

UCSF

INFECTIOUS DISEASE MOLECULAR IMAGING SYMPOSIUM



MARCH 15, 2024

Sponsored by:
Division of Experimental Medicine / Department of Medicine
Department of Radiology and Biomedical Imaging

VISION STATEMENT

Application of cutting-edge molecular imaging technologies to localize and characterize infectious diseases will enhance therapeutic development and intervention improving global health

MISSION STATEMENT

UCSF is already a major leader in infectious disease and molecular imaging research and clinical care. The rich environment has led to many ground-breaking findings spanning basic, pre-clinical, translational and clinical investigation. Leveraging these existing strengths, we envision the creation of a collaborative and transdisciplinary research and clinical implementation space to kick start a formal Program/Center in Infectious Disease Molecular Imaging. This Program/Center will provide shared resources to facilitate inter-departmental and inter-institutional collaborations.

Ultimately, such a Program/Center will help investigators leverage the unique depth of resources available at UCSF and partner institutions to: (1) obtain major project funding, (2) support the development of junior investigators and students interested in infectious disease molecular imaging, (3) foster diversity in this rapidly-growing, high-impact field, (4) enable the acquisition and implementation of instrumentation and other resources required to perform cutting-edge imaging research, (5) provide a forum for sharing novel ideas and findings. The creation of this Program/Center has the potential to enhance therapeutic development, clinical management, and positively impact human health.

Welcome to the inaugural Infectious Disease Molecular Imaging Symposium.

We are pleased to bring together experts in molecular imaging technologies and basic science, therapeutic development and management of infectious diseases who will present cutting edge research and clinical perspectives.

We hope that this symposium will stimulate new ideas, facilitate cross-disciplinary collaborations, and inspire development of novel diagnostic and therapeutic strategies to combat infectious diseases of global concern.

Timothy J. Henrich, MD

Henry VanBrocklin, PhD

Symposium Co-Chairs

10:00 – 10:30

Introduction/ Welcome

Bob Wachter MD – Chair, UCSF Department of Medicine

Chris Hess MD, PhD -Chair, UCSF Department of Radiology and Biomedical Imaging

Center Overview/ Mission/ Vision

Timothy Henrich, MD – Professor, UCSF Division of Experimental Medicine

Henry VanBrocklin, PhD – Professor, UCSF Department of Radiology and Biomedical Imaging

10:30 – 12:00

Session I

Steve Deeks, MD – Professor, UCSF Division of HIV, Infectious Diseases, and Global Medicine

Introduction

Negar Omidvari, PhD – Assistant Project Scientist, UC Davis, Department of Biomedical Engineering

Dynamic Imaging of T Cells in COVID-19 Convalescent Patients and Healthy Volunteers Using Total-Body PET

Michael Evans, PhD – Professor, UCSF Department of Radiology and Biomedical Imaging

Imaging the host immune response to viral and bacterial pathogens in vivo using granzyme activated positron emission tomography

Henry VanBrocklin, PhD – Professor, UCSF Department of Radiology and Biomedical Imaging

Infection PET Imaging with ¹⁸F-FAraG

Sara Suliman, PhD, MPH – Assistant Professor, UCSF Division of Experimental Medicine

Applications of PET/CT Imaging in TB Treatment Response Studies

Panel Discussion

12:00 – 12:45 Lunch (Lobby)

12:45 – 2:00

Session II

Sarah Doernberg, MD, MAS – Professor, UCSF Division of Infectious Diseases

ID clinical challenges: a call for novel diagnostic strategies

Christina Homer, MD, PhD – Clinical Fellow, UCSF Division of Infectious Diseases

Roles for molecular imaging in the diagnosis and management of invasive fungal infections

Michael Ohliger, MD, PhD – Associate Professor, UCSF Department of Radiology and Biomedical Imaging

Looking in the mirror: imaging bacteria using D-amino acids, from bench to bedside.

