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HAPS-EDucator is the official publication of the Human Anatomy and Physiology Society (HAPS) and is published four times per year. Major goals of the Human Anatomy and Physiology Society are: to promote communication among teachers of human anatomy and physiology in colleges, universities, and related institutions; to present workshops and conferences, both regional and national, where members can obtain information about the latest developments in the health and science fields; and to encourage educational research and publication by HAPS members. HAPS was established in 1989.

Annual membership dues are $50. Annual membership renewals shall be due on January 1, April 1, July 1, or October 1. New members shall renew on whichever date most closely follows the date of their initial membership. HAPS Hotline: (800) 448-HAPS (4277).

Information on membership, meetings, and more! Send correspondence to: HAPS, 222 S Meramec, Suite 303, St. Louis, MO 63105. Check out our new webpage at: http://www.hapsweb.org/

SUBMISSIONS TO HAPS-EDucator

Papers for publication, requests for information, positions available and wanted and letters to the editor are welcomed. Articles submitted on 3.5" double density disks are preferred - please include a hard copy as a backup. If references are included, please follow the methods suggested in Scientific Style and Format: The CBE Manual for Authors, Editors, and Publishers. 6th Edition, Style Manual Committee (Council of Biology Editors) Cambridge, Cambridge University Press. 1994.

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DEADLINES FOR SUBMITTING MATERIAL TO HAPS-EDucator: June 1 (Fall issue); September 1 (Summer issue); December 1 (Winter issue); March 1 (Spring issue).

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The HAPS annual conference in Charlotte, North Carolina was mentioned by many attendees as one of the most relaxing conferences yet. This was entirely due to the elegant and unflappable grace and organization of Nishi Bryska and her conference committee members who provided one of our best annual conferences to date. Many new attendees at our annual "First-Timers Breakfast" displayed enthusiasm for the organization and expressed an interest in getting involved. I was gratified to see officers and long-time members show up to introduce themselves and make people feel welcome - in my opinion one of the most valuable things about HAPS. Conference attendees had to choose from nearly fifty workshops during the two days which allowed us to walk through the heart of downtown Charlotte to the University of North Carolina-Charlotte's Uptown Center where the workshops were held. The generosity of our publishers and vendors always provides some social time for the attendees and has proven to be a much appreciated part of the conference. Total attendance for the conference this year was 310.

This has been a year of unprecedented activity for the organization because of two factors: 1) members have asked for increased services in such areas as benefits, position papers, committee work, and marketing strategies and 2) the board of directors and committee chairs (who make up the HAPS steering committee) have been unceasing in their efforts to communicate weekly regarding matters of policy, position, and member requests.

Committees have been more active than ever before and have written inclusions for the Policies and Procedures Manual which outlines their ongoing goals. Sandy Lewis, (our outgoing western regional director) has offered to chair the Safety Committee which plans to provide HAPS with a strong voice with regards to laboratory safety. Plans for development of a safety manual and position paper with the possibility of providing members with annual certification in laboratory safety are the goals for the coming year.

Kudos to outgoing Grants & Scholarships Committee chair Estry Ang (University of Pittsburgh at Greensburg) who is turning the helm over to Richard Faircloth (Anne Arundel Community College in Maryland). Estry will be joining the Membership Development Committee and assisting Kevin Petti in that regard. Richard has plans to expand the scholarship offerings by making the membership more aware of what is offered. We have an increased fund this year due to generosity of some of the vendors at the recent conference.

Thanks to Jay Druecker (Chadron State College, Nebraska) who is handing over the chair of the Cadaver Use Committee to John Martin (Clark Community College in Vancouver, Washington). John is our out-going treasurer and has done an outstanding job the past two years. John and Bill Perrotti hosted an informative workshop at the Charlotte conference regarding the challenges, pros and cons of cadaver use. The committee, recently reformed, will be authoring a position paper, as well as providing information about cadaver use, care, and maintenance and ethical considerations.

Our membership development chair, Kevin Petti (San Diego Miramar College, California), unveiled his committee's new strategy for increasing our membership awareness, recruitment and retention. It was enthusiastically received by the members and the vendors at the conference. New membership materials were also displayed at a HAPS booth at the April Experimental Biology meeting. Now available are new member packets which include all position papers and HAPS information, a membership brochure, and a HAPS logo mug. The mug became a running gag at the conference since they were highly coveted by existing members. Those who won mugs at the banquet as door prizes were widely envied! (Hint: the only way you can get one is to recruit three new members or be a new member yourself.) Contact Kevin Petti for details on membership recruitment and how to win free registration for the Maui conference.

Sam Drogo and the Competency Committee will revise and complete a new two-semester exam by mid-November. The role of the committee will be expanded to include assessment. Our webmaster, Jim Pendley, will be contacting potential commercial server sites to upgrade the HAPS web page but will remain as moderator. We would like to increase the services on the web page to better serve the membership, particularly with regards to policy and procedure, areas for chatting, and archival data retrieval from past resources. The HAPS list serve will remain dedicated to discussion regarding the teaching of anatomy and physiology.

We increased our organizational liaison this year with the American Physiological Society (APS) and the American Association of Anatomists (AAA). Don't forget that the professional journals produced by AAA are available free of charge from HAPS Headquarters. You may request a copy of The New Anatomist or Developmental Dynamics by emailing secretary Judi Nath at jnath@journals.edu. The workshops sponsored jointly by HAPS and APS at the Charlotte conference were informative and a great success. We look forward to continuing to benefit from our partnership with these organizations.

Greetings from your President - continued on page 3
Greetings from your President- continued from page 2

Membership dues continue to provide operating expenses for the organization and allow a six month reserve. Our association management firm continues to perform increasing services for us in the areas of database management, direct mailings, and conference registration. As the membership grows, monies are used to defray the cost of formatting, publishing and distributing the position papers, membership directory, and the HAPS-EDucator. Next year, a Proceedings from the annual conference will be available to better serve the members who are not able to attend.

