

BCDB Leading Edge

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Taste of BCDB 2025



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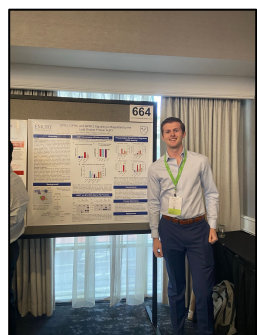
MESSAGE FROM THE DIRECTOR

Mike Koval, Ph.D.



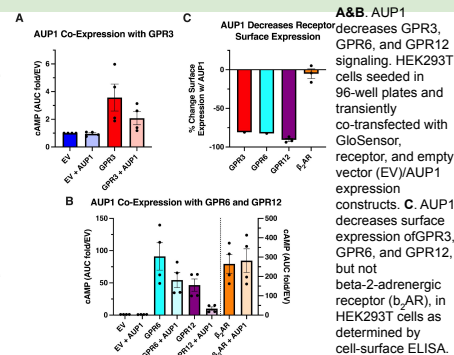
Are you tired of living in unprecedented times? There are many times when I am, or at least tired of hearing that phrase in the context of the news. But **research requires us to embrace the unprecedented**. After all, isn't that what new discoveries are? This is also a big part of why I like the Advanced Seminar class so much, it's a chance to catch up on all the great science being done by BCDB students. Of course, other types of uncertainty are more stressful than exhilarating. Individual resilience helps. Our community helps even more. This includes the recent student-initiated BCDB peer mentoring program, where junior and senior students were matched to provide student-centric guidance, advice and support. This kind of **grassroots BCDB support is effective** and complements programs provided by LGS and GDBBS. Please know that **everyone involved in the BCDB program is valued** and what you do to contribute to every aspect of our community, from science to social, is greatly appreciated!

BCDB STUDENT DISCOVERIES



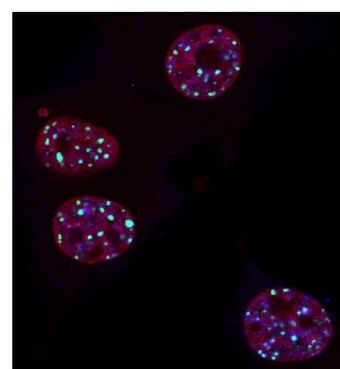
Ian Pyne
3rd year

My research in the **Hall Lab** concerns **how the constitutively active orphan G protein-coupled receptors GPR3, GPR6, and GPR12 are regulated**. Data from our lab and others suggests that these receptors may be modulated by lipids. In particular, I have found that the constitutive activity and surface expression of GPR3, GPR6, and GPR12 is **highly regulated by Ancient Ubiquitous Protein 1 (AUP1)**. AUP1 is a lipid droplet scaffold protein that plays a role in lipophagy. Ongoing work is aimed at determining how AUP1 regulates receptor activity and what cellular lipids are involved in this process. Outside of lab, I was the **co-chair of this year's student recruitment committee**. I also just attended the ASPET2025 Conference in Portland, Oregon to present a poster on my most recent work.



Lydia Gutema
4th year

My research is focused on **how histone post-translational modifications contribute to DNA repair mechanisms**. The modification that I study is a phosphorylation of histone H3 at Threonine 45, which has been shown to be activated by the kinase AKT in the presence of DNA damage. I am studying the effect of this modification in the context of glioblastoma cell lines that have **AKT hyperactivation, a trait that is common in many patient glioblastomas**, to determine what functions histone H3T45 phosphorylation may have in maintenance of genome integrity and cell survival. I served as **student co-chair for recruitment**, and I help organize events, such as **Taste of BCDB**, as a member of the BCDB DEI committee. What I enjoy most about the BCDB program is the people and the **sense of community**!

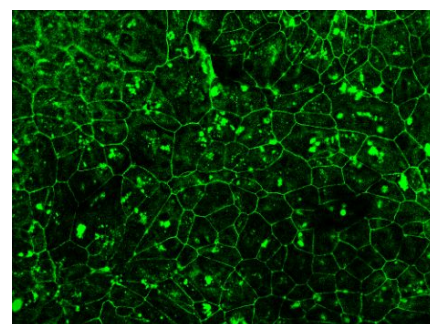


Visualization of repair protein recruitment to DNA breaks by immunofluorescence.



