Penn Genome Integrity Center (PCGI) Annual Scientific Retreat

Science History Institute
Thursday, June 1, 2023
9:30 am - 6:30 pm

PCGI Penn Center for Genome Integrity

Program

8:30-9:00 am
Registration & light breakfast buffet
Lobby & Auditorium

Session One: Chromosome Integrity
Moderator: Piero Lamelza

9:00-9:15 am
Introduction: Roger A. Greenberg, MD, PhD
Director, Penn Center for Genome Integrity (PCGI)
J. Samuel Staub, MD Professor of Cancer Biology
Director of Basic Science, Basser Center for BRCA
UPenn PSOM

9:20-9:35 am
Scott Chen, PhD
Postdoctoral Researcher, Lampson Laboratory
University of Pennsylvania Perelman School of Medicine

"Optogenetic control of cell biology: insights into mitotic chromosome segregation"

9:35-9:50 am
Craig Gambogi, PhD
Postdoctoral Researcher, Black Laboratory
University of Pennsylvania Perelman School of Medicine

"Efficient Formation of Single-copy Human Artificial Chromosomes"

10:00-10:40 am **Keynote Address**
Taekjip Ha, PhD
Bloomberg Distinguished Professor of Biophysics and Biophysical Chemistry, Biophysics, Biophysical Engineering, Johns Hopkins University
Investigator, Howard Hughes Medical Institute

"Light, CRISPR and DNA Repair"

10:40-11:00 am
Coffee Break

Session Two: Mechanisms of Recombination
Moderator: Heidi Elashal

11:00-11:15 am
Haoyang Jiang, PhD
Postdoctoral Researcher, Greenberg Laboratory
UPenn PSOM

"BLM helicase activity is essential for the telomere damage response that mediates ALT"

11:15-11:30 am
Adeola Fagunloye
PhD Candidate, BMB, Bernstein Laboratory
UPenn PSOM

"Interactions between the Rad51 paralogs and the replicative machinery enable efficient repair DNA damage"

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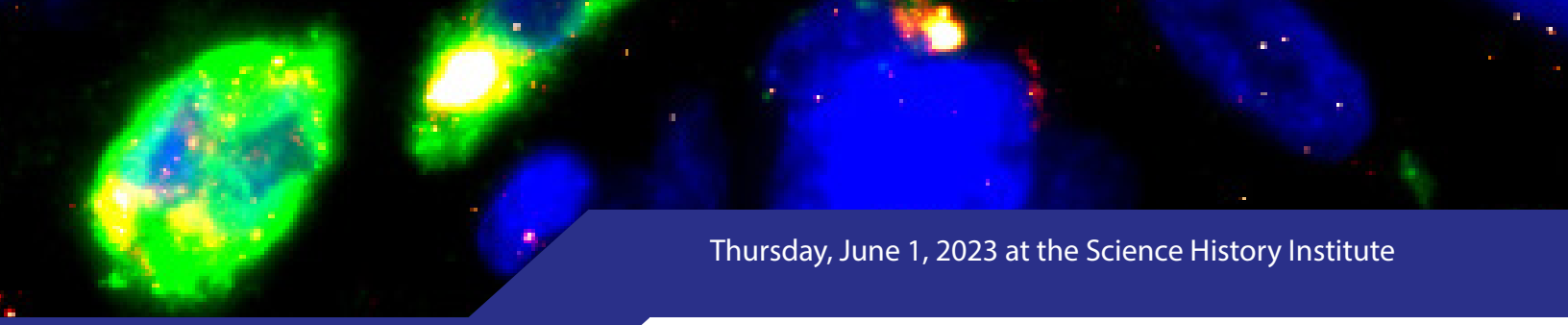

PCGI Retreat Program, continued:

11:30-11:50 am
Eric J. Brown, PhD
Associate Professor of Cancer Biology
Associate Investigator, Abramson Family Cancer Research Institute (AFCRI)
UPenn PSOM

"A story about ATR: from checkpoint regulator to cancer therapy"

11:50-12:00 pm
Intro to lunch and roundtable discussions

Session Three: Lunch and Roundtable Discussions
Moderators: Faculty leading the Roundtables

