



**Integrative
Physiology**

University of Colorado
Boulder

Department
Newsletter

IPHY

Issue #21

February 2024

Special points of interest:

- Monique LeBourgeois was an exceptional scientist, teacher, mentor and person who will be greatly missed by many in our department and across campus.
- On July 1 2003, the Environmental Population and Organismic Biology (EPOB) and Kinesiology (KINE) departments combined all of KINE's faculty and curriculum with some of EPOB's faculty and curriculum to become Integrative Physiology (IPHY).
- IPHY's Monika Fleshner sits on a panel of 75 scientists who are calling for funding to expand biological and physical science by a factor of 10.

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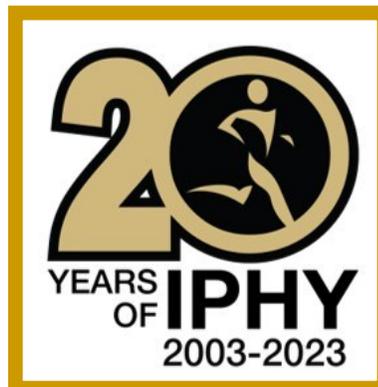
A Few Words from Chair Marissa Ehringer

We celebrated the 20-year anniversary of the Department of Integrative Physiology last fall with a social event that welcomed past and current students, staff, and faculty. Many changes have occurred during this time, as our undergraduate major has exploded in popularity. We are excited for the future as our research programs and classes continue to evolve in a world where new advances are achieved rapidly. As an example, this issue highlights the contributions of Dr. Monika Fleshner as an advisor to NASA's space exploration program.

Sadly, the fall semester also brought a tragic loss to all of us when Dr. Monique LeBourgeois passed unexpectedly. Dr. LeBourgeois was an incredible mentor, scientist, and friend to all who knew her. In February, we were able to come together for a memorial service that allowed students, colleagues, and mentors to mourn, cry, share stories, and laugh. She will be missed by many.

For IPHY undergraduate majors, our department has always been on the leading edge of developing new strategies to support learning success. We now offer two new courses – IPHY 1020 and IPHY 3020 – that serve as “bookends” for students. IPHY 1020 is a first-year course designed to inform majors about available resources and opportunities, while IPHY 3020 assists students closing in on graduation with professional skills to land their first job.

Finally, we are delighted to welcome Dr. Rachel Rowe, a new Assistant Professor who joined us in August and has already contributed to the teaching and research missions of the department. Thanks for reading this update – please stay in touch and follow us also FaceBook, Instagram, and X (@CUBoulderIPHY) for the latest news!





