

Molecular Matters

Department of Biochemistry

August 2024 Department News



CONGRATULATIONS TO...

Alice Westermann Villock was awarded a SURF research grant from ASPB (American Society of Plant Biologists). She was one of only 15 awards given in the country. Alice will present her research next summer at the ASPB Annual Meeting in Wisconsin.

AUGUST GRADUATES...



Jayathilaka Abeyaratna

B.S. Biochemistry

Next: Yang lab, Research Associate



Grace Helms

B.S. Biochemistry

Next: Unknown

UNDERGRADUATE SUMMER PROGRAMS...

Summer was a busy time for Purdue Biochemistry; 19 students participated in campus research programs – see participant list below.

Summer Undergraduate Research Symposium

Shelby Sliger gave a research talk titled “Determining the Contribution of Histone Variant H2A.Z to H3K27me-3-dependent traits in *Arabidopsis thaliana*.”

Amanda Schoonmaker – presented a poster titled “Investigating the Role of INO80 in H3K27me3 Homeostasis and Pickle Root Phenotype in *Arabidopsis thaliana*.”

2024 Biochemistry students who participated in SCARF:

Jamie Bryan presented a poster titled “Unraveling the roles of DEAD-box helicases in Eukaryotic gene regulation.” Mentors: Elizabeth Tran; Subhadeep Das; Maria Zea Rojas

Lauren Connors presented a poster titled “Investigating the role of Erg5 in azole susceptibility in *Candida glabrata*.” Mentors: Scott Briggs; Justin Gregor

Gage Gottman presented a poster titled “Metabolite extraction and analysis of High Chlorophyll Fluorescence (HCF) in *Sorghum* mutants.” Mentors: Jacob Olson; Brian Dilkes

Nathan Henderson presented a poster titled "Cdc14 Targeted Antifungal Drug Discovery" Mentors: Mark C Hall; Kevin Velazquez-Marrero

Madolyn Jarrett presented a poster titled "Investigating AH CY Interacting Partners in Drosophila S2 Cells." Mentors: Vikki Weake; Sarah Stanhope

Molly Kosiba presented a poster titled "Phenotypic characterization of Arabidopsis MLO overexpression and mutant lines to determine the role of MLO proteins in plant development." Mentors: Sharon Kessler; Sienna Tsuruko

Maxine Kushner presented a poster titled "Fumarase and the DNA Replication Stress Response." Mentors: Ann Kirchmaier; Ronard Kwizera

Erica Long presented a poster titled "Characterization of Prevotellaceae in the pig gut" Mentor: Tingting Ju

Eleanore Malinowski presented a poster titled "Changes in Development and Metabolism in an Inducible Lignin-Modified Arabidopsis Mutant." Mentors: Clint Chapple; Chase Hearn

Nathaniel Miller presented a poster titled "Benchmarking Dimethyl Labeling-based Data-Independent Acquisition Pipelines for Extracellular Vesicle Proteomics and Phosphoproteomics." Mentors: W. Andy Tao; Yi Kai Liu

Elysia Uggen presented a poster titled "Proximity Labeling to Identify Transient Protein Interactions with APT-dependent chromatin Remodeler PICKLE." Mentors: Joe Ogas; Jacob Fawley; Jiaxin Long

2024 Biochemistry REU Students

Hillary English presented a poster titled "Biophysical and Biochemical characterization of sulfotransferase 2B1a and determining its effect in drug delivery." Mentors: Andy Mesecar; Beinan Yang

Laila Fortson presented a poster titled "Validating and Developing the AID system in human fungal pathogens for anti-fungal drug discovery." Mentors: Mark C Hall; Emily Danzeisen; Jim Forney

Juan Gómez-Solis presented a poster titled "CTCF knockdown rescues the expression of MAPK signaling genes in Vezf1 null murine embryonic stem cells." Mentors: Humaira Gowher; Sameer Khan

Victoria Haber presented a poster titled “Investigating AD-induced Gnm1 upregulation in *Drosophila melanogaster* clock cells”. Mentors: Mikayla Marlin; Vikki Weake