Transition of new HAPS officers took place on July 1st, and I am pleased to hand the gavel over to Henry Ruschin from Humber College in Ontario, Canada. Steve Trautwein progresses from greatly appreciated Past-President to regal President Emeritus (can you hear him saying “Whew!”?). Again, thanks to outgoing board members Sandy Lewis and John Martin (previously mentioned) and to Pam Langley. Pam was truly the voice of reason this year on the board of directors. Her administrative experience was invaluable as we progressed through the year and we all knew that when her emails popped up, answers and solutions were going to be very clear indeed (and always provided a bit of clever humor). Susan Baxley will be the new editor of the HAPS-EDucator following this issue. Thanks to Caryl Tickner for providing us with an attractive and informative publication for the last few years. Welcome to new board members Bill Perrotti, Don Kisiel, Izak Paul, and John Waters.

Serving as your President has been an honor indeed. My professional development as an educator has been due entirely to HAPS and member networking. I have truly appreciated the opportunity to serve and return something to the organization this last year. I hope to see the organization move ahead and provide a confident voice which will serve the needs of anatomy and physiology educators. I wish you all the best of luck in the year ahead and look forward to the next annual conference in Hawaii. Hope to see you there. As the saying goes, “Here today, gone to Maui.”

HAPS 2001
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Early in my career as an eager young college instructor I wanted to diversify the experience of learning Human Physiology. So I sent my students to the library to report on the latest scientific findings in our field of study. Since I perceived this to be a conventional collegiate activity, I thought very little of discussing specific parameters or expectations and merely emphasized the due date of the assignment.

The resulting papers not only represented the expected array of composition quality, but also lacked conformity both in format and content style. The grading process was a difficult task but one I diligently undertook trying to make constructive comments to the students on ways in which to improve their writing. I concluded that the assignment was time consuming on my part and promptly began considering alternatives.

However, upon returning the research papers I was dumbstruck as one student announced that my assignment forced him to break his record of never having been in the campus library. And yet another student, hands on her hips, loudly proclaimed: “You can’t grade-me-down for ‘incorrect spelling’ and ‘poor sentence structure,’ scientists DON’T DO English!” Hence my scientific journal abstract assignment was born or, more accurately reborn, in earnest.

The Rubric  
Communication is the key. I have found the students need to be given clear guidance. Although some students may feel constrained by the rigid parameters of this assignment, many more welcome the specific directions by which to proceed.

Scientific Article Selection:  
• Collect and read three RESEARCH articles that emphasize the topic of Human Physiology from three DIFFERENT scientific journals available from the H.F. Davis Memorial Library from the following list:  
  * The American Journal of Sports Medicine  
  * Archives of Physical Medicine and Rehabilitation  
  * Journal of Orthopedic and Sports Physical Therapy  
  * The Lancet  
  * The New England Journal of Medicine  
  * Science  
• Only select Journal issues published since the month of____ (month the last abstracts were due).  
• Please allow the instructor the opportunity to approve your article selections.

Abstract Writing Style:  
• Write your abstract as a comprehensive, objective summary of the scientific study; this should include: who did the study, the purpose of the study, the method of the study, details about the subject population, statistical results, and the researcher’s conclusions.  
• The abstract should be written in the past tense using the third person (don’t use “I” or make references to yourself or your beliefs).  
• Quotations should be limited and even avoided.  
• Use careful attention to keep mechanical errors (spelling, grammatical and punctuation) to a minimum, as they will be considered in the overall grade in addition to the actual content of the abstract.  
• An abstract will NOT be accepted if ANY portion of the content is found to be plagiarized.

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Teaching Tips - continued from page 4

Reference Documentation:
- Each heading MUST include the student’s full name, course title, and the journal referenced in APA style. (The APA Publication Manual is available in the H.F. Davis Memorial Library and the campus bookstore.)
- Each abstract MUST be stapled to a photocopy of the ENTIRE original article.

Format Requirements:
- Each abstract MUST be presented separately, each on an 8.5" x 11" sheet of paper.
- Each abstract’s length is LIMITED to one side of one page.
- Each abstract MUST be typed. (Use of the computer is encouraged.)
- Please DO NOT present the assignment in a folder or binder.
- The ENTIRE assignment is DUE NO LATER THAN: (2 weeks before mid-term)

The Rationale
By utilizing current scientific journals I am able to expose my students to the most current research that has not yet found its way into the textbooks or that, in a few rare cases, has actually nullified an accepted tenant of Human Physiology. More often than not though, I hope the assignment will simply begin to demystify the scientific process for the students and allow them to see how scientific research rarely ever proves anything beyond a shadow of a doubt.

Since professional journals exist for most every field imaginable, I would presume this assignment could be modified to fit most any field of study. With some minor modification, it could be tailored for either the secondary level or the advanced pre-professional student.

I am careful to specify the titles and publication dates of the scientific journals that may be used for the assignment. This allows me the realistic opportunity to “read ahead” and be prepared for the students’ interpretations. Then by limiting the issues to those that have been published since the last scientific abstract assignment was due, I can effectively preclude the temptation of a student submitting a graded assignment from a previous semester.

I encourage each student to bring the photocopies of their selected articles to my office for approval. Primarily I see this as an opportunity to get better acquainted with the student. I can then assess their individual understanding of the assignment and ensure they are getting off on the right foot by having selected articles that fit the assignment parameters. Additionally, the photocopy of the article that is later submitted with the scientific journal abstract allows me to search for and prove instances of plagiarism in a judicious manner. Conversely, on occasion the photocopy has actually exonerated a student I suspected of plagiarizing, but couldn’t find evidence to substantiate my claim.

Most college students have had more experience writing personal narratives, comparison/contrast, argumentative, and essay style papers than they have writing technical objective summaries. Hence, this assignment offers a valid venue outside of the traditional English classroom to develop this writing technique. And although I do not profess to be an English instructor or even attempt to teach the nuances of the field, I DO evaluate the use of proper spelling, grammar, and punctuation!

I ask my students to document their references using APA style principally for the sake of requiring them to step out of their established MLA style high school comfort zone and to follow the guidelines of yet another widely accepted method of reference documentation.

The stringent format requirements compel the student to adhere to brevity and conformity when writing their scientific journal abstract. Most would agree that the task of writing succinctly often requires more thought and organization than simply allowing the pen to flow. The issue of format conformity allows grading to be a bit more of a uniform process. The due date of the assignment is generally two weeks before mid-term, thus allowing me plenty of time to grade and include them on the mid-term progress report.

