

**20th Annual Conference of the
Human Anatomy and Physiology Society
May 27th – May 31st, 2006**



**Update Seminars and Workshops Promoting Excellence in the
Teaching of Human Anatomy and Physiology
Celebrating 20 Years of HAPS**

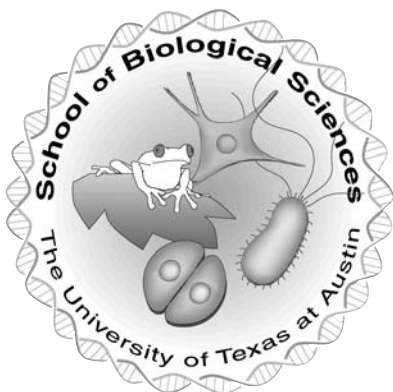


Table of Contents

Registration Form	3
Description of optional (additional fee) events	6
General Registration Information	8
Welcome	10
Conference at a Glance Schedule	11
Conference Accommodations	12
Travel	13
Update Seminars	14
Poster Session	19
Workshops	22
Exhibitors and Conference Sponsors	38
Sights and Sounds of Austin	39



2006 Annual Conference Registration Form

General Information

Your name (for name tag) _____

Registered Guest name(s) _____

Institution/Department _____

Street address _____

City/State/Prov. _____

Country _____ Postal code _____

Phone _____ Fax _____

Email _____

Registrant information. Check all that apply:

First timer (attending HAPS conference for the first time)

Update seminar or Keynote Speaker

Workshop presenter

Poster session presenter

Board member

Exhibitor:

NOTE: If you are an exhibitor, please do not use this form. Contact the HAPS Marketing Manager, Javni Mody jmody@aacc.edu or 410-777-2265 for the correct form.

Please note: Registration Forms must be received by May 15, 2006 to guarantee inclusion in "List of Attendees".

A. If you are a nonmember, join HAPS now and save on conference registration fees. One year membership (\$50.00 regular faculty, \$35 adjunct faculty or student) \$ _____

B. If you have already completed early-bird registration, skip to part C.

Entire Conference Package (May 27 th – May 31 st)					
	Member	Nonmember	Student	Guest	
1/31 – 4/30	___\$225	___\$300	___\$113	___\$120	\$ _____
Beginning 5/1	___\$265	___\$340	___\$133	___\$160	\$ _____

Update Seminar Package (May 28 th – May 29 th)					
	Member	Nonmember	Student	Guest	
1/31 – 4/30	___\$170	___\$245	___\$85	___\$120	\$ _____
Beginning 5/1	___\$265	___\$340	___\$133	___\$160	\$ _____

Workshop Package (May 30 th – May 31 st)					
	Member	Nonmember	Student	Guest	
1/31 – 4/30	___\$130	___\$205	___\$65	N/A	\$ _____
Beginning 5/1	___\$170	___\$245	___\$85	N/A	\$ _____

C. Ladybird Johnson Wildflower Center, Sat., May 27th,
Transportation and guided tour. Bus leaves hotel at 2:30,
arrives back at hotel at 5:00. Minimum 15 people. ___ @ \$20 \$ _____

D. Welcome Reception, 6:00, Sat., May 27th, no fee, ticket required
Number of registered participants/registered guests attending _____

E. First-Timer’s Breakfast, 7:30, Sun., May 28th, no fee, ticket required
Number of registered participants/registered guests attending _____

F. Social Evening at the State History Museum, 6:30, Sun. May 28th
Transportation, buffet Mexican dinner, and museum fee
Registered participants or registered guests ___ @ \$36 \$ _____

G. Banquet Reception, 5:00, Mon., May 29th, no fee, ticket required
Number of registered participants/registered guests attending _____

H. Annual Banquet, 6:00, Mon. May 29th – Celebrating 20 Years of HAPS
Banquet will be served buffet style with your choice of a variety of meat
and meatless dishes. Live band following program and meal.
Adults (12 years and up): _____ @ \$45.00 \$ _____
Children (5 – 11 years): _____ @ \$18.00 \$ _____
Children (under 5 years): Free

I. Bat flight from Congress Ave. Bridge - Sunset
Boat option: 1-hour boat cruise takes off from Hyatt hotel and
includes watching bat flight from the water. ___ @ \$8.00 \$ _____
Free option: Walk or take ‘Dillo to the bridge. Viewing area
provided by Austin-American Statesman

J. Optional Day Tour (Thurs. June 1st) see pg. 6 ___ @ \$20.00 \$ _____
Leave 8:30 AM for Fredricksburg, see LBJ Ranch, return at 4:45

K. HAPS 2006 Memorabilia

Order now to guarantee your size!

	short-sleeved T	polo shirts	
Small	_____ @ \$12.00	_____ @ \$25.00	
Medium	_____ @ \$12.00	_____ @ \$25.00	
Large	_____ @ \$12.00	_____ @ \$25.00	
X Large	_____ @ \$12.00	_____ @ \$25.00	
XX Large	_____ @ \$13.00	_____ @ \$26.00	\$ _____

L. Insulated 12 oz. cups red with silver lettering – HAPS 2006 logo (limited supply – no reorder)_____ @ \$5.00 each \$ _____

M. YOUR TOTAL AMOUNT DUE (Sections A – L) \$ _____

Note: To guarantee event and trip reservations, payment must be made by May 1, 2005.

If paying by check, make check payable to HAPS for the total amount due. Mail pages 3 – 5 of the registration materials to:

**HAPS
8816 Manchester Rd., Suite 314
St. Louis, MO 63144**

If paying by credit card, complete and mail the following along with pages 3 – 5 of the registration materials to HAPS, or fax pages 3 – 5 of these registration materials to HAPS at 314-447-0489.

Credit Card: _____ **Visa** _____ **MC (sorry, but other cards not accepted)**

Dollar amount to be charged to card _____

Name on card _____

Billing address for card (address, city, state/province, zip/postal code)

Signature _____

Card number _____ **Expiration Date** _____

_____ **CVV2 Number (The last three digits of the number located on the back of your credit card in the signature area)**

Any questions? Call HAPS Headquarters at 800-448-4277.

Welcome and Banquet Receptions

We need to have an accurate estimate of the number of people who will be attending these events. Please help us by indicating if you will be attending the receptions. There is no charge for those who are registered, but you must have a ticket for admission. The tickets will be in your registration packet.

First-Timers Breakfast

If you have never attended a HAPS conference join us for breakfast at the First-Timers Breakfast. Officers and board members will share ideas on how you can get the most out of your HAPS membership. This is a sit-down affair so tickets are required.

Optional Activities

Ladybird Johnson Wildflower Center – The bus leaves the hotel promptly at 2:30 for a one hour docent guided tour of the wildflower center. The tour includes not only native plants but also an unparalleled rainwater collection and storage system, recycled building materials, American folk art, and environmentally conscious architecture. (Minimum of 15 people at \$20.00 per person).

Texas State History Museum - Entering through the lobby you'll find yourself in a circular rotunda. The most prominent features are the winding granite staircase and the beautiful terrazzo floor with a campfire theme suggesting the stories and legends of Texas as told around long ago campfires and passed down from generation to generation. You'll find the **Texas Spirit Theatre** on the second floor. The Texas Spirit Theatre is a multimedia event entitled *The Star of Destiny*. This is a must-see movie! Through artifacts, reconstructions, and multimedia displays you'll learn about the land, early Native American inhabitants, European and American exploration, and settlement. Moving up to the second floor you find yourself on the frontlines of the Battle for Texas Independence. As you proceed you'll find yourself moving through statehood, the Civil War, and the Texas Centennial celebration. The entire exhibit hall is a feast for the eyes and ears. Don't forget to look down at your feet to see puddles of water, horse hoof prints, and even blood-soaked earth. On the third floor you'll learn all about oil, ranching, space exploration, and other ways that Texas and Texans have had an impact on our state, our country, and the world. The Museum's website is located at: www.thestoryoftexas.com

Celebrating 20 Years of HAPS – Enjoy a buffet of brisket or grilled chicken with “sides” and watch the history of HAPS unfold. Banquet and program to be followed by live band music.

Bat Watching - HAPS has reserved “The Little Star”, a one-level 32’ electric, pontoon cruiser to witness the spectacular emergence of the famous Mexican free tail bats at sunset. The cost is \$8.00 per person. This is a one-hour tour which leaves from the dock near the Hyatt Hotel. Transportation to and from the Hyatt is on your own. There is not a bar onboard the boat, but you can bring your own drinks aboard. (32 – 34 people **maximum**). Bat watching is also free from the shore. There is a viewing area near the Congress Ave. Bridge and 1st St. The walk from the hotel would be approximately two miles, or catch the ‘Dillo.