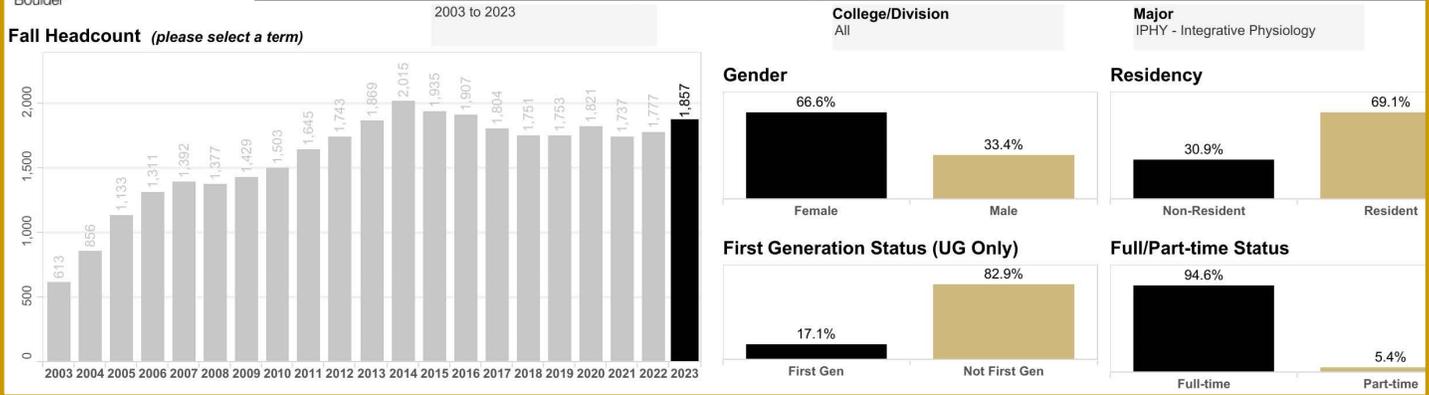
IPHY Celebrates 20-Year Anniversary

On July 1 2003, the Environmental Population and Organismic Biology (EPOB) and Kinesiology (KINE) departments combined all of KINE’s faculty and curriculum with some of EPOB’s faculty and curriculum to become Integrative Physiology (IPHY). At that time, the goals of the new department/curriculum were to enhance the foundation for students applying to professional schools, guide students toward upper division core courses earlier in their programs so they can participate in laboratory research opportunities, retain the flexibility of the major, and minimize the prerequisites to simplify the major. Over the twenty years, IPHY has seen growth in research labs and grant funding along with a 203% increase in student enrollment.

Demographics of IPHY Students



CU Boulder Fall Enrollment - Summary by Major
Major: IPHY - Integrative Physiology
Most recent fall term is currently selected.
Selections made in one graph will affect all others (e.g. click on 'Male' to see breakdown of other measures for males).



On Friday, October 27, we celebrated our 20-year anniversary at the Koenig Alumni Center. It was attended by current and alumni faculty, staff, research personnel and students. A great time was had by all!





IPHY's Monika Fleshner Sits on Space Station Panel

The International Space Station (ISS) is an engineering triumph that has had an astronaut presence for two decades all the while maintaining important international partnerships. It is a one-of-a-kind laboratory that is on the front end of being well utilized, yet there is so much more that can be done. More than 3000 experiments have been conducted on the ISS, but a panel of scientists wants that number to grow. IPHY's Monika Fleshner sits on that panel of 75 scientists who are calling for funding to expand biological and physical science by a factor of 10. This panel, overseen by the National Academies of Sciences, Engineering, and Medicine, created a survey that gives NASA and Congress priorities on how the ISS and future space stations should be used.



NASA's Division of Biological & Physical Sciences (BPS) is severely underfunded and at the same time it is projected to have a big role in NASA's space exploration efforts. With the promise to return humans to the moon and on to Mars, rocket companies lowering the cost of moving people and hardware into the lower orbit, and plans to have NASA astronauts, private researchers and space tourists visit simultaneously, this decadal survey will be a driving force to enable human space exploration. One major project would gather the fundamental science needed to build life-based systems that could keep crews alive in deep space for years at a time. Another would supercharge research into zero-waste recycling methods and the techniques needed to "live off the land" on the Moon and elsewhere. We are so very proud to have one of our very own scientists participating in such an important, world-changing project.



Astronauts work on an experiment to grow plants in nontraditional media—a line of research that could help sustain long-duration human missions.

Excerpt/photo from *Science*: [Panel calls for giant boost to space station research.](#)



New IPHY Courses Focus on Setting Students Up for Success *by Ruth Heisler*

How would you define Student Success? Is it getting good grades? Participating in a community? Becoming more independent? Practicing self-advocacy? Setting and meeting individual goals? In our experience, it is all the above. But students often tell us they struggle in at least one of these areas. So, in 2020, the Department of Integrative Physiology (IPHY) implemented a plan to help support all students by creating two new courses that target two of the most stressful aspects of the undergraduate experience: entering college and graduating from college.

In 2021, IPHY 1020: Intro to Integrative Physiology was first offered to all incoming first-year students and transfer students. Professor Ruth Heisler designed the course with the primary goal of guaranteeing that all incoming IPHY majors are equally aware of resources and opportunities available on campus and within the IPHY department. Thus, this course helps to break down barriers to success that many incoming students, particularly at-risk populations, face when beginning their college careers.

Weekly speakers are scheduled around critical events in the semester. For instance, Dr. Janet Casagrand introduces the benefits of active learning strategies before the first set of midterms; staff from Health Promotion talk about stress and mental health just after the first midterms; Biology advisors provide support in preparation for spring class registration; IPHY faculty talk about their teaching and research and give advice on

how to get involved in research labs; Career Services and the Office of Prehealth Advising educate students on services they offer; and this year we added a session on AI/ChatGPT to help students navigate when the use of AI is appropriate. These are just a few of the topics and resources that are promoted in a low-stress, 1-credit weekly seminar format.