Emma Litzelman presented a poster titled “SHIP1 phosphatase as a Late-Onset Alzheimer’s Disease therapeutic target.” Mentors: Andy Mesecar; Kratika Singhal

Andrés Moran presented a poster titled “Characterizing Chromatin Assembly Factor Capabilities of the ATP-dependent Chromatin Remodeler PICKLE (PKL) in *Arabidopsis thaliana*.” Mentors: Joe Ogas; Jiaxin Long; Jacob Fawley

David Onishile presented a poster titled “Evaluating dependence of mitochondrial translation in breast cancer. Mentor: Kyle Cottrell

Matthew Tabrisky presented a poster titled “The Set1 histone H3K4 methyltransferase alters *Candida glabrata* pathogenesis by controlling the expression of genes involved in cell wall formation.” Mentors: Scott Briggs; Smriti Hoda

The Biochemistry Department welcomed 14 new graduate students for rotations this fall.



Back Row L-R: Lucas Kramer, Troy Sievertsen, Tommy Sheeley, Roya Ghaffarnia, Reed Smith (light shirt) **Middle Row L-R:** Jacob Czaicki, Audrey Bates, Nikta Zafarjafarzadeh, Amirhesam Mashaollahi, Hern Tan
Front Row L-R: Sanjida Ahmed, Isabelle Juhler, Lauren Dome, Misa Meadows

NEW FACES...



Dr. Manuel Bellucci is an Italian postdoctoral researcher in the **Dudareva** lab specializing in plant metabolism and secondary metabolites. He earned his PhD in Plant Science from the Campus Bio-Medico University of Rome, focusing on plant volatiles. I've had the opportunity to collaborate with international labs and food industry. Outside of work, I'm really into sports, particularly fencing, which I practice regularly."



Radhika Bhaumik earned a Ph.D. in Microbiology from IUPUI, where she investigated the role of pilus operons in the opportunistic pathogen *Stenotrophomonas maltophilia*, particularly in how they contribute to biofilm formation and virulence. She is currently a postdoctoral associate working under **Dr. Seema Mattoo** and **Dr. Vikki Weake** on a project funded by Purdue University's Life Sciences Summit initiative, with a focus on the role of Fic proteins and its impact on aging.



José Colón is a PREP scholar at Purdue University, working in the Biochemistry Department under the mentorship of **Dr. Natalia Dudareva** and **Matthew Bergman**. He earned a Bachelor's degree in Microbiology from the University of Puerto Rico, Humacao, where he developed a deep interest in natural product research. "My goal is to contribute to the field of biotechnology by identifying novel compounds with potential medical applications."

BIOCHEMISTRY IN THE NEWS...

Dr. Humaira Gowher is an international PI on the proposal, "Understanding the mechanism of histone methyltransferase, G9a mediated role in autophagy during Non-alcoholic fatty liver disease (NAFLD)," which received \$125,668 for two years from the Ministry of Education, India. This is a joint Indo SPARC grant in collaboration with Dr. Altaf Bhat, University of Kashmir. Please read the article [here](#).

GOING THE EXTRA MILE...

In July, **Dr. Clint Chapple** attended the Lignin Gordon Conference in Easton Massachusetts where he presented a talk titled "Lignin-Modified Plants Reveal that Phenylpropanoids May be Regulators of Plant Growth."

Bobby Cheng, graduate student in the **Chapple** lab, presented a poster at the IN VITRO Biology conference in Saint Louis recently. His poster, titled "Characterization of Phenylalanine Ammonia Lyase (PAL) Gene Family in Arabidopsis" was awarded first place.

Dr. Subhadeep Das, postdoc in the **Tran** lab, presented a poster at the Cold Spring Harbor Meeting 'Mechanisms and Models of Cancer' from August 13–17. He received a Postdoctoral Supplemental Travel Award from the Office for Postdoctoral studies to attend this meeting.

Dr. Natalia Dudareva traveled to the Plant Biology 2024 ASPB Annual Meeting in Honolulu from June 22-26 and gave a talk titled "Sense of smell: from genes to flower perfume".

