.
Welcome from the City of Henderson

On behalf of the City of Henderson, it is a pleasure to welcome the organizers and participants of the Human Anatomy and Physiology Society (HAPS) National Conference hosted by Nevada State College.

We appreciate your dedication to promoting excellence in the teaching of anatomy and physiology.

During your stay, I hope you have an opportunity to explore everything Henderson has to offer, including premier shopping, dining and entertainment options as well as our outstanding parks, trails and recreation facilities.

We send our best wishes to all of you gathered for this conference.

Sincerely,

[Signature]

Andy Hafen
Mayor

Office of the Mayor and Council • (702) 267-2085 • Fax (702) 267-2081 • www.cityofhenderson.com
May 25, 2013

Dear HAPS Conference Attendees:

On behalf of the faculty and staff of Nevada State College, I would like to welcome you to our campus for the 27th Annual Conference of the Human Anatomy & Physiology Society. We are honored to have you for the two days of workshops.

The dedication of HAPS to promote and enhance the instruction of human anatomy and physiology and to encourage collaboration among educators and partner organizations is exceptional. I am confident this conference will benefit the instruction of students in the health and science fields now and in the future.

We hope you enjoy the conference and your time here on our campus and in our city of Henderson.

Sincerely,

[Signature]

Provost and Executive Vice President
Nevada State College
Room Layouts

DAWSON BUILDING (DA)

FIRST FLOOR PLAN

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<td>Mythbusters of A&amp;P</td>
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<td>Champions in the Classroom – the Process</td>
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<td>2:30 pm - 4:00 pm</td>
<td>513 (LAS 221) Preventing rejection of the transplant.</td>
<td>713 (LAS 123) Introducing the New BIOPAC MP45- A Budget Beating Physiology Lab Solution for Community Colleges</td>
<td>813 A (LAS 222) A heart is a heart is a heart, right? Comparing face-to-face and online student performance.</td>
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| 501 (LAS 120) Life at the pool: A play about protein synthesis | 601 (DA 110) Using the bible to illustrate anatomy and physiology concepts | 701 (LAS 120) The Integration of a Virtual Cadaver Dissection in an A & P Laboratory | 801 B (LAS 120) The value of lab kits for online and hybrid A & P courses: Lessons learned from a converted skeptic |
| 502 (LAS 121) Flipping the anatomy and physiology classroom for community college students | 602 (DA 109) Digestive trouble? We can help! | 702 (LAS 121) The “Casino Classroom”: incorporating games and educational technology as a tool for learning | 802 B (LAS 121) "And This is How I Teach That" - Part 2: Reproduction, Osseous Tissues, and Gradients |
| 503 (LAS 122) Addressing new laboratory classroom challenges with hybrid instruction | 603 (DA 108) Using Cadavers in Anatomy and Physiology Lab | 703 (LAS 221) Dinner, dishes and dissection: Using eScience lab experiments as a tool for teaching fully online Anatomy and Physiology labs | 803 B (LAS 122) You Say ba-NAN-ah, I Say bah-NAH-nah |
| 505 (DA 101) Nurses Need Physiology: Case Studies Relating Anatomy and Physiology to Clinical Judgment | 605 (DA 106) The Fine Art of Transforming your Students into “Anatomy & Physiology Nerds” - Round Two | 705 (DA 102) Fusing Online and Active Learning Strategies in the A&P Classroom | 805 B (DA 101) Enliven Your Anatomy and Physiology Course by Adding Humor! (it won’t hurt I promise) |
| 506 (DA 102) Pain free ways to incorporate technology into your classrooms. | 606 (DA 102) Advising for Medical School: Myths and Facts | 706 (DA 106) Diamonds in the rough: unearthing pre-medical ,pre-dental, and pre-optometry students | 806 B (DA 102) A digital and “hands on” alternative to virtual labs |
| 508 (DA 107) Effective independent assessment using your campus LMS | 608 (LAS 120) Sewing the endocrine system together: making concept connections with needle and thread. | 708 (DA 108) Fostering habits of the mind: enhancing critical thinking in undergraduate A&P courses | 808 A (DA 107) Using iPads for Histology, Case Study, and Practical Reviews |
| 510 (DA 109) Worksheets - An Active Learning Technique for Accomplishing Learning Goals | 610 (DA 122) Reinforcing Acid-Base Principles in a Medical Simulation Lab | 710 (DA 110) An Active Learning Zone: Reforming the Traditional Classroom | 810 A (DA 109) Understanding fascial planes |
| 511 (LAS 222) Sharing Data Collected in Physiology Labs between Colleges | 611 (DA 123) Teaching pathophysiology to a mixed-discipline student cohort | 711 (DA 222) Give your students a voice! Active learning during lecture. | 811 A (DA 110) Top-Down Activities for Anatomy & Physiology |
| 513 (LAS 221) Preventing rejection of the transplant. | 613 (LAS 221) How to become a HAPS-I instructor and teach a HAPS-I course | 713 (LAS 123) Introducing the New BIOPAC MP45- A Budget Beating Physiology Lab Solution for Community Colleges | 813 A (LAS 222) A heart is a heart is a heart, right? Comparing face-to-face and online student performance. |
Tuesday Workshops
Session 1 (60 minutes) 9:00 am – 10:00 am

Molecular and Cellular Basis of Human Disease  (must be pre-registered for HAPS Institute course)
LAS 124
Dr. Brian R. Shmaefsky, Lone Star College - Kingwood
Morning workshop (1/2 day)

Cadaver Anatomy and Embryology of the Abdominal and Thoracic Cavities  (must be pre-registered for HAPS Institute course)
Cadaver Lab DA 100
Dr. Melissa A. Carroll, University of Texas at El Paso
Afternoon workshop (1/2 day)

LAS 120
Lakshmi Atchison and Michael Atchinson
Chestnut Hill College, Philadelphia, PA
latchiso@chc.edu
A blood cell visual model has been devised as an educational tool to study normal blood cells, disorders and leukemia. This model was developed because students often have difficulty identifying blood cells under the light microscope. In order to better present quantitative concepts, the model was devised using colored glass/plastic beads of various sizes in a “petri-scope”. The visual blood cell model is simple, unique, brings facts to life, and serves many purposes: The model is macroscopic, 3-dimensional, and easy to understand when compared to microscopic blood cells. The model is easy to grasp and conveys facts within minutes. It is a novel educational tool to teach normal and abnormal blood cell types. These abnormalities include altered blood cell shape, size, number, pathology, clogging of the arteries, and other changes that occur in many types of leukemia. The model can be used by physicians, hematologists, healthcare professionals, and teachers. It can also be used at many levels of education from high school through medical school to explain multiple kinds of leukemia. The model has been tested in the classroom; the student’s comments are in the excellent range. With the advice of a law firm, the blood cell model has a US copyright number and was recently awarded patent from US Patent and Trademark Office.

102 Creating unique active learning pre-class assignments to help students (and instructors) get the most out of their limited class time together.
LAS 121
Jon Runyeon and Hilary Senesac
University of Oregon, Eugene, OR
junruneon@uoregon.edu
In order to maximize the time spent in the classroom and lab, students are often directed to specific readings or given assignments to prepare, but often with dissatisfying results. This can be frustrating for instructors utilizing an active learning approach; for students to be interactive, they must be prepared. Student engagement and ownership in their preparation is enhanced through the creation of their own unique resource. This workshop will focus on the design of meaningful preparatory assignments, and how to use this work during class and on exams. Sample assignments and data from the University of Oregon’s anatomy program will be presented.

103 Effective ways of using the latest technology in the teaching of physiology
LAS 122
Chaya Gopalan
St. Louis College of Pharmacy, St. Louis, MO
chaya.gopalan@stlcop.edu
While video capturing of lectures to help students learn the lecture material outside the classroom has many advantages, there are new challenges that follow this pursuit. The flipped classroom approach of using prerecorded lectures to allow students to interact with the instructor and/or peers in the classroom is a powerful active learning methodology. In addition, the use of iPad, and online assessment tools and the pros and cons of these applications will be discussed. (Continued on next page)
104 Online learning resources: How to use Connect
LAS 123
Leslie Day
Northeastern University, Boston MA
dl.day@neu.edu
Do your students ever ask for sample test questions? Do you wish your students had better retention of the material or a higher level of learning than just memorization? With the generation of students being more tech savvy than previously, online/interactive learning is becoming an invaluable resource. Although every instructor wishes they had time to create multiple questions and resources for the students, we are all quite busy. Connect has done the work for you. Come see how easy it is to create and use online/interactive learning resources within the Connect platform.

105 Helping A&P Students Succeed: Using Supplemental Courses and Workshops to Reinforce Concepts and Promote Learning Skills
LAS 221
Kevin Patton and Suzanne Hembrough
St. Charles Community College, Cottleville, MO
kevin@theAPprofessor.org
Do your A&P students struggle with the whole process of learning? Do they seem ill prepared in their study skills and their knowledge of basic principles of biology? Explore case studies in which optional student workshops and short supplemental courses provide underprepared and unskilled students with knowledge and skills that make them better able to succeed in the A&P course and beyond. You will also receive free resources to help your own students succeed.

106 Tools for success: best practices in teaching and learning in STEM
DA 101
Wendy Rappazzo
Harford Community College, Bel Air, MD
wrappazzo@harford.edu
This workshop will present an overview of the best practices and tools shown to increase student learning and success in STEM courses. HCC has developed short modules used to increase student study skills, learning, and ultimately success in the classroom. These modules and current information on learning and memory will be discussed. Bring your own ideas and best practices to share.

