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 the Pilot Award Winners

OCTOBER 23, 2020 10:00AM–3:30PM

VIRTUAL CONFERENCE

Columbia | Precision Medicine

Columbia | Irving Institute for Clinical and Translational Research

Columbia
Vagelos College of
Physicians and Surgeons

Columbia
Columbia University
Herbert Irving Comprehensive
Cancer Center

Schedule

10:00 a.m.	**Tom Maniatis, PhD**
10:05 a.m.	**Utpal B. Pajvani, MD, PhD**
10:35 a.m.	**Tuuli Lappalainen, PhD,** and **Harmen Bussemaker, PhD**
11:15 a.m.	**Nicholas Arpaia, PhD,** and **Tal Danino, PhD**
11:45 a.m.	**Anil Rustgi, MD**
11:50 a.m.	**Lynn Petukhova, PhD**
12:00 p.m.	**Chaolin Zhang, PhD**
12:10 p.m.	**Tal Korem, PhD**
12:20 p.m.	**Rich Carvajal, MD**
12:30 p.m.	**Thomas Nickolas, MD, MS**
12:40–1:15 p.m.	**Lunch**
1:15 p.m.	**Muredach Reilly, MBBCh, MSCE,** and **Wendy Chung, MD, PhD**
1:20 p.m.	**Vidhu Thaker, MD,** and **Claudia Doege, MD**
1:50 p.m.	**Yuichi Shimada, MD, MPH**
2:20 p.m.	**Howard Lieberman, PhD**

Keynote Addresses

2:50 p.m.	**Gary Miller, PhD**
3:20 p.m.	**Closing Remarks**

Tom Maniatis, PhD

Dr. Maniatis is Isidore S. Edelman Professor at the Columbia University Irving Medical Center 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, 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 by 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 a fellow the American Academy of Arts and Sciences. Dr. Maniatis cofounded the biotechnology companies Genetics Institute, ProScript, Acceleron, and Kallyope.

Utpal B. Pajvani, MD, PhD

NOTCH2 Polymorphisms as Predictors of Low β-Cell Mass and Increased T2D Risk

Dr. Utpal Pajvani, associate professor of medicine in the Division of Endocrinology at Columbia University, is a physician-scientist with clinical and research focus in Type 2 diabetes, and related metabolic diseases. He graduated from the Massachusetts Institute of Technology with a degree in biology in 1996, then earned MS (2001), MD (2005), and PhD (Department of Cell Biology, 2005) degrees from the Albert Einstein College of Medicine. Dr. Pajvani completed his internship and residency training and is board certified in internal medicine (2007) with a fellowship in endocrinology, diabetes, and metabolism (2011), both at the Columbia University Irving Medical Center.

Dr. Pajvani has been on the faculty of Columbia University since 2011. He is a teaching attending on the inpatient and outpatient Endocrinology and General Medicine services of the NewYork-Presbyterian Hospital and sees patients at the Naomi Berrie Diabetes Center at Columbia University. Dr. Pajvani's research focuses on the role of developmental pathways in the regulation of Type 2 diabetes and non-alcoholic fatty liver disease, and the use of existing therapeutic agents in other scientific areas in novel applications to ameliorate obesity-induced complications including cancer. He has received intramural and NIH support for his research and has mentored medical and graduate students as well as postdoctoral and clinical fellows.

Tuuli Lappalainen, PhD, and Harmen Bussemaker, PhD

Integrative Analysis of Genetic Variation and Transcription Factor Networks to Elucidate Mechanisms of Complex Disease

Tuuli Lappalainen, PhD

Tuuli Lappalainen, PhD, is an associate professor in the Department of Systems Biology at Columbia University and a core faculty member at the New York Genome Center. Dr. Lappalainen received her PhD in genetics from the University of Helsinki, followed by postdoctoral research at the University of Geneva and Stanford University. Her research focuses on functional genetic variation in human populations and its contribution to human traits and diseases. She has pioneered in integrating large-scale genome and transcriptome sequencing data to understand how genetic variation affects gene expression, which gives insight to biological mechanisms underlying genetic disease risk. She has contributed to many of the most important international research consortia in human genetics, including the 1000 Genomes Project, the Geuvadis Consortium, the GTEx Project, MoTrPAC, and TOPMed. She is a principal investigator of numerous NIH grants from the NIGMS, NHLBI, NIMH, and NIA. She's a recipient of the Leena Peltonen Prize for excellence in human genetics and the Harold and Golden Lamport Award in Excellence in Basic Research.