12:00-2:00 pm
Lunch Break

12:40-1:00 pm
Elizabeth McDonald, MD, PhD
Associate Professor of Radiology at the Hospital of the University of Pennsylvania
Co-Director, Breast Cancer Translational Research Group
Affiliate Faculty, Penn Center for Cancer Care Innovation

Radiotracers as cancer predictive biomarkers

1:00-1:40 pm
Roundtable discussions:

1. Entrepreneurship with Eric J. Brown and Roger A. Greenberg
2. Bench to bedside with Elizabeth McDonald and Dan Pryma
3. Landing a faculty position with Chengcheng Jin, Cornelius Taabazuing, and Andrew Modzelewski

1:40-2:00 p.m.
Daniel A. Pryma, MD
Gerd Muehllehner Professor of Radiology
UPenn PSOM
Attending, Hospital of the University of Pennsylvania, Radiology Department

Radiopharmaceuticals for cancer therapy

Session Four:
Molecular patterns and innate immunity
Moderator: Mikel Haggadone

2:00-2:15 pm
Joe Holly, PhD
Postdoctoral Researcher, Miner Lab
UPenn PSOM

"Nuclear TREX1 causes genomic instability and disease"

2:15-2:30 pm
Víctor R. Vázquez Marrero
PhD Candidate, IGG, Shin Lab
UPenn PSOM

"Secreted bacterial effectors trigger cell death in dendritic cells during Legionella pneumphila infection"

2:30-2:45 pm
Patrick Exconde
Graduate Student, BMB, Taabazuing Lab
UPenn PSOM

"A novel platform for uncovering new mediators of protein degradation"

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PCGI Retreat Program, continued:

2:45-3:00 pm
Alişya Anlaş, PhD
Postdoctoral Researcher, Discher Lab
Penn Engineering

"Matrix stiffness suppresses growth but induces genomic instability and variation in lung cancer spheroids"

3:00-3:30 pm
Coffee Break

Session Four: Repetitive DNA and genome stability – from chromosome ends to viruses
Moderator: Adeola Fagunloye

3:30-4:10 pm **Faculty Keynote**
Jennifer E. Phillips-Cremins, PhD
Associate Professor Dean's Faculty Fellow in Bioengineering and Genetics
University of Pennsylvania School of Engineering and Applied Sciences Department of Bioengineering

"Dissecting the repetitive genome's structure-function relationship in single cells"

4:10-4:25 pm
Sung-Ya Lin
Graduate Student, Levine Lab
Department of Biology, UPenn SAS

"Telomere protein coevolution preserves genome integrity"

4:25-4:40 pm
Ji-Hyung Lee, PhD
Postdoctoral Fellow, Mourkioti Lab
Department of Orthopaedic Surgery, UPenn PSOM

"New insights of muscle stem cells regulation: role of telomeric protein TRF2"

4:40-4:55 pm
Namrata Kumar, PhD
Postdoctoral Researcher, Weitzman lab
Children's Hospital of Philadelphia

"Herpes simplex virus manipulates host DNA repair pathways for productive infection"

4:55-5:00 pm
Closing remarks

5:00 pm
Reception in the courtyard
(Overlook if raining)

Speaker Bios (in order of presentations)

Geng-Yuan (Scott) Chen, PhD
Scott finished his graduate training in Dr. Will Hancock's lab at Pennsylvania State University working on molecular biophysics and biochemistry of kinesin motor proteins and microtubules. His PhD thesis focused on understanding how microtubules and kinesins regulate the mechanochemical cycle of each other, and resulted in four first-authored publications. To acquire postdoctoral training in cell biology that complements his analytical background, he joined Dr. Mike Lampson's lab in 2018, where he works on using chemical and optogenetic tools to study cell division, a topic that he's presenting today. His long-term career goal is to become an independent cancer cell biologist studying the physical science of cell division across molecular, cellular, and tissue scales.

Craig Gambogi
Craig Gambogi is a PhD student in the lab of Ben Black. He started his research career with...

