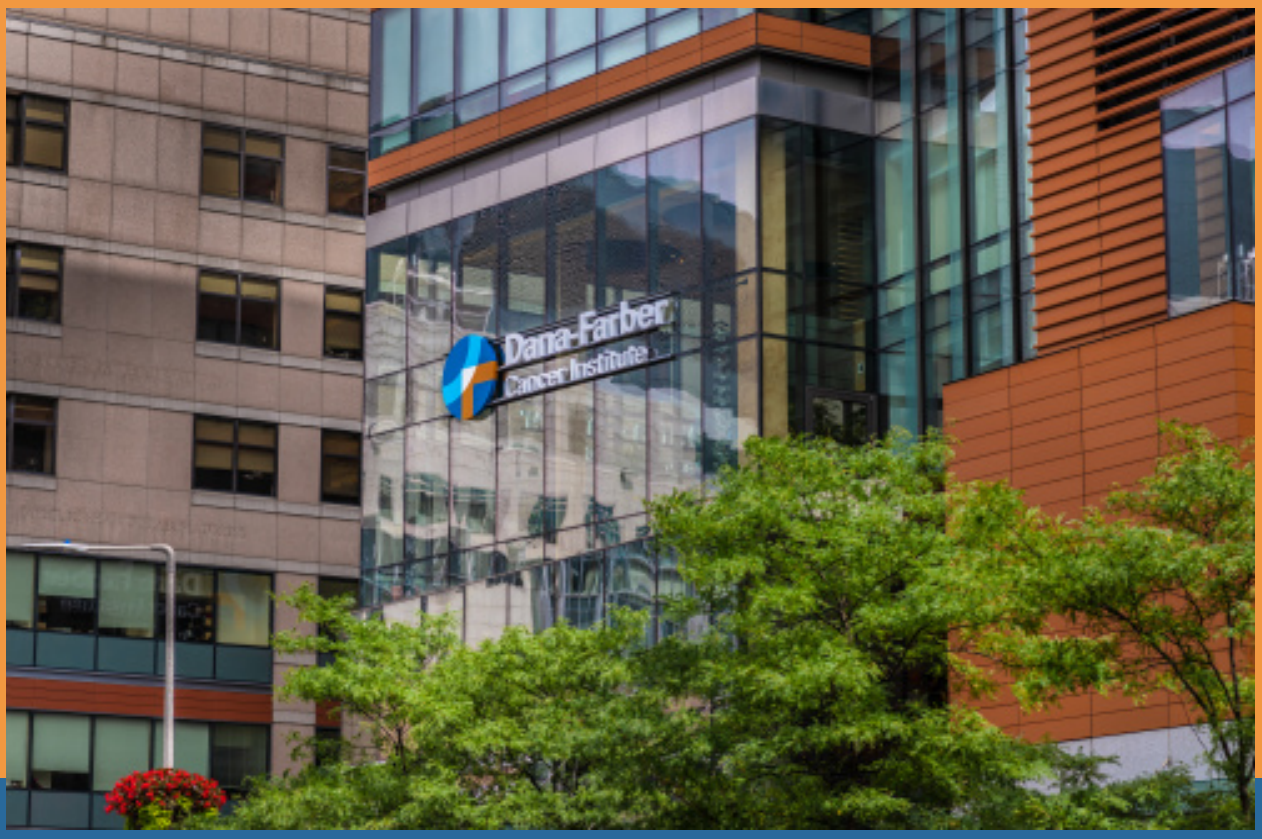


Cancer Chemical Biology and Metabolism (CCBM) T32 Training Program

Annual Retreat 2020

Program funded by the NCI T32CA236754

About the CCBM Program

Welcome to the 1st Annual Cancer Chemical Biology and Metabolism (CCBM) training program retreat.

CCBM is the NCI-funded T32 postdoctoral training program that integrates cancer chemical biology and metabolism (CCBM) – two synergistic and conceptually related research disciplines grounded in small molecule chemistry and biochemistry that are of growing importance from both basic and translational research perspectives.

