Young Career Focus: Dr. Stephen Thomas (University of Edinburgh, UK)

Background and Purpose. SYNFORM regularly meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This Young Career Focus presents Dr. Stephen Thomas (University of Edinburgh, UK).

Biographical Sketch

Dr. Stephen Thomas

Stephen Thomas was born in Toronto, Canada, and moved to Somerset (UK) at a young age where he completed his secondary school education at Court Fields Community School and Richard Huish College. After gaining his undergraduate degree from Cardiff University (UK), Stephen completed his PhD with Dr Stuart Warren at the University of Cambridge (UK). Following post-doctoral research with Prof. Andreas Pfaltz at the University of Basel (Switzerland), Stephen was appointed to a fixed-term lectureship at the University of Bristol (UK) associated with Prof. Varinder Aggarwal FRS, allowing him to begin his independent research career. In 2012 Stephen moved to the University of Edinburgh (UK) to take up a Chancellor's Fellowship and in 2014 was awarded a Royal Society University Research Fellowship. Stephen was awarded the 2016 RSC Hickinbottom Award, a 2017 Thieme Chemistry Award and a 2018 Pfizer Green Chemistry Research Award.

INTERVIEW

SYNFORM *What is the focus of your current research activity?*

Dr. S. Thomas We are interested in developing and understanding sustainable catalytic methods. Our focus has been on the application and use of the most abundant elements in the earth's crust as catalysts the reductive functionalisation of unsaturated groups. A key driver for us is understanding the methods we develop and how the unique reactivities of first-row transition metals and main group elements can be applied in new ways.

SYNFORM *When did you get interested in synthesis?*

Dr. S. Thomas As an undergraduate I was lucky enough to join Prof. Nick Tomkinson's lab for a summer research project at the end of my second year. Nick's enthusiasm was infectious and it led me to regularly visit the library to read the latest journal issues. It was here that I first discovered the potential for elegance in synthesis, and the limitation of synthetic methods. I can vividly recall reading Steve Ley's 'latent pseudo symmetry' approach to spongistatin and Phil Power's main group multiple bonding papers. Although my focus has shifted towards methodology and catalysis, I am still in awe of target molecule disconnections beyond the familiar.

SYNFORM *What do you think about the modern role and prospects of organic synthesis?*

Dr. S. Thomas Organic synthesis is as crucial now as it has ever been. It underpins developments in everything from medicine to materials. Synthesis can often be lost when the ultimate goal of a project is presented, seen merely as a tool. However, this hides the fundamental role synthesis has played in realising the project. In our work, ligand synthesis and the

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selective variation of ligand structure is essential and often a challenge. Innovative materials require new building blocks, molecular machines require construction, biological probes require highly accurate spatial placement. Synthesis is essential for all of these.

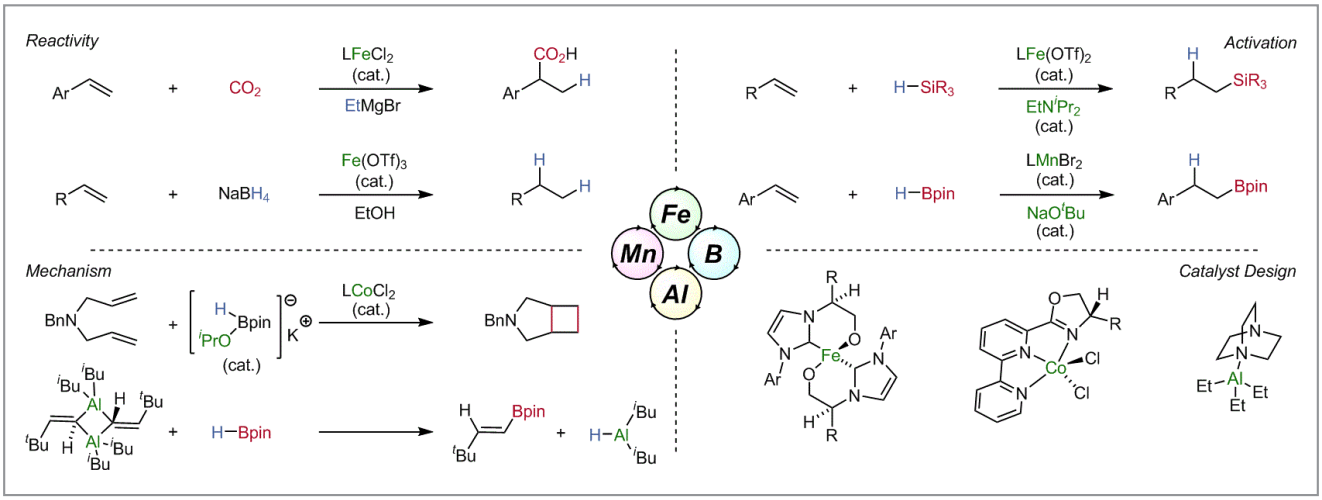
SYNFORM *Your research group is active across the areas of methods development, catalysis and organometallic chemistry. Could you tell us more about your research and its aims?*

Dr. S. Thomas We are fundamentally interested in understanding catalyst reactivity and applying this understanding in the development of sustainable catalytic methods (Scheme 1). Therefore, we have focused on the use of first-row transition metals[1,2] and main group elements[3] as catalysts. Alongside this we are very aware that there is a barrier to using any new method, so we actively work to develop operationally simple methods which do not use reagents or techniques that necessitate specialist handling or training. This can be seen in our work on first-row transition-metal catalysis which has focused on the activation of bench-stable pre-catalysts.[4,5] We hope that by reducing the practical barriers to trialing these reactions we will expedite the uptake and development of these methods. To understand the activation processes currently used, and those we have developed, organometallic chemistry and mechanistic analysis are key.[6–9] This is also true of our work on main group catalysis where understanding the mechanism of catalysis has opened exciting new areas of research.[10,11] We have been very fortunate to work with a number of exceptional academic and industrial collaborators. This has proved invaluable in terms of viewing a problem from different perspectives and in applying our methods to 'real-world' synthetic targets.

While we have focused on reductive catalysis to functionalise unsaturated groups, our developments have been informed by the observations of excellent coworkers of the unexpected reaction outcomes. This has taken us in directions I never would have predicted, but ones in which our key aims of developing simple, robust and sustainable catalytic methods have allowed us to contribute.

SYNFORM *What is your most important scientific achievement to date and why?*

Dr. S. Thomas That's a tough question and one to which the answer changes regularly. The people who have progressed through the group are our most important and impactful achievement. My passion for individual projects is generally dictated by the interactions with the co-worker on that project. Thankfully I have a group full of enthusiastic and excellent scientists, so one project, or achievement, is impossible to pick. If forced to answer, I would say simplicity and the ability to apply that simplicity to challenging problems.



Scheme 1

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