After the abstracts have been graded and returned, I ask each student to give an informal 3-5 minute oral presentation about one of their abstracts to the class. Initially I began this as an opportunity for public speaking outside of a traditional speech class, but it has evolved into almost a journal club type of group activity. At times the students have actually boldly criticized the design of a study and questioned the conclusions of the researchers. Many thought provoking class discussions and even a few impassioned personal stands have ensued. Empowered students who possess the ability to think critically are certainly a positive yet immeasurable outcome of this assignment as well.

Each year the editor of our campus publication, The Colby Community College Collection, eagerly selects three or four of the highest quality scientific journal abstracts I’ve submitted for their “Writing across the curriculum” section. Consequently, the assignment affords the students the opportunity and honor of possibly being published.

The scientific journal abstract assignment has truly become a work in progress for me as an instructor. Generally I find myself tweaking the rubric here and there to increase the clarity of the assignment and enhance the opportunity for learning, not to mention my continual attempt to prevent the opportunity for plagiarism and other types of academic dishonesty. Overall though, it represents my continuing effort to incorporate a multitude of disciplines in the classroom, and my firm belief that true learning is a synthesis of our total educational experience.

Final Comments
As we find ourselves inside the threshold of a new millennium with the information highway electronically whisking us all along, I’ve found myself clinging ever more tightly to my old friend - the library. Remember that friendly sentry in the center of the campus who has long guarded volumes of wisdom and secrets of the ages? Throughout history scholars from all disciplines, even science, have found great academic inspiration and even solace while working amid the book-lined nooks of the library and breathing its vaguely musty aromas.

As instructors, we owe it to today’s young scholars not only to guide them through the Internet’s maze of wonders but also to reintroduce them to the library and the art of integrating academic disciplines into a cohesive educational experience.

Teaching Tips continued on page 6
**Machine Dialysis Demonstration**

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**Introduction:**

This article describes how to demonstrate machine dialysis during a kidney lab. The demonstration is inexpensive and does not require blood.

The most important part of a kidney dialysis machine is the dialyzer, which consists of thousands of foot-long dialysis tubes, each the diameter of a hair, surrounded by a plastic cylinder. The tubes provide a huge surface area for dialysis. Blood is pumped through the tubes while dialysis fluid flows through the cylinder in the opposite direction.

**Supplies:**

One discarded dialyzer, which can be obtained free from a dialysis center

Two inexpensive sump pumps, of the type used in water coolers, available from a building supply store

Thirteen feet of surgical tubing with an inside diameter of half an inch

Two 2-liter beakers, one labeled "dialysis fluid", the other labeled "patient's blood"

Congo red dye, available from a biological supply company

Yellow food coloring

**Procedure:**

Half fill the "patient's blood" beaker with water and stir in a little Congo red dye to create the appearance of blood. Also add 10 drops of yellow food coloring.

Half fill the "dialysis fluid" beaker with water.

Connect segments of surgical tubing to the sump pumps as shown in the figure. Immerse pumps in beakers without wetting their electrical motors. Insert return hoses for "blood" and "dialysis fluid" into their respective beakers.

Turn on the demonstration by plugging in the pumps.

**Expected results:**

Congo red stays in the "patient's blood" because it is too large to diffuse out of the dialysis tubing. It is similar to blood cells in this respect.

Yellow food coloring is small enough to diffuse into the "dialysis fluid." After fifteen minutes, the "dialysis fluid" beaker will acquire a yellow tint suggestive of urochrome.

The topic of counter current exchange can be raised by asking students to explain why "blood" and "dialysis fluid" circulate in opposite directions through the dialyzer.

The dialyzer can be used repeatedly if it is flushed with water after each use. ♦

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*Teaching Tips - continued on page 7*
Here are a few inexpensive lecture aids that are helpful in explaining some difficult concepts.

**Balloons**

Students may wonder why lungs keep a residual volume instead of squeezing out all the air. A very simple way to explain this is to inflate a balloon. Everyone knows that a balloon is hardest to inflate at the beginning. Then, as it expands, inflation becomes easier. Point out that lungs operate the same way. Inspiration is easier because lungs start out partly inflated.

Balloons and lungs operate according to Laplace’s Law, which states that the force stretching the container’s wall is equal to the pressure inside the container times the container’s diameter. As the lung or balloon inflates, less and less pressure is needed to stretch it further.

Alveolar surface tension can be illustrated by adding a small amount of water to a balloon. Point out that alveoli have a surface film of water too. Then try to inflate the balloon. It will be difficult because of surface tension.

Then add a small amount of concentrated liquid detergent to the balloon. Point out that Type 2 cells in alveoli produce a similar surfactant. The balloon will be easier to inflate because of reduced surface tension.

**Styrofoam cups**

Chemists illustrate acetone’s power as an organic solvent by setting a styrofoam cup in a shallow pool of acetone in a small dish. The cup quickly disappears.

Biologists can point out that both plasma membranes and styrofoam cups are made of materials that are not water soluble and hence prevent water from passing. Fill a cup with water to illustrate.

On the other hand, both cup and membrane are lipid soluble and allow lipids through. Illustrate by melting a cup in acetone.

**Water snakes**

A water snake can be purchased at most toy stores. It is an elongated, water-filled, doughnut-shaped toy that entertains by slipping out of one’s hands when it is grasped. It nicely illustrates a tendon sheath. Simply slip a slender rod through its central hole, and the rod becomes a tendon that glides through the sheath.

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**Using “The Wave” as an Effective Analogy for Illustrating the Generation and Propagation of Action Potentials Along A Neuron**

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**Introduction**

One of the content areas that can be challenging for instructors to teach and for students to learn is the generation and propagation of action potentials during a nerve impulse. I believe one of the major reasons students have trouble with this content is that they have difficulty visualizing what is occurring along the neuron during these processes. In thinking about ways to more effectively explain these concepts, it came to me that “the wave” (the sporting-event phenomenon in which spectators sequentially stand up and sit down around an arena) might be an effective analogy for the generation and propagation of action potentials that would allow students to more clearly conceptualize the events occurring during a nerve impulse. This has proven to be so. Students have responded very favorably to this teaching strategy, and exam scores on this content area have improved since I began using the analogy.

