



Boehringer Ingelheim  
Stiftung

2018

HEINRICH WIELAND PRIZE



## AWARD SYMPOSIUM OF THE 2018 HEINRICH WIELAND PRIZE

Nymphenburg Palace, Munich, Germany  
Thursday, November 22, 2018

## HEINRICH WIELAND PRIZE

The international Heinrich Wieland Prize honours distinguished scientists for their outstanding research on biologically active molecules and systems in the fields of chemistry, biochemistry, and physiology as well as their clinical importance. The prize is endowed with 100,000 euros by the Boehringer Ingelheim Foundation and named after Heinrich Wieland (1877–1957), Nobel Laureate in Chemistry in 1927.

Every year, the foundation invites scientists to make nominations in an open call. It entrusts the selection of the awardees to a scientific Board of Trustees, all of whom work in an honorary capacity (see page 7 for current members). Presented annually since 1964, the Heinrich Wieland Prize has four subsequent Nobel Laureates among its awardees.

[www.heinrich-wieland-prize.de](http://www.heinrich-wieland-prize.de)



## AWARD SYMPOSIUM

- 3:30 P.M.      **Registration**
- 4:00 P.M.      **Welcome and opening remarks**  
Professor Dr Felix Wieland, Chair of the Board of Trustees of the  
Heinrich Wieland Prize, University of Heidelberg, Germany
- 4:10 P.M.      **“Bacterial quorum sensing and its control”**  
Professor Bonnie L. Bassler, PhD,  
Princeton University, NJ, USA
- 4:50 P.M.      **“Suppression of adaptive immunity by Salmonella”**  
Professor David W. Holden, PhD,  
Imperial College London, UK
- 5:30 P.M.      **Coffee break** including **“Meet the Speakers”** for selected students
- 6:10 P.M.      **“The RNA world of the human microbiome”**  
Professor Dr Jörg Vogel,  
University of Würzburg, Germany
- 6:50 P.M.      **Award ceremony**  
Moderated by Dr Claudia Walther,  
Managing Director of the Boehringer Ingelheim Foundation, Mainz, Germany
- Musical Introduction**  
Joseph Haydn (1732–1809),  
String Quartet in G major, op. 33 No. 5 – Finale: Allegretto-Presto
- Laudation**  
Professor Dr Petra Schwille,  
Max Planck Institute of Biochemistry, Martinsried, Germany
- Award presentation**  
to Professor Pascale Cossart, PhD,  
Institut Pasteur, Paris, France  
by Christoph Boehringer, Chairman of the Executive Committee of the Boehringer  
Ingelheim Foundation, Mainz, Germany, and Professor Dr Felix Wieland
- Award lecture**  
**“The bacterium *Listeria monocytogenes*: a unique model in biology”**  
Professor Pascale Cossart, PhD
- Musical conclusion**  
Franz Schubert (1797–1828), String Quartet No. 10 in E flat major, D87, Allegro
- 8:00–10:00 P.M.      **Get-together**

Music performed by Schumann Quartet Munich (members of the Bavarian State Orchestra): Barbara Burgdorf (violin), Traudi Pauer (violin), Stephan Finkentey (viola), Oliver Göske (cello)

## Professor Pascale Cossart, PhD

Institut Pasteur, Paris, France

Pascale Cossart receives the 2018 Heinrich Wieland Prize for her fundamental contributions to the field of Molecular Infection Biology. She is recognized as a pioneer in a discipline that emerged twenty-five years ago, which combines molecular and cell biology approaches, and that she named "Cellular Microbiology". Her research uncovered how bacteria can enter human cells and spread in the body by subverting the host cell's own mechanisms. Cossart and her group also identified key elements of how bacteria can cross host body barriers such as in the intestine and the placenta, evade the host cells' defence, and other factors governing virulence including proteins affecting host mitochondria, post-translational modifications or epigenetic marks. More recently, she identified several novel types of RNA-mediated regulations. Most of her work was done in the food-borne pathogen *Listeria monocytogenes*, which she established as a model organism. It is now one of the best-studied bacterial pathogens. Her work inspired many other discoveries and paves the way to develop new therapies against bacterial infections, which are responsible for about a quarter of all deaths worldwide.