Day trip to LBJ Ranch and Fredericksburg – First we will explore the old German town of Fredericksburg. This charming Old World town is brimming with antique stores and quality restaurants. Raised in Fredericksburg, the story of Admiral Chester Nimitz and the other soldiers who served with him in the Pacific is displayed at the Admiral Nimitz Museum. It is your option to shop or visit the Nimitz. While in Fredericksburg individuals are on their own for lunch at a local restaurant. After our visit to Fredericksburg we will continue to Lyndon Baines Johnson’s home. On this tour we will be welcomed by the National Park Service to the LBJ National Historic Park, located in the heart of the beautiful Hill Country. You can experience small town life that helped shape President Johnson and explore the LBJ Ranch. Following our visit to the ranch we will be on our way back to Austin with an estimated arrival time of 4:45 PM.

For the baseball fans – The Round Rock Express, a Pacific Coast league owned by Nolan Ryan, is playing the Memphis Redbirds on May 30th and May 31st at 7:05. Games are played at the Dell Diamond in Round Rock, north of Austin. To obtain tickets, call (512) 255-BALL. The website is <http://www.roundrockexpress.com>. People wishing to attend a game will need a car for transportation.

General Registration Information

Registration Fees

Registration fees for the Update Seminar Package include all update seminars, the welcome reception, banquet reception, two continental breakfasts, and all refreshment breaks. **PLEASE NOTE you have to reserve your ticket in advance for the welcome reception and the banquet reception. These are vendor sponsored events and we must have an accurate head count.**

Registration fees for the Workshop Package include all workshops, two boxed lunches, refreshment breaks, and transportation between the Marriott Hotel and the University of Texas campus for the workshops.

Registration fees for the Entire Conference Package include everything in the Update Seminar and Workshop Packages.

Guest Fees

Guest fees apply to all guests who are not registered as participants for the conferences, regardless of age. They include the welcome reception, banquet reception, two continental breakfasts, and all refreshment breaks. **PLEASE NOTE you have to reserve your ticket in advance for the welcome reception and the banquet reception.** The guest fees **do not** include update seminars or workshops. There may be limited space for vendor-sponsored activities. Only registered participants and registered guests may attend vendor-sponsored functions.

Other Fees

The annual banquet fee and additional activities will be charged separately per individual registrant or guest.

Cancellation Policy

Registration fees are fully refundable until the end of the regular registration period (April 30, 2006) less a \$15.00 handling fee. From May 1, 2006 through May 26, 2006, 75% of the registration fee will be refunded. There will be no refund of registration fees after May 26, 2006. Cancellations should be provided in writing and be postmarked no later than May 26, 2006.

Registration Times

Sat. May 27 th	Sun. May 28 th	Mon. May 29 th	Tues. May 30 th
1:00 PM – 6:00 PM	7:30 AM – 2:00 PM	7:30 AM – 2:00 PM	8:00 AM – 9:00 AM
Marriott Hotel	Marriott Hotel	Marriott Hotel	University of Texas

For further information regarding payments or registration contact:

HAPS Headquarters

Tonya Ferguson

Phone (800) 448-4277

Fax (314) 447-0489

Email: tonya@fergusonmgnt.com

For other conference information contact:

Mary Lou Percy - Conference Coordinator

Phone: (903) 875-7519

Email: marylou.percy@navarrocollege.edu

Austin Welcomes HAPS

Austin is proud to be the destination of the 20th Human Anatomy and Physiology Society national conference. This is the third time the national conference has convened in Texas. Prior conferences were held in Beaumont (1993) and Fort Worth (1998). Our conference committee has attempted to make this conference special, since the 20th meeting is a landmark event.

We are planning the usual update seminars, posters, exhibits, and workshops, while trying to give the meeting a unique Austin flavor. Due to problems encountered last year with on-line registration, we have decided to register by snail-mail only for this convention. Austin is considered by many to be the Live Music Capitol of the World. We hope that you will come early and stay late to explore not only the unique sights and sounds of Austin but also the surrounding area.

Welcome to HAPS, Austin style,

Conference Coordinator

Mary Lou Percy (Navarro College)

Local Arrangements Coordinator

Dee Silverthorn (University of Texas – Austin)

Update Seminars Chairperson

Sherry Stewart (Navarro College)

Workshop Coordinator

Betsy Ott (Tyler Junior College)

Poster Session Coordinators

Steve Dutton (Amarillo College)

Craig Clifford (Northeastern State University)

Banquet Program - Celebrating 20 Years of HAPS

Jackie Butler (Grayson County College)

Graphics Artist

Pam Gregory (Tyler Junior College)

Registration Coordinator

Vernon Wiersema (Houston Community College – Southwest)

Business Manager

Tonya Ferguson

Conference at a Glance HAPS 2006

	Sat. May 27	Sun. May 28	Mon. May 29	Tues. May 30	Wed. May31	Thurs. June 01	
	<i>Marriott at the Capitol</i>			<i>University of Texas</i>			
7:30		Registration first timer's breakfast	Registration cont. breakfast				
7:45		cont. breakfast					
8:00	HAPS Board and Steering Committee Meetings	breakfast					
8:15				cont. breakfast registration	cont. breakfast		
8:30		<i>opening</i>			welcome	workshop 6	
8:45			HAPS business meeting		workshop1	break	
9:00		update 1			break	workshop 7	
9:15					workshop 2	break	
9:30					break	workshop 8	
9:45					workshop3		
10:00			break & exhibits	break & exhibits			Optional day trip Tour ticket required in advance Leaving 8:30 AM Fredricksburg LBJ Ranch Lunch on your own Returning 4:30 PM
10:15					lunch & committee meetings	lunch	
10:30							
10:45							
11:00			update 2	update 5			
11:15						workshop 9	
11:30							
11:45							
12:00							
12:15							
12:30		Lunch posters	break & exhibits lunch				
12:45							
1:00	Registration and Check-in						
1:15							
1:30				update 6			
1:45					workshop 4		
2:00			update 3				
2:15				exhibits	break		
2:30							
2:45			break & exhibits poster		workshop 5		
3:00							
3:15							
3:30			update 4			break visit with Bevo	
3:45							
4:00							
4:15							
4:30							
4:45							
5:00							
5:15							
5:30			reception ticket required no additional cost for reg. guest				
5:45							
6:00	welcome reception						
6:15	ticket required						
6:30	no additional cost for attendees or registered guests						
6:45							
7:00				See the Bats			
7:15		evening social	Celebrating 20 years of HAPS banquet ticket required additional cost				
7:30		Evening at The State History Museum ticket required additional cost			evening free	evening free	
7:45							
8:00							
8:15			music dancing				
8:30							

Accommodations

Our conference hotel is the Austin Marriott at the Capitol (701 East 11th Street, Austin, Texas 78701) in the heart of downtown Austin, within view of the Texas State Capitol.

Our HAPS 2006 conference room rate is \$104.00 per night for single and double rooms. Triple and quad rooms are \$124.00 per night. These rates do not include the state and local taxes which are currently 15%. These rates are available for three days before and after the conference. The deadline for making reservations to receive the conference rate is Thursday, May 4th, 2006. The hotel cannot guarantee these special rates for anyone who makes reservations after the cut-off date, or after our reserved block is full.

The Supershuttle can deliver you to the hotel from Austin-Bergstrom International Airport. It is a distance of 12 miles and the approximate cost is \$10.00. Hotel parking is available on either a valet (\$17) or self-parking basis (\$12). Hop aboard a 'Dillo Trolley for a sightseeing trip through downtown Austin. The trolleys are part of the larger Capitol Metro transportation system. It is within a block of the hotel.

Make hotel reservations by phone
(800) 228-9290 or (512) 478-1111

Or online at <http://www.marriott.com/ausdt>. The group code is **HAPHAPA**. This can be used when calling in for reservations or online at the Marriott website.

Travel

Air Transportation: American Airlines (One World Partners outside the U.S). For a conference discount of 5%, you must use the number **A3556AJ**. The account name is **HAPS convention**. The discount is good for flights to and from Austin from May 23 – June 4, 2006. To book your flight, go to <http://www.aa.com/>. American Airline's meeting services desk toll-free number is (800) 433-1790, but there is an additional charge if you reserve your ticket by phone. You will be flying into Austin-Bergstrom International Airport, which is 12 miles from the hotel.

Ground Transportation:

Taxis:

One-way taxi fare is approximately \$20, depending on the traffic. Taxi fares within the city of Austin are regulated. Three taxi companies serve the airport, American Yellow Checker Cab: (512) 452-9999, Austin Cab: (512) 478-2222, and Roy's Taxi: (512) 482-0000.

Shuttle:

Upon arrival at the airport, please follow signs from baggage claim to the SuperShuttle ticket counter. No reservation is necessary and service is available 24 hours a day, 365 days a year. Please call (512) 929-3900 ext. 2 with any question. SuperShuttle accepts cash and credit cards for payment. The Austin direct number: (512) 258-3826; National number: 1-800-BLUE VAN (258-3826). The approximate fare is \$10 per person, one-way. The email address is <http://www.supershuttle.com/htm/cities/aus.htm>.

