Saturday, April 26

8:00 am – 10:00 am – Room 7B
Advancing Your Career through Social Networks
Chair: David Mills (Louisiana Tech Univ.)

Social media tools and websites offer a powerful way for scientists to boost their professional profile and act as a public voice for science. These Internet vehicles are becoming obligatory for career success and lack of an online presence can severely limit a researcher's visibility. Scientists are increasingly using social media as a way to share journal articles, advertise their thoughts and scientific opinions, post updates from conferences and meetings, and circulate information about professional opportunities and upcoming events. The scientist has the opportunity to leverage one or all of their digital assets — blog, podcast, social networking sites, and science portals — to establish an online identity and enable people to discover and connect with you. The web can make your science speak to a larger audience by making your research more visible to the public and fellow researchers, provide opportunities for extending the reach of your lab’s science, and bring you useful information, ideas, and even scientific allies.

The workshop will identify and distinguish between the different social media formats and social networking sites for engineers and scientists. It will show participants how to develop a web presence, how to select the right tools, and use social media to advance their own careers. In our interactive component, we will review "case study" examples and analyze them for best practices and errors to avoid. Each participant will learn how to conduct a situational analysis, figure out exactly what your personal brand is, select the best social media tools to connect with your audience, build your online presence and finally, market your brand for advancing your science.

Mary Canady (Comprendia LLC and San Diego Biotechnology Network)
Importance of Scientific Social Networks
Jenna Carpenter (Louisiana Tech Univ.)
The Role of Networking and Social Media in Career Advancement
David Mills (Louisiana Tech Univ.)
Key Science Networking Sites and How They Work
Case-based Studies and Group Discussion

10:30 am – 12:00 pm – Room 7B & 8
Individual Growth and Career Planning
Chairs: Michael Lehman (Univ. of Mississippi Medical Center) & Linda May (East Carolina Univ.)

This session will help you understand the importance of social networking in your career advancement. The presentations will further describe the details of how best to utilize the social networking in your career. Panel discussions and interactions are encouraged and will help each participant to begin or enhance their personal career planning.

Individual Growth and Career Planning for Graduates and Post-docs
Philip Clifford (Medical College of Wisconsin) & Cynthia Fuhrmann (Univ. of Massachusetts Medical School)

Individual Growth and Career Planning for New Faculty – Got My First Faculty Job—Now What?
Richard McGee (Northwestern Univ. Feinberg School of Medicine)

12:00 pm – 1:00 pm – Room 10
Career Networking Lunch

Join us at the Career Networking lunch to continue the conversation over an informal lunch with career advisors and mentors. Sign up in advance at https://www.surveymonkey.com/s/F5MYD9Y (maximum attendance is 50 people)
1:30 pm – 3:00 pm – Room 7B
Langman Graduate Student Platform Award Session
Chair: Jason Mussell (LSU Health Sciences Center)

- Rushita Bagchi (Institute of Cardiovascular Sciences)
  Regulation of cardiac fibroblast population and cell fate by Scleraxis
- Bhavisha Bakrania (Griffith Univ.)
  Bilirubin loading of the heart: a novel treatment for ischemia-reperfusion injury
- Holly Tamski (Marshall Univ. Joan C. Edwards School of Medicine)
  Validation of a unilateral heating model to increase hindlimb length in growing mice
- Shannon Kesl (Morsani College of Medicine, Univ. of South Florida)
  Sustaining dietary ketosis to improve blood flow and wound healing in young and aged Fisher rats
- Soo Ahn (Queen’s Univ.)
  Interleukin-17A expression in endometriotic tissue and plasma samples from women with endometriosis
- Phillip Wong (Roseman Univ. of Health Sciences)
  The role of TGFβ1 and HTRA1 in the pathogenesis of TMJ osteoarthritis

2:00 pm – 4:00 pm – Room 9
Bioflyers: Anatomy of Animal Flight
Chair: Michael Habib (Univ. of Southern California)

Animal flight, especially powered flight, has long been considered a key evolutionary transition in animals. Flying animals are remarkably diverse and widespread: they include the most species-rich group of living animals, the most widespread vertebrate species, and some of the most numerous living animals. The behavior and anatomy of flying animals can provide critical insights regarding major evolutionary transitions, biological materials, and the limits of animal performance. This session will feature presentations on the evolution and biomechanics of flight in animals, with a focus on key anatomical adaptations. Major topics will include: the origin of aerial behavior in insects, performance estimates for the largest animal flyers in Earth’s history, the biomechanics of feathers, and the origin and ontogeny of avian body plans.

  - Robert Dudley (Univ. of California, Berkeley)
    Arthropod aloft: The anatomical and biomechanical origins of aerial behavior
  - Ashley Heers (Univ. of Montana)
    Building a bird: ontogenetic and evolutionary construction of the avian body plan
  - Michael Habib (Univ. of Southern California)
    Giant Pterosaurs and the Limits of Animal Flight
  - Justin Hall (Univ. of Southern California, Lost Angeles County Museum of Natural History)
    The Aerodynamics of Feather Asymmetry and Implications for Paravian Flight

2:00 pm – 4:00 pm – Room 8
Energizing Your Educational Scholarship
Chair: Rebecca Lufler (Tufts Univ. School of Medicine)

With decreased basic science research funding and increased interest in educational research, this session will highlight how to create robust and publishable scholarly work from your everyday work. The speakers will introduce you to hot topics in medical education research and help direct your educational research questions through stages of planning toward publication. By the end of the session, attendees will be able to identify their own educational research interests, formulate feasible research questions, identify the appropriate steps to conducting research, develop assessments to produce learning outcome data, and analyze the data to turn into a publishable paper.

