

# **Mendel Lectures**

## **2013—2014**





2013 — 2014

# Peter Baumann

\* 1969

*Stowers Institute for Medical Research, Kansas City, USA*

**📅 October 17, 2013**

Peter Baumann obtained his BA in zoology at Cambridge University, UK, in 1993. The following year, he joined Steve Jackson's group at the Wellcome/Cancer Research Centre Institute (now Wellcome Trust/Cancer Research UK Gurdon Institute) to study the transcriptional apparatus in *Archaea*, and obtained his MSc in 1994. The same year he joined Stephen West at the Clare Hall Laboratories (now the Francis Crick Institute) and earned a PhD in biochemistry from the University of London in 1998. He then started postdoctoral research with Tom Cech at the University of Colorado in Boulder. During his time in Boulder, Baumann's research interests expanded into the area of telomeres and the fundamental question of how chromosome ends are distinguished from DNA breaks. In 2000, he discovered telomere end binding proteins in fission yeast and human cells. Deletion of the gene in yeast led to rapid loss of telomeres, chromosome fusions and death of most cells. Based on these phenotypes he named the protein Pot1 for Protection of Telomeres.


In 2002 he joined the Stowers Institute as an independent investigator where he continued his research into telomere maintenance and chromosome stability using both fission yeast and mammalian cells. He also began investigating the molecular mechanisms of chromosome inheritance in parthenogenetic lizards. This work earned him a Pew Scholar Award (2003), an appointment as a Howard Hughes Early Career Scientist (2009) and as a Howard Hughes Medical Institute Investigator (2013). Also in 2013,

he was named the inaugural recipient of the Priscilla Wood Neaves Endowed Chair in the Biomedical Sciences.



After receiving a prestigious Alexander von Humboldt Professorship, Baumann moved his research group to Johannes Gutenberg-Universität Mainz in Germany in 2017. He continues his research on the architecture and dynamics of chromosome ends and the inheritance of genetics. In 2019 he was elected an EMBO member.

## Biogenesis and Regulation of Telomerase



*Visiting the birthplace of modern genetics and participating in the Mendel Lectures was a deeply moving experience, for which I am eternally grateful to the organizers.*

# Carlos Bustamante

\* 1951

*University of California, Berkeley, USA*

**📅 October 24, 2013**

Carlos José Bustamante is a Peruvian scientist, an HHMI investigator and professor of molecular and cell biology, physics, and chemistry at the University of California, Berkeley.

Bustamante studied medicine at the National University of San Marcos before discovering his true interest in biochemistry. He received his BSc and MSc in biochemistry from Cayetano Heredia University in Lima, and his PhD in 1981 in biophysics from UC Berkeley. In 1981-1982 he worked as a postdoctoral fellow at the Lawrence Berkeley National Laboratory. After eight years (1982-1990) at the University of New Mexico, he spent seven years as a professor of chemistry at the University of Oregon, and in 1998 he accepted a position as professor in molecular and cell biology at UC Berkeley. Since 2012 he has held the Raymond and Beverly Sackler Chair of Biophysics at UC Berkeley.

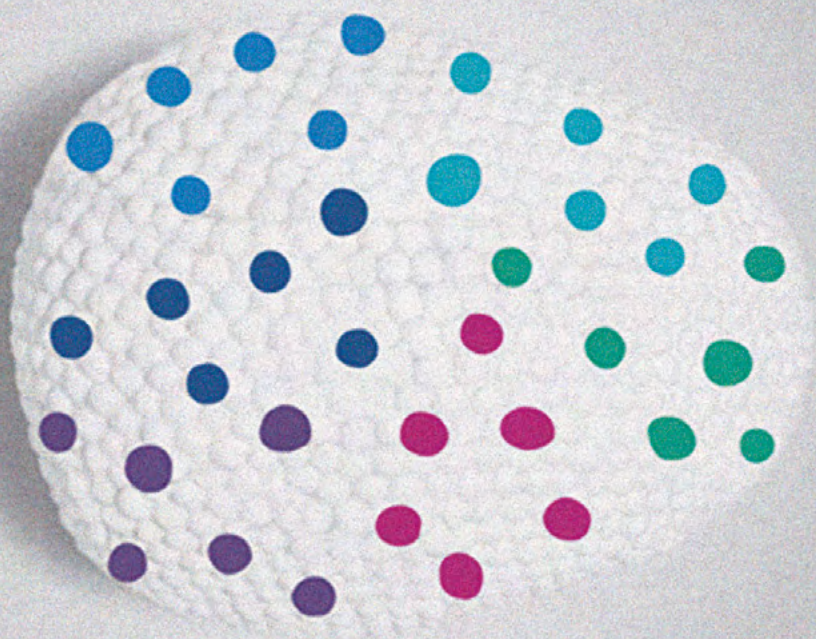


Professor Bustamante uses novel methods of single-molecule visualization, such as scanning force microscopy, optical and magnetic tweezers, single molecule fluorescence, fluorescence correlation spectroscopy and super-resolution

photo-activated light microscopy to study how cells convert chemical energy into mechanical work through highly specialized molecular machines. Bustamante's research played a pivotal role in the characterization of viral DNA packing, transcription, translation and protein folding and degradation.