All too quickly, students find themselves preparing to graduate and wondering how to land that first job. Feedback from our graduates made it clear that we could better support our majors in preparing for that next step, especially for those who may not be pursuing careers in the health professions. In the fall semester of 2023, IPHY 3020: Next Steps: Preparing for Life after Graduation was first offered. Professor Heisler and Dr. Casagrand worked with Career Services to develop another low-stress, 1-credit weekly seminar focused on helping students identify their skillset, formulate a plan to fill in gaps in their skillset based on their career goals, build a resume, write cover letters, network, and practice interview skills. It was exciting to see students work through these processes and confidently start applying for internships and jobs during the semester.



The IPHY department continually strives to improve the educational experience of our students, and IPHY 1020 and 3020 are the most recent steps in this process. Together these courses are providing valuable support and resources for our students, helping them navigate not only their college careers but their lives after graduation.



We Celebrate the Life & Science of Dr. Monique LeBourgeois



Monique LeBourgeois, associate professor of integrative physiology at the University of Colorado Boulder and an expert on sleep and circadian physiology in children, died on November 28, 2023. She was 54.

LeBourgeois' colleagues and friends were "devastated by her premature passing," Marissa Ehringer, CU Boulder chair and professor of integrative physiology, said in a statement. In addition to the personal loss, Ehringer noted the loss to science: "Her innovative research pioneered methods for assessing circadian rhythms and sleep measures in toddlers in the home environment."

In 2018, for example, the LeBourgeois Sleep and Development Lab found that dimming the lights in the hours before bedtime can help children fall asleep. Specifically, the lab found that exposing preschoolers to an hour of bright light before bedtime almost completely shuts down their production of melatonin, a sleep-promoting hormone.

Further, exposure to bright light just before bedtime suppressed the production of melatonin for at least 50 minutes after lights were turned off. The study was the first to assess the hormonal impact nighttime light exposure can have on young children. LeBourgeois and her colleagues also shed new light on the biological, neurological and environmental effects of light and electronic screen time on children.

In 2010, the CU Boulder Department of Integrative Physiology recruited her to join the faculty as a tenure-track professor. She conducted longitudinal studies examining the development of Process C and Process S (two components of a sleep regulation concept) across early childhood, as well as researching the sensitivity of the developing circadian system to light exposure.

Beyond her scientific accomplishments, LeBourgeois devoted much of her academic life to mentorship, always asking trainees, "What do you want your life to look like?" She invested time, energy, trust and love into helping trainees to successfully achieve their goals. Recognizing the mentorship she received, she sought to sustain it by creating the Mary A. Carskadon Sleep and Circadian Summer Research Fellowship in 2017.

This annual fellowship provided enriching and unique opportunities for students to receive hands-on research experiences, form relationships with families in the community and develop basic professional skills. Many of her trainees have gone on to successful careers in professions including biomedical research, health care, science policy and industry.

She published nearly 80 peer-reviewed journal articles and had another 10 in progress or under review at the time of her death. Among the recognitions she received were the American Academy of Sleep Medicine Young Investigator Award in 2003, the American Academy of Sleep Medicine/Pfizer Scholars Grants in Sleep Medicine Award in 2005, and a College Scholar Award from CU Boulder in 2022. Last year, she was named a Health Research Accelerator Fellow at the University of Queensland, Brisbane, Australia.

A celebration of Dr. LeBourgeois' life and science took place on February 10 at the Koenig Alumni Center. The outpouring of respect, love, and gratitude shared by the speakers and in individual conversations was a reflection of her positive spirit and enthusiasm for all she did.

[Monique K LeBourgeois Undergraduate Endowment Fund](#)



IPHY New Faculty—Welcome, Rachel Rowe!



Growing up in a small town in southeastern Kentucky, I spent most of time fishing and playing sports. While attending Eastern Kentucky University on an academic scholarship, I majored in pre-medical sciences with a minor in chemistry. After college, I received a PhD from the University of Kentucky College of Medicine where I trained at the Spinal Cord and Brain Injury Research Center (SCoBIRC). My doctoral research was funded by an NIH Research Supplement to Promote Diversity and focused on acute sleep disturbances after traumatic brain injury. Following graduate school, I relocated to Phoenix, Arizona and completed a post-doctoral fellowship with Barrow Neurological Institute at Phoenix Children’s Hospital and the University of Arizona College of Medicine-Phoenix. My post-doctoral research was funded by Science Foundation Arizona through a Bisgrove Fellowship.

