Integrative Physiology
University of Colorado Boulder

Department Newsletter

IPHY

Issue #13 May 2015

Special points of interest

- IPHY undergrads engage in multiple extra-classroom activities including internship, independent research, and teaching assistantship
- Three IPHY faculty members, Drs. Link, Ahmed, and Wright, have been reappointed or promoted
- IPHY Club offers diverse opportunities for undergrads to meet with advisors relevant to their career opportunities, receive free course tutoring, and interact with faculty members
- IPHY's graduates continue to succeed in professional/ graduate schools and employment in non-profit organizations

Inside this issue:

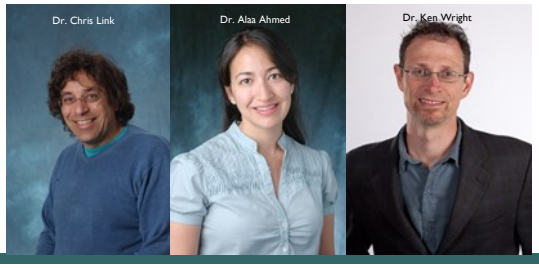
A Few Words from the Chair — Pei-San Tsai

As the academic year comes to an end, I would like to present to you summaries of our student population, teaching, and research. Further, I would like to share with you some exciting news on the reappointment and promotion of our excellent faculty.

IPHY continues to have the second largest undergraduate enrollment in the College of Arts and Sciences. We proudly match this quantity with quality, and our major is as strong and popular as ever. Currently, there are 1,804 undergraduate IPHY majors. Of these, 78% are Colorado residents, 64% are females, and 26% are classified as a minority. On average, CU-Boulder loses 36% of its undergraduates over time, with the peak dropout period at the end of freshman year. IPHY remains strong in student retention and retains 86% of the previous freshman class after a year. Collectively, IPHY faculty taught an impressive 18,708 student credit hours (the number of course credits x number of students) last year, yet we are able to maintain an average class size of 36 students. This May, we awarded B.A. degrees to ~300 IPHY students.

In addition to active teaching, IPHY faculty are at the forefront of cutting-edge physiology research. Last year alone, 7 million dollars were awarded from federal and private agencies to our faculty to perform diverse research projects, many of which are related to the improvement of human health and performance. Hundreds of our undergraduates benefit from this research-savvy environment and conduct independent research projects under the supervision of IPHY faculty sponsors. This endeavor sharpens the students' analytical, verbal, and writing skills, and allows them to acquire the type of advanced knowledge that cannot be acquired in a classroom setting. Many of our undergraduates publish their research results in peer-reviewed journals and present their data in national or international scientific meetings.

Of course, we could not have run a successful educational program without our excellent faculty. During this academic year, three of our faculty members went through reappointment, tenure, and promotion to reach the next stage of their career. This is a rigorous year-long review process that first involves an internal review by the department based on the faculty member's teaching, research, and service records, followed by critical reviews by the Dean and the Vice Chancellor's review committee. Critiques from scientists from other comparable institutions are also solicited to corroborate our own evaluations. I am happy to announce that Professors ***Chris Link*** (reappointment as Associate Professor), ***Alaa Ahmed*** (tenure and promotion to Associate Professor), and ***Ken Wright*** (promotion to Full Professor) have successfully gone through this process. We are indeed very proud of our high-caliber faculty and look forward to their contributions to our teaching and research missions in the foreseeable future.



IPHY and the STEM Revolution by Janet Casagrand

Across the country, a revolution is taking place in undergraduate STEM (science, technology, engineering, and math) classrooms. To prepare students for our fast-changing world, educators are taking a new approach to educational design. This approach begins with a vision of where students need to end up (*learning outcomes*), namely deciding what knowledge and skills students should acquire, informed by faculty, employers, alumni, and other key stakeholders. To achieve this, existing courses are enhanced with new problem-solving and critical thinking activities which actively engage students (*active learning*), and have been shown to improve students' understanding of and persistence in STEM. One challenge that has arisen, however, is how to sustain these reforms.

IPHY in the revolution...

Several years ago, the Department of Integrative Physiology (IPHY) garnered national attention for its faculty engagement in curricular reforms resulting from a collaboration with the CU-Boulder Science Education Initiative (SEI). The extensive faculty involvement and adoption of the new learning outcomes-focused teaching and learning practices not only improved our majors' learning, but also launched IPHY into the national science education reform spotlight. Key to the success of this program was the guidance of specially trained SEI Science Teaching Fellows (STFs) who helped develop and implement this curricular transformation. Today, IPHY is again poised to serve as a model for STEM education reform efforts, as it partners with a new science education initiative spearheaded by the Association of American Universities (AAU) with a grant from the Helmsley Foundation. This new initiative will allow IPHY to continue and expand upon the educational reform foundation established under the SEI.

A little history on the SEI….

