IBP 2018

All oars in the water. There’s a popular slogan going around campus this year: “Row the Boat.” It’s a catchy phrase, and certainly is reflective of IBP’s mantra that when we all put an oar in the water and pull together we can be a force of nature! This year is no different in terms of our mission and vision for the future with our laser focus on celebrating excellence.

As we say goodbye to 2017 and hello to 2018, it is a good time to reflect on our shared accomplishments and peer into the future for the great opportunities ahead. We can all take great pride in IBP again hitting a home run in the Dean’s annual performance assessment. I think we all understand that no one metric can accurately reflect the fullness of our contributions to the medical school. That said, when considering published scholarship, teaching performance, grant success and financial health, IBP comes out very well once again. Faculty, students, postdocs and staff - Hats off to thee!

2017 has been a very exciting year with new faculty joining the IBP team: Dalay Olson, Steve Wu and Yuk Sham - welcome aboard! Recruiting new faculty continues in full swing with two main searches ongoing, chaired by Cathy Kotz in metabolism and Marc Jenkins in immunology. In the coming year, we hope to be announcing new faculty to IBP. Also, a special “hats off” to DeWayne Townsend for being awarded tenure as he continues his climb up the academic ranks - way to go DeWayne!

Across the medical school, IBP is again in the top echelon in terms of faculty scholarship and peer-reviewed papers published. We can take further pride in that we are the only medical school department with every tenured faculty member having R01 funding - no small feat indeed considering NIH’s challenging funding line.

Hand-in-hand with scholarship, papers and grants is our continued focus on excellence in teaching. Under Steve Katz’s leadership, IBP again leads the medical school in terms of having the top medical school classes. Lisa Anderson is taking on new leadership this year as Assistant Director of Education and this year Mark Cook assumes his new role as Co-Director of the Anatomy program along with Tony Weinhaus. I am 100% confident in the leadership they will bring to further enrich our outstanding educational programs.

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The invited speaker was Dr. Viviana Gradinaru, Assistant Professor of Biology and Biological Engineering, Heritage Medical Research Institute at the California Institute of Technology (Cal Tech). Dr. Gradinaru also serves as the Director for the Center for Molecular and Cellular Neuroscience at Cal Tech. The title of her lecture was, “Optogenetic, tissue clearing, and viral vector approaches to understand and influence whole-animal physiology and behavior.”

STUDENT ACHIEVEMENTS: Tim Matsuura, Ph.D. candidate, received the 2016-17 Dr. Marvin & Hadassah Bacaner Research Award, recognizing excellence in science research. Tim successfully defended his Ph.D. thesis and in October will be joining Daniel Kelly’s laboratory at the University of Pennsylvania to work on cardiac mitochondrial substrate switching during the pathogenesis of heart failure. Matt Wheelwright successfully defended his Ph.D. thesis and has returned to medical school to complete his M.D./Ph.D. program. Snider Desir, Ph.D. candidate, had a first author publication and is scheduled to defend his thesis in December 2017. Anthony Vetter, Ph.D. candidate, received an American Heart Association Pre-doctoral Research Award Fellowship and is on track to defend his Ph.D. in 2017. Mayank Verma, Ph.D. candidate, continues on his F30 fellowship and is currently writing his thesis with the goal to graduate in March 2018. Amritha Yellamilli, Ph.D. candidate and MSTP student, was awarded a Doctoral Dissertation Fellowship and won 1st place in the 3 Minute Thesis event held at the 2017 Biomedical Sciences Programs Research Recognition Day. Kadambari Shekar, Ph.D. candidate, won the AHA Resuscitation Science Award, which is given to the graduate student with the highest cumulative GPA upon completion of their first year of coursework.

INCOMING 2017-2018 CLASS WELCOME: The incoming class includes Iffy Akinola, a MSTP Student, who came to us from the University of Maryland, Baltimore and is now in Angela Mortari’s lab. Daniel Baumann, came to us from Boston College, where he majored in Biology and minored in Philosophy. Thu An Nguyen, M.S., originally from Hanoi, Vietnam, graduated from the University of Minnesota Duluth (UMD) with a B.S. in Biochemistry and a M.S in Molecular and Cellular Biology. Pedro Rodriguez, M.S. Michigan Tech (biology), Pedro Rodriguez, was born and raised in Durango, Mexico, moved to Houghton, MI, where he graduated with a B.S. in Molecular Biology and a M.S. in Biology. Dogacan Yücel was born and raised in Istanbul, Turkey and graduated from Yeditepe University in 2016 with a B.S. in Genetics and Bioengineering. All of the incoming students are taking classes and doing their laboratory rotations (see next page).
New Graduate Student Profiles