In 2021, I moved my research lab to the University of Colorado Boulder, and in 2023 I transitioned into a tenure-track position with the Department of Integrative Physiology. The Sleep, Inflammation, and Neuropathology Laboratory conducts research on how inflammation induced by traumatic brain injury, neurodegenerative diseases, and immune challenges contributes to sleep-wake disorders. The lab is funded by the National Institutes of Health and the Department of Defense. For my multidisciplinary research I have received the American Academy of Sleep Medicine Foundation Young Investigator Award, the International Brain Injury Association Young Investigator Award, and National Neurotrauma Society Rising Star Award.

As a faculty member I am committed to promoting individuals from underrepresented backgrounds and am actively serving on the IPHY Diversity, Equity, and Inclusion Committee. I also serve as a mentor on several funded grants that promote diversity and excellence in research. At a national level I serve as the co-chair of the National Neurotrauma Society Local Diversity Scholar Program. I am committed to promoting the visibility and voices of the disadvantaged.

On a personal note, I love music, listening to vinyl records, singing karaoke, and playing the guitar. I enjoy being a mother and introducing my daughters to nature. My family enjoys living in Colorado, and we spend our time camping, hiking, riding mountain bikes, and rock climbing.





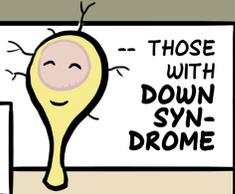
Cartoon Representation of Dr. Charles Hoeffler's Research by Leif Saul

MENDING THE MOLECULES OF THE MIND

ACCUMULATIONS OF THE BETA AMYLOID PROTEIN ARE THOUGHT TO PLAY AN IMPORTANT ROLE IN CAUSING ALZHEIMER'S DISEASE

ONE FACTOR SLOWING DOWN RESEARCH IS THAT THE UNDERLYING CHANGES IN BRAIN TISSUE TAKE MANY YEARS TO CAUSE SYMPTOMS.

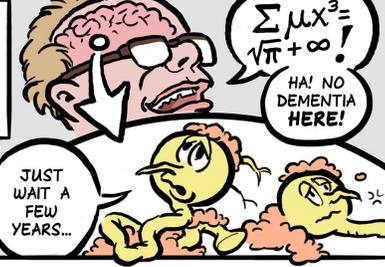
HOWEVER, THERE IS ONE POPULATION --



-- THOSE WITH DOWN SYNDROME



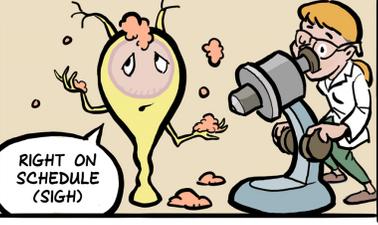
-- BUT DRUGS TARGETING THE PROTEIN HAVE SO FAR PROVEN UNSUCCESSFUL.



$\sum \mu x^3 = \sqrt{\pi} + \infty!$
HA! NO DEMENTIA HERE!

JUST WAIT A FEW YEARS...

-- WHO ALWAYS DEVELOP ALZHEIMER'S DISEASE BY MIDDLE AGE



RIGHT ON SCHEDULE (SIGH)

-- AND COULD HOLD THE KEY TO UNDERSTANDING ALZHEIMER'S DISEASE IN THE GENERAL POPULATION.

AND SURELY SLEEP PLAYS A ROLE? RESEARCH HAS SHOWN HOW IMPORTANT IT IS FOR LEARNING AND MEMORY.



STOP REMINDING ME -- IT KEEPS ME UP AT NIGHT!

INDEED, SLEEP IRREGULARITIES ARE A RISK FACTOR FOR ALZHEIMER'S DISEASE, AND ARE CHARACTERISTIC OF DOWN SYNDROME, AS WELL AS NORMAL AGING.



YOU GUYS UP LATE TOO?

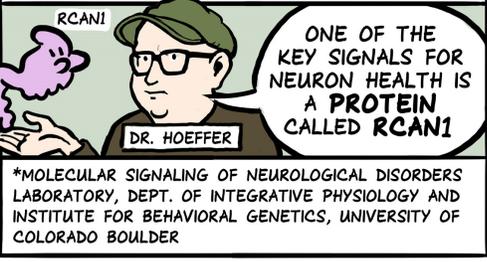
DOWN SYNDROME

AGING

ALZHEIMER'S DISEASE

YEP, COULDN'T SLEEP

CHARLES HOFFER* AND COLLEAGUES ARE FOLLOWING THESE CLUES TO TRACK DOWN THE MOLECULAR SIGNALS THAT LIE AT THE HEART OF NEUROLOGICAL DISORDERS.