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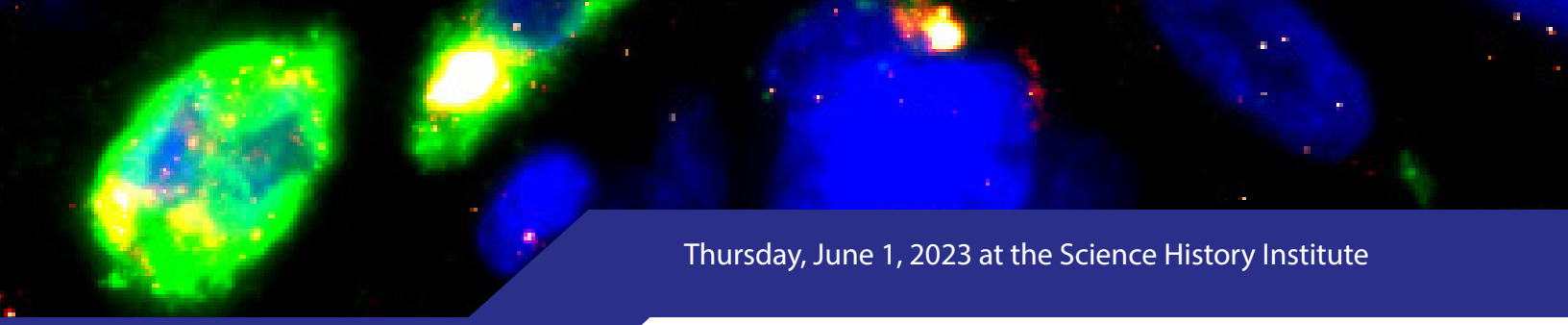

PCGI Retreat Program, continued:

...Andrew Lee by using NMR to understand protein allostery. In Ben Black's lab, he has studied the role of DNA sequence in centromere function, with a focus on understanding how to make human artificial chromosomes (HACs). He has made pivotal contributions in the field of human artificial chromosomes by demonstrating that HAC centromeres can be formed without repetitive a-satellite DNA or acquiring genomic sequences through a CENP-A seeding approach developed by Glennis Logsdon. His current research aims to address the problem of HAC multimerization, which has affected the field since the inception of the first HACs in the 90s.

Taekjip (TJ) Ha, PhD
Dr. Ha is a Bloomberg Distinguished Professor of Biophysics and Biophysical Chemistry, Biophysics, Biomedical Engineering at Johns Hopkins University. He has been an Investigator at the Howard Hughes Medical Institute since September 2005. He completed his postdoctoral research in the laboratory of Dr. Steven Chu at Stanford University Department of Physics. Dr. Ha obtained his Ph.D. in Physics, University of California at Berkeley.

Haoyang Jiang, PhD
Dr. Jiang obtained his bachelor's degree in Biological Sciences at Nanjing University. He finished his PhD research at Penn State under the supervision of Dr. Joseph Reese, where he studied DNA damage response and revealed that the Ccr4-Not complex is involved in DNA damage-induced RNAPII destruction in yeast. In the Greenberg lab, his work aims to understand the mechanism of BLM in alternative lengthening of telomeres (ALT) using genetic, molecular, and cell biology approaches.

Adeola Fagunloye
Adeola is a highly motivated scientist with a strong background in epidemiology and oncology research. He holds a Bachelor of Pharmacy degree, and a Master of Science in Cancer Biology, and is currently pursuing a Ph.D. in Biochemistry and Molecular Biophysics. He is an active member of several professional organizations, including the American College of Clinical Pharmacology and the Biomedical Graduate Student Association. Adeola is a dedicated and compassionate individual who is committed to making a positive impact in his community and has been involved in numerous volunteering and philanthropic activities.

Eric J. Brown, PhD
Dr. Brown is an Associate Professor of Cancer Biology at the University of Pennsylvania Perelman School of Medicine. His doctoral and postdoctoral research focused on the function of two PI kinase-related kinases, mTOR and ATR. Dr. Brown's laboratory at Penn focuses on the role of the replication stress response on genome stability. These efforts seek to define which cancer-associated genetic changes impact the efficacy of cancer therapeutics that inhibit these replication stress response pathways. Dr. Brown also consults for several DNA damage response-focused pharmaceutical companies, including Aprea Therapeutics, which is now testing a next-generation ATR inhibitor in the clinic as a cancer treatment.