Yasmin Ibrahim
5th year

My research in the **Koval lab** focuses on studying **integrins and their role on the apical surface of lung epithelial cells**. Patients with **alcohol use disorder have a leaky lung barrier** which can lead to catastrophic paracellular leak when paired with a second hit such as sepsis, COVID, or mechanical stress. My research looks to **use integrin activation as a possible therapeutic to restore a leaky barrier** by using molecular, imaging, and biochemical techniques to study function. My involvement in BCDB has included being **co-president of Student Interested in Biochemistry (Social Committee)** and helping with **recruit and retreat planning**. I love being a part of the BCDB community and **getting to know all the other amazing students/scientists!**



ZO-1 positive phase separated densities forming with the addition of alcohol into lung epithelial cells.

Reported faculty accomplishments

Dr. Cheryl Maier's lab recently joined the BCDB

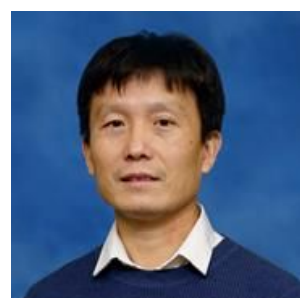
Dr. Maier received a Young Physician Scientist Award from the ASCI, received an R00, and was recently promoted to Associate Professor

FACULTY SPOTLIGHT



Charles Cho, M.D./Ph.D.

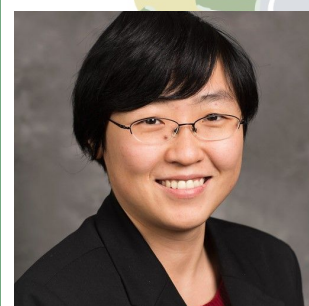
Charles Cho, Ph.D. joined the faculty in 2024 as an Assistant Professor in the Division of Digestive Diseases, Department of Medicine. Research in the Cho Lab focuses on **ribosome/translational dynamics and ribosome-binding proteins in pancreatic acinar cells**, which are a major source of pancreatic ductal adenocarcinoma (PDAC) and its precursor lesion, pancreatic intraepithelial neoplasia (PanIN). This process is known to be primed and facilitated by pancreatitis, which can be induced in mouse models using a cholecystokinin secretagogue that faithfully mimics human pancreatitis—a recognized risk factor for PDAC development. Utilizing injury systems in genetically engineered mouse models, acinar cell culture models, and advanced methods to define translation status both globally and at the level of individual transcripts, **the lab aims to uncover novel targets to alter or prevent the earliest stages of PanIN and PDAC development.**



Ding Xu, Ph.D.

Ding Xu, Ph.D. joined the Emory faculty in 2024. His research focuses on understanding **how proteins interact with heparan sulfate (HS) and the pathophysiological significance of the interactions in bone and cartilage diseases**. Universally expressed by all mammalian cells, HS is a major component of the landscape at the cell surface and in the extracellular matrix, thereby playing essential roles in cell signaling and cell-cell interactions. His lab is highly multidisciplinary and the projects often involve **structural biology, biochemistry, cell biology and transgenic murine models**. Once the molecular mechanisms for certain HS-protein interaction are delineated, his lab further use the information to develop and test the pre-clinical efficacy of novel therapeutic agents (including monoclonal antibodies and HS oligosaccharides) that target HS-protein interactions.

Xin Hu, Ph.D. holds a primary faculty appointment in the Gangarosa Department of Environmental Health at Emory University. **Her research bridges environmental health sciences and developmental biology**, with a focus on **how prenatal and early-life exposures to environmental toxicants disrupt molecular and cellular processes during organogenesis—especially in respiratory airway development**. Her lab integrates high-resolution mass spectrometry with single-cell and spatial multi-omics to uncover how these exposures alter signaling pathways, transcriptional regulation, and tissue morphogenesis. With a strong foundation in toxicology and systems biology, Dr. Hu's research is well-suited for graduate students interested in **cell fate decisions, developmental signaling, and environmental stress responses**. Her work not only sheds light on mechanisms underlying disease origins but also provides a systems-level framework for understanding how complex exposures influence cellular identity, organ development, and long-term health outcomes.



Xin Hu, Ph.D.

STUDENT AWARDS AND ACCOMPLISHMENTS

Congrats on a successful recruitment! We are welcoming 15 new students in the fall including 2 MSTP students!