**Generation and Propagation of Action Potentials - A Brief Review**

An action potential involves depolarization and repolarization of the nerve cell membrane (specifically, the axon membrane). This is accomplished through the opening and closing of voltage-gated sodium and potassium ion channels.

**Depolarization:** At rest, the membrane potential of the nerve cell is -70mV, and the voltage-gated sodium ion and potassium ion channels are closed. When an area of the membrane is stimulated by a depolarizing graded potential or local current, voltage-gated sodium ion channels begin to open at that location. Sodium ions, moving along their electrochemical gradient, enter the cell through these channels and the membrane begins to depolarize. If the...
membrane depolarizes to threshold (-55mV), positive feedback will cause increasing numbers of voltage-gated sodium ion channels to open as the charge on the membrane becomes more and more positive. Thus, as depolarization proceeds the membrane becomes increasingly permeable to sodium, more and more sodium ions enter the cell, and the charge on the membrane increases to +30mV.

**Repolarization:** At this point, repolarization of the membrane will begin. Repolarization occurs when the voltage-gated sodium ion channels close, and the voltage-gated potassium ion channels in the membrane open. Sodium entry into the cell is now prevented, and potassium begins to leave the cell along its electrochemical gradient. As potassium leaves the cell, the charge on the membrane decreases until the membrane potential returns to its resting level. (The voltage-gated potassium ion channels may stay open long enough for the membrane to become temporarily hyperpolarized due to excessive potassium efflux before it returns to the resting potential.)

What causes the opening and closing of voltage-gated sodium ion and potassium ion channels? Voltage-gated sodium channels actually have two gates - an activation gate and an inactivation gate, both of which are stimulated (in opposite ways) by depolarization of the nerve cell membrane. **Keep in mind that when the membrane is at rest, the activation gate is closed and the inactivation gate is open.** Depolarization of the membrane causes the activation gates of sodium ion channels to open immediately so that sodium enters the cell. Depolarization of the membrane also stimulates delayed closure of the inactivation gates. These gates don't fully close until sodium influx has resulted in a membrane potential of about +30mV - time for repolarization to begin. The voltage-gated potassium ion channels, which are closed when the membrane is at rest, are stimulated to open by depolarization of the cell membrane. However, these are sluggish gates, which don't respond until the membrane has depolarized to about +30mV. Thus the voltage-gated potassium ion channels open concurrently with the closure of the voltage-gated sodium ion channels, allowing repolarization to proceed.

**Propagation of action potentials:** Propagation of action potentials along the axon membrane (a nerve impulse) occurs when a local current generated by an ongoing action potential stimulates depolarization of the adjacent region of the cell membrane. This region then undergoes an action potential, which triggers an action potential in the subsequent section of the membrane and so on. This mechanism applies to the propagation of action potentials along unmyelinated axons. Action potentials proceed along the neuron in one direction only, away from the origin of the nerve impulse. This unidirectional wave of action potentials produces the nerve impulse.

**Method**

In order to explain the process of action potential generation and propagation to students in a way they can visualize, I first explain the events in these physiologic processes as described above, and then relate these events to the spectator actions that occur during “the wave” at sporting events.

First I ask the students to visualize “the wave” so they have a fresh picture of the phenomenon in their minds. (I've tried asking the students to perform the wave in class, but that is generally a less than successful effort!) I then relate each aspect of the generation of an action potential at a particular point on the nerve cell membrane to what is happening in a particular section of spectators during the wave.

I point out that seated spectators are equivalent to the membrane being at its resting potential of -70mV. Spectators standing up and then putting their arms in the air illustrates what happens to the membrane potential as the nerve cell membrane depolarizes. The charge on the membrane becomes increasingly positive as voltage-gated sodium ion channels open and sodium enters the cell, just as the height of a section of spectators gradually increases as the spectators stand up from a sitting position and then extend their arms fully into the air. Repolarization occurs when the sodium channels close, potassium channels open, and potassium leaves the cell returning the membrane potential to its resting level. This is analogous to the spectators lowering their arms and sitting back down. (The weakness of this analogy is that it doesn’t illustrate the temporary hyperpolarization of the membrane that occurs when the membrane potential undershoots its resting level.)

I then explain that the propagation of action potentials occurs just as “the wave” proceeds around an arena. The occurrence of an action potential in one area of the membrane causes an action potential to be generated in the adjacent section of the membrane, like a section of spectators standing up during “the wave” causes the adjacent section of spectators to stand up as the previous section begins to sit down. I point out that as the section of spectators that just stood up sits down (repolarizes), the adjacent section begins to stand up (depolarizes) just as occurs in a nerve cell membrane. I also explain that the propagation of action potentials occurs in just one direction along the axon, just as the wave proceeds unidirectionally around the stadium, and conclude that a nerve impulse is simply a “wave” of action potentials along the neuron.

A final note. This analogy can be adapted slightly to explain the concept of threshold. I ask the students to think about what happens if someone tries to start a wave and only a few people in that section will participate - the wave never gets going because that section of spectators doesn’t “depolarize to threshold.” However, if enough people participate, “threshold” is reached, and the wave will proceed around the stadium.

**Conclusions**

Although this analogy is not perfect, it seems to be quite effective in helping students “see” what is occurring along the nerve cell membrane during the generation and propagation of action potentials. Whenever I use it, students tell me how much it helps them learn the physiology of nerve impulse generation, and I recommend giving it a try.

Teaching Tips - continued on page 9
Recruiting an art professor, I gained the artistic talents of a painter. During the summer, my laboratory floor will have calligraphic flourish of enamel paint to properly label the sutures and the adjoining bones. This combination of cement and paint will allow me a multimedia composite. Students will have one more means of studying bones, and I will have increased my ability to meet student learning styles at little cost to my biology budget.

