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U-M scientists selected as Howard Hughes Medical Institute investigators

John Moran (Mark Bialek/AP, ©HHMI)

ANN ARBOR, Mich.—Two researchers at the University of Michigan have been appointed as Howard Hughes Medical Institute investigators.

John V. Moran, associate professor of human genetics at the U-M Medical School, and Mercedes Pascual, associate professor of ecology and evolutionary biology at the U-M College of Literature, Science, and the Arts, are among 56 top scientists nationally who have been appointed as investigators, the institute announced Wednesday.

Moran is a pioneer in understanding the biology of common repetitive DNA elements in the human genome often dismissed as “junk” DNA. He leads a group of U-M researchers who examine how these repetitive elements impact the evolution of the human genome.

Pascual is a theoretical ecologist who uses mathematical models to explore links between climate fluctuations and cycles of infectious diseases such as cholera and malaria. In 2002, Discover magazine named her one of "The 50 Most Important Women in Science."

The Howard Hughes Medical Institute is a non-profit medical research organization that ranks as one of the nation's largest philanthropies. In the past two decades, HHMI has made investments of more than $8.3 billion for the support, training and education of the nation's most creative and promising scientists.

Mercedes Pascual

Selected from more than 1,070 researchers in a nationwide competition, the new HHMI investigators come from 31 institutions from across the country. The institute is committing more than $600 million over their first term of appointment.

HHMI enters into long-term collaboration agreements with universities and other academic research organizations, where its investigators hold faculty appointments. Under these agreements, HHMI investigators, who are directly employed by the institute, and their research teams carry out their research in HHMI laboratories located on various campuses.

The institute currently employs more than 300 of the nation's most innovative scientists, who lead Hughes laboratories at 64 institutions.

Moran examines a class of “jumping genes” called LINE-1 elements, which are a perplexing class of repetitive DNA in the human genome. These repetitive elements make up roughly 17 percent of human genetic material, but once were largely ignored and disparaged as “junk.” The bulk of this “junk” DNA appears to have been carried down from our distant evolutionary past and can be considered to be molecular fossils.

Moran and his laboratory have shown that some LINE-1 elements can still jump and that their mobility can impact the human genome in a myriad of ways. The lab has developed tools from the fields of genetics, molecular biology and biochemistry to systematically study LINE-1 movement in cultured human cells.

Moran continues to study why, when and how often LINE-1 elements jump to new locations, with the long-range goal of understanding how the process has influenced the evolution of the human genome and how the mobility of LINE-1 elements can occasionally lead to genetic diseases such as Hemophilia A, colon cancer and muscular dystrophy.

Moran is an associate professor in the Department of Human Genetics at the U-M Medical School. He received a bachelor’s degree in chemistry at the Rochester Institute of Technology; a master’s degree in molecular genetics at Ohio State University; and a Ph.D. in biochemistry at the University of Texas Southwestern Medical Center.

Moran is a past associate editor of the American Journal of Human Genetics and is on the editorial board of Gene. In 2003 he

received the U-M Henry Russel Award. He is a past recipient of the W. M. Keck Foundation Young Scholar in Medical Research Award, the Basil O'Connor Starter Scholar Research Award, the Damon Runyon Scholar Award and a Postdoctoral Basic Science Research Award from the American Society of Human Genetics.

Pascual is exploring the issue of whether and how global warming and climate variability are contributing to the spread of infectious diseases. In one project, she and collaborators in Barcelona and Bangladesh found evidence that a phenomenon called the El Nino-Southern Oscillation (ENSO), which is a major source of climate variability from year to year, influences cycles of cholera in Bangladesh. They also showed that the coupling between climate variability and cholera cycles has become stronger in recent decades. Pascual has been examining the feasibility of using a model developed during that work as an early warning system to predict cholera outbreaks. In other research, Pascual and her research group have studied the connection between global warming and the resurgence of malaria in East Africa and developed a model that couples evolutionary change and epidemiological dynamics to explain ups and downs in influenza epidemics during interpandemic periods.

Pascual is an associate professor in the Department of Ecology and Evolutionary Biology. She received a Licenciatura degree in biology from Universidadde CienciasExactas y Naturales in Buenos Aires, Argentina; a master's degree in mathematics from New Mexico State University; and a doctorate in biological oceanography from the Joint Program of the Woods Hole Oceanographic Institution and the Massachusetts Institute of Technology.

She was awarded a U.S. Department of Energy Alexander Hollaender Distinguished Postdoctoral Fellowship for studies at Princeton, and in 1999 received a Centennial Fellowship in Global and Complex Systems from the James S. McDonnell Foundation. In addition to her primary affiliation, Pascual is also associated with the U-M Center for the Study of Complex Systems and the Santa Fe Institute.

Related Links:

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