The main goals of this program are to:

- Provide training in a range of topics relevant to cancer chemical biology and metabolism.
- Familiarize trainees with state-of-the-art technologies and approaches in chemical biology and metabolic science.
- Train fellows to identify important questions and approaches that will move the field forward and provide translational opportunities to impact cancer treatment.
- Provide trainees with opportunities to develop and enhance their grantsmanship and scientific communication skills.
- Coach fellows on their paths to an independent career in science by implementing Individual Development Plans (IDPs), individual postdoctoral mentoring committees, and customized opportunities for trainees to acquire experience in mentoring, teaching depending on their career goals.

Our 35 mentors span four Dana-Farber Cancer Institute departments (Cancer Biology, Cancer Immunology and Virology, Pediatric Oncology, Medical Oncology), which contributes to diversity of our training opportunities and curriculum offering. We structured our training around conceptual, technical and career development needs of our trainees. If you are interested in applying to join our Program, please visit our website to learn more: https://danafarbercancerbiologytraining.org/. You can also find us on Twitter: @DFCI_CCBM.

Thomas Roberts, Ph.D.
Nika Danial, Ph.D.
Program Directors

Agenda

10 – 10:15AM Introductions (Matthew Streeter) and Welcome remarks (Nika Danial, Program Co-Director)

Session I - Emerging Technologies in CCBM
10:15 – 10:45AM
Making the most of your microscopy with high-throughput image analysis
Beth Cimini (Broad) – Introduction by Jon Dempersmier
10:45 – 11:15AM
Mapping Cell-Cell Interactions in Tumor Microenvironment via Photocatalytic Proximity Labeling
Niyi Fadeyi (Merck) – Introduction by Matthew Streeter
11:15AM – 11:45AM
The Impact of DEL Diversity and Normalization on Identifying Screening Hits
Chris Phelps (GSK) – Introduction by Matthew Streeter
11:45AM – 12PM Trainee talk
Development of Chemical Activators of Uncoupling Protein 1 to Treat Obesity
Martha Ordonez (Chouchani lab) – Introduction by Narek Darabedian

12 – 1PM BREAK

1PM to 3:15PM
Session II - Cutting Edge Science in CCBM
1 – 1:30PM
How understanding metabolism informs cancer therapy
Matt Vander Heiden (MIT) – Introduction by Narek Darabedian
1:30 – 1:45PM Trainee talk
Discovery of Histone Lysine Demethylase (KDM)5A Inhibitors for Multiple Myeloma Therapy
Xiaofeng Zhang (Dana-Farber Cancer Institute) – Introduction by Laura Stransky
1:45 – 2:15PM
RNA methylation in gene expression regulation
Chuan He (UChicago) – Introduction by Xiaofeng Zhang
2:15 – 2:30PM Trainee talk
Recurrent SMARCB1 mutations reveal a critical BAF complex-nucleosome interaction conserved for millennia
Freddy Valencia (Stanford U) – Introduction by Laura Stransky
2:30 – 3PM
Hypoxia, Metabolism, and Tumor Progression
M. Celeste Simon (UPenn) – introduction by Laura Stevens
3 – 3:15PM Closing remarks Laura Stevens

Retreat organizers:

Narek Darabedian, Ph.D. (Chouchani lab)
Jon Dempersmier, Ph.D. (Arthanari lab)
Laura Stransky, Ph.D. (Kaelin lab)
Matthew Streeter, Ph.D. (Justin Kim lab)
Laura Stevens, Ph.D. (Polyak lab)
Xiaofeng Zhang, Ph.D. (Jun Qi lab)

Speakers Bio (in alphabetical order)

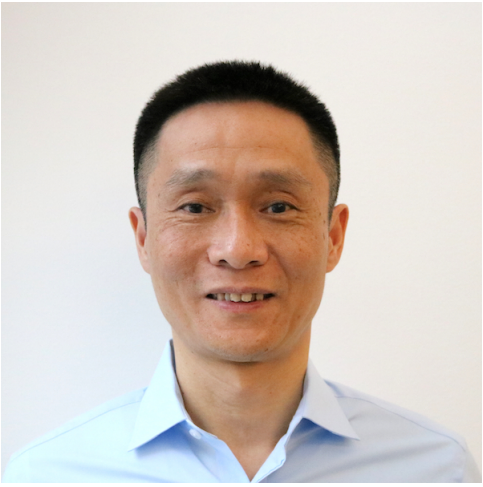
Beth Cimini, Ph.D.