Joanne Engel, MD, PhD – Professor; Chief, UCSF Division of Infectious Diseases

Developing PET tracers to diagnose musculoskeletal infections

Panel Discussion

2:00-2:15

Break

2:15- 3:15

Session III

Phyllis Tien, MD – Professor; Chief, UCSF Division of Infectious Diseases, VA

HIV and Liver Disease: Applications for Liver Imaging

Galatea Kazakia, PhD – Professor, UCSF Department of Radiology and Biomedical Imaging

Mechanisms of elevated fracture risk in people living with HIV

Jared Narvid, MD – Associate Professor, UCSF Department of Radiology and Biomedical Imaging
Imaging Endothelial Dysfunction and the Neurovascular Unit in HIV in the cART Era

Panel Discussion

3:15-3:30

Break

3:30-4:45

Session IV

Afam Okoye, PhD – Associate Professor, OHSU Vaccine and Gene Therapy Institute
PET-CT Imaging in Nonhuman Primate Models of HIV/SIV

Michael VanElzakker, PhD – Instructor, Harvard Medical School & Massachusetts General Hospital
Neuroinflammation in post-acute sequelae of COVID-19 (PASC) as assessed by [11C]PBR28 PET correlates with vascular disease measures

Priscilla Hsue, MD – Professor, UCSF Division of Cardiology
FDG PET imaging and cardiovascular Inflammation in people with HIV

Michael Peluso, MD – Assistant Professor, UCSF Division of HIV, Infectious Diseases and Global Medicine
Molecular imaging in human trials: challenges and opportunities

Panel Discussion

4:45

Closing Remarks

Timothy Henrich, MD – Professor, UCSF Division of Experimental Medicine

Henry VanBrocklin, PhD – Professor, UCSF Department of Radiology and Biomedical Imaging

5:00 Reception (Lobby)



Timothy Henrich, MD is a Professor of Medicine in the Division of Experimental Medicine at UCSF. He oversees a collaborative and interdisciplinary research group focused on understanding the nature of chronic viral persistence and developing and implementing novel strategies to purge viral reservoirs and achieve long-term viral-free remission. Dr. Henrich's interests include stem cell and gene

therapies for HIV cure and immunotherapeutic approaches for HIV, SARS-CoV-2 and other viral infections. He is also interested in identifying novel biomarkers of viral infection and elucidating the host-viral interactions that facilitate pathogen persistence in various tissues using high-parameter digital spatial multiomic profiling. Dr. Henrich has been spearheading pathogenesis-based studies in the Long-term Impact of Infection with Novel Coronavirus (LIINC) study at San Francisco General Hospital. He also has been working to design and implement non-invasive PET imaging approaches to characterize viral protein persistence and immune responses to infection in vivo. He is a Member of the American Society for Clinical Investigation and is a Member of the NIH Office of AIDS Research Advisory Board.



Henry VanBrocklin, PHD is Professor and Director of Radiopharmaceutical Research in the Department of Radiology and Biomedical Imaging at the University of California San Francisco (UCSF). His work spans many radiopharmaceutical science disciplines from short-lived radioisotope production to the development of new strategies for labeling biomolecules with imaging and therapeutic isotopes. His current research interests include design of imaging agents targeting cancer cell surface markers, preparation of probes for neurodegenerative disorders including AD

and ALS, application of imaging in drug development and elaboration of zirconium-89 labeled antibodies for imaging rheumatoid arthritis, HIV reservoirs and Long COVID. He has translated >10 radiopharmaceuticals for evaluation in human studies. He was selected as a Distinguished Investigator by the Academy for Radiology & Biomedical Imaging Research in 2018, the recipient of the 2020 Michael J. Welch Award from the Radiopharmaceutical Science Council of the SNMMI, and the 2023 Paul Abersold Award from the SNMMI.



Steven G. Deeks, MD is a Professor of Medicine at the University of California, San Francisco. He is an expert on HIV and its impact on health during antiretroviral therapy. In early 2020 his team leveraged his HIV program (SCOPE) to implement one of the first prospective studies aimed at defining the natural history, biology and treatment of Long COVID (LIINC). Dr. Deeks has published over 700 peer-reviewed articles, editorials and invited

reviews on these and related topics. He is the contact principal investigator (PI) of DARE (the Delaney AIDS Research Enterprise), an NIH-funded international collaboratory aimed at developing a cure for HIV infection. He is also the contact PI for one of the adult cohort sites within RECOVER, a national Long COVID research program. Dr. Deeks was elected to the American Society for Clinical Investigation (ASCI) and the Association of America Physicians (AAP) and serves on the scientific advisory board for Science Translational Medicine. He is listed annually as one of the world's most cited scientists for the past several years. In 2022, he received the Lifetime Achievement in Mentoring Award from UCSF. He maintains a primary care clinic for people living with HIV.