107 Creating a 21st century learning experience in your anatomy laboratory
DA 102
Ruth Heisler and Nora Hebert
University of Colorado-Boulder. Boulder, CO
ruth.heisler@colorado.edu
Feeling the pressure to update the way in which material is taught in your labs? It isn’t easy to create a new learning environment for your students, nor is it always necessary to completely change the methods that have worked in the past. Pulling on our combined experiences in both gross anatomy and A&P labs, we will share what has worked for us. Some of the topics covered will be how to implement online teaching resources; effective use of online quizzes; successfully implementing a jigsaw learning method into the lab; and utilizing software to complement and not replace hands-on learning.

108 High School Anatomy and Physiology Offered Through a Dual Enrollment Program
DA 106
Murray Jensen and Ann Marie Froehle
University of Minnesota, Minneapolis, MN
msjensen@umn.edu
Murray Jensen’s Essentials of Human Anatomy and Physiology course is currently offered in over 20 high schools through the University of Minnesota’s College in the Schools program. This workshop, led by Professor Jensen and two high school teachers, will focus on how the program is run, describe the student-centered curriculum used (e.g., POGIL activities), and also provide details on how teachers and their classrooms in order to promote individual learning at home and cooperative group learning in the classroom.

(Continued on next page)
109 O say can you...trace a drop of blood?
DA 107
Steven Kish
Zane State College, Zanesville, OH
skish@zanestate.edu
The cardiovascular system is one of the most important systems we have in the human body, yet that importance is not often seen by students. Building the cardiovascular system on a model allows the cardiovascular system to be isolated, making tracing a drop of blood easier to visualize. In this hands-on session, participants will build the cardiovascular system in clay and see how this method can help your students develop a better understanding of the anatomy of the cardiovascular system.

110 Helping students succeed in the A&P classroom
DA 108
Ewa Gorski and Ellen Lathrop-Davis
Community College of Baltimore County, Catonsville, MD
egorski@ccbcmd.edu
Are you frustrated with students who lack study skills? Do they have skills that just don’t work? Do you teach online or hybrid/blended courses? This presentation will highlight a variety of strategies to increase students’ awareness of study skills and techniques related to successful completion of both traditional and hybrid A&P courses. Techniques include take-home exams, pre-test quizzes, writing assignments, and classroom and online interactive activities.

111 Introduction to iWorx New TA (Teaching Assistant) Physiology Teaching System
DA 109
Judi D’Aleo and Josh Brown
Plymouth State University, Dover, NH
judid@iworx.com
See an interactive demonstration of iWorx new easy-to-use family of TA teaching solutions for human, animal, exercise and psychological physiology and neurobiology. Based on 25 years of teaching experience and expert input from lab instructors around the world, the new teaching systems are designed for the utmost in ease-of-use. The foundation for iWorx TA teaching system is the TA Control Module, a novel recording instrument that eliminates many of the tedious set-up and calibration routines typically required to perform a lab. Several sensors are built into the TA module and precalibrated so that students simply plug in the sensors and start recording and analyzing data. The systems also incorporate a new proprietary interface, called iWire, which allows the TA Control Module to interface with digital sensors and enables simultaneous recording from multiple sensors via a single connection. Courseware is carefully synced to iWorx LabScribe software to make labs run smoothly. Students can use a built-in Journal to write reports without having to launch another program. No other lab systems are this simple, allowing instructors to focus on teaching rather than cumbersome equipment. The workshop will include a live demonstration of recording and analysis of ECG, EMG and Spirometry.

112 The first year teaching high school A&P and how you can help.
DA 110
Erin Russe and Peter English
erin.russe@utexas.edu, haps.exec@gmail.com
High school anatomy and physiology courses are typically taught by teachers with little or no formal training in A&P. I am a first-year high school A&P teacher who is a contributor to the HAPSBlog. I will share my experience and lead a group interested in solving high school teaching content challenges. Using audience experience teaching undergraduate-level physiology and in conjunction with Dr. Peter English, the HAPS Executive Director, we will seek to define concrete ways in which HAPS member experience can be utilized by the high school teacher community.
113 Using capstones to develop research skills and graduate capabilities: a case study from physiology
LAS 222
Louise Lexis and Brianna Julien
La Trobe University, Bundoora, Victoria, AU
l.lexis@latrobe.edu.au
Two physiology capstone subjects were recently introduced with the aims of providing an effective culmination point for the Bachelor of Health Science course and to offer students orientation to opportunities for further study, employment and career development. This workshop provides an overview of the research skills-related assessment tasks of the capstone program and an evaluation of its early success based on student performance and feedback and staff perceptions. We will provide an insight into the challenges of developing and implementing capstone subjects which, due to a strong student-centered approach, have different staff and resource requirements to more traditional subjects.

124 Creating Lessons with the Biopac Student Lab System
Brett Denaro and William McMullen, BIOPAC, Goleta, CA
This workshop is aimed at current BIOPAC Student Lab users, or those instructors who want to see the full extent of the BIOPAC Student Lab’s capabilities. Learn how to use the power of the BSL PRO software to create your own lessons and for independent projects. No programming required, just simple pull-down menu selections. The BSLPRO software allows you to perform exciting lessons on human and animal subjects. We have a wide range of BSL PRO lessons that are downloadable from our web site and include the lesson software (graph template file) and lesson instructions—everything you need to run the lesson.

Session 2 (90 minutes) 10:30 am – 12:00 pm

201 LabTutor 4 Learning Modules enhance student experience with LabTutor Online
LAS 221
Wes Colgan and Ben Bouman
ADInstruments.com, Colorado Springs, CO
w.colgan@adinstruments.com
LabTutor 4 suite has more functionality than ever. Come see how LabTutor 4 learning modules allow you and your students to get the most out of your laboratory course. ADInstruments’ innovative software enhances teaching and learning and is now easier to use for teachers and students. An overview of the latest in online laboratory course delivery will be demonstrated using LabTutor Online. See the latest on how students can access pre-lab materials and post lab data analysis over the Internet.

202 A Novel Approach to Teaching EMG in a Fun Lab Environment
LAS 120
Judi D’Aleo and Akira Sano
Plymouth State University, Dover, NH
judi@iworx.com
In this workshop, iWorx will demonstrate one of its most popular physiology teaching labs: Observation and Measurement of EMG Activity while Arm Wrestling. The demonstration will be conducted using iWorx new TA (Teaching Assistant) human physiology teaching system that is designed to make recording and analysis of physiological data in a classroom setting easier than ever. The foundation for iWorx new teaching systems is the TA Control Module which removes many of the tedious set-up and calibration routines typically required to perform a lab. Students simply plug in the sensors and start recording and analyzing data. Novel iWire technology built in to the TA module enables simultaneous recording from multiple sensors via a single connection. During the arm wrestling experiment, electrodes are placed on the biceps and forearm muscles of both contestants to observe muscle action as different forces are used during the arm wrestling match. Using the iWire connection, students can view EMG activity from both contestants simultaneously during the experiment, making it a fun and interesting mechanism to learn about EMG. Courseware is carefully synced to iWorx LabScribe software to make the lab run smoothly.
203 I’m not a medical doctor, but I play one in A&P!
LAS 121
Kyla Ross
Georgia State University, Atlanta, GA
kross@gsu.edu
Concerned you can’t write a clinical case without a medical degree? Want to use clinical cases in your A&P course but just aren’t sure how? Convinced your students wouldn’t benefit from or even understand a clinical case? If the answers to any of these questions is yes, then join us for a hands-on workshop that explores how to adapt New England Journal of Medicine (NEJM) cases for an introductory A&P course. We will (1) discuss how to use clinical cases to promote active learning in any classroom (laboratory to large lecture); (2) determine constructive ways to assess students using clinical cases; (3) develop a clinical case study based on a NEJM case. Join us to gain the tools and confidence you need to play a medical doctor in A&P!

204 Homeostasis: How do we use diagrams to teach this core concept?
LAS 123
Jenny McFarland and Anne Wright
Edmonds Community College, Lynnwood, WA
jmcfarla@email.edcc.edu
Homeostasis is an essential concept in physiology. We will explore how diagrams are used in student learning of negative feedback and homeostasis. We will (1) share and evaluate diagrams used in teaching and textbooks, (2) discuss the advantages of particular diagrams to reinforce learning, (3) explore the misconceptions that might be unintentionally reinforced and (4) distinguish between homeostasis and negative feedback. In addition to examining the elements of a diagram that help students develop an accurate, working understanding of homeostasis we will discuss how diagrams can be used repeatedly to reinforce learning in courses and textbooks. Supported by NSF DUE-1043443.

205 Human Physiology with Vernier
DA 101
John Melville
Vernier Software & Technology, Beaverton, OR
jmelville@vernier.com
In this demonstration, you will learn how easy it is to integrate Vernier technology into your Human Anatomy and Physiology curriculum. Activities from our Human Physiology with Vernier lab book will be performed using a variety of easy-to-use and affordable sensors. Come try our intuitive and innovative products, including Logger Pro software, LabQuest, and Vernier Graphical Analysis for iPad.