My belief is that other laboratory floors around the country might yield similar teaching tools. The serrate sutures provide plenty of surface area and help resist forces directed to the roofing bones of the skull (Hildebrand 1982). Serrations allow slight movement when outside forces contact the bones - this is especially noted in head-banging animals such as Bighorn sheep which display greater zigzagging of the sutures than non-head-banging animals (Palmer 1995). The specific crack morphology may result from the settling of the cement following repetitive wet and dry cycles of the dirt under the foundation of the building or they may result from 10 years of students engaging in cerebral discussions of anatomical and physiological importance.

As educators, it is our job to assist students in learning difficult concepts and vocabulary. Since students come in all colors, shapes, and sizes, and with a variety of learning styles, we must creatively stretch to meet their needs. We need to combine inspirational teaching with sophisticated software, well-written textbooks, probing discussions, myriad models, and cadavers or non-human animals - and now in a new century, we can add cracked floors...

*A tongue-in-cheek Teaching Tip that could actually work!!

References

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Last fall when I was giving a laboratory exam on human bones, I had a teaching revelation! I discovered a new media to add to my bag of teaching tricks - a new, low-tech, and inexpensive illustration - cracks in the cement floor of my laboratory. I was somewhat bored as I proctored the exam. As my gaze wandered around the room noting student responses to questions laid out on the laboratory tables, my eyes dropped to the floor and I bent down to re-tie a loose shoelace. And there, right at my feet, lay a new teaching tool. I realized that I could teach students the sutures of the skull merely by using the laboratory floor (figures 1 and 2).

Now I have a new modality to teach students with alternative learning styles. For those students who do not learn well by touching real skulls, looking at the very low-tech photographic atlases, or by using software such as the Neotek three-dimensional computer programs or the interactive ADAM discs, I can now offer them cracks in the floor! These cracks will allow me to expand my teaching in a world of ever increasing technology. I thereby address a variety of student learning styles and incorporate more multimedia presentations.

Figure 1. Photograph of the cracks in the laboratory floor.

Figure 2. Photograph of a human skull showing similar suture morphology.

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Anatomical and developmental regulation studies in transgenic *Drosophila* using mammalian transcription factor YY1

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Yin-Yang-1 (YY1) is a 414 amino acid, ubiquitously expressed transcription factor found in many organisms including humans. YY1 can either activate or repress transcription of many genes under a variety of conditions. There are some reports in literature to document the medical relevance of YY1. For example, in the case of human immunodeficiency virus (HIV), YY1 can bind to the viral promoter resulting in reduced viral gene expression and reduced viral titers. In addition, spontaneous deletions of YY1 binding sites in the human papilloma virus (HPV) type 16 genome leads to overexpression of viral oncogenes and tumor progression. Therefore, YY1 is implicated in important disease conditions such as AIDS and human cervical cancer. In addition, homozygous mutation of the YY1 gene in mice results in peri-implantation lethality. Recently, YY1 was found to share some homology with the *Drosophila* protein pleiohomeotic (PHO). PHO is a member of the polycomb group (PcG) complex that functions to repress transcription of homeotic genes. Homeotic genes cause anatomic changes in body parts needed for proper embryonic development. An exciting possibility is that mammalian YY1 functions in a similar capacity. In order to study the mechanism of YY1 transcription regulation, and to study its role in embryonic development, we prepared *Drosophila* lines expressing either YY1 or pho transgenes. We injected the YY1 or pho genes in the posterior end of the newly hatched (half-hour old) *Drosophila* embryos. Of the 3100 embryos injected, we obtained 13 independent transgenic lines (-0.4% success rate). We found that a pho transgene was capable of partially correcting PcG mutant anatomical defects. Most pho transgenic flies were also much more hardy and survived longer (over 1 week) than the mutant flies, which died two days after birth. We also found that a YY1 transgene was capable of repressing gene expression in *Drosophila* embryos. These results strongly indicate that we will be able to determine the ability of YY1 to functionally rescue PHO deficient flies. The above transgenic systems could also be used in teaching laboratories to demonstrate mechanisms of gene regulation and anatomical development.

Teaching human anatomy and physiology to high school students via case study analysis

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Case study analysis proves to be an effective means for teaching human anatomy and physiology to university students. We tested this approach in two separate high schools where two sections of human anatomy and physiology were offered. At each school, we taught respiratory anatomy and its relation to the development of lung cancer by having students analyze a case in one section and by lecture in the second section of the course. Background knowledge was assessed by a multiple choice test (pretest) prior to presentation of the material. Students also completed a survey to assess their motivation for learning (presurvey). Following teaching, we administered a second multiple choice test (posttest) and a second motivational survey (postsurvey). The two sections using the case study method scored higher on the posttests (9.31 ± 0.6, n=19 students vs. 8.6 ± 0.9, n=15 and 8.71 ± 1.2, n=14 vs. 6.6 ± 1.2, n=15; p<.05) and had a greater pre-to-post test differential (p<.05) when compared to the matched sections using the lecture methods. No statistical significantly differences occurred in student motivation (postsurvey versus presurvey). These results indicate that case study analysis improves the cognitive learning of human anatomy and physiology by high school students and suggest that this method is an active learning strategy that can be successfully used in the secondary science classroom.
Tracking student performance at lower and higher cognitive levels in an anatomy and physiology class

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We are interested in the cognitive development of introductory anatomy and physiology students. Most instructors are intuitively aware of the difference between exam questions that emphasize memorization and those that require substantial thought, but it is possible to use a more objective method of categorizing test items. We chose to classify exam questions according to Bloom's Taxonomy at the levels of knowledge, comprehension, application and analysis. The purpose of this study is to determine if student performance at the different cognitive levels change over time, and if so, how much time is required. We are classifying questions on all eight exams throughout a year-long sequence of an introductory anatomy and physiology class (N=130) taught by one of us (Rod Seeley). The exams consist of 50 questions with 20 questions (40%) at a knowledge level, 18 questions (35%) at a comprehension level, and 12 (25%) at an application analysis level. For data analysis we are employing a two-factor within subject ANOVA design to determine if there is a significant difference in student performance on questions at the different cognitive levels among the eight exams. To account for the variation in difficulty of content throughout the year, we are also administering non-content based critical thinking skills test to students in the beginning, middle, and end of the year. We are using the California Critical Thinking Skills Test (CCTST) produced by the California Academic Press. We intend to correlate the results of these tests with the data collected on the anatomy and physiology exams to determine if there is a relationship between student performance on higher-level exam questions and student ability as measured by the CCTST.