Harmen Bussemaker, PhD

Harmen Bussemaker, PhD, is professor and chair in the Department of Biological Sciences at Columbia University and professor in the Department of Systems Biology at Columbia University Irving Medical Center. Originally trained as a theoretical physicist at Utrecht University in the Netherlands, he transitioned to the then-burgeoning field of genomics as a postdoc at The Rockefeller University in the late 1990s. He has been working in the life sciences

ever since, acquiring a background in genetics and molecular biology through intense interdisciplinary collaborations, participation as a student in an intensive Cold Spring Harbor Labs (CSHL) summer course in Yeast Genetics and Genomics, and a yearlong sabbatical performing experiments in the laboratory of Dr. David Botstein at Princeton University. His research group at Columbia University has pioneered many topics related to the DNA binding specificity of transcription factors and the structure and function of gene regulatory networks based on integrative analysis of functional genomics data of different types. His lab tends to ask fundamental questions and develop innovative computational approaches to answer them. Dr. Bussemaker has been the recipient of a John Simon Guggenheim Memorial Foundation Fellowship, a Lenfest Distinguished Columbia Faculty Award, and a Visiting Professor Fellowship from the Netherlands Academy of Sciences. He has been an organizer of the CSHL conference on Systems Biology, an organizer/instructor of the CSHL summer course on Statistical Methods for Functional Genomics, and a judge for the Blavatnik Awards for Young Scientists at the New York Academy of Sciences.

Nicholas Arpaia, PhD, and Tal Danino, PhD

Programmable Bacteria Induce Durable Tumor Regression and Systemic Antitumor Immunity

Nicholas Arpaia, PhD

Nicholas Arpaia is an assistant professor in the Department of Microbiology & Immunology at Columbia University Irving Medical Center. His laboratory incorporates interdisciplinary approaches and quantitative methodologies to uncover ways in which tissue-resident leukocytes sense changes in their local environment—during tumorigenesis, dietary perturbation, and following infectious or noninfectious tissue disruption. Dr. Arpaia received his PhD in molecular and cell biology/immunology and pathogenesis from the University of California, Berkeley, in Dr. Greg Barton's lab, and was a postdoctoral fellow at Memorial Sloan Kettering Cancer Center with Dr. Alexander Rudensky. He is the recipient of a Career Transition Award (K22) from NIAID, a Searle Scholar, and a member of the Herbert Irving Comprehensive Cancer Center.

Tal Danino, PhD

Tal Danino is an associate professor in the Department of Biomedical Engineering at Columbia University. His lab focuses on engineering bacteria for biomedical applications, with a particular emphasis on developing bacteria as a cancer therapy. Originally from Los Angeles, Tal received a PhD in bioengineering from UCSD, in Jeff Hasty's lab, and was a postdoctoral fellow at the Koch Institute for Integrative Cancer Research with Sangeeta Bhatia. He is the recipient of awards including the NSF CAREER Award, Era of Hope Scholar Award, CRI Lloyd J Old STARS Award, Pershing Prize, and TED Fellow. He directs the Synthetic Biological Systems Laboratory and is a member of the Herbert Irving Comprehensive Cancer Center and Data Science Institute.

Anil Rustgi, MD

Anil Rustgi, MD, is interim executive vice president and dean of the Faculties of Health Sciences and Medicine at Columbia University. He is dean of the Vagelos College of Physicians and Surgeons and is administratively responsible for the Mailman School of Public Health, the College of Dental Medicine, and the School of Nursing at Columbia University Irving Medical Center (CUIMC), for which he also is interim chief executive.

