

VAGELOS COLLEGE OF PHYSICIANS & SURGEONS,
COLUMBIA PRECISION MEDICINE INITIATIVE,
IRVING INSTITUTE FOR CLINICAL AND
TRANSLATIONAL RESEARCH, AND THE
HERBERT IRVING COMPREHENSIVE CANCER CENTER

PRESENT

PRECISION MEDICINE SCHOLARS' DAY

Featuring Research Presentations by Joint Precision Medicine
Pilot Award Winners

WEDNESDAY, NOVEMBER 30, 2022

9:50 A.M.-3:45 P.M.

VAGELOS COLLEGE OF PHYSICIANS AND SURGEONS
650 WEST 168TH STREET, 4TH FLOOR, FACULTY CLUB

 COLUMBIA | PRECISION MEDICINE

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IRVING INSTITUTE FOR CLINICAL
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VAGELOS COLLEGE OF
PHYSICIANS AND SURGEONS

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HERBERT IRVING COMPREHENSIVE
CANCER CENTER

Schedule

9:50 a.m.	Welcome: Tom Maniatis, PhD
10:00 a.m.	Opening Remarks: Katrina Armstrong, MD
10:10 a.m.	Xuebing Wu, PhD
10:35 a.m.	Marie-Pierre St-Onge, PhD
10:45 a.m.	Srilaxmi Bearely, MD, MHS
11:00 a.m.	Brent R. Stockwell, PhD
11:10 a.m.	Richard Carvajal, MD
11:35 a.m.	Chi-Min Ho, PhD
12:00 p.m.	Ibrahim Batal, MD
12:10 p.m.	Lunch (Boxed lunch provided)
1:00 p.m.	Remarks: Muredach Reilly, MD
1:10 p.m.	Keynote Speaker: Christine Kim Garcia, MD, PhD
2:00 p.m.	Remarks: Anil K. Rustgi, MD
2:10 p.m.	Brian Henick, MD
2:35 p.m.	Kelley Yan, MD, PhD
2:45 p.m.	Tal Korem, PhD
3:10 p.m.	Raju Tomer, PhD
3:20 p.m.	Yufeng Shen, PhD
3:45 p.m.	Networking Reception

This is a private meeting for Columbia researchers. By participating in this meeting, you agree to treat all information disclosed during the meeting as solely for Columbia internal use for academic purposes.

Tom Maniatis, PhD

Isidore S. Edelman Professor of Biochemistry and Molecular Biophysics; Director, Columbia University Precision Medicine Initiative; Executive Committee Member, Zuckerman Mind Brain Behavior Institute; Principal Investigator, Maniatis Lab; Scientific Director and Chief Executive Officer, New York Genome Center



Tom Maniatis is the Isidore S. Edelman Professor of Biochemistry at Columbia University Irving Medical Center (CUIMC) and the director of the Columbia University Precision Medicine Initiative. Dr. Maniatis also serves as the Evnin Family Scientific Director and chief executive officer of the New York Genome Center (NYGC), where he is one of the founders. At the NYGC, Dr. Maniatis leads research activities, including technology development and informatics, and directs the faculty and scientists in their individual and collaborative projects.

Dr. Maniatis is known for pioneering the development of gene cloning technology and its application to both basic research and biotechnology. He also coauthored the definitive laboratory manual on molecular cloning, which profoundly impacted the international dissemination of gene cloning technology. His research has led to fundamental advances in understanding the mechanisms of gene regulation and RNA splicing, the biochemistry of innate immunity signaling pathways, the function of single cell diversity in the nervous system, and neurodegenerative disease mechanisms. Dr. Maniatis's research has been recognized with many awards, including the Eli Lilly Award in Microbiology and Immunology, the Richard Lounsbery Award from the U.S. and French National Academies of Sciences, and the 2012 Lasker-Koshland Special Achievement Award in Medical Science. He is a member of the U.S. National Academy of Sciences and of the National Academy of Medicine and is a fellow of the American Academy of Arts and Sciences. Dr. Maniatis cofounded the biotechnology companies Genetics Institute, ProScript, Acceleron, and Kallyope.