Local Bus Service:

Capital Metro Bus - [Routes Serving the Airport](#): (512) 474-1200

Car Rental:

Advantage Rent-A-Car is offering guaranteed rates through Jun. 28, 2006. Although this agency is not located at the airport, free shuttle service is provided to the Advantage location. Reservations may be made by calling (800) 777-5500. When making reservations, you must use the HAPS ID (**155914-FSC**). Advantage reserves by the class of vehicle, and not the model.

Hotel Parking Fees:

Self-parking is currently \$12/day. Valet parking is \$17/day. Be sure to ask for in-out privileges if needed.

Update Seminars

Sunday, May 28, 2006

8:45 – 9:45	Thomas Blevins, M.D.	Texas Diabetes & Endocrinology	Developments in Endocrinology
10:45 – 11:45	Michael Morgan Dowling, M.D., Ph.D.	University of Texas Southwestern Medical Center	That Other Sense: The Molecular Basis of Olfaction
1:30 – 2:30	H. Gill-King, Ph.D. Diplomate of Forensic Anthropology	University of North Texas Health Science Center	Basic Musculoskeletal Anatomy and Physiology in Forensic Science
3:30 – 4:30	Mark Henkemeyer, Ph.D.	University of Texas Southwestern Medical Center	Cell to Cell Signaling During Embryonic Development

Monday, May 29, 2006

10:45 – 11:45	Robert G. Carroll, Ph.D. (Sponsored by APS)	Brody School of Medicine at East Carolina University	The Hot and Cold of Temperature Regulation
1:30 – 2:30	Suzzette F. Chopin, Ph.D., M.B.A. (Sponsored by AAA)	Texas A&M University-Corpus Christi	Biological Basis of Aging

Hot Topics in Clinical Endocrinology: Diabetes, Metabolic Syndrome, Osteoporosis, and Thyroid Disease

Thomas Blevins, M.D. has been in private practice in Austin since 1986 and in 2001 he founded Texas Diabetes and Endocrinology, a practice devoted to bringing the latest in diabetes advances, thyroid care and osteoporosis diagnostics and treatment to Austin and Central Texas. He attended the University of Texas at Austin as an undergraduate, medical school at the Baylor College of Medicine in Houston, and completed his internal medicine and endocrinology training there as well. He is Board Certified in Internal Medicine, Endocrinology, and Metabolism and is a Fellow of the American Association of Clinical Endocrinology. Dr. Blevins is a member of the American Diabetes Association. He and his colleagues are active in clinical research concerning endocrine diseases, and Dr. Blevins is a national level speaker and educator on diabetes, osteoporosis, lipid management, and thyroid disease.

The field of endocrinology is rapidly expanding as molecular biology research is translated into clinical therapeutics. In 2005 the Food and Drug Administration approved [Byetta \(exenatide\)](#), derived from gila monster saliva, and amylin, the peptide co-secreted with insulin, for the treatment of Type 2 diabetes mellitus. In 2004 the FDA approved [Boniva \(ibandronate\)](#) for the treatment and prevention of osteoporosis and metabolic syndrome became the new diagnosis. What are these drugs and diagnoses, and how do they relate to normal physiology? This update talk will review the new developments in endocrinology and metabolism.

That Other Sense: The Molecular Basis of Olfaction

The Nobel Prize in Medicine for 2005 was awarded to Richard Axel and Linda Buck for the remarkable discovery of a large family of genes encoding olfactory receptors. Michael Morgan Dowling, M.D., Ph.D., a Pediatric Neurologist from UT Southwestern at Dallas will review the anatomy, physiology, and molecular biology of the olfactory system.

The human olfactory system is remarkable in that we can distinguish over 10,000 different odors, some at vapor concentrations as low as 1 part in 10^{-12} . The olfactory neurons are located high in the nasal cavity and remarkably; new neurons are generated throughout life, a phenomenon nearly unique in the nervous system. The odorant receptor molecules themselves number almost 1000 and are members of a large family of receptors that transduce signals in neurons by activating a second messenger system inside the cell called the cAMP pathway. These receptor proteins share the same basic structure in that they cross the cell membrane 7 times and couple with the so called G-proteins. (The discovery of G-proteins also merited a Nobel Prize). Interestingly, each of the many olfactory sensory neurons appears to express one specific olfactory receptor and as new olfactory neurons are born, they send axons into the brain where they are able to make specific neuronal connections and the constancy of olfactory perception is maintained throughout life. A rose will always smell like a rose. The mechanism by which this occurs remains another, future, Nobel prize winning question.

Basic Musculoskeletal Anatomy and Physiology in Forensic Science

H. Gill-King, PhD, DABFA (Diplomate of the American Board of Forensic Anthropology) and a Fellow of the American Academy of Forensic Sciences, Director of Laboratory for Human Identification and Forensic Anthropology, Professor of Pathology and Anatomy. University of North Texas Health Science Center

The presenter was a first-responder in the Oklahoma City Federal Building bombing, the World Trade Center 9/11 Disaster, the Columbia Shuttle crash, and other mass death events. He has taught anatomy and physiology courses for thirty years.

This presentation will emphasize the use of basic musculoskeletal anatomy and physiology in

- (1) The establishment of the basic “biological profile”, (i.e. the determination of sex, age, ancestry, stature /physique, and occupation), as used in missing persons databases, and
- (2) The use of basic knowledge of “bone as a material” in the analysis of trauma, including gunshot, blade, blunt, and thermal trauma, and
- (3) Applications of basic radiological, photographic, digital technology to the problems of identification.

Cell to Cell Signaling During Embryonic Development

Mark Henkemeyer, Ph.D., Associate Professor Dick and Martha Brooks Professor in Nerve Growth Research, Center for Developmental Biology and Kent Waldrep Center for Basic Research on Nerve Growth and Regeneration. University of Texas Southwestern Medical Center

The primary goal of my laboratory is to understand the biochemical signals that regulate cell-cell interactions during embryonic development. We focus on a large group of transmembrane receptor tyrosine kinases known as the Eph receptors and their activating ligands, which are termed Ephrins. The Ephrin ligands are also membrane-anchored and we now know that they too are able to act like a receptor to transduce signals into their own cell. Thus, when a cell expressing an Eph receptor contacts a cell expressing an Ephrin ligand, novel bidirectional signals are transduced into both the Eph receptor-expressing cell (forward signaling) and the Ephrin ligand-expressing cell (reverse signaling). In general, Eph-Ephrin bidirectional signals are known to regulate contact-mediated repulsion-type cellular movements such as those utilized by the axon growth cone during neural pathfinding.

Key to our studies is the generation of Eph and Ephrin knockout mutant mice using embryonic stem cell technologies. Our phenotypic analysis of these mutant mice demonstrates that forward and reverse signaling is important for nerve axon pathfinding and synaptogenesis as the developing brain and spinal cord become wired. Our studies also show diverse roles for Ephs and Ephrins in regulating cell-cell interactions outside of the nervous system, for instance during the development of embryonic midline structures and as blood vessels form and remodel to form the vascular network. These mice have also allowed us to uncover functions for Ephs and Ephrins in the adult, including important roles in the vestibular system and in the regulation of neuronal and intestinal stem cells.

In addition to a developmental genetic approach, our ongoing analysis of Eph-Ephrin bidirectional signaling also involves in vitro biochemical, cell-based, and live-cell imaging studies to characterize in detail how the forward and reverse signals are transduced into the cell. Consistent with cell migration/adhesion and axon pathfinding defects observed in knockout mice, our biochemical and cellular studies indicate that forward and reverse signaling can induce a variety of cytoskeletal responses, including the disassembly of F-actin stress fibers and focal adhesions leading to, for example, growth cone collapse and axonal repulsion. Such cellular responses are consistent with the ability of the Ephs and Ephrins to form protein-protein interactions with a number of molecules with known roles in cytoskeletal regulation. By combining in vivo biological studies of mutant mice with in vitro biochemical and cell-based approaches, our aim is to better understand the molecular basis by which cellular movements and cell-cell interactions are regulated as the embryo develops and in the adult.

