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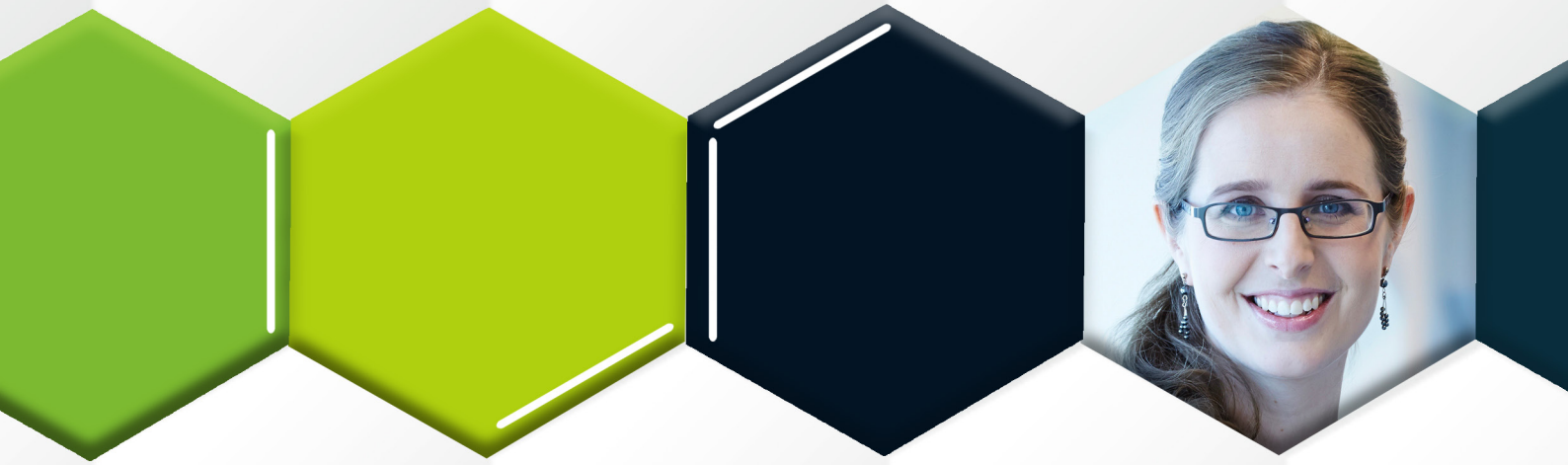
EuroTech Seminar

Enzyme-Mediated Dynamic Combinatorial Chemistry with Cyclodextrins



20 April 2022

15:00-16:00 CET
Zoom link:
https://us02web.zoom.us/j/9797668534

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Dynamic Combinatorial Chemistry (DCC) is a selection-based methodology for the synthesis of oligomers that relies upon self-assembly under thermodynamic control to direct the synthesis of complex architectures. Small molecule building blocks are reacted together via reversible reactions to give a dynamic equilibrium mixture of oligomers called a Dynamic Combinatorial Library (DCL). By addition of a template molecule that binds selectively to one of the oligomers in the DCL, one can manipulate the system and stabilise specific products. Typically, reversible covalent reactions such as disulfide exchange, imine exchange or hydrazone exchange have been used to link together small synthetic building blocks. In this talk, I will present Enzyme-mediated Dynamic Combinatorial Chemistry, wherein an enzyme is employed to take seemingly stable (bio)molecules and turn them into a DCL of interconverting (bio)-oligomers.
Cyclodextrins (CDs) are macrocycles formed from α-1,4-linked glucopyranose units. CDs with 6, 7, and 8 glucose units (α- β- and γ-CD) are important hosts for the encapsulation of hydrophobic molecules and are widely utilized in the food, pharmaceutical and cosmetics industries. Here, I will discuss how DCLs of interconverting cyclodextrins can be generated by the action of cyclodextrin glucanotransferase (CGTase). The use of templates to direct the selective enzymatic synthesis of specific natural and unnatural CDs will be presented, including photo-responsive templates, pH-sensitive templates, and templates for the synthesis of large-ring cyclodextrins.