Katrina Armstrong, MD

Executive Vice President for Health and Biomedical Sciences and
Dean of the Faculties of Health Sciences and the Vagelos College of
Physicians and Surgeons; CEO of CUIMC; Harold and Margaret Hatch
Professor of the University; Professor of Medicine



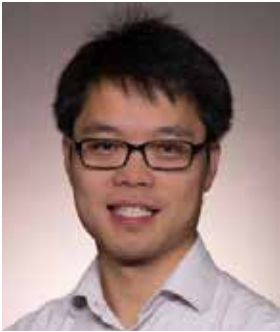
Katrina Armstrong leads Columbia University's medical campus as the chief executive officer of CUIMC, which includes the Vagelos College of Physicians and Surgeons (VP&S), the School of Nursing, the College of Dental Medicine, and the Mailman School of Public Health. She also is executive vice president for health and biomedical sciences for Columbia University and dean of the Faculties of Health Sciences and the Vagelos College of Physicians and Surgeons. As dean of VP&S, Dr. Armstrong leads the nation's

second oldest medical school and the first to award an MD degree. She is an internationally recognized investigator in medical decision making, quality of care, and cancer prevention and outcomes; an award-winning teacher; and a practicing primary care physician.

Dr. Armstrong has served on multiple advisory panels for academic and federal organizations and has been elected to the National Academy of Medicine, the American Academy of Arts and Sciences, the Association of American Physicians, and the American Society for Clinical Investigation. Before joining Columbia, Dr. Armstrong was the Jackson Professor of Clinical Medicine at Harvard Medical School, chair of the Department of Medicine and physician-in-chief of Massachusetts General Hospital, and professor of epidemiology at the Harvard T.H. Chan School of Public Health. Before joining Harvard, she was chief of the Division of General Internal Medicine, associate director of the Abramson Cancer Center, and co-director of the Robert Wood Johnson Clinical Scholars Program at the University of Pennsylvania. Dr. Armstrong is a graduate of Yale University (BA degree in architecture), Johns Hopkins (MD degree), and the University of Pennsylvania (MS degree in clinical epidemiology). She completed her residency training in internal medicine at Johns Hopkins.

Xuebing Wu, PhD

Assistant Professor of Medical Sciences (in Medicine, in Systems Biology, and in the Irving Institute for Clinical and Translational Research)



A Special Ribosome in the Heart

Xuebing Wu joined Columbia University as an assistant professor in November 2018. Dr. Wu received his BS and MS in control science and engineering from Tsinghua University, Beijing. He pursued his PhD in computational and systems biology at MIT with Phillip Sharp and Christopher Burge. He worked as a Helen Hay Whitney Fellow in Dr. David Bartel's lab at Whitehead Institute/MIT prior to joining Columbia. The Wu lab integrates

CRISPR, genomics, and machine learning to both decode and target RNA in human health and disease. The Wu lab seeks to bridge the discovery of basic mechanisms of gene regulation with the development of novel therapeutics for human diseases, focusing on cancer and cardiometabolic diseases.

Marie-Pierre St-Onge, PhD

Associate Professor of Nutritional Medicine; Director, Columbia University Irving Medical Center Sleep Center of Excellence; Division of General Medicine, Department of Medicine, Vagelos College of Physicians and Surgeons, Columbia University



Sleep, An Essential Factor in Aging?

Marie-Pierre St-Onge completed her bachelor's, master's, and doctoral degrees in human nutrition at McGill University. Her master's degree thesis focused on the impact of kefir, a fermented milk product, on cholesterol synthesis rates and circulating lipid profile in men with overweight and mild hypercholesterolemia. She developed a passion for research and a strong interest in foods that could influence disease

risk factors. She therefore decided to pursue a PhD, this time studying the effects of medium chain triglyceride oil consumption on energy expenditure, body composition, and cardiometabolic risk factors in men and women with overweight/obesity. Upon completion of her training at McGill, Dr. St-Onge joined the New York Obesity Nutrition Research Center and the Institute of Human Nutrition as a postdoctoral fellow to further her knowledge in the area of energy metabolism and body composition.