The Hot and Cold of Temperature Regulation

Robert G. Carroll earned his Ph.D. under the direction of Dr. David F. Opdyke from the Department of Physiology of the Graduate School of Biomedical Sciences of the University of Medicine and Dentistry of New Jersey-Newark in 1981. Following a 3 year post-doc at University of Mississippi Medical Center in Jackson, MS under the sponsorship of Drs. Thomas E. Lohmeier and Arthur C. Guyton, he moved to East Carolina University in 1984 as an Assistant Professor of Physiology. He is currently Professor of Physiology at the Brody School of Medicine at East Carolina University, and holds adjunct appointments in the Departments of Emergency Medicine and in the Department of Biology. Sponsored by APS

Back when he did the actual experiments, Rob's dissertation examined blood pressure regulation in sharks. He now sits around and spends his time in front of a computer, and has an addiction to "free cell." For the past 20 years, the real work in the laboratory was accomplished by his technician, one doctoral student, 2 masters' students, and numerous medical students, residents and fellows, resulting in 47 research manuscripts. He uses travel as another mechanism to avoid lab work, presenting seminars and workshops in Hungary, Indonesia, Jamaica, Mexico, New Zealand, Pakistan, Russia, and Scotland, and hosting visiting faculty members from Indonesia, Sudan, and Jamaica. Apart from his bench research, Rob has published 11 peer reviewed education manuscripts, edited one book, is a section editor for a Medical-Surgical Nursing textbook, and is writing a review book for medical students preparing for their licensing examination.

Rob currently chairs the Education Committee for the American Physiological Society, and is a member of the Education Committee of the International Union of Physiological Sciences. He is an associate editor of the journal “Advances in Physiology Education”. In the past, he served on the USMLE Step I Physiology Test Material Development Committee of the National Board of Medical Examiners, and as Secretary for the International Association of Medical Science Educators. In 2002, he was recognized in the inaugural class of Master Educators at the Brody School of Medicine, and received the Arthur C. Guyton Physiology Educator of the Year from the American Physiological Society in 2004. He received the Outstanding Alumni Award from the University of Medicine and Dentistry of New Jersey in 2005. His three teenage children, however, still question his sanity and judgment.

Biological Basis of Aging

**Suzette F. Chopin, Ph.D., M.B.A., Texas A&M University-Corpus Christi,
Sponsored by AAA**

While the focus of this presentation will be on human aging, we will also discuss some issues related to aging in general such as: What is aging? and Do all organisms age? We will briefly review human aging through the centuries as we determine the reasons for the increased life expectancy we see over time. Other topics investigated will be gender differences in aging, mechanisms of aging and anti-aging interventions. The goal of the presentation is to provide overarching concepts of aging that faculty can bring back to their classrooms.

Posters

The posters will be on display on Sunday, May 28th from 8:00 – 4:00 in front of the exhibitor's hall and seminar room. Authors will be available for questions before and after the third update seminar.

Four Case Studies Involving the Hemolymphatic System

David F. Dean DVM, Ph.D., Spring Hill College

Case studies are not only a great way to illustrate fundamental physiological principles, they also strengthen the student's deductive thinking skills, inject real-life relevancy into the course content, and they are fun for both students and instructor. I presented three case studies pertaining to the endocrine system at HAPS in Calgary, and three cases involving the nervous system last year in St. Louis. Each case consists of four parts: Learning Objectives (physiological concepts to be reviewed and reinforced), Case Presentation (clinical history and laboratory data), Questions (which students are to answer prior to class), and Answers (available only to the instructor). Printed copies of the case studies will be available for you to use in your course(s).

Identifying Factors which Lead to Success in Anatomy and Physiology I

Rachel Hopp, Houston Baptist University

Across the nation, the Anatomy and Physiology I (A&P I) course is taught at the freshman level and typically has no prerequisite(s). Although this is an entry-level course, it is very rigorous and national attrition rates are approximately 45%. At Houston Baptist University (HBU), A&P I students were monitored from the Fall 1999 term to the Winter 2003 term and 46.2% (162 of 351) were not successful in completing the course. Because HBU is a small university and we advise our students individually about their course selections, I wanted to determine if there were any predictors for success in A&P I. A pre-test and a statistical analysis of factors such as SAT scores and previous college coursework were used. The pre-test results were inconclusive. The SAT scores correlated with grades, but there was not a clear index score for predicting success. However, statistical analysis of the previous college coursework data indicated that previous science coursework (t-test, $p=0.016$), in particular Chemistry (t-test, $p<0.001$), correlated with higher grades in A&P I. 2003-05 data will be presented. This time period follows the change in advising in which students deficient in Chemistry are recommended to take Chemistry before A&P I.

Reflections on Dissection

Kathy A. Starr, Western Carolina University

Dissecting the human body is important for visualizing structures and their anatomical relationships. While dissections help in understanding how the body is organized, it is also important to know how working with cadavers personally affects students. As part of an ongoing study to determine the best ways to reduce anxieties in the anatomy lab, physical

therapy (PT) students from the class of 2006 (n = 28) at Western Carolina University were asked to write brief reflections based on several questions about the impact of working with cadavers. These reflections were completed near the end of the second semester of a two-semester human anatomy course.

The following year PT students from the class of 2007 (n = 32) were also asked to write similar reflections before beginning dissection to determine how they thought working with cadavers might affect them. Students from both classes described their perceptions on the importance of cadaver dissection in their ability to learn anatomy but also spoke about the deeper spiritual and/or emotional impact of the experience. Interviews obtained from small focus groups were used to further explore students' thoughts and feelings.

The Effect of Dietary Weight Loss Supplements Containing Caffeine on the Mass and Metabolic Rate of Rats

Suzanne S. Frucht, Ph.D., Northwest Missouri State University

The 1990-2002 National Health and Nutrition Examination Survey revealed that 65% of adults over the age of 20 are overweight or obese. The sale of dietary supplements is a \$19.4 billion per year industry, a significant portion of which is advertised to promote weight loss by boosting metabolism. Manufacturers do not have to prove their product produces results as advertised. The Federal Drug Administration allots only \$10 million and 60 persons to investigate claims that a product has caused harm and does not investigate efficacy at all. The purpose of this experiment was to study if two dietary supplements, One a Day Weight Smart and Stacker 2 Ephedra Free, both containing caffeine, increased the metabolic rate and promoted weight loss in rats. Groups of 10 rats received one of these supplements added to its rat chow. Weight and metabolic rate were measured at weekly intervals for four weeks. Results indicated that the group of rats receiving Stacker 2 Ephedra Free gained statistically significantly less weight and gained it at a statistically significantly slower rate than rats receiving One a Day Weight Smart or the control group. However, there was no statistically significant difference in metabolic rate of the three groups across time. These results present evidence that One A Day Weight Smart does not promote weight loss or stimulate metabolic rate and that Stacker 2 Ephedra Free does promote weight loss, but does not do so by stimulating metabolic rate.

Health Fair Screenings: Bringing Life to Anatomy

Mark A. Jaffe, D.P.M., M.H.S.A., Nova Southeastern University

A unique methodology in applying anatomy to real world situations revolves around the concept of undergraduate pre-professional (nursing, pharmacy, dental, medicine, etc.) students active involvement in health fair screenings. Students in good standing in Anatomy & Physiology courses (or other science courses) sign up for a "shift." With a clinician present, the students are offered the opportunity to screen a health fair participant in a discipline specific area. Students have the opportunity to take a screening health history and perform a screening health physical exam. Lessons related to surface anatomy and normal versus abnormal anatomy can be enhanced. For those academic programs that have vertical access to professional health education programs, the undergraduate student can be paired with a graduate student to provide an even richer cooperative learning exercise, a "glimpse into the future" of the graduate level of knowledge. Although utilizing clinically licensed Anatomy and Physiology professors facilitates

the process, it is not a requirement. Alternatively, a similar program can be initiated by partnering academically trained Anatomy and Physiology professors with community health care providers. In addition to the stated objective of enhancing anatomical applications, students who participate in this unique learning exercise also can develop professional skills such as dressing and acting with a professional demeanor, communicating with a diverse multi-ethnic population, and collaborating in the team concept of health care delivery. Health Fair screenings are an innovative mechanism that exposes students to anatomical variability and real world learning opportunities that results in highly motivated learners.

Workshops

Using physics and mechanical models to teach pulmonary physiology

Stephen C. Wood, Ph.D., cellwood@rossmed.edu.dm,

Students routinely encounter problems when studying pulmonary physiology because of the large number of equations used in standard textbooks. Many of these equations are daunting because of the symbols used and extensive use of subscripts. In fact, almost all of these equations are derived from a few simple physical principles and basic equations. For example, the equation for resistance to air flow (or blood flow) is $R = \Delta P / \text{flow}$ is an expression of Ohm's law for electrical resistance = voltage/current. Another example is the alveolar gas equation, $\text{PaCO}_2 = \text{VCO}_2 / \text{VA} \times \text{RT}$, is an expression of the ideal gas law, $\text{PV} = \text{mRT}$. The principle of "conservation of mass" is employed in many physiological equations including Fick principle, dilution equations, and renal clearance. Students only need to learn a few basic physical principles in order to master pulmonary, cardiovascular and renal physiology.