Dr. Rustgi earned a BS in molecular biophysics and biochemistry from Yale College and an MD from Duke University School of Medicine. He completed an internal medicine residency at Beth Israel Hospital and a gastroenterology fellowship at Massachusetts General Hospital (MGH). He rose to associate professor of medicine at MGH before joining the University of Pennsylvania in 1998, serving as chief of Gastroenterology until 2018.

Dr. Rustgi is the director of the Herbert Irving Comprehensive Cancer Center. He is also Irving Professor of Medicine, associate dean of Oncology, and chief of Cancer Services at NYP/CUIMC. Dr. Rustgi is a leader in gastrointestinal oncology. His research focuses on tumor initiation, microenvironment, and metastasis in gastrointestinal cancers. His lab works to translate discoveries into improving molecular diagnostics and finding new therapeutics for patients. He 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 over 350 publications and has published in high-impact journals such as *Nature* and *New England Journal of Medicine*. He maintains a clinical practice in hereditary GI cancers and teaches.

Lynn Petukhova, PhD

Initiating Translational Genetic Studies of Hidradenitis Suppurativa

Dr. Petukhova is an assistant professor in the departments of Dermatology and Epidemiology at CUIMC. Prior to coming to Columbia University for academic training in biostatistics and epidemiology, she was founding director of the Genotyping Center at The Rockefeller University. As a genetic epidemiologist, the overarching goal of her research program is to use translational genetic studies to redress unmet needs and to reduce health disparities for underserved populations. Her group uses information in the human genome to discover biological causes of disease and then translate that knowledge into new therapeutic approaches to prevent and manage disease.

Her research has demonstrated that studies of inherited genetic variants can have a profound impact on patient care in a relatively short amount of time when, for example, the identification of a new, genetically defined disease mechanism provides a rationale for drug repurposing. The clinical focus of her research program is inflammatory diseases of the pilosebaceous unit in the skin, including acne vulgaris and hidradenitis suppurativa. Dr. Petukhova is a former KL2 scholar and a recipient of the Dermatology Foundation Career Development Award. Her research program receives federal funding from the National Institute of Arthritis and Musculoskeletal and Skin Diseases and the National Center for Advancing Translational Sciences, as well as private funding from the Irving Institute, the Data Science Institute, and the Precision Medicine Institute.

Chaolin Zhang, PhD

Unbiased Screen of Proximal and Distal Splicing Regulatory Elements Towards Drug Discovery
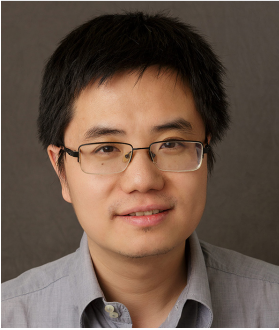
Dr. Chaolin Zhang is an associate professor in the Department of Systems Biology, the Department of Biochemistry and Molecular Biophysics, and the Motor Neuron Center at Columbia University since 2012. His lab uses an integrative approach to study neuronal RNA-binding proteins and how they regulate the transcriptomic diversity in the nervous system through alternative splicing in both normal and disease contexts. A current focus of the lab is to elucidate mechanisms underlying the precise timing of dynamic transcript isoform switches and the functional consequences during neural development. This is done in model systems including in vitro neural differentiation from embryonic stem cells and mice. Dr. Zhang's work has contributed to mapping protein-RNA interactions at single nucleotide resolution, to constructing neuronal RNA regulatory networks with high sensitivity and specificity, and to dissecting their function in neurodevelopment.

Tal Korem, PhD

Investigation of the Vaginal Microbiome in Different Presentations of Spontaneous Preterm Birth

Tal Korem develops computational methods for microbiome and other biomedical data analysis that are aimed toward practical use in clinical care. His group has a special focus on women's reproductive health and adverse pregnancy outcomes. He performed his doctoral and postdoctoral studies at the Weizmann Institute of Science, Israel, where he oversaw one of the largest studies to date studying the relationship between personalized nutrition, postprandial glycemic responses, and the gut microbiome. He has further developed several methods for analyzing microbiome data that infer bacterial growth rates and structural genomic variations. He is currently an assistant professor of systems biology and reproductive sciences (in Obstetrics and Gynecology) and a member of Columbia's Program for Mathematical Genomics (PMG).