Professor Bustamante is a member of several scientific organizations, including the American Physical Society (1995) and the National Academy of Science (2002); he is an Honorary Member of the Royal Spanish Biochemistry Society (2009); and a member of the Academy of Science of Chile (2013), the American Association for the Advancement of Science (2014), the American Academy of Arts and Sciences (2015), and the Peruvian Society of Biochemistry and Molecular Biology (2017). He is also the recipient of many awards - the 2004 Alexander Hollaender Award, the 2004 Hans Neurath Prize, the 2002 Biological Physics Prize, the 2004 National Science Prize of Peru, the 2012 Fellows of the Biophysical Society Award, the 2012 Vilcek Prize, and the 2012 Raymond and Beverly Sackler International Prize.

## Grabbing the Cat by the Tail: How a Viral Molecular Motor Packages DNA



# Kay Hofmann

\* 1961

*University of Cologne, Cologne, Germany*

**📅 November 21, 2013**

Kay Hofmann obtained his MSc in chemistry from the University of Dortmund, Germany, in 1986 and his PhD in biochemistry from the University of Cologne, Germany, in 1992. Following his postdoctoral work in bioinformatics at the same university during the years 1992–1994, he stayed as a postdoctoral fellow for four years at the Swiss Institute for Experimental Cancer Research in Lausanne. After his return to Germany, he served as Head of Bioinformatics at Memorec Biotec GmbH (1998–2005), and later as Head of Bioinformatics at Miltenyi Biotec GmbH (2005–2012). In 2012, he was appointed Professor of Genetics and Computational Biology at the University of Cologne, Germany.

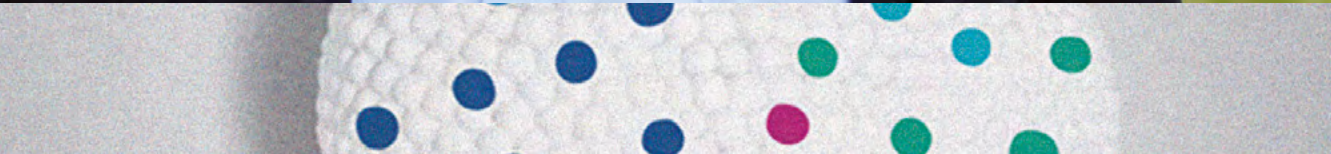


His group is applying bioinformatical and experimental methods to study the natural history of ancient cell signalling pathways. One research focus is programmed cell death, which is important

for development and anti-pathogen defence in animals, plants and fungi. While different organism classes appear to employ very different mechanisms to achieve a similar goal, recent findings suggest a common evolutionary origin of programmed cell death. A second research focus is the role of protein ubiquitination in the anti-pathogen defence. While host cells use this system to target pathogens and associated components for removal, many pathogens have evolved evasive mechanisms, often by co-opting host-derived genes for their own purpose. The study of such pathways offers not only interesting insights into the evolution of signalling pathways, but also has important medical applications.

## A Common Evolutionary Basis for Cell Death Pathways in Animals, Plants and Fungi





# Joan Massagué

\* 1953

*Memorial Sloan-Kettering Cancer Center, New York, USA*

**📅 May 22, 2014**

Joan Massagué earned his PhD in Pharmacy and Biochemistry from the University of Barcelona in 1978. In 1982, he completed a postdoctoral fellowship at Brown University, where he worked on the insulin receptor. Later that year, he became assistant professor of Biochemistry at the University of Massachusetts Medical School and initiated work on transforming growth factor- $\beta$  (TGF $\beta$ ). In 1989 he joined the Memorial Sloan Kettering Cancer Center in New York and was appointed a Howard Hughes Medical Institute Investigator. He served as Chairman of the Sloan Kettering Institute Cell Biology Program from 1989 to 2003 and as the Founding Chairman of the Cancer Biology and Genetics Program from 2003 to 2013. He holds the Marie-Josée and Henry R. Kravis Foundation Chair, and is also a professor at Weill-Cornell Graduate School of Medical Sciences. In 2014, Massagué was appointed Director of the Sloan Kettering Institute and Provost of the Gerstner Sloan Kettering Graduate School of Biomedical Sciences.

Massagué is interested in the mechanisms that support tissue homeostasis and cancer metastasis. Focusing on TGF $\beta$  as one of the most prevalent signalling pathways in metazoan biology, he elucidated this signalling pathway and is establishing how TGF $\beta$  signals control pluripotency and differentiation in stem cells and homeostasis in mature cells. He has also identified a set of genes associated with metastasis in various organs. His group described metastasis as a dynamic process by which stem-like

cancer cells with high phenotypic plasticity re-infiltrate tissues in response to tumour microenvironment changes mimicking tissue regeneration processes. He described a cell adhesion mechanism that metastasis-initiating cells use for outgrowth. In addition, his group defined the basis for metastatic latency in breast and lung cancers and the role of the immune system in enforcing dormancy. His work illuminated the regenerative origin of metastases, which were previously believed to result from specialized genetic mutations.

Massagué is a member of the American Academy of Arts and Sciences (1990), the US National Academy of Sciences (2000), the National Academy of Medicine (2004), the Spanish Royal Academies of Medicine and of Pharmacy, the European Molecular Biology Organization, and the American Association for Cancer Research (AACR) Academy (2016). He is the recipient of many prestigious awards including the 2004 Prince of Asturias Prize, the 2006 Vilcek Prize, the 2007 Passano Prize, the 2008 BBVA Frontiers of Science Prize, the 2011 Pasa-row Foundation Medical Research Award, the 2016 Pezcoller Foundation-AACR International Award, and other honours.

## Origins of Metastatic Traits



*The Mendel Lectures are a splendid initiative for international scientific exchange and the training of future generations of biomedical scholars and entrepreneurs in Czechia. Delivering one amid the incomparable history and beauty of Brno is an indelible experience.*