Caltech Division of Engineering and Applied Science

Azita Emami, Andrew and Peggy Cherng Professor of Electrical Engineering and Medical Engineering; Investigator, Heritage Andrew and Peggy Cherng Professor of Electrical Engineering and Medical Research Institute; Executive Officer for Electrical Engineering

INTERFACES

TINY CHIPS FOR BRAIN-BODY-MACHINE INTERFACES

APRIL 3, 2019 / 8 PM

How to solve these problems and build microchips that can continuously and wirelessly monitor key biomarkers such as diabetes and epileptic diseases such as Alzheimer’s and autism. Such advances have hard to track, and do not last very long inside the body. Azita Emami will discuss how they reflect most of the antigens present on the surfaces of cells, and modulates the ability of cells to communicate (with other cells). In her lectures, Linda Hsieh-Wilson will describe the development of new tools to help researchers uncover the roles of glycan in the brain, including their participation in neurological and psychiatric disorders such as Alzheimer’s and autism.

THE VON KÁRMÁN LECTURE SERIES AT CALTECH

THE EARNEST C. WATSON LECTURE SERIES

CLOUDS AND CLIMATE TIPPING POINTS

Tapio Schneider, Theodore Y. Wu Professor of Environmental Science and Engineering; Jet Propulsion Laboratory Senior Research Scientist

Clouds and climate tipping points

APRIL 24, 2019 / 8 PM

Low clouds over subtropical ocean cool Earth’s climate because high-reflecting, white clouds over subtropical oceans may melt away, and once on campus. For a full schedule of upcoming events, visit caltech.edu/public-events.

Wilson will describe the roles of sugars in the brain, inincluding their participation in neurological and psychiatric disorders such as Alzheimer’s and autism.

THE EARNEST C. WATSON LECTURE SERIES

In named for Earnest C. Watson, who was a professor of physics at Caltech from 1932 until 1965. Spotlighting a virtual selection of pioneering research, the lecture is currently conducted at the Institute’s Leonard S. Leisa in the Heritage Andrew and Peggy Cherng Professor of Electrical Engineering and Medical Research Institute, Executive Officer for Electrical Engineering, and Investigator, Heritage Andrew and Peggy Cherng Professor of Electrical Engineering and Medical Research Institute.

Wilson will describe the roles of sugars in the brain, inincluding their participation in neurological and psychiatric disorders such as Alzheimer’s and autism. She will one day transform the field of medicine. Microscale implantable and wearable devices will one day transform the field of medicine. They enable continuous monitoring and closed-loop therapeutic systems that can help millions of patients suffering from chronic disease such as diabetes and epilepsy.

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OCTOBER 14, 2015
OCTOBER 31, 2018 / 8 PM
SPACE SOLAR POWER: A NEW BEGINNING
Sergio Pellegrino, Joyce and Kent Kresa Professor of Aerospace and Civil Engineering; Jet Propulsion Laboratory Senior Research Scientist; Co-Director, Space-Based Solar Power Project
Caltech Division of Engineering and Applied Science
In 1968, Peter Glaser, the father of space solar power, envisaged kilometer-scale space systems comprising solar collectors and transmitting antennas that would beam power to the earth from geostationary orbit, but that dream has remained elusive. Until now. In his talk, Sergio Pellegrino will discuss the Caltech Space Solar Power Project’s pursuit to conceive, design, and demonstrate a scalable vision for a constellation of ultralight, modular spacecraft that collect sunlight, transform it into electrical power, and wirelessly beam that electricity to the earth. The basic module of this future solar power system is a giant coilable structure that elastically deploys after launch into orbit, and is made of paper-thin materials of high stiffness.

NOVEMBER 28, 2018 / 8 PM
WORLD’S DEEPEST-PENETRATION AND FASTEST OPTICAL CAMERAS
Lihong V. Wang, Binet Professor of Medical Engineering and Electrical Engineering
Caltech Division of Engineering and Applied Science
In his talk, Lihong Wang will discuss the development of photoacoustic tomography, which allows scientists to peer deep into biological tissue. He will also talk about his lab’s development of compressed ultrafast photography that records 10 trillion frames per second. At 10 orders of magnitude faster than commercially available technologies, it can capture light propagation, the fastest phenomenon in the universe.

JANUARY 16, 2019 / 8 PM
– Biedebach Memorial Lecture –
THE LONG-RUN BEHAVIOR OF RANDOM WALKS
Omer Tamuz, Assistant Professor of Economics and Mathematics
Caltech Division of the Humanities and Social Sciences
Random walks—trajectories formed by successions of random steps—have been studied for more than a hundred years as important models in physics, computer science, finance, and economics, and as intriguing mathematical objects in their own right. Still, many simple questions remain unanswered, and are the subject of current research. In his talk, Omer Tamuz will describe some classical results, introduce random walks on groups and graphs, present some open questions regarding their long-run behavior, and talk about the solution of a longstanding problem as well as a surprising connection to economics.

FEBRUARY 27, 2019 / 8 PM
– Robert F. Christy Lecturer –
MY HALF-CENTURY ROMANCE WITH CALTECH AND WITH BLACK HOLES, WORMHOLES, TIME TRAVEL, AND GRAVITATIONAL WAVES
Kip Thorne (BS ’62), Richard P. Feynman Professor of Theoretical Physics, Emeritus, Caltech Division of Physics, Mathematics and Astronomy
When Kip Thorne arrived at Caltech as a freshman in 1958, the “warped side of our universe”—objects and phenomena made from warped space and time—was a far-out speculation. In his talk, Thorne will describe how he and colleagues transformed a portion of that warped side (black holes and gravitational waves) into firmly established and observed phenomena, and discuss what they have learned about another portion (wormholes and time travel). He will also speculate on future warped-side discoveries about the birth of our universe and of the laws that govern it.

FEBRUARY 13, 2019 / 8 PM
PLANT GROWTH: HOW STEM CELLS MAKE STEMS
Elliot M. Meyerowitz, George W. Beadle Professor of Biology, Investigator, Howard Hughes Medical Institute
Caltech Division of Biology and Biological Engineering
Plants are the dominant source of our food, clothing, shelter, and many pharmaceutical drugs, yet we know very little about how they grow. Elliot Meyerowitz’s laboratory studies the collections of stem cells that create stems, leaves, and flowers, focusing on the spiral phyllotaxis pattern, in which successive leaves or flowers appear at angles of roughly 140 degrees. His talk will describe how the pattern forms, answering questions that have intrigued mathematically inclined biologists and revealing surprising modes of communication between plant stem cells.

SINCE 1922, THE EARNEST C. WATSON LECTURE SERIES HAS BROUGHT CALTECH’S MOST INNOVATIVE SCIENTIFIC RESEARCH TO THE PUBLIC.