VILCEK FOUNDATION

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Vilcek Prizes Recognize Groundbreaking Accomplishments by Immigrant Scientists

Immunologist Alexander Rudensky receives $100,000 Vilcek Prize

Biomedical researchers Polina Anikeeva, Sergiu P. Pasca, and Feng Zhang win $50,000 Vilcek Prizes for Creative Promise

New York, NY, February 1, 2018 — The Vilcek Foundation is pleased to announce the winners of the 2018 Vilcek Prizes in Biomedical Science. Awarded annually, the prizes call attention to the breadth of immigrant contributions to science in the United States. In parallel, the Vilcek Foundation also awards prizes for immigrant accomplishments in the arts.

"The collective discoveries of this year's prizewinners are truly exceptional," says Jan Vilcek, Chairman and CEO of the Vilcek Foundation. "They have wide-ranging implications in both basic and translational science, and include novel technologies that, until recently, were not even within the realm of imagination. They are proof that immigrants push the boundaries of possibility, in science and in society."

The Vilcek Prize in Biomedical Science, which is accompanied by a $100,000 cash prize, is awarded to immunologist **Alexander Rudensky**, chair of the immunology program at Sloan Kettering Institute, director of the Ludwig Center at Memorial Sloan Kettering Cancer Center, and Howard Hughes Medical Institute Investigator. Rudensky, known to his friends as Sasha, was born in the former Soviet Union, and came to the U.S. soon after the fall of the Berlin Wall as a postdoctoral fellow. Much of his career has been devoted to understanding regulatory T cells, or Tregs, immune cells that suppress unwanted immune responses and fends off runaway inflammation and autoimmune disorders. He first uncovered its genetic origins in a gene switch called FOXP3; later, Rudensky demonstrated how Tregs control immune responses to stave off spontaneous miscarriage during pregnancy, protecting growing fetuses from reflexive attack by the maternal immune system. He also deciphered the biochemical basis of the communication between Tregs and gut microbes—a process crucial to preventing gut inflammation. More recently, his work has revealed a central role for Tregs in cancer treatment, suggesting that finessing the action of Tregs using molecular approaches could help enhance the efficacy of cancer immunotherapy drugs, which work by unleashing the immune system against tumors. For his important contributions to science, Rudensky has received several honors, including the Howard Hughes Medical Institute investigatorship; the Crafoord Prize of the Royal Swedish Academy of Sciences; and memberships in the American Academy of Arts and Sciences, the National Academy of Sciences, and the National Academy of Medicine.

The Vilcek Prizes for Creative Promise are given to younger immigrants who have demonstrated exceptional promise early in their careers. Each prize includes a $50,000 cash award. The winners are the following:

Polina Anikeeva has fashioned ingenious solutions to long-standing challenges in biomedical engineering. Her technical acumen has led to advances in optogenetics, an approach to exploring brain function by using light to control the actions of brain cells in lab animals. Her design of implantable probes from ultrathin, flexible polymers that closely mimic the brain's material properties has allowed neuroscientists to simultaneously stimulate and record neuronal activity in awake—rather than anesthetized—animals. The ability to examine brain activity in awake lab animals is crucial to establishing links between the brain and behavior. Additionally, her work on wireless deep brain stimulation unveiled a prototype for the noninvasive analysis of brain function, as well as the future design of therapeutic devices for conditions such as Parkinson's disease and spinal cord injury. Anikeeva, born in the former Soviet Union, is the Class of 1942 Associate Professor in Materials Science and Engineering and associate director of the Research Laboratory of Electronics at Massachusetts Institute for Technology.

Sergiu P. Pasca uses models of the human brain, created through cellular reprogramming technology, to explore the biological underpinnings of brain disease. Pasca developed some of the early laboratory dish models of brain disease by deriving neurons from skin cells of patients with genetic forms of autism and other neurodevelopmental disorders; these neurons helped uncover the cellular effects of specific mutations and demonstrated the promise of this novel approach. Next, Pasca developed methods to engineer lab-grown self-assembling 3D structures called brain spheroids, or brain region-specific organoids, also from extracted stem cells. These structures mimic specific regions of the nervous system, and they can be assembled to study the cross-talk between cells in the developing human brain and to form functioning brain circuits in lab dishes. Pasca's lifelike models of the brain pave the way toward a better understanding of disorders such as autism and schizophrenia. Pasca, originally from Romania, is an assistant professor of psychiatry and behavioral sciences at Stanford University.

Feng Zhang developed tools that have advanced both optogenetics, a method of exploring brain function by using light to control the actions of brain cells in lab animals, and gene editing, an approach to altering the genomes of virtually all living organisms. Using a virus-based gene delivery system, Zhang introduced light-sensitive proteins called rhodopsins into the neurons of mice to monitor and control neuronal activity, allowing neuroscientists to map the circuits underlying normal brain function and neuropsychiatric disorders. A few years later, he developed molecular tools for editing genes, launching a technology, known as CRISPR-Cas, to make highly precise changes to genomes in a rapid and efficient manner. Zhang's work in this area of biology has resulted in a growing array of applications, such as uncovering the genetic underpinnings of diseases, ushering in gene therapies to cure heritable diseases, and improving agriculture. Born in China, Zheng is the James and Patricia Poitras Professor in Neuroscience at McGovern Institute for Brain Research at Massachusetts Institute for Technology and a core institute member of the Broad Institute.

The prizewinners were selected by panels of experts in biomedical science; they will be honored at an awards gala in New York City in April 2018. In addition to prizes in biomedical science, the Vilcek Foundation also awards corresponding prizes in the arts and humanities, this year recognizing the field of architecture. For more information, please visit vilcek.org.

The Vilcek Foundation was established in 2000 by Jan and Marica Vilcek, immigrants from the former Czechoslovakia. The mission of the foundation, to honor the contributions of immigrants to the United States and to foster appreciation of the arts and sciences, was inspired by the couple's respective careers in biomedical science and art history, as well as their personal experiences and appreciation of the opportunities they received as newcomers to this country. The foundation awards annual prizes to

prominent immigrant biomedical scientists and artists, and manages the Vilcek Foundation Art Collections. To learn more about the Vilcek Foundation, please visit vilcek.org.