Her first faculty position came within two years of starting her fellowship, and she joined the faculty of the Department of Nutritional Sciences at the University of Alabama at Birmingham. There, she continued her research on dietary fats, including medium chain triglycerides, and dairy but also encountered colleagues interested in the role of sleep on energy balance regulation. However, it wasn't until Dr. St-Onge's return to Columbia University, in 2007, that she received NIH funding to study sleep and energy balance; and her research now focuses greatly on sleep and its association with obesity and cardiometabolic risk factors. Interestingly, she is finding that sleep influences diet and that diet may also influence sleep, bringing her back to her original passion related to foods and their influence on disease risk.

Srilaxmi Bearely, MD, MHS

Associate Professor of Ophthalmology, Columbia Medical Center



Retinal Imaging and Deep Learning to Identify Maternal Risk and Reduce Racial Disparities

Srilaxmi Bearely is a retina specialist with expertise in the evaluation and treatment of age-related macular degeneration, diabetic retinopathy, retinal vascular occlusions, choroidal neovascularization, and macular disorders.

Her experience in the treatment of retinal diseases started with a seven-year tenure on the Vitreoretinal Service at Duke University Eye Center in North Carolina (2003 to 2010). Since then, she joined Columbia's faculty in 2010. She has treated thousands of patients and helped patients and their families through their treatments. She has also volunteered her medical expertise in underserved areas, such as El Salvador and rural United States.

Dr. Bearely received her undergraduate degree from Northwestern University, her M.D. from Northwestern University Medical School, and a Master of Health Sciences degree from Duke University School of Medicine. Following her ophthalmology training at Northwestern University, she completed her fellowship training in diseases of the retina and vitreous at Duke University Eye Center.

She has written 70 articles, chapters, and abstracts and frequently presents at scientific and professional conferences both nationally and abroad. Currently, Dr. Bearely is a collaborator on a Columbia University clinical study of retinal changes in preeclampsia (a disease of pregnancy).

She is recognized as a Castle Connolly Top Doctor in Ophthalmology and received the Castle Connolly's Exceptional Women in Medicine award. She has also received several research awards, including an NIH/NEI K12 and K23 Mentored Research Career Award, and a Young Investigator Award by Retinal Degenerations Symposium at the International Congress of Eye Research Meeting in China.

Dr. Bearely has been certified by the American Board of Ophthalmology and is a fellow of the American Academy of Ophthalmology (AAO). She is an active member of the AAO, the Association for Research in Vision and Ophthalmology (ARVO), and the American Society of Retina Specialists (ASRS).

Brent R. Stockwell, PhD

Professor of Biological Sciences and of Chemistry; Chair,
Department of Biological Sciences



Precision Small Molecules That Restore Activity to R152H GPX4 for Treatment of SSMD

Brent R. Stockwell grew up in Bay Terrace, a suburban neighborhood in New York City, and graduated from Hunter College High School. He received his BA in chemistry and economics from Cornell University, graduating summa cum laude. He received his PhD degree in chemistry, doing his doctoral studies under the supervision of

Stuart L. Schreiber at Harvard University. He is a professor on the Faculty of Arts & Sciences at Columbia University with joint appointments in the Department of Biological Sciences and the Department of Chemistry; he is also a member of the Motor Neuron Center and the Cancer Center at Columbia Medical School.

Dr. Stockwell's research involves the use of chemical tools to define cell death mechanisms in order to better understand and treat cancer and neurodegeneration. Prior to joining the faculty of Columbia University, he was an independent fellow at the Whitehead Institute for Biomedical Research, where he directed his own laboratory, developing new tools to enable the exploration of biology with small molecules.

Dr. Stockwell has received a Burroughs Wellcome Fund Career Award at the Scientific Interface (2002), a Beckman Young Investigator Award (2007), an Early Career Scientist appointment at the Howard Hughes Medical Institute (2010–2016), the Bioaccelerate NYC Prize (2010), a Lenfest Distinguished Columbia Faculty Award (2014), a National Academies Education Fellowship in the Sciences (2014–2015), and the Great Teacher of Columbia College Award from the Society of Columbia Graduates (2015). Dr. Stockwell is the author of more than 80 publications, 38 patent applications, and 14 issued US patents. His first book, *The Quest for the Cure*, was published in the spring of 2011.