Cossart studied chemistry at Lille University, France, and in 1971 obtained a master degree at Georgetown University, Washington DC, USA. Back in Paris, she received her PhD in biochemistry from the University of Paris in 1977. Since that time she has been working at the Institut Pasteur, where she has been a professor since 1997. Currently, she heads the Bacteria-Cell Interactions Unit in the Department of Cell Biology and Infection. During her career she has been accorded many scientific accolades: She has been elected for example as a member of EMBO, the Royal Society, the Academy of Microbiology (USA), the national academies of sciences of France, Germany (Leopoldina), and the USA (NAS). She has been awarded numerous prizes, among them the Robert Koch Prize, the Louis-Jeantet Prize for Medicine, the L'Oreal/UNESCO Award for Women in Science, and the Balzan Prize.

## **Professor Bonnie Bassler, PhD**

Princeton University, Princeton, NJ, USA

Bonnie Bassler has unravelled molecular mechanisms underlying bacterial intra- and inter-species communication, a process called quorum sensing. She established the current conceptual framework of bacteria as interacting organisms that act as coordinated groups with profound implications for nature and medicine. Bassler demonstrated that bacteria “talk” to each other using chemicals as their words. She showed that chemical communication allows bacteria to assess the surrounding population density and species composition, and to control behaviour on a community-wide scale. Quorum sensing regulates processes ranging from nutrient uptake, to biofilm formation, to pathogenicity. Thus, Bassler’s work provides new possibilities for applications in a wide range of microbiological processes.

Bassler studied biochemistry at the University of California at Davis, USA, and she received her PhD from the Johns Hopkins University in 1990. After postdoctoral work at the Agouron Institute, she joined the Princeton University faculty in 1994, and she became a full professor in 2003. Bassler is an HHMI investigator as well as a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the National Academy of Medicine, the Royal Society, and EMBO. Bassler has been awarded prizes including a MacArthur fellowship, the Wiley Prize in Biomedical Sciences, the Richard Lounsbery Award, the L’Oreal-UNESCO Women in Science Award, and the Shaw Prize in Life Science and Medicine.

## **Professor David Holden, PhD**

Imperial College London, London, UK

David Holden is one of the leading experts on Salmonella and made several breakthroughs in understanding how Salmonella causes diseases such as gastroenteritis and typhoid fever. He is best known for inventing a powerful genetic screening method called ‘signature-tagged mutagenesis’ or ‘DNA barcoding’, which enables multiplexed screening of mutant libraries for effects on growth. It has aided the design of vaccines against bacterial pathogens and several patents on it have been granted. More recently, Holden developed techniques to analyse bacteria at the single cell level and using these discovered antibiotic-tolerant non-replicating persister cells of Salmonella in vivo, likely to be an important cause of relapsing infection.

David Holden completed his PhD in Microbiology at University College London, UK, in 1981. He held postdoctoral fellowships in Canada and the USA. In 1988, he moved to the UK’s National Institute for Medical Research and later joined the Royal Postgraduate Medical School (now part of Imperial College London), where he became a full Professor in 1995. Holden is currently Director of the Medical Research Council Centre for Molecular Bacteriology and Infection (MRC CMBI). He co-founded the vaccine company Microscience and is a Fellow of the Royal Society (UK Academy of Science), the American Academy of Microbiology, the Academy of Medical Sciences (UK), and EMBO.



## **Professor Dr Petra Schwille**

Max Planck Institute of Biochemistry, Martinsried, Germany

Petra Schwille has made substantial contributions to modern biophysics by, for example, developing fluorescence cross-correlation spectroscopy (FCCS), one of the most elegant, non-invasive optical methods. Its unparalleled precision helps us to understand how cells self-organize, polarize, and develop into organisms by showing where key regulating factors are within the cell and how fast they disperse. She also devised cell-like model systems to mimic and investigate processes at the cell membrane, such as receptor signalling or pathogen entry. More recently, Schwille constructs cell-like biomimetic systems bottom-up, to find out how complexity arises from simple building blocks.