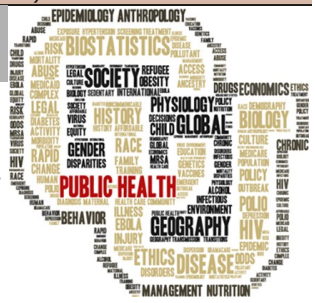
In 2006, IPHY became one of five departments accepted to join the CU-Boulder SEI. This collaboration led to many changes in our curriculum, including: (1) the development of standardized learning outcomes for our core courses and assessments to test whether students are meeting those objectives, (2) wider adoption of active learning activities and assessment of the effectiveness of these practices, (3) faculty training in these new teaching/learning approaches, and (4) faculty conversations about how best to teach. These SEI-facilitated efforts were very successful, and led to improvements in student learning, journal publications, and presentations at local and national conferences. However, in 2011 SEI funding ended and the STFs were no longer available to IPHY. Without the leadership, educational expertise, and support these unique individuals provided, a key question for IPHY was how to sustain and build on the progress that had been made. A similar challenge is faced nationwide, and is one that is receiving much attention. It is now recognized that without a mechanism in place to actively sustain and maintain currency of efforts, reforms are unlikely to be maintained over time.

Enter the STEM Education Initiative...

In 2013, the AAU funded an initiative to improve undergraduate STEM education. CU-Boulder applied to participate and was one of eight universities chosen. Because of its track record, IPHY was recruited to participate in one of three Departmental Action Teams (DAT). IPHY seized this opportunity, and several IPHY faculty began meeting with representatives of the CU-Boulder STEM Education Initiative. The DAT committee was charged with identifying an educational issue of common interest and departmental importance, and developing a solution. During the fall and spring semesters of academic year 2014-2015, the IPHY DAT identified two main areas of interest.

The first was to develop a process by which the individual course transformations resulting from the SEI initiative could be sustained and grow. The second was to think more holistically across our curriculum about what it means to be an IPHY major, and what we want an IPHY major to be able to do at the completion of the major. While previous efforts focused on learning outcomes for individual courses, the DAT is working to develop a set of curricular learning outcomes. The DAT proposed the creation of permanent curriculum coordinators (STF-like positions) within the department who will meet frequently with faculty across the curriculum to discuss and coordinate the curriculum, quantify and reflect on students' learning experiences in individual courses and across the curriculum, and provide an educational/pedagogical resource for faculty. The IPHY teaching committee approved the establishment of these positions beginning in academic year 2016-2017. This innovative approach will provide a sustainability mechanism that ensures continued growth and development of our major in meeting the current and future needs of our students, and could serve as a model for other programs. The CU-Boulder STEM Initiative, thus, represents an exciting new opportunity for IPHY to be at the forefront of STEM education reform efforts.

Launching the Public Health Certificate by Matt McQueen



The new Certificate in Public Health was successfully launched during the 2014/2015 academic year. We have seen tremendous growth in students interested in complementing their undergraduate education with elements of public health. In the approximately 8 months since the program launched, over 170 students have enrolled in the certificate program from over 15 different departments on campus. This exciting growth and diversity of student interest underscores the demand for public health education and highlights the highly interdisciplinary nature of public health.

The first course developed specifically for the public health program, IPHY 3490: Introduction to Epidemiology, taught by IPHY's Matt McQueen was offered in the spring 2015 and filled up with over 100 students rather quickly. This course explores measures of disease frequency and occurrence, association and causality as well as evidence-based screening and infectious disease outbreak investigations. The course is the first of its kind to be offered on the CU-Boulder campus and by all accounts, appears to have had a successful launch.

This May, the public health program will recognize the very first 19 students graduating with a certificate in public health, including 7 IPHY majors. These are students who have been taking public-health related courses on their own before the program was available, and with the new core courses coming online this spring, were able complete the certificate curriculum just in time! Congratulations to these public health academic pioneers for leading the way and being an integral part of bringing public health education to the CU-Boulder campus.

Undergraduate Teaching Assistants of Human Anatomy by Steve Hobbs

At 10:00 AM, the person standing before the deceased begins to speak. Her words are deliberate, carefully chosen and well timed to allow the listeners to absorb their meaning. Those gathered around hang on every word, seeking to understand what is before them, hoping not to forget, and expecting to be enlightened about life itself. From time to time, everyone needs a moment to process what is seen, heard and felt. The mood is profoundly respectful, but also remarkably positive.

I am describing, of course, any given day in our human anatomy labs where undergraduate teaching assistants (UGTAs) like ***Jacob Albers*** and ***Caroline Gamwell*** share their expertise and passion for human anatomy. Our undergraduates learn human anatomy the best way possible, from humans, both living and deceased, teaching other humans. Having actual human cadavers is rare for undergraduate anatomy programs, and is one of the cornerstones of our course. Another cornerstone is the group of students that come back as UGTAs each semester to help teach their peers.

