

# COLUMBIA PATHOLOGY AND CELL BIOLOGY REPORT

Fall Edition 2015

## From the Chairman



**Dr. Kevin A. Roth**  
*Chair, Department of Pathology and Cell Biology*

It is an honor to be the new Chair of the Department of Pathology and Cell Biology at Columbia University. The intellectual vigor of the institution, the commitment of departmental faculty to scientific excellence and a shared mission with New York-Presbyterian Hospital to deliver outstand-

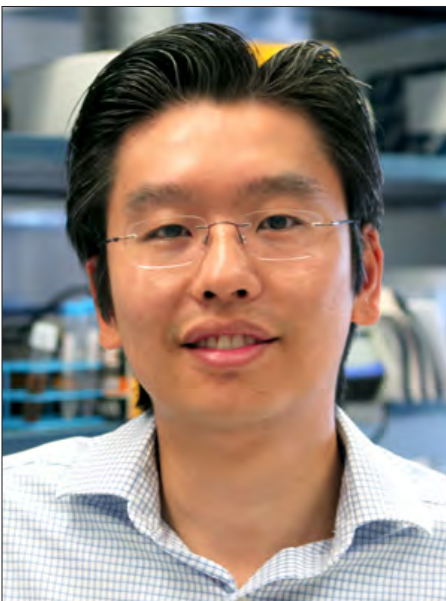
ing clinical care to our patients were the motivating forces in my decision to accept this new and exciting challenge.

I have established four main departmental goals to reach over the next five years. First, to further enhance our status as a nationally-ranked research department as measured by NIH funding, total extramural grant support, high-impact publications, faculty honors and other measures of scientific success. Second, to be recognized as a leader in the application of genetic, epigenetic, proteomic, and metabolomic testing in personalized medicine and cost-effective, evidence-based patient care. Third, to expand clinical subspecialty expertise while promoting independent and collaborative research opportunities across the entire department and institution. Fourth, to augment the success of future clinical and research faculty by increasing the size and diversity of our training programs and providing effective mentoring to trainees and faculty alike.

These are challenging goals requiring a commitment of new resources and an unprecedented level of cooperation within the department and between the College of Physicians and Surgeons and the New York-Presbyterian Hospital. In my discussions over the last several months with College and Hospital leadership, I have been impressed with the mutual understanding of what it will take for the Department of Pathology and Cell Biology to succeed and importantly, a willingness to contribute necessary resources to meet these goals.

In future departmental meetings and newsletters, I will outline specific programs and projects for investment and seek your valuable input on strategic decisions and opportunities. I look forward over the next several months to meeting with faculty, residents, clinical and research fellows, graduate students, post-doctoral students, administrators and support staff to discuss strategies to take the department to even higher levels of excellence in teaching, research and clinical care.

## 2015 Alfred P. Sloan Research Fellowship Recipient, Harris Wang, PhD



The department would like to congratulate Harris Wang, PhD who was awarded the 2015 Alfred P. Sloan Foundation Research Fellowship in Computational and Evolutionary Molecular Biology. Dr. Wang will use this two-year award to advance his laboratory's research on horizontal gene transfer and its effect on the evolution of microbial communities. The Sloan Research Fellowship Program has been awarding researchers with the potential to make outstanding contributions to their field since 1955.

After completing his joint PhD in Biophysics and Medical Engineering Medical Physics at Harvard University, Dr. Wang started his laboratory at CUMC in 2013. The Wang Laboratory is focused on understanding the principles that drive the design and evolu-



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## New Faculty

### Andrew Turk, MD



Andrew Turk, MD joined our department as Assistant Professor in July 2014. Dr. Turk graduated from Columbia University College of Physicians and Surgeons, and went on to do his AP/CP residencies in the department. After an in-house surgical pathology fellowship, he completed a molecu-

lar genetic pathology fellowship at Cornell in 2014. After ten years of education and training at Columbia, Dr. Turk is glad to return to the department as faculty.

Dr. Turk's area of expertise is head, neck, and endocrine pathology. Since there are few training programs in this subspecialty, Dr. Turk feels lucky to have worked closely with prominent head and neck pathologist Bruce Wenig at Beth Israel. During his second year of residency, he established a mentorship with Dr. Wenig who was adjunct faculty at Columbia at the time. Since then, they have remained close collaborators, and are currently establishing diagnostic criteria for thyroid cancer with extrathyroid extension. Their criteria will be essential for staging this cancer that begins in the thyroid but ultimately spreads outside of the gland.