206 Exploring the nerve action potential using SPIKE: Ode to Hodgkin and Huxley
LAS 220
John Cornell
Saint Cloud State University, Saint Cloud, MN
jccornell@gmail.com
SPIKE is a nerve action potential simulation that is based on the Hodgkin and Huxley equations. Using SPIKE one can duplicate many of the results obtained by Hodgkin and Huxley. The ion concentrations used in SPIKE have been altered so that they are similar to those of a vertebrate. I wrote the original program for the DOS environment. With the free availability of DOSBox, a DOS emulator, SPIKE will run on Windows XP, Vista, Windows 7, Windows 8, Mac OS X, Fedora, Gentoo Linux, RISC OS, Debian, Solaris 10 sparc, and BeOS. In the Mac and Windows environment it may be run without administrator rights from a CD or jump drive. I have used SPIKE in non-majors courses to demonstrate the properties of the action potential. I have also used SPIKE in lower division A & P courses and in upper division General Physiology courses. Two modifiable exercises are available for students (with and without the Nernst equation). When students log in to SPIKE they get different simulations, based on their name. As a result, students cannot simply copy their results from another student. If you are looking for a nerve action potential simulation to use in your course, this may be it. Free copies of DOSBox and SPIKE are available to participants. http://www.jccornell.net/spike.htm
207 Beyond the Microscope: In Pursuit of a More Lively Histology Class
DA 102
Nina Zanetti
Siena College, Loudonville, NY
zanetti@siena.edu

Traditional histology labs are sometimes perceived as dull, partly because “normal” lab exercises in these courses tend to be sedentary and observational, as compared to the active, experimental labs of many other science courses. In this workshop, we’ll explore a range of activities that can both liven up a histology lab and also help students master some of the more difficult aspects of histology, such as interpreting two-dimensional sections and memorizing terminology. Participants will get to try their hand at some of these fun activities, such as scavenger hunts, “histology theater”, and a get-acquainted party.

208 Learning by Building: Online Tutorials Guide Student Hands-On Experience
LAS 222
Penny Perkins-Johnston and Jeren Marquecho-Riley
California State University, San Marcos, San Marcos, CA
pperkins@csusm.edu

Learning origins, insertions and actions of the muscular system is challenging for students. Typically, anatomy and physiology courses use dissection of cats or fetal pigs to give students laboratory experience with skeletal muscle structure. Clearly, there is a difference between human musculature and that of quadrupeds. In order to give Kinesiology students a lasting and realistic understanding of skeletal muscle structure, origins, insertions and actions, muscles were fashioned out of modeling clay and attached to unique skeletal models. Students check out a model that they will use throughout the semester. The instructor supplies worksheets and directions on building muscle groups using clay. Students build the muscle group, photograph and label their work according to the report template provided. Grading rubrics are used to assess the quality and accuracy of student work. Because students do their work outside of the laboratory, we produced online tutorials to exemplify how to build the muscles, and the location of their origins and insertions. Muscle group actions are performed by kinesiology students and incorporated into the video. In this workshop, we will demonstrate all of the above.

209 Histology Challenge - are you smarter than an undergrad iPad?
DA 106
William Karkow
University of Dubuque, Dubuque, IA
wkarkow@dbq.edu

Come to challenge yourself with new case presentations. See what student-generated images you can figure out for yourself if the shoe is put on the other foot. Consider how you can stay one step ahead of your charges, even if histology is not your forte. Flock here to confess your limitations among us shepherds, while we chew over how to pull the wool over our sheep’s eye-Pads. Meander this way to see the leader of the pack stumped, whilst you ravage him with faux paws. Ruminate over how much histology is considered good taste for undergrads.

210 Students coming to lab and lecture under-prepared? Want more time in your classroom? Assignable adaptive learning tools are effective ways to prepare students to engage in a discussion, rather than be lectured to.
DA 107
Steve Sullivan
Bucks County Community College, Newtown, PA
sullivan@bucks.edu

Adaptive learning is a method of education that personalizes learning by continually assessing students’ knowledge, skill and confidence levels and automatically designing and delivering targeted study paths. This helps instructors bolster students’ understanding in the areas where they need to improve the most. By helping students focus their outside-of-class study time on the topics and concepts that are most challenging to them, adaptive learning has been shown to help students study more efficiently, develop greater proficiency, and earn better grades. In addition, it helps professors “flip the classroom” so students come prepared for a discussion and/or application of concepts rather than being lectured to.

(Continued on next page)
211 Anatomia Italiana: The Medieval and Renaissance History of Anatomy Along the Italian Peninsula
DA 109
Kevin Petti
San Diego Miramar College, San Diego, CA
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 nexus 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 conventional hospital still hangs in the Basilica of Santo Spirito in Florence. This lecture tells a thousand-year story of anatomy as an academic discipline. From its inclusion into the curriculum of the earliest universities, to the construction of the first permanent dissection theaters, to the invention of visually arresting wax anatomy models, the history of anatomy is an interdisciplinary saga of art and science that evolved along the Italian peninsula.

212 Group-learning metacognitive activities in human anatomy and physiology courses
DA 110
Jennifer Regan and Cinnamon Van Putte
University of Southern Mississippi, Hattiesburg, MS
jennifer.regan@usm.edu
Metacognition is defined as ‘knowing about knowing’ or thinking about how we understand concepts and identifying methods and activities that increase our learning process. Many freshman and sophomore level college students have not been challenged to consider how they learn and how to develop useful strategies to improve the extent of their understanding of different subjects. Considering one’s learning process is important because it allows a person to plan and use methods that best support true understanding of a particular subject. If students are challenged to explore their own learning process and recognize methods of increasing their understanding, these tools will become part of their overall learning strategy and benefit them in their overall academic career. In this workshop, we will explore different activities that can be used in lecture or lab courses that challenge students to discuss difficult material while encouraging the students to fully share their thinking process and learning strategies.

213 “And This Is How I Teach That” - Part 1: Neurophysiology, Acid-Base Balance, and Digestion
LAS 223
Robert Rawding
Gannon University, Erie, PA
rawding@gannon.edu
This workshop is interactive; bring your techniques to share, demonstrate, and exchange. The presenter will lead off each of the 30-minute rounds with a brief 5-8 minute presentation in each of three topics areas. Within each round, workshop participants may likewise present their tips and techniques for better student comprehension. Part (A): summation, EPSP’s & IPSP’s and impulse generation; Part (B): acid-base balance problem solving, and Part (C): hormones that almost completely dominate initial digestion and signaling to accomplish assimilation.

214 The next level of adaptive learning and you
LAS 122
Terry Austin
Temple College, Temple, TX
taustin@templejc.edu
The future of education and learning is now. See two new tools that harness the latest educational research in neurobiology, cognitive psychology, game studies, and adaptive learning technology to help your students maximize their potential in your classroom.

(Continued on next page)
Session 3 (60 minutes) 1:00 – 2:00 pm

301 Developing the vending machine nutrition experiment to develop an inquiry-based activity
LAS 221
Aaron Fried and Wes Colgan
Mohawk Valley Community College, Utica, NY
afried@mvcc.edu
This demonstration will show the steps in planning, customization, development, and deployment of a nutritional analysis lab exercise using ADInstruments LabTutor software. This session will focus on the process of refining the experiment as well as the development of the experiment within the ADInstruments LabTutor Teaching Suite. Use of the LabTutor allows a scaffold to build an experiential learning cycle around an analysis of blood sugar levels after ingesting different food types. The LabTutor environment makes it easier to control that inquiry based environment with a group of students. We will focus on presenting practical examples of how the software components work including asset management, content editing, experiment deployment and student assessment. Benefits and drawbacks as well as ways to overcome those drawbacks will be discussed.

302 The HAPS POGIL Project: Part 1. An Introduction to the POGIL Program
DA 101
Murray Jensen and Patrick Brown
University of Minnesota, Minneapolis, MN
msjensen@umn.edu
Process Oriented Guided Inquiry Learning (POGIL) is a teaching and learning strategy that combines cooperative group activities with constructivist learning theory. Recent NSF grant funding has allowed a group of HAPS members to develop POGIL curriculum modules for entry-level anatomy and physiology. This session will focus on details of the NSF POGIL grant, provide background on the POGIL teaching strategy, and give participants a chance to engage in an example POGIL activity.

303 Developing a broad skill set in those students undertaking a physiology practical subject.
DA 102
Tom Samiric and Stuart McDonald
La Trobe University, Bundoora, Victoria, AU
T.Samiric@latrobe.edu.au
Physiology laboratory skills often get confused or lost when the practicals are embedded within the theoretical part of the subject. This workshop will consider the benefits of separating a typical physiology subject with embedded practicals into two subjects: a theory and practical subject. The separation of subjects afforded us the opportunity to demark skills associated with the understanding of core theoretical information from a clearly distinct set of skills associated with scientific enquiry, scientific instrumentation, data collection and analysis, and scientific writing. We will discuss the development of distinct learning objectives and assessment tasks for each subject.

304 Assessing and Remediating A&P Students Before They Arrive in Class
DA 106
Lori Garrett
Parkland College, Champaign, IL
Lgarrett@parkland.edu
We are too often frustrated by students who, often through no fault of their own, arrive in our classes woefully underprepared for the rigor of A&P. Yet rarely can we require prerequisites to improve student success. In today’s academic atmosphere that increasingly emphasizes completion and retention, we realize many of our students are doomed to fail and perhaps repeat the course, or we may lose them forever. Combine a flood of underprepared freshman with renewed external discussion of performance-based funding for education, and our own classroom performance may soon be under the microscope as well. In this session, we will discover a powerful solution to this problem. MyReadinessTest for A&P is a comprehensive A&P prep system with four goals: 1. Assess pre-A&P students proficiency in foundational science and study skills; 2. Remediate in core areas with practice and review; 3. Improve student confidence; and 4. Improve student (and thus our own) success.
305 Bio-Gerontology: The Next Course After A & P
LAS 120
John Lloyd
Aurora University, Aurora, IL
jlloyd@aurora.edu
Bio-Gerontology, a course involving the biology of aging provides an opportunity for students to be exposed to the geriatric population. Individuals are living longer and the “baby boomers” are quickly approaching their “golden years”. Aging, which leads to gradual changes in body composition, involves structural and functional losses at the cellular, tissue, and organ system levels. Chronic medical conditions such as hypertension, COPD, arthritis, coronary heart disease, and stroke have been associated with the aging process. Health care providers need to distinguish pathophysiological conditions from “normal aging” of the human body. Students in the course interact and observe elders individually at a local long-term care facility weekly and in addition they organize and implement a group activity for all the residents. Over the semester a human bond develops (companionship/friendship) between the student and resident. As a Sioux Proverb states “As you go through life, act in such a way as to not deprive others of happiness. Avoid giving sorrow to your fellow man, but to the contrary, see that you give him joy as often as you can.” Selective student’s reflections of their experiences with the residents along with action photographs will be presented.

