

directed the Bangalore Microscopy Course. Dr. Vale's laboratory also developed MicroManager, free and open source software that controls light microscopes.

He recently served as President of the American Society of Cell Biology. In the biotechnology industry, Vale co-founded Cytokinetics, Inc. and currently serves on their scientific advisory board.

Dr. Vale's awards include the Lasker Award in Basic Medical Research, the Massry Prize, the Wiley Prize in Biomedical Science, the Pfizer Award in Enzyme Chemistry, and the Young Investigator Award from the Biophysical Society. He was elected to the National Academy of Sciences in 2001, the American Academy of Arts and Sciences in 2002, and the European Molecular Biology Organization in 2012.

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**RONALD D. VALE, Ph.D**

MECHANISMS OF BIOLOGICAL MOTILITY

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JANUARY 30, 2014  
4:00 P.M.  
208 LIGHT HALL

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Upcoming Discovery Lecture:

**RUSS ALTMAN, M.D., Ph.D.**  
*Stanford University*

*February 6, 2014*  
*208 Light Hall / 4:00 P.M.*

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

## MECHANISMS OF BIOLOGICAL MOTILITY

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Movement is a fundamental property of living organisms. The contraction of muscle, beating of cilia and flagella, segregation of genetic material during mitosis, and intracellular transport of membranes, proteins and mRNAs are driven by molecular motor proteins that move along cytoskeletal filaments. The mechanism of kinesin is reasonably well understood through measurements of its single molecule motility and the elucidation of its atomic structure. Dynein, a much larger motor that is evolutionarily unrelated to kinesin, is much less well understood. In this talk, I will discuss our recent efforts to understand how structural changes in the dynein motor produce motility and how the motility of dynein might be regulated.



### **RONALD D. VALE, Ph.D.**

**PROFESSOR AND VICE-CHAIR, DEPARTMENT  
OF CELLULAR AND MOLECULAR PHARMACOLOGY  
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO**

**INVESTIGATOR, HOWARD HUGHES MEDICAL  
INSTITUTE**

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Ronald D. Vale is a Professor in the Dept. of Cellular and Molecular Pharmacology at UCSF, where he also serves as Vice-Chair, and is an Investigator in the Howard Hughes Medical Institute. Dr. Vale received his Ph.D. in Neurosciences from Stanford University in 1985 where he trained with Dr. Eric Shooter. He was a Staff Fellow with the N.I.H. stationed at the Marine Biological Laboratory in 1985–6 and began his faculty appointment at UCSF in 1987.

Dr. Vale's main research focus has been understanding molecular motor proteins and their role in transporting materials within cells. As a graduate student, Vale, along with colleagues Schnapp, Reese and Sheetz, discovered a new type of molecule motor, which he christened "kinesin." As a faculty member at UCSF, Dr. Vale and his laboratory, using structural approaches in combination with new microscopic methods for tracking single protein molecules, developed a detailed model of how kinesins generates motion. More recently, Dr. Vale has focused on dynein, a microtubule motor that remains less well understood than the kinesins. His laboratory also investigates the assembly of the mitotic spindle and the mechanism of T cell signaling.

Vale is involved in several activities that benefit the scientific community. He founded iBiology.Org, a project that produces videos of scientific talks by leading scientists and makes them freely available to students and scientists throughout the world. He founded IndiaBioscience.Org, a web site for the life sciences in India, and also started the annual Young Investigator Meeting for young Indian scientists. He previously co-directed the MBL Physiology Course for five years and founded/

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W. Jackson Pledger, Ph.D., Professor	1985–1994
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J. Ann Richmond, Ph.D., Professor	1989–2000+
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Steven K. Hanks, Ph.D., Professor Emeritus	1990–2011
Susan R. Fox, Ph.D., Assistant Professor	1990–1993
Kathleen L. Gould, Ph.D., Professor	1991–present
Claude M. Nagamine, Ph.D., Assistant Professor	1991–2000
Mary Ann Arildsen, M.D., Ph.D., Assistant Professor	1991–1998^

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Albert B. Reynolds, Ph.D., Professor	1996–2000+
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Chin Chiang, Ph.D., Professor	1997–present
Arthur F. Dalley, Ph.D., Professor	1998–present
Christopher F.J. Hardy, Ph.D., Associate Professor	2002–2009
Susan R. Wentz, Ph.D., Professor**	2002–present
Daniela Drummond-Barbosa, Ph.D., Assistant Professor	2002–2009
Guoqiang Gu, Ph.D., Associate Professor	2002–present
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Laura A. Lee, M.D., Ph.D., Associate Professor	2003–present
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Ian G. Macara, Ph.D., Professor and Chair	2012–present
Ken Lau, Ph.D., Assistant Professor	2013–present
Jason MacGurn, Ph.D., Assistant Professor	2013–present

\* Chair of Cell Biology (1985–2000), Emeritus Director,  
Vanderbilt-Ingram Cancer Center

\*\*Chair of Cell Biology (2002–2012), Associate Vice Chancellor Research,  
Sr. Dean Biomedical Sciences

+ Department of Cancer Biology, VUMC

^ Department of Pathology, Microbiology and Immunology VUMC

# Deceased