Elizabeth McDonald, MD, PhD
Elizabeth McDonald, MD, PhD, is an Associate Professor of Radiology at the University of Pennsylvania, Perelman School of Medicine and...

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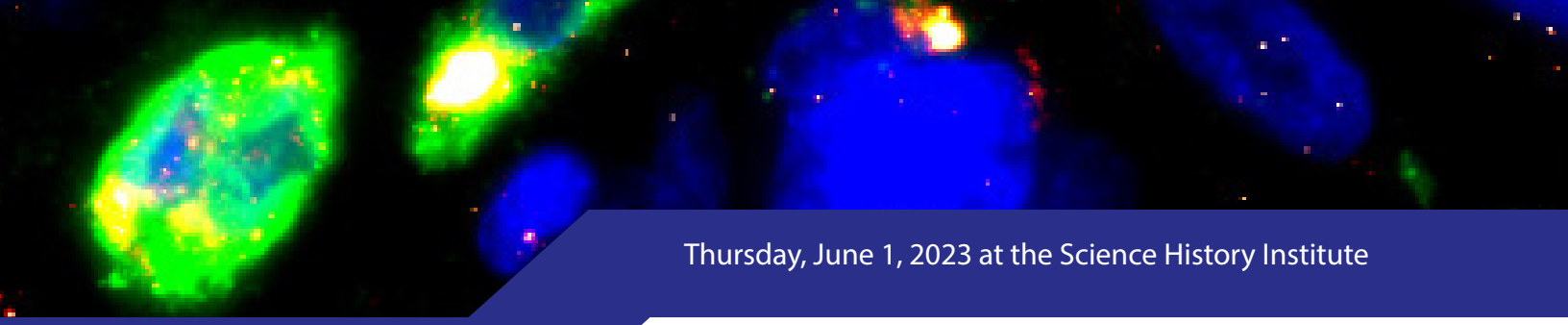

PCGI Retreat Program, continued:

...Co-Director of the Penn Breast Cancer Translational Research Group (BCTRG), a bench-to-bedside multi-disciplinary team committed to advancing the science of breast cancer care while training the next generation of translational researchers. Dr. McDonald's clinical roles include the Penn Breast Cancer Clinical Steering Committee and Director of Breast MRI. She received a B.A. in Biochemistry magna cum laude from Harvard University and completed medical school, graduate school, residency, and fellowship at the Mayo Clinic in Rochester. Awards include being named the 2016 American Roentgen Ray Society Scholar and a 2018 Abramson Cancer Center Cooper Scholar. Dr. McDonald has been a Fellow in the Society of Breast Imaging since 2017 and was inducted into the "Council of Distinguished Investigators" by the Academy for Radiology & Biomedical Imaging Research in 2022.

Daniel A. Pryma, MD
Daniel Pryma is the Gerd Muehllehner Professor of Radiology. He serves as the Associate Director for Clinical Research in the Abramson Cancer Center and Chief of the Division of Nuclear Medicine Imaging and Therapy at the Perelman School of Medicine at the University of Pennsylvania. His research focuses on therapeutic radiopharmaceuticals and companion diagnostics. He is also co-Leader of the Radiobiology and Imaging Program of the Abramson Cancer Center and serves as Chair of the Imaging Committee for NRG Oncology.

Joe Holley, PhD
Joe Holley attained his PhD from the University of Surrey in molecular virology in 2018 studying poxviruses. Following his graduate degree, he spent three years in industry developing virus-based gene therapies at Oxford Biomedica. Following his career in industry, he joined the University of Pennsylvania as a postdoctoral fellow in the laboratory of Dr. Jonathan Miner to study mechanisms of a rare inherited disease called RVCL, and to develop therapy strategies for patients with RVCL.