PUBLICATIONS

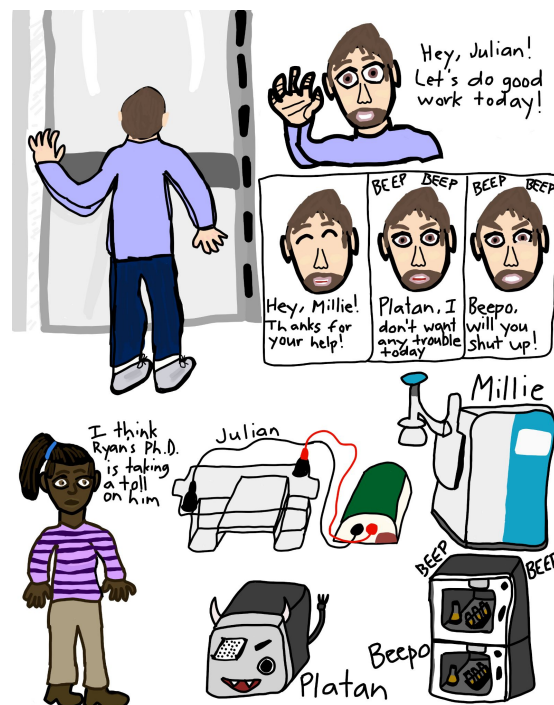
Hrncir HR, Goodloe B, Bombin S, Hogan CB, Jadi O, Gracz AD. Sox9 inhibits Activin A to promote biliary maturation and branching morphogenesis. *Nat Commun* (2025). <https://doi.org/10.1038/s41467-025-56813-x>

Neilsen G, Mathew AM, **Castro JM**, **McFadden WM**, Wen X, Ong YT, Tedbury PR, Lan S and Sarafianos SG. Dimming the corona: studying SARS-coronavirus-2 at reduced biocontainment level using replicons and virus-like particles. *mBio* (2024). <https://doi.org/10.1128/mbio.03368-23>

McFadden WM., Faerch M, Kirby KA, Dick RA, Torbett BE and Sarafianos SG. Considerations for capsid-targeting antiretrovirals in pre-exposure prophylaxis. *Trends in Molecular Medicine* (2025). <https://doi.org/10.1016/j.molmed.2025.01.013>

Bressman ZJ, Corbett AH, Ghalei H. Built differently or defective: can RNA exosomopathies cause ribosome heterogeneity? *Philos Trans R Soc Lond B Biol Sci.* (2025). <https://doi.org/10.1098/rstb.2023.0382>

Ulrichs H, Shekhar S. Regulation of actin dynamics by Twinfilin. *Curr Opin Cell Biol.* (2025). <https://doi.org/10.1016/j.ceb.2024.102459>



Cartoon by Zachary Bressman

AWARDS/HONORS

Mohamed Barmada (Conn lab)

Invited talk at 2025 RNA Society meeting

Zachary Bressman (Ghalei/Corbett labs)

NSF GRFP honorable mention

George Dangas (Michailidis lab)

Competitive scholarship from the Greek gov and the Laney Outstanding Doctoral Student Award

Jordan Goldy (Moberg/Corbett labs)

Best talk in Cellular and Molecular Pathways at the GDBBS Research Symposium; invited plenary talk at 2025 RNA Society meeting

Shreya Ravichandran (Sarafianos lab)

Outstanding Graduate Teaching Assistant Award

Luke Shoemaker (Kwong/Benian labs)

2nd place poster at GDBBS Research Symposium

Sarah Webster (Ghalei/Marcus labs)

1st place poster at GDBBS Research Symposium

Alumni Corner

Life as a Chemist at the CDC and freelance science

illustrator - an alumni interview with Sue Kim, Ph.D.

Job title: Chemist at the CDC (Chemical Threats Laboratory in the Emergency Response Branch) and freelance science illustrator.

What attracted you to a job in this field? I was particularly drawn to this role because it allows me to apply my interest in **high-resolution mass spectrometry (HRMS)** and **metabolomics to public health threats**, such as studying the impact of chlorine gas exposure and detecting nerve agents.

Useful skills acquired during your Ph.D.: My **hands-on experience** with HRMS, **bioinformatics background**, and **effective communication skills** developed during my doctoral training made me a strong fit for this position.

Interview process: I had **two formal interviews** and met informally with the team twice within six months of applying. The **behavioral questions** were relatively easy, while the **technical problem-solving questions** (e.g., how to troubleshoot high back pressure in an HPLC system) were more challenging.

Most exciting aspect of the job: What excites me most is the potential public health impact of our work, particularly its role in **emergency preparedness and response**.

Advice to Ph.D. students interested in a job in your field: For PhD students interested in this field, having **technical experience is critical**. Networking is also really important—start early and be proactive in reaching out for **informational interviews**. Most people are generous with their time and happy to share their insights.



Sue Kim, Ph.D.