Dr. Cimini is the Lead Image Assay Developer for the Imaging Platform at the Broad Institute in Cambridge, MA. After doing research in visual neuroscience with Dr. William Eldred at Boston University as an undergraduate, she obtained a Ph.D. in Biochemistry and Molecular Biology with Dr. Elizabeth Blackburn at UCSF, studying the difference between splicing variants of the telomere master scaffolding protein TIN2. These projects honed her interests in image analysis, leading her to join Dr. Anne Carpenter's lab at the Broad, where she leads a team collaborating with approximately 30 outside scientists per year on their own custom image analysis projects. She also co-maintains the lab's main software tool, CellProfiler, and directs the Broad efforts towards community engagement and driving biological projects for the Center for Open Bioimage Analysis (COBA).

Olugbeminiyi (Niyi) Fadeyi, Ph.D.

Dr. Fadeyi completed his B.Sc. in Chemistry at Obafemi Awolowo University where he conducted undergraduate research under the direction of Professor Craig Obafemi and later moved to the US for graduate studies. He obtained his Masters in 2007 from Tennessee State University and completed two internships at Eli Lilly. He continued to the doctoral program at Vanderbilt University, Department of Chemistry and Chemical Biology under the mentorship of Prof. Craig Lindsley. In 2011, Dr. Fadeyi obtained his doctorate degree and moved to Harvard University as a UNCF/Merck postdoctoral fellow in the lab Prof. Matthew Shair at the Department of Chemistry and Chemical Biology. He joined Pfizer Inc., Groton in 2014, where he was a Principal Scientist in Chemistry and Chemical Biology (Inflammation & Immunology/Rare Diseases division in Worldwide Medicinal Chemistry). After 3 years at Pfizer, he joined the Molecular Discovery and Chemical Biology group at Merck Exploratory Science Center in Cambridge where he works with a team of multidisciplinary scientists that integrates chemistry and biology to study novel mechanistic basis of human diseases to develop new therapeutics.

Chuan He, Ph.D.



Dr. He is the John T. Wilson Distinguished Service Professor in the Department of Chemistry and Department of Biochemistry and Molecular Biology at the University of Chicago. He received his bachelor of science degree in 1994 from the University of Science and Technology of China and his Ph.D. in chemistry from the Massachusetts Institute of Technology in 2000, studying under professor Stephen J. Lippard. After training as a Damon-Runyon postdoctoral fellow with professor Gregory L. Verdine at Harvard University, he joined the University of Chicago as an assistant professor, rising to associate professor in 2008 and full professor in 2010. He was selected as an investigator of the Howard Hughes Medical Institute in 2013. Dr. He's research spans a broad range of fields including chemical biology, RNA biology, epigenetics, biochemistry, and genomics. His recent research concerns reversible RNA and DNA methylation in biological regulation. In 2011, his group discovered reversible RNA methylation as a new mechanism of gene expression regulation. His laboratory has spearheaded the development of enabling technologies to study the biology of RNA and DNA modifications.

Martha Ordonez

Ms. Ordonez is a 3rd year PhD candidate in the Biological and Biomedical Sciences (BBS) program and also part of the therapeutics graduate program at Harvard. Her research focuses on the development and characterization of small molecule therapeutics for the treatment of metabolic diseases. Outside the lab, Ms. Ordonez is very passionate about advocating for the minority community. She has served in multiple Harvard organizations and events to promote race equity and inclusion, including serving as a peer mentor coordinator for the summer honors undergraduate research program (SHURP), co-founder of the BBS Committee on Diversity, Inclusion, and Belonging, and Harvard Coalition for Black Lives, and is the current co-President of the Minority Biomedical Scientists of Harvard (MBSH) student organization.

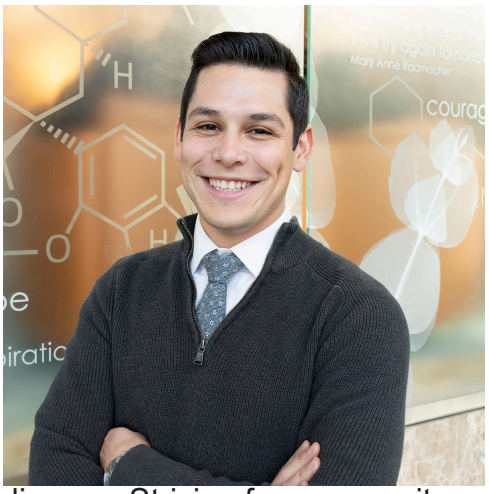
Chris Phelps, Ph.D.