At the moment, Dr. Turk is especially interested in studying the molecular alterations that underlie salivary gland lesions. Our af-

filiation with CHONY has allowed him to study a cohort of pediatric salivary gland anlage tumors and sialoblastoma, an extremely rare form of cancer. Dr. Turk uses cancer whole exome sequencing to search for common recurrent clonal molecular alterations that could characterize these types of tumors. He is also studying carcinoma ex pleomorphic adenoma, an unusual salivary gland tumor that is characterized as extremely aggressive. Dr. Turk is studying these tumors in pursuit of a subset that he suspects might behave in a more indolent fashion.

Dr. Turk has a dual appointment with the molecular lab, and signs out both surgical pathology and molecular cases. When he is not engaged in clinical or research work, Dr. Turk enjoys being a reviewer for the academic journal *Thyroid*.

### Anthony Sireci, MD, MS



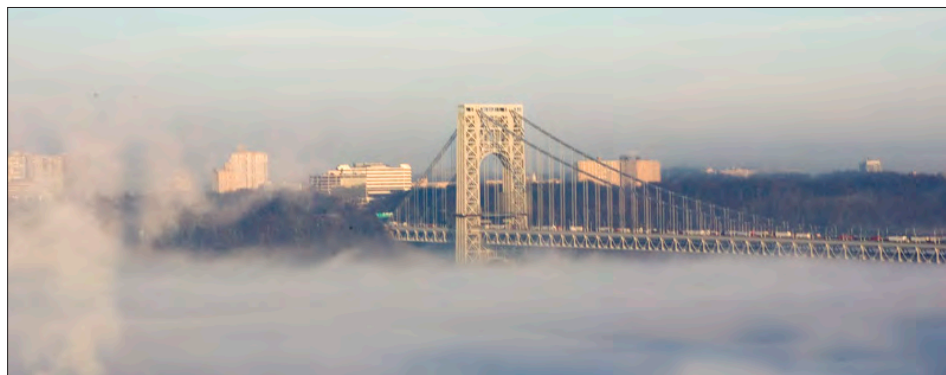
We are pleased to welcome back Anthony Sireci, MD, MS in a new capacity. Dr. Sireci graduated from Johns Hopkins School of Medicine in 2007, and completed his clinical pathology residency here in the department. After residency, he pursued an MS in Biostatistics at the Mailman School of Public Health. Dr. Sireci joined the department as assistant professor in 2011, and founded the biochemical genetics laboratory in CHONY. After establishing the lab, Dr. Sireci departed in 2013 for a consulting opportunity at McKinsey & Company,

where he was a clinical operations consultant for large healthcare organizations.

After some time as a consultant, Dr. Sireci wanted to return to clinical pathology. He rejoined the department as a physician manager for the Laboratory of Personalized Genomic Medicine in early 2014. This position, which is novel for the pathology department, aims to bring medical leadership into the administrative and strategic decisions for Personalized Genomic Medicine. Dr. Sireci is the laboratory's liaison between clinical, finance, and operations colleagues at New York Presbyterian/Columbia University Medical Center. In

this new role, Dr. Sireci works to integrate PGM into the big picture of developing health care at NYP/CUMC.

Since starting this position last year, Dr. Sireci has seen incredible growth in the cancer testing as well as the day-to-day genetics work performed at the PGM lab. Indeed, now that precision medicine has been declared a Columbia University initiative, more clinicians are looking to PGM for genetic testing. At this moment, Dr. Sireci acknowledges that they have a golden opportunity to lead in the field of genomics and personalized medicine.



*The George Washington Bridge through the fog.*

### Laura McIntire, PhD



We are pleased to welcome Laura McIntire, PhD to the department as faculty. Dr. McIntire completed her PhD in pharmacology at the University of Washington, where she specialized in the biology of lipid-modifying enzymes. She came to

CUMC to apply her expertise to projects that are clinically relevant, and she has been studying the contribution of lipids to Alzheimer's disease since her arrival in 2006. She started as a postdoc in Dr. Tae-Wan Kim's laboratory, was promoted to an associate research scientist, and then was appointed to assistant professor in 2014.