Richard Carvajal, MD

Professor of Medicine, Columbia University Irving Medical Center; Co-Leader, Precision Oncology and Systems Biology Program; Director, Experimental Therapeutics; Director, Melanoma Service



Liquid Biopsy and Drug Development in Uveal Melanoma

As the director of Experimental Therapeutics and director of the Melanoma Service at Columbia University Irving Medical Center, Richard Carvajal is focused on the development of novel therapies for patients with melanoma and other cancers, with the overall objective of controlling and curing these diseases.

To achieve this goal, he has used the increasing knowledge of the underlying biology of cancer to rapidly integrate this knowledge, novel therapeutic agents, and efficient trial design in order to improve the outcomes of cancer patients everywhere. Working closely with laboratory scientists, his group is using the techniques of molecular biology to identify specific proteins, genes, or other molecules that influence the growth of each person's cancer, with the goal of selecting the most promising therapies for individual patients.

Dr. Carvajal's melanoma research has included the study and treatment of uncommon clinical and molecular subsets of melanoma such as melanomas arising from the eye (uveal melanomas); from the mucosal surfaces of the body (mucosal melanomas); and from the palms of the hands, soles of the feet, or under the fingernails (acral melanomas). Although these tumors arise from pigment cells of the body just as do the more common melanomas that arise from the skin (cutaneous melanomas), they are clinically and biologically distinct from cutaneous disease. Once metastatic (that is, spread from where it originally began to other sites in the body), these diseases have proven to be difficult to treat.

In an advance that helped to launch a new era of personalized medicine in melanoma therapy, Dr. Carvajal has led a clinical trial of imatinib (Gleevec) in patients with melanoma characterized by the presence of a mutation in a gene called KIT. While this mutation is rare in cutaneous melanoma, it is found in about 20 percent of mucosal and acral melanomas. Based in part on the positive results of this trial, where long-lasting tumor responses were observed

in patients with these diseases, the use of imatinib in melanomas harboring KIT mutations was added to the National Comprehensive Cancer Network guidelines for the treatment of melanoma. Uveal melanoma is characterized by mutations in genes called GNAQ and GNA11 that lead to activation of a growth pathway called the MAPK pathway. Before 2013, there were no effective treatments for metastatic disease; however, another trial that Dr. Carvajal has developed and conducted identified selumetinib, a medicine that blocks the MAPK pathway, as the first effective treatment for patients with advanced uveal melanoma.

Dr. Carvajal's research has been supported by the National Cancer Institute, the Food and Drug Administration, the Conquer Cancer Foundation, the Melanoma Research Alliance, the Melanoma Research Foundation, the Empire Clinical Research Investigator Program, and the generous philanthropic support of patients and their families. He has authored or co-authored more than 150 peer-reviewed manuscripts, books, and book chapters. He has received several awards in recognition of his work, including the Louise and Allston Boyer Young Investigator Award and the Melanoma Research Foundation's CURE OM Vision of Hope Award.

In addition to Dr. Carvajal's work at Columbia University Irving Medical Center, he serves as the co-chair of the International Rare Cancer Initiative Uveal Melanoma working group, a joint initiative between the National Cancer Institute, the European Organization for Research and Treatment of Cancer, and Cancer Research UK to enhance international collaboration in the conduct of clinical trials for uveal melanoma.

Chi-Min Ho, PhD

Assistant Professor of Microbiology and Immunology



Visualizing the Translational Choreography of Malaria Parasites

Research in the Ho Lab focuses on understanding how membrane protein complexes mediate host-pathogen interactions of malaria parasites, using single-particle cryo-electron microscopy (cryoEM) and in situ cryo-electron tomography (cryoET).

Dr. Chi-Min Ho earned her B.A. in molecular and cell biology at the University of California, Berkeley, in 2004, after which she joined the lab of Professor Robert Stroud at the University of California, San Francisco, and worked on membrane protein structure determination. In 2011, she was recruited by the Infectious Diseases Division at the Novartis Institutes for Biomedical Research in Emeryville, CA, where she worked for three years in small molecule drug discovery for infectious diseases, before moving on to pursue a doctoral degree in 2014. She completed her Ph.D. in the Biochemistry, Biophysics & Structural Biology program at the University of California, Los Angeles, in 2019, under the mentorship of Professor Hong Zhou. She joined the faculty of the Department of Microbiology and Immunology at Columbia University in January 2020. Her lab develops and applies novel approaches that combine cutting-edge techniques in malaria parasite gene-editing, single-particle cryoEM, and in situ cryoET to overcome long-standing barriers to high resolution structural study in malaria parasites.

