

**Yet to be Charted:
Mapping the Lymphatic System Across
Body Scales and Expertise Domains**

Virtual Workshop Sponsored by the NIH/NHLBI
Boston Lymphatic Symposium
Clinical Pre-conference

<https://videocast.nih.gov/watch=43995>

Speaker and Moderator Biographies



Thursday, November 4, 2021
9:30 AM – 4:00 PM



Katy Börner, Ph.D.

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Victor H. Yngve Professor of Engineering & Information Science
Distinguished Professor of Engineering & Information Science
Cyberinfrastructure for Network Science (CNS) Center Director
Adjunct Professor of Informatics, Core Faculty of Cognitive Science
Adjunct Professor at the Department of Statistics in the College of Arts and Sciences, Research Affiliate
of the Biocomplexity Institute
Indiana University Bloomington

Dr. Katy Börner holds an M.S. in electrical engineering from the University of Technology in Leipzig and a PhD in computer science from the University of Kaiserslautern. She is the Victor H. Yngve Distinguished Professor of Engineering & Information Science in the Department of Intelligent Systems Engineering & Information and Library Science, School of Informatics, Computing, and Engineering at Indiana University in Bloomington, Indiana. She is also an Adjunct Professor at the Department of Statistics in the College of Arts and Sciences, Core Faculty of Cognitive Science, and Founding Director of the Cyberinfrastructure for Network Science Center at Indiana University in Bloomington, IN and Visiting Professor at the Royal Netherlands Academy of Arts and Sciences (KNAW) in The Netherlands. She became an American Association for the Advancement of Science (AAAS) Fellow in 2012.

Dr. Börner's research focuses on the development of data analysis and visualization techniques for information access, understanding, and management. She is particularly interested in the formalization, measurement, and systematic improvement of people's data visualization literacy; the study of the structure and evolution of scientific disciplines; the analysis and visualization of online activity; and the development of cyberinfrastructures for large-scale scientific collaboration and computation.



Elliot Chaikof, M.D., Ph.D.

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Chairman

Roberta and Stephen R. Weiner Department of Surgery
Surgeon-in-Chief, Beth Israel Deaconess Medical Center
Harvard Medical School

Dr. Chaikof received his B.A. and M.D. degrees from the Johns Hopkins University and completed a residency in General Surgery at the Massachusetts General Hospital. While a surgical resident, he obtained his Ph.D. in Chemical Engineering at the Massachusetts Institute of Technology and subsequently completed additional training in Vascular Surgery at the Emory University.

Dr. Chaikof received his B.A. and M.D. degrees from the Johns Hopkins University and completed a residency in General Surgery at the Massachusetts General Hospital. While a surgical resident, he obtained his Ph.D. in Chemical Engineering at the Massachusetts Institute of Technology and subsequently completed additional training in Vascular Surgery at the Emory University. He promotes alliances of clinicians, engineers, chemists, and biologists, in the process developing biologically inspired materials, devices, and pharmacotherapeutics based upon the principles of molecular engineering and nanofabrication technologies. These endeavors have enabled advances in cell-based therapies, artificial organs, and engineered living tissues, which define the evolving field of Regenerative Medicine.

Dr. Chaikof's laboratory investigations have determined that robust, chemically heterogeneous, and biologically functional membrane-mimetic systems can be used to biochemically remodel abiotic and living cell and tissue surfaces. These investigations were among the first to demonstrate that the protein C pathway can be utilized in the design of antithrombogenic and anti-inflammatory interfaces for blood contacting cells, tissues, and devices. These strategies are expected to have a significant impact in the areas of vascular, cardiac, and plastic surgery, as well as cell transplantation.



Michael Detmar, M.D.

