

MAY 2023

## Highlights

# The Leading Edge

BCDB Newsletter



Sarah Webster and Yasmin Ibrahim volunteer at the Atlanta Science Festival explaining protein structure to the public. The event was organized by Sarah Strassler. Thanks Sarah!

## BCDB and the community

BCDB students have a strong commitment to giving back to the community and in scientific education. One outlet for these interests is by volunteering with Science ATL. Science ATL's mission is to cultivate an equitable community of lifelong learners across metro Atlanta who are connected and inspired by the wonder of science. You can learn more [here](#) or by reaching out to Sarah Strassler.

## BCDB and the community

### BCDB Student discoveries:

- Levi Gifford
- Sue Kim
- Colby Schweibenz
- Kristen Easley

## Faculty Spotlight

## Student awards and accomplishments

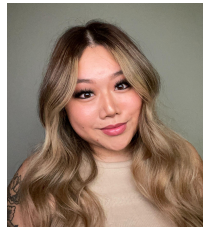
Careers after BCDB: Kate Mahar (Hutchinson), Ph.D.

## BCDB STUDENT DISCOVERIES



**Levi Gifford**  
3rd Year

My research investigates how the HIV-1 capsid behaves inside of living cells. The HIV-1 capsid is a large structure that allows the virus to hijack the host cell machinery to traffic the viral genome to the nucleus for integration into host genome. Using amber codon suppression labeling of the capsid, in combination with capsid lattice integrity markers, I found that intact capsid enters the nucleus, and that capsid disassembly (uncoating) occurs through two distinct steps: (1) minor breakage of the lattice, and (2) terminal and catastrophic disassembly of the lattice. Outside of my research, I enjoy traveling, visiting local breweries, and hiking the mountains of Georgia. What I enjoy the most about BCDB is the welcoming environment and the great student/faculty interactions.



**Sue Kim**  
4th Year

I study how chronic exposure of neutrophil-derived oxidants impact the metabolome of airway epithelial cells, which are critical targets of oxidative stress in chronic lung diseases such as cystic fibrosis (CF). Using high-resolution mass spectrometry, I identified a unique oxidation product in our in vitro oxidant exposure model and found that the presence of this metabolite in clinical airway specimen from pediatric CF patients significantly correlated to structural lung damage. Further clinical validation can tell us if this potential biomarker could be predictive of lung disease progression in early CF. Beyond the lab, I enjoyed serving as the BCDB rep for the Division Student Advisory Council which aims to address student concerns across all GDBBS programs in order to improve the graduate student experience.



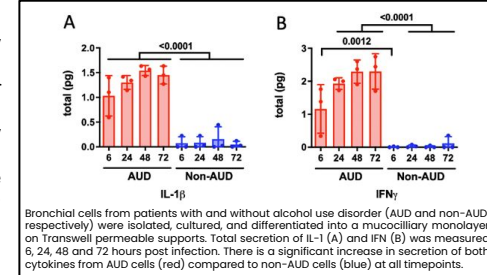
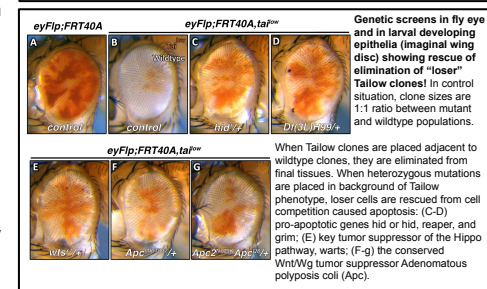
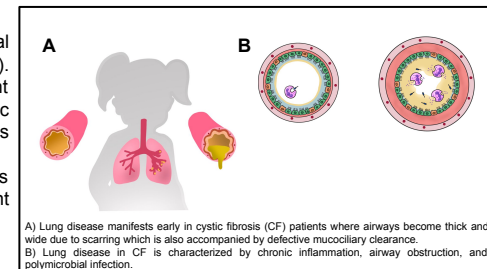
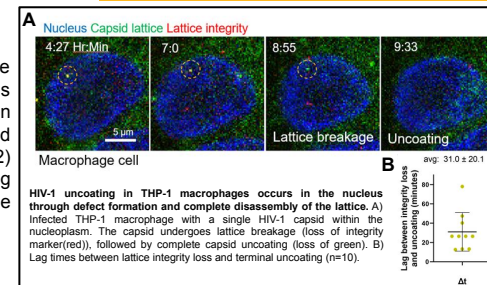
**Colby Schweibenz**  
5th Year