Negar Omidvari, PhD is an Assistant Project Scientist at UC Davis. She received the B.Sc. degree in Electrical Engineering from University of Tehran, Iran in 2011, the M.Sc. degree in Biomedical Engineering from RWTH Aachen University, Germany in 2013, and the Ph.D. degree in Physics from Technical University of Munich, Germany in 2018. She joined Dr. Simon Cherry's lab at UC Davis in 2019 as a PostDoc and was involved in the characterization of the world's first total-body PET scanner, the

uEXPLORER. Dr. Omidvari's latest research has focused on quantitative total-body imaging of T cells and she has led two pilot studies on this topic at UC Davis. She has received several recognitions, including the Young Investigator Award of the European Society for Molecular Imaging in 2022, Ones to Watch recognition from the Society of Nuclear Medicine and Molecular Imaging in 2021, and IEEE Glenn F. Knoll Graduate Award in 2018.



Michael Evans, PhD is a Professor in Residence in the UCSF Department of Radiology and Biomedical Imaging. He is a chemical biologist with an interest in biomarker discovery with proteomics, nuclear medicine, theranostics, and molecular imaging. Dr. Evans has published over 80 peer-reviewed articles, 40 meeting abstracts, and is a co-inventor on 13 patents pending or issued. He is a scientific co-founder and previously served on the

scientific advisory board of ORIC Pharmaceuticals, Inc. He is a co-founder of Therapaint, Inc, Honeybear Biosciences, Inc., and Hap10, Inc. He has been recognized with numerous honors, including a 2013 Young Investigator Award from the Prostate Cancer Foundation, a Pathway to Independence Award from the National Cancer Institute, a 2017 Research Scholar Award from the American Chemical Society, the 2023 Roger Tsien Award for excellence in chemical biology from the World Molecular Imaging Society, and he was a 2020 inductee to the Council of Distinguished Investigators in the Academy of Radiology and Biomedical Imaging Research.



Sara Suliman, PhD is an Assistant Professor in the Division of Experimental Medicine and an immunologist by training with a focus on understanding the risk of progression to active TB disease and developing predictive biomarkers. She received a PhD at the University of Toronto, followed by two post-doctoral fellowships at the South African TB Vaccine Initiative at the University of Cape Town, then the Brigham and Women's Hospital in Boston. She then became an instructor at the Brigham and

Women's Hospital and Harvard Medical Schools, where she focused on dissecting host factors associated with TB risk, including genetic associations and non-classical T cell responses to mycobacterial antigens. During the COVID-19 pandemic, she led the Mass General and Brigham COVID-19 diagnostics accelerator lab to evaluate emerging diagnostics. She is now an assistant professor at the UCSF Division of experimental Medicine, studying the impact of host factors and viral infections on risk of TB disease progression and unfavorable treatment outcomes.



Sarah Doernberg, MD is a Professor in the Division of Infectious Diseases and the Medical Director of Adult Antimicrobial Stewardship at UCSF Medical Center. She has an active outpatient Infectious Diseases Clinic and sees inpatients on the Transplant Infectious Diseases service. Her clinical research focuses on diagnosis and treatment of antibiotic resistant infections and antimicrobial stewardship. She received her BA from Harvard University in Biology with a focus in Neurobiology and

received her MD from Yale University School of Medicine. She completed her Internal Medicine residency and Infectious Diseases fellowship at UCSF. She also received a Masters' degree in advanced studies through the Training in Clinical Research Program at UCSF.