At the moment, Dr. McIntire is especially interested in an enzyme called BACE1. This enzyme initiates the production of amyloid beta (A $\beta$ ), the synaptotoxic peptide that accumulates in the brains of Alzheimer's disease patients. While many in the field are pushing to discover direct modulators of this enzyme, she is searching for indirect, cell-based signaling pathways which may modulate BACE1. Dr. McIntire intends to harness these molecules or pathways that can potentially regulate Alzheimer's-related neuronal dysfunction.

Bolstered by an NIH-funded grant, Dr. McIntire is also leading a project involving mouse embryonic stem cell-derived neurons. She treats the neurons with A $\beta$ , and then looks for the ensuing synapse loss. To prevent this loss, Dr. McIntire plans to down-regulate the enzymes that control lipid metabolism, which could maintain critical lipid signaling and inhibit the synapse loss that we see in Alzheimer's disease. Ultimately, Dr. McIntire would like this project to identify candidates for genetic studies that could lead to drug discovery.

While A $\beta$  and tau are the most widely researched characteristics of Alzheimer's disease, Dr. McIntire reminds us that Dr. Alzheimer defined lipid granules as a third hallmark of the disease. Dr. McIntire's work contributes to the accumulating momentum of research that looks at aberrant lipid metabolism as a major component of Alzheimer's disease.

### Rebecca Haeusler, PhD



We are happy to welcome Rebecca Haeusler, PhD to the department as Assistant Professor. Dr. Haeusler studied biology at MIT, and went on to pursue her PhD at the University of Michigan Ann Arbor. She came to CUMC in 2007 for a postdoctoral fellowship in the laboratory of Domenico Accili, MD, the Director of the Columbia University Diabetes and Endocrinology Research

Center. While in his lab, Dr. Haeusler studied insulin and its ability to regulate lipid metabolism as part of a larger collaborative grant that explored the link between diabetes and cardiovascular disease. Compelled by this connection, Dr. Haeusler decided to specialize in both fields of research.

Dr. Haeusler's young lab is now studying aspects of cholesterol metabolism and cardiovascular health. One of their current projects stems from a discovery made during Dr. Haeusler's work in Dr. Accili's lab: They found that in mice, insulin controls the production and modification of bile acids, the indispensable molecules that metabolize cholesterol out of the body. After Dr. Haeusler confirmed that these changes are also present in humans, it became a major focus of the lab. They are looking at the ways that changes in bile acids affect people who are insulin-resistant, obese, or type 2 diabetic.

Dr. Haeusler is exploring another method of lipid metabolism in which cholesterol can be cleared from the system by traveling onboard "good" HDL particles on

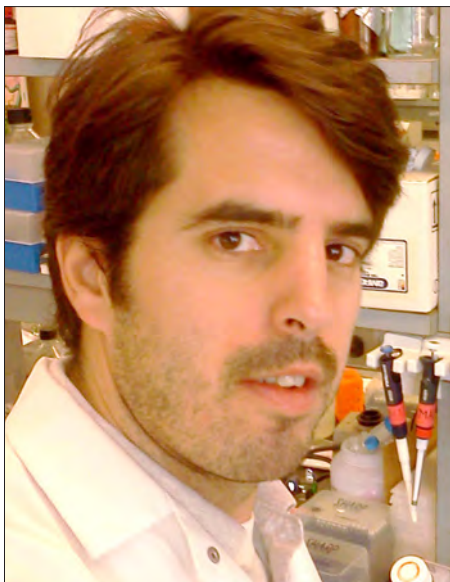
their way to the liver. The Haeusler Lab found that an insulin-regulated transcription factor manages this process, and they are investigating to see if it is disrupted in those who are insulin-resistant, obese, or type 2 diabetic.

The Haeusler Lab thrives with postdocs, graduate students, and undergrads, and is located in Russ Berrie Pavilion. She shares her space with two other new assistant professors that are involved in various aspects of diabetes research, Dieter Egli, PhD and Utpal Pajvani, MD, PhD.



*Presbyterian Hospital nurses in the early days.*

### Ismael Santa-Maria Perez, PhD



The department is pleased to welcome Ismael Santa-Maria Perez, PhD who was promoted to Assistant Professor in October 2014. Dr. Santa-Maria Perez worked as an undergraduate student at Tsukuba Research Institute in Tokyo and at Memorial Sloan Kettering Cancer Center in New York. He completed his doctoral training at the Autonomous University of Madrid in the Center of Molecular Biology “Severo Ochoa” where he studied the phosphorylation and aggregation of tau proteins, which are implicated in the pathogenesis of Alzheimer’s disease. After one year as a postdoc in Madrid, he obtained a fellowship from the Neurological Diseases Research Centre Foundation and Queen Sofia Foundation’s Alzheimer’s disease Project to study at Mount Sinai School of Medicine. His work covered both the role of grape-derived polyphenols in the attenuation of tau neuropathology in a mouse model of Alzheimer’s disease and the implication of aggresome formation in the spreading of tau pathology. He started at CUMC as a postdoctoral research scientist in 2010. The Santa-Maria Perez Laboratory is part of the Taub Institute for research on Alzheimer’s disease and the aging brain.