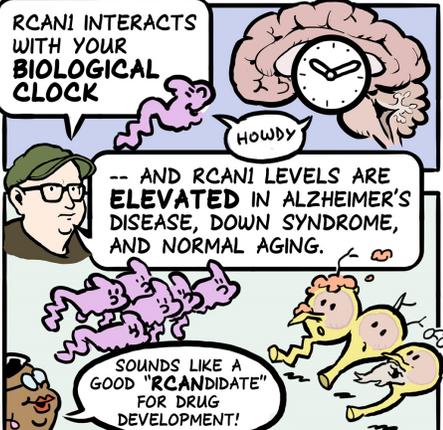


RCANI

DR. HOFFER

ONE OF THE KEY SIGNALS FOR NEURON HEALTH IS A PROTEIN CALLED RCANI

*MOLECULAR SIGNALING OF NEUROLOGICAL DISORDERS LABORATORY, DEPT. OF INTEGRATIVE PHYSIOLOGY AND INSTITUTE FOR BEHAVIORAL GENETICS, UNIVERSITY OF COLORADO BOULDER

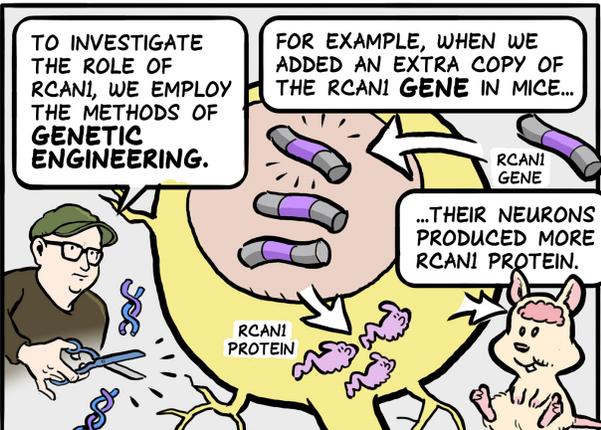


RCANI INTERACTS WITH YOUR BIOLOGICAL CLOCK

HOWDY

-- AND RCANI LEVELS ARE ELEVATED IN ALZHEIMER'S DISEASE, DOWN SYNDROME, AND NORMAL AGING.

SOUNDS LIKE A GOOD "RCANDIDATE" FOR DRUG DEVELOPMENT!



TO INVESTIGATE THE ROLE OF RCANI, WE EMPLOY THE METHODS OF GENETIC ENGINEERING.

FOR EXAMPLE, WHEN WE ADDED AN EXTRA COPY OF THE RCANI GENE IN MICE...

...THEIR NEURONS PRODUCED MORE RCANI PROTEIN.

RCANI GENE

RCANI PROTEIN



THESE MICE, WHEN YOUNG, HAD DISRUPTIONS IN THEIR DAILY ACTIVITY RHYTHMS...

AND AT A LATER AGE, THEY HAD NEURON PATHOLOGIES AND COGNITIVE DEFICITS.



YOU FORGOT THE MILK AND THE CHEESE?

THESE FINDINGS MIRROR THE PROGRESSION OF SLEEP DISRUPTION AND BRAIN PATHOLOGY THAT OCCURS IN HUMAN DISEASE.

IN FUTURE WORK, WE'LL STUDY "SLEEP IN A DISH" USING NEURONS DERIVED FROM REPROGRAMMED SKIN OR BLOOD CELLS

-- WHICH MAY SOMEDAY RESULT IN NEW TREATMENTS TO IMPROVE THE LIVES OF PEOPLE WITH DOWN SYNDROME AND ALZHEIMER'S DISEASE.



LET'S SEE WHAT WE CAN "DREAM UP" IN THE LABORATORY

Leif Saul



Kudos/News

Tanya Alderete was awarded a Provost's Faculty Achievement award for her research article demonstrating the health effects of environmental toxicants such as air pollution on the human gut microbiome.

Holzhausen EA, Kupsco A, Chalifour BN, Patterson WB, Schmidt KA, Mokhtari K, Lurmann F, Baccarelli AA, Goran MI, and Alderete TL. Influence of technical and maternal-infant factors on the measurement and expression of extracellular miRNA in human milk. *Front. Immunol.* 2023.

Tanya Alderete and **Kevin Clark** (MS student) were featured in CU Boulder Today for a recent study published in *BMC Public Health* regarding mask use during the pandemic.