Thu An Nguyen
I come from Hanoi, Vietnam and graduated from the University of Minnesota Duluth (UMD) with a B.S in Biochemistry and a M.S in Molecular and Cellular Biology. During the time at UMD, I worked with Dr. Grant Anderson at the College of Pharmacy Duluth and studied the effects of iron deficiency on the developing brain vasculature. I chose to pursue my PhD at the IBP program hoping to continue working on a nutritional project with Dr. Catherine Kotz.

Ifeolu Akinnola
I am originally from Maryland and attended the University of Maryland, Baltimore County (UMBC). Towards the end of college, I had decided to pursue both an M.D. and a Ph.D. so after graduating with a B.S. in Biochemistry I moved to Minneapolis and joined the University of Minnesota MSTP. For my graduate program I joined IBP and the lab of Dr. Angela Panoskaltsis-Mortari. In the lab, I focus on the using iPSC-derived progenitor cells to recreate the endothelium of pulmonary vasculature after lung decellularization.

Daniel Baumann
I was born and raised in Oradell, New Jersey. After doing my undergrad (majoring in Biology and minoring in Philosophy) at Boston College, I worked as a research technician for two years at Boston Children’s Hospital with Dr. Dale Umetsu at Dana-Farber Cancer Institute with Dr. Gordon Freeman, studying asthma and cancer immunotherapy. I then moved to Minneapolis in 2015 and joined Dr. Emilyn Alejandro’s lab. I am excited to join the graduate program to expand my abilities as a scientist.

Dogacan Yucel
I was born and raised in Istanbul, Turkey and graduated from Yeditepe University in 2016 with B.S. in Genetics and Bioengineering. During my undergraduate years, I spent two years in a Regenerative Biology Research Laboratory under supervision of Fatih Kocabas. Then, I moved to Minnesota to take a part in a project related to the identification of the genes that are related to cardiac regeneration in Dr. van Berlo’s lab as I enjoyed working in this field.

Pedro Rodriguez
I was born and raised in Durango, Mexico. I moved to Lancaster, SC, and later on to Houghton, MI, where I graduated from MTU with a B.S. in Molecular Biology and a M.S. in Biology. As an undergraduate student, I volunteered in Dr. Xiaqing Tang’s lab where we studied miRNAs in pancreatic α- and β-cells. I joined the IBP program here at the University of Minnesota, and I am currently doing lab rotations.

IBP 2018, continued

I also point out that Vince Barnett played a vital role in establishing an innovative B.A. to M.D. program in the medical school, designed for recruiting the best young scholars to UMN (see page 4).

IBP continues to enhance its visibility by hosting prominent events locally. This included our annual marquee event, the Visscher Symposium, which was highlighted by a great talk by “Mr. Leptin” - aka Dr. Jeffrey Friedman, and culminated in a wonderful celebration with UMN President Eric Kaler at Eastcliff. It is particularly notable and gratifying to hear UMN President Kaler speak so glowingly and knowledgably about Visscher and IBP. Mark your calendars for June 11, 2018 when Dr. Barbara Kahn, Harvard/Joslin will keynote next year’s Visscher.

Along with the Visscher Symposium, Cardio-Palooza was a great success, as were the student-led Zofia Zukowska Lectureship, and the Franz Halberg Symposium, organized by Germaine Cornelissen-Guillaume, and The American Association of Clinical Anatomists in which Tony Weinhaus and Mark Cook played key roles. These events and many others further the mission of IBP and enhance the medical school and university.

All oars in the water and let’s Row the Boat IBP in 2018!

Sincerely,

Joseph M. Metzger Ph.D.
Maurice B. Visscher Endowed Chair in Physiology
Professor and Chair of the Department of Integrative Biology and Physiology
The education mission of the Department of Integrative Biology and Physiology (IBP) focuses on physiology and anatomy classes aimed at undergraduate, graduate and professional students. For the year ending in June 2017, we offered more than 40 separate courses reaching over 3,000 students and yielding total revenue of just under $6 million (including our January Short Courses for industry professionals). Our teaching faculty has grown from five to seven full-time teachers (Drs. Anderson, Barnett, Cook, Katz, Olson, Weinhaus and Wu). In addition, the IBP research faculty all contribute to our teaching excellence. Our teaching mission is augmented with about a dozen additional faculty who teach part-time in IBP and well over 50 student teaching assistants!