  - Sebastian Uijtdehaage (David Geffen School of Medicine at UCLA)
    Energizing Your Educational Scholarship: What Are the Hot Topics?
  - Nicole Borges (Boonshoft School of Medicine, Wright State Univ.)
    Developing Research Questions and Designing Studies for Your Scholarly Activities in Medical Education
  - Patricia O’Sullivan (Univ. of California San Francisco)
    Creating a Roadmap for Educational Scholarship
2:00 pm – 4:00 pm – Room 7A
Cardiovascular Biology Platform Session
Chair: Eduard Dedkov (New York Institute of Technology)

Alexandra Ysasi (Brigham and Women’s Hospital)
Sequence of vascular patterning and gene transcription in the chick chorioallantoic membrane
Keerthi Harikrishnan (Medical Univ. of South Carolina)
Fibulin-1 suppresses EMT and apoptosis during semilunar valve morphogenesis
Rushita Bagchi (Institute of Cardiovascular Sciences)
Regulation of cardiac fibroblast population and cell fate by Scleraxis
Janeil Belle (Brigham and Women's Hospital)
Micromechanical forces regulate vascular patterning in the chick chorioallantoic membrane
Yulia Lipovka (Univ. of Arizona)
Estradiol activates AMPK through interaction with extrogen receptor beta
Ashlie Riley (Univ. of South Carolina School of Medicine)
Aortopathy: a developmental defect with adult pathology?
Katherine Holzem (Washington Univ. in St. Louis)
Mitochondrial respiratory capacity is not markedly reduced in end-stage human heart failure
Corey Mjaatvedt (Medical Univ. of South Carolina)
Adverse cardiac remodeling mediated by the altered expression of versican

3:15 pm – 4:45 pm – Room 7B
Postdoctoral Platform Award Session
Chair: Benjamin Auerbach (The Univ. of Tennessee)

Kristen Lauing (Univ. of Chicago)
The role of aggregcan in embryonic growth plate cytoarchitecture and differentiation: a rescue model
Foteini Hassiotou (The Univ. of Western Australia)
Breastmilk stem cell transfer from mother to neonatal organs
Ashley Hammond (Univ. of Missouri)
Can morphological variables be used to predict hip joint function? An examination of the anthropoid proximal femur and range of abduction
Baojin Ding (Univ. of Massachusetts Medical School)
Auto-regulatory interactions between NFI occupancy and ETV1 direct the timing of gene expression in late maturing neurons
Payam Gharibani (Johns Hopkins School of Medicine)
Using of oligodendrocyte progenitors from integration-free human induced pluripotent stem cells in treatment of spinal cord injury
Chelsea Bahney (UCSF)
Transdifferentiation of hypertrophic chondrocytes during endochondral bone repair by activation of pluripotent stem cell programs

4:30 pm – 6:30 pm – Room 9
Form, Function and Evolution Platform Session
Chair: Valerie DeLeon (Johns Hopkins School of Medicine)

Heidi Schutz (Pacific Lutheran Univ.)
Differential morphological responses to selection for high voluntary wheel running in the scapula and os coxae of mice
Virginia Naples (Northern Illinois Univ.)
What put the “slink” in a saber cat? Scapular and pelvic adaptations enhance stealthy stalking behavior in Smilodon fatalis
Frank Ruhli (Centre for Evolutionary Medicine)
Assessing bone and soft tissue morphology of the scapula region: a cadaver dissection-based study to improve uncemented glenoid metalback fixation
Ali Nabavizadeh (Johns Hopkins Univ. School of Medicine)
Jaw muscle reconstruction and vector analysis in ornithischian dinosaurs
Casey Holliday (Univ. of Missouri)
Modeling cranial biomechanics in archosaurs using 3D computational methods
Samuel Márquez (SUNY Downstate Medical Center)
Examining the upper respiratory tract of Neanderthals and other later Pleistocene human fossils: analysis of form and function
Bernadette de Bakker (Academic Medical Center)
Development of the hyoid-larynx complex and its variants: significance for clinical and forensic studies
Joy Reidenberg (Icahn School of Medicine at Mount Sinai)
Trachea in cetacea: the inside story

4:30 pm – 6:30 pm – Room 8
Interprofessional Education in the Anatomical Sciences (Hybrid Symposium)
Chair: Mary Bee (Oakland Univ. William Beaumont School of Medicine/UDM)
The strength of our medically trained students will only be as great as their ability to work with other members of the health care team. One of the top priorities as educators should be providing our students opportunities to have meaningful interactions with other health professionals as they learn about topics in medicine. This type of collaborative learning is known as Interprofessional Education (IPE). The importance of IPE in health professional curricula will be emphasized. Speakers will describe innovative programs and provide insight on how we can reshape basic science anatomy education. Highlighted examples of IPE include nearly every health care profession in both lecture and especially laboratory settings. The majority of faculty and students are eager to incorporate IPE in their curriculum and are aware of the necessary trust and respect that is integral to this approach, especially when providing constructive feedback.

Darrell Kirch (Association of American Medical Colleges)
Importance of Interprofessional Approaches in Medical Education
Bruce Wainman (McMaster Univ.)
Is Anatomy Dissection Effective IPE?
Andrew Palombella (McMaster Univ.)
Dissecting through Barriers: Interprofessional Education, Problem-based Learning, and Gross Anatomy
Anne Titelbaum (Univ. of Arizona College of Medicine Phoenix)
Sowing the Seeds of Integrative Health Care: Implementation of an Interprofessional Anatomy Curriculum for First Year Students
Terin Euerle (Mayo Clinic)
Designing an Interprofessional Learning Curriculum for Medical and Physical Therapy Students in Gross Anatomy Curriculum
Jared Dowdy (Medical College of Georgia at Georgia Regents Univ.)
Peer Feedback among Interprofessional Allied Health Students in the Anatomy Lab

4:30 pm – 6:30 pm – Room 7A
Collateral Vessels: Recent Insights into Mechanisms and Clinical Significance
Chair: Robert Tomanek (Univ. of Iowa)
Recent data indicate that: 1) growth of collateral vessels can be stimulated by several approaches including reprogramming of cells and mechanical stimuli, 2) mechanisms regulating collateral growth differs in brain, leg and heart and 3) growth and remodeling of collateral vessels plays a key role in survival after stroke, myocardial ischemia and infarction, and protects against peripheral vascular disease. This symposium will review the cellular and molecular events that comprise collateral vessel formation and remodelling (Robert Tomanek). The second talk will focus of reprogramming of cells and the therapeutic potential of this approach (William Chilian). James Faber will discuss the genetic basis for collateral growth in brain, leg and heart and why mechanisms are not uniform in the
three. Finally Christian Seiler will present evidence that coronary collaterals increase survival in patients with coronary artery disease.