Sophia Blasco, an UG student in the Fleshner lab, won the distinguished presenter award from the National Institute of Mental Health for her work entitled, "Predictions for Neural Activity in the Lateral Hypothalamus During Appetitive Learning with Symbolic Reinforcement."

Heidi Bustamante was selected to participate in the Online Teaching Academy to develop a summer 2024 course.

Tomicek NJ, Cafferty P, Casagrand J, Co E, Flemming M, McFarland J, O'Loughlin VD, Scott D, Silverthorn D. Creating the HAPS Physiology Learning Outcomes: terminology, eponyms, inclusive language, core concepts, and skills. *Advances in Physiology Education.*

Luke Desmond, PhD student in the Lowry lab, received an Outstanding Oral Presentation Award at GEBIN meeting.

Chris DeSouza completed "Tour De France" to raise money for leukemia research.

Eamonn Duffy and Erika Mehrhoff (Ehringer Lab) received a travel award to attend the Jackson Laboratory's Short Course on the Genetics of Addiction.

Evans LM, Arehart CH, Grotzinger AD, Mize TJ, Brasher MS, Stitzel JA, Ehringer MA, Hoeffler CA. (2023) Transcriptome-wide gene-gene interaction associations elucidate pathways and functional enrichment of complex traits. *PLOS Genetics.*

Marissa Ehringer was awarded an AB Nexus grant with Dr. Darleen Sandoval at CU Anschutz: "The Effect of Human GCKR P446L Genetic Variant on Alcohol Behaviors and Metabolism".

Lyanna Kessler (Lowry Lab), received the AY23-24 Carol B. Lynch Memorial Fellowship .

Brasher MS, Mize TJ, Thomas AL, Hoeffler CA, Ehringer MA, Evans LM. (2023) Testing associations between human anxiety and genes previously implicated by mouse anxiety models. *Genes, Brain, and Behavior.* DOI: 10.1111/gbb.12851.

Monika Fleshner was among 75 scientists who recently called for NASA's funding of biological and physical science on the ISS and elsewhere.

Maureen Floriano was selected to participate in the Active Learning Academy "Learning By Design" Professional Development Program.

Tabitha Green, a postdoctoral fellow in the Rowe lab, was selected as a 2023 Outstanding Postdoc of the Year by the Office of Postdoctoral Affairs.

Lauren Hartstein and **Monique LeBourgeois'** [Children and preteen use of melatonin as sleep aid](#) work was recognized.

Charles Hoeffler received a 5-year NIH R01 from NIA: "Sleep abnormalities in Down Syndrome-related Alzheimer's disease" (~\$500,000 direct costs each year)—**Chris Link and Mark Opp** are co-Investigators on this project.

Steve Hobbs was awarded an A&S Fund for Excellence grant to support travel to the Posit meeting in Chicago, where he learned more tools for advanced data analysis and statistical modeling in R.

Lyanna Kessler was awarded an Outstanding Poster Presentation Award at GEBIN.

Lowry Lab research, [How Dirty Litter Box Could Slow You Down as You Age](#), was highlighted in *CU Boulder Today* and presented at the Science Writers 2023 Conference at Folsom Stadium.

Sophia Mahoney (Seals lab) was awarded a summer fellowship at the National Institute on Aging.

Grant Mannino (Rowe Lab) received a PACE award and a PNIRS trainee travel award.

Kevin Murray (Seals Lab) received the American Heart Association's Postdoctoral Fellowship; he also has received a NIH F32 award.

Emily Ostrander (DeSouza Lab) received two research/grant awards: BSI Scholar in STEM award and a UROP award.

Matthew Rossman' received an American Heart Association Career Development Award.



Kudos/News

Dana Ritterbusch (Rowe Lab) was awarded a \$1000 Diamond Stecher Family Endowed Scholarship—only one in College of A & S.

AB Nexus Award (**Jerry Stitzel & Manisha Patel**): “Multi-generation impact of developmental nicotine exposure on mitochondrial function”.

Rachel Rowe is co-investigator on a 5-year grant at the University of Arizona and the Phoenix VA Hospital: “Gravida traumatic brain injury (TBI) impacts neurobehavioral and neurocircuitry phenotypes of the offspring”.

Rowe Lab publication: Ortiz, J Bryce et al. Diffuse traumatic brain injury substantially alters plasma growth hormone in the juvenile rat. *The Journal of endocrinology* vol. 260.

