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For a lecture hosted by Prof. Olli Ikkala,
Aalto University

MERCK

With Prof. Rafal Klajn
Weizmann Institute of Science, Israel

14th May 2019
14:00 - 15:00
Hall U4, M Entrance, Aalto University

From new dynamically self-assembling materials to chemical reactivities in confined environments

Abstract

Living organisms are prominent examples of systems self-assembled and performing useful functions under far-from-equilibrium conditions. Inspired by Nature, we design new materials whose properties and functions can be “turned on” and “off” on demand, using external stimuli as “inputs”. Among the different external stimuli, we focus on light² since it can be delivered instantaneously, into precise locations, and in the form of different wavelengths.

In this talk, I will discuss molecular switches and inorganic nanoparticles as the key building blocks of new dynamically self-assembling nanomaterials. These materials hold promise for new applications as diverse as light-controlled catalysis.³

I will also describe how these studies led us to become interested in a more fundamental issue of chemical reactivity in confined environments. Among the different types of synthetic confined spaces we studied, I will focus on nanopores of porous aromatic frameworks,⁴ surfaces of inorganic nanoparticles,⁵ nanopores within non-close-packed nanoparticle arrays,⁶ and cavities of coordination cages.^{7,8}

¹ Singh, G. et al., *Science* 2014, 345, 1149–1153.

² Kundu, P. K. et al., *Nat. Chem.* 2015, 7, 646–652.

³ Zhao, H. et al., *Nat. Nanotech.* 2016, 11, 82–88.

⁴ Kundu, P. K. et al., *Nat. Commun.* 2014, 5, 3588.

⁵ Zdobinsky, T. et al., *J. Am. Chem. Soc.* 2014, 136, 2711–2714.

⁶ Udayabaskararao, T. et al., *Science* 2017, 358, 514–518.

⁷ Samanta, D. et al., *Nat. Commun.* 2018, 9, 641.

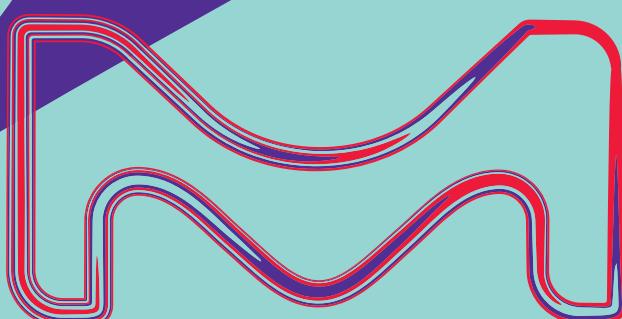
⁸ Samanta, D. et al., *Proc. Natl. Acad. Sci. USA* 2018, 115, in press



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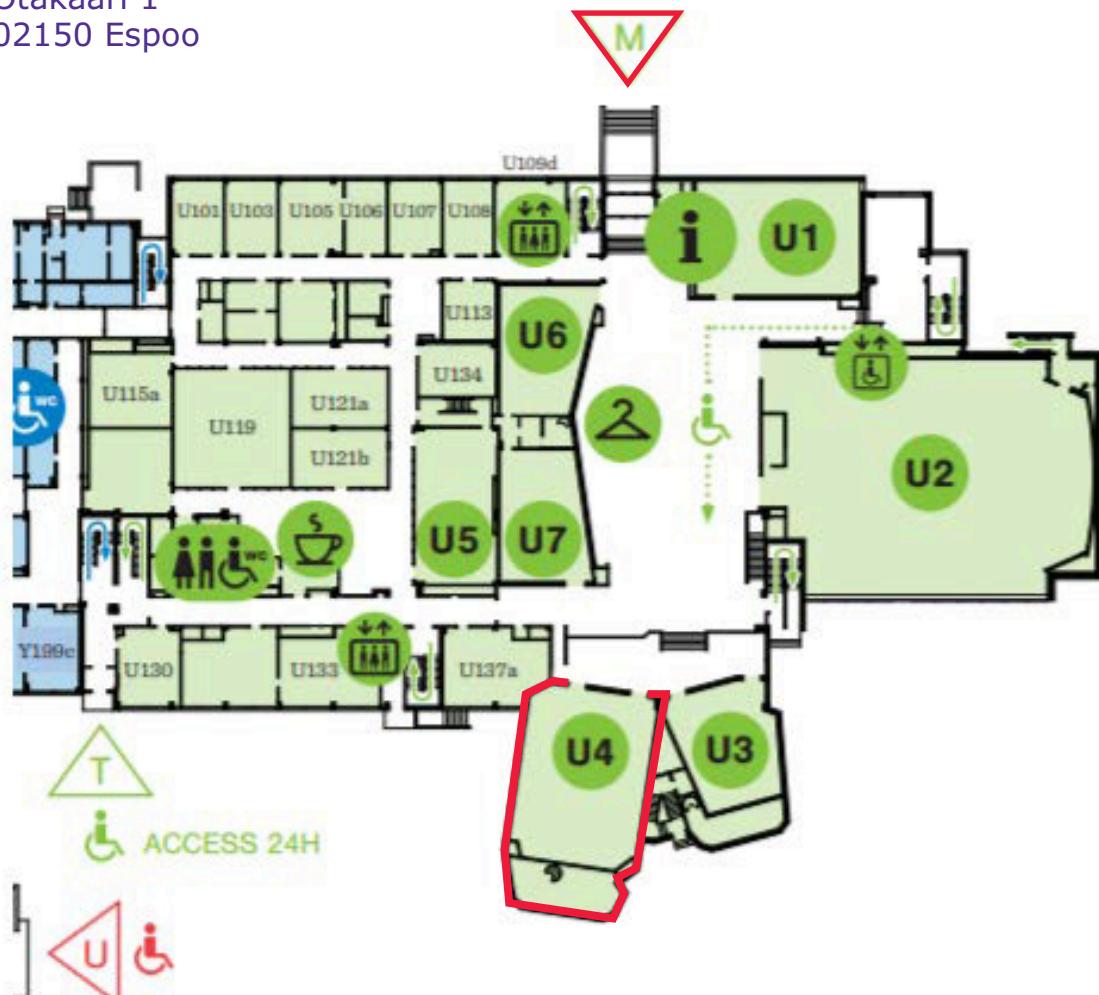


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Lecture Location:

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