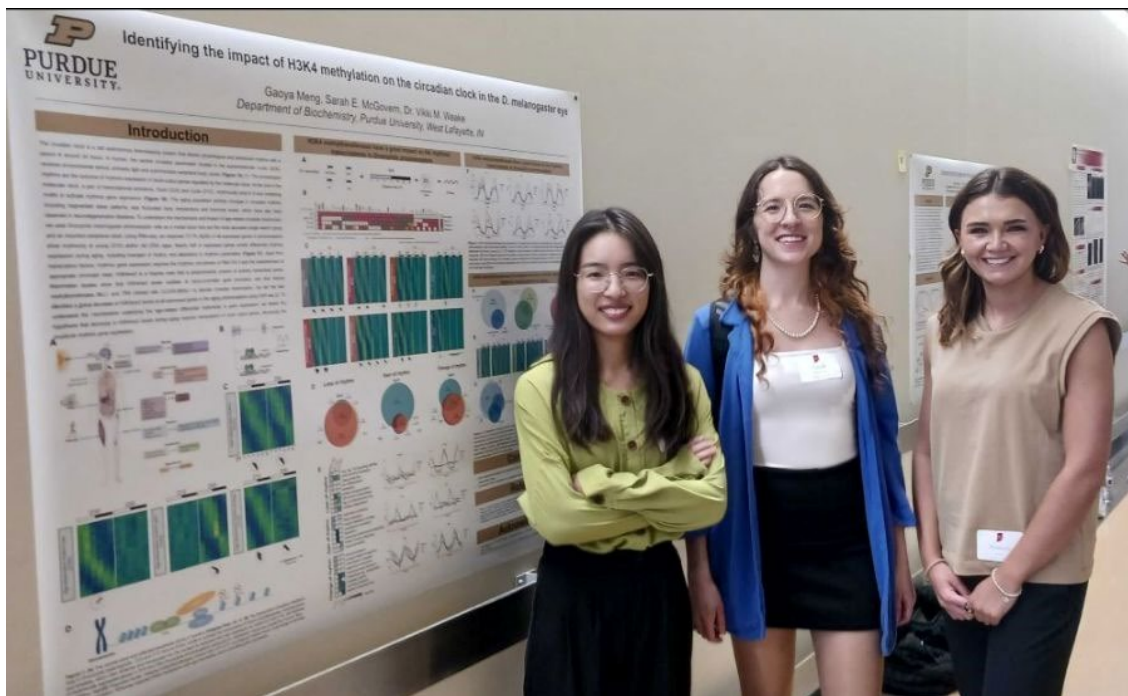
Dr. Natalia Dudareva also traveled to Erfurt, Germany where she gave a talk titled “Volatile communication in plants relies on a KAI2-mediated signaling pathway” at the World Petunia Days 2024 from July 3 – 6. While in Germany, she also gave invited talks at the Leibniz Institute of Plant Biochemistry (Halle, July 1), the Max Planck Institute for Chemical Ecology (Jena, July 2,) and the Max Planck Institute for Molecular Plant Physiology (Potsdam, July 8).

Dr. Seema Mattoo completed her 3-year term on the Scientific Program Committee for the American Society for Microbiology (**ASM**). She planned and convened several sessions, including an In-Depth Symposium titled "It Takes Two to Tango: How the Molecular Crosstalk of Protein Evolution and Target Recognition Guides Cell Signaling" at the ASM Microbe Annual Meeting in Atlanta, GA.

Dr. Seema Mattoo recently gave an invited talk titled "Fic-mediated GMPylation: Discovery of a *Bordetella* Fic protein with guanylyltransferase activity" at the International Bordetella Symposium in Prague, Czech Republic.



Dr. Andy Mesecar, and graduate students **Bridget Kaiser** and **Kratika Singhal**, attended the 2024 American Alzheimer's International Conference (AAIC) in Philadelphia. Dr. Mesecar gave a talk; Bridget presented a poster titled, “Kinetic and X-ray Structural Characterization of Phospholipase C Gamma 2 (PLCG2)--An Emerging Target for Alzheimer's Disease" and Kratika presented a poster titled “SHIP1 Phosphatase as a Late-Onset Alzheimer's Disease Therapeutic Target.”