While tau toxicity and neurofibrillary degeneration are hallmarks of several neurodegenerative diseases including Alzheimer’s disease, little is known about the underlying mechanisms of their dysfunction. Dr.

Santa-Maria Perez is interested in understanding the mechanisms maintaining or altering microtubule associated protein tau proteostasis in neurons, and their relevance in aging and Alzheimer’s disease. He is investigating how specific microRNAs impact tau synthesis and deposition. Using a variety of biochemical, cell culture and transgenic animal approaches and techniques, his research has uncovered a crucial role for miR-219 in the development of tauopathies. Dr. Santa-Maria observed that this microRNA was downregulated in Alzheimer’s disease autopsy brain tissue and demonstrated that miR-219 binds to the 3’ untranslated region of tau and silences its expression at the post-transcriptional level. This research suggests that miR-219 is part of a regulatory system that prevents tau toxicity and accumulation.

The Santa-Maria Perez lab includes Maria Alaniz, PhD, who continues to study the role of microRNAs in tau proteostasis regulation in collaboration with Brian McCabe, PhD. Another member is Isabel Nelson, a graduate student in Neuroscience and Behavior at Barnard, who is currently investigating whether miR-219 targets other proteins modulating tau physiology and pathology. As a whole, the lab continues to investigate the role of microRNAs in post-transcriptional regulation of tau in mice. They are starting a collaboration with Karen Duff to discover how tau-mRNA interactions impact tau toxicity in mouse models of Alzheimer’s disease.



*A pastoral scene in the Vivian & Seymour Milstein Family Heart Center.*

### Harris Wang, PhD

*Continued from page 1*

tion of biological systems, and is specifically interested in microbial communities. With support from the Sloan fellowship, The Wang Lab is working to uncover and define the principles that enable horizontal gene flow in microbial populations and the effect of this mobility on genetic expression.

The Wang Lab is applying this research to cell populations with undesirable DNA such as antibiotic resistance. By employing genetic engineering techniques, Dr. Wang intends to modify genes in these populations to immunize them against the acquisition of problematic DNA that contributes to chronic disease. The microbiome of the gastrointestinal tract, where evolutionary principles are not greatly understood, is of particular interest to Dr. Wang. He hopes that his lab’s research on this system will lead to developing therapeutics that could help fight chronic diseases of the GI tract, such as IBD.

During his studies at Harvard, Dr. Wang became interested in synthetic biology, and in 2009 invented MAGE (Multiplex Automated Genome Engineering). This innovative technique enables rapid, specific DNA transformations in a cell population to facilitate the large-scale directed evolution of organisms. As the Wang Lab continues to research gene flow in microbial communities, they will use MAGE and other tools to modify entire microbial ecosystems to address genetic problems on a systems-wide level.

## Faculty Promotions



**Lori Zeltser, PhD** has been appointed to Associate Professor. The Zeltser Laboratory studies how developmental influences on circuits regulating food intake and body weight could impart long-lasting effects on susceptibility to obesity and eating disorders.



**Eldad Arie Hod, MD**  
Associate Professor of Pathology and Cell Biology



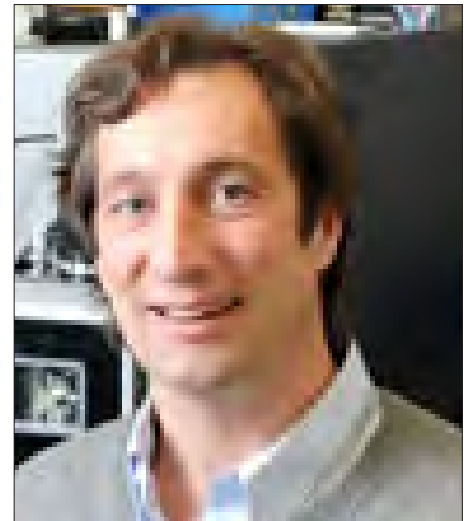
**Qing Fan, PhD** has been promoted to Associate Professor of Pharmacology and Pathology & Cell Biology. Her lab studies G-protein-coupled receptors to determine the specificity of receptor-ligand interactions and to identify receptor activation mechanisms.