On the cover - illustrated by Dr. Sue Kim: The chemical structures of **three Novichok nerve agents** overlaid on a flask with a skull, symbolizing their **lethal design as chemical weapons**. It also features a hazmat-suited figure with the protective gear used during the **2018 Novichok poisoning investigation in Salisbury, Wiltshire, England**.
<https://doi.org/10.1021/acs.chemrestox.4c00397>

Meet Communications Committee

"I participate in the Communications Committee to help share important updates and ensure clear, effective communication between graduate students and faculty. By contributing to strategic messaging, I aim to enhance transparency and collaboration within our academic community." - **Bo Liang**



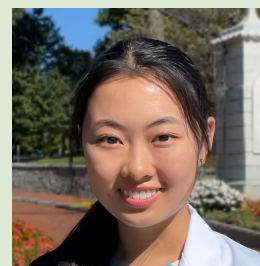
"I joined BCDB Communications Committee because I value clear and engaging science communication and want to help highlight the impactful research being done in our program. I'm especially interested in helping craft content for the BCDB newsletter that not only informs but also builds community—whether through spotlighting faculty and student achievements or sharing updates from program leadership. I am so grateful for the opportunity to help compile the BCDB newsletter, as it has allowed me to expand my connections to BCDB faculty, students, and alumni while helping to develop my skills in scientific writing." - **Hannah Hrcir**

"After seeing one of the newsletters I knew I wanted to join the communications committee. I enjoy designing visually appealing presentations that help push forward science communication. Although I have to say, the best part of this committee is meeting new students, faculty, and learning about the accomplishments of the program. We are surrounded by brilliant researchers and I love getting to highlight their positive contributions to science and the community." - **Heidi Ulrichs**



"Although I was recruited to the communications committee through unconventional means, I really appreciate the key goals of the committee in promoting the hard work that BCDB students, faculty, and alumni put into everything they do. I think that outlets like the newsletter helps counteract some of the imposter syndrome prevalent in our community by allowing people to acknowledge that they have accomplished a lot, and it helps the community be as interconnected as possible. I hope that people enjoy the art that I make for the newsletter as well because I like doing it even if I'm still very much trying to improve at art." - **Zachary Bressman**

"I joined the BCDB Communications Committee to enhance leadership and collaboration skills while fostering a more connected and informed student community. This role also allows me to refine writing, design, and outreach abilities while building valuable connections with faculty and peers." - **Abby Frederick**



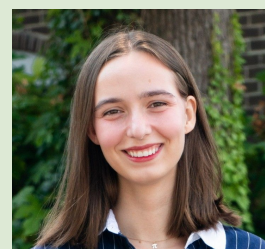
"I joined the Communications Committee because I'd like to get to know more people in the BCDB program!" - **Raining Huo (Left)**

"I joined the Communications Committee because I enjoy finding creative ways to share science and make it easier for everyone to understand. Whether highlighting the exciting work of our peers or breaking down complex ideas, I believe strong science communication brings people together and makes research more meaningful. I'm excited to help tell the stories that make our program so special!" - **George Dangas (Right)**



"I joined comm committee to get more involved in the BCDB program, and also because I've loved writing since I was a kid and its an exciting opportunity to combine that with science!" - **Madison Allegetti (Left)**

"I believe effective communication is an integral part of being a scientist, and I've joined the Communications Committee to be a part of the effort to advance scientific communication in the BCDB program. I hope to learn more about many of the amazing members of the program and share their wonderful accomplishments with you." - **Taryn Trigler (Right)**



Stand Up for Science

The Stand up for Science march occurred on March 7th, 2025. This was a nationwide protest against the federal government's scientific funding and institution cuts.

In Georgia, the protest was at the Georgia State Capitol in Atlanta. People from institutions all over the state came together to support the scientific community. There were chants, music, and first hand stories. One of which was a cancer survivor emphasizing the importance of scientific research and development for biomedical applications.

You can find out more about the Stand Up for Science initiatives here: <https://standupforscience2025.org/>

Upcoming Events

- BCDB Social Committee Event, May 30th, 4:30-6:30 pm, location TBD
- 14th Annual Southeastern Pediatric Research Conference, June 6 Georgia Aquarium
- Workshop: Somatic Cells Reprogramming and Induced Pluripotent Stem Cell Maintenance, hosted by Emory ESCOC and ICI Cores - June 11-12th, Whitehead Biomedical Research Building
- 22nd INFORMS Applied Probability Society Conference - June 30th to July 3rd, Georgia Tech Exhibition Hall
- 2025 Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID) - July 7 - July 30; Emory Rollins School of Public Health
- Joint Annual Meeting of the International Society of Exposure Science and the International Society for Environmental Epidemiology 2025 - August 17-20



Pictured Above: Emory Students at the Georgia Stand Up for Science March on March 7th, 2025.

ACKNOWLEDGEMENTS

Many thanks to the BCDB community for your help with recruitment. We appreciate you!

This newsletter was written and compiled by Dr. Bo Liang, Heidi Ulrichs, Zachary Bressman, Abby Frederick, Madison Allegretti, Raining Huo, George Dangas, Taryn Trigler, and Hannah Hrcir.