Rich Carvajal, MD

Elucidating the Function of Exosomes in Uveal Melanoma

Richard D. Carvajal, MD, is an associate professor of medicine at Columbia University Irving Medical Center, where he serves as both director of Experimental Therapeutics and director of the Melanoma Service within the Division of Hematology/Oncology. He also serves as co-leader of the Precision Oncology and Systems Biology Program within the Herbert Irving Comprehensive Cancer Center. Dr. Carvajal's research 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 our increasing knowledge of the underlying biology of cancer to rapidly integrate this knowledge, novel targeted and immunotherapeutic agents, and efficient trial design in order to improve the outcomes of cancer patients everywhere. 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). He has been the principal investigator or co-investigator of over 500 clinical trials, including a number of investigator-initiated, multicenter, Cancer Therapy Evaluation Program (CTEP)–sponsored, and industry-supported clinical trials. His 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, and the Empire Clinical Research Investigator Program. He has authored or coauthored more than 150 peer-reviewed manuscripts, books, and book chapters. 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.

Thomas Nickolas, MD, MS

A MicroRNA Approach to Identify Renal Osteodystrophy Sub-type

Dr. Nickolas is an associate professor of medicine at Columbia University Irving Medical Center and a member of the Division of Nephrology. Patients with chronic kidney disease have poor bone strength and increased fracture risk. Hip fractures, which tend to be debilitating, are particularly common and can result in an increased risk of death. His primary interests are in the skeletal effects of kidney disease, focusing on clinical and translational studies of bone cell signaling and bone microarchitecture. The goal of his work is to identify mechanisms that will lay the groundwork for the development and study of novel and effective strategies that will preserve skeletal integrity and prevent bone loss and fractures in patients with kidney disease. His lab uses high-resolution in vivo bone imaging to identify how the kidney differentially impacts cortical versus trabecular bone. His group described mechanisms that underly paradoxical observations of increased fracture risk in de novo kidney transplant recipients despite increased or preserved bone mineral density. Recently, his group identified novel circulating markers of bone turnover based on microRNA methods that are highly accurate for the noninvasive diagnosis of renal osteodystrophy type. Further development of these findings is critically important to the diagnosis, treatment, and monitoring of kidney-related bone disease.

Dr. Nickolas received his BS in biochemistry from Rutgers University and his MD from the University of Pittsburgh School of Medicine, trained in internal medicine at the University of Pennsylvania and in nephrology at Columbia University, and studied biostatistics/epidemiology at the Mailman School of Public Health at Columbia University. He has been a recipient of the Columbia University Patient Oriented Research and K12 Awards and was a Herbert Irving Assistant Professor of Medicine.

Muredach Reilly, MBBCh, MSCE, and Wendy Chung, MD, PhD

Muredach Reilly, MBBCh, MSCE

Muredach P. Reilly serves as director of the Irving Institute for Clinical and Translational Research (Irving Institute), home to Columbia University's NIH/NCATS-funded Clinical and Translational Science Award Program hub. A cardiologist and the Herbert and Florence Irving Professor of Medicine, Dr. Reilly was recruited to Columbia in 2016 from the University of Pennsylvania to lead the Irving Institute into a new era of genomics and translational personalized health care. His research program is dedicated to precision medicine studies of cardiovascular disease and related metabolic disorders. This translational research emphasizes humans as the most ideal "model" to understand mechanisms of human disease and therapeutic opportunities for prevention.

Dr. Reilly received his medical degree from University College Dublin, Ireland, and completed his residency and fellowship training in medicine and cardiovascular medicine at the University of Pennsylvania, where he also received an MS degree in clinical epidemiology. In 2010, Dr. Reilly was elected to the Royal College of Physicians in Ireland as well as to the American Society of Clinical Investigation. In addition, he has received numerous awards including the 2013 William Osler Patient Oriented Research Award, the American Heart Association's Mentor of Women Award in 2015, and, in 2018, the Jeffrey M. Hoeg Arteriosclerosis, Thrombosis, and Vascular Biology Award for Basic Science and Clinical Research.