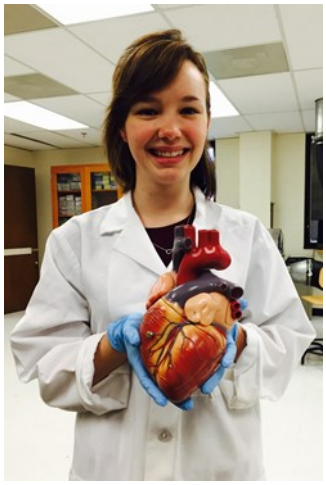
Every fall and spring semester a group of dedicated UGTAs co-teach nearly 400 students enrolled in up to 24 sections (individual classes) of human anatomy lab. The UGTAs are carefully chosen from a highly competitive applicant pool typically between 50 and 70 deep. These are not paid positions though. To the contrary, UGTAs receive course credit and pay tuition, as for any other class. They compete for these positions because of the opportunity to deepen their knowledge of the human body, to take on leadership roles and to help others on their paths to medical school, physician assistant school, physical therapy school and other post-graduate health programs.

Jacob Albers was one of our UGTAs this past spring semester. Jacob was selected for the position because he performed exceptionally well in the course, and because professors from other IPHY classes recognized his strong work ethic and positive attitude. Here is what Jacob writes about his experience:

"The UGTA Anatomy Lab position is a unique opportunity for IPHY undergrads to obtain mastery in one of the most basic yet fascinating aspects of what we study: the human body. As someone who is strongly considering medical school, being able to gain extensive familiarity with the cadavers we use in the teaching setting has been fascinating, entertaining, and has greatly strengthened my understanding of the human body. Additionally, being responsible for presenting the information has left me feeling more confident in not only teaching, but public speaking as well. My only regret is that I waited until my last semester to apply and only having one semester to teach!"

For some UGTAs, the anatomy lab experience does not end when their semester ends. A select few, four to be precise, will return in a subsequent semester to serve as cadaver specialist UGTAs. Every human has unique anatomy, and anatomy has nearly infinite levels of detail and organization. Consequently, our semester pool of 24 UGTAs must review, relearn and apply what they know to the 4 new cadavers we have each semester. They do so through weekly review sessions that are taught in part by these cadaver specialist UGTAs. Cadaver specialist UGTAs are highly selective positions held by students that have typically already been a UGTA for anatomy lab, and have often completed a dissecting internship as well. Each cadaver specialist UGTA is assigned to a single cadaver and their mission is to become *the* expert on this cadaver. To this end, they invest many hours each week dissecting and exposing the intricate arteries, miniscule nerves and countless other structures. Helping with dissection builds on their knowledge base, and places them in position to learn directly from lead dissectors, instructors and senior doctoral students with many years of experience. The cadaver specialist UGTAs also attend the graduate TA meetings, to review anatomy at the graduate level, prior to teaching the other UGTAs.

Caroline Gamwell was a cadaver specialist UGTA in the spring semester, and has the following to say about her experience:



"Being a UGTA for Anatomy has truly been one of the best opportunities I've had as a student here at Boulder, so much so that I wanted to do it twice! Every single day that I got to teach or dissect helped me further solidify my knowledge of the human body, more so than when I was a student. The educational aspect was especially important to me because I aspire to be a physical therapist and my knowledge and acquired skill set help me get one step closer to my goal. What really kept me coming back to the anatomy labs though was the look on other's faces when I had the privilege of showing/teaching them something mind-blowing. It was always the best part of my day. I was extremely lucky to work with cadavers for two semesters after being a student, but even as anatomy students we are fortunate to have the chance to learn from cadavers, an opportunity that so many other universities do not give their undergraduates. Being a UGTA is truly a once in a lifetime experience that I encourage others not to pass up."

The UGTAs that work in our anatomy labs are some of CUs best and brightest students. One of the great pleasures of coordinating these labs, is seeing this individuals progress from student, to teacher, and to near expert, all the while gaining self confidence and deepening their fascination with the magnificent architecture of the human body.

IPHY Students Get Academic Credit for Volunteer Experiences by Teresa Foley

This spring, 97 IPHY students received academic credit for volunteering in a hospital or clinical setting. As the faculty sponsor to eight of these students, there are numerous reasons why students choose to volunteer for academic credit. For those interested in a health-care profession, these volunteer opportunities help students distinguish themselves from other applicants. For those interested in personalizing his or her program of study, these experiences allow students to can gain real-life experiences outside of the classroom. Finally, for students unsure of their plans after graduation, these volunteer experiences allow a unique opportunity to explore various career paths.

In order to receive academic credit for volunteering, students must carry a minimum 2.0 GPA and enroll in one of two courses depending on their status. Freshmen and sophomores can receive credit by enrolling in Practicum in Integrative Physiology (IPHY 2910), while juniors and seniors can receive credit by enrolling in Internships in Physiology (IPHY 4930). Although not required to graduate, student can apply up to 3 credit hours of IPHY 2910 or 6 credit hours of IPHY 4930 toward graduation. For each credit hour, students must complete 45 hours of volunteer work.