306 Mythbusters of A&P
LAS 121
Ken Saladin
Georgia College, Milledgeville, GA
ksaladin@windstream.net
This workshop explores some ideas that are quite common in A&P textbooks but that, to quote Sportin’ Life, ain’t necessarily so. I will present some propositions that I think are widely believed and taught, but false, along with some foils that are presumably true. Participants will vote true or false for each, and for the false ones, I will explain why they are so and invite discussion among participants. I may be right and perhaps offer some thinking that reshapes your teaching; or I may be wrong and find I need to rethink some issues after hearing your thoughts. Right or wrong, the idea is to share some provocative ideas and go home reflecting on A&P myths we’ve been teaching for years, but that ain’t necessarily so.

307 Using Comparative Anatomy to Reinforce Human Anatomy, or, an Ulna is an Ulna, is an Ulna
LAS 122
Molly O’Shaughnessy
Oregon Institute of Technology, Klamath Falls, OR
molly.oshauhnessy@oit.edu
Come and experience a lab that utilizes owl pellets, mammal skulls and bones, human and hominoid skulls, radiographs, skeletal pathology specimens, and other observations to develop a deeper understanding of the characteristics and landmarks of various bones, as well as the concept of form following function as it relates to the skeletal system. Participants will use divergent thinking skills when they compare a horse’s front leg with a bat’s wing and the human hand. The lab acts to review, enrich, and solidify knowledge of skeletal anatomy prior to a skeletal practical exam.

308 Problem-based learning in a two-semester Anatomy and Physiology Course: What is it and how to get started
DA 107
Pam Smith and Jennifer Welch
Madisonville Community College, KCTCS, Madisonville, KY
pam.smith@kctcs.edu
Problem-based Learning (PBL) is a pedagogy through which students learn course content in the context of real-world, ‘messy’ problems. The classroom is student-centered with the students working in groups to discover information necessary to solve the problem. The instructor serves as a facilitator rather than lecturer. The problems differ from case-studies, as they do not to lead to a diagnosis or treatment, but rather to lead the students on a pathway of discovery. Problem-based learning was introduced at Madisonville Community College in 2010 and has been growing in success with students and faculty alike.

(Continued on next page)
309 Moving A&P Outside of the Classroom: Outreach Events for Children
DA 108
Sarah Straud
Saint Augustine’s University, Raleigh, NC
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Interest in science begins at a young age. To promote and foster this interest, this year’s Anatomy and Physiology students were charged with the task of designing an outreach event targeted towards elementary school-aged children. In this workshop, I will discuss the overall logistics of the event and the types of activities that were presented. Saint Augustine’s University is a small, historically black institution. Because of our demographics, we chose to reach out to a group of underprivileged, African American male students. Games, demonstrations, and hands on activities were included in our two hour long event.

310 Champions in the classroom-the process
DA 110
Bennett Tucker
Huntingdon College, Montgomery, AL
bdtdmd@gmail.com
Coach Nick Saban has developed The Process, a way of life that has allowed the Alabama Crimson Tide to win the NCAA Football National Championship three out of the last four years. We really should ask ourselves: “What is it about Nick’s “process” that creates such a championship mentality?” Closer examination of the tenets of this process reveals a formula for success that is far from exclusive to football. We as A&P instructors can adapt this methodology for proven success and use it to help create champions in our classrooms.

311 Practical Uses of Mobile Devices for Anatomy & Physiology
LAS 123
Amie Yenser
Penn State Hazleton, Hazleton, PA
alv10@psu.edu
Looking for a way to actively engage your students in your classroom? In this hands-on session, I will provide participants with simple, yet effective pedagogical techniques using mobile devices in the classroom. Research indicates that over 60% of cell phone users are addicted, checking their phones at least once per hour throughout the day. As educators, we can utilize this to our benefit to capture the attention of every student in the classroom (even those persistent texters in the back of the room!). Leave this presentation with simple, quick pedagogical tools you can use tomorrow.

312 Independent research project in physiology
LAS 123
Brianna Julien and Louise Lexis
La Trobe University, Bundooka, Victoria, AU
b.julien@latrobe.edu.au
As part of a recently developed capstone program in physiology, we introduced a semester-long independent research project. This task was designed to promote the development of scientific research skills along with life-long skills such as critical thinking, problem solving, communication and interpersonal skills. In teams of 5-6 students, a research project is designed and implemented, and concludes with a team poster presentation, and an individual oral presentation and journal article submission.

313 Ultrasound in teaching A&P
LAS 222
Richard Hoppman and Victor Rau
University of South Carolina School of Medicine, Columbia, SC
Richard.Hoppmann@uscmed.sc.edu , vrao@uscmed.sc.edu
The University Of South Carolina School Of Medicine has been using web-based learning modules and hands-on ultrasound experience to enhance the teaching of anatomy and physiology since 2006. Learning material, assessment tools, outcomes, and “lessons learned” will be presented. Participants will also have a chance to perform some basic ultrasound screening themselves.
Session 4 (60 minutes or 90 minutes) A: 2:30 – 3:30 pm or B: 2:30 – 4:00 pm

401 B Team Based Learning: A Different Approach to Teaching Anatomy and Physiology
LAS 222
Cindy Stanfield and Coral Gubler
University of South Alabama, Mobile, AL
cstanfield@southalabama.edu
The University of South Alabama instigated Team Based Learning (TBL) throughout the curriculum, from freshman orientation courses to senior and professional courses. We will present how TBL has been implemented in anatomy and physiology-related courses in allied health. We will discuss why we adopted the Team Based Learning approach and how we used it to improve classroom learning. This will be a hands-on workshop where participants will go through a first day experience in the course, including developing teams, taking a readiness assurance test (RAT), and doing a team exercise.

402 B Human Physiology with Vernier
LAS 121
John Melville
Vernier Software & Technology, Beaverton, OR
jmelville@vernier.com
In this demonstration, you will learn how easy it is to integrate Vernier technology into your Human Anatomy and Physiology curriculum. Activities from our Human Physiology with Vernier lab book will be performed using a variety of easy-to-use and affordable sensors. Come try our intuitive and innovative products, including Logger Pro software, LabQuest, and Vernier Graphical Analysis, for iPad.

403 B The Smart World: Understanding the Role of Adaptive Technologies in the New Science Classroom
LAS 220
Michael Windelspecht
Appalachian State University, Ricochet Creative Productions LLC, Boone, NC
michael@ricochetprod.com
Instructors are increasingly experimenting with flipped and hybrid class structures. Yet, these environments present new challenges as instructors work to adapt traditional materials and assess student success. Using data from online and flipped classes at Appalachian State, we will demonstrate how the use of adaptive technologies is shaping the online, hybrid and flipped learning environments. The session will feature several hands-on activities that will examine what is meant by the term adaptive learning. Using the LearnSmart Advantage platform as a model, we will discuss not only how these technologies work, but how instructors can maximize their usefulness in their specific learning environments. We will take a detailed look at the reporting functions found within these programs, and provide best practices for deploying adaptive learning technologies in the classroom.

404 B Vending Machine Nutrition
LAS 221
Eileen Bush and Aaron Fried
Mohawk Valley Community College, Utica, NY
ebush@mvcc.edu
This is a demonstration of a customized laboratory exercise used at MVCC that demonstrates digestive and endocrine physiology. Using an ADInstruments LabTutor teaching suite, participants will participate in a directed experiment to test glycemic digestion of different types of commonly available vending machine snacks. In small groups participants will actively predict and test their hypotheses about the speed of carbohydrate digestion. Participants will also investigate how the presence of different nutritional variables (e.g. presence of proteins and fats) affect carbohydrate digestion. Finally participants will examine experimental design and data analysis using the LabTutor.

(Continued on next page)
405 A Unveiling the New HAPS Competency Exam - How to Use the New Online HAPS CE at My Institution
DA 102
Curtis DeFriez
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The testing Committee for HAPS has been working for 6 years to develop a new online competency examination that conforms to the HAPS Topics and Outcomes put forth by the society as best practices for teaching a year-long Human Anatomy and Physiology course. The new test is a 100 question exam, each question chosen in a randomized fashion from a multi-question test bank consisting of several hundreds of questions. The test bank was developed by subcommittees of the testing committee and members of the HAPS board of directors. Each question in the test bank is linked to 100 specific topics chosen from among the 19 Modules set forth by the HAPS Learning Outcomes Project. The new HAPS Competency Exam (HAPS CE) will serve as a tool for measuring outcomes of Anatomy and Physiology instruction by those interested in quantifying student performance and documenting the integrity of their instructional pedagogy. The advantages of administering this exam in an online-only environment, and the mechanics of the new test will be explained in this workshop. The workshop will also be an ideal setting to answer questions and explain procedures for those instructors not accustomed to giving online exams to their students.