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Professor of Pharmacogenomics

Institute of Pharmaceutical Sciences

Eidgenössische Technische Hochschule Zürich, Switzerland

Dr. Detmar studied medicine in Freiburg and Vienna and obtained a M.D. degree in 1984 from the University of Freiburg. He trained in pathology at the University of Freiburg from 1984 to 1985 and completed a residency in dermatology at the Free University of Berlin in 1990. In 1991, he completed his habilitation and then served for 2 years as an assistant professor of dermatology at the Free University of Berlin. From 1993 to 1997, he was appointed visiting professor of pathology and dermatology at

Harvard Medical School in Boston, USA. Since 1998, he holds an appointment as associate professor at Harvard Medical School, and he also served as an associate director of research at the Department of Dermatology, Massachusetts General Hospital. He is the recipient of several awards, most recently of the year 2005 Marion B. Sulzberger Memorial Award and Lectureship of the American Academy of Dermatology. He serves as an associate editor of several scientific journals including Cancer Research, Cancer Biology and Therapy, and The Journal of Investigative Dermatology, and he also serves on the advisory boards of several international institutions and companies.



Maija Hollmén, Ph.D.

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Academy Research Fellow, MedCity
Adjunct Professor, MedCity
University of Turku, Finland

Dr. Maija Hollmén obtained her master's degree in Science in 2004 and a PhD in Medical Biochemistry and Genetics in 2010 at the University of Turku in Finland. She completed her postdoctoral research at the Swiss Federal Institute of Technology (ETH Zurich) in Switzerland where she studied macrophage-cancer cell crosstalk under the supervision of Prof. Michael Detmar. Dr. Hollmén is an adjunct professor of tumor immunology, group leader and academy research fellow at the MedCity Research Laboratory, Institute of Biomedicine, University of Turku, Finland. Her research exploits a unique scavenger receptor Clever-1, expressed on a subpopulation of immunosuppressive macrophages, to alleviate tumor related inflammation and develop Clever-1 as a companion therapeutic, diagnostic, and prognostic biomarker to treat and identify patients under immunosuppression. This involves the use of in vivo tumor models and sophisticated immunological assays with cutting-edge technology and state-of-the-art imaging combined with fresh human cancer patient material.

Dr. Hollmén aspires to do trans-disciplinary research combining different methods and ideas together with good outcome. Currently she is leading a small tumor immunology research group and building collaborations both nationally and internationally. Dr. Hollmén aims to produce clinically relevant data that can be translated directly from bench to bedside.



Jeffrey Iliff, Ph.D.

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Professor, UW Department of Psychiatry & Behavioral Sciences,
Professor of Neurology,
Arthur J & Marcella McCaffray Professor in Alzheimer's
University of Washington

Starting as an undergraduate researcher at the University of Washington studying cerebral blood flow regulation, Dr. Jeff Iliff's research has always focused on the brain vasculature as the crossroads of the CNS. He completed his Ph.D. in Physiology and Pharmacology at Oregon Health & Science University focusing on mechanisms governing the release of neuropeptides from perivascular trigeminal afferents at the brain surface. As a postdoc in the lab of Maiken Nedergaard at the University of Rochester Medical Center, he led the team that initially characterized the glymphatic system, the network of perivascular pathways that supports the clearance of wastes from brain tissue during sleep. Since starting up his own lab in 2013, Dr. Iliff's work has focused on defining the glial and vascular changes in the aging and post-traumatic brain that underlie impairment of glymphatic function and the vulnerability to the development of conditions like Alzheimer's disease, Parkinson's disease and chronic traumatic encephalopathy.

Dr. Iliff is the Associate Director for Research at the VISN 20 NW Mental Illness, Research, Education and Clinical Center (MIRECC) at the VA Puget Sound Health Care System. He is a Professor in the Departments of Psychiatry and Behavioral Sciences and in Neurology at the University of Washington School of Medicine, where he is the Arthur J. and Marcella McCaffray Professor in Alzheimer's Disease. He serves as the Lead for the UW Alzheimer's Disease Research Center Research Education Component (ADRC REC).

Dr. Jeffrey Iliff focuses on neurodegeneration and traumatic brain injury research at the VA Puget Sound and at the UW Alzheimer's Disease Research Center. Dr. Iliff's work has probed the 'glymphatic' system, a brain-wide network of perivascular spaces that facilitates the clearance of waste products, including amyloid beta and tau, from the brain interstitium during sleep. Previously at OHSU, his group demonstrated that the glymphatic system fails in the aging brain and in the young brain after traumatic brain injury. The studies suggest that impairment of glymphatic function may be one factor that renders the aging brain vulnerable to protein aggregation and neurodegeneration and may link brain trauma early in life with the development of dementia in the decades that follow. His ongoing work seeks to define the molecular and cellular underpinnings of impaired glymphatic function in the aging and post-traumatic brain, and to use novel MRI-based imaging approaches to extend these findings into clinical Alzheimer's disease and post-traumatic populations.