**Robert Tomanek** (Univ. of Iowa)
Cell and Molecular Events Comprising Collateral Vessel Development and Remodeling

**William Chilian** (Northeast Ohio Medical Univ.)
Reprogramming Cells and their use in Regenerative Therapy

**James Faber** (Univ. of North Carolina)
Genetic Determinants of the Native Collateral Circulation

**Christian Seiler** (Univ. of Heidelberg)
Therapeutic Induction of Arteriogenesis in Humans

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5:00 pm – 6:30 pm – Room 7B

**AAA Educational Research Platform Award Session**

*Chair: Patrick Nahirney* (Univ. of Victoria)

**Syed Haris Ali** (Univ. of North Dakota)
Quality of MCQ-based Exams: Why Functioning Distractors Matter

**Samuel Gottlieb** (Medical College of Georgia at Georgia Regents Univ.)
Student peer teaching in the anatomy lab enhances anatomy performance in the lowest quartile of allied health students

**Erin Fillmore** (Indiana Univ. School of Medicine)
Understanding anatomical competence: Perceptions of residents and program directors using a mixed methods survey

**Leah Labranche** (Western Univ.)
Tetris as homework: does videogame training improve spatial anatomy comprehension?

**Zulianna Ibrahim** (Western Univ.)
Introducing and evaluating competency-based teaching in Rwandan teaching hospitals - a student v. teacher perspective

**Pierre Lapaine** (Western Univ.)
Video game and mental rotation training improve Spatial Anatomy Task scores

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7:00 pm – 8:00 pm – Coronado Room (Marriott)

New Member & 1st Time Attendee Welcome Reception

7:00 pm – 8:00 pm – Cardiff Room (Marriott)

AACBNC Reception

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**Sunday, April 27**

**Mini Meeting I**

**Signaling by Natural and Engineered Extracellular Matrix Mini Meeting**

*Co-sponsored by The Anatomical Record*

*Chairs: Rocky Tuan* (Univ. of Pittsburgh School of Medicine) & *Charles Little* (Kansas Univ. Medical Center)

This mini-meeting, consisting of 4 separate sessions, will explore how cells and tissues respond to the physical structure and biological properties of natural and engineered extracellular matrices. The presentations will show how interplay and 'dynamic reciprocity' between cells and their surrounding ECM scaffold/template play a pivotal role in the formation of new organs and tissues.

**Plenary Session**

8:00 am – 10:00 am – Room 8

**Biology of Matrix Function in Development and Diseases**

**Celeste Nelson** (Princeton Univ.)
Matrix-mediated Mechanical Regulation of Tissue Morphogenesis

**Penney Gilbert** (Univ. of Toronto)
The Aging Muscle Stem Cell Niche as a Therapeutic Target

**David Cheresh** (Univ. of California San Diego)
Tumor Progression Induced by Integrin αvβ3 Mediated Anchorage-dependent and -independent Signaling

**10:30 am – 12:00 pm – Room 9**

**Biological and Physical Principles of Matrix-Guided Tissue Engineering**

**Kevin Healy** (Univ. of California, Berkeley)
Biophysics and Dynamics of Bioinspired Stem Cell Microenvironments

**Jennifer Eliseeff** (Johns Hopkins Univ.)
Biomaterial Scaffolds in Regenerative Medicine

**Rocky Tuan** (Univ. of Pittsburgh)
Biomimetic Scaffolds and Natural Matrices for Stem Cell-based Tissue Engineering and Modeling

**12:15 pm – 1:45 pm – Exhibit Hall**

**Poster Session viewing time**

Anatomy Education
Cell Biology
Development & Growth
Cardiovascular Biology

**2:00 pm – 4:00 pm – Room 9**

**Customized Matrices for Tissue Engineering**

**Michael Detamore** (Univ. of Kansas, Lawrence)
‘Raw Materials’ in Tissue Engineering

**Lucie Germain** (Centre LOEX de l'Université Laval)
Tissue-engineered Extracellular Matrices for 3D Tissue Modeling and Clinical Applications

**Miqin Zhang** (Univ. of Washington)
Aligned Polymer Nanofibers for Tissue Engineering

**Ali Khademhosseini** (Wyss Institute at Harvard)
Microengineered Hydrogels for Tissue Engineering

**4:30 pm – 6:30 pm – Room 9**

**Tissue Engineering and Regenerative Medicine Platform Session**

*Chair: Ralph Marcucio* (Univ. of California, San Francisco)

**Svenja Hinderer** (Fraunhofer IGB)
In vitro elastogenesis

**Nicolas L'Heureux** (Cytograft Tissue Engineering, Inc.)
Cell-synthesized extracellular matrix particles for tissue engineering and aesthetic applications

**Eliska Krejci** (1st Faculty of Medicine)
Cellular and molecular characteristics of neonatal skin: consequences for healing

**Abdulwahab Noorwali** (King Abdulaziz Univ.)
Therapeutic effects of mesenchymal stem cells on hepatocellular carcinoma: tracking of cells using iron oxide nanoparticles

**David Mills** (Louisiana Tech Univ.)
Biocompatibility of halloysite clay nanotubes in a rat dermal model

**Johnny Yang** (California State Univ., San Bernardino)
Cardiac regenerative capacity of the American alligator

**Chelsea Bahney** (UCSF)
Endochondral bone tissue engineering: using cartilage to drive vascularized bone regeneration

**Robert Bennett** (Brigham & Women's Hospital)
Glycoconjugate expression in the extracellular matrix of the mouse lung

10:00 am – 12:00 pm – Room 10
Anatomy Education Roundtable - Designing Assessment for Learning: Leave with One in Hand
Chair: Jennifer McBride (Cleveland Clinic Lerner College of Medicine)

Bring your assessments for conversion! Are the assessment tools you use evaluating evidence of learning or evidence of achievement? In this session, Patricia O’Sullivan will discuss the foundation for assessing student learning and describe a process of creating assessments with this goal in mind. Participants will then have the opportunity to work on modifying their own assessments and discuss changes with other attendees. The session will wrap up with dialogue on the future challenges facing approaches to student assessment.

