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May 23, 2022

Emanuel Merck Lectureship 2022 Awarded to John F. Hartwig

- **Outstanding scientific work in the field of metallo-organic chemistry honored**
- **Co-discoverer of the Buchwald-Hartwig amination**
- **17th joint award presented by TU Darmstadt and Merck KGaA, Darmstadt, Germany**

Darmstadt, Germany, May 23, 2022– Merck KGaA, Darmstadt, Germany, a leading science and technology company, today named John F. Hartwig, Henry Rapoport Professor of Chemistry at the University of California, Berkeley, USA, as the seventeenth recipient of the Emanuel Merck Lectureship.

"I am honored by the recognition being given to me today for the discoveries made by my research group," said Hartwig on receiving the news about this distinction. "Through our research, I wanted to show how transition-metal chemistry could change the way organic molecules are made and to influence the foundations of synthetic chemistry down to the level of undergraduate chemistry. My dream, which is beginning to be realized, has been to use fundamental principles to discover organic reactions catalyzed by these metals that are used to create life-saving medicines."

Hartwig is being recognized for his outstanding work in transition metal catalysis. His achievements in transition metal chemistry have brought the design of molecules and syntheses to a new level – not only in an academic context where almost every total synthesis involves a catalytic transformation, but also for the industrial production of numerous pharmaceuticals. He has published more than 450

News Release

articles in scientific journals, holds 21 patents and has contributed numerous chapters to textbooks. To make the foundations and applications of catalysis accessible to a broader audience, he wrote the textbook "Organotransition Metal Chemistry – From Bonding to Catalysis". Moreover, Hartwig is the founder of his own start-up Catylix Inc. Hartwig is co-discoverer of the Buchwald-Hartwig amination – a widely used palladium-catalyzed coupling reaction for the formation of C-N bonds from amines and aryl halides.

"Today we are recognizing the achievements of a superb scientist who has made breakthrough contributions to the further development of synthetic chemistry," said Ulrich Betz, Vice President Innovation at Merck KGaA, Darmstadt, Germany. "This award helps to promote scientific exchange with internationally renowned researchers and to recognize them for their important work for science and society. As such, the award is ideally suited to both us as a science and technology company as well as to the research profile of the renowned Technical University of Darmstadt."

The prize, worth € 30,000, will be presented to Hartwig today, on May 23, 2022, during a public lecture at the Hörsaal- und Medienzentrum at the Lichtwiese campus of TU Darmstadt. The prizewinner will hold a presentation there on "Catalyzing Organic Synthesis" at 5 p.m.

The Emanuel Merck Lectureship was jointly established by Merck KGaA, Darmstadt, Germany, and TU Darmstadt in 1992. It recognizes globally renowned scientists who have made superb contributions to chemical and pharmaceutical research. From 1993 to the present day, the award has been granted to 17 eminent scientists from all over the world.

Apart from the Emanuel Merck Lectureship, Merck KGaA, Darmstadt, Germany, honors science and supports the work of scientists with many other awards and grants. The Future Insight Prize, which was announced in July 2018, was also created by Merck KGaA, Darmstadt, Germany. It will be granted for the fourth time at the Curious2022 – Future Insight Conference in July 2022. This year's prize of € 1 million will be granted to researchers working to fight climate change.

News Release

Laureates of the Emanuel Merck Lectureship

Name	Year	University
Prof John F. Hartwig	2022	University of California, Berkeley, USA
Prof. Susumu Kitagawa	2019	Kyoto University, JP
Prof. Jennifer Doudna (Nobel laureate 2020)	2018	University of California, Berkeley, USA
Prof. Phil Baran	2017	Scripps Research Institute, La Jolla, USA
Prof. Paul T. Anastas	2015	Yale University, New Haven, USA
Prof. Frances H. Arnold (Nobel laureate 2018)	2013	California Institute of Technology, Pasadena, USA
Prof. Carolyn R. Bertozzi	2011	University of California, Berkeley, USA
Prof. Axel Ullrich	2009	Max-Planck-Institut für Biochemie, Martinsried, Germany
Prof. Sir Harold W. Kroto (Nobel laureate 1996)	2007	University of Sussex, Brighton, UK
Prof. George M. Whitesides	2005	Harvard University, Cambridge, USA
Prof. Samuel J. Danishefsky	2003	Columbia University, New York, USA
Prof. Stuart Schreiber	2000	Harvard University, Cambridge, USA
Prof. Jean-Pierre Changeux	1998	Institut Pasteur, Paris, France
Prof. Manfred Eigen (Nobel laureate 1967)	1996	MPI Göttingen, Germany
Prof. Jean-Marie Lehn (Nobel laureate 1987)	1995	University of Strasbourg, France
Prof. Kenneth Wade	1994	University of Durham, UK
Prof. Albert Eschenmoser	1993	ETH Zurich, Switzerland

About Emanuel Merck

Emanuel Merck (1794–1855) was a direct descendant of company's founder Friedrich Jacob Merck, who had received a privilege for a pharmacy—later known as Engel-Apotheke—in Darmstadt in 1668. Emanuel Merck studied pharmacy in Berlin and Vienna. Following his studies, he worked at his father's pharmacy, and in 1816 he took over its management. In addition to this, he was occupied with research on the chemical constitution of herbal natural materials where he isolated alkaloids and prepared them in a pure state.

In 1827 Emanuel Merck introduced what he called a "Novitäten-Kabinett" ("Cabinet of Novelties"). This contained a list of high-purity alkaloids (such as morphine) that he had isolated independently. It also included a booklet summarizing what was currently known about their chemistry, pharmacology, and information on synthesizing these substances.

Alkaloids tested the limits of an ordinary pharmacist's capabilities. Although the pharmacopoeias contained information on these substances and how to make them, the finished products were not sufficiently pure, so their therapeutic use still posed a risk. While the only alkaloid that other German manufacturers were mostly producing was quinine, Emanuel Merck was interested in a much broader portfolio. An official report on the General German Industry Exhibition in 1842 observed: "In the unanimous opinion of experts, alkaloids surpassed anything produced by similar factories in size and purity."

This unmatched level of purity, which Emanuel Merck attained in his work with alkaloids, then applied to all substances, became the company's hallmark as formulated in its famous "Guarantee Policy".

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About Merck KGaA, Darmstadt, Germany
Merck KGaA, Darmstadt, Germany, a leading science and technology company, operates across healthcare, life science and electronics. Around 60,000 employees work to make a positive difference to millions of people's lives every day by creating more joyful and sustainable ways to live. From advancing gene editing technologies and discovering unique ways to treat the most challenging diseases to enabling the intelligence of devices – the company is everywhere. In 2021, Merck KGaA, Darmstadt, Germany, generated sales of € 19.7 billion in 66 countries.
The company holds the global rights to the name and trademark "Merck" internationally. The only exceptions are the United States and Canada, where the business sectors of Merck KGaA, Darmstadt, Germany, operate as EMD Serono in healthcare, MilliporeSigma in life science, and EMD Electronics in electronics. Since its founding in 1668, scientific exploration and responsible entrepreneurship have been key to the company's technological and scientific advances. To this day, the founding family remains the majority owner of the publicly listed company.