406A Why does a patient with a stone in the cystic duct not jaundice: nuts to know-really?
DA 106
Bennett Tucker
Huntingdon College, Montgomery, AL
bdtdmd@gmail.com
It has been suggested A&P instructors should teach basic topics (need to know) and maybe a few extras (nice to know), yet stay away from contributing topics that could be deemed “nuts to know”. Could it be that extraordinary learning begins when a student asks, “Why doesn’t he turn orange?” We, as instructors, can use correlating topics to uncover the pearl that, once learned, can stimulate our students to be relentless in their academic preparation. It’s not “nuts” if it helps create insatiable learners.

407 A Cancer as an Integrative Topic in Anatomy and Physiology
DA 107
Patricia Bowne
Alverno College, Milwaukee, WI
pat.bowne@alverno.edu
We’ve all seen students who memorize individual physiological pathways beautifully, but “hit the wall” with the tasks of identifying which of these pathways is related to a given scenario and predicting what will happen when more than one pathway is affected at the same time. Yet students are fascinated by the medical topics which require just this kind of thinking. This workshop presents end-of-course summary activities using the topic of cancer. Students use anatomy to predict the complications of a specific tumor, and physiology to predict the consequences for the patient.

408A Powerpoint and “passive” need not be synonymous: Games and cases for learning endocrine physiology using Powerpoint interactively
DA 108
Kevin Strang
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A great way to help students learn physiology is by using interactive case studies and games. Although Powerpoint is generally thought of as a vehicle for passive learning, with a little creativity it can be used as an excellent tool for creating interactive exercises. In this workshop, I will share some games and cases developed in Powerpoint to help students learn endocrine physiology. Workshop participants will work in teams to showcase their endocrine knowledge by playing some of the games, followed by a general discussion of how to use Powerpoint more interactively in labs, small groups, and even lectures. Come and play!
409 B The Role of a General Biology Prerequisite in Anatomy and Physiology Student Success.
DA 109
Brian Shmaefsky
Lone Star College – Kingwood, Kingwood, TX
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There is much debate about the value of a general biology prerequisite for freshman level anatomy and physiology course-
work. Many allied health programs that require A&P cannot add another course to their already jam-packed curriculum or list of prerequisite classes. However, A&P faculty generally would prefer students who were better prepared for the rigors of the biology conceptualizations needed for success in A&P. This presentation evaluates the role of college-level general bi-
ology as prerequisite for A&P. It investigates the effects of prerequisites on student success and describes faculty and student attitudes about the effectiveness of a biology prerequisite for achievement in A&P. Options tantamount to a biology prereq-
uisite will also be discussed as well as upcoming best practices in career oriented biology courses recommended in the Vi-
sion and Change document developed by the American Association for the Advancement of Science with support from the National Science Foundation. The project in this presentation was the result of work done at the NABT and SCST 2012 Vision and Change Working Group funded by McGraw-Hill Higher Education.

410 A The HAPS POGIL Project: Part 2. POGIL Curriculum Materials for Human Anatomy and Physiology
DA 110
Murray Jensen
University of Minnesota, Minneapolis, MN
msjensen@umn.edu
The HAPS POGIL project has generated curriculum materials for entry-level anatomy and physiology students. The materials promote conceptual learning through active learning endeavors and provide a practical alternative to lecture. This session will feature the unveiling of sample POGIL activities from the first half of a typical course, such as those focused on levels of organization, the skeletal system, and the muscular system. All materials generated by the HAPS curriculum project will be free to HAPS members.

411 A Case study approach to teaching of physiology
LAS 120
Chaya Gopalan and Margaret Weck
St. Louis College of Pharmacy, St. Louis, MO
chaya.gopalan@stlcop.edu
We use case study to strengthen the teaching of selected topics in physiology. A typical pattern of case study involves (a) group formation (b) completion of homework that demonstrates understanding of the underlying physiology needed to solve the case, (c) an individual content readiness assessment test, (d) answering critical thinking questions about the normal physiology involved in the clinical setting, (e) hypothesizing how the normal physiology could have failed, thus causing the clinical condition being presented, (f) preparing written group responses to case questions, (g) assessing group reports, and (i) evaluation of the participation of group members within each group.

412 A Assessment of learning in anatomy and physiology “round three”: “coming full circle”
DA 101
Joyce Jennings-Pineda
Missouri State University West Plains, West Plains, MO
joycepine@missouristate.edu
This is a third and final presentation (Round One: 2005, Round Two: 2007) on the steps of developing and implementing an assessment plan for Human Anatomy and Human Physiology at Missouri State University West Plains. This presentation demonstrates the full implementation of the plan from institutional mission to course objectives and culminates with analysis of data used in the budgeting process. It is more difficult for administrators to say no if you can demonstrate a direct tie to learning outcomes!
413 A Head-to-head: an online anatomy tournament module to reinforce anatomical knowledge
LAS 122
Daniel Belliveau
Western University, London, ON, CAN
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Returning competition into the classroom, this workshop explores the role of direct competition as a stimulus to learning. Using an innovative online and real-time tournament module developed by Top Hat Monocle, we explore the value-added element of tournaments to exam preparation. This workshop will review the findings to date in our study and introduce participants to the tournament module, learning how to organize practice sessions and tournament game play. The tournament module consists of nearly 500 questions covering all systems. Bring your laptop, smartphone or tablet to take full advantage of the experience.

Wednesday Workshops
Session 5 (60 minutes) 9:30 am – 10:30 am

501 Life at the pool: A play about protein synthesis
LAS 120
John Cornell and Theresa Cacek
Saint Cloud State University, Saint Cloud, MN
jccornell@gmail.com
Calling all thespians, “Life at the Pool” is a one act play that was written for non-majors in biology. The audience is introduced to a number of characters including aminoacyl tRNA synthetases, tRNAs, mRNAs, the P and the A site of the ribosome, and of course the amino acids of the pool. During the course of the play our characters manage to assemble a small polypeptide. The play was written to demonstrate some major concepts in the translation of an mRNA to a protein. If you teach a course in which the Central Dogma is presented you may be interested in ‘Life at the Pool’. Come and help us put on the Los Vegas premier of ”Life at the Pool’. Warning: Audience participation is required!

502 Flipping the anatomy and physiology classroom for community college students
LAS 121
Jill Feinstein
Richland Community College, Decatur, IL
jfeinste@richland.edu
Have you ever wished that you could discuss anatomy and physiology topics in more detail while incorporating more pathological and clinical cases into your course? I will explain my trials, frustrations, and successes in flipping the classroom on my Anatomy and Physiology I & II courses. This presentation will focus on knowledge gained from transforming traditional classes into flipped courses, allowing students to spend more time with the material while creating an investigative atmosphere in the classroom. Don’t forget to bring a jump drive; I will distribute examples of successful case studies, activities and labs to anyone who is interested.

503 Addressing new laboratory classroom challenges with hybrid instruction
LAS 122
Robert Kellar and Aaron Tabor
Northern Arizona University, Flagstaff, AZ
robert.kellar@nau.edu
Hybrid sections of Anatomy & Physiology Laboratory I course were recently piloted. These sections alternated weeks of “in class” instruction with “off weeks” complemented by on-line instruction and self-study activities to reinforce concepts. Lectures were delivered on Blackboard in A-V format. CONNECT laboratory assignments and digital pathology using the APERIO digital scanning platform were used to provide students with self-study opportunities outside of the classroom. Digital pathology was adopted onto iPads, Macs, and PCs. Overall, technology was leveraged in the classroom to provide new learning modalities for students, to help improve performance, and to meet enrollment growth in this course.

(Continued on next page)
504 The HAPS POGIL Project: Part 3. POGIL Curriculum Materials for Human Anatomy and Physiology
LAS 123
Murray Jensen
University of Minnesota, Minneapolis, MN
msjensen@umn.edu
The HAPS POGIL project has generated curriculum materials for entry-level anatomy and physiology students. The materials promote conceptual learning through active learning endeavors and provide a viable alternative to lecture. This session will feature the unveiling of sample POGIL activities from the second half of a typical course, covering topics such as those from the nervous system, the lymphatic system, and the reproductive system. All materials generated by the HAPS curriculum project will be free to HAPS members.

505 Nurses Need Physiology: Case Studies Relating Anatomy and Physiology to Clinical Judgment
DA 101
Patricia Bowne
Alverno College, Milwaukee, WI
pat.bowne@alverno.edu
HAPS members often complain that their nursing students don’t see the importance of Anatomy and Physiology. This workshop discusses how nurses use these topics clinically and presents examples from a set of case studies (being created for Pearson’s MasteringA&P) designed to address this issue by integrating clinical judgment into physiology problems. Participants will also work on designing short case studies for their own use.

506 Pain free ways to incorporate technology into your classrooms.
DA 102
Terry Austin
Temple College Temple, TX
taaustin@templejc.edu
Technology is our new best friend in the classroom. It has proven to raise grades. Your students have it incorporated in their other classes, and you want to do the same in yours. In this session a Pearson Faculty Advisor will help you set-up a Pearson MasteringA&P site, and get your basic set up in just a few minutes. The rest of the time will be spent to go over easy ways you can use MasteringA&P and the technology that it contains to help your students inside and outside the classroom improve their A&P experience and grades.

