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Access to new and diverse chemical structures for the exploration of biological systems is a primary driver of pharmaceutical drug discovery. The Chemical Technologies group focuses on developing innovative chemical solutions to enable access to synthetically challenging scaffolds, thereby addressing material supply needs right across the research pipeline (early to late phase programs).

Our current scientific interests are focused on technologies that can help us to rapidly transfer and develop emerging diversity-building reactions into practical and scalable synthetic solutions. As the landscape of new diversity-building reactions (e.g., synergistic catalysis) becomes increasingly complex, it opens up a rich opportunity to exploit new disconnections, yet simultaneously raises the challenge of how to explore and optimize these processes effectively. Existing plate-based screening technologies (e.g., using photocatalysis) has a number of limitations that do not readily lend themselves to these new processing windows, in addition to having significant scale-up challenges. In collaboration with Prof. Klavs Jensen (http://web.mit.edu/jensenlab/ [2]), we are seeking to establish an automated microfluidic screening platform, which combined with in-line analysis and feedback loop will deliver an entirely new way to screen chemical transformations. The Jensen group has recently shown

the ability of this type of automated platform to “self-optimize” a catalyzed process, and in particular we see that this technology as having huge potential to bridge batch reactions into a flow regime. In addition, the system has huge potential to impact the way we explore and develop new chemical reactions, enhancing data quality generation (e.g., obtaining kinetic data), as well as potential new applications as a synthesis platform.

Selected Publications

Batch versus flow photochemistry: a revealing comparison of yield and productivity. [3]
Elliott LD, Knowles JP, Koovits PJ, Maskill KG, Ralph MJ, Lejeune G, Edwards LJ, Robinson RI, Clemens IR, Cox B, Pascoe DD, Koch G, Eberle M, Berry MB, Booker-Milburn Kl.
Chemistry 2014 Nov, 20 (46), 15226–15232.

Ritter reactions in flow. [4]
Audiger L, Watts K, Elmore SC, Robinson RI, Wirth T.
ChemSusChem. 2012 Feb, 5 (2) 257-260.

Selected Publication for Klavs Jensen

Simultaneous solvent screening and reaction optimization in microliter slugs. [5]
Reizman BJ and Jensen KF
Chem. Commun.(Camb) 2015 Sep, 51(68), 13290-13293.

Click here [6] for additional publications.

Links

[1] https://www.novartis.com/our-science/postdoc-program/research-themes/chemistry/richard-robinson-phd
[2] http://web.mit.edu/jensenlab/
[3] http://www.ncbi.nlm.nih.gov/pubmed/25263341
[4] http://www.ncbi.nlm.nih.gov/pubmed/22135007
[5] http://www.ncbi.nlm.nih.gov/pubmed/26201048%20
[6] http://www.ncbi.nlm.nih.gov/pubmed/?term=robinson+ri