Wendy Chung, MD, PhD

Dr. Wendy Chung is an ABMG board-certified clinical and molecular geneticist with 20 years of experience in human genetic research of monogenic and complex traits including diseases such as breast cancer, pancreatic cancer, congenital heart disease, pulmonary hypertension, inherited arrhythmias, cardiomyopathies, obesity, diabetes, congenital diaphragmatic hernias, and autism. She has extensive experience in mapping and cloning genes in humans, describing the clinical characteristics and natural history of novel genetic conditions and characterizing the spectrum of disease, and developing tailored care and treatments for rare genetic diseases. Dr. Chung directs NIH-funded research programs in human genetics of birth defects including congenital diaphragmatic hernia, congenital heart disease, esophageal atresia, autism, neurodevelopmental disorders, pulmonary hypertension, cardiomyopathy, obesity, diabetes, and breast cancer. She leads the Precision Medicine Resource in the Irving Institute at Columbia University. She has authored over 300 peer-reviewed papers and 50 reviews and chapters in medical texts. She was the recipient of the American Academy of Pediatrics Young Investigator Award, the Medical Achievement Award from Bonei Olam, the New York Academy Medal for Distinguished Contributions in Biomedical Science, and the Rare Impact Award from the National Organization of Rare Disorders. Dr. Chung is renowned for her teaching and mentoring and received Columbia University's highest teaching award, the Presidential Award for Outstanding Teaching. She led the pilot newborn screening study of spinal muscular atrophy in New York that helped lead to nationwide adoption of this test in newborns. She was the original plaintiff in the Supreme Court case that overturned the ability to patent genes and served on the Institute of Medicine Committee on Genetic Testing. Dr. Chung enjoys the challenges of genetics as a rapidly changing field of medicine and strives to facilitate the integration of genetic medicine into all areas of health care in a medically, scientifically, and ethically sound, accessible, and cost-effective manner. She received her BA in biochemistry and economics from Cornell University, her MD from Cornell University Medical College, and her PhD in genetics from The Rockefeller University.

Vidhu Thaker, MD, and Claudia Doege, MD

TBX3 as a Novel Regulator of POMC for Therapeutic Targeting

Vidhu Thaker, MD

Dr. Thaker is a pediatric endocrinologist with special interest in clinical management and genetics of severe early onset obesity. Dr. Thaker received her medical training and pediatric residency at Mumbai University, India. She continued her training in pediatrics at Jacobi Medical Center at Albert Einstein College of Medicine, Bronx, New York. She provided care at a community pediatric practice serving children from minority populations and subsequently completed a fellowship in pediatric endocrinology at Boston Children's Hospital, Harvard Medical School, and the Broad Institute under the guidance of Drs. Joel Hirschhorn and Joseph Majzoub. She joined the Division of Molecular Genetics in the Department of Pediatrics at Columbia University in 2016. Her research focuses on common and rare variants associated with severe obesity and other endocrine disorders in children and their phenotypic implications.

Claudia Doege, MD

Born and raised in Berlin, Germany, Claudia Doege trained as a clinical neurologist at Charité Hospital, Medical School of Humboldt University, Berlin, before moving to New York to pursue a career in research science. Her career in cell biology and biochemistry research started in the James Rothman laboratory at Memorial Sloan Kettering Cancer. She would eventually transition to the field of stem cell biology and somatic cell reprogramming when she joined the Asa Abeliovich laboratory at Columbia University.

Currently, she is an assistant professor in the Department of Pathology and Cell Biology and a member of the Naomi Berrie Diabetes Center and the

Columbia Stem Cell Initiative. Dr. Doege's work straddles the fields of obesity, neuroscience, and stem cell biology, aiming to uncover the neuromolecular mechanisms of human genetic obesity. Her laboratory's precision medicine approach for obesity includes reprogramming, stem cell and genome-editing technologies, hypothalamic neuron differentiation, single-cell technologies, cell biology, and biochemical approaches to conduct patient-specific molecular mutation analysis in stem cell–derived human hypothalamic neurons. These studies may ultimately lead to the development of novel therapeutic strategies for human obesity.