Ibrahim Batal, MD

Associate Professor of Pathology and Cell Biology, Columbia University
Irving Medical Center



The Immunopathology of Donor-Derived APOL1 Nephropathy

Using immunohistochemistry and in vitro approaches, Ibrahim Batal's research focuses on the role of dendritic cells in shaping early and late kidney allograft inflammation, including their association with distinct morphologic patterns of allograft injury.

Dr. Batal is also interested in investigating the immune and inherited factors that predict glomerulonephritis in the kidney allograft.

Muredach Reilly, MD

Florence and Herbert Irving Endowed Professor of Medicine; Director, Irving Institute for Clinical and Translational Research; Associate Dean for Clinical and Translational Research; Director, Cardiometabolic Precision Medicine Program



As Professor of Medicine at Columbia University, Muredach Reilly has experience in human genetics and functional genomics, genetic epidemiology, mechanistic translational research, and cardiometabolic medicine. His research program is dedicated to translational genomic studies and focused on (1) cell specific (e.g., adipocyte and macrophage) genomic and transcriptomic contributions to human cardiometabolic disorders; (2) the functions of adipose tissue in insulin resistance and

atherosclerotic risk; (3) novel mechanisms of human atherosclerosis underlying recent GWAS discoveries; and (4) the role of innate immunity in promoting cardiometabolic disease. The Reilly lab employs a translational and genomic approach including human functional genomics, human induced pluripotent stem cell (hiPSC) technology and gene-editing, animal-based mechanistic studies, and patient-oriented interrogation, as well as large-scale genetic epidemiological studies. In his role as director of the Irving Institute for Clinical and Translational Research at Columbia, Dr. Reilly also builds programs in clinical and translational research and in precision medicine while continuing his research program in cardiometabolic diseases. He has nearly 20 years in NIH grant-funding experience and publications as well as mentorship and teaching activities.

Christine Kim Garcia, MD, PhD

Frode-Jensen Professor of Medicine; Chief, Division of Pulmonary, Allergy, and Critical Care Medicine



Precision Medicine in Pulmonary Fibrosis: Leveraging Rare Variants Discoveries

Christine Kim Garcia leads a research team that is focused on understanding the genetic underpinning of adult-onset lung disease. Her laboratory has defined the landscape of rare variants found in patients with pulmonary fibrosis using unbiased genomic approaches, including

linkage and next generation sequencing. These discoveries have implicated surfactant, telomere, and spindle pathways as being relevant to Idiopathic Pulmonary Fibrosis (IPF). As its name implies, this disease had an unknown etiology prior to these genetic discoveries. Her research team has leveraged these discoveries to impact patient care. For example, they have shown that leukocyte telomere length is a biomarker that predicts rate of pulmonary fibrosis progression, risk of fibrosis after COVID-19, and adverse events after exposure to certain medications. Her multimodal team has effectively used patient-derived samples, bioinformatic platforms, and, more recently, mouse models, to better understand how pathogenic genetic variants lead to lung fibrosis.

Dr. Garcia's research has been supported by the National Institutes of Health, the Department of Defense, the Pulmonary Fibrosis Foundation, and generous philanthropic support of patients and their families. She is an elected member of the American Society of Clinical Investigation. She currently co-chairs the NIH Clinical Genome (ClinGen) Expert Panel for pulmonary genetic disorders.

Christine Kim Garcia is the Frode-Jensen Professor of Medicine at Columbia University Irving Medical Center. She is the chief of the Pulmonary, Allergy, and Critical Care Medicine Division within the Department of Medicine; a member of the Center for Precision Medicine and Genomics; and an affiliate of the Institute for Genomic Medicine. In 2022, she was awarded the Irene and Arthur Fishberg Prize for making significant original contributions to Internal Medicine at Columbia.