**Joseph Schwartz, MD, MPH**  
Professor of Pathology and Cell Biology at CUMC



**Carol M. Troy, MD, PhD**  
Professor of Pathology and Cell Biology and Neurology (in the Taub Institute for Research on Alzheimer's Disease and the Aging Brain)



**Serge Cremers, PhD, PharmD**  
Associate Professor of Pathology and Cell Biology and Medicine at CUMC

## Honors and Awards

**Ron Liem, PhD** was awarded the Charles W. Bohmfalk Award for his outstanding contributions to the educational programs of the College of Physicians and Surgeons.

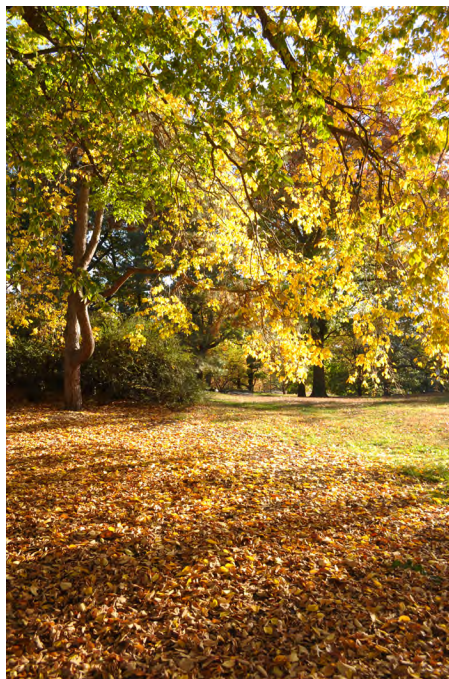
**Lori Zeltser, PhD** received the Harold and Golden Lampart Research Award for clinical research. This award recognizes junior faculty who show great promise in their area of research.

**Nicole Suciu-Foca, PhD** was awarded the Distinguished Service Award, which honors emeritus faculty members of the College of Physicians and Surgeons for their exceptional contributions to medicine.

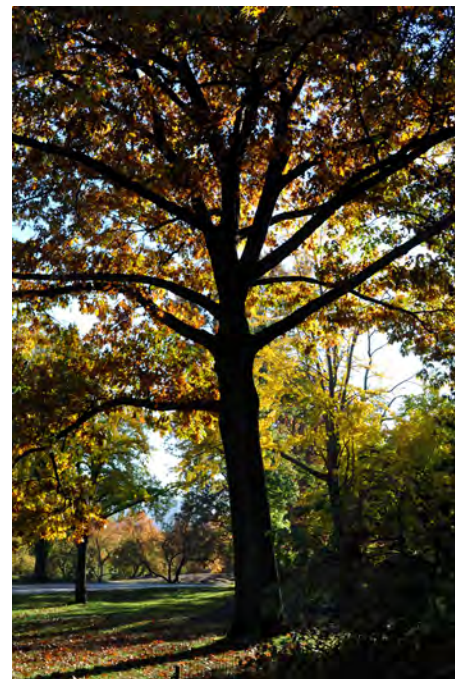
**Riccardo Dalla-Favera, MD** was elected as a member of the National Academy of Sciences in recognition of his distinguished achievements in original research.



**Dr. Michael Gershon**, Professor of Pathology and Cell Biology and former Chair (October 1975 - 2006, Professor and Chairman, Anatomy & Cell Biology) just celebrated 40 years at Columbia University.



*Central Park in the Fall 2015*



## A Note on Publications

*The members of the department contributed to many peer reviewed publications in the years 2014-2015. The newsletter suggests that interested parties search the websites of individual faculty members at <http://pathology.columbia.edu>*

## Our Diagnostic Services

The Department offers a very broad range of expertise and diagnostic services. We are available for consultation at the following locations.

**Web:**  
[www.pathology.columbia.edu](http://www.pathology.columbia.edu)

**Email:**  
[pathology@columbia.edu](mailto:pathology@columbia.edu)

**Laboratory services:**  
1-800-653-8200/1-212-305-4840

**Administrative Services:**  
1-212-305-7164

# COLUMBIA PATHOLOGY AND CELL BIOLOGY REPORT

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