Yuichi Shimada, MD, MPH

Application of Proteomics and Metabolomics Profiling to the Diagnosis and Prognostication of Hypertrophic Cardiomyopathy

Yuichi "Jay" Shimada, MD, MPH, is assistant professor of medicine at Columbia University Vagelos College of Physicians and Surgeons and director of research at the Hypertrophic Cardiomyopathy Center at Columbia University Irving Medical Center. After completing his fellowship training in cardiovascular medicine at Brigham and Women's Hospital and concurrently gaining an MPH degree from the Johns Hopkins Bloomberg School of Public Health, he received specific training in hypertrophic cardiomyopathy at Massachusetts General Hospital and in advanced echocardiography at Columbia. Dr. Shimada has won several awards, including the American Heart Association's Mentored Clinical & Population Research Award (2014 and 2016) and Career Development Award (2018). Dr. Shimada's lab has focused on the most common genetic cardiac disease—i.e., hypertrophic cardiomyopathy. The main goal of his lab is to refine the risk stratification strategies to predict major adverse cardiovascular events in patients with hypertrophic cardiomyopathy, such as sudden cardiac death, stroke, and arrhythmias. Accurate prediction of major adverse cardiovascular events is clinically important as several interventions are currently available to prevent such events—e.g., implantable cardioverter-defibrillators. He utilizes a variety of investigational approaches, from clinical research using large population-based databases to proteomics and metabolomics profiling to improve the currently available diagnostic and prognostic systems. On the day of Columbia's Precision Medicine Symposium, he will present recent progress in the field of precision medicine in hypertrophic cardiomyopathy, including his latest discoveries on the application of large-scale proteomics and metabolomics profiling to this patient population.

Howard Lieberman, PhD

P53 and RAD9 Regulated Genes Critical for Malignant Prostate Cancer

Howard B. Lieberman is a professor of radiation oncology in the Center for Radiological Research and professor of environmental health sciences at the Columbia University Irving Medical Center. He is also director of the Radiation Research Facility, a core resource of the Herbert Irving Comprehensive Cancer Center. His laboratory focuses on molecular mechanisms of DNA damage and repair, and the relationship to carcinogenesis. Dr. Lieberman's group identified and characterized the radioresistance gene RAD9 from fission yeast, mouse, and human, and found that it regulates genomic stability by multiple mechanisms, including through cell cycle checkpoint control, DNA repair, and apoptosis. Further, mammalian RAD9 functions as a transcription factor by regulating expression of a select set of downstream genes by binding p53 consensus sequences in or near target gene promoters. Aberrantly high expression of RAD9 can drive prostate cancer, and the Lieberman lab is focusing on this finding to understand the underlying mechanism for exploitation to develop novel diagnostic and anticancer agents for this prevalent type of cancer.

Dr. Lieberman received a BS degree from Brooklyn College and a PhD from Rutgers, and did postdoctoral work at Yale University before joining Columbia. For his work on RAD9 and the DNA damage response, he was elected fellow of the American Association for the Advancement of Science.

Gary Miller, PhD

The Exposome: The Environmental Omic for Precision Medicine

Dr. Miller is a professor of environmental health sciences, vice dean of research strategy and innovation, and a director of the Exposomics Laboratory and Core at the Mailman School of Public Health.

Dr. Miller moved to Columbia University in August 2018 after 16 years at Emory University. From 2009 to 2018, he was associate dean for research in the Rollins School of Public Health. Dr. Miller was the founding director of the HERCULES Exposome Research Center at Emory University, the first exposome-based research center in the U.S. He authored the first book on the topic, *The Exposome: A Primer,* published by Elsevier. His research focuses on environmental drivers of neurodegeneration. His laboratory uses a variety of methods including transgenic mouse production, immunohistochemistry, neurotransmitter transport assays, high-resolution metabolomics, electrochemistry, and behavioral assays. Dr. Miller's work is conducted in several experimental models from cultured neurons and C. elegans to mice and human studies. He is an adviser to several exposome-associated research entities, including the Human Biomonitoring for the European Union (HBM4EU). He also serves as editor-in-chief of *Toxicological Sciences,* the official journal of the Society of Toxicology.