After finding a volunteer opportunity, students need to find an IPHY faculty member to serve as his or her sponsor. Typically, students ask their current instructor or professor to serve as their volunteer sponsor. Then, students work with their sponsor to determine what kind of academic effort will be required for the credit. In most cases this is a paper, but there is a lot of flexibility on what is acceptable. For instance, my students are required to submit a weekly journal that details their volunteer experience and how this applies to their IPHY courses. If a student was volunteering in a physical therapy clinic, for example, their journal entries might provide further detail about the anatomy of the knee, knee injuries, or rehabilitation techniques. Because these journals can be quite extensive, I encourage my students to refer to these entries when writing their application essays to post-baccalaureate or graduate programs.

Since each IPHY student has a unique reason for volunteering, the type and location of each volunteer experience is very different. The majority of students volunteer locally in a hospital or clinic, while a few students have volunteered internationally in Guatemala or Argentina. To complete the required volunteer hours, students will shadow a health care provider, prepare and clean equipment, or greet and assist patients. In essence, the more a student is willing to get "his or her hands dirty," the more fulfilling the overall volunteer experience.

As explained by three of my students this semester, the benefits to volunteering extend far beyond earning academic credit. For some lucky students, these opportunities lead to job opportunities after graduation.

> *"This opportunity has provided a wealth of knowledge about physiology, pathology, anatomy and healthcare that would otherwise have been hard to achieve in the classroom."*
> -***Kristen Sena***, a volunteer EMT at the Emergency Department at Children's Hospital Colorado
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> *"Ending my junior year of college, I was very anxious for the upcoming year because I didn't know exactly what I wanted to do after I graduated. I was stuck between nursing and pharmacy. After the internship this summer, I realized that pharmacy was more of a fit for me…. My recommendation for all people who do not know what to do after they graduate is to shadow some health professionals, see what you are most interested in, and find an internship in that area."*
> -***Ali Savage***, a volunteer in the pharmacy at The Medical Center of Aurora
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> *"This internship has inspired me in ways I wasn't expecting. Being able to see improvements in patients and having better understanding of what is involved in the practice has allowed me to get a better sense of how I want to involve chiropractic care in my life."*
> -***Marilyn Barnett***, a volunteer in chiropractic medicine at Wellness of Boulder

For more information, please watch the *Internships and Volunteer Work* video on the IPHY website: **http://www.colorado.edu/intphys/ugrad/videos.html.**

Spring 2015 IPHY Club: Events and Service by Taylor Pence and Heidi Bustamante

The Department of Integrative Physiology was able to resurrect the IPHY Club at the beginning of the 2013 academic year. Over the course of these last two active years, the executive board members have been able to provide necessary assistance to the students of the department. We have organized a multitude of events that allowed us to bring in health professionals across all medical fields ranging from doctors of medicine to physical therapists to experts in orthotics. In addition to offering students the opportunity to engage in informative talks with these professionals, we have given them a chance to assist in the department

itself. We've provided seminars about getting involved in research labs and TAships, and free tutoring for all courses in the IPHY degree (prerequisites and all). As many may know, the health field has an incredible range of professions and opportunities. As the executive board, our goal is to bridge the gap between IPHY students and their future careers. Below I wanted to share a few accomplishments of the IPHY Club in spring 2015.

Lauren Wahlquist: In recent years, growth in the field of physical therapy has been exponentially increasing. With a much higher demand for therapists and a higher recognition of their importance, more and more students are becoming interested in a career in physical therapy. At the beginning of this last semester, we were able to bring in the admissions coordinator, Lauren Wahlquist, from the PT program at University of Colorado Anschutz Medical Campus. Lauren was able to provide quality information about what makes a good application, give a detailed outline of their program and answer any questions students had. This event turned out extremely successful, informing upwards of 50 students about the essentials of applying to PT school.

Faculty Meet & Greet: As a student of the Integrative Physiology department, one can easily be a bit intimidated as they communicate with their course instructor in class. Many students breeze straight through college hardly ever speaking to the ones who are actually teaching the material. This last semester, the club was able to organize a meet and greet, where over 10 professors and instructors were able to chat with many students in a calm and relaxing environment. We brought together both the faculty and the students, allowing the students to naturally communicate and understand more about those who are teaching them the very material that will help them in their future careers. It was our hope that this would help lead students in the appropriate direction, and engage them in developing relationships with the faculty of our department.

IPHY Tutoring: A degree in Integrative Physiology is no easy achievement, and over the years students of this major encounter many difficult courses: from the infamous "weed out" class of General Chemistry to the complex class of Neurophysiology. No one should be afraid to admit that they could use a little extra help. However, hiring a tutor may not be feasible for everyone. The IPHY Club offers free tutoring in all subjects necessary to complete the IPHY degree. The tutoring committee, led by Grace Boll, was able to recruit 40+ tutors who helped over 150 students in our department this last year.

As the president of this outstanding club, I was thrilled to see all that we have accomplished this last year. Not only were the students of the department able to receive the proper assistance with their classes and the necessary guidance for their futures, they were able to build closer relationships with their fellow classmates and instructors. The biggest success this club has had over the course of this last year was more than just providing resources to the student body; we helped build a more connected department, a department that allows us to grow together and learn from one another.