My research seeks to identify mechanisms of cell competition, a conserved biological phenomenon that could have a role in cancer emergence and field cancerization. I use the common fruit fly, *Drosophila melanogaster*, to study this phenomenon in developing larval epithelial tissue. In my thesis work, I propose that a steroid coactivator, Taiman (Tai), of the main hormone receptor in flies, the Ecdysone Receptor, controls competitive cell fitness, where the amount of Tai in cells determines whether those cells become "winners" or "losers" in a tissue. Outside of lab, I've been highly involved in BCDB serving on social committee, BCDB recruitment committee, being a JPE Ambassador for first year orientation, Emory's Biotech Consulting Club (EBCC), and president of Aspiring Medical Science Liaisons at Emory (AMSLE). And of course, what I love to do most is hanging out with my fiancé Louis, riding bikes around Atlanta or catching up on our favorite TV shows 😊. I want to give a huge shoutout to my mentor Ken Moberg, and my amazing lab for all their support and encouragement during my PhD journey. *You can learn more about Colby's work and involvement in the program [here](#).*



**Kristen Easley**  
6th Year

My research focuses on elucidating the synergistic effects of chronic alcohol use and SARS-CoV-2 infection on airway cell function. Chronic alcohol use alone increases the susceptibility to respiratory infections and the risk of developing acute respiratory distress syndrome (ARDS). We've determined that chronic alcohol use inhibits airway cells from recovering barrier function 72 hours after SARS-CoV-2 infection. Additionally, chronic alcohol use primes airway cells for increased secretion of many pro-inflammatory cytokines, including IL-1b and IFN $\gamma$ , in response to infection. I hope my research brings awareness to alcohol use disorder as a potential comorbidity of COVID-19. What I enjoy most about BCDB is the sense of community and willingness to help one another achieve our goals! This was evident when I led the student-arm of BCDB Recruitment during the 2019-2020 school year and when I co-founded Aspiring Medical Science Liaisons at Emory (AMSLE) with fellow BCDB student, Julia de Amorim.



## Welcome new students!

We had a great recruiting season and are welcoming an exciting new class of BCDB students in the fall.

- Bressman, Zachary
- Cai, Xinyong (Steven)
- Frederick, Abigael
- Gallant, Samuel
- Morningstar, Carolyn
- Ravichandran, Shreya
- Shoemaker, Luke
- Tan, Tony
- Tillis, Tiara
- \*\*Young, Lauren

\*\*deferred

# FACULTY SPOTLIGHT



**Elizabeth (Lizzy) Draganova, Ph.D.**

**Elizabeth (Lizzy) Draganova, Ph.D.**, joined Emory in 2022 as an Assistant Professor in the Department of Biochemistry with a secondary appointment in Microbiology and Immunology. Research in the laboratory focuses on understanding how herpesviruses – a ubiquitous human pathogen – assemble, package, and traffic their capsids during viral replication. The lab uses various biophysical/biochemical techniques, including cryo-electron microscopy/tomography, x-ray crystallography, light scattering, and molecular virology. The lab's long-term goals are to develop molecular footprints of these capsid-centric processes that will be used to screen for novel antivirals. As a postdoc, Lizzy trained as a Tufts IRACDA Fellow due to her strong commitment to mentoring and teaching. She has mentored numerous undergraduate and graduate students during her training and looks forward to serving as a mentor in her independent career.

**Adam Gracz, Ph.D.**, joined Emory as an Assistant Professor in the Department of Medicine and Division of Digestive Diseases in August 2020. His research explores how transcriptional and chromatin regulation determines cellular identity in epithelial cells. The lab combines mouse and organoid models with bulk and single-cell-omics approaches to pursue a mechanistic understanding of stem cell and regenerative biology in the intestine and liver. Outside of the lab, Adam is working on launching the Emory Digestive Disease Initiative (EDDI), which will build a community of GI, liver, and pancreas-focused labs across the Atlanta area. In his free time, Adam enjoys working out, traveling, and anything food-related.