Patricia O’Sullivan (Univ. of California San Francisco)

10:30 am – 12:00 pm – Room 7B
Advances in Neuroimaging: Linking Structure and Function toward the Connectome
Chair: Todd Parrish (Northwestern Univ.)

Magnetic resonance imaging has revolutionized the way we are able to visualize the human brain in vivo by providing tremendous soft tissue contrast with high spatial and temporal resolution. Developments in hardware and pulse sequence design have moved MRI from static structural images towards physiologic imaging. Two examples of this are sensitivity to blood oxygen levels and visualization of microscopic water movement. The former has advanced neuroscience with fMRI and resting state connectivity. The latter is known as diffusion imaging which has improved acute stroke imaging and is used to study white matter connectivity. Cutting edge methods of each will be discussed.

Darren Gitelman (Northwestern Univ.)
What Makes Connections Effective? An Introduction to Model-based Measures of Brain Connectivity
Tom Liu (Univ. of California San Diego)
Resting-state Functional Connectivity of the Brain
Joe Zhou (Univ. of Illinois at Chicago)
Probing Tissue Microstructures Using Diffusion MRI

2:00 pm - 4:00 pm – Room 8
Workshop: How to Include Ultrasound in your Anatomy Course
Chair: Geoffrey Guttmann (Univ. of North Texas Health Science Center)

Attendees will be introduced to the principles of ultrasound, the ultrasound machine and probes, and some approaches to applying ultrasound imaging in the anatomy lab. Attendees will have an opportunity to use ultrasound to obtain images relevant to the thyroid, wrist, liver and gallbladder, which would give one experience with the common probes being used in ultrasound clinics. A demonstration will precede the ultrasound activity. Attendees will work in groups and use the ultrasound machine on each other. There will also be a demonstration of an application of ultrasound imaging for treatment purposes or approaches.

Geoffrey Guttmann (Univ. of North Texas Health Science Center)
Vaughn Lee (Texas Tech Univ. in Lubbock)
Thomas Clark (MSKUS)

2:00 pm – 4:00 pm – Room 7B
Getting Nervous about the Immune System
Chair: Keith Kelley (Univ. of Illinois)

The brain gets nervous in response to infections, leading to activation of central neuronal circuits that cause physiological changes to promote homeostasis. Neuroendocrine stress responses were the first to be identified following peripheral insults, but now it is known that other systems are regulated that control appetite, fever, sleep, cognition, pain and mood. Even in the absence of an infection, cerebrospinal fluid and probably antigen-presenting cells in the subarachnoid space drain into cervical lymph nodes, thereby informing the immune system about what is happening in the brain. This symposium features international experts who are leading the way in defining afferent and efferent neural, humoral and cellular communication pathways between the immune system and brain.
Roxanna Carare (Univ. of Southampton)
Afferent and Efferent Immunological Pathways of the Brain. Anatomy, Function and Failure

Kevin Tracey (Feinstein Institute for Medical Research)
Nerves and Immunity: Reflexes in Immunological Homeostasis

Linda Watkins (Univ. of Colorado-Boulder)
Targeting Glial Activation for Treating Chronic Pain and Improving Opioid Efficacy

Andrew Miller (Emory Univ.)
Cytokine Targets in the Brain: Impact on Neurotransmitters and Neurocircuits

2:00 pm – 4:00 pm – Room 7A
Excellence in Canadian Research – Cancer Biology
Sponsored by the Canadian Association for Anatomy, Neurobiology & Cell Biology

Chair: Michael Kawaja (Queen’s Univ.)

Charles Graham (Queen’s Univ.)
Mechanisms of Hypoxia-induced Immune Escape in Cancer and their Regulation by Nitric Oxide

Amina Zoubeidi (Univ. of British Columbia)
Treatment Resistance in Prostate Cancer: Rationale of Combination Therapy

Russell Jones (McGill Univ.)
Metabolic Control Points in Cancer

Christopher Nicol (Queen’s Univ.)
Stromal PPARγ Protects Against Breast Tumourigenesis

4:30 pm – 6:30 pm – Room 8
An Integrated Medical Curriculum: Successes and Pitfalls across Disciplines
Chair: Judith Venuti (Oakland Univ. William Beaumont School of Medicine)

For the first time, we have planned a multi-society symposium to discuss the successes and pitfalls of an integrated medical school curriculum. The session will include invited speakers from the American Association of Anatomist (AAA), Association for Psychological Science (APS), American Society for Investigative Pathology (ASIP), and American Society for Pharmacology and Experimental Therapeutics (ASPET). They will discuss how they have integrated their disciplines (Anatomy, Physiology, Pathology and Pharmacology, respectively) into the medical school curriculum at their schools.