507 Good things do come from fat: adiponectin reduces cardiac damage following ischemic injury
DA 106
Nanette Tomicek
Pennsylvania State University, University Park, PA
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Adipose has been previously characterized as an inert storage depot. However, fat is actually a dynamic tissue that produces and secretes a multitude of hormones and signaling factors. One factor, adiponectin, has been implicated in predicting heart disease risk. Interestingly, fatter individuals have less adiponectin and are therefore at greater risk for heart disease and heart attack. The purpose of the study was to determine that adiponectin treatment can limit the amount of cardiac damage following ischemic injury in a rat model. Indeed adiponectin treatment successfully improved functional recovery (end diastolic pressure and left ventricular developed pressure) in the heart.

508 Effective independent assessment using your campus LMS
DA 107
John Arle
Lane Community College, Eugene, OR
arlej@laneccc.edu
This workshop examines both formal and informal assessment techniques using common Learning Management Systems. See how LMS assessment technology can be utilized to create better measurement of learning outcomes while actually increasing instructional time on task. Once structured, online assessment releases instructor time for more creative instructional purposes. Even traditional lab practicals can be brought into the digital age with no more pinning, taping, pointing, or
3x5 cards. These very same technologies can be set for student self-assessment that is specific to your instruction and your class rather than the common shotgun approach offered by most publishers. Enhanced assessment may arguably be the best use of online LMS systems and this session shows and discusses how you can take advantage of what’s already available on your campus.

509 Active drawing exercises for anatomy students
DA 108
Bradley Barger
Indiana University, Bloomington, IN
jbarger@indiana.edu
In this workshop, the instructor will lead you through simple drawings of complex anatomical structures with the goal of using this method in your own classes. You will be shown simple ways to highlight important anatomical landmarks by drawing basic geometric shapes that students can follow, even without any previous drawing experience. By producing your own drawings at the same time as your students, individual relationships of structures can be emphasized, and even highly complex topics can be made less daunting. Topics covered will include integument, appendicular skeleton, cranial nerves, and systemic circulation.

510 Worksheets - An Active Learning Technique for Accomplishing Learning Goals
DA 109
Janet Casagrand and Heidi Bustamante
University of Colorado, Boulder, CO 80309-0354
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Do your students have particular topics they struggle with? Active learning techniques can help students grasp key concepts and achieve learning goals. There are a variety of such techniques. One we’ve been successfully utilizing is short, in-class worksheets aligned with learning goals. These targeted activities fit into lecture to provide timely practice and feedback, with little sacrifice of lecture time. These activities can take many forms depending on content and learning goal. We’ll discuss several we’ve developed (e.g., electrochemical gradients and equilibrium potentials, endocrine regulation, autonomic control of the heart, kidney function), then have you brainstorm one for your students.

511 Sharing Data Collected in Physiology Labs between Colleges
LAS 222
Julie Dais and Bruce Campbell
Okanagan College, Kelowna, BC, CAN
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In order to increase interest in data analysis among first year students in anatomy and physiology labs, sharing the data collected between colleges has been suggested (Cyberlearning in Community Colleges Workshop, 2012). An additional benefit to this activity would be an increase in sample size. However, there are some challenges to this process such as the use of different protocols and collection equipment (i.e. Logger Pro, BioPac, iWorks, etc.). The goal of this workshop is to bring together interested people to determine which data could be collected (such as EKG, lung volumes, hematocrit, other?), develop common protocols, and create a repository for sharing the data in the future.

512 The Carnegie Mellon University, Open Learning Initiative (OLI) Anatomy and Physiology Course: A Resource for Both Students and Educators
LAS 223
Ron Gerrits and Erin Czerwinsk
Milwaukee School of Engineering, Milwaukee, WI
gerrits@msoe.edu
The Community College Open Learning Initiative (CC-OLI) project used a collaborative approach to bring together faculty across institutions, including several HAPS members, to develop a free and open anatomy and physiology course. The course is centered on the learning outcomes developed by the HAPS Curriculum and Instruction Committee, and can be used independently by students or by faculty as a course supplement. This presentation and discussion will focus on the goals of the OLI course, its implementation, and how immediate student feedback and faculty tracking of student performance can be beneficial to faculty, students, and physiology education in general.

(Continued on next page)
513 Preventing rejection of the transplant.
LAS 221
Bennett Tucker
Huntingdon College, Montgomery, AL
btdmd@gmail.com
Coach Barry Switzer, referring to an athlete, was quoted as saying, “It was like a heart transplant. We tried to implant college in him but his head rejected it.” If we look at the body of knowledge we want to “implant” into our students, we must ask this question: How do we prevent rejection? What are the factors and contributing factors that could lead to rejection, and what can we do to improve the chances of our “transplant” becoming successful?

Session 6 (60 minutes) 11:00 am – 12:00 pm

601 Using the Bible to illustrate anatomy and physiology concepts
DA 110
Bennett Tucker
Huntingdon College, Montgomery, AL
btdmd@gmail.com
From the dry bones in Ezekiel to King Solomon’s review of human body systems in Ecclesiastes, Biblical history proves to be a great adjunct in classroom A&P instruction. As we dissect these passages, we can capture anatomical and physiological writings dating to 1400 B.C. and use them to establish relevance of our instruction to the clinical careers that our students desire.

602 Digestive trouble? We can help!
DA 109
Steven Kish
Zane State College, Zanesville, OH
skish@zanestate.edu
The digestive system is one of those body systems that we do not think about much, until something goes wrong. Building the digestive system on a model allows for a 3-D examination of this complex and fascinating system. In this hands-on session, participants will build the digestive system in clay and see how this method can help your students develop a better understanding of the anatomy of this system.

603 Using Cadavers in Anatomy and Physiology Lab
DA 108
Kim Kerr
Troy University, Montgomery Campus, Montgomery, AL
kkerr5601@troy.edu
Using cadavers in anatomy and physiology lab can be a great experience for students. In this workshop I will show how Troy University started a cadaver lab with only a small space and few resources. We will discuss materials used, student response and interest and how having a cadaver lab may help prospective students choose to attend your school.

604 Transforming review sessions: interactive use of practice exams for effective student review in class settings
DA 107
Stacey Dunham
Indiana University, Bloomington, IN
dunhams@indiana.edu
Many students ask for a review session prior to the exam, but attendance is typically low and few have questions to ask. Rather than simply hosting a question and answer session, instructors can incorporate a practice exam to engage students and to generate additional relevant questions. This session will discuss the benefits of using practice exams to improve student learning and outline approaches for using practice exams individually, in small groups, or in large class discussions for review. Instructors will leave with an action plan to develop review sessions centered around the use of practice exams.

(Continued on next page)
605 The Fine Art of Transforming your Students into “Anatomy & Physiology Nerds” - Round Two
DA 106
Carol Veil
Anne Arundel Community College, Arnold, MD
cbveil@aacc.edu
Join me for a follow-up to last year’s presentation in Tulsa, with all new content to nurture those A&P Nerds in your classes. What are A&P nerds? They are individuals who are fascinated to see the application and the true beauty of A&P in every aspect of their lives, much to the bewilderment, amusement, and sometimes disgust, of family and friends. Get ready for more examples of music, art, humor, and great stories to enhance your teaching and, step by step, turn your students into true A&P nerds.

606 Advising for Medical School: Myths and Facts
DA 102
Barbara DeHart
Penn State University, University Park, PA
bd2@psu.edu
Medical school ranks as one of the most popular career goals among incoming first-year students in the Life Sciences. As such, this presentation will focus on how faculty and advisers can help their students prepare and succeed when applying to medical school. The information provided will help faculty and advisers become familiar with current medical school statistics, the characteristics of a competitive applicant, and to distinguish between medical school myths and facts. Furthermore, we will look at traditional and non-traditional ways of applying, as well as the important role that faculty and advisers play in this process. The presentation will be followed by a question and answer session.

607 Reflective journaling as a means to improve learning in A&P
DA 101
Audra Schutte
Indiana University, Bloomington, IN
afschutt@umail.iu.edu
Do your students struggle to effectively regulate their own learning? I will discuss the use of reflective journaling in an anatomy supplemental study skills course, which could also be implemented in a regular A&P course. These journals allowed students an opportunity to grow as learners and provided instructors with valuable student feedback. I will also discuss the development and use of a codebook to analyze the journals after the completion of the semester. This allows for measurement of changes in student’s habits and awareness of their learning over the course of a semester.

608 Sewing the endocrine system together: making concept connections with needle and thread.
LAS 120
Lauretta O’Dell
Hillsborough Community College, Tampa, FL
lodell@hccfl.edu
Students find the complex physiology of the endocrine system perplexing, especially the multi-step action of tropic hormones. With hands-on practice using color-coded thread, labels, and cardboard cut-out organ systems, students develop a feeling for the connections between hormones, their targets, and their effects. This workshop will allow participants to create a threaded concept map of the endocrine system in an exercise that might be duplicated in any anatomy and physiology classroom.

609 The startling history and the present reality of cadaver dissection and body donation.
LAS 121
Bill Perrotti
Mohawk Valley Community College, Utica, NY
wperrotti@mvcc.edu
For many years, human cadavers have been a mainstay in the educational preparation of physicians. More recently in the U.S., cadavers have been used increasingly in undergraduate education at both baccalaureate and associate degree-granting institutions as important elements in the preparation of nurses, therapists, trainers, physician assistants, and others. Where do these bodies come from now? Where did they come from in years past? This presentation will attempt to answer those questions by looking at the history of dissection and body procurement through the ages. The focus will be largely on Europe and North America but may drift farther afield.