Ian Rutherford (Lowry Lab), received a PACE travel award to present at GEBIN in Ulm, Germany.

Sam Ruzzene (DeSouza Lab) is a BSI Scholars in the STEM Undergraduate Research Program.

Saydie Sago (Lowry Lab) received the Figueroa Family Fellowship in recognition of commitment to the achievement of a diverse student body along with two research awards: Cobell Research Fellowship and Beverly Sears & Cynthia H. Schultz Research Grant.

NIH STTR grant (PI: **Doug Seals**): Feasibility and design of a novel smartphone app to deliver blood pressure-lowering inspiratory muscle strength training. R41HL167375, NIH NHLBI.

LaRocca TJ, Smith ME, Freeberg KA, Craighead DH, Helmuth T, Robinson MM, Nair KS, Bryan AD, Seals DR. Physiol Genomics. KA, Craighead DH, Helmuth T, Robinson MM, Nair KS, Bryan AD, Seals DR. Novel whole blood transcriptome signatures of changes in maximal aerobic capacity in response to endurance exercise training in healthy women. *Physiol Genomics*.

Murray KO, Ludwig KR, Murray KO, Ludwig KR, Darvish S, Coppock ME, Seals DR, Rossman MJ. Chronic mitochondria antioxidant treatment in older adults alters the circulating milieu to improve endothelial cell function and mitochondrial oxidative stress. *Am J Physiol Heart Circ Physiol*.

Jules Ulrich (Rowe Lab) was selected as a trainee on the NIH Bridges to Baccalaureate T34 grant.

Kendra Wegerson and Aubrun Berry (DeSouza lab) received UROP grants.

Ken Wright was awarded two NIH R01s: R01HL165343-Biomarkers for Peripheral Circadian Clocks in Humans (PI Wright); and R01HL159647-Pathophysiology of Circadian Rhythm Delayed Sleep Wake Phase Disorder (PI Wright). He was also appointed to the NIH/NHLBI Board of External Experts.

My Internship Abroad in Dublin, Ireland *by Anna Stone*

This summer, I had the incredible opportunity to travel to Dublin, Ireland, where I participated in a research and clinical combined internship. During my time there, I engaged in a patient chart review and conducted an audit of perioperative care in spinal procedures, comparing them to an international spine registry database. Additionally, I had the privilege of shadowing the hospital's clinical team and observing numerous orthopedic surgeries in the operating room.

The experience provided me with invaluable exposure to both clinical practice and research, while also challenging my cultural perspective of medicine. Despite the internship being limited to a 2-month period, being in a foreign country allowed me to learn and grow in ways I had never experienced before. I found a new excitement for my future career in medicine and reaffirmed the type of medical provider I aspire to become.

To all the IPHY students seeking an enriching internship opportunity, I wholeheartedly recommend the CU Global Internship program. Embrace every opportunity to challenge yourself and step outside your comfort zone, while maintaining an open-minded approach. My time in Dublin was truly priceless, and it has left me with more to explore on my path to a career in medicine. As I now shift my focus to plans for my final year at CU Boulder, I carry with me a renewed enthusiasm and eagerness for the exciting journey that lies ahead.





December PhD Graduate, Kaitlin Freeberg

My time in the IPHY department began in 2018 as a master’s student in the Integrative Physiology of Aging Laboratory. As a research assistant, I helped run clinical trials assessing the effects of healthy lifestyle interventions on cardiovascular health in midlife and older adults. After 2 years, I transitioned into the PhD program and received an NIH F31 predoctoral fellowship, which covered 3 years of PhD training. My research was primarily focused on the assessment of age-related vascular dysfunction in the arteries that supply blood to the brain. I investigated the potential causes of cerebral vascular dysfunction (such as the role of free radicals) and assessed the ability of high-resistance inspiratory muscle strength training, a time-efficient form of physical training, to improve cerebral vascular function in midlife and older adults.

Along with the research I performed, one of the highlights of my time in the department was serving as a teaching assistant for Exercise Physiology for 4 semesters. Teaching laboratory sections of Ex Phys brought me closer to undergraduate IPHY students who were in the midst of their college careers, trying to figure out what was next for them. I loved having the opportunity to engage with these students and see their excitement towards Ex Phys through hands-on, interactive laboratory activities. My hope is to teach and encourage more students in the future as they develop their passions and pursue careers in physiology.