Kelly Dowhower Karpa (Pennsylvania State Univ. College of Medicine)
Creating a Virtual Pharmacology Curriculum in a PBL-Intensive, Integrated Learning Environment

Herb Janssen (Texas Tech Univ. Health Sciences Center)
Integrating Physiology into a Scheme-based Curriculum

Andrew Lichtman (Harvard Medical School)
Integrating Pathology Education: Current Practice and Coming Changes at Harvard Medical School

Carol Nichols (Medical College of Georgia at Georgia Regents Univ.)
Teaching Anatomy in an Integrated Medical Curriculum: Getting to the Heart of the Matter

4:30 pm – 6:30 pm – Room 7B
Neurobiology Platform Session
Chair: Joseph Cheatwood (Southern Illinois Univ. School of Medicine)

Erika Gyengesi (Univ. of Western Sydney)
Can you believe what you see: evaluation of choline acetyl transferase (ChAT) expression in the ChAT-eGFP transgenic mouse

Judith Alawa (Ahmadu Bello Univ.)
Morphology of Golgi stained neurons in spinal cord of African giant pouched rat Cricetomys gambianus

Waterhouse

Diana Sarko (Edward Via College of Osteopathic Medicine)
The neurobiology of predation: sensory adaptations to carnivory

Payam Gharibani (Johns Hopkins School of Medicine)
Using of oligodendrocyte progenitors from integration-free human induced pluripotent stem cells in treatment of spinal cord injury
**Makini Duval** (Florida A&M Univ.)

The antioxidant effects of thymoquinone in lipopolysaccharide-activated BV2 murine microglia cells
**Mark Hughes** (Univ. of Edinburgh)

Patterning neuronal networks on photolithographically-defined parylene:silicon substrates
**Rena Meadows** (Indiana Univ. School of Medicine)

Electrical stimulation enhances functional recovery after sciatic nerve injury
**Lisa Nevell** (Wayne State Univ. School of Medicine)

Adaptive evolution of cis-regulatory regions among genes dynamically expressed in the juvenile human cortex

6:30 pm – 7:30 pm – West Terrace
AAA Welcome Reception

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**Monday, April 28**

**Mini Meeting II - Organogenesis: The Anatomy of Development, Disease Pathogenesis, and Regeneration Mini Meeting**

*Co-sponsored by Developmental Dynamics*

The second mini-meeting focuses on Organogenesis. Organized into a mini-meeting format, are four sessions that focus on the molecular control of cell types and organ size; specification of organs in males versus females; the etiology and pathogenesis if organ cancer; and the role of natural and induced stem cells in organ repair and regeneration. The Organogenesis mini-meeting is spearheaded by a keynote presentation from Dr. Andy McMahon.

8:00 am – 10:00 am – Room 8

**Organogenesis Plenary Session – Stem Cells and Regeneration**

*Chairs:* **Parker Antin** (Univ. of Arizona and Editor Developmental Dynamics)

- **Mark Mercola** (UC San Diego/Sanford-Burnham Medical Research Institute)
- RNA and Small Molecule Probes of hiPSC-Cardiomyocyte Differentiation and Physiology
- **Xin Sun** (Univ. of Wisconsin, Madison)
- Genetic Control of Upper Airway Patterning
- **Matthias Hebrok** (UCSF Diabetes Center)
- Generation of Insulin-producing Cells from Human Stem Cells

10:30 am – 11:30 am – Room 8

**Organogenesis Keynote Presentation - The Anatomy of Development, Disease Pathogenesis and Regeneration**

**Andrew P. McMahon, Ph.D.** (Keck School of Medicine, University of Southern California)

Keynote Speaker, Dr. Andy McMahon is the W. M. Keck Professorship of Stem Cell Biology and Regenerative Medicine at the University of Southern California. He is a pioneer in mammalian developmental biology and renowned for his contributions to understanding the cell signaling mechanisms that govern embryogenesis. Dr. McMahon’s research has focused for many years on the assembly, repair, and regeneration of the kidney as part of a long term goal to translate basic research into improved treatments for human disease.

2:00 pm – 4:00 pm – Room 9

**Organogenesis Symposium – Development and Disease Pathogenesis**

*Co-sponsored by AAA Fellows Circle*

*Chair:* **Kathryn Jones** (Indiana Univ. School of Medicine)
Debbie Yelon (Univ. of California San Diego)
Controlling the Dynamics of Differentiation: Regulation of Cardiac Outflow Tract Assembly

Randy Johnson (MD Anderson Cancer Center)
Genetic Analysis of the Hippo Signaling Pathway in Mammalian Liver Development and Disease

Blanche Capel (Duke Univ. Medical Center)
The Battle of the Sexes

Michael Shen (Columbia Univ.)
Epithelial Cell Lineage Specification during Prostate Organogenesis and Regeneration

4:30 pm – 6:00 pm – Room 9
Organogenesis Symposium - The Molecular Basis of Gastrointestinal Disease (Hybrid Symposium)
Co-sponsored by AAA’s Advisory Committee for Young Anatomists
Chair: Julian Guttman (Simon Fraser Univ.)

Michael Gershon (Columbia Univ.)
Quiet But Powerful: The Role of the Enteric Nervous System in the Pathophysiology of Gastrointestinal Disease

Roeland Buckinx (Univ. of Antwerp)
Differential Expression of Corticotropin Releasing Factor and Urocortins in the Schistosoma mansoni-infected Mouse ileum

H.T. Law (Simon Fraser Univ.)
A Mass Spectrometry-based Proteomics Approach to Identify Novel Host Proteins in Enteropathic E. coli Pedestals

12:15 pm – 1:45 pm – Exhibit Hall
Poster Session viewing time

Anatomy Education
EB Teaching
Neurobiology
Muscle
Stem Cells
Bioengineering
Wound Healing

2:00 pm – 4:00 pm – Room 8
Anatomy Education Platform Session 1: Innovative Teaching Methods
Chairs: Anna Edmondson (Georgia Health Sciences Univ.) & Michelle Lazarus (Penn State College of Medicine)

Stefanie Attardi (Western Univ.)
Mixed methods evaluation of an online undergraduate systemic human anatomy course with laboratory

Marc Pizzimenti (Univ. of Iowa)
Individual and group performance during an interactive lecture: anatomy of a session

Claudia Krebs (Univ. of British Columbia)
Flipping the neuroanatomy labs: how the production of high quality video and interactive modules changed our approach to teaching

Fantley Smither (Mayo Medical School)
The mini ultrasound institute: does incorporating ultrasound in the anatomy curriculum increase students’ understanding of living anatomy and comfort with new technology?

