Young Career Focus: Prof. Rowan D. Young (National University of Singapore, Singapore)

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 Prof. Rowan D. Young (National University of Singapore, Singapore).

Biographical Sketch

Prof. R. D. Young

Rowan D. Young obtained his BSc (Hons) from the University of New South Wales (Australia). He then went on to pursue his PhD at the Australian National University under the supervision of Professor Anthony Hill. After stints at Oxford (UK) and Edinburgh (UK) as a postdoctoral researcher with the research groups of Andrew Weller and Polly Arnold, respectively, he took up a position at the National University of Singapore in 2014.

INTERVIEW

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

Prof. R. D. Young My group is concerned with inventing new ways in which to functionalise carbon–fluorine (C–F) bonds. This is primarily achieved using Lewis acid catalysis. Some of the challenges we aim to overcome in this field include enabling C–F activation methods that tolerate a wider range of co-functional groups present in our reaction substrates, improving regio- and chemo-selectivity, and preventing 'over-reaction' of C–F bonds allowing monoselective C–F bond functionalization.

SYNFORM *When did you get interested in synthesis?*

Prof. R. D. Young I was trained as an organometallic chemist, concerned with generating new transition-metal catalysts and studying their reaction mechanisms. However, in order to test the activity of any new organometallic catalysts that we generate, it has been necessary to apply such catalysts in organic synthesis. Thus, we have also recently become active as an organic synthesis group.

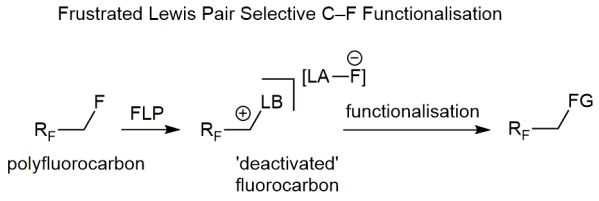
SYNFORM *What do you think about the modern role and prospects of organic synthesis?*

Prof. R. D. Young Part of our research concerns the use of waste fluorocarbon materials as starting materials to access various fluorinated targets. There exists huge potential for organic synthesis to employ waste materials as zero-cost or negative-cost starting materials. This offers opportunities for more economical synthetic approaches, and also allows organic syntheses to be 'greener' and offer re-purposing pathways for various waste chemicals. I think that this area of chemical research deserves much more exploration.

SYNFORM *Could you tell us more about your group's areas of research and your aims?*

Prof. R. D. Young Waste fluorocarbon gases (e.g. hydrofluorocarbons) used in refrigeration and blower applications offer a unique environmental threat as they possess high global warming potentials. Part of our research aims to employ these waste gases as starting materials for the synthesis of partially fluorinated chemicals. To achieve this we need to be able to avoid 'over-reaction' of C–F bonds, and develop methods for monoselective functionalisation. We also aim to increase the variety of functional groups (and possible targets) that can be incorporated into C–F positions.

 Synform **2019/10**, A150–A151 • Published online: September 17, 2019 • DOI: 10.1055/s-0037-1612195



Scheme 1 Aliphatic polyfluorides are prone to 'over-reaction', where more than one C–F bond is transformed. Using an FLP approach, we generate cationic intermediates that resist further Lewis acid fluoride abstraction, allowing monoselective C–F functionalisation for a range of polyfluorides.

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

Prof. R. D. Young Last year we reported a proof-of-principle for monoselective C–F functionalisation using a Frustrated Lewis Pair (FLP) approach (*J. Am. Chem. Soc.* **2018**, *140*, 10682–10686). We hope to further explore this methodology, as in principle, it allows the monoselective activation of any aliphatic polyfluorocarbon, even if the fluoro-positions are distal.