Student responses to internet supplementation of a human physiology course

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A website consisting of 18 modules was constructed for a two-semester course in Human Physiology (http://www.mroyal.ab.ca/-khoehn). Each module consisted of learning objectives, key terms, complete lecture outlines, links to selected sites on the internet and interactive java script-based quizzes. These modules were designed to enhance student learning by helping students review the organization of the course material and assess their command of that material. The practice quizzes allowed them to assess their knowledge, identify areas of weakness, and receive feedback that guided students to specific areas of the course or page of the text they needed to review. In addition, an area that students traditionally find particularly difficult, membrane physiology, was supplemented with a pretest, an interactive worksheet and a java simulating diffusion. After three months in the course, students were given an anonymous survey about the course website. Out of the 68 students enrolled in the course at that point, 60 completed the survey. Out of 60 students, 28 reported using the website frequently, 24 reported using it occasionally, 7 reported use only once or twice and one student had not visited the website. Students were asked, in an open-ended question, to identify the features of the website most useful to them. Quizzes, objectives, links, lecture outlines and news were identified by students as being the most useful features of the website, with 43, 28, 16, 14, and 9 students, respectively, identifying each of these features of the website. Students were also asked, in an open-ended question, what additional features they would like to see on the website. Features identified included, old midterms and finals (6 students), diagrams/interactive diagrams (4 students), more sample questions/practice exams (4 students), more multiple choice questions (2 students), and more worksheets (2 students). Overall, students' comments about the website were overwhelmingly positive and enthusiastic. For example, one student wrote, "I enjoy having the website as a good place for getting additional information and a good place for an overall view of what's happening."

Writing-to-learn: interpreting scientific findings to the general public

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An important step in the scientific process is communicating one's findings to peers, for review and possible verification or correction, and then with the public. This graded writing-to-learn exercise requires students to compare and contrast the content and style of a scientific journal article with that of a newspaper article based on the original journal article. In the exercise pairs of students study the assigned journal article and write their own newspaper article. After the students' newspaper article is submitted,
In a survey distributed to physical therapist assistant (PTA) programs in North Carolina, we found that faculty desire access to cadaver dissections to enhance the anatomy content in their curriculum. In a second survey, practicing PTAs also felt that access to cadavers while they were students would have aided in their ability to learn anatomy. Acting on the results of these surveys, we developed a service-learning student project that provided a teaching/learning experience for our physical therapy (PT) students while providing nearby PTA program students the opportunity to view cadaver dissections. Two PT students planned and presented three interactive anatomy lessons for students in the PTA program at Southwestern Community College. Topics included the shoulder joint, lumbar spine, and the hip joint. Each lesson covered basic anatomic principles, selected pathologies and related treatment options. A workbook containing pertinent information accompanied each lesson. Classroom activities were followed by a 30-minute study of related cadaver dissections. PTA students who attended the sessions were given pre- and post-tests to determine whether objectives had been met. Student evaluations provided important feedback about the quality and efficacy of each lesson. As part of the service-learning protocol, the PT student/presenters were asked to maintain a reflection log of the service-learning experience. Both the PTA student evaluations and the reflective log of the PT student/presenters indicated that this was a valuable learning experience for both groups.

The creation of an immuno-protective environment utilizing the testis-derived Sertoli cell

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The use of Sertoli cells may also have applications in other fields. These include gene therapy, nerve regeneration, and the treatment of local autoimmune diseases. The creation of transgenic large animal models for the production of human proteins has been well established. A potential use for Sertoli cells would be to create a transgenic large animal that expresses a protein such as Factor VIII or Factor IX. The Sertoli cells from these animals could then be isolated and implanted into people who have various blood disorders that require the constitutive production of these proteins. Other genetic based diseases could be corrected using this same approach. Drs. Paul Sanberg and Donald Cameron have demonstrated that Sertoli cells transplanted into the brain of rats with Parkinson-like symptoms show functional recovery. The hypothesis derived from these observed results is that the Sertoli cells produce trophic factors such as transforming growth factor beta, stem cell factor, and nerve growth factor that may stimulate the growth of new neurons in the brain. These are preliminary, but intriguing results. Finally, it has been demonstrated that Sertoli cells can protect against the rejection of islets in an autoimmune NOD mouse model. In this animal model, beta cells are destroyed by the mouse’s own immune system in a similar way to Type 1 diabetic patients. This antibody-mediated response appears to be blocked by the Sertoli cells. This discovery could lead to the use of these cells for other autoimmune diseases including arthritis.

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FAQs on Hosting a Regional Conference

Mary Bracken
Chair of the HAPS Regional Planning Committee

There has been a lot of interest expressed in hosting a local or regional conference by HAPS members. I had the opportunity to meet lots of people at the recent national conference in Charlotte. Some approached me with the intention of hosting a regional. Some people were hesitant to even consider such a project because they thought there was too much involved, or they didn’t know how to do it, OR they just never thought about it.

HAPS has a thirteen-page document with step-by-step directions on planning your own conference, as well as a suggested timeline. It has never been easier to host your own conference. Besides myself, there is your regional director and former hosts of conferences that can serve as mentors.

I took the opportunity to talk with former hosts of two regional conferences and have compiled their answers. Richard Faircloth of Maryland and Caryl Tickner and Cris Martin of Ohio provided their answers to some frequently asked questions concerning hosting a regional. I hope these help some of you who are considering a regional OR never thought about hosting one but will consider it now. My goal is to have a regional in each state of the U.S. and province of Canada.

Q. Where and when was your conference?

OH - Stark State College, Canton, Ohio, on February 28 and March 1, 1997. We had a 1 1/2 day conference which included three update speakers and four sessions of workshops, each containing four different choices. We provided a wonderful banquet, breakfast, lunch, and breaks. Our regional conference had ten vendor displays/sponsorships and approximately 100 attendees from six states!