Samuel Gottlieb (Medical College of Georgia at Georgia Regents Univ.)
Student peer teaching in the anatomy lab enhances anatomy performance in the lowest quartile of allied health students

Danielle Bentley (Univ. of Toronto)
Development of lifelong learning strategies using inquiry guided learning projects in a first year anatomy course
Inflammation: At the Crossroads of Regeneration and Repair

Chair: Traci Wilgus (The Ohio State Univ.)

Inflammation is prominent during the repair of adult tissues. It is meant to be a protective response, with inflammatory cells functioning to prevent infection, clear debris, and produce growth factors and cytokines that promote healing. However, inflammation can prevent complete tissue regeneration, in part by promoting scar formation/fibrosis. In addition, persistent inflammation resulting from either uncontrolled stimulation or a blockade in resolution can contribute to the development of chronic, non-healing wounds. Speakers in this symposium will discuss new findings on the regulation of inflammation following tissue injury and the mechanisms by which inflammation influences healing outcomes (regeneration versus repair).

Anthony Mescher (Indiana Univ.)
Inflammation and the Capacity for Organ Regeneration

Traci Wilgus (The Ohio State Univ.)
Inflammation and the Regulation of Repair Responses in Developing Skin

Matthew Hardman (The Univ. of Manchester)
Microbiome, Host Response and Wound Healing

Sashwati Roy (The Ohio State Univ.)
Micromanaging Inflammation and Tissue Repair

Unexpected Morphological Consequences of Highly Specific Genetic Alterations

Chair: Amy Merrill (Univ. of Southern California)

How do the actions of individual genes contribute to development of complex anatomical structures? Scientists have persistently pursued this fundamental question by examining how gene mutations, provoked either by nature or design, cause dysmorphology. While these gene mutations can be unique or rare, uncovering their morphological consequences can expose previously unknown mechanisms that push the boundaries of existing molecular dogma. This session is dedicated to highlighting recent examples of such studies. Towards this goal, the speakers will share with us how their initial observation of abnormal morphology is pioneering new paradigms in the fields of genetics, cell and developmental biology.

Matthew Warman (Harvard Medical School & Boston Children's Hosp.)
Human Malformations Caused by Somatic Mosaic Activating Mutations Affecting the PI3 Kinase Pathway

Brendan Lee (Baylor College of Medicine)
Unexpected Genotype-phenotype Associations in Bone Dysplasias Driven by Whole Exome Sequencing

Maria Barna (Stanford Univ.)
Specialized Ribosomes: A New Frontier in Gene Expression and Organismal Development

Amy Merrill (Univ. of Southern California)
An Unexpected Nucleolar Role for FGFR2 in Development and Disease

Keep Students Coming to Anatomy Class! – How to Integrate Online Teaching tools into Formal Didactics to Optimize Classroom Efficiency and Interest

Chair: Adam Fisch (Indiana Univ. School of Medicine)

In an era in anatomy education when there is decreased contact time with students, when students often choose self-directed learning over classroom didactics, and when institutions frequently mandate the use Online Resources in educational curricula, it is imperative that professors have a keen knowledge of what tools are available to help them maintain an Active, Clinically-relevant classroom that meets the Mobile demands of its students. Through this
symposium, the audience will learn about the recent Big Shifts in Anatomy Education from Dr. Patricia Wade and about the Online Resources available in Gross Anatomy and Histology from Dr. Jonathan Wisco and in Neuroanatomy from Dr. Adam Fisch. At the conclusion of the symposium, the audience should understand Online Technology’s potentials and pitfalls, and how it can be used to keep anatomy education active, clinically-relevant, and exciting, so that students continue to come to class!

**Patricia Ann Wade** (Indiana Univ. School of Medicine)
Big Shifts in Anatomy Education

**Jonathan Wisco** (Brigham Young Univ.)
Necessity is the Mother of Educational Innovation: A Journey of Discovering and Developing Electronic Pedagogical Tools for Gross Anatomy and Histology

**Adam Fisch** (Indiana Univ. School of Medicine)
Neuroanatomy Education – Tools to Make it Active, Clinical, and Mobile

4:30 pm – 6:00 pm – Room 7B

**Stem Cells and Tissue Injury Platform Session**
*Chair: Kenneth Kramer* (Creighton Univ.)

**Chelsea Bahney** (UCSF)
Transdifferentiation of hypertrophic chondrocytes during endochondral bone repair by activation of pluripotent stem cell programs

**Liya Yin** (Northeast Ohio Medical Univ.)
Inducible vascular progenitor cells grown on the biodegradable polymer bundles in the cardiovascular regeneration

**Mari Dezawa** (Tohoku Univ)
Making three dimensional human colored skin by using Muse cells, a novel type of non-tumorigenic pluripotent stem cells

**Foteini Hassiotou** (The Univ. of Western Australia)
Breastmilk stem cell transfer from mother to neonatal organs

**Deng Fu Guo** (The Univ. of Iowa)
Bbs1 gene is required for wound healing

**Yoke-chen Chang** (Rutgers Univ.)
Wound healing of cutaneous nitrogen mustard injuries by dynamic modulation of gap junction communication using connexin43 antisense oligodeoxynucleotides

4:30 pm – 6:00 pm – Room 7A

**From the Lab to the Capitol: A Scientist’s Guide to Advocacy**
*Chair: Joseph Yost* (Univ. of Utah)

Government laws, regulations, and policies are increasingly affecting individual scientists, as well as the broader research community. For example, although public opinion polls demonstrate that the majority of the American public supports greater investment in research, the budgets of the National Institutes of Health and other federal agencies have remained relatively flat for the last decade and sustained direct cuts in 2013 due to sequestration. It is critical that researchers use their credibility and expertise to advocate on behalf of new policies and laws that will help maintain and grow the U.S. scientific enterprise. Understanding who makes decisions on Capitol Hill, knowing when and how to get involved in the legislative process, and being able to articulate the need for change are key steps to successfully becoming an advocate for biomedical research. Participants in this session will:

- Learn the basics of becoming an advocate and the role of professional societies in advocacy
- Receive an overview of the federal budget and appropriations process and how that affects funding for the National Institutes of Health
- Find out about careers in advocacy
- Hear about tools and resources available to help researchers monitor key legislative and policy developments on Capitol Hill
- How to get more involved in advocacy
Tuesday, April 29

8:00 am – 10:00 am – Room 9
Wound'omics' or the Contribution of Personal Genetics to Tissue Repair

Chair: Martine Dunnwald (The Univ. of Iowa)

Tissue repair is a natural process that occurs after the body is injured. And it happens all the time: from a simple cut, scrape, to the more involved surgeries and diabetic foot ulcers. If for most people tissue repair is uneventful, for others it becomes a complex medical problem requiring specialized treatment and care. Why such individual variations? Can genetic variations contribute to wound healing outcome? More importantly, can genetic variations predict wound healing outcome?

The scientific community has been invaded by the “omics” world, yet very little “omics” has been associated with tissue repair. This session will gather investigators that are at the forefront of the field leading cutting edge research in the field of tissue repair and genetics.

Jeffrey Shupp (Georgetown Univ. School of Medicine)
From Mental Health to the Host Microbiome: Looking at the Forest not just the Trees in Wound Healing

Harriet Hopf (Univ. of Utah School of Medicine)
Empiric Evidence for a Genetic Contribution to Predisposition to Surgical Site Infection

Martine Dunnwald (The Univ. of Iowa)
Genetic Contribution to Scar Outcome

Nicole Gibran (UW Medicine, Harborview Medical Center)
The Genetics and Epigenetics of Extreme Healing: Hypertrophic Scars and Diabetic Ulcers

8:00 am – 9:30 am – Room 8
Outside of the Classroom: A Look at Factors Influencing Education

Chair: Polly Husmann (Case Western Reserve Univ.)

Educational research has shown that most learning actually occurs outside the classroom, as the student attempts to assimilate classroom information into a personalized model of understanding. There are a variety of factors that may facilitate or impede this out-of-classroom learning. Unfortunately, these factors are too often overlooked or paid lip-service at best. This symposium will endeavor to provide some insight into the factors that influence our students' learning outside of the classroom. Presenters will describe out-of-classroom factors they have examined and/or incorporated into their classroom, such as the analysis of study habits, the use of metacognitive techniques, and the use of technologies that foster collaboration. We will end this symposium with a group-wide discussion of additional factors that may influence learning outside of the classroom.

Polly Husmann (Case Western Reserve Univ.)
Study Skills in Anatomy & Physiology: What’s the Difference?

Valerie Dean O'Loughlin (Indiana Univ.)
How to Develop Students’ Metacognitive Skills: Lessons Learned from an Upper Level Undergraduate Anatomy Course

Alison Doubleday (Univ. of Illinois at Chicago)
The Social Network: How are Students Communicating Outside of the Classroom?

8:00 am – 10:00 am – Room 7B
The Obstetrical Dilemma in the Human Pelvis: Constraints, Compromises and Complications

Chair: Kirsten Brown (George Washington School of Medicine)

Washburn (1960) was one of the first researchers to recognize that in humans, bipedalism and encephalization have created novel, and somewhat conflicting, functional requirements on pelvic shape. He coined this competition the
“obstetrical dilemma,” because human females were presented with the problem of pushing neonates through constricted birth canals. Correspondingly, Washburn argued that the solution was to truncate gestation length, resulting in the delivery of a fetus at a much earlier developmental stage. His original hypothesis has had implications on interpreting the hominin fossil record and on the evolution on human social behaviors. But are bipedalism and encephalization the only factors that have driven the evolution of our unique birthing process? Are there other factors that have played a significant role in our evolutionary history, and how do these other factors impact Washburn’s hypothesis 50 years later? This session will address recent developments in the literature as it relates to the evolution of the human birth mechanism, and how these developments have modified our understanding of our obstetrical dilemma.

Carol Ward (Univ. of Missouri)
Locomotor Adaptations and the Origin of the Hominin Pelvis
Karen Rosenberg (Univ. of Delaware)
The Fossil Evidence for the Evolution of Human Infant Helplessness, Complicated Labor and Big Babies
Anna Warrener (Harvard Univ.)
A Model Dilemma: How Assumptions about Locomotion and Birth have Shaped the Obstetrical Dilemma
Cara Wall-Scheffler (Seattle Pacific Univ.)
The Role of Female Pelvic Width on Walking Economy and Speed: Benefits with Few Tradeoffs

8:00 am – 10:00 am – Room 7A
Anatomy Ontologies: Bioinformatics in the Anatomical Sciences (Hybrid Symposium)
Chair: Robert Druzinsky (Univ. of Illinois at Chicago, College of Dentistry)
Melissa Haendel (Oregon Health & Science Univ.)
Computing on the Anatomical Form for Disease Discovery
Maryanne Martone (UC San Diego Health Sciences)
The Scourge of Neuroanatomical Nomenclature: Use of Neuroanatomical Ontologies within the Neuroscience Information Framework
Kimberly Van Auken (California Institute of Technology)
Textpresso for Oro-Pharyngeal Anatomy: A System for Searching the Full Text of Anatomy Literatures
Robert Druzinsky (Univ. of Illinois at Chicago, College of Dentistry)
An Anatomy Ontology for Oro-Pharyngeal Muscles and the Logical Underpinnings of Comparative Anatomy
Alex Dececchi (Univ. of South Dakota)
The Modern Character Synthesis: Using Semantic Tools to Aggregate Morphological Characters across Studies
Paula Mabee (Univ. of South Dakota)
Big Anatomy: The New Views from Integrated Anatomy Development and Genes