Dr. Phelps has spent the last 11 years working at GSK in the Encoded Library Technology group helping to develop the DNA encoded library screening platform. He is currently the Director of Biology for group, located in Cambridge, MA. His team focuses on using DELs and aptamers to deliver hits and tools for programs while continuing to evolve the platforms. Dr. Phelps earned his PhD in Chemistry from UC San Diego and prior to joining GSK was a Post-doctoral fellow with Rachel Gaudet in the Department of Molecular and Cellular Biology at Harvard University.

M. Celeste Simon, Ph.D.

Dr. Simon is the Scientific Director of the Abramson Family Cancer Research Institute of the Perelman School of Medicine at the University of Pennsylvania. Dr. Simon's research is focused on how cells sense and respond to changes in the availability of molecular oxygen and nutrients. This affects normal development, physiology, and numerous diseases, such as the growth of solid tumors. The Simon Laboratory is studying how O_2 sensing impacts tumor angiogenesis, inflammation, metabolism, metastasis, and overall disease progression. She is studying both animal models and cancer patient samples with the ultimate goal of developing novel strategies to treat tumors such as pancreatic cancer, soft tissue sarcoma, and renal cancer. Dr. Simon currently directs a laboratory of 20 individuals, including graduate students, postdoctoral fellows, clinical fellows, and research technicians. She was an HHMI Investigator for twenty years, and has received numerous awards recognizing her research, such as the Fouad Bashour Award for Distinguished Physiologists, Stanley N. Cohen Award for Biomedical Research, and Elliot Osserman Award from the Israel Cancer Research Fund. In 2014, she was elected to the American Academy of Arts and Sciences, and the National Academy of Medicine in 2018.

Alfredo (Freddy) Valencia, Ph.D.



Dr. Valencia recently graduated with a Ph.D. in Chemical Biology from Harvard and is currently a Science Fellow at Stanford University in the laboratory of Dr. Sergiu Pasca. His dissertation in the laboratory of Dr. Cigall Kadoch, one of the mentor in CCBM T32 program, where he examined the biochemical and functional consequences of mutations in the SMARCB1 subunit of the mammalian SWI/SNF (mSWI/SNF or BAF) chromatin-remodeling complex. His long-term research interests aim to uncover the underlying epigenetic mechanisms implicated in the development of human disorders and disease. Striving for race equity and inclusion in higher education, while at Harvard, he was a mentor for the Native American High School Summer Program at HMS and he also served as a Diversity and Inclusion Fellow and Co-President of the Minority Biomedical Scientists of Harvard (MBSH) student organization.

Matthew Vander Heiden, M.D., Ph.D.

Dr. Vander Heiden is an Associate Professor in the Department of Biology at the Massachusetts Institute of Technology, and Associate Director of the Koch Institute for Integrative Cancer Research. He is also an Institute Member of the Broad Institute of Harvard and MIT, and an Instructor of Medicine at the Dana-Farber Cancer Institute and Harvard Medical School. Dr. Vander Heiden received his MD and PhD degree from the University of Chicago. He also completed clinical training in Internal Medicine and Medical Oncology at the Brigham and Women's Hospital/ Dana-Farber Cancer Institute prior to completing a post-doctoral fellowship at Harvard Medical School. His laboratory studies how metabolism is regulated to meet the needs of cells in different physiological situations with a focus on understanding the role of metabolism in cancer.

Xiaofeng Zhang, Ph.D.

Dr. Zhang is the postdoc fellow in the Department of Cancer Biology at Dana-Farber Cancer Institute and a trainee in the CCBM T32 program. He received his master's degree in physical chemistry from Jilin University in 2007 and his Ph.D. in organic chemistry from the University of Massachusetts Boston in 2019. He joined the Qi lab in 2019. Dr. Zhang's research spans a broad range of fields including medicinal chemistry, chemical biology and epigenetics. His recent research concerns establishing biological rationales for hematologic malignancy therapy by using novel small molecules as chemical probes.