A Career with My Scientific Hero by Ashley Bolden

This may sound pretty dorky, but do you know when you have your first scientific hero? That would be a scientist that is "famous" to both the scientific community and general public. Mine was Theo Colborn. I was in my first year of graduate school in the IPHY master's program when I picked up a copy of *Our Stolen Future*, Dr. Colborn's groundbreaking look at the history and background of "endocrine disruption", a term she coined. I literally devoured that book. I had no idea at the time that within a few years I would not only meet Dr. Colborn, but co-author a paper with her.

Without a doubt, my experience at IPHY was a crucial step on my path towards my current position. The IPHY department provided me with a diverse and substantial understanding of physiology that has been instrumental in the positions that I have taken following graduation. The courses I took during my master's education covered many fascinating topics – such as how molecules are trafficked across the plasma membrane, or how DNA is copied and regulated by molecular machines. My particular interest, however, was understanding how trace quantities of hormonally active chemicals can change the mating behaviors of fishes. I studied how waste-treated water affected the reproductive ability of fish.

I completed my master's degree in 2009; it was a year into the recession and jobs were scarce. I was fortunate enough to find a position as a research associate for an orthopedic surgeon at Denver Health whose focus was on traumatic brain injury. I studied the role of natural antibodies in the severe inflammation that follows a collision equivalent to being ejected from a vehicle at 40 mph and crushing one's skull on the pavement. It was a little outside my field, but I loved a challenge, and my time there was rewarding in several ways,. Every day that passed made me feel more like a scientist. I wrote protocols, learned new techniques, trained medical doctors, and made connections with colleagues outside the hospital.

I had worked at the hospital for just over a year when two of my mentors from CU-Boulder contacted me to tell me that The Endocrine Disruption Exchange (TEDX) was looking for a research associate. TEDX is a non-profit organization devoted to reducing or eliminating the use and production of endocrine disruptors, which could harm human and ecological health. It was founded by Dr. Colborn in 2003. I was enjoying my work in the Traumatic Brain Injury Lab, but this was an opportunity that I could not turn down – a chance to work with one of the founders of my field and a personal idol. There was a catch – I would have to move. TEDX is located on the single downtown block of Paonia, Colorado, a small town of 2000 on the Western slope.

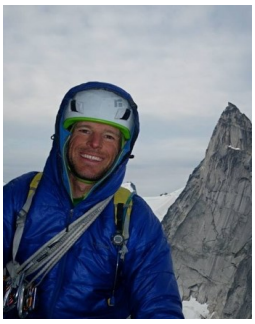
Life in Paonia is different from what I was used to, to say the least. I grew up in the urban center of Denver. When I toured CU-Boulder I remember thinking, "wow this place is small"! In comparison to Paonia, however, Boulder may as well be New York City. Before living here, I did not realize people still lived on farms. I've seen bears swimming in the creek from my back porch and fallen asleep to the eerie screams of vixens.

My time at TEDX has been very interesting, different than I could have ever imagined. One of the best things about it is that I have gotten to use most of knowledge I gained during graduate school. So often I hear people complain that their coursework did not prepare them for the workforce; I had the opposite experience. I have worked on several interesting projects while at TEDX. To highlight a few with Drs. Colborn and Kwiatkowski, we wrote the first review examining the health effects of the common air pollutants, BTEX. I also co-authored a paper with Dr. Rochester to evaluate the endocrine disrupting properties of two common bisphenol A (BPA) substitutes, bisphenol S and F, which are found in many consumer products. Last year I led a project for a European NGO. We evaluated the endocrine disrupting properties of several chemicals. Our analysis was used to encourage businesses in the European Union to eliminate the use of chemicals that will likely be targeted by legislation in Europe.

I've always loved to learn, but IPHY really nurtured my curiosity and helped me become aware of my thirst for knowledge. This has allowed me to see situations from different perspectives and to find inspiration in unexpected places. My time in the IPHY department really prepared me for a multi-disciplinary scientific landscape. Aside for the basic knowledge on the complex interworkings of our bodies, my time in graduate school taught me how to teach myself. This skill has been invaluable in all the positions I have taken thus far. I have no doubt that I will continue to use the skills that I acquired at CU-Boulder throughout my life – and I can't wait to find out what the future holds!

People Updates

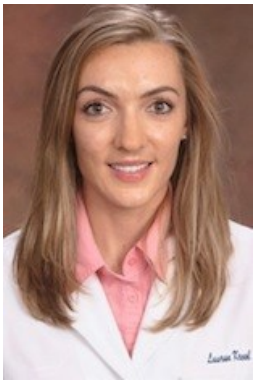
Andrew (Drew) Hildner originally graduated CU in 2001, majoring in history and communications and afterwards working for a short period with Dr. Patricia Limerick, of the History Department, researching, writing, and managing projects for the Center of the American West. He had developed an interest in how the body works from his experience as a track and field decathlete for CU and the interest was furthered by his experiences as a member of Boulder's all-volunteer mountain search and rescue group. This eventually led him to get his EMT and return to school to complete his science prerequisites for a physician assistant (PA) graduate program while working on an ambulance.