On August 2nd, the **Weake** lab attended the Heartland Vision Research Symposium (HVRs) 2024, Glick Eye Institute, Indiana University School of Medicine. **Grace Meng**, **Makayla Marlin**, and **Seth Lammert**, graduate students in the Weake lab, presented posters on their work, and **Sarah McGovern**, graduate student, presented a talk – winning the best talk award, which was presented to her by the Director of the National Eye Institute, Dr. Michael Chiang.

GRANTS...

Dr. Natalia Dudareva received \$68,189 from NSF-IOS for her project titled “Collaborative Research: Deciphering the molecular mechanisms of hormone-like function of terpenoids.” 08/01/2024 - 07/31/2025

Dr. Andy Tao received \$60,000 from Louisiana State University for his proposal titled “Regulation of transcription coupled DNA repair”. 6/01/2021 - 05/31/2025

Dr. Beth Tran received \$4,000 from the CIS Program Special Projects at the Purdue Institute for Cancer Research for her proposal titled for his proposal titled “Analysis of the Role of DDX5 in Remodeling RNA Structure In Small Cell Lung Cancer.” 9/1/24 – 2/28/24

Dr. Vikki Weake received a \$1,155,315 NSF award for her project titled “NSF-BSF: REDOX REGULATION OF DROSOPHILA PHOTOTRANSDUCTION.” 07/15/2024 to 06/30/2028.

RECENT PUBLICATIONS...

Bergman ME, Kortbeek RWJ, Gutensohn M, Dudareva N. 2024. Plant terpenoid biosynthetic network and its multiple layers of regulation. *Progress in Lipid Research*, 2024 Jun 19:95:101287

Bergman ME, Dudareva N. 2024. Plant specialized metabolism: Diversity of terpene synthases and their products. *Curr. Opin. Plant Biol.* 2024 Jul 24:81:102607

Andrew G. DeMarco, Marcella G. Dibble, and **Mark C. Hall** (2024). Inducible degradation-coupled phosphoproteomics identifies PP2ARts1 as a novel eisosome regulator. *Frontiers in Cell & Developmental Biology* 12: doi: 10.3389/fcell.2024.1451027

Kedric L. Milholland, Benjamin T. Waddey, **Kevin G. Velázquez-Marrero**, **Michelle V. Lihon**, **Emily L. Danzeisen**, Noelle H. Naughton, Timothy J. Adams, Jack L. Schwartz, **Xing Liu**, and **Mark C. Hall** (2024). Cdc14 phosphatases use an intramolecular pseudosubstrate motif to stimulate and regulate catalysis. *J Biol Chem*, in press, <https://doi.org/10.1016/j.jbc.2024.107644>.

Das S, Zea Rojas MP, Tran EJ. Novel insights on the positive correlation between sense and antisense pairs on gene expression. *Wiley Interdiscip Rev RNA*. 2024 Jul-Aug;15(4):e1864. doi: 10.1002/wrna.1864. PMID: 39087253

Timothy R Fallon, Vikram V Shende, Igor H Wierzbicki, **Amanda L Pendleton**, **Nathan F Watervoot**, **Robert P Auber**, David J Gonzalez, **Jennifer H Wisecaver**, Bradley S Moore. Giant polyketide synthase enzymes in the biosynthesis of giant marine polyether toxins. *Science* 2024 Aug 9PMID: 39116217 DOI: 10.1126/science.ado3290

IMPORTANT DATES...

Please join us for the Department of Biochemistry Seminar Series. All seminars will begin at 3:30 pm, in WSLR 116, unless otherwise noted.

Aug 20	Dr. Karthik Sankar, Purdue University, Ag & Biological Engineering
Aug 27	Dr. Rebecca Adams, Belmont University, Biology
Sep 10	Dr. Takuya Akiyama, Indiana State University, Biology
Sep 17	Dr. Hachung Chung, Columbia University, Microbiology & Immunology
Sep 24	Dr. Barry Stoddard, University of Washington, School of Medicine
Oct 1	Dr. Thomas Wubben, University of Michigan, Ophthalmology & Visual Sciences

ATTENTION BCHM ALUMS...

We would love to hear from you! If you have any alumni news to share or had a change of address, please let us know! Updates can be sent to bchm-alumni-friends@purdue.edu.

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