December PhD Graduate, Abigail Longtine

After joining the IPHY department during junior year of my undergraduate at CU, I got involved in the department as an undergraduate teaching assistant in the Anatomy Lab and volunteered as a research assistant in Dr. Seals’ Integrative Physiology of Aging laboratory where I continued on as a graduate student. My research has focused on the role of gut microbiome-derived metabolites in mediating arterial dysfunction with aging. The gut microbiome is a collection of microorganisms that reside in the gastrointestinal tract. These organisms are metabolically active and produce various compounds that can enter into the host blood stream. Some of these compounds can accumulate in circulation with aging and damage arteries. Conversely, the production of other gut microbiome-derived compounds that have health-promoting effects may decrease with aging. My research demonstrated that interventions that favorably modulate levels of these gut microbiome-derived metabolites are effective for improving artery function with aging in mice.

The time spent in IPHY has been positive in so many ways. I have enjoyed the wide range of expertise within the department and have learned about so many different topics through colloquium, other undergraduate and graduate courses, discussions with professors, and participating as a research subject in various labs. I have also enjoyed getting to know many of the faculty, staff and students in IPHY, as there are so many passionate, curious, and kind individuals. I am very grateful to have crossed paths with these incredible individuals!

My goal is to be a lifelong learner and explorer, and graduate school has been an awesome opportunity to realize that goal. My future plans are to first take a brief intermission from science to do lots of travelling and playing outside. Then, I plan to continue doing research by pursuing a postdoc. Ultimately, I would love to obtain either a faculty position at a research-intensive university or a position as a staff scientist in a lab or biotech company.





PhD & MS December 2023 Graduates

Doctor of Philosophy Degrees

Kaitlin Freeberg

Dissertation: *Preserving Brain Vascular Health with Aging*

Advisor: Dr. Douglas Seals

Abigail Longtine

Dissertation: *Gut microbiome-targeted interventions for enhancing vascular health with aging*

Advisor: Dr. Douglas Seals

Robert Courter IV

Dissertation: *Movement Vigor in Multiple Sclerosis: A Neuroeconomics Perspective*

Advisor: Dr. Alaa Ahmed

Master of Science Degree

Surayut Kluaiphanngam

Research Project: *De-differentiation, death, and pharmacological rescue of postnatal gonadotropin-releasing hormone neurons in FGF signaling-deficient mice*

Advisor: Dr. Pei-San Tsai

Bachelor of Arts December 2023 Graduates

*Nicole Adkins
Aspen Allsop
Logan Anchick
Haley Anderson
Peter Ash
Ainsley Baker
Micah Bast
Catherine Bates
Shanti Baumangelis
Anissa Becerra
Ashley Breitman
Mirelyse Burge
Aisha Chugh
Carla Cobos-Hernandez
Taylor Confar
Kaitlyn Cozart
Anna-Maria Croitoru
Zachary D'Amico
Anastasia Dinescu
Taryn Egaas
Jonathan Epperson
Emma Forrester
Kennedy Graves
Alexander Hahn*

*Paige Hardy
Learta Hasangjekaj
Jayden Heukels
Quyem Hua
Emily Jaramillo
Mason Kane
Brian Kim
Sigrid Kite
Danielle Knaus
Kelsie Koch
Priya Kodenkandath
Isabella Kolodziej
Adam Kulakowski
Andrew LaPenta
Sarah Lastition
June Seo Lee
Ella Lindberg
Alexis Macha-Astorga
Hung Mai
Ellyn Malfeld
Makenna May Jr.
Julia Mulhall
Isaac Mun*

*Grace Neff
Cindy Nguyen
Sam Nguyen
Rivenna Olden
Sarah O'Sullivan
Charles Parr
Morgan Riddle
Jason Rivera
William Rose
Till Roskamp
Cayla Serna
Hannah Sherwood
Zoey Shutes
Drew Sotebeer
Jazmine Striegel
Jada Taylor
Brett Van Marter
Brooke Vercauteren
Kacey Ward
Hannah Watts
Meheret Wendemkun
Lawrence West
Giovanni Wilson*



Many Thanks to Donors

As usual, we thank our alumni and supporters. Your comments, suggestions, and financial support have contributed greatly to the success of our department.



Graduate students on skydiving outing!!

Ways to Give

For info on more ways to give: <https://www.colorado.edu/iphy/about-us/give-iphy>

To send checks, please mark payable to the “CU Foundation”:

University of Colorado Foundation

Attention: Gift Processing, P.O. Box 17126

Denver, CO 80217-9155

We Want To Hear From You

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