(Continued on next page)
610 Reinforcing Acid-Base Principles in a Medical Simulation Lab
LAS 122
Robert Rawding
Gannon University, Erie, PA
rawding@gannon.edu
This workshop presents the evolution of a hands-on approach for students to make clinical observations of patients in acid-base balance stress: from lecture pre- and post-tests (Theory) to group laboratory problem solving (Application) to patient care observation and management (Clinical). It includes a walkthrough of an Institutional Review Board application and approval, implied consent forms and data custodianship, sample student assessments along the way, student feedback and statistical analyses, and submission for journal publication. It includes a pictorial tour through a state-of-the-art medical simulation laboratory. Copies of requisite documents will be available to attendees.

611 Teaching pathophysiology to a mixed-discipline student cohort
LAS 123
Robert Paine
La Trobe University, Bundoora, Victoria, AU
r.paine@latrobe.edu.au
In recent years we have reduced the number of our pathophysiology subjects from relatively small single-discipline groups of students to subjects with large numbers of students from multiple disciplines (physiotherapy, podiatry, nursing, etc). The intended outcomes, interests, and levels of understanding often differ amongst students enrolled in different courses, making it challenging to deliver discipline-specific content in a lecture format. This workshop explores the use of clinical case studies and “discipline specific workshop” to cover additional pathophysiology content to meet the specific needs of each discipline.

612 Problem-based approach to learning musculoskeletal anatomy: Focus on evolution of human locomotion.
LAS 222
Robin McFarland
Cabrillo College, Soquel CA
romcfarl@cabrillo.edu
Science education research demonstrates the effectiveness of student-centered, active learning rather than memorization. Anatomy has been criticized for emphasizing memorization. Whether endurance running was a key innovation in human evolution is a question that underlies an anatomy problem-based learning exercise. Students identify evidence for the hypothesis that running is a fundamental human adaptation; for example, hominin fossil anatomy, comparative anatomy, and modern human locomotion. Students share information and evaluate whether endurance running is a central human adaptation. The exercise applies anatomical knowledge to a scientific question and is an example of how advances in science education may be applied to anatomy.

613 How to become a HAPS-I instructor and teach a HAPS-I course
LAS 221
Patricia Bowne and Peter English
Alverno College, Milwaukee, WI
pat.bowne@alverno.edu
HAPS-I is a vibrant program that offers graduate-level courses in Anatomy and Physiology in a variety of settings. The design of the course is completely defined by the instructor. Courses can be online, a mix of online and in-person, or wholly in-person. The mechanics of designing a course and shepherding it through the approval process are far more streamlined than many imagine, and approvals take place in a fraction of the amount of time that many of us experience at our home institutions. Pat Bowne, the HAPS Communications Committee Chair, will discuss requirements of courses and the approval process. Peter English, HAPS Executive Director, will discuss the implementation process and the online course management system, and answer questions.
Session 7 (60 minutes) 1:00 pm – 2:00 pm

701 The Integration of a Virtual Cadaver Dissection in an A & P Laboratory
LAS 120
John Lloyd
Aurora University, Aurora IL
jlloyd@aurora.edu
Since the fall, 2006, the McGraw-Hill’s Anatomy & Physiology Revealed (APR), an interactive cadaver dissection experience has been used in the teaching of anatomy & physiology to various pre-health professional students (mainly pre-nursing majors). Along with anatomical models and various wet tissue specimens, this program has been an effective learning tool. With the APR, students are able to literally dissect a cadaver anywhere (24/7). APR allows the student to peel away layers of the human body on their computer screens to reveal more than 5,000 anatomical structures from the various physiological systems of the body. Why APR? When there is not a real cadaver in the lab, this program is an excellent substitute. Concerns of cost, dissection itself, and exposure to formalin disappear and students do learn anatomy. In addition, the APR has animations, histology, imaging, and quizzes and lab practicals. In this workshop, the presenter will demonstrate how the APR is integrated in the lab and how lab exams are created and implemented by using the APR.

702 The “Casino Classroom”: incorporating games and educational technology as a tool for learning
LAS 121
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Humans are genetically wired to compete and play games. Why not break a monotony of a string of review questions with a game and reward? Competitive power and excitement can be unleashed in no time. Use this energy and guide it in the direction of a more active and involved learning experience. Join this presentation if you are in a mood for playing a game or two. We will use mini-whiteboards, clickers and other tools.

703 Dinner, dishes and dissection: Using eScience lab experiments as a tool for teaching fully online Anatomy and Physiology labs
LAS 221
Vicky L Navaroli and Debra A Rajaniemi
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It is important to any college to increase student retention and accommodate various learning needs. As professors, we hear student complaints about attending class and keeping motivated while providing for their families in this growing economy. We have designed a fully online Anatomy and Physiology 1 and 2 course so that students can learn from home. These courses include dissections and interactive labs experiments provided by eScience Labs. After one piloted semester, student enrollment has increased, lab and discussion interactions were overwhelming, and overall GPA improved as a result of independent learning.

704 On equity & diversity in the A&P classroom: initiating discussions about scientists from diverse backgrounds while covering A&P content
DA 101
Jeff Schinske
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A&P instructors serve students with varied ethnic backgrounds, ages, religions, sexual orientations, temperaments, socio-economic backgrounds, and abilities/disabilities. Some students might view themselves as different from a “typical” scientist, which could present barriers to engagement and learning. Introducing diverse scientists might broaden student’s ideas regarding who does science, but how can we structure such activities and integrate them with course content? Workshop participants will discuss the utility of incorporating diversity into the A&P curriculum and will experience an activity that covers content while introducing scientists from diverse backgrounds. Resources for identifying other diverse scientists for use in class will be provided.

(Continued on next page)
705 Fusing Online and Active Learning Strategies in the A&P Classroom
DA 102
Sarah Straud
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Scientific inquiry, critical analysis of data, and synthesis of ideas are key skills STEM majors must possess in order to be successful. To improve these higher order thinking skills, I have added online Mastering A&P labs and associated activities to my course. In this workshop, I will discuss how these labs have improved student’s analytical skills, and the tools used to reinforce and assess these skills. Others experiences are welcome for discussion.

706 Diamonds in the rough: unearthing pre-medical, pre-dental, and pre-optometry students
DA 106
Bennett Tucker
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We are around these students every day, but are we aware of their potential? What should we see that would indicate these students could be diagnosticians? Do we see, hear, and notice traits that are essential to taking care of patients? Is there a “Dr. House” in the house? What can we, as A&P instructors, do to help point these students in the right direction? How can we be instrumental in helping them reach higher than they ever thought they could reach?

707 Histology Challenge: Using Digital Microscopy for Case Studies Teaching in A&P
DA 107
Brian Shmaefsky
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Case studies in A&P teaching encourage students to be active learners in a learning environment that makes information in the course relevant and pertinent. They are a proven way of reinforcing A&P content for long-term retention. This presentation will use an entertaining audience-participation Histology Challenge event to demonstrate how digital image case studies can be used to embed the facts of the course in a problem-solving case study. In addition, digital imaging has been used to instill workforce skills in A&P and other allied health coursework. One example will show how dental hygiene students used actual patient case studies in a patient education program on oral hygiene. This student-run project linked the information in their coursework into a holistic systems approach to learning pertinent concepts in A&P. This project was partly funded by National Optical (Swift Optical Instruments) and in fulfillment of a project for the BEN Scholars: Building Digital Resources to Power 21st Century Biology Education program.

708 Fostering habits of the mind: enhancing critical thinking in undergraduate A&P courses
DA 108
Lourdes Norman-McKay
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Critics claim that undergraduate education is not adequately preparing students; deficiencies in critical thinking are especially cited. This session explores the following topics with the goal of empowering faculty to help students foster habits of the mind: (1) the role of student readiness in priming higher cognition, (2) how learning outcome data is central to teaching and higher order learning, (3) employing formative evaluation as a cornerstone for developing higher cognition, (4) using Mastering and PhysioEx to infuse more critical thinking opportunities into the A&P classroom.

(Continued on next page)
709 Building New Learning Strategies for A and P
DA 109
Jeanine Page
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One of the most challenging aspects of teaching anatomy and physiology is keeping the students actively engaged in the learning process. These activities have been developed with this challenge in mind. I have taken concepts that, at first, appear out of reach to the students and place these ideas literally into the palm of their hands. This not only keeps the students focused and engaged, but it also allows the students to see the material from a new and more approachable perspective. This workshop will focus on helping instructors build new ways to present, and even demonstrate, difficult concepts including: glomerular filtration, lung volume and pressure relationships, muscle contraction and ABO blood typing.

710 An Active Learning Zone: Reforming the Traditional Classroom
DA 110
Hiranya Roychowdhury
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I will demonstrate my teaching approach in making my students active in their own learning. No single tool has worked alone, as might be expected, but one method that has worked wonders in my classroom is the application of Problem Based Learning (PBL). I have blended the essential features of PBL with Team Based Learning, Classroom Response system, Two Minute writing, and other instruments, and have received encouraging response in terms of student engagement and performance. My workshop will demonstrate the controlled chaos environment in which I make my students learn the content without using too much lecture on any topic.

711 Give your students a voice! Active learning during lecture.
LAS 222
Jennelle Malcos
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Traditional lectures are teacher-centered, whereby an expert bestows his or her wisdom to a class of passive participants. However, research has shown that students learn deeper and retain more information when they are active members of the discussion occurring in a classroom. In this workshop we will discuss some strategies used in lecture to promote student-centered learning. One example will be the use of Learning Assistants (LAs). LAs are undergraduate students that sit-in during lecture and facilitate group activities; they receive pedagogical training in preparation for their role in lecture and participate in the course the duration of the semester. LAs have been used in classes ranging in size from 80 to 500 students at Penn State. The use of LAs in conjunction with several other techniques will be explored, as well as experiences and ideas shared by the workshop attendees. Come on by and get some ideas on how to give your students a voice during lecture, even in a large setting!