Petra Schwille studied physics and philosophy in Göttingen and completed her PhD at the MPI for Biophysical Chemistry in Göttingen in 1996. After a postdoc at Cornell University, NY, she returned to the MPI for Biophysical Chemistry. In 2002, she was appointed full professor and chair of Biophysics at the Technische Universität Dresden. Since 2011, she is Director at the MPI for Biochemistry in Martinsried. She is a member of the German National Academy of Sciences Leopoldina, the National Academy of Science and Engineering acatech, the Berlin-Brandenburg Academy of Sciences and Humanities, and EMBO. Schwille has received numerous awards, among them the Gottfried Wilhelm Leibniz Prize of the German Research Foundation.

## **Professor Dr Jörg Vogel**

University of Würzburg, Würzburg, Germany

Jörg Vogel, a leading expert on RNA biology, combines it with molecular biology, asking for example how non-coding RNA sequences of bacterial pathogens regulate the gene expression of them and their host. He introduced high-throughput sequencing to search for small RNAs and RNA-protein interaction in many different bacterial species. By analysing RNA expression of bacterial pathogens together with their host cells' patterns, he uncovered an up to then unimaginable regulatory RNA network and its influence on protein synthesis and RNA stability during infection. This allowed to develop new methods for gene therapy. Vogel is also a co-discoverer of trans-activating RNA, which made the application of the CRISPR-Cas9 system possible.

Vogel obtained his PhD in biochemistry from the Humboldt University of Berlin in 1999. After postdoctoral stays in Sweden and Israel, he started his own research group at the MPI for Infection Biology in Berlin in 2004. In 2009, he became full professor and head of the Institute of Molecular Infection Biology at the University of Würzburg. Since 2017, he is Founding Director of the Helmholtz Institute for RNA-based Infection Research in Würzburg. Vogel is a member of the European Academy of Microbiology, the American Academy of Microbiology, the German National Academy of Sciences, and EMBO. For his work he has been awarded the Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft.

# THE PRIZE

**Heinrich Otto Wieland** was born on July 4, 1877, in Pforzheim, Germany. Wieland studied chemistry at the Ludwig-Maximilians-Universität München (LMU) in Munich, Germany, where he received his doctorate in 1901 and was appointed “außerordentlicher Professor” in 1909. At this time, he was already interested in oxidation processes in the living cell, one of the foundation stones of the field of biochemistry. He worked at the Technische Universität München (TUM), also in Munich, and LMU until 1921 as well as at the Kaiser Wilhelm Institute in Berlin-Dahlem, Germany. Wieland then accepted a call to the University of Freiburg, Germany, but returned to LMU in 1925 to succeed Richard Willstätter as Chair of Chemistry. He retired in 1952 and died in Munich on August 5, 1957.

Heinrich Wieland received numerous awards, among them the 1927 Nobel Prize in Chemistry for his pioneering investigations of bile acids and related substances.

Heinrich Wieland was a cousin of Albert Boehringer, the founder of the company Boehringer Ingelheim. As early as 1903, Wieland worked with the company and, in 1917, his advice led to the company establishing its first scientific department dedicated to innovative research. His scientific findings made it possible, for example, to produce drugs for cardiovascular and respiratory diseases.



## The Board of Trustees of the Heinrich Wieland Prize

Its current members are the following professors:

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# 2018 HEINRICH WIELAND PRIZE

## BOEHRINGER INGELHEIM FOUNDATION

The Boehringer Ingelheim Foundation is an independent, non-profit organization committed to the promotion of the medical, biological, chemical, and pharmaceutical sciences. It was established in 1977 by Hubertus Liebrecht (1931–1991), a member of the shareholder family of the Boehringer Ingelheim company. With the Perspectives Programme Plus 3 and the Exploration Grants, the foundation supports independent junior group leaders. It also endows the internationally renowned Heinrich Wieland Prize as well as awards for up-and-coming scientists. In addition, the Foundation is donating a total of 154 million euros from 2009 to 2027 to the University of Mainz to finance scientific operations at the Institute of Molecular Biology (IMB). Since 2013, the Foundation has been providing a further 50 million euros for the development of the life sciences at the University of Mainz.



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