Our two medical school courses, Human Structure and Function (Anatomy) and Physiology, continue to place very well above the mean in each of 7 separate areas of medical school course comparisons. They placed first and second respectively in the most recent graduation questionnaire concerning course preparation for clerkships!

In 2014, we started a new program to prepare future physiology teachers for possible teaching roles in IBP. This project has borne fruit with the hiring of Dr. Steven Wu and Dr. Dalay Olson. Dr. Wu will teach undergraduate and dental physiology courses and assume a coordinating role between the faculty and the graduate teaching assistants. Dr. Olson will also teach in the undergraduate physiology courses and help with the advising needs of the undergraduate majors. We continue to groom new teachers for the future of IBP teaching. For example, Jason Massey (anthropology graduate student) is acquiring valuable anatomy education experience.

In partnership with the Medical School and CLA, IBP initiated a new undergraduate program that streamlines the path for accepting students into the UMN Medical School. The new B.A./M.D. program will accept up to ten incoming freshmen each year and direct them through a combined curriculum leading to a B.A. and M.D. degree after seven years of study. High school students are accepted based on interest, academics, leadership and service. Dr. Vincent Barnett, IBP undergraduate physiology advisor, led this effort in which completion of the curriculum and successful MCAT exam, guarantee admission to the UM Medical School at the beginning of the fourth year of study.
**SAVE THE DATE** for the 9th Annual Visscher Symposium, featuring Dr. Barbara Kahn, M.D., of Harvard Medical School, June 11, 2018.

Dr. Kahn is an international leader in the field of diabetes, endocrinology and metabolism whose research has identified fundamental molecular mechanisms underlying obesity, insulin resistance and type 2 diabetes. She is the winner of the 2016 Banting Medal for Scientific Achievement from the American Diabetes Association (ADA).

**IBP SPECIAL EVENTS**

**8th Annual Visscher Symposium – 2017**

The 8th Annual Visscher Symposium was held June 6, 2017, featuring keynote speaker, Dr. Jeffrey Friedman of Rockefeller University. The title of his keynote was “Leptin Physiology, Pathophysiology and the Neural Circuit Regulating Body Weight.” The auditorium was filled to capacity for this event, which was followed by an evening reception at Eastcliff and the Young Investigator award ceremony.

**IBP, in collaboration with the Lillehei Heart Institute and Cardiology, led another highly successful cardiovascular retreat this past July, 2017. **Cardio-Palooza 9 featured over 200 faculty, students and fellows in attendance at CCRB. It featured 85+ posters and three short talks by young investigators representing both basic and clinical cardiovascular sciences.
FACULTY, STAFF & ALUMNI HIGHLIGHTS

Welcome to new IBP faculty!

This year, we are pleased to welcome two new academic track faculty to IBP: Dr. Steven Wu and Dr. Dalay Olson.

Dr. Wu grew up in Denver, Colorado. He received his B.S. in Biochemistry from Colorado State University. Then, he pursued his Ph.D. in Physiology and Biophysics from the University of Illinois, Chicago. Afterwards, he trained under Dr. Tim O’Connell (IBP) as a post-doctoral fellow, with whom he continues to collaborate.

We are also welcoming Dalay Olson to her new position as Assistant Professor in the department of Integrative Biology and Physiology. Dalay Olson has a bachelor’s degree in chemistry from St. Olaf College and a Ph.D in physiology from the University of Minnesota. Currently Dr. Olson is teaching several undergraduate Physiology courses offered by IBP and is working with a non-profit organization to help design an affordable online physiology textbook.

Alumni Profile

Nancy R. Tich, M.S., Ph.D.

Dr. Tich graduated from the UMN Department of Cellular Biology in 1989. She is currently the VP of Clinical Research at Zynerba Pharmaceuticals (www.zynerba.com) in Devon, PA. Zynerba develops therapeutics for Fragile X Syndrome, epilepsy and osteoarthritis pain. Dr. Tich’s Ph.D. advisor was Dr. Hon Cheung Lee. Her husband, Stephen Tich, received his undergraduate degree from UMN and currently serves on the newly formed advisory board for the UMN School of Statistics. Nancy’s oldest daughter graduated with an M.A. in Communications from the UMN and her son, a physics major from UCLA, is currently working in Minnesota.