Christina Homer, MD, PhD is a physician scientist in the Division of Infectious Diseases. She completed the UCSF MSTP, where she studied the fungal pathogen *Cryptococcus neoformans* under the mentorship of Dr. Hiten Madhani. After Internal Medicine Residency at UCSF, she continued in the Infectious Diseases Fellowship, with additional training in Immunocompromised and Transplant Infectious Diseases, which includes a number of patients with fungal infections. She is now performing her postdoctoral work with Dr. Anita Sil, studying the

human fungal pathogen *Coccidioides*. She is passionate about developing better treatments, and ultimately a cure, for this difficult-to-treat and poorly understood fungal pathogen. In the future, she plans to start her own lab studying *Coccidioides* pathogenesis and its interactions with the host immune system.



Michael Ohliger, MD, PhD is an Associate Professor in the Department of Radiology and Biomedical Imaging at the UCSF. Dr. Ohliger obtained his PhD in Medical Physics from the Harvard/MIT Division of Health Sciences and Technology in 2005, and he received his MD in Medicine from Harvard Medical School in 2007. He completed his residency in Diagnostic Radiology and fellowship training in Abdominal Imaging at UCSF. He joined the UCSF faculty in 2013. He currently serves as Modality Director for MRI. Dr. Ohliger's research

focuses on development and clinical translation of novel imaging techniques for the abdomen and pelvis, with a focus on molecular imaging of metabolism. Current research projects involve using hyperpolarized carbon-13 MRI to image liver tumors as well as fatty liver disease as well as developing novel methods for imaging bacterial injection.



Joanne Engel, MD, PhD completed her B.S. in Molecular Biophysics and Biochemistry from Yale, an MD-PhD program at Stanford, a residency in Internal Medicine at the University of Pennsylvania followed by a clinical and postdoctoral fellowship in Infectious Disease at UCSF. She was appointed to the faculty at UCSF in 1990, and is currently a Professor in the Departments of Medicine and Microbiology/Immunology. She has served as the Chief of the Division of Infectious Disease since 2005 and is the founding and current co-director of the Integrative Microbiology program at UCSF. Her lab focuses on the complex interplay

between bacterial pathogens and their human hosts. Her lab has made many important contributions to understanding how *Chlamydia trachomatis* alters the cell biology of their host cell as well as discovering and elucidating the role of the type III secretion system in *Pseudomonas aeruginosa*. She is an elected member of the American Society for Clinical Investigation, the Association of American Physicians, and of the American Academy of Microbiology. She is currently an ASM Distinguished Lecturer.



Phyllis Tien, MD is Professor of Medicine at UCSF and Chief of the Infectious Diseases Division at the San Francisco Veterans Affairs Health Care System. She completed her MD at UC San Diego, medical residency and fellowship in Infectious Diseases and Geographic Medicine at Stanford, a second fellowship in AIDS Prevention Studies at UCSF, and a MSc from the Harvard School of Public Health.

Her research examines the mechanisms by which chronic viral infections (specifically HIV and HCV) and their associated metabolic and immune perturbations impact long term organ injury and has leveraged the Multicenter AIDS Cohort Study (MACS)/Women's Interagency HIV Study (WIHS) Combined Cohort Study – the largest and longest running NIH-funded prospective cohorts of US adult men and women with and without HIV. Dr. Tien has served as Chair of the NIH AIDS Clinical Epidemiology Study Section and member of the Department of Health and Human Services Antiretroviral Guidelines Panel.



Galateia J. Kazakia, PhD is

Professor in Residence and Director of the Bone Quality Research Laboratory in the Department of Radiology and Biomedical Imaging at UCSF. Dr. Kazakia serves as the Faculty Director of the Quantitative Musculoskeletal-Imaging Core, Director of the UCSF Core Center for Musculoskeletal Biology and Medicine (CCMBM) Imaging Core, and Co-Director of the Nutrition and Obesity Research Center (NORC) Human Metabolism Core. Dr. Kazakia's research is focused on the assessment of the musculoskeletal system using both in

vivo and ex vivo imaging tools, spanning the hierarchical levels of structure and composition. Through her research she aims to characterize changes occurring in the musculoskeletal system in response to aging and disease, to discover biological mechanisms of these changes, and to understand the impact skeletal changes have on bone strength and fracture risk.