As Co-Lead of the Alzheimer's Disease Research Center (ADRC's) Research Education Component (REC), Dr. Iliff oversees the effort to train and develop a community of clinical, basic and translational Alzheimer's disease researchers with the necessary clinical, scientific and technical competence to effectively collaborate and define the mechanistic and biological underpinnings of Alzheimer's and related dementia, and to translate this understanding to improve the lives of those living with memory loss and dementia.



Maxim Itkin, M.D.

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Director, Penn Center for Lymphatic Disorders, Professor of Radiology at the Hospital of the University of Pennsylvania, Prof of Pediatrics

Dr. Itkin is a Professor of Radiology and Pediatrics at the University of Pennsylvania, where he is the director of the Center for Lymphatic Imaging and Interventions. Dr. Itkin is nationally and internationally recognized for his clinical and research expertise in interventional treatment of lymphatic disorders. Over the last fifteen years Dr. Itkin has been actively involved in the development of image guided interventions of the lymphatic system (i.e., thoracic duct embolization, liver lymphatic embolization, interstitial lymphatic embolization, etc.) as a treatment for lymphatic disorders. Dr. Itkin developed internodal lymphangiogram as a substitute of pedal lymphangiogram. This method opened new horizons for lymphatic interventions. He developed contrast-enhanced magnetic resonance (MR) lymphangiogram for noninvasive dynamic imaging of the lymphatic anatomy. This technique led to the discovery of pathophysiology and treatment of plastic bronchitis, neonatal chylothorax, congenital limb lymphodysplasia, and protein losing enteropathy. Dr. Itkin has lectured extensively nationally and internationally and has over 90 peer-reviewed publications, reviews and editorials in leading journals. He is a member of multiple national and international professional societies and in 2011 was inducted to the Society of the Interventional Radiology as a Fellow member, in recognition of significant contributions to the field of cardiovascular and interventional radiology.



Taija Makinen, Ph.D.

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Professor

Uppsala University, Sweden

Dr. Taija Makinen studied Biology in University of Helsinki and obtained PhD in 2002. She completed her postdoctoral studies in Max-Planck Institute, Martinsried, Germany. She was a group leader at the Cancer Research UK London Research Institute during 2007 to 2013. Dr. Makinen then joined to Uppsala University, Sweden as an Associate Professor in 2013. Since 2019, she has been a Professor in Uppsala University.

Taija Makinen's research is focused on understanding the mechanisms that regulate the lymphatic vasculature in development, homeostasis and disease. A major interest of her laboratory is to elucidate how lymphatic endothelial cells communicate with the tissue environment to co-ordinate morphogenesis and organ-specific functional specialization of the vasculature, but also to investigate how regulators of developmental lymphangiogenesis impact on genetic human diseases such as lymphedema and vascular malformations



Guillermo Oliver, Ph.D.

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Director, Feinberg Cardiovascular and Renal Research Institute – Center for Vascular and Developmental Biology, Northwestern University Feinberg School of Medicine, Chicago, IL

Thomas D. Spies Professor of Lymphatic Metabolism

Professor of Medicine (Nephrology and Hypertension)

Dr. Guillermo Oliver got his bachelor's degree in sciences from the [University of Uruguay](#) and his master's in sciences degree from the [National University of Mexico](#) (UNAM). He then completed his