Q. How much work is involved in planning a regional?
MD - We met each month for about a year prior to the conference.

OH - We began six months in advance and did things on a daily basis as they arose. Of course, the closer the conference date became, the more time we spent. The two of us did all of the planning and organizational duties for the conference. Since our conference spanned two days, it took a bit more prep time. The most time involved contacting vendors and soliciting sponsorship, constructing the program, and assembling the conference packets. We provided an attendee list, a certificate of completion, a HAPS position paper (Core Curriculum guide), information about HAPS membership and annual conferences and also sent out area shopping and sight-seeing information. It was a rewarding experience, and one we would do again, despite the time commitment.

Q. How many were on your committee?
MD - Eight or nine people, plus one member from the regional committee of HAPS by email.

OH - Two: Caryl Tickner and Cris Martin. We had additional help from adjuncts who manned the registration table the first afternoon. We were very organized, split up the tasks and were ready for the conference well in advance of the actual dates! A master plan followed by daily "to-do" lists allowed us to efficiently plan, organize and manage our conference.

Q. How did you select your speakers? How much did you pay them?
MD - We first selected a theme, such as sports medicine, and then contacted individuals at local universities and research hospitals who might be able to speak on the topics. It seems to me that we paid about $200. I'm not sure exactly since I don't have the paperwork handy. Dave Parker and Gail Jenkins were also on the committee. Gail was the chair of the committee.

OH - How to obtain speakers and workshop presenters was initially the most unnerving aspect, as we were not sure how or where to contact folks. Our worries proved to be unfounded. Once the initial mailing went out, many volunteered to present workshops. In addition, through talking with other educators, health-care providers in the area, and vendors, we were able to very quickly fill up the slots for our update sessions. As indicated above, universities, medical schools, hospitals, and city speakers' bureaus are all wonderful resources for speakers and workshop presenters. We had a professor at the local medical school perform a by-pass on one of our cadavers! We paid speakers $100 - and made sure that the checks were available to them immediately after their presentations.

Q. How did you do your budget? How did you know what to budget for, etc?
MD - We brainstormed everything on a list that we thought we needed. Our rep from the regional committee was helpful.

OH - We determined what we wanted to provide to conference attendees and then gathered pricing information from the caterers (for meals and breaks), the hotel, the shuttle from the airport (for those flying in), a t-shirt vendor (we had t-shirts designed and printed), and our college (for costs associated with security and janitorial services). From that information,

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we were able to develop a budget and know what to charge attendees. Obviously, some of the costs such as the hotel and shuttle were the responsibility of those who used the services and not all conference attendees.

Q. How much did you charge for registration?
MD - It seems to me that we had different levels depending upon when a person registered. We also had a cut-off date after which we could not guarantee the participant lunch. I think we charged around $45-50.

OH - We charged $55 for members and $60 for nonmembers. It was a great deal because we fed everyone generously.

Q. Did you have monetary support from vendors? the administration?
MD - Vendors paid for things like the breaks and breakfast. The administration provided the facilities, tables and security. We did not use the seed money provided by HAPS as I recall.

OH - The vendors were very generous in providing support for breaks and in providing door prizes. Our college provided facilities, security and janitorial services free-of-charge, even though it was included in our initial budget. Our college also picked up the costs associated with the various mailings and copying we had done. Our bookstore provided door prizes and our admissions office provided folders, pens, and pads for conference attendees. We did not need to use HAPS seed money.

Q. Would you do another regional conference?
MD - Absolutely! Many friendships were forged in the process. Sort of like a rite of passage.

OH - We were so excited about the turn-out and outstanding quality of the program that we hope to host a national conference in the future!

Q. What other issues do you think future hosts need to know?
MD - Start early. Try to involve your local textbook reps early; they may pay for some of the extras. If you are the chair of the steering committee, delegate, delegate, delegate and follow-up with progress at each of the monthly meetings. Keep your committee informed with e-mail. Knowing what was going on was invaluable.

OH - Use HAPS resources, specifically the Regional Conference Committee for help. All of us who have done regional conferences would be happy to provide answers to any of your questions. Look for local vendors as well as national vendors. Learn to keep track of the "minor" details (such as a potential lack of extension cords for vendors, in our case!) as they could become "major" problems! Your college can be a wonderful resource, too. Show it off!

My thanks go to Richard Faircloth, Caryl Tickner, and Cris Martin for their time in answering these questions. I hope these ideas will help. If you should have any other questions, please contact me.

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HAPS REGIONAL CONFERENCE
Human Anatomy & Physiology Society Regional Conference at
DELAWARE TECHNICAL AND COMMUNITY COLLEGE

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SATURDAY, MARCH 10, 2001

For information contact:
Ron Klopfen
Department of Biology & Chemistry
Delaware Technical & Community College
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Donations to the Robert Anthony Scholarship Fund

In honor of outgoing HAPS President Christine (Cris) Martin, the HAPS Board of Directors and Steering Committee have contributed a generous donation to the Robert Anthony Scholarship Fund. We thank Cris for the hundreds of hours (literally!) she has volunteered as HAPS President this past year. Her outstanding leadership abilities have resulted in significant positive changes for our organization. The Board and Steering Committee appreciate her tireless devotion to HAPS and look forward to her continued involvement.

Annual Conference on Teaching Case Studies in Science

October 6-7, 2000
University Inn & Conference, Buffalo, NY

Featuring: Mini workshops and panels on writing case studies and case teaching notes, small group learning, and teaching cases in science disciplines; poster session and “case swap;” speakers and facilitators from around the country.

For more information: http://ublib.buffalo.edu/libraries/projects/cases/conference.html

HAPS GRANTS and SCHOLARSHIPS

2001 Faculty and Student Grants

HAPS Faculty Members and Their Students

All proposals must be postmarked by February 1, 2001. Faculty applications will be grouped according to geographical regions represented by HAPS.

