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*VABILO NA PREDAVANJE  
V OKVIRU DOKTORSKEGA ŠTUDIJA  
KEMIJSKE ZNANOSTI*

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z naslovom:

**Top-down and bottom-up assembly of enzyme  
cascades – a multiscale approach to  
compartmentalized biocatalysis**

**v sredo, 29. januarja 2020 ob 15:00 uri**  
v predavalnici 1 v 1. nadstropju Fakultete  
za kemijo in kemijsko tehnologijo, Večna pot 113

*Vljudno vabljeni!*

## Abstract:

Biological principles for the compartmentalization and cascading of multiple enzymatic transformations provide a rich source of innovation for the next generation of modular production processes in industrial biocatalysis.<sup>1</sup> Our work concerns the establishment of machine-assisted, microfluidic enzyme cascades whose development is significantly determined by the availability of methods for the mild and efficient immobilization of isolated enzymes. To tackle this challenge, we focus on self-immobilizing enzymes bearing genetically encoded fusion tags, such as Halo-tag, Snap-tag, or Spy-tag. Using ketoreductases and other enzymes, we demonstrated that such fusion proteins are perfectly well suited for the production of microfluidic reactors by implementation of particle-based packed-bed<sup>2</sup> or all-enzyme hydrogel<sup>3-6</sup> formats. While these reactor formats use molecular self-assembly to build microscale architectures, more complex methods are required to accurately control stoichiometry and spacing of multiple enzymes on the nanometer length scale. This task can be solved by concepts of DNA nanotechnology,<sup>7,8</sup> which allow to assemble arbitrary enzyme constructs that can be incorporated into microfluidic systems.

## References:

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