

# CHEMISTRY SEMINAR SERIES

Department of Chemistry | College of Arts and Sciences

## ZOOM LINK:

[https://tamuk-](https://tamuk-edu.zoom.us/j/6769157893?pwd=Y29YSTBxeEJVOU1JVkh2MHIXZG5yUT09)

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Meeting ID: 676 915 7893

Passcode: 552210



September 12 | 3:00 – 4:00 pm | NEIR 251

## Catalytic Tools for Iterative Synthesis: Advancing Sustainability and Control



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### Christopher Sandford, PhD

Automated methods for the synthesis of complex organic molecules enable the rapid creation of chemical libraries, which can be used to study how structure affects biological activity and to identify potential drug candidates. Iterative reaction methodologies used in automation require high conversions, reliability, and control, but these processes often suffer in sustainability metrics as a result. This seminar will demonstrate how homogeneous catalysts can be leveraged to provide alternative frameworks for automated synthesis. We will discuss how organocatalysts can be used to afford key amide bonds at room temperature without the stoichiometric waste associated with peptide coupling reagents in amide synthesis. Ligand design in organometallic systems used to bias radical and polar mechanisms will also be discussed as a platform for iterative carbon-carbon bond formation and hydrogen-atom abstraction. Throughout the seminar, tools in experimental, analytical, and computational organic chemistry will be utilized to aid our understanding of reaction mechanisms and to predict new catalyst designs.

### Biography:

Chris Sandford is originally from Bristol, UK, and completed his undergraduate studies at the University of Oxford in 2013. In 2017, he earned his Ph.D. degree in synthetic organic chemistry from the University of Bristol under the direction of Prof. Varinder Aggarwal. From 2017–2021, he was a Marie Curie postdoctoral fellow at the University of Utah and the Institut Català d'Investigació Química in Spain, working with Prof. Matt Sigman and Prof. Ruben Martin, respectively. In 2021, he began his independent career at Dartmouth College before moving to UT San Antonio in 2025. His group's work has been recognized by awards, including the NIH Maximizing Investigator's Research Award, and he has been named a Scialog Fellow in Automating Chemical Laboratories.