Prior to joining the faculty of Columbia University, she obtained her MD and PhD degrees at the University of Texas (UT) Southwestern Medical Center, where she was elected to Alpha Omega Alpha, the national medical honorary society. Her PhD thesis work was completed in the laboratory of Drs. Brown and Goldstein, with whom she cloned and characterized the first two monocarboxylate transporters. Her postdoctoral fellowship with Dr. Hobbs led to discovering the roles of LDLRAP1 and PCSK9 in lipid metabolism. She completed internal medicine residency as well as pulmonary and critical care fellowship at the UT Southwestern. She rose to the rank of professor of medicine at UT Southwestern before joining Columbia in 2019.

Anil K. Rustgi, MD

Herbert and Florence Irving Professor of Medicine; Herbert and Florence Irving Director, Herbert Irving Comprehensive Cancer Center; Associate Dean of Oncology; Special Advisor to the President, Cancer Programs and Strategies



Anil K. Rustgi is the director of the Herbert Irving Comprehensive Cancer Center at NewYork-Presbyterian/Columbia University Irving Medical Center. Dr. Rustgi is a world-renowned leader in the field of gastrointestinal oncology. His interdisciplinary research focuses on tumor initiation and on the tumor microenvironment and tumor metastasis in the context of gastrointestinal cancers, including cancer of the esophagus, pancreas, and colon. Dr. Rustgi's lab works to translate its discoveries into improving

molecular diagnostics and finding new experimental therapeutics for patients and is funded through several grants including an NCI P01 (program project on esophageal cancer), an NCI U54 on Barrett's esophagus, two NIH R01 grants (for pancreatic cancer and colon cancer), and an American Cancer Society Research Professorship. He has more than 300 publications and his work has appeared in high-impact journals such as *Nature*, *Nature Genetics*, *Nature Medicine*, *Cancer Cell*, *Genes and Development*, *Gastroenterology*, *Journal of Clinical Investigation*, *PNAS*, and *New England Journal of Medicine*.

He has been elected to the American Society of Clinical Investigation and the Association of American Physicians and is a fellow of the American Association for the Advancement of Science. Previously, he was president of the American Gastroenterological Association (17,000 members), editor-in-chief of *Gastroenterology*, and president of the International Society of Gastroenterological Carcinogenesis. Dr. Rustgi will serve as president of the American Pancreatic Association.

He has been recognized for his contributions with numerous awards, including the AGA Julius Friedenwald Lifetime Achievement in Gastroenterology Medal (2017), the AGA Distinguished Mentor Award (2016), the Ruth C. Brufsky Award for Excellence in Research in Pancreatic Cancer (2013), the Distinguished

Achievement Award from the South Asian American Society for Cancer Research (2012), and an American Cancer Society Research Professorship. In addition, he received the top mentorship awards (Arthur Asbury for faculty and one from the postdoctoral fellow program) from his tenure at the University of Pennsylvania.

Dr. Rustgi graduated summa cum laude from Yale College with a bachelor's degree in molecular biophysics and biochemistry (departmental honors) and earned his medical degree at Duke University School of Medicine, where he was elected to Alpha Omega Alpha, the national medical honorary society. He completed an internal medicine residency at Beth Israel Hospital and a GI fellowship at Massachusetts General Hospital (MGH), both of which are affiliates of Harvard Medical School. He also rose to associate professor of medicine at MGH before joining the University of Pennsylvania in 1998, where he served as chief of gastroenterology and directed two centers and NIH T32 training grants until 2018.

Brian Henick, MD

Assistant Professor of Medicine at the Columbia University Irving Medical Center; Associate Director, Experimental Therapeutics; Director of Translational Research, Upper Aerodigestive Cancers in Medical Oncology



Therapeutic Implications of Tumor Regulatory Dependencies Using Patient-Derived Organoids of Esophageal Adenocarcinoma

Brian Henick is a medical oncologist specializing in the care of patients with malignancies of the aerodigestive tract. As the associate director of Experimental Therapeutics and director of Translational Research in Aerodigestive Cancers in Medical Oncology, Dr. Henick aligns his clinical

care and research to improve the effectiveness of, and limit toxicity from, emerging cancer treatments. These efforts entail clinical trials that Dr. Henick has written and leads to study novel therapeutic approaches and to reduce steroid dependence among patients experiencing adverse events from immunotherapy.

