Program in Cellular and Molecular Medicine

at Boston Children's Hospital

MARCH 2025 NEWSLETTER

About PCMM

The Program in Cellular and Molecular Medicine (PCMM) is a research program at Boston Children's Hospital (BCH) recognized worldwide for its discoveries that increase the body's ability to fight disease and to heal. The breakthroughs of PCMM scientists are greatly increasing our understanding of the influence of immune defense and inflammation on medical discovery, healthcare, and disease management. Our investigators are academically affiliated with Harvard Medical School. Please contact Colin Smith (colin.smith@childrens.harvard.edu) for questions and suggestions for future newsletters.

Research Highlights

In or out of the loop: A tale of two immunoglobulin loci

Almost 50 years ago, it was discovered that the immune system can reshuffle gene fragments in antibodies' variable regions, giving them the ability to recognize nearly all pathogens. Throughout his career, Frederick Alt, PhD, has revealed multiple aspects of this process, known as V(D)J recombination. The newest work from his lab, in *Nature*, solves a long-standing question, revealing that different mechanisms generate heavy chain versus light chain gene rearrangements during V(D)J recombination.

A New Tool Could Exponentially Expand Our Understanding of Bacteria

Combining powerful genomic-scale microscopy with a technical innovation, the lab of Jeffrey Moffitt (PCMM) is capturing what genes bacteria turn on in different situations and different spatial environments. Their work may give clues to how bacteria become more virulent, resist antibiotics, and more. Ari Sarfatis, Yuanyou Wang, PhD, and Nana Twumasi-Ankrah in the Moffitt Lab were coauthors on the paper, published in *Science*. A new tool could exponentially expand our understanding of bacteria: https://answers.childrenshospital.org/bacteria-merfish/

Bringing Order to Disorder: Jhullian Alston, PhD

Jhullian Alston, in the PCMM lab of Taekjip Ha, uses biophysics techniques to study disordered proteins, which don't fold into orderly structures and currently can't be targeted with drugs — something he hopes to change. He is currently focused on fusion proteins, which drive some childhood cancers. Full article: https://answers.childrenshospital.org/probing-disordered-proteins-jhullian-alston-phd/

Graduate Student Awards

Liam Healy of Hao Wu's laboratory Wins an NIH F31 Ruth L. Kirschstein Predoctoral Individual National Research Service Award!

This reflects not only how much time and effort Liam put into his application, but also Hao's success as his mentor!

Postdoctoral Fellow Awards

PCMM researchers win prestigious fellowships

Three PCMM researchers have recently been honored with high-profile fellowships: Jhullian Alston (Ha Lab) won an HHMI Hanna Gray Fellowship, Camille Le Gall (Ploegh Lab) won an American Heart Association Postdoctoral Fellowship, and Molly Parsons (Hur Lab) won an NIH Ruth L. Kirschstein NRSA postdoctoral fellowship.

Jhullian Alston

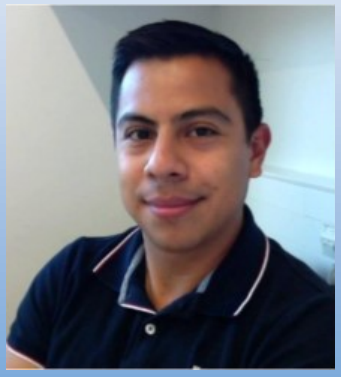
Camille Le Gall

Molly Parsons

Four PCMM researchers have recently been honored with high-profile fellowships: Aritra Bhattacherjee (Zhang Lab) won a Harvard Brain Science Initiative Postdoc Pioneers Grant, both Paolo Cadinu (Moffitt Lab) and Uriel López-Sánchez (Springer Lab) won Charles A. King Trust Fellowships, and Yingying Zhang (Carroll Lab) won a Brain and Behavior Research Foundation Young Investigator Grant.

Aritra Bhattacherjee

Paolo Cadinu



Uriel López-Sánchez

Yingying Zhang

Three PCMM researchers have recently been honored with high-profile fellowships: Pietro Fontana (Wu Lab) won a BCH Faculty Career Development Fellowship, Ibraheem Alshareedah (Ha Lab) won a Jane Coffin Childs Fellowship, and Man Wu (Wu Lab) won a CRI Irvington Post-doctoral Fellowship.

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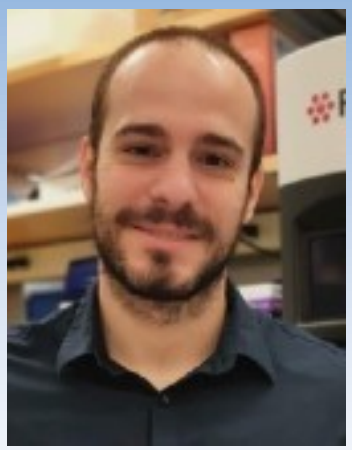


Pietro Fontana

Ibraheem Alshareedah

Man Wu

Saket Bagde of Tim Springer's Lab Named one of 13 new Damon Runyon Fellows!