Mechanical Vibratory Therapy: An Historical Perspective

Dr. L. S. Cane, lcane@life.edu

The ancient Greeks were considered the first to utilize vibratory modes of treatment for various forms of illness, including nervous and muscular disorders, lymphatic or circulatory problems and a wide array of digestive disturbances. Various forms of vibratory treatment continued well into the 19th century when mechanical devices and instruments replaced more manual forms of health therapies. Many of these mechanical vibratory devices were "adjustable" for delivery of movements that could affect areas of the body that required superficial or deep muscular circulatory effects. The nervous system, in particular, was a focus for vibratory therapies of the brain (skull) and spinal cord (vertebral column), since mental "afflictions" became more prevalent during the late 19th and early 20th centuries.

Prosected Cadavers vs. Clay Sculpting: A comparison of two approaches to an undergraduate human anatomy laboratory.

John Waters, johnwaters@psu.edu, Salvatore Drogo , William Perrotti , Donald Kelly

Last fall, approximately 160 anatomy students at Mohawk Valley Community College were assigned to one of two laboratory treatment groups. In the control treatment, students performed investigative laboratory exercises on human skeletal muscles using prosected cadavers. In the experimental treatment, students performed similar exercises, but sculpted clay muscles onto small plastic skeletons instead of studying cadavers. All students had access to laboratory skeletons, charts, etc. Student learning was evaluated using exam items ranging from low difficulty identification questions, to high difficulty items where students evaluated case studies involving injured "patients". We will present and discuss our results in this workshop.

The Role of Technology in the Anatomy and Physiology and General Biology classrooms.

Kleinelp, William, william_kleinelp@middlesexcc.edu,

This presentation will focus on the comparison of past and present classroom instructional methodologies and how the integration of interactive visual multimedia has improved individual student performance and increase the overall retention rate in Anatomy & Physiology. The focus of the presentation will be how to integrate laboratory instruction with applicable faculty developed interactive multimedia as a home study tool using software geared exclusively to Anatomy and Physiology. Traditionally, these two courses have the highest attrition rates. We have successfully reduced attrition by 50% with our self-developed visual multimedia.

The Anatomy Digital Story Book Projects 101: How to create and implement digital storytelling into your curriculum.

Mandi Dupain, Mandi.Dupain@millersville.edu

Anatomy digital story book projects are a powerful way to motivate students to understand an academic concept while building their narrative presentation. Anatomy digital story book projects can increase student's retention rate and comprehension of course material through cooperative learning and active learning. This session will help participants understand the pedagogical importance of implementing digital storytelling into their curriculum, view examples of digital story book projects and finally learn how to create digital story book projects using Microsoft Windows Movie Maker 2.0.

Virtual Edge Human Prosection Guide

Mark Frasier, Ph.D., Mark.Frasier@ColoState.edu

Using Electromyography in the Lab: A Problem Solving Approach

Megan Kozemchak, Sam Drogo, Don Kelly, Bill Perrotti, wperrotti@mvcc.edu

This presentation is an expansion of our 2005 HAPS presentation and will involve three elements. First, some general principles regarding EMG will be presented. This will be followed by several simple EMG maneuvers that will analyze biceps/triceps activity using an AD Instruments data acquisition system. This segment will demonstrate the opposing nature of skeletal muscle activity, the role of gravity, motor unit summation, and isometric contraction and distinguishes concentric from eccentric contractions. Lastly, several problems/scenarios will be presented for participants working in small groups to analyze/evaluate/demonstrate by devising and executing simple EMG exercises.

Visual Imagery in the Classroom: How To

Pamela Gregory, pgre@tjc.edu

A hands-on workshop to help you get started creating your own visual images to enhance student learning. Definitely for beginners. Focus will be on use of Macromedia Flash, but fundamental elements and useful concepts will be covered.

A Computer Simulation for the Nerve Action Potential

John C Cornell, John.Cornell@anokaramsey.edu

We will use SPIKE as a teaching tool. SPIKE is computer program based on the mathematical model developed by Hodgkin and Huxley for the squid giant axon and has been adapted to the teaching of vertebrate physiology. The program can demonstrate such phenomena as the refractory period, the effects of changes in sodium and potassium concentrations on the action potential, and the relationship between stimulus strength and stimulus duration. SPIKE was written by the author and is available at no charge. The program can be run from the Internet on most IBM compatible computers.

What Everyone Should Know For Teaching GI Physiology

Barbara E. Goodman, Ph.D., Barb.Goodman@usd.edu

This workshop will share and model information used by the presenter for teaching gastrointestinal physiology to undergraduate students in an active learning lecture-based setting and will introduce some straightforward laboratory exercises to be used in learning GI physiology. The presentation will highlight learning objectives and content useful to enhance student learning in a human physiology class. Materials to be provided include sample lecture handouts and sample PowerPoint slides to help students with different learning preferences understand the content. The case study to be included will investigate *Helicobacter pylori* and how it causes ulcers.

Using Structure/Function Relationships to Stimulate Critical Thinking

Richard Faircloth, rfaircloth@aacc.edu and Michael Glasgow

Fundamental to a sound understanding of anatomy & physiology is an appreciation for the intimate relationship between structure and function. Whether at a microscopic or a macroscopic level, that relationship provides the basis for understanding of both normal and pathological states. In this workshop, participants will be enticed into thinking critically by participation in group activities that employ a variety of structural/functional relationships, at both gross and microscopic levels, ultimately to create hypothetical organs charged with carrying out critical body functions.

How to Write, Integrate and Assess Problem-Based Learning Exercises into a Two-Semester Undergraduate Anatomy and Physiology Course

Ed Westen, ed.westen@wartburg.edu

Balancing content demands with the desire for more problem-based learning (PBL) and knowing how to write and assess such exercises can be a considerable challenge to the anatomy and physiology instructor. This workshop will provide examples of PBL's as well as discussion of one instructor's experience writing, implementing and assessing them in a two-semester anatomy and physiology course.

Assessment of Learning in Human Anatomy and Physiology
Joyce Jennings-Pineda, joycepineda@missouristate.edu

Missouri State University West Plains has been involved in an on-going development of an institutional-wide assessment of its mission. This workshop will take participants through the steps of developing and implementing an assessment plan for Human Anatomy and Physiology. Participants will receive example documentation.

Playing Around; games that teach Anatomy & Physiology
Patricia S. Bowne, pat.bowne@alverno.edu and Sherry Stewart,
sherry.stewart@navarrocollege.edu

We've already laid claim to students' study time -- now is there any way we can focus their leisure time on A&P? This workshop will look at games that reinforce Anatomy and Physiology learning. Perhaps studying can be fun after all! Participants will be playing card games and other games in small groups, as well as looking at some computerized 'video' games.

Teaching (and learning) difficult concepts by accommodating multiple learning modes; a practical demonstration
Shyla Akkaraju and Nikki McDaniel, nichole.mcdaniel@bcc.cuny.edu

What began as a simple trichotomy of learning modes (visual, print, aural) has expanded over recent years. We will present topics that are typically difficult for students (resting membrane potential, translation) by employing a variety of learning modes. Activities overview: students analyze a figure (visual), then write and discuss their observations (print, interactive). After an explanation from the instructor (aural), the concept is presented again using manipulatives (haptic). Finally, students participate in a skit (kinesthetic) followed by a directed wrap-up (interactive). Workshop participants will take part in the activities as if they were students. Some instructional materials will be provided.

Introducing the new Human Cardiac Output lesson for the Biopac Student Lab System
Tim Cook, timc@biopac.com

This workshop will demonstrate the latest version of the Biopac Student Lab software with special emphasis on the New Human Cardiac Output Lesson. The lesson is a new addition to the series of fundamental physiology labs that are part of the Biopac Student Lab software and lab manual. The lesson guides students through setup, recording, and analysis. Students will compare the results before and after light exercise.

Introducing the latest hardware and software for the Biopac Student Lab System
Tim Cook, timc@biopac.com

We have significantly improved the Biopac Student Lab system with the introduction of powerful NEW hardware, NEW software, and a wide range of NEW transducers. The new software includes video movie clips and example data files that significantly enhance student and instructor interactions with the system. With the largest curriculum library in the industry, we have also teamed up with a number of publishers to offer a phenomenal range of lab options. Attend the workshop to learn more about the most comprehensive teaching program available today. Attend the workshop to receive your FREE multi-media CD presentation and the latest BSL catalog.

Classroom Assessment Techniques (CATs) Made Simple: How you can quickly assess student understanding and inspire active learning in the classroom
Valerie Dean O'Loughlin, vdean@indiana.edu

Students are reluctant to ask questions or ask for clarification, especially in a large lecture hall. How then, do you know your students really "get" the material? Is there a way to assess students' understanding in the classroom, well before the exam? In this session, Valerie O'Loughlin will introduce you to assessment strategies called "Classroom Assessment Techniques", or CATs. CATs were first developed by Angelo and Cross, and Valerie has modified these CATs for use in her anatomy classroom. She will demonstrate the types of CATs she prepared, how she uses them in class to assess understanding of the material, and discuss how these CATs make her lectures a more active learning experience for all involved. Participant discussion is encouraged and participants should be prepared to brainstorm ways for how to use CATs in their own classrooms.