712 Competitive Collaborations in the Classroom: Formative Assessment Techniques
LAS 223
Melissa Carroll
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Tired of getting blank stares during lecture because students are not engaged or focused on the material being discussed? As instructors it is our duty to create a safe and integrative, yet academically challenging, classroom environment. Biological sciences already serve as the challenge and current research states that students do well when there are challenging goals that are associated with academic achievement. During this workshop we will explore the creation of classroom learning contracts, formative assessments and collaborative assessment techniques as discussed in the Biology Scholars Assessment Residency.

(Continued on next page)
Session 8 (60 minutes or 90 minutes) A: 2:30 pm – 3:30 pm B: 2:30 pm – 4:00 pm

801 B The value of lab kits for online and hybrid A&P courses: Lessons learned from a converted skeptic
LAS 120
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There is much argument over the pedagogical value of “use at home” lab kits for teaching anatomy and physiology. Particularly, there is much contention about on-line courses that do not require students to visit the college for supervised laboratory sessions. In spite of the vehement disagreements about “at home” labs, many colleges are compelled to offer full online courses. Colleges offering full online A&P courses must have a strategy for providing students with the same learning experience as students in classes that teach laboratory sessions on campus. This presentation discusses strategies for using “at home” labs in a way the encourages critical thinking to reinforce learning and takes advantage of opportunities student use to find assistance from family, friends, professionals, or the Web with laboratory activities. Also covered in this presentation how to offer faculty training when using lab kits for online and hybrid science courses. It is essential that all full-time and adjunct faculty are properly prepared for the teaching online science courses labs and labs that students perform at home with a lab kit. Simple to follow principles for faculty preparation during ins-service time or through virtual training can aid in the success of your A&P students. Also learn how one school “GIVES BACK” with their used lab kits through service learning. The integration of STEM, learning outcomes attainment, and civic responsibility can make a difference for your students and community by using lab kits for online A&P courses.

802 B “And This Is How I Teach That” - Part 2: Reproduction, Osseous Tissues, and Gradients
LAS 121
Robert Rawding
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This workshop is interactive; bring your techniques to share, demonstrate, and exchange. The presenter will lead off each of the 30-minute rounds with a brief 5-8 minute presentation in each of three topics areas. Within each round, workshop participants may likewise present their tips and techniques for better student comprehension. Part (A): prenatal differentiation of the sexes; Part (B): dynamics of the skeletal system, and Part (C): gradients: how to make ‘em & how to work ‘em.

803 B You Say ba-NAN-ah, I Say bah-NAH-nah
LAS 122
Ken Saladin
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How do YOU pronounce “mediastinum,” “apoptosis,” or “acetylcholine” as you were taught orally, or as a dictionary says they “should” be pronounced? Is there a difference? Are you sure you’ve been teaching your students correctly? What defines correct pronunciation, anyway? This interactive workshop will use PowerPoint slides of alternative, correct and incorrect pronunciations of common A&P terms. Participants will vote on the way you think they should be pronounced. 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.
804 B Flipping Over Interactive Case Studies: How to engage students with real-life scenarios
LAS 123
Cherie McKeever and Quinice Lords
Great Falls College MSU, Great Falls, MT
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Don’t just sit there! Experience active learning at it’s best. See how role-playing as patients and members of a health care team can bring case studies and learning to life. This dynamic, entertaining session provides step by step hands-on experience in creating and using interactive case studies in A&P. Participants will work in groups, choose a role and simple props, and work through an interactive case study. Plus take-away template provided so you can implement this technique in your classroom immediately. Perfect for a flipped classroom.

805 B Enliven Your Anatomy and Physiology Course by Adding Humor! (it won’t hurt I promise)
DA 101
Gary Heisermann
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Anecdotal evidence strongly suggests that people like to laugh! (Seriously - students do seem more interested and engaged when they laugh more). I will share a variety of strategies I have developed for “spicing up” my classroom presentations “adding humor and laughter while still focusing on course content. After an initial presentation and discussion, we will break into small groups and brainstorm ideas (bring any “tried and true” methods to share). Let’s keep students wondering what we’ll do next!

806 B A digital and “hands on” alternative to virtual labs
DA 102
William Hoover and Dennis Burke
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Students and professors find great value in online lab simulations. They are used in the lab setting to guide lab discussions. They are also assigned as pre-lab activities to prepare students for the wet lab. However, there still seems to be a void that needs to be filled when comparing them to the traditional lab. Through an entirely digital lab text, requiring “hands on” activities, students and professors can experience the best from both worlds.

807 B Use Hospitals to Help Students Do Histology
DA 106
William Karkow
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How can one get students to create full histology presentations, while doing it “on the cheap”? We will walk through the processes of students sectioning their own specimens, creating, staining and photographing their own slides, and creating composite photos. Student hospital-assisted case presentations will be shown, discussing the necessary permissions, materials and methods. Why do all the work yourself?

808 A Using iPads for Histology, Case Study, and Practical Reviews
DA 107
Tom Lehman
Coconino Community College, Flagstaff, AZ
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I started using iPads for review sessions in Spring 2012 and have been amazed at the success. The students are so much more engaged during review sessions. Microscopy has always been a bane for many of my students and the iPad review sessions have been thoroughly embraced. Come experience how we use these devices to assist in learning microscopy, case studies, and other A&P activities.
809 A Do You See What I See? How Students Comprehend and Learn from Figures and Graphs
DA 108
John Waters and Peggy Van Meter
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Figures, diagrams and graphs play a critical role in science learning, yet many students struggle with them. These difficulties should come as no surprise given that American students receive little instruction on how to comprehend and interpret visual information. In this workshop, we will discuss our recent research in which we tested the effectiveness of five learning strategies to help biology students learn from visual representations of information.

810 A Understanding fascial planes
DA 109
Mark Nielsen
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An understanding of the fascial planes and fascial compartments of the body is critical to a large range of health care providers from massage therapists, to physical therapists, chiropractors, osteopathic doctors, and medical doctors. The fascial system defines the connective tissue continuity of the body and the clefts and spaces through which inflammation and infection can spread. For this reason, an understanding of the fascial system is of great therapeutic and clinical relevance. However, a clear understanding of this system is often not shared with our students. While the plethora of anatomical nomenclature associated with this system can be confusing, there exist clear patterns of structural organization, which if understood, can simplify and clarify the teaching and understanding of the fascial system. This presentation will cover these clarifying patterns and will illustrate how it can be used in diagnostic problem solving.

811 A Top-Down Activities for Anatomy & Physiology
DA 110
John Robertson
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Top-down approaches start with a broad perspective (e.g., a group or a whole organism) and work down (e.g., to systems, cells, molecules) in order to facilitate integrated understanding. Landscape level assignments offer a number of benefits for A&P courses that are taught using a bottom-up, hierarchical organization approach clinical case studies are a classic form of this approach. Incorporation of varied top-down exercises provides opportunities to reinforce and build on course material, and allows students to adopt a broad perspective in integrating course material and concepts in novel and creative ways. Specific top-down activities used in A&P courses will be described and discussed. One exercise involves use of advertisements for pharmaceuticals as a gateway for an exploration of drug chemistry and biochemistry, mode of action, and systems-to-cell effects including side effects. Another assignment is a group peer-education project that centers on an issue in biomedicine with a strong relation to A&P course content. Students research the issue and develop and administer a survey to assess peer knowledge of and attitudes toward the issue and underlying biology. They then analyze and interpret findings in light of clinical approaches to the issue, including devising strategies to help effectively provide information on the issue. Students produce a poster on their work that they present in a public forum. Assessment of instructor and student reaction to these assignments, including perceived educational value, will be presented. Discussion of this approach and these activities, as well as related exercises used by workshop attendees, will be encouraged.

(Continued on next page)
812 A Flipping the Classroom in A & P?
LAS 221
Rhonda Meyers
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The idea of a flipped classroom is gaining popularity in many disciplines yet seems to be a daunting task for the science classroom. Lecturing is the mode of familiarity and longevity. Yet is this really engaging students in the material? Flipping allows the student to watch and listen to your lectures prior to class. The classroom then turns into a time of discussion and activities to solidify this material. Participants in the workshop will learn the challenges and the success of an actual flipped classroom. They will be shown various ways to do activities such as group work, iPad usage, and Socrative. Join me in this exciting journey that establishes dialogue and idea exchange leading to educators having time for engagement and interaction with the learners.

813 A A heart is a heart is a heart, right? Comparing face-to-face and online student performance.
LAS 222
Betsy Brantley
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Online students taking Anatomy & Physiology II were taught to identify structures of the heart using a digital lab manual which utilizes Anatomy & Physiology Revealed (a virtual cadaver program). Face-to-face students utilized the same lab manual and resource during their lab hours. The face-to-face students also identified heart structures on anatomical models and by dissecting preserved pig hearts. As part of their lab practical, both groups of students were given an identical set of heart identification questions, but on a heart that neither group had seen before. The heart used on the exam was a fresh cow heart presented on screen as a 3-D digital, manipulative image (i.e. students could rotate the image). The results of the group performance comparison will be presented, as well as ideas for revisions of the study. There will also be time for participant discussion.

Notes:
Thanks to our
HAPS 2013 Annual Conference Committee!

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Workshop Coordinator ........................ Shannon Larsen
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