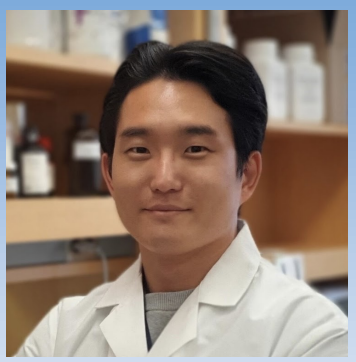
From the official announcement:

Most cancers develop in the epithelial tissue, which includes the skin and internal organ linings. Hemidesmosomes (HDs) are adhesive structures that anchor epithelial cells to the underlying base layer and maintain tissue integrity. While HD disassembly occurs normally during wound healing, tumor cells can exploit this process to detach and spread to other parts of the body. Dr. Bagde is studying how HD components interlock like Lego blocks to form stable HDs in healthy tissues and how they disassemble in cancerous tissues. To investigate this phenomenon, Dr. Bagde plans to develop organoids—self-organizing mini-organs grown in a petri dish to study disease progression. By creating simple base layers that simulate the supportive properties of the native organ base layer, he plans to promote the growth of both normal and cancerous organoids. This work has the potential to support the development of personalized cancer therapies based on patient-derived tumor samples.

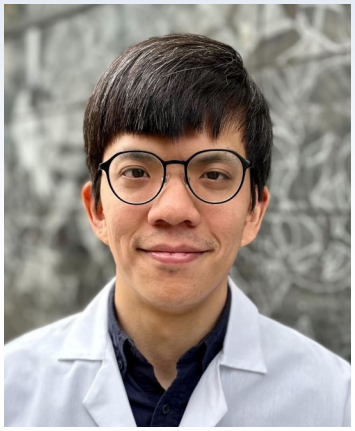
Dr. Bagde received his PhD from Cornell University, Ithaca and his MS and BS from the Indian Institute of Science Education and Research, Pune.

Ph.D. Thesis Defenses

Dr. Jimin Kang of TJ Ha's Laboratory Successfully Defends his Ph.D. Thesis!



Titled "SHARP Amplification of PCR-challenging Nucleic Acid Templates,", Dr. Kang successfully defended his thesis on January 22! His thesis seminar was held at Johns Hopkins University as part of the Jenkins Biophysics Program. Special thanks go to his review committee, in addition to TJ: Doug Barrick (JHU, Chair), Sua Myong, Wesley Wong, and Yaojun Zhang (JHU). We wish him continued success in his future endeavors!

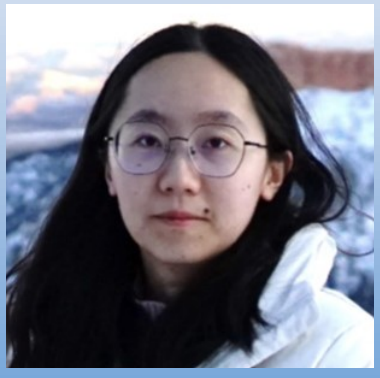


Dr. Ting-Wei Liao of TJ Ha's Laboratory Successfully Defends his Ph.D. Thesis!

Titled "Exploring the Functional Kinetics of Biological Machines," his thesis seminar was held on December 9 at Johns Hopkins University as part of the Jenkins Biophysics Program. Special thanks go to his review committee, in addition to TJ: Sarah Woodson (Chair), James Berger, Carl Wu, and Stephen Fried. We wish him continued success in his future endeavors!

Dr. Rosalind Xu of Jeff Moffitt's Laboratory Successfully Defends her Ph.D. Thesis!

Titled "Constructing a Spatially Resolved Single-Cell Reference Atlas of the Murine Gastrointestinal Tract with MERFISH," the successful defense took place at the end of August this year! We wish Rosalind continued success in her future endeavors!



Dr. Yiwen Zhang of Fred Alt's Laboratory Successfully Defends Her Ph.D. Thesis!

Titled "Molecular Basis for Differential V(D)J Recombination Mechanisms in Immunoglobulin Loci," the thesis was successfully defended on November 12! Special thanks go to her review committee: Raul Mostoslavsky (Chair), TJ Ha, Shiv Pillai, and guest examiner Kefei Yu from Michigan State University. We wish Yiwen continued success in her future endeavors!

Faculty News

Julia Li joins PCMM

Julia Li, PhD, has joined the Boston Children's faculty as an Investigator in PCMM and the Harvard Medical School faculty as an Assistant Professor of Genetics. She joins us from University of California at San Diego, where she was a postdoctoral fellow in the laboratory of Don Cleveland and received the Damon Runyon-Dale F. Frey Award for Breakthrough Scientists.

Judy Lieberman Elected to the American Academy of Microbiology

On behalf of the PCMM leadership, we are delighted to announce the election of Judy Lieberman, PhD, MD, to the American Academy of Microbiology! The Academy is the honorific leadership group within the American Society for Microbiology, and its official mission is "to recognize scientists for outstanding contributions to microbiology and provide microbiological expertise in the service of science and the public." Please join us in congratulating Judy for becoming a fellow of the Academy's Class of 2025!

Hao Wu named to the National Academy of Medicine

Congratulations to Hao Wu, PhD, who was elected to the National Academy of Medicine for her discovery of signalosomes, central organizing structures that have changed our understanding of innate immune signaling. Her work could lead to new therapeutic strategies for inflammation and cancer.

Hao Wu named a 2025 fellow of the American Society for Biochemistry and Molecular Biology

ASBMB Fellows are selected for "exceptional and sustained service to the society as well as accomplishments in research, education, mentorship, diversity and inclusion, advocacy and service to the scientific community." The society will recognize the 2025 class at its annual meeting on April 12–15 in Chicago.