The First Day of class: They'll want to come back for more!
Thomas Lehman, Tom.Lehman@MorganCC.edu

First impressions set the tone for the entire course. Make the most of that first day. Come learn some simple techniques for the integration of group collaboration, terminology usage, and microscopy and model experience. Stations include "That's a banana?", "Where's McBurney?", "What color's the nucleus?", "Which way's up?", and "Build a spleen." Your students will leave that day with applicable knowledge, an idea of what to expect in the course, and the desire to come back for more.

Evaluation of Student Visual Problems: Irlen Syndrome (Scotopic Sensitivity Syndrome)
Carolyn Corn, adj-ccor@tjc.edu

Many students are hampered by an unrecognized visual problem known as Irlen syndrome, or scotopic sensitivity syndrome. This workshop will introduce you to the problems and some solutions: how to recognize a student that might have this syndrome, how to refer them for screening, and how to deal with the practical problems. Treatment is easy and successful in students who are properly diagnosed; their performance in class improves remarkably.

Standardizing Lab Sections in a Large Undergraduate Anatomy Class

Alison French Doubleday, almfrenc@indiana.edu and Jennifer Eastwood, jvanduse@indiana.edu

Since human anatomy is a required course in many pre-medical and health-related programs, instructors may encounter increasing class sizes. With very large anatomy classes, it is often necessary to divide lab sections among multiple instructors or graduate assistants. Achieving standardization of lab structure and quality of teaching across multiple lab sections however is often challenging. In our workshop we will discuss and evaluate ways we have approached this challenge at Indiana University Bloomington. We will focus on current practices as well as perspectives from our anatomy students and graduate and undergraduate teaching assistants.

If You Only Have One Nerve Left - I Hope It's Your Ulnar

Ellen Arnestad, ellen.arnestad@sait.ca

To those of us who grew up with the switch from blackboard to whiteboard as the major educational breakthrough, the generation X-box students can be challenging. Without video clips, sound bites and other fiber optic field trips how do we hold their attention? Even if you're not a "techie" you can liven up your classroom sessions with humor. Learn different ways to build humor into your lectures and fun into your labs. Have your students in stitches without throwing things at them. Even if you don't think you're funny, all it takes is practice ... and some viscera.

Techniques to engage and assist students in the learning process

Janice Young, jyoung@mchenry.edu

A review of successful techniques to engage, motivate, and inspire students.

Getting Started with Digital Photomicroscopy

Lynn Gray, Ph.D., lgra@tjc.edu

Practical aspects of choosing a digital photomicroscopy system: how to choose a microscope and a digital camera to fit it (some system examples will be presented with the results to expect.) For those with little or no experience with digital photomicroscopy who wish to generate their own histological or other microscopic images.

Item Analysis, Anyone?

Margaret A. Weck, mweck@stlcp.edu

The bulk of the session will be used for discussing how to use item analysis results (especially the discrimination score) to evaluate the quality of your exam questions and to gain more insight into a particular group of student's conceptual difficulties with the content of your courses.

Much audience participation is expected. No extensive prior experience with item analysis is required, as an overview of item analysis of machine-graded multiple-choice questions will be presented for those not familiar with the process.

Student Engagement/ Civic Engagement Portfolio
Dana Emberton-Tinius, dana.emberton-tinius@wku.edu

This session features a creative way to incorporate community service, a K-12 science outreach event, classroom presentations, a university activity and writing opportunities. Instructors from Bowling Green Community College of Western Kentucky University integrate student portfolios representing civic engagement and student engagement while writing across the curriculum. This focus is a strategy to develop the whole university student.

Teaching methods that capture student's learning style preferences (or, How I beat my PowerPoint addiction!)

Thomas M. Lancraft, Lancraft.Tom@spscollege.edu

Tom L. relates his recovery story-from his "bottom" of daily PPT abuse to being PPT free for over three years. Tom will demonstrate how his "program" (actually two, Interactions and PowerPhys) has given him, and his students, peace of mind...and better A&P understanding in lecture and laboratory. This meeting will include a discussion on the interaction between student learning style preferences and teaching software for lecture and lab.

Incorporating Active Learning in Content-Rich Courses

Jennifer Lundmark, lundmark@csus.edu

There is substantial evidence that students learn best when they use higher-order thinking skills like analysis, synthesis, and evaluation (that, when they think "actively".) However, activities using these skills tend to require much more classroom time than traditional lecture, and thus present a significant problem in terms of content delivery. Workshop attendees will learn creative ways to gain time for active learning, and will explore ideas for creating active learning opportunities in both lecture and laboratory settings.

Blood & Erythrocytes (RBC's)

Charlene L. Hartlaub, charlene.newby@sbcglobal.net

This workshop deals with general information about blood with a focus on erythrocytes (RBC's). It will include discussion on serum vs. plasma, RBC production, function, RBC count, hemoglobin, hematocrit, normal values, reticulocytes, and a little pathology.

Leukocytes & Thrombocytes

Charlene L. Hartlaub, charlene.newby@sbcglobal.net

This workshop deals with general information about leukocytes (WBC's) and thrombocytes (platelets). It will include discussion on WBC production, function, 5 kinds of WBC's & their respective functions, platelet production, functions, and a little pathology of both WBC's and platelets, and their normal values.

ABO Blood Groups

Charlene L. Hartlaub, charlene.newby@sbcglobal.net

This workshop deals with general information on the four major ABO blood groups, their phenotypes, genotypes, inheritance, antibodies present in each, and which blood groups each can receive.

Rh Types, Rh babies, RhoGAM

Charlene L. Hartlaub, charlene.newby@sbcglobal.net

This workshop deals with general information about the Rh system, its phenotypes, genotypes, inheritance, “Rh babies,” RhoGAM, and transfusion implications.

Maintaining Course Quality without Sacrificing Teaching Style Diversity

Patti Turner, pturner@howardcc.edu

Nationwide enrollment in Anatomy and Physiology courses is growing tremendously with increased numbers of faculty teaching the same course within an institution. While this leads to diversity in teaching styles, it may come as a sacrifice in uniformity in course objectives and material covered. This workshop will present ways we have developed to help ensure consistency among many lab and lecture sections. Discussion of approaches used in other institutions and brainstorming to develop new methods will also form a part of this workshop. In addition we have administered the HAPS Comprehensive Exam to students from lecture sections taught by different faculty and different semesters. The data was used to determine whether there are significant differences in the performance of students based on variables such as faculty or class schedule. Results of these analyses will be presented.

Laboratory Experiments in Sensory Physiology

Dr. Edward E. Brandt, ebrandt@su.edu

An opportunity to acquire new and novel activities you can carry out with your students. The experiments will involve thermo, tactile and visual receptors.

Physiology for Physiology Teachers: Helping students visualize mechanisms

Harold Modell, modell@physiologyeducation.org

Students often view physiological mechanisms in descriptive terms from a perspective that does not help them recognize causal relationships. The “view from the inside” is a technique that helps students focus on causal relationships from the “viewpoint” of a reporter standing inside of the system. Attendees will participate as students using this technique to engage in exercises focusing on mechanisms that students find difficult to understand. Topics will be drawn from the following: The membrane potential, propagation of the action potential, the cardiac cycle, arterial pressure, the countercurrent multiplier in the loop of Henle, and controlling the environment in the duodenum.

Designing a student guide for meaningful learning
Harold Modell, modell@physiologyeducation.org

The goal of our physiology courses is for students to use the physiology facts that they are acquiring to solve problems. To help reach this goal, we provide a “learning guide” to help them make their current mental models visible, test those models, and refine them. This workshop will focus on the process of designing learning guides. Attendees will discuss what it means to engage in meaningful learning and participate as students in an illustrative exercise focused on one topic in physiology. Attendees will then design one or more exercises that they can use in their classroom and share their ideas with the group.

Getting Unprepared Students Ready for A&P
Lori K. Garrett, lgarrett@dacc.edu

As competition for admission into Allied Health and Nursing programs increases, A&P students need to do more than just pass the class--they need to truly master the course content and complete quality work. At the same time, many of these same students have either forgotten what they learned in high school science classes, or they are not prepared to study for a rigorous science course, or they lack the fundamental knowledge to handle the material in lecture and lab. In this interactive session, we will discuss several strategies and techniques that have helped students overcome these challenges and ultimately succeed in A&P.