Ph.D. work, focusing on the role of Hox genes in mouse development at [UCLA](#). He has worked on cloning and characterizing the Six3 and Prox1 genes. In 1996 Dr. Oliver began working in the Department of Genetics at [St. Jude Children's Research Hospital](#) in Memphis, as a faculty member. In 2015 he moved to Northwestern University in Chicago where he was named the Thomas D. Spies Professor of Lymphatic Metabolism in the Department of Medicine in the Division of Nephrology and Hypertension, and he is also the director of the Center for Vascular and Developmental Biology at the Feinberg Cardiovascular Research Institute. His laboratory identified Six2 as a critical gene in the generation of nephron progenitors and demonstrated that Six3 activity was required for the formation of the mammalian forebrain and neuroretina in mice. He expanded those results using embryonic stem cells and induced pluripotent stem cells to generate eye organoids that mimic early eye development. Of course, another of the main Dr. Oliver's research focuses has been the lymphatic vasculature, and his laboratory identified the Prox1 as the first specific lymphatic endothelial cell marker and demonstrated that Prox1 activity was required for the differentiation of lymphatic endothelial cells and the formation of the entire lymphatic vasculature. They determined that in the mammalian embryo most lymphatic endothelial cells are venous derived and that lymphatic endothelial cell fate is plastic and requires constant Prox1 expression to maintain that fate. They also reported for the first time the role of the lymphatic vasculature on obesity. More recently in a paper published in the journal Nature, his lab reported on the identification of another novel functional roles of lymphatics as lymphangiocrine factors, as they identified that lymphatic secreted Reelin protein promotes cardiac growth and repair. Dr. Oliver was the recipient of the Lymphatic Research Foundation Leadership Award in 2008, elected as a Fellow of the American Association for the Advancement of Sciences in 2011, and Latin America Academy of Sciences in 2020. He is the 2021 recipient of the prestigious NAVBO Earl P. Benditt Award.



Timothy Padera, Ph.D.

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Associate Prof., Radiation Oncology,
Massachusetts General Hospital and Harvard Medical School

Dr. Timothy Padera received his B.S. in Chemical Engineering and Biomedical Engineering from Northwestern University and his Ph.D. in Medical Engineering from Massachusetts Institute of Technology, Cambridge, MA. He trained in tumor biology during his postdoctoral studies at Massachusetts General Hospital, Harvard Medical School.

Dr. Padera is recognized as a leader in the field of functional lymphatic imaging, particularly with respect to tumor growth, lymphatic metastasis and lymphedema. He published seminal papers describing the role of functional tumor margin lymphatic vessels in tumor dissemination (Science 2002) and the source of lymphatic dysfunction inside tumors (Nature 2004). His group has shown that lymph node metastasis

can spread further to distant metastatic sites (Science 2018) and that metastatic lesions in lymph nodes exclude lymphocytes (Nature Biomedical Engineering 2021)

Dr. Padera's group has developed several methods and techniques contributing to the lymphatic field. They developed first chronic lymph node window in a mouse that allows lymph node imaging over the course of weeks (Nature Protocol 2017). His lab also developed a novel method to study the autonomous contraction of collecting lymphatic vessels in mice (PNAS 2011). This work opened the door to the wide array of genetic mouse models for studying the underlying functional lymphatic deficits in lymphedema and states of inflammation. Additionally, his group has also developed methods to measure lymph flow without the need for injected contrast using Doppler optical coherence tomography (Scientific Reports 2016). Further, Dr. Padera's team have shown that bacterial infections of the skin can cause long-term disruption of lymphatic function, which makes the tissue prone to reinfection and lymphedema development (Science Translational Medicine 2018).

Dr. Padera has been continuously funded by NIH since 2006, including a K99/R00 Pathway to Independence Award and an NIH Director's New Innovator Award. His lab is currently supported by R01CA214913 (Targeting lymph node metastases to prevent cancer progression) as well as institutional funds (MGH Research Scholar Award and MGH ECOR Interim Support Fund).

Dr. Padera is the recipient of several honors: AIChE National Scholarship (1996), Summa Cum Laude with Honors, Northwestern University (1997), National Science Foundation Graduate Fellowship (1997-2000), Elected to Sigma Xi (1998), AACR-AFLAC Scholars in Cancer Research Travel Award (2000, 2003), Whitaker Health Sciences Fund Graduate Fellowship (2000), NIH Pathway to Independence Award (2008), Martin Research Prize for Excellence in Clinical Research (2010), NIH Director's New Innovator Award (2011), Rullo Family MGH Research Scholar 2021-2026.



