USC Viterbi
Department of
Biomedical Engineering

USC University of Southern California

The Fred S. Grodins Keynote Lecture

Na Ji, Ph.D.

Associate Professor
Departments of Physics and
Molecular Cell Biology
University of California, Berkeley

Thursday, October 26, 2017
3:00PM – 4:00 pm, EEB 132

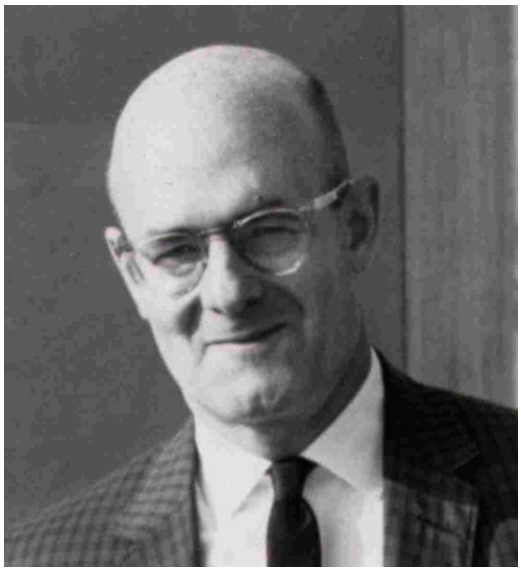
Followed by reception in the Andrus Gerontology Courtyard from 4:00 pm to 5:30 pm.

Open to all BME Faculty, Staff, and students.

Probing neural circuits with shaped light

To understand computation in the brain, one needs to understand the input-output relationships for neural circuits and the anatomical and functional relationships between individual neurons therein. Optical microscopy has emerged as an ideal tool in this quest, as it is capable of recording the activity of neurons distributed over millimeter dimensions with sub-micron spatial resolution. I will describe how we use concepts in astronomy and optics to develop next-generation microscopy methods for imaging neural circuits at higher resolution, greater depth, and faster speed. By shaping the wavefront of the light, we have achieved synapse-level spatial resolution through the entire depth of primary visual cortex, optimized microendoscopes for imaging deeply buried nuclei, and developed a video-rate (30 Hz) volumetric imaging method. We apply these methods to understanding neural circuits, using the mouse primary visual cortex as our model system.

Bio:
Na Ji studied chemistry and physics as an undergraduate in the University of Science and Technology of China, then pursued her graduate degree at the University of California Berkeley. In 2006, she moved to Janelia Research Campus, Howard Hughes Medical Institute, where she worked with Eric Betzig on improving the speed and resolution of in vivo brain imaging. She started her own group in Janelia in 2011, where, in addition to imaging technology development, her lab applies the resulting techniques to outstanding problems in neurobiology. Na Ji, PhD, is currently at Associate Professor in the Department of Physics and Department of Molecular Cell Biology at the University of California, Berkeley.



Grodins Keynote Lecture

Fred S. Grodins (1915-1989) joined the faculty at USC in 1967 as Professor of Physiology and Electrical Engineering. He established Biomedical Engineering (BME) at USC first as a Program in 1970 and subsequently as a full-fledged Department in 1976. Dr. Grodins was Professor and Chairman of BME until 1986. He remained active in research as Emeritus Professor at USC until his death in 1989.

Universally acknowledged as a pioneer in the field of biomedical engineering, Dr. Grodins made profound and lasting contributions in the area of physiological control. His famous monograph on “Control Theory and Biological Systems”, published in 1963, is considered a landmark publication on the application of engineering control theory to physiological systems. Dr. Grodins published over 100 scientific articles and book chapters in the areas of respiratory physiology, cardiovascular control, mathematical modeling and computer simulation. Through his career-long active research program, funded by the National Institutes of Health, Dr. Grodins was responsible for the training of numerous graduate students and postdoctoral fellows.

Dr. Grodins served on many governmental panels and advisory committees for the NIH, NSF and NASA, and was on the editorial boards of the American Journal of Physiology, the Journal of Applied Physiology, Circulation Research and Physiological Reviews. A past president and member of the board of directors of the Biomedical Engineering Society, Dr. Grodins was also a member of the American Physiological Society, Phi Beta Kappa, Sigma Xi, and the American Association for the Advancement of Science.

Dr. Grodins received his B.S., M.S., M.D. and Ph.D. (Physiology) degrees from Northwestern University. He served in the U.S. Air Force from 1944 to 1946. He was Abbott Professor of Physiology at Northwestern until his move to USC in 1967.

USC Viterbi School of Engineering

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