TOWNSEND PROMOTION:

Dr. DeWayne Townsend was promoted to Associate Professor with tenure on July 1, 2017. DeWayne received his B.A. from St. Olaf College, and both a D.V.M (2003) and Ph.D. from the UMN (2007). His research focuses on dystrophic cardio-myopathies, where he has made significant advances in understanding how the dystrophic heart is compromised structurally and functionally in response to injury conditions, such as hypoxia. A current project is a bio-feedback video game interface for assessment of muscle function in patients with muscular dystrophy (www.townsendlab.umn.edu). Congratulations to DeWayne!

FACULTY HIGHLIGHTS: Dr. Yuk Sham

IBP has aligned with several UMN programs, along with the Dean’s office, to facilitate the career advancement of Dr. Yuk Sham. Yuk is a world-class computational scientist and has great knowledge in small molecule development for clinical applications. Yuk trained with Arieh Warshel who was awarded the 2013 Nobel Prize in Chemistry based in part by studies performed by Yuk. His lab and office are located on the 3rd floor of CCRB. Welcome Yuk!
The IBP Phenotyping Core is an Internal Service Organization (ISO) created to offer University of Minnesota faculty highly specialized equipment, surgical and technical expertise and data analysis capability in the area of metabolic and cardiovascular phenotyping and stress physiology (http://www.researchservices.umn.edu/services-name/integrative biology-and-physiology-phenotyping-cores). Alessandro Bartolomucci, Ph.D., is the Core Director, Pilar Ariza-Guzman, D.V.M., M.S., is Core Manager, and Maria Razzoli, Ph.D., is the Metabolism and Behavior Specialist.

The Core was launched in 2015 to offer a fee-for-service, state-of-the-art, comprehensive range of metabolic and cardiovascular analysis, as well as surgical expertise for small rodents. The Core has served over 40 PIs affiliated with more than 15 different departments, spanning four different schools at the University of Minnesota.

Major services include:

- Whole animal energy expenditure: Oxymax/CLAMS Lab Animal Monitoring System (Columbus Instruments, Columbus, OH).
- Echo-MRI 3-in-1 (Echo Medical Systems LLC, Houston, TX) delivers precise body composition measurements of fat, lean, free water, and total water masses in live mice.
- Automated Food Consumption and meal pattern analysis (BioDaq, Research Diets, Inc.).
- Cardiovascular functions in freely moving rodents using Data Science’s radiotelemetry system (Data Science International, St Paul, MN).
- Specialized surgery and echocardiography analysis in mice and rats.

**News Updates:** New radiotelemetry service is offered by the IBP Phenotyping Core in collaboration with Data Science International (St Paul, MN). The Core users would be able to select any of the DSI-manufactured miniaturized radiotransmitters for wireless recording of mouse physiology (HD-X11: BP, ECG, temperature, activity; PAC10: BP, temperature, activity; ETAf10: ECG, temperature, activity; TAF10: Temperature; HDXG: blood glucose) at a convenient fixed exchange fee. Further information on the DSI transmitter can be found here: https://www.datasci.com/products/implantable-telemetry/mouse-(miniature). This new Core concept is unique for the IBP Phenotyping Core and is not something DSI offered in the past.

The main Core facility is located in the Cardio-Cancer Research Building (CCRB), while select services are also available on the 1st floor of Jackson Hall.
MISSION STATEMENT
Department of Integrative Biology & Physiology
University of Minnesota Medical School

Dedicated to an integrative systems biology approach to bio-medical discovery. We partner with colleagues across disciplines to investigate questions ranging from the gene/molecule to the intact animal, while striving for excellence in research and dissemination of new knowledge with local, national, and global impact.

Committed to mentoring and training graduate students and fellows. We empower students to develop a deep understanding of the complexity of physiological systems to enable them to pursue unique career pathways spanning from academia to bio-industry.

Devoted to excellence, innovation and scholarship in education.
We educate undergraduate, graduate and professional students in the integration of structure and function of cells, organ-systems, and living animals, providing a strong foundation for knowledge discovery in basic science and human health fields.

Make a Gift to IBP
The generosity of individuals who recognize the importance of our department’s work is indispensable to our success. Donate online at http://www.give.umn.edu/give/physiology.