Ellen Quardokus, M.S.

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Senior Research Analyst-Biologist,
Cyberinfrastructure for Network Science (CNS),
Indiana University, Bloomington

Ms. Ellen Quardokus is a member of Dr. Katy Börner's data visualization team as part of a challenging and exciting effort to spatially and semantically map and visualize molecular datasets to the human body through the NIH Human Biomolecular Atlas Program (HuBMAP). She is a molecular biologist and light and electron microscopist and brings 30 years of laboratory research experience in DNA sequencing platforms, technologies & analysis, image analysis, bacterial genetics, protein biochemistry, scientific

software & user interface beta testing and 5 years of laboratory teaching experience in human anatomy and physiology, histology, human genetics and comparative anatomy.



Andrea Radtke, Ph.D.

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Staff Scientist,

Center for Advanced Tissue Imaging, NIAID, NIH

Dr. Andrea Radtke obtained her PhD from Johns Hopkins University in the Department of Molecular Microbiology and Immunology where she studied anti-malaria CD8+ T cell responses. She trained as a post-doctoral fellow in the laboratory of Dr. Ronald Germain at the National Institutes of Health from 2013-2018 before transitioning to a Staff Scientist. Within the Germain laboratory, Andrea specializes in advanced microscopy techniques including a multiplexed antibody-based imaging technique, IBEX, that she developed with colleagues. IBEX is an open-source method that enables more than 65 protein biomarkers to be visualized in diverse human and mouse tissues.



Dhruv Singhal, M.D.

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Associate Professor of Surgery, Harvard Medical School

Co-Director, Boston Lymphatic Center

Director of Lymphatic Surgery, Beth Israel Deaconess Medical Center

Harvard Medical School

Dr. Dhruv Singhal completed all of his formal surgical training in Boston. He is Board Certified in General Surgery having completed his general surgery training at the Brigham and Women's Hospital (Boston, MA). Dr. Singhal is also Board Certified in Plastic and Reconstructive Surgery having completed further training in plastic surgery in the Harvard Combined Plastic Surgery Program. He then pursued a

fellowship in adult craniofacial surgery at the Chang Gung Memorial Hospital (Taipei, Taiwan) and microsurgery at the China Medical University Hospital (Taichung, Taiwan). Currently, Dr. Singhal serves as Co-Director of the Boston Lymphatic Center and the Director of Lymphatic Surgery at the Beth Israel Deaconess Medical Center (Boston, MA) and Associate Professor of Surgery at Harvard Medical School. Dr. Singhal was previously the Director of Microsurgery at the University of Florida (Gainesville, Florida).

Dr. Singhal's clinical focus is cancer and trauma reconstruction. Dr. Singhal performs the entire gambit of breast reconstruction from oncoplastic procedures to perforator flap operations (e.g., DIEP flaps). Dr. Singhal is a pioneer in immediate lymphatic reconstruction for the prevention of lymphedema in high-risk patients and performs liposuction, lymphovenous bypass, and lymph node transplantation for the treatment of chronic lymphedema.

Dr. Singhal's research focus is on lymphatic reconstruction. He has also published extensively on breast reconstruction, the role of integrative medicine in the care of the plastic surgery patient, and surgical ergonomics. Over the past few years, Dr. Singhal has been the recipient of research grants from the Plastic Surgery Foundation, American Society of Reconstructive Microsurgeons, Lymphatic Education and Research Network, Osher Center for Integrative Medicine (Harvard Medical School), and most recently, an RO1 from the NIH/NHLBI.



Hiroo Suami, M.D., Ph.D.