Víctor R. Vázquez Marrero
Víctor R. Vázquez Marrero graduated with a B.S. in Cellular and Molecular Biology from the University of Puerto Rico – Río Piedras (UPR-RP). With the support of the National Science Foundation Graduate Research Fellowship, he is currently pursuing his Ph.D. in Immunology at the Perelman School of Medicine in Dr. Sunny Shin's lab, where he studies how innate immune cells respond to bacterial infection. His project specifically focuses on understanding how dendritic cells activate cell death pathways in response to Legionella pneumophila infection. Outside of the lab, Víctor enjoys playing sports like volleyball and tennis as well as playing board games.

Patrick Exconde
Patrick Exconde is a first-generation PhD student in the Biochemistry and Molecular Biophysics graduate group at Penn. He is the first graduate student in the Taabazuing lab and an incoming Institute for Infectious and Zoonotic Diseases (IIZD) graduate fellow. The Taabazuing lab studies the molecular regulation of pyroptotic and apoptotic cell death. In doing so, they hope to understand how cell death influences the immune system and use this knowledge to develop therapeutics to combat human diseases. Patrick immigrated from the Philippines when he was 10 years old, and has always been interested in science. He received his...

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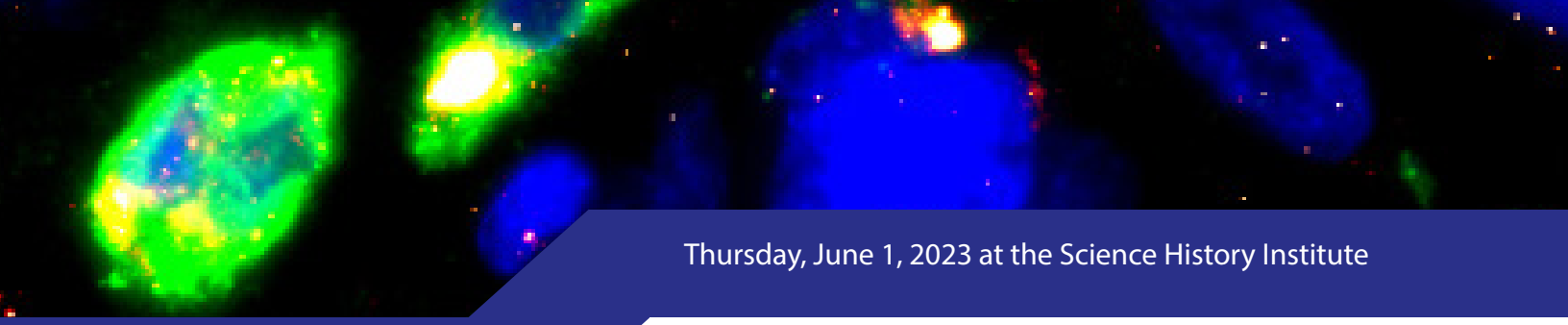

PCGI Retreat Program, continued:

...Bachelor of Arts in Chemistry and Biochemistry from the College of the Holy Cross, where he researched the mechanistic enzymology of inteins in Kenneth Mills' lab. Afterwards, he worked as a research technician in the lab of Keith Joung at Harvard Medical School, where he helped engineer a novel base editor, and developed assays and platforms to detect CRISPR-induced off-targets. His experiences have led Patrick to be interested in technology development, using these tools to uncover new therapeutic strategies for diseases. Outside of research, Patrick enjoys exploring the Philly food scene with his partner, engaging in his church community, and taking advantage of Penn's free gym membership.

Alişya Anlaş, PhD
Alişya is a postdoctoral researcher in Prof. Dennis Discher's group in Chemical and Biomolecular Engineering where she investigates how mechanically-confined microenvironments regulate genomic instability in lung cancer spheroids and macrophage migration. She completed her Ph.D. in Chemical and Biological Engineering at Princeton University in 2020, focusing on the mechanical regulation of autophagy, chemoresistance and genomic instability in breast cancer.

