

nanoSeminar Series 2021

Institute for Materials Science

Dr. Charalampos Pappas

Freiburg Center for Interactive Materials and Bioinspired Technologies (FIT),
University of Freiburg

“Systems Chemistry: Steps towards Life-like Systems”

Thursday, April 29th 2021
9:00 – 10:00

Normal: Seminar Room 115, Hallwachsstr. 3 (HAL)

Pandemic version: <https://tinyurl.com/nanoSeminar-GA>

Living systems possess overwhelming molecular complexity that largely results from combinations of just twenty amino acids that are found across all life forms. It is increasingly clear that structure and functionality may be observed in much simpler combinations of amino acids in short peptides. Thus, beyond their role as the molecular building blocks of life, amino acids may be ideally suited as building blocks for adaptive nanotechnology. Inspired by living systems, where molecular assemblies perform tasks that exceed the functionality of their basic constituents, systems chemistry focusses on connectedness, interactivity and patterns. The use of mixtures of interacting molecules that continuously exchange chemical information, leads to emergent properties, properties that only originate when parts assemble together. This network concept contrasts with the more traditional reductionist approach and has empowered soft matter systems with the abilities to replicate to compartmentalize and to adapt in response to chemical and physical signals from the environment. Herein, we demonstrate the use of a systems chemistry pathway towards the discovery of adaptive and active materials based on the building blocks of life.

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Charalampos (Babis) Pappas received his M.Sc. degree in 2012 from the University of Ioannina, where he worked on the cis/trans isomerisation of proline on model peptides. In 2016, he received his Ph.D. degree entitled "Supramolecular Systems Chemistry using Peptides" from the University of Strathclyde in Glasgow working in the group of Prof. Rein Ulijn. After a short 6-month postdoctoral stay at the Advanced Science Research Centre (ASRC), at the City University of New York, in 2017 he received a Marie Curie Fellowship and moved to the University of Groningen, in the Netherlands, where he worked with Prof. Sijbren Otto on dynamic folded macromolecules. Babis joined as a group leader the Cluster of Excellence Living, Adaptive and Energy-autonomous Materials Systems (livMatS) in October 2020.