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Associate Professor, Department of Health Sciences
ALERT, Australian Lymphoedema Education, Research and Treatment
Faculty of Medicine, Health and Human Sciences Macquarie University, Australia

Dr. Suami trained in Japan as a reconstructive microsurgeon. He was admitted to the Japan Society of Plastic and Reconstructive Surgery in 1999. He started lymphatic research in 2001 when he worked in the Reconstructive Microsurgery Research Unit at the University of Melbourne, Australia. Dr. Suami developed a novel radiographic technique to demonstrate the lymphatic system in a cadaver model in 2003 and in 2005 he was awarded the Basic Science Award from the Plastic Surgery Education Foundation in the USA. In 2009, Dr. Suami joined the Department of Plastic Surgery at the University of Texas MD Anderson Cancer Centre in Houston, Texas as Assistant Professor and a director of the microsurgery research center. Here he developed a large animal model for lymphoedema and assisted with indocyanine green fluorescence lymphography in over 250 surgical lymphoedema cases. Dr. Suami was recruited to the Faculty of Medicine, Health and Human Sciences at Macquarie University in 2015 and works with the Australian Lymphatic Education, Research and Treatment (ALERT).



Griffin Weber, M.D., Ph.D.

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Associate Professor of Medicine, Beth Israel Deaconess Medical Center
Associate Professor of Biomedical Informatics
Harvard Medical School

Dr. Weber received his M.D. and Ph.D. in computer science from Harvard University in 2007. While still a student, he became the first Chief Technology Officer of Harvard Medical School and built an educational web portal that provided interactive online content to over 500 courses. His past research projects also include analyzing DNA microarrays, modeling the growth of breast cancer tumors, and creating algorithms for predicting life expectancy.

Dr. Weber directs the Biomedical Research Informatics Core (BRIC) at BIDMC. A result of his research in expertise mining and social network analysis is his invention of an open-source social networking website for scientists called 'Profiles RNS', now used at dozens of universities across the country. It automatically mines large datasets such as PubMed, NIH ExPORTER, and the U.S. patent database to discover investigators' research areas and scientific networks. It then presents these connections using temporal, geospatial, and network visualizations. The software has numerous applications, ranging from finding individual collaborators and mentors to understanding the dynamics of an entire research community.

Dr. Weber is also an investigator on Informatics for Integrating Biology and the Bedside (i2b2), an NIH National Center for Biomedical Computing, for which he helped develop a web-based open-source platform that enables a variety of functions, including queries of large clinical repositories for hypothesis testing and identification of patients for clinical trials. He also created the original prototype software for the Shared Health Research Information Network (SHRINE), which is a federated query tool that connects i2b2 databases across multiple institutions. More than 100 institutions worldwide use i2b2 and SHRINE to support clinical research.

NHLBI Organizers:



Zorina Galis, Ph.D.

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Chief, Vascular Biology and Hypertension Branch
Division of Cardiovascular Sciences, NHLBI, NIH

Dr. Zorina Galis was trained in Physics, Biophysics, and Cell Biology, at University of Bucharest, in Pathology at McGill, Canada, and in Vascular Medicine at Harvard, followed by a career in academic research ([Google Scholar](#)), achieving tenured positions in Cardiology and Biomedical Engineering in Emory School of Medicine and at Georgia Institute of Technology, in industry, serving as Chief Scientific Officer for Cardiovascular R&D at Eli Lilly and Co, and currently serves in public health research administration at the NIH.

Dr. Galis serves as the Chief of the Vascular Biology and Hypertension Branch at National Heart Lung and Blood Institute (NHLBI) of the National Institutes of Health (NIH), that provides scientific leadership and enables extramural research, from basic discovery through technology development, translation, and multi-site clinical trials. Since joining the NIH in 2011, Zorina also has spearheaded and led large interdisciplinary scientific initiatives to create opportunities for the vascular community, such as the Trans-NIH Small Blood Vessels in Health and Disease Working Group, the Trans-NIH Lymphatic Coordination Committee, the NHLBI Vascular Interventions/Innovations and Therapeutic Advances ([VITA](#)) Program, accelerating development of biomedical products (devices, diagnostics, and drugs), and the NIH Common Fund Human BioMolecular Atlas Program ([HuBMAP](#)). Several of these initiatives were recognized with NHLBI and NIH Director Awards.



Selen Catania, Ph.D.