Back at CU, he found enjoyment in his many IPHY classes and in the research the professors were conducting; so much so that he nearly abandoned his clinical practice plans to join the graduate program. He completed his prerequisites, mostly IPHY courses, in 2008, and went on to a PA program in Oakland, California. Graduating in 2010, he returned to the Front Range, working initially in orthopedic surgery and sports medicine (where his classes on biomechanics and exercise physiology have been particularly useful), and went on to include emergency medicine. He recently added remote medicine to his experience, spending the last half of 2014 as the medical provider for an Air Force outpost on Wake Island (of WWII fame), a small, isolated coral atoll in the tropical Pacific. After experiencing the physiologic effects of low altitude, humidity, tropical breezes and cramped quarters on the small remote island, he has since returned to Boulder and CU-Denver, now as clinical faculty in the Orthopedics Department Medical Program.

When not working, he stays busy with mountain rescue, rock and ice climbing, mountaineering, road and mountain biking, alpine and backcountry skiing, and making guilty-pleasure baked goods. Future plans include giving orthopedic and emergency medicine lectures to students at CU Physician Assistant Program this fall, getting more involved in medical research, and more international climbing trips.

Colleen Glyde Julian graduated from CU-Boulder with an MS in Integrative Physiology in 2001. After graduation, she spent two years in California working as an exercise physiologist alongside Dr. Jack Daniels. Colleen kept her hand in research during this time by developing small collaborative research projects with the US Olympic Committee and the Palo Alto VA Medical Center. After this rewarding experience, she returned to Colorado to pursue her PhD in health and behavioral sciences at UC-Denver. Her doctoral research focused on the physiological mechanisms underlying fetal growth restriction at high altitude in Colorado and South America. In Bolivia she and her team, led by Dr. Lorna Moore, observed that the effect of high altitude to impair fetal growth is diminished in Andeans, a native highland population considered to be adapted to the hypoxic environment. Their work demonstrated that Andean protection against hypoxia-induced fetal growth restriction was the result, in part, of increased blood flow and oxygen delivery to the fetus through greater expansion of maternal blood vessels during pregnancy. Colleen is currently an NIH Building Interdisciplinary Research Careers in Women's Health (BIRCWH) scholar and an Assistant Professor in the Department of Medicine at the Anschutz Medical Campus. She is using epigenetic and genomic strategies to understand how environmental exposures modify fetal growth and influence disease susceptibility throughout the lifespan. By integrating genomic and functional studies, the goal of this work is to identify potential targets for the development of novel therapies for IUGR as well as its long-term consequences, and to design more effective methods to detect individuals at risk for hypoxia-related pregnancy complications. Her research is currently supported by the NIH-BIRCWH program and the Colorado Clinical and Translational Sciences Institute (CCTSI). Her additional interests include human adaptation to chronic hypoxia, maternal adaptation to pregnancy and the influence of environmental epigenetic modifiers during intrauterine life for adult-onset disease. "I don't think I'll ever stop being in awe of how intricate human physiology is or how much biologic fine-tuning has to go on to keep the whole operation moving," she says. When she's not working, you'll most likely find her running around in the mountains!



Lauren Krowl MD (PGY-1) graduated from CU-Boulder in 2009 with a BA in Integrative Physiology. While at CU she was the first chief research assistant elected for Dr. Kai Larsen's Human Behavior Project at the Leeds School of Business. She also completed an internship at the Spinal Cord Injury Recovery Project under the supervision of Dr. David Sherwood. After graduation, she worked for a year at Coram Specialty Infusion on a clinical trial involving the use of IVIG on patients with Alzheimer's disease. She contemplated medical school during this year and ultimately enrolled at an offshore medical school. Her decision to attend a medical school in the Caribbean was influenced by her former CU Buff chemistry tutor, Jessica Best MD, who also attended an offshore school and is now in her final year of residency. Lauren will start her internal medicine residency this July at the State University of New York in Syracuse, NY. She is also preparing to present her MBA thesis regarding the costs/benefits of hospital safety protocols later this year. Her future plans include a critical care fellowship and integrating her business degree with medicine in a hospital management role.

Kudos to Faculty & Other News

Dr. ***Anne Bekoff*** has recently published a paper in *Developmental Psychobiology* on the role of sensory feedback in embryonic chick movement.

Dr. ***Janet Casagrand*** has received the *Sam Drogo Technology in the Classroom Award* from the Human Anatomy and Physiology Society (HAPS) for her innovative use of technology to engage undergraduates in Human Anatomy and Physiology.

Dr. ***Marissa Ehringer***'s laboratory has published a paper showing that adolescent mice voluntarily consume less alcohol when they have access to a running wheel, with sex differences in gene expression.

The 5th edition of Dr. ***Roger Enoka***'s textbook entitled "*Neuromechanics of Human Movement*" was published in April. The book describes how the nervous system controls the movements we perform within the context of our physical world.

In July, Dr. ***Monika Fleshner*** will be giving a keynote lecture in Vienna, Austria at the International Society for Exercise Immunology on the impacts of stress on immune function and the role of miRNAs.

