

THE  KAVLI PRIZE
B I O G R A P H I E S
N E U R O S C I E N C E

Cornelia Bargmann, Winfried Denk, Ann M Graybiel



Cornelia Bargmann

Cornelia Bargmann was born in 1961 in Virginia and raised in Athens, Georgia, where she attended the University of Georgia. She then went north to study cancer-signalling genes and cloned the oncogene HER2, a key factor in breast cancer, in the laboratory of Robert Weinberg at the Whitehead Institute, Massachusetts Institute of Technology.

After receiving her Ph.D. in 1987, Professor Bargmann transferred to the laboratory of H. Robert Horvitz, at MIT, where she became acquainted with the tiny worm *C. elegans*. Professor Horvitz had already made major contributions to understanding neural development using *C. elegans* as a simple model organism. For this he shared the 2002 Nobel Prize in Physiology or Medicine with Sydney Brenner and John Sulston “for their discoveries concerning genetic regulation of organ development and programmed cell

death”. Professor Bargmann then embarked upon what was to become a lifetime mission to define how genes and the environment influence behavior by dissecting the neural circuitry of *C. elegans* and the genes, receptors and signaling molecules involved in such behaviour as feeding and responses to odours.

In 1995 California beckoned, and Cornelia Bargmann took up an appointment as assistant professor at the University of California, San Francisco. In 1998, she was promoted to Professor, and in 1999 was named vice chair of the Department of Anatomy. In 2004 she returned to the east coast to take up the position of head of the Lulu and Anthony Wang Laboratory of Neural Circuits and Behaviour at Rockefeller University, New York, where she is now Torsten N. Weasel Professor and a Howard Hughes Medical Investigator. Rockefeller University president Paul Nurse welcomed her arrival saying, “Cori Bargmann typifies the Rockefeller scientist: she is bold and highly original in her thinking and her approach to studying the brain and other components of the nervous system”.

Professor Bargmann has received numerous awards, including the Charles Judson Herrick Award for comparative neurology in 2000, the Dargut and Milena Kemali International Prize for Research in the Field of Basic and Clinical Neurosciences in 2004, and the Richard Lounsbery Award from the US and French National Academies of Sciences in 2009. She is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and the European Molecular Biology Organisation.

Professor Bargmann has trained many students and postdocs in cutting-edge techniques and encouraged them to share her enthusiasm for research. She is renowned for the quality of her presentations and breadth of knowledge as for her research.



Winfried Denk

Winfried Denk was born in 1957 in Munich. From 1978 to 1981 he studied physics as an undergraduate at the Ludwig-Maximilians University in Munich, followed by further studies at the Swiss Federal Institute of Technology in Zürich, where he was awarded a diploma in physics in 1984.

Professor Denk then moved to the USA to join the laboratory of biophysicist Watt Web at Cornell University in Ithaca, New York, to pursue a Ph.D., measuring the motion of inner ear cells. He was awarded

The Norwegian Academy of Science and Letters

Drammensveien 78, 0271 Oslo, Norway
Phone +47 22 12 10 90
Fax +47 22 12 10 99
www.dnva.no

See also:

The Kavli Prize
www.kavliprize.no

The Kavli Foundation
www.kavlifoundation.org

his Ph.D. in 1990, and in the same year, announced the invention of two-photon microscopy, which he patented together with James Stickler and Watt Webb. Two-photon microscopy has since revolutionised fluorescence microscopy by enabling imaging of living tissue to greater depth (up to a millimetre) than was previously possible.

Professor Denk took up a postdoctoral position at the IBM Research Laboratory in Rueschlikon, Switzerland, and then crossed the Atlantic again in 1991 to spend the following eight years at the Bell Laboratories in Murray Hill, New Jersey.

In 1999, Professor Denk returned to Germany to become Director of the Department of Biomedical Optics at the Max Planck Institute for Medical Research in Heidelberg, and since 2002 has also held the position of Professor in the Faculty of Physics, University of Heidelberg. He is also a Janelia Farm Scientist, spending one month per year at the Janelia Farm Research Campus, part of the Howard Hughes Medical Institute, in Virginia, where scientists are freed from grant application writing, administration and teaching, and instead encouraged to pursue high-risk ventures.

It was in 2004 that Professor Denk reported his next major invention: serial block-face electron microscopy (SBEM). This automated tool creates high-resolution three-dimensional images from biological tissue. It enables features such as individual neurons to be visually isolated and viewed in multiple orientations using computer graphics.

Among his many prizes and awards, Professor Denk received the Rank Prize for Optoelectronics in 2000, followed by the Gottfried Wilhelm Leibniz Prize in 2003, Germany's most prestigious research prize, from the German Research Foundation. In 2006 he gave the Fred Kavli Distinguished International Scientist Lecture at the Society for Neuroscience annual meeting, and was awarded the W. Alden Spencer Lecture and Award at Columbia University in New York. In 2008 he gave the Henri Sacks lecture at Cornell University.



Ann M Graybiel

Ann M Graybiel was born in Chestnut Hill, Massachusetts, in 1942. Her father, Ashton Graybiel, was a prominent medical doctor and researcher who investigated the effects of weightlessness and acceleration in astronauts and helped to

prepare them for space motion sickness.

Professor Graybiel received her bachelor's degree from Harvard University in 1964, majoring in biology and chemistry, and an M.A. in biology from Tufts University in 1966, thanks to the support of a Woodrow Wilson Fellowship. She then began studying for a Ph.D. in psychology and brain science at the Massachusetts Institute of Technology, supervised by the late Hans Lukas Teuber, and the late Walle Nauta. She was awarded a Ph.D. in 1971 and just two years later became a member of MIT faculty. By this time she was already questioning the role of a poorly-understood area of the mid-brain known as the striatum. Over the next 40 years she was to develop methodologies and animal models that would allow her to map and define the neuronal circuits of the striatum and how these connect with other parts of the brain to influence behavior, particularly during the formation of habits. Her work is recognized as providing fundamental new insights not only into normal brain function but also some of the abnormalities that underlie disorders such as Huntingdon's chorea, Parkinson's disease, obsessive-compulsive disorder and drug addiction.

In 1994 she was named Walter A. Rosenblith Professor of Neuroscience in the Department of Brain and Cognitive Sciences, and in 2001 was promoted to Investigator at the MIT McGovern Institute for Brain Research. In the same year Professor Graybiel went to the White House to receive the nation's highest science award, the National Medal of Science, and she was the only female among

14 recipients. Further honours followed: in 2004, the Parkinson's Disease Foundation gave Professor Graybiel the Woman Leader of Parkinson's Science award, and 2006, the National Parkinson Foundation bestowed upon her the title of Harold S. Diamond Professor in recognition of her achievements.

MIT then awarded Professor Graybiel its highest honour for a faculty member, naming her Institute Professor in 2008. This permitted freedom to pursue her research interests without any departmental administration or teaching obligations.

Congratulating Professor Graybiel, MIT President Susan Hockfield said, "Professor Graybiel's research has contributed profoundly to our understanding of the functional anatomy and physiology of the brain, particularly the brain regions involved in the control of movement. Her work has provided new insights to the neurobiological basis of a range of disorders, from Parkinson's disease to major depression."

Graybiel is a member of the National Academy of Sciences, the Institute of Medicine, and the American Academy of Arts and Sciences.

By Julie Clayton, science writer

