Peter Hegemann receives Warren Alpert Foundation Prize 2019 for optogenetics

Start Time: Wednesday, July 17, 2019

End Time:

We are delighted to announce that Peter Hegemann, Hertie professor of Neuroscience at Humboldt-Universität zu Berlin and researcher in UniSysCat has received the Warren Alpert Foundation Prize together with Edward Boyden, Y. Eva Tan Professor in Neurotechnology at MIT, Karl Deisseroth, D.H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences at Stanford University, and Gero Miesenböck, Waynflete Professor of Physiology and director of the Centre for Neural Circuits and Behaviour at the University of Oxford

The Warren Alpert Foundation Prize is given in association with Harvard Medical School recognizing and honoring one or more scientists, physicians and researchers whose scientific achievements have led to the prevention, cure or treatment of human diseases or disorders. The research should furthermore constitute a seminal scientific finding that holds great promise of ultimately changing our understanding and ability to treat disease.

Optogenetics turns out to be a key technology in understanding some of the brain's more confounding mysteries, including decision-making and behavior, but also for elucidating and manipulating circuits that underlie serious neurologic and neuropsychiatric disorders as well as for testing and monitoring response to treatment. Selective targeting of neurons in the brain allows for the study how the activity of these cells contributes to simple and complex behaviors. Optogenetic manipulation of degenerating or aberrant neural circuits in the human brain carries the promise to restore vision loss, preserve movement following spinal cord injury, or dampen down circuits that fuel anxiety, depression and other psychiatric conditions.

The work of all four 2019 awardees has transformed neuroscience by allowing researchers an unprecedented degree of control over the inner workings of the brain. Their discoveries established the field of optogenetics, propelled it forward and laid the foundation for optogenetic-based therapies for disorders ranging from Parkinson's to addiction.

The Warren Alpert Foundation Prize honorees will be recognized at a daylong symposium on Oct. 3 at Harvard Medical School.

For further information see the press release of the Warren Alpert Foundation

Peter Hegemann is Professor and Head of the Department for Biophysics at the Humboldt University of Berlin, Germany. He is credited with the discovery and characterization of channelrhodopsins, a family of directly light-gated ion channels. Hegemann's research focused almost entirely on the characterization of natural sensory photoreceptors, mainly from microalgae. Hegemann has characterized behavioral and photoelectric responses of the unicellular alga Chlamydomonas, a work that cumulated in the claim that the photoreceptors for these responses a rhodopsins that unify the sensor and ion channel in one protein. He has finally proven this concept with Georg Nagel by identifying the light gated channel channelrhodopsin, and its functionality in animal cells. His group characterized this proteins in molecular detail by a wide range of biophysical techniques, and the many mutants he generated in close collaboration with Karl Deisseroth lead to the deciphering of the ion channel mechanism, including gating and ion selection. This work was the basis for the discovery of Optogenetics, a technology where light activated proteins – first of all channelrhodopsin - allow to control selected cells of large networks as the animal brain with unprecedented precision in space and time just by application of light. Currently the Hegemann group also works on light-activated enzymes as the light-activated nucleotide-cyclases which further expand the optogenetic applications to important biochemical pathways. Dr. Hegemann is the recipient of the Wiley Prize in Biomedical Sciences (2010), the Karl Heinz Beckurts Prize (2010), the Zülch Prize (2012), the Gottfried Wilhelm Leibniz Prize, awarded by the German Research Foundation (2013), the Grete Lundbeck Brain Prize (2013), the Harvey Prize (2016), the

Massry Prize (2016), the Gairdner Foundation International Award (2018) and the Rumford Prize (2019) for his extraordinary contributions related to the invention and refinement of optogenetics. He is a member of the German Academy of Sciences Leopoldina and holds a Honorary Doctorate Degree from the University of Regensburg.