Kelley Yan, MD, PhD

Warner-Lambert Assistant Professor of Medicine
Assistant Professor of Genetics and Development
Co-Director of the Organoid and Cell Culture Core



Organoid Models of Stem Cells, Tumors, and Their Microenvironment

Kelley Yan is a physician-scientist with a background in clinical gastroenterology, structural biology, and stem cell biology. She received her MD and PhD degrees from the Mount Sinai School of Medicine and then completed her clinical training in internal medicine and gastroenterology as well as a postdoctoral fellowship in intestinal stem cell

biology at Stanford University, as a California Institute for Regenerative Medicine (CIRM) MD Scholar.

Currently, she is a physician-scientist practicing general gastroenterology and holds an appointment as the Warner-Lambert Assistant Professor of Medicine and of Genetics and Development at Columbia University Irving Medical Center, where her lab studies intestinal stem cell biology in health and disease. Her lab uses multidisciplinary approaches to understand the behavior of intestinal stem cells, with the ultimate goal of manipulating them for therapeutic benefit. She is the recipient of the NIH Director's New Innovator Award (DP2), Burroughs Wellcome Fund Career Award for Medical Scientists, the Young Investigator Award in the Basic Sciences from the AGA, and the Harold and Golden Lampont Research Award from Columbia University.

Tal Korem, PhD

Assistant Professor of Systems Biology and Reproductive Sciences (in Obstetrics and Gynecology)



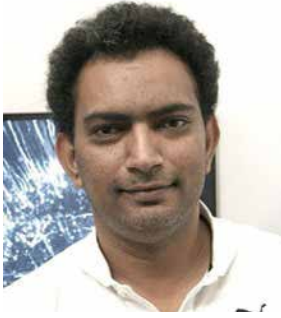
The Vaginal Microbiome and Metabolome in Adverse Pregnancy Outcomes

Tal Korem's research program focuses on the development of computational methods that identify and interpret host-microbiome interactions in various clinical settings, with a special focus on women's health. The ultimate goal of his research is to translate the microbiome to clinical care, with microbiome-

based therapeutics and microbiome-informed clinical practices. He has developed several new approaches for microbiome data analysis, inferring microbial growth rates, structural variants, and microbiome-metabolite interactions; and he has applied these methods in diverse clinical and biological investigations, most notably for personalization of dietary treatment for normalizing glycemic responses. He is a member of Columbia's Program for Mathematical Genomics (PMG), an assistant professor in the Departments of Systems Biology and Obstetrics & Gynecology, and was named a CIFAR-Azrieli global scholar by the Canadian Institute for Advanced Research.

Raju Tomer, PhD

Assistant Professor of Biological Sciences



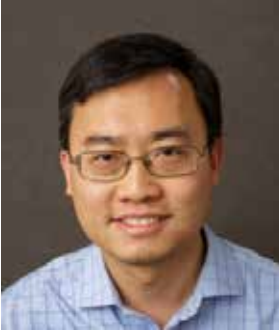
An In Vitro Model of Schizophrenia-Associated Network Pathophysiology

Raju Tomer has an interdisciplinary training background in brain evolution, advanced microscopy development, whole brain mapping, and large-scale image data analysis. Over the years, he has developed methods that enabled novel insights into the vertebrate nervous system, including the deep evolutionary origins of mammalian brains, in toto cellular dynamics of

developing embryos, mapping of whole intact mouse brains at high resolution, and capturing of cellular-resolution neuronal activity of entire functioning vertebrate nervous systems. In the last years, Tomer lab has been focused on advancing the field of 3D neuronal cultures for in vitro modelling of some of the higher-order properties of brain networks, with a specific focus on schizophrenia-associated network dysfunctions.

Yufeng Shen, PhD

Associate Professor of Systems Biology and Biomedical Informatics



Predicting Functional Impact of Missense Variants by Machine Learning

Yufeng Shen is an associate professor in the Columbia University Department of Systems Biology and the Department of Biomedical Informatics. He serves as associate director of bioinformatics at the JP Sulzberger Columbia Genome Center. He is also a member of the Program in Mathematical Genomics. The Shen

Lab studies human biology and diseases using genomic and computational approaches. They are developing new methods to predict functional impact of genetic variation and to identify genetic causes of human conditions. They have discovered new risks genes of human conditions such as autism, congenital heart disease, and pulmonary arterial hypertension.

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