The Anatomy Bowl: Using On-Line Games to Increase Student Interest in Learning Anatomy and Physiology
Murray Jensen, msjensen@umn.edu

Webanatomy is a free, on-line tutorial for anatomy and physiology students. The site has been revised this past year to include a new game called “The Anatomy Bowl”. In the game students compete with each other on a set of questions of varying topics and levels of difficulty. Over the next few years I hope to develop the site so that instructors from different colleges can set up games for their individual students, and also develop competitions between students from different colleges. In this workshop we’ll demonstrate the game and brainstorm how we can use it.

Examining the effect of stress on the immune system using a novel laboratory exercise adaptable to various levels of instruction
Jacqueline Brehe, jbrehe@carroll.edu

This workshop will explore the ways in which an endocrinology experiment can be incorporated into physiology education at different levels of instruction. The exercise entails using restraint stress in mice to elicit the depressive action of glucocorticoids on the immune system as determined by a WBC differential. Able to be accomplished within a single lab session this exercise is well-suited for Anatomy & Physiology, Introductory Biology or Advanced Physiology classes. Those attending the workshop will learn how to conduct the experiment and adapt its use to their classes. The protocol can be carried out with basic laboratory equipment.

The Integration of Nervous System Components in an Inquiry-Based Reaction Time Laboratory Exercise.

Andrea Salmi, salmia@crc.losrios.edu

During this workshop, participants will perform a simple, fun reaction time lab exercise designed to encourage students to make observations, understand nervous system pathways, and develop and test hypotheses. Although we use the Biopac data acquisition system to perform this exercise, it can be easily modified to use other equipment, including reaction time rulers. The principles used can be applied to other laboratory exercises; examples will be provided. These inquiry-based exercises are designed to give students experience with the scientific method, group discussion, creativity, design of simple experimental protocols, and the responsibility for making their own decisions. The development of the lab exercises was supported in part by an NSF CCLI grant (#9952394).

Effective Use of Electronic Response Systems

Jan Machart, janmachart@mail.utexas.edu

Electronic response systems are the latest classroom technology and like all technology, they can be used well or poorly. This hands-on session will demonstrate the use of electronic response systems for gathering formative feedback and will include a presentation by a UT staff member who has been investigating the strengths and weaknesses of all of the infrared and radio-frequency systems currently available.

A Discovery Approach to Learning Histology

Paul Findell, paulfindell@mail.utexas.edu

Traditionally laboratories that introduce students to histology are fairly cookbook: look at this slide of tissue X, draw it, and label the parts that are already labeled in the lab manual's picture. In an effort to get students more engaged and really looking at what they see under the microscope, we converted a traditional histology lab into a discovery lab, with the students working in groups on sets of unknown tissues. In this workshop, participants will take the role of the students and experience this discovery approach to teaching histology.

A Clicker In Every Hand & A Chicken In Every Pot: Pleasures, Politics, & Pitfalls Of "Clicker" Systems In Large Classroom Settings

Jon Jackson, jackson@medicine.nodak.edu

The use of clickers in a large class is a means to reaching the goal of a happy, active learning environment. Like all journeys, this one has some turbulence, but generally speaking clickers can be a success, even in BIG classes; they can really help you keep better tabs on how students are doing in their own learning battles with the material. I'll share some of my successes, and help you avoid the (many) missteps I've taken. Today's clickers are powerful tools, and pose more of a challenge to the teachers than to our mostly tech-savvy students.

ImmunoScenarios Update: Making the game for the immune system more realistic

Dr. Mark F. Taylor, mark_taylor@baylor.edu

ImmunoScenarios, a game for the immune system, was developed in 1996 and is used each semester in an A&P II lab setting. The original game used a static game board in which health scenarios were "fixed." The modified version allows students to draw scenarios randomly; thus, preventing students from "looking ahead" and seeing which health problems might be encountered. In this way, students can experience the benefits of vaccinations early in the game. The game reinforces students' knowledge of antibody structure, antigen-antibody interactions, and the role of lymphocytes in the body's immune system.

Walk On and Drive Through Diagrams to learn Anatomy and Physiology

Nancy Kincaid, nkincaid@troyst.edu and Susan Baxley

Body structures and functions are presented in a way that is helpful to all students, but especially the kinesthetic and tactile learners. Students literally walk on labeled or unlabeled portable diagrams of pathways through the body. Drive-Through Kidney and Drive-Through Heart and Lung Circulation table-top diagrams were also developed. These diagrams are inexpensive, easy to make, and do not require artistic ability. We have used these kinesthetic learning activities with primary, secondary, and university students. These activities can also be used as "in service" teaching projects for K-12 science teachers as well as for university education methods classes.

Development of an online Anatomy and Physiology laboratory manual

Paul Garcia, paul.garcia@hccs.edu and Don Shult

We have developed an electronic lab manual for the first semester of Anatomy and Physiology for students at Houston Community College Southwest and development for second semester classes is ongoing. The advantages for using an online lab manual include decreased costs for students, the ability to edit labs without waiting for publishers and using student user identification to ensure that each student does their own work.

Learning Through Service - Using Service Learning to Reinforce A&P Teaching

Dr. Brian R. Shmaefsky, brian.shmaefsky@nhmccd.edu

Service learning has been proven to be an effective strategy for reinforcing science course content at the college level. It entails having students take part in volunteer projects in which they use the materials learned in class for the betterment of society. Many students entering the allied health fields and professional medical fields are expected to know how to do similar community involvement activities as part of their job duties. This presentation will serve as a primer for carrying out service learning in A&P and other health professions coursework and programs. Ample resources are provided. This presentation encourages audience participation and will encourage networking.

Tailoring Anatomy to the Needs of Your Students

Lawrence J. Rizzolo

The vastness of anatomy, and the limits on the time we can devote to it, challenges us to scrutinize our course goals and those of our students. Decisions about what to teach can be guided by applying the pedagogical concept of “learning material in the context that it will be used”. Highly-interactive computer software is a valuable buttress for this approach, as it encourages students to formulate and research questions. We have applied this concept at Yale to design anatomy courses targeted to either medical, nurse practitioner or high school students. At each level, the programs focus on developing the habits of mind that promote problem-solving and life-long learning. With this foundation, a student’s anatomical knowledge-base can grow with his or her career development. With this framework, a course can be modified and adapted to changing needs. Join us in a “hands-on” workshop that will provide the attendees with a personal interaction with these educational concepts for understanding human anatomy.

Life Beyond Scantron: Making the Grading of Written Work Easier

Carol Veil, cbveil@aacc.edu

Having your students engage in writing activities is a great way to assess their understanding of complex processes involved in Anatomy & Physiology. However, written work can be time-consuming to grade. This workshop offers tips for efficient planning and grading of written work, as well as suggestions for helping your students to become better writers.

Repairing Models

Paul F. Teller, pteller@ftc-i.net

The repair of anatomical models holds many dividends for both students and budgets. Since my last workshop in Calgary in 2004, several new techniques and useful tools have come to light. This session will be devoted to both new developments and a review of previous material for interested participants. Each participant is invited to bring items that might need repair.

Histology Hints: Let’s Tour the Digestive System

Nina C. Zanetti, zanetti@siena.edu
Siena College

By focusing on the microscopic anatomy of a single organ system (digestive), this workshop will explore a variety of pedagogical techniques that we can use to help undergraduate students learn and enjoy histology. Topics will include structure-function relationships, pathological correlations, 2- D to 3-D interpretation, histological “look-alikes”, and some active learning approaches. In addition, we will look at some details of digestive system histology that will make routine microscope slides more meaningful to instructors. Participants will have opportunity to practice interpreting histological images and to try out some interactive activities designed to get students interested in learning histology.

Using Web-HUMAN to Teach Basic Classical Physiological Relationships

Roy S. Meyers, rmeyers@skidmore.edu

Integrated, comprehensive physiology simulations such as web-HUMAN www.skidmore.edu/academics/human/ are naturally best suited to teach the coordinated physiology of several systems acting in concert such as the response to aerobic exercise of the respiratory, cardiovascular and renal systems. On the other hand, much basic physiology teaching first entails developing student understanding of isolated, individual physiological relationships such as the effects of anatomic dead space, components of cardiac output and Starling's law of the heart. It IS possible to structure experiments in web-HUMAN to target such individual relationships by carefully limiting the time of the experiment to very short intervals so that the response of the remainder of the physiology does not have a chance to develop. This technique is illustrated by participants building simulations of the alveolar ventilation/ dead space relationship, cardiac output as the product of heart rate and stroke volume and other such relationships as time allows.

Tips and Tools for Enhancing Student Learning in the Classroom

Joanne Settel, jsettel@comcast.net and Ewa Gorski, egorski@ccbcmd.edu

This workshop will highlight variety of dynamic learning tools that we have developed over the years to enhance student learning and critical thinking skills. These include interactive thinking exercises for engaging large classes, dramatizations of physiological processes, use of an on-line website for face to face classes students, on-line review quizzes for lab practicals and lecture exams, guided study tools, guided on-line lectures and the development of an in-house lab manual with color photos of our models.