**Adam Gracz, Ph.D.**

**Mike Koval, Ph.D.**, is a Professor of Medicine and Cell Biology who first joined the Emory faculty in 2005. He became a member of the BCDB program soon after that, serving as DGS from 2010-2014 and Program Director from 2014-2021. He is also a founding member of the BCDB Diversity, Equity, and Inclusion (DEI) committee. A major focus of the Koval laboratory is the study of cell structures mediating intercellular communication, including gap and tight junctions. A continuing line of research is to define how these junctions are coordinately regulated and to determine how junction proteins organize into protein complexes that act as signaling hubs. Among the techniques used is the development of specialized primary cell models that mimic their in vivo behavior and can be readily manipulated and imaged. A long-term goal is understanding how intercellular junctions are misregulated in disease states such as acute lung injury, cystic fibrosis, and inflammation.



**Mike Koval, Ph.D.**



# STUDENT AWARDS AND ACCOMPLISHMENTS

## FUNDED

**Lauren Askew:** Received an F30

**Sarah Webster:** Received an NSF GRFP

**Joey Buehler:** Perfect Score on F31

Congratulations to the 2nd years for passing their Qual II Exams.

Good Luck to 1st years on their Qual I Exam- we are rooting for you!

## Publications

**Maria Sterrett:** 'In vivo characterization of the critical interaction between the RNA exosome and the essential RNA helicase Mtr4 in *Saccharomyces cerevisiae*'



**Tala Khatib:** 'A live-cell platform to isolate phenotypically defined subpopulations for spatial multi-omic profiling'



**Sarah Strassler:** 'tRNA mG9 modification depends on substrate-specific RNA conformational changes induced by the methyltransferase Trm10'



**Will McFadden:** 'Targeting the HIV-1 and HBV Capsids, an EnCore'



**Sarah Webster:** 'Generation of anti-GD2 CAR macrophages from human pluripotent stem cells for cancer immunotherapies'



**Hannah Hrcir:** 'Panic at the Bile Duct: How Intrahepatic Cholangiocytes Respond to Stress and Injury'



**Christine Bowden:** 'Advances in proteomic phenotyping of microglia in neurodegeneration'



AND

'Cellular proteomic profiling using proximity labelling by TurboID-NES in microglial and neuronal cell lines'



# Alumni Corner

## **Life as an associate at Destum Partners Inc. - an alumni interview** with **Kate Mahar (Hutchinson), Ph.D.**

**Useful skills acquired during your Ph.D.:** First and foremost, the **scientific knowledge** I obtained during my PhD made me an excellent fit for this particular job. I feel incredibly lucky to work in a non-bench role that still allows me to directly use my scientific knowledge/training every day of my job (shoutout to Danny!).

**Interview process:** I went through **4 rounds of interviews** over the course of 4 months before I was offered this role. I started the process when I began writing my dissertation because I knew the process would take time and I wanted to be able to start working at the completion of my degree.

**Advice to Ph.D. students interested in a job in life-science consulting:** **Reach out and ask questions!** For me, I knew that I wanted to move away from bench science but didn't really know what else was out there besides roles like MSLs and medical writing/communications which were roles that were highly talked about/ advertised on LinkedIn at the time. It can be incredibly overwhelming trying to figure out your career when you don't really know all the options available to you. I started by reaching out and asking questions and I really think it's a great place to start.

**Most exciting aspect of the job:** I can honestly say **I wake up every day loving the work that I do**. What has me most excited these days is an upcoming business trip to Boston. I will be attending the RNA Leaders USA Congress where I will get to attend lectures from the top people/ companies in the industry as well as set up 1-on-1 meetings with my current clients and potential future clients. I look forward to the opportunity to develop myself professionally and scientifically while also expanding my client portfolio.



← Scan for the full interview with Kate!

### **Acknowledgments**

**Many thanks to the BCDB community for all your hard work during recruitment. We appreciate you!**

This newsletter was written and compiled by Dr. Bo Liang, Heidi Ulrichs, and Hannah Hrcir.

## **Communications Committee is Recruiting!**

Come join, we would love to have you! If you are interested in joining communications committee please contact Hannah Hrcir at [hhrncir@emory.edu](mailto:hhrncir@emory.edu).