Dr. ***Alena Grabowski*** was recently featured in the *Boulder Daily Camera* for her research helping Paralympic sprinters with leg amputations to improve their performance with optimized running-specific prostheses.

Sr. Instructor ***Ruth Heisler*** has published *A Photographic Atlas for Anatomy & Physiology* for use in undergraduate gross anatomy laboratories.

Dr. ***Charles Hoeffer*** has received a 5-year grant form the National Institute of Mental Health to study how different Akt isoforms (a protein critical to cellular growth) are in involved in learning, memory formation and neuropsychiatric disorders like schizophrenia.

Dr. ***Tom Johnson*** recently received a $200,000 grant from the state of Colorado. This was a Bioscience Discovery Evaluation Grant to promote the development of jobs in the state by aiding small companies in the private domain. The focus of the work is to develop cryoprotectants that would allow human organs to be stored indefinitely and then transplanted back into the recipient.

Dr. ***Rodger Kram*** published a paper in *PLoS One* reporting that senior *runners* (> 65 years old) retain the same *walking* efficiency as 20 year olds whereas senior walkers do not. The finding garnered lots of coverage in the popular media including the *New York Times* and National Public Radio and international outlets.

Dr. ***Tom LaRocca*** ran a CU Crowdfunding campaign to support public outreach projects aimed at promoting information and research on healthy aging.

Dr. ***Monique LeBourgeois*** and PhD student ***Lameese Akacem*** published a paper in *PLoS One* showing differences in the timing of the circadian clock between napping and non-napping toddlers.

Dr. ***Monique LeBourgeois*** was appointed a working group member in a joint effort between the National Sleep Foundation, the Institute of Medicine and National Research Council of the National Academies, and the Institute of Digital Media and Child Development to report on electronic media use and sleep in children and adolescents.

Dr. ***Chris Link*** published a study in *EMBO J* identifying a novel function for a protein with a central role in Amyotrophic Lateral Sclerosis (ALS)

Dr. ***Chris Lowry*** participated in a Live Google Hangout sponsored by the The Kavli Foundation to explore The Microbiome & the Brain - A New State of Mind.

Dr. ***Suzanne Nelson*** has won the Honor Code's Faculty Integrity Award. This is awarded to one faculty member per year on campus.

Dr. ***Doug Seals*** published a paper in the prestigious scientific journal *Nature* on the importance of assessing physiological function in studies of aging, and the need to identify interventions to preserve function with advancing age.

Dr. ***Dave Sherwood*** published a paper on the differences in the accuracy of aiming movements in both preferred and non-preferred limbs in the *Frontiers in Psychology* journal.

Dr. ***Jerry Stitzel*** recently published a paper in *Psychopharmacology* showing that the hormone melatonin may regulate nicotine intake. The study was led by former IPHY graduate student ***Will Horton***.

Dr. ***Pei-San Tsai*** and former graduate student ***Joshua Johnson*** published a paper in *PLoS One* on the discovery and weight-loss effect of a novel invertebrate hormone that is evolutionarily related to a vertebrate fertility hormone.

Dr. ***Ken Wright*** has recently interviewed with NPR Marketplace to discuss how shiftwork impacts the economy and workers health.

Other News

View a video of the ***Integrative Physiology Spring 2015 Recognition Ceremony*** (http://livestream.com/accounts/983593/events/4025057)