Anatomy and Physiology Online

Mary L. Puglia, Mary_Puglia@centralaz.edu

I have been teaching anatomy and physiology for over 10 years. As the Internet made its way into the classroom, I started to use Blackboard for my gradebook. Students appreciated getting their grades so quickly. As with many community college students, my students have families and work full time. Soon after I started keeping my gradebook online, I began to get requests for both an online class and a hybrid approach to A & P. I found a textbook with the online support that I needed. This past semester, I have taught A & P both in a traditional and a hybrid format. There was no significant difference in student performance between the traditional and hybrid classes. Next semester, I am putting the A & P class online. I used the HAPS best practices for distance learning in developing my online class. The materials provided by HAPS were an indispensable guideline in developing all aspects of the online class. I will present my online class and how it conforms to the best practices listed by HAPS, and a few tips learned in the process.

**HAPS Comprehensive Exam in A&P - 1993-2006 Getting better all the time.
Detailed Item Analysis, correlations, prospects for NSF Grant.
Chris Farrell, cfarrell@trevecca.edu**

This is an update on the soundness of our exam and what the National Science Foundation thinks of our grant request for making it into a more widespread (national) exam.

**An Introduction to iWorx Physiology Lab Kits and the New LabScribe Software
Steve Andre**

The physiology lab kits and the virtual labs (Labs On CD, Labs On Line) from iWorx make it easy to do human and animal physiology experiments. These experiments include exercises on the cardiovascular, neuromuscular, and respiration systems. Teaching kits include the hardware (except computer), software, and courseware needed to do over 175 different exercises. Data collection and analysis with iWorx systems can easily be accomplished with the “click” of a button or two. Users can also complete experiments of their own design with the same “click and play” ease. Virtual exercises, covering many of the same topics in the iWorx lab manual, can be completed on a computer on campus or at home with Labs On CD, or Labs On Line.

With these two products, students record and analyze data just as they would with lab equipment. Animations, illustrations, and digital movies compliment each virtual lab exercise so students have an understanding of how the experiment was conducted

**Using the New LabScribe Software with iWorx Physiology Teaching Kits.
Steve Andre**

Learn about the new LabScribe software and how easy it is to use. Experiments selected by the participants will be performed with helpful hints and suggestions provided by the iWorx staff and users. These experiments can include ones recently added to the latest edition of the iWorx Physiology Lab Manual and ones appearing in the iWorx newsletter. Participants are welcomed to share their experiences with iWorx equipment, software, and courseware.

**The utility and efficacy of teaching human gross anatomy using plastinated specimens
Britt E. Sanford, MD.**

For more than 100 years human gross anatomy has been taught in the laboratory where students perform detailed dissections under the tutelage of faculty. To augment, or in some cases replace, active student dissection many programs have provided prosected specimens - cadavers dissected by faculty. Most recently, some programs have the means to preserve prosected specimens in a plastic-like form; this process is termed plastination. The purpose of this workshop is to provide participants with a hands-on teaching experience utilizing plastinated specimens and to demonstrate their utility in human anatomy courses.

"Zoologik™ Anatomical Position" (ZAP) An alternative paradigm to the Standard Anatomical Position (SAP)

Jon Zahourek, jonz@anatomyinclay.com

Most students invest too much confidence in the Standard Anatomical Position (SAP). Often, they expect to find the basic morphology on which to build common sense understandings of ventral/dorsal, or of flexion/extension, for example. The SAP presents, however, fundamental logical contradictions embedded in that tradition, making cognitive modeling of anatomy unnecessarily difficult. In this class, we will build neuromuscular anatomy in clay on Maniken® models of two paradigms.

LabTutor® Solutions for Your Laboratory Classroom. Wes Colgan III

LabTutor® for Windows XP, is the latest software offering from ADInstruments especially for education. LabTutor's integrated approach to experiments ensures the scientific principles remain students' focus rather than experimental procedures. The interactivity and content of LabTutor® captures and keeps students' attention, thereby inspiring them to learn. LabTutor® makes teaching easier by integrating all experiment information and step-by-step protocols into one software program. LabTutor's range of ready to use life science experiments include background information, real-time data acquisition, spreadsheets, graphing, and reporting capabilities. By taking students from theory to finished lab reports, LabTutor® removes the need for printed manuals and additional software programs.

What's the Problem in Problem Based Learning? Christopher P. Kemnitz, ckemnitz@uwsuper.edu

In this workshop, participants are encouraged to come and share ideas and strategies for writing and running problem based learning sessions. The presenter will be sharing one full case and several case ideas.

Team Teaching--Sharing the Pain and Gain Claire Oakley, oakleyc@rocky.edu

Sharing successes and failures are strengths of the HAPS organization. Team-teaching offers faculty the chance to creatively blend disciplines and teaching styles with both students and colleagues. This roundtable discussion will focus on various classes that members teach with an emphasis on skills, activities, and/or discussions that worked well or not so well with an eye towards sharing and then modifying our classes. Contributors are asked to bring syllabi and other packets of material worth sharing. Example: The Biology and Literature of HIV/AIDS; Freshman Experience—General Biology and 1st Year Writing.

Developing and Delivering On-Line Assessments with Blackboard

Robert S. Rawding, rawding@gannon.edu

After an introduction to on-line assessments in general, participants will learn how to develop and deliver assessment tools with the Blackboard course management system (CMS). Included will be tips and techniques about Blackboard's diverse question-type capabilities, suggestions to strengthen the validity of an on-line assessment, cautions about limitations, adding images and audio clips to assessments, and ways to integrate assessments into web-enhanced learning experiences, both for laboratory and lecture. Participants are encouraged to bring or have access to current test question material that they are using in face-to-face or web-enhanced courses.

A Practical Introduction to Problem Based Learning

Robert B. Tallitsch, Ph.D., bitallitsch@augustana.edu

This talk will help participants examine what they hope their students will get out of their classes, and how they currently work to accomplish that. Participants will be introduced to the concept of Problem Based Learning (PBL) and how it can be used in small, large, major, and non-major courses. Good utilization of PBL is a long and time intensive undertaking. However, the advantages of active learning more than outweigh the disadvantages, and Dr. Tallitsch will discuss the results he has seen in his Human Anatomy, Neuroanatomy and Kinesiology courses. Participants will receive a series of handouts that define PBL, including sample problems and provide additional resources.

Exhibitors and Sponsors

The success of our conference depends on the generosity of our exhibitors and sponsors. We have scheduled 30 minute breaks on update seminar days to allow more time for HAPS members to interact with the vendors. Please take the time to visit with our exhibitors and thank our sponsors in person.

A partial listing of our exhibitors is included here. The full list will appear in the final conference brochure.

A.D.A.M., Inc.

ADInstruments Inc.

American Association of Anatomists

American Physiological Society

Benjamin Cummings

Bluedoor

Carolina Biological Supply Co.

CleveMed

Elephant CDs

Hayden-McNeil Publishing, Inc.

iWorx/CB Sciences

Kendall/Hunt Publishing Company

McGraw-Hill

Morton Publishing

Mosby/Elsevier, Inc.

Science Learning Workshop, Inc.

Touch of Life Technologies

Vernier Software

Wiley

Sights and Sounds of Austin

- ❖ Tour the **State Capitol of Texas**, one of the most beloved landmarks in the Lone Star State. Completed in 1888, the pink granite statehouse stands 311 feet high and is 14 feet higher than our nation's capitol.
- ❖ Step inside the stunning **Texas Governor's Mansion**, official residence for the First Family of Texas since 1856.
- ❖ Experience life on Capitol Hill as it played out during the days of LBJ at the **Lyndon Baines Johnson Library and Museum**.
- ❖ Enter the lobby of the grand **Driskill Hotel** to be completely overwhelmed by the elegance of yester-year. Built in 1886 by cattle baron Jesse Driskill, the hotel has accommodated Texas' elite and politically powerful for more than a century.
- ❖ Inspired by Austin's burgeoning live music scene in the early '70s, **Austin City Limits** has featured more than 500 different regional and internationally acclaimed artists on its stage over the years.
- ❖ A stroll down the city's famous **Sixth Street** places visitors in the midst of some 50 nightclubs and restaurants, with live music offerings of every genre and a host of colorful street characters. The hilarious **Esther's Follies** has anchored Sixth Street entertainment for more than 20 years.
- ❖ See the natural beauty of the Texas Hill Country up-close at the **Lady Bird Johnson Wildflower Center**, where planting areas, wildflower meadows, exhibits and observation tower pay homage to Mrs. Johnson's devotion to native landscaping and preservation.
- ❖ Learn about literature as you view the home and personal belongings of short-story writer William Sidney Porter at the **O. Henry Museum**.