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Program Officer, Vascular Biology and Hypertension Branch
Division of Cardiovascular Sciences, NHLBI, NIH

Dr. Selen Catania earned her Ph.D. in Molecular and Cellular Biology from the Institute of Biological Sciences, University of Szeged, in Hungary. Dr. Catania was a research fellow, first in Roswell Park Cancer Institute and later at the University of Maryland, Baltimore. Her graduate and postdoctoral studies focused on developmental regulation of matrix gene expression, chromatin remodeling in cancer biology, signaling pathways regulating hematopoiesis, and vascular disease progression. As an Assistant Professor at the Center for Vascular and Inflammatory Diseases and Department of Physiology at the University of Maryland, she led her team to investigate the role of LDL receptor-like protein 1 (LRP1) in regulating aneurysm formation and inflammation in the vasculature. This work revealed the role of LRP1 in regulating calcium signaling in vascular smooth muscle cells and therefore their contractile phenotype. From December 2018 until April 2020, Dr. Catania also served as the Director of Cellular and Molecular Biomedical Sciences Master's Program at the University of Maryland mentoring 20 students. A complete list of Dr. Catania's publications can be found [here](#).

Dr. Catania serves as Program Officer in the Vascular Biology and Hypertension Branch at National Heart Lung and Blood Institute (NHLBI) of the National Institutes of Health (NIH) since 2020. Her current program area includes, lymphatics, arterial stiffness, vessel wall structure and function, basic peripheral arterial disease, vascular calcification, extracellular matrix, vascular development. She also takes part of two interdisciplinary scientific initiatives; Trans-NIH Lymphatic Coordination Committee, the NHLBI Vascular Contributions to Cognitive Impairment and Dementia Workgroup, and the RECOVER Pathobiology Workgroup.

Useful Resources

Meeting information:

<https://bostonlymphaticsymposium.org/pre-symposium/agenda/>
<https://www.nhlbi.nih.gov/events/2021/yet-be-charted-mapping-lymphatic-system-across-body-scales-and-expertise-domains>

Manuscripts and publication:

1. Börner, Katy, Sarah A. Teichmann, Ellen M. Quardokus, James Gee, Kristen Browne, David Osumi-Sutherland, Bruce W. Herr, et al. 2021. "Anatomical Structures, Cell Types, and Biomarkers Tables Plus 3D Reference Organs in Support of a Human Reference Atlas." *BioRxiv*, January, 2021.05.31.446440. <https://doi.org/10.1101/2021.05.31.446440>
2. <https://www.biorxiv.org/content/10.1101/2021.05.31.446440v2.full>
3. <https://www.biorxiv.org/content/10.1101/2021.05.31.446440v2.full>

HuBMAP:

1. <https://portal.hubmapconsortium.org>
2. <https://hubmapconsortium.org/>
3. <https://hubmapconsortium.org/open-working-groups/>
4. <https://hubmapconsortium.github.io/ccf-asct-reporter/>

HuBMAP Common Coordinate Framework (CCF) effort: <https://hubmapconsortium.github.io/ccf/>
CCF Anatomical Structures, Cell Types and Biomarkers
(ASCT+B) Tables: <https://hubmapconsortium.github.io/ccf/pages/ccf-anatomical-structures.html>

ASCT+B expert registration: https://iu.co1.qualtrics.com/jfe/form/SV_bpaBhIr8XfdiNRH
CCF portal for mapping tools and ASCT+B effort: <https://hubmapconsortium.github.io/ccf/>

To get a feeling for the working group activities:

Slides: <https://drive.google.com/drive/folders/1dwXw8oSvBIIIyGHWMHNiYVPWB9adyUW>
Videos: <https://www.youtube.com/playlist?list=PL-CUnYVly7DNJc1FhqPsFPzDmd-bQD1jf>

ASCT+B WG:

<https://docs.google.com/document/d/1KxcZfKiDtSYx0BrCro9NucFaixPTdMixvloHZe6BkzY/edit>

Register to receive invites to monthly meetings:

https://iu.co1.qualtrics.com/jfe/form/SV_bpaBhIr8XfdiNRH

ASCT+B Reporter User Interface (RUI): <https://hubmapconsortium.github.io/ccf-asct-reporter>

RUI: <https://hubmapconsortium.github.io/ccf-ui/rui>

Exploration User Interface: <https://portal.hubmapconsortium.org/ccf-eui>