Jennifer E. Phillips-Cremins, PhD
Dr. Phillips-Cremins is an Associate Professor and Deans' Faculty Fellow in Engineering and Medicine at the University of Pennsylvania with primary appointments in the Departments of Genetics and Bioengineering. Dr. Cremins obtained her Ph.D. in Biomedical Engineering from the Georgia Institute of Technology in the laboratory of Andres Garcia. She conducted a multi-disciplinary postdoc in the laboratories of Job Dekker and Victor Corces. Dr. Cremins now runs the Laboratory of Chromatin and Spatial Neurobiology at UPenn. Her primary research interests lie in understanding the long-range chromatin architecture mechanisms that govern neural specification and synaptic plasticity in healthy neurons and how chromatin is dysregulated in neurodevelopmental and neurodegenerative diseases.

Dr. Phillips-Cremins has been selected as a 2014 New York Stem Cell Foundation Robertson Investigator, a 2015 Albert P. Sloan Foundation Fellow, a 2016 and 2018 Kavli Frontiers of Science Fellow, 2015 NIH Director's New Innovator Awardee, 2020 NSF CAREER Awardee, a 2020 CZI Neurodegenerative Disease Pairs Awardee, the 2022 ISSCR Susan B. Lim Outstanding New Investigator Award, and as a recipient of the 2021 NIH Pioneer Award.

Sung-Ya Lin
Sung-Ya received a B.S. in Life Science from National Taiwan University (NTU). She then completed a Master's degree in the Genome and Systems Biology degree program in Dr. Chau-Ti Ting's lab at NTU, where she studied the sex-ratio meiotic drive in Drosophila simulans. She then attended the biology graduate program at Penn and joined Dr. Mia Levine's lab to continue exploring more evolutionary questions using Drosophila. Sung-Ya's current research focuses on how the rapidly evolving telomere binding proteins shape essential genome functions.

Ji-Hyung Lee, PhD
Dr. Lee obtained his Ph.D in South Korea in 2021 and started his postdoctoral research in the same year...

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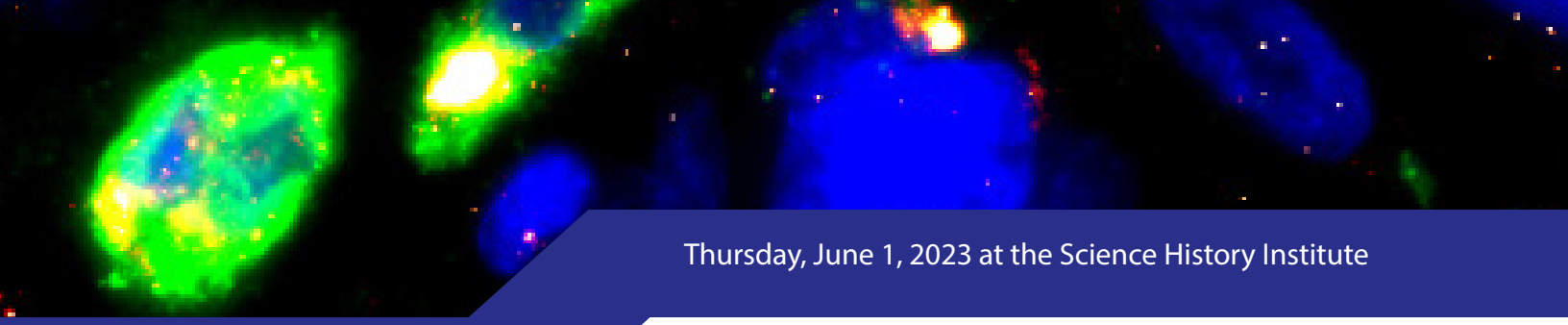

PCGI Retreat Program, continued:

...under the mentorship of Dr. Mourkioti in the Mckay Orthopaedic research lab of the Orthopaedic surgery department. His research interest is regulatory mechanism of muscle stem cell function.

Namrata Kumar, PhD
Namrata received her PhD in Molecular Genetics from University of Pittsburgh where her thesis work was focused on the interplay between different DNA excision repair pathways in the recognition and removal of telomeric oxidative damage. In 2022, Namrata joined Dr. Matthew Weitzman's laboratory at CHOP as a Postdoctoral Fellow, where she is currently trying to understand the role of DNA damage response during viral infections. Today her talk will mainly focus on the role of the homologous recombination protein RAD51 in facilitating herpes simplex virus (HSV) replication.