Plenary Award Lectures
10:30 am – 12:00 pm – Room 8
Henry Gray/Elsevier Distinguished Educator Award Lecture
Jeffrey T. Laitman, Ph.D (Icahn School of Medicine at Mount Sinai)
Beyond Facts: The Deeper Responsibility of Teachers to Their Students

Henry Gray/Lippincott Williams & Wilkins Scientific Achievement Award Lecture
Drew M. Noden, Ph.D. (Cornell Univ., College of Veterinary Medicine)
Getting A Head: Changing Perspectives on Craniofacial Development

AAA/Wiley A.J. Ladman Exemplary Service Award Lecture
Kathy K. H. Svoboda, Ph.D. (Texas A&M Univ. Baylor College of Dentistry)
30 Years in 30 Minutes: Integrating Imaging, Cell and Developmental Biology with Teaching and Service

12:15 pm – 1:45 pm – Exhibit Hall
Poster Session viewing time
Anatomy General
2:00 pm – 4:00 pm – Room 9
Vascularization and Bone Regeneration (Hybrid Symposium)
Chair: Kurt Hankenson (Univ. of Pennsylvania)

Jeffrey Isenberg (Univ. of Pittsburgh School of Medicine)
Ischemia – A Paradox Waiting a Solution
Kurt Hankenson (Univ. of Pennsylvania)
Progenitor Cell Fate: Fine Tuning by Blood Vessels and Oxygen
Maria Serrat (Marshall Univ. Joan C. Edwards School of Medicine)
Hindlimb Heating Increases Vascular Access of Large Molecules to Murine Tibial Growth Plates Measured by In Vivo Multiphoton Imaging
Holly Tamski (Marshall Univ. Joan C. Edwards School of Medicine)
Validation of a Unilateral Heating Model to Increase Hindlimb Length in Growing Mice
Cynthia Hill (Vanderbilt Univ.)
TGFβR3 is Required for Normal Vascularization and Ossification of the Palate
Chelsea Bahney (UCSF)
Therapeutic Delivery of Placental Stem Cells to Modulate Vasculature and Promote Fracture Repair

2:00 pm – 4:00 pm – Room 8
Anatomy Education Platform Session II: Horizontal and Vertical Integration of Anatomy
Chairs: Ann Poznanski (California Northstate Univ. College of Medicine) & Paulette Bernd (Columbia Univ.)

David Morton (Univ. of Utah School of Medicine)
Introduction of an anatomy multi-station integrated table conference
Darren Bridgewater (McMaster Univ.)
RAP Sessions - interdisciplinary delivery of anatomy, radiology, and procedural skills
Vaughan Lee (Texas Tech Univ. Health Sciences Center)
Ultrasound imaging in anatomy: a supplement to dissection
Charys Martin (Medical College of Georgia at Georgia Regents Univ.)
The influence of spatial ability on high and low order anatomy examination questions in a first year integrated medical curriculum
Michelle Lazarus (Penn State College of Medicine)
Anatomy integration blueprint: a 4th year musculoskeletal anatomy elective model
Kirsten Brown (The George Washington Univ. School of Medicine and Health Sciences)
Improving OB/GYN anatomy education through nesting interactive and clinically relevant anatomical sciences E-modules in the curriculum
Guenevere Rae (Louisiana State Univ. Health Sciences Center)
A gift in disguise: teaching opportunities that are overlooked in the gross anatomy laboratory
Akash Kumar (Univ. of Washington)
Next generation anatomy: integrating whole genome sequencing within the human anatomy curriculum

2:00 pm – 4:00 pm – Room 7B
Development and Disease - It's all about Anatomy Platform Session
Chair: Paul Trainor (Stowers Institute for Medical Research)

Lisa Taneyhill (Univ. of Maryland)
Neural crest αN-catenin function in cranial ganglia assembly
Jeffrey Bush (Univ. of California, San Francisco)
Cell intercalation and migration mediated by actin contractility are key cellular behaviors in fusion of the mammalian secondary palate
Alexis Lainoff (UC San Francisco)
A comparative examination of odontogenic markers in both toothed and toothless amniotes

**C. Lovely** (Univ. of Texas at Austin)
Using zebrafish to identify and characterize gene-ethanol interactions

**Felix Boivin** (McMaster Univ.)
β-Catenin in the renal stroma regulates apoptosis via Bcl2l1 during kidney development

**Cynthia Neben** (Univ. of Southern California)
A nucleolar role for FGFR2 in bent bone dysplasia syndrome

**Kristen Lauing** (Univ. of Chicago)
The role of aggrecan in embryonic growth plate cytoarchitecture and differentiation: a rescue model

**Elizabeth Hutchins** (Arizona State Univ.)
Activation of musculoskeletal development and repair mechanisms in the regenerating lizard tail

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**Young Investigator Award Symposium**
4:30 pm – 6:30 pm – Room 9

**R.R. Bensley Award Lecture in Cell Biology**
**Takanari Inoue, Ph.D.** (Johns Hopkins Univ. School of Medicine)
*Synthetically Rerouting Phagocytosis by Rapidly Turning Inert Cells into "Eat you" Mode*

**C.J. Herrick Award Lecture in Neuroanatomy**
**Xiangmin Xu, Ph.D.** (Univ. of California, Irvine School of Medicine)
*Inhibitory Neuron Organization and Function in Cerebral Cortex*

**H.W. Mossman Award Lecture in Developmental Biology**
**Lionel Christiaen, Ph.D.** (New York Univ.)
The Chordate Origins of the Second Heart Field and Head Muscle Stem Cells

**Morphological Sciences Award Lecture**
**Ben Emery, Ph.D.** (Univ. of Melbourne)
Regulation of Oligodendrocyte Differentiation and CNS Myelination by a Novel Transmembrane Transcription Factor

7:30 pm – 10:00 pm – Marina Ballroom (Marriott)
**AAA Closing Awards Ceremony**

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**Wednesday, April 30**

7:00 am – 4:00 pm
Late Breaking Poster Session