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Press Release

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ERC Advanced Grants for Stefan Jakobs and Theofanis Kitsopoulos

In this year's competition for funding by the European Research Council (ERC), Göttingen scientists were once again successful: Stefan Jakobs, research group leader at the Max Planck Institute (MPI) for Biophysical Chemistry and professor at the University Medical Center Göttingen (UMG), and his colleague Theofanis Kitsopoulos, researcher at the MPI and the University of Göttingen, will each receive an ERC Advanced Grant endowed with 2.5 million euros.

The European Union awards the funding to top researchers who have already achieved scientific breakthroughs and would like to tackle a new, promising project in their field. Stefan Jakobs and Theofanis Kitsopoulos successfully prevailed against more than 2,000 competitors.

Prof. Dr. Stefan Jakobs (*Photo: Irene Böttcher-Gajewski / Max Planck Institute for Biophysical Chemistry*)

Stefan Jakobs will use the funding to investigate the structure and function of cellular power plants – the mitochondria – in even greater detail. Mitochondria have an extremely complex structure: a smooth outer membrane and a strongly folded inner membrane. The latter is decisive for the function of the mitochondria as the cell's energy supplier. Changes in the mitochondria's inner structure can therefore have fatal consequences. Nerve and heart muscle cells, for example, do require a lot of energy, and are particularly sensitive to changes in their energy level. Diseases of the brain such as Alzheimer's or Parkinson's but also diseases of the heart are associated with altered mitochondria.

"The ERC Advanced Grant is a great acknowledgement of our work up to now," Jakobs says. "It gives us the opportunity to delve even deeper into the biology of mitochondria than we have been able to in the past." In the next few years, Jakobs and his research group will apply a highly

interdisciplinary approach to elucidate how the invaginations within the inner mitochondrial membrane develop and how this structure is maintained. Besides molecular biological methods and mass spectrometry, Jakobs' team will most of all use imaging methods such as the high-resolution STED and MINFLUX fluorescence microscopy developed by Nobel Laureate Stefan Hell at the MPI.

Prof. Dr. Theofanis Kitsopoulos (*Photo: Irene Böttcher-Gajewski / Max Planck Institute for Biophysical Chemistry*)

Kitsopoulos was successful with his proposal for basic research in the field of reaction kinetics. To speed up chemical reactions, catalysts are widely used. "Catalytic processes contribute, directly or indirectly, between 20 and 30 percent to the worldwide gross domestic product," Kitsopoulos explains. A better understanding of such processes is important to develop new and sustainable technologies and to optimize existing ones.

The aim of his research project *Kinetics and Dynamics at Surfaces* is to characterize the most important factors that determine how elementary reactions take place on surfaces. These include, for example, the chemical structure of the catalyst and the geometry of the active sites, the regions where reactions take place at the atomic level. In 2018, Kitsopoulos demonstrated with carbon monoxide reactions on a platinum surface that for about 40 years traditional experiments had led to misinterpretations. In the now funded project, the researcher wants to develop a method to measure the rates of elementary chemical reactions on solid surfaces in the microsecond regime. For the products formed, their chemical constituency, speed, and angular distributions are determined using novel imaging methods that provide the decisive information concerning the dynamics and kinetics of catalytic surface reactions. (jp/cr)

About the awardees

Stefan Jakobs studied biology at the Institute for Science and Technology in Manchester (Great Britain) and Kaiserslautern and carried out research for his PhD at the MPI for Plant Breeding Research in Cologne. Subsequently, he moved to the MPI for Biophysical Chemistry. In Stefan Hell's Department of *NanoBiophotonics*, he was significantly involved in the development and establishment of high-resolution STED light microscopy for application in biology. Since 2005, he has been leading the Research Group *Structure and Dynamics of Mitochondria* in the Department of NanoBiophotonics at the same institute. Since 2010, he has been professor for High-Resolution Microscopy of the Cell at the University Medical Center Göttingen.

Theofanis Kitsopoulos received his doctorate in chemistry from the University of California at Berkeley (USA). From 1991 to 1993, he carried out research at the Combustion Research Facility of Sandia National Laboratories in Livermore (USA). Kitsopoulos was then appointed professor at the Department of Chemistry of the University of Crete (Greece). There, he was Vice Rector from 2007 to 2010. Since 2012, Kitsopoulos has been a project group leader in the Department of Surface Dynamics at the MPI for Biophysical Chemistry and a group leader at the Institute of Physical Chemistry at the University of Göttingen. For his scientific work he was awarded the Humboldt Foundation Award (2012) and the Friedrich von Bessel Award (2004-2005).

About the ERC Advanced Grants

The ERC Advanced Grants are awarded by the ERC since 2008. Applications are open to scientists who lead independent groups and can prove at least ten years of excellent research. The funding rate is only about ten percent. In the current twelfth round, 2052 applications were submitted. The ERC approved a total of 222 proposals with a total budget of 540 million euros. The individual projects will receive funding of up to 2.5 million euros over a maximum period of five years.

Further information

https://www.mpibpc.mpg.de/jakobs – Website of the research group *Structure and Dynamics of Mitochondria,* Max Planck Institute for Biophysical Chemistry

https://www.mpibpc.mpg.de/630708/kitsopoulos – Website of the project group *Probing surface chemistry with ion imaging,* Max Planck Institute for Biophysical Chemistry

https://erc.europa.eu/funding/advanced-grants – Website of the European Research Council about the ERC Advanced Grants

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