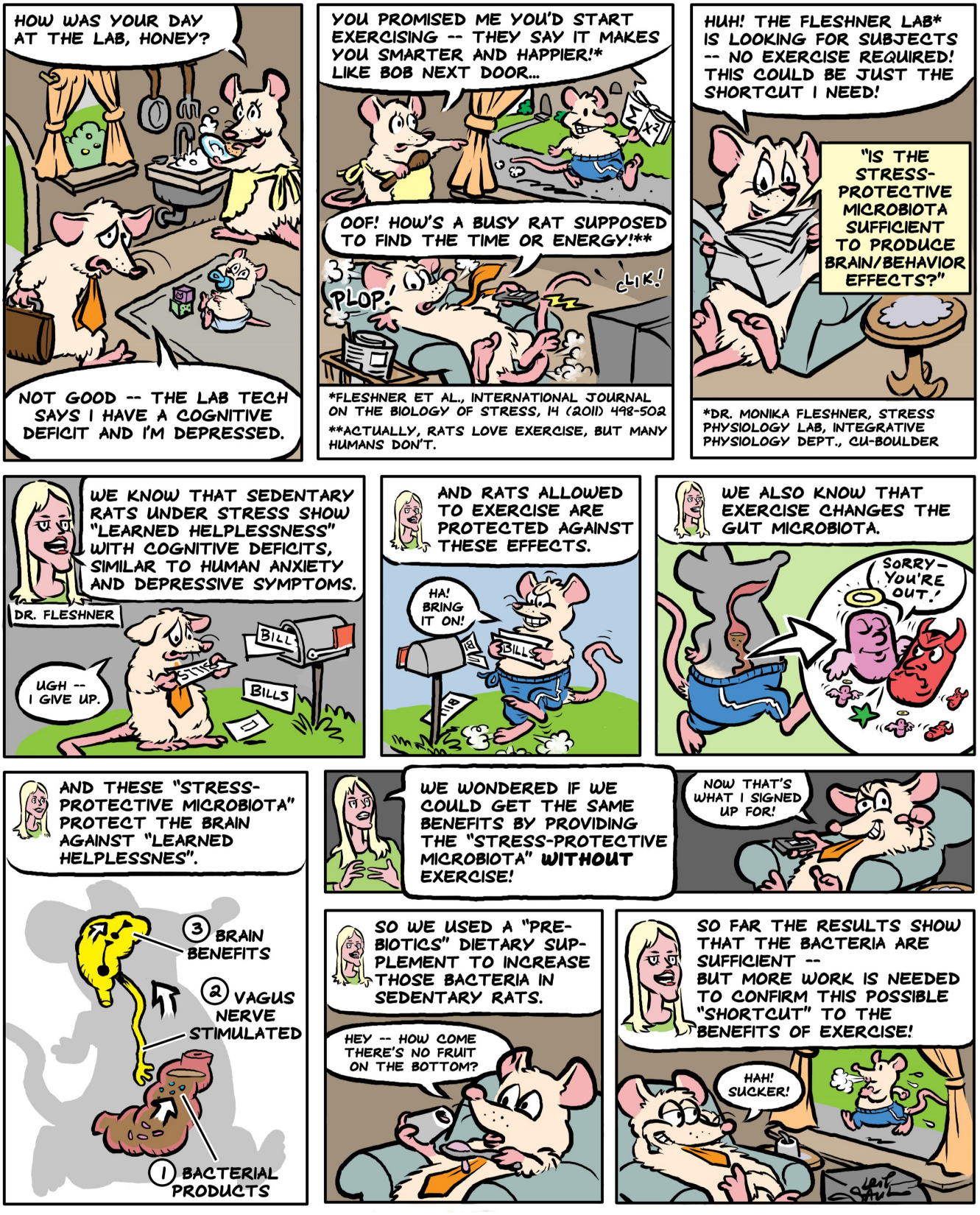
IPHY Adjunct Faculty ***Carol Kwiatkowski*** and former graduate student ***Ashley Bolden*** has co-authored a review on BTEX, a group of chemical contaminants, in the peer-reviewed journal *Environmental Science and Technology*. The study has been written up by several popular media outlets including *Environmental Health News* (http://www.environmentalhealthnews.org/ehs/news/2015/apr/endocrine-disruption-hormones-benzene-solvents)

Jennifer Law, IPHY Manager of Operations, has received the CU Green Labs Program Award for Individual Achievement reducing the impact of laboratory research on the environment. For more information see http://www.colorado.edu/ecenter/cu-green-labs-program/cu-green-labs-program-awards.

Dr. ***Chris Lowry*** has been selected to present the 2015 Roy H. Garstang Memorial Lecture "Can We Vaccinate Against Anxiety and Affective Disorders?". CU-Boulder Sigma Xi Chapter, April 2015.

A cartoon representation of Dr. Monika Fleshner's research *by Leif Saul*

HOW TO BEAT LIFE'S STRESSES -- WITH EXERCISE, PREBIOTICS, AND YOUR GUT



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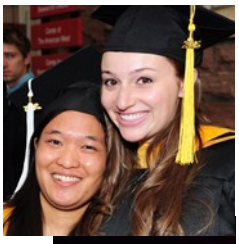

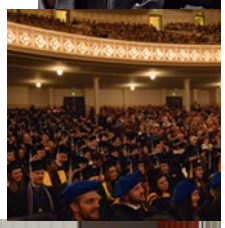

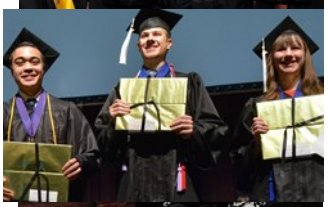
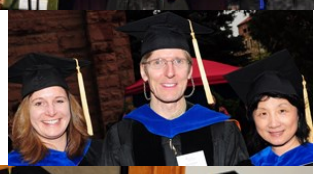
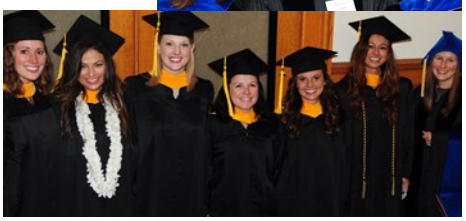

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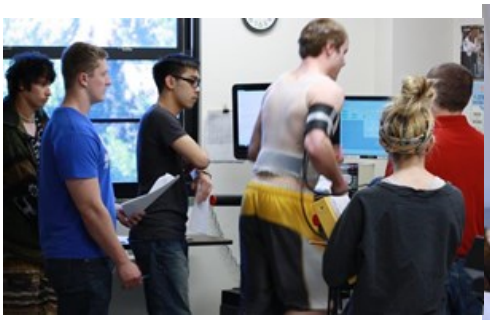

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