Jared Narvid, MD is an Associate Professor of Neuroradiology at the University of California, San Francisco. Dr. Narvid has received numerous honors including research awards from the American Medical Association, Lifeline Foundation, American Heart Association, and the Howard Hughes Medical Institute. His research evaluates the impact of cerebrovascular disease and Neuro-HIV on cognition. Antimicrobial



Afam Okoye, PhD is an Associate Professor at the Vaccine & Gene Therapy Institute and a Core Scientist within the Division of Pathobiology and Immunology at the Oregon National Primate Research Center, Oregon Health & Science University. He received his M.Sc. in Biotechnology from the Nottingham Trent University and his Ph.D. from the University of Glasgow. He is a trained immunologist with extensive experience in the investigation of nonhuman primate models of HIV pathogenesis, vaccine

and cure. His current research is focused on understanding the mechanisms of HIV persistence during therapy and developing therapeutic approaches aimed at eliminating HIV reservoirs and/or achieving durable remission from HIV replication after ART is withdrawn.



Michael VanElzakker, PhD is an Instructor in the Neurotherapeutics Division of Harvard Medical School & Massachusetts General Hospital, and an Instructor in the Tufts University Psychology Department. He is also co-founder of the nonprofit PolyBio Research Foundation. His research program is focused on neuroimmunology and the long-term consequences from environmental insults.



Priscilla Hsue, MD is a Professor of Medicine and Chief of Cardiology at ZSFG. Dr. Hsue trained in Internal Medicine in the Molecular Medicine Training Program at UC San Francisco and in Cardiovascular Medicine at UC San Francisco. She served as Chief Cardiology Fellow during this time. She has been on the faculty in the Department of Medicine at San Francisco General Hospital since 2002. She started the HIV Cardiology Clinic since March 2004 at the Positive Health Program at Ward 86, which is one of the first subspecialty clinics of its kind in the nation. Her research interests include: (1)

cardiovascular complications of cocaine including aortic dissection, myocardial infarction, and cardiac arrest, (2) pathogenesis of atherosclerosis in HIV-infected patients treated with antiretroviral therapy, (3) clinical features and outcomes of acute coronary syndromes in HIV-infected patients, (4) incidence and mechanisms of pulmonary hypertension in HIV-infected patients, and (3) dyslipidemia in HIV-infected patients.



Dr. Peluso, MD, MPhil is an Assistant Professor and infectious disease physician at the University of California, San Francisco. Prior to COVID, his research focus was on the chronic sequelae of HIV infection. When the SARS-CoV-2 pandemic emerged, Dr. Peluso led the efforts to implement the Long-term Impact of Infection with Novel Coronavirus (LIINC, pronounced "link") study at San Francisco General Hospital, based on the hypothesis that COVID could

have a long-term impact on health and well-being. LIINC was one of the first post-COVID cohorts in the U.S. and now includes over 1000 individuals with and without Long COVID, many of whom have been followed for more than 3 years. He leads projects within LIINC aimed at understanding the biological mechanisms that drive Long COVID and is also responsible for implementation of the UCSF enrolling sites for the NIH's RECOVER initiative.

Organizing Committee

Joel Ernst, MD

Professor, Department of Medicine, Division of
Experimental Medicine

Timothy Henrich, MD

Professor, Department of Medicine, Division of
Experimental Medicine

Henry VanBrocklin, PhD

Professor, Department of Radiology and Biomedical
Imaging

David Wilson, MD, PhD

Professor, Department of Radiology and Biomedical
Imaging

Acknowledgements

We would like to acknowledge the Division of Experimental Medicine (DEM) and the Department of Radiology and Biomedical Imaging for providing financial support for this symposium.

We would like to thank Meredith Lew Tan from the DEM for administrative and organizational support. We also acknowledge Dr. Sharmila Majumdar for her programmatic input, Barbara Yip for assisting Meredith with logistical details, and Martin Rawlings-Fein for technical support.

We would also like to thank Belen Altamirano-Poblano and Dr. David Maison (Henrich Lab) for help with logo development and graphic design.