To request complete Call for Proposals or Grant Applications
Contact HAPS Grant and Scholarship Committee Chair:

Richard Faircloth at 410-541-2272
or e-mail at Rfaircloth@mail.aacc.cc.md.us
Robert L. Smoes  
Towson University  
8000 York Rd.  
Towson, MD 21252  
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When in Cleveland, Ohio, every A&P educator should visit The Health Museum of Cleveland. This modern, bright museum is designed to teach A&P, particularly to kids, but kids of any age could learn here. The theme of the “wonderful world of you” is developed in a layout that allows a self-guided tour through more than 150 very interactive audio-visual exhibits and displays. While there are several permanent exhibits, highlights of the museum include Juno, The Transparent Woman, The Giant Tooth, Come to Your Senses, Family Discovery Center, Growth and Development, and AIDS. Each is done with good anatomical accuracy (including all body parts of both sexes) but with discretion and scientific objectivity such that everything in the museum is appropriate for even fairly young elementary school children. Super-sized models are used throughout with good accuracy but not a lot of detail. Larger than life Juno (remember the “visible woman” kit?) is in the center of a theater with single system displays around the periphery. A system in Juno lights up as does that peripheral display and an audio tape gives a simple overview. The Giant Tooth is a huge walk-through model of two levels. The “senses” display was good. I felt the Growth and Development exhibit was superb and the large AIDS exhibit, while basic, was extremely sensitively and well done. This museum obviously has heavy use. As a result, syncing problems of audio with visual occurred, especially with the Juno exhibit. This should be only a minor distraction for HAPS members, and I expect that syncing requires constant attention anyway. There is a museum shop with a small selection of anatomical hoopla, including the usual system T-shirts, miniature models of bones, etc. The friendly staff was very helpful. If you are traveling with your kids, this is a great chance to show them just what you do every day after you leave home!!

The Health Museum of Cleveland is located at 8911 Euclid Avenue, just west of the University Circle area. The museum is open 9-5 M-F, 10-5 Sat. and 12-5 Sun. The general admission fee is $5.00 and the on-site parking lot is free. For more information: www.healthmuseum.org

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Thank You Nurse

by Richard Faircloth  
Anne Arundel Community College  
101 College Parkway  
Arnold, MD 21012  
May 22, 2000  

It is 5 am, my bed light comes on and a smile greets my morning. It is time to get ready for our trip downstairs.

Another smile greets me in preop, and another smile preps me for surgery.

A smile and a gentle touch on my forehead are the last things I remember.

A smile and a gentle touch on my forehead greet me as I awaken. I am on a respirator and cannot speak - fear grips me momentarily. Her gentle words and touch calm me: “You are doing great and are going to be just fine. Better than ever.”

The nurses never left my side for my entire eighteen-hour stay in cardiac surgical intensive care. They were my nurses.

For five more days my nurses encouraged me and pushed me to sit up, stand, walk, walk and walk some more. They monitored me and followed my doctors’ orders.

At the end of my twelve hours with atrial fibrillation, my nurse came running into my room waving my EKG strip in the air and joyfully exclaiming - “normal sinus rhythm - here’s a souvenoir for you.” She was more excited than I was.

My night nurses were especially comforting. They knew the psychological impact of what I had been through, six bypasses and the fear of being alone at night. I never felt that I was alone.

It was time to go home, when Blue Cross said it was time to go home, and my nurses gathered around to hug me goodbye and wish me God speed.

My home health nurse supported me for about a week before setting me free or rather weaning me off all of the TLC.

To all the nurses...“Never stop caring and never stop smiling.” Thank you from all of the patients out there and especially from me.
HAPS COMMITTEES AND BOARDS

Have you ever wondered where you could obtain a standardized anatomy and physiology test? Or maybe you are thinking about an educational project and are looking for funding? Do you feel strongly about a particular issue and would appreciate an opportunity to discuss it with other HAPS members? The following committee chairs invite input from HAPS members and willingly provide information on the activities of their committees.

ANIMAL USE COMMITTEE
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A three-year plan includes widely distributing the HAPS policy statement, developing animal use internet links on the HAPS Home Page, monitoring relevant legislation, and creating a resource packet for HAPS members. Suggestions and questions from members are welcome.

COMPETENCY TESTING COMMITTEE
Sam Drogo, Chair
Mohawk Valley Community College
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Utica, NY 13501
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drogo@mavcc.edu

This committee recently completed and tested an approved HAPS Standardized Test for Human Anatomy and Physiology. Any HAPS member may obtain a copy of the test by writing to the Chair.

CORE CURRICULUM AND ASSESSMENT COMMITTEE
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This committee has developed a second, revised edition of the HAPS "Human Anatomy and Physiology Course Guidelines." The second edition includes new guidelines relating specifically to the laboratory component of the course.

HAPS-EDUCATOR EDITORIAL ADVISORY BOARD
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Members of the HAPS-Educator Editorial Advisory Board provide advisory and support services to the HAPS-Educator editor such as writing articles and proofreading the final draft of the HAPS-Educator before it goes to press.

GRANTS AND SCHOLARSHIPS COMMITTEE
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This committee is responsible for reviewing all grant and scholarship proposals, selecting proposals to receive funding, and submitting its recommendations to the Board of Directors for approval.

MEMBERSHIP COMMITTEE
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Committee members assist the Chair with recruiting members and compiling membership information.

NOMINATING COMMITTEE
William Perrotti
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The committee chair is always the current President-Elect. The responsibility of the committee is to recruit nominees for the elected offices and appointed positions of the HAPS organization.

ANNUAL CONFERENCE COMMITTEE
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The primary responsibilities of this committee are development of a standardized fees structure for the annual conference, formulation of guidelines and assistance for the conference coordinator, and generation of a calendar of conference sites.

REGIONAL CONFERENCE COMMITTEE
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The committee provides mentoring assistance to coordinators of regional conferences. Anyone interested in hosting a regional conference should contact the Chair.

TECHNOLOGY COMMITTEE
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The committee monitors and reports on technological changes influencing anatomy and physiology teaching, such as advances in instructional software and data acquisition equipment.

DISTANCE LEARNING POLICY COMMITTEE
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This committee is responsible for developing and distributing a HAPS position paper on distance learning.

SAFETY COMMITTEE
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The Safety Committee is developing standards for safety in the laboratory.

CADAVER USE COMMITTEE
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The goals of this committee are to develop guidelines for use of cadavers in anatomy and physiology instruction.