



Arlene Bonner

Research Title: *The Integration of Continuous Flow Technology with Strained Cyclic Systems*

Supervisor: [Professor Marcus Baumann](#)

Arlene's research interests focus on continuous flow processing applied to organic synthesis. Her research demonstrates innovative flow methods to exploit strained rings systems under thermal and photochemical conditions. The use of continuous flow thermal and photochemical methods provides superior reaction control, enabling both the synthesis and exploitation of these reactive, strained entities via both ring expansion and ring contraction mechanisms, resulting in highly efficient processes. Arlene's PhD is funded through a prestigious IRC Postgraduate Scholarship award and addresses directly some of the key needs of the Irish chemical industries in view of generating drug-like entities under safer and more sustainable conditions.

Publications:

A. Bonner, M. Baumann, Development of a Continuous Flow Baldwin Rearrangement Process and Its Comparison to Traditional Batch Mode Org. Process Res. Dev., 2024, 28, 1567. <https://doi.org/10.1021/acs.oprd.3c00213>

A. Bonner, P. Naik, R. Crawford, M. Baumann, Recent Advances Exploiting Reactive Intermediates Generated via Continuous Flow Chemistry, Curr. Opin. Green Sustain. Chem., 2024, 24, 100907.

A. Bonner, A. Loftus, A. C. Padgham, M. Baumann, Forgotten and forbidden chemical reactions revitalised through continuous flow technology, Org. Biomol. Chem., 2021, 19, 7737.



Emer Farrell

Research Title: *Quartz Nanopipettes in Aprotic Solvent; from Fundamentals to Applications*

Supervisor: [Dr. Robert Johnson](#)

My research interests are in physical and analytical chemistry, with a particular emphasis on improving the sustainability of current analytical procedures in industry. As such, my graduate research has been primarily focused on developing novel nanopore electrochemical devices for quality control in the pharmaceutical industry, both in trace contaminant detection and chemical characterization. From this work, I have two first author publications, and a patent which was filed in February 2024. Throughout my PhD I discovered a love for writing and publishing, and I am now working as a Senior Associate of Publications in Eli Lilly having submitted my thesis in April 2024.

Publications:

Farrell, E. B.; Duleba, D.; Johnson, R. P. Aprotic Solvent Accumulation Amplifies Ion Current Rectification in Conical Nanopores. *J. Phys. Chem. B.* **2022**, 126 (30), 5689-5694. DOI: 10.1021/acs.jpcc.2c03172.

Farrell, E.B.; McNeill, F.; Weiss, A.; Duleba, D.; Guiry, P.J.; Johnson, R.P.; The Detection of Trace Metal Contaminants in Organic Products Using Ion-Current Rectifying Quartz Nanopipettes. *Anal. Chem.* **2022**, 96 (15), 6055-6064. DOI: 10.1021/acs.analchem.4c00634.

Patents:

Farrell, E.B.; Johnson, R.P.; GB2401902.8, filed Feb 2024.



Adam O'Connell

Research Title: *Bioanalytical Routes to Complex N-heterocycles*

Supervisor: [Dr. Robert Johnson](#)

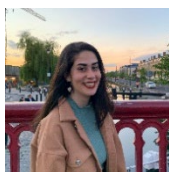
In recent years, biocatalysis has provided synthetic organic chemists with a new catalytic “toolbox” capable of performing novel chemistry in an efficient and sustainable manner. Enzymes, with their unparalleled regio-, chemo-, and stereoselectivity, offer unprecedented opportunities for innovation and the opportunity to explore novel methodologies, one example being the ability to trigger subsequent reactions following an enzymatic transformation. My research focuses on developing novel ω -transaminase-triggered reaction methodologies for the synthesis of natural products and their analogues. This involves the design and synthesis of tailor-made substrates capable of undergoing sequential reactions post-enzymatic transformation, thus streamlining complex synthesis processes into a single step. Through this interdisciplinary approach, I strive to contribute to the advancement of both the chemical synthesis and biocatalysis fields, unlocking new catalysis for the production of high-value compounds.

Publications:

[A. O'Connell](#), A. Barry, A. J. Burke, A. E. Hutton, E. L. Bell, A. P. Green and E. O'Reilly, *Chem. Soc. Rev.*, 2024, 53, 2828-2850.

F. Taday, R. Cairns, [A. O'Connell](#) and E. O'Reilly, *Chem. Commun.*, 2022, 58, 1697-1700

E.L. Bell, A. E. Hutton, A. J. Burke, [A. O'Connell](#), A. Barry, E. O'Reilly and A. P. Green, *Chem. Soc. Rev.*, 2024, 53, 2851-2862.



M. Rosa Fernandez Pison

Research Title: *Comprehensive Evaluation of Ruthenium β -Beta-Diketiminato Complexes for Catalytic Activation and Heterocyclic Incorporation of Carbon Dioxide*

Supervisor: [Dr Andrew Phillips](#)

My thesis work represents a hot topic in organometallic research: the utilization of CO₂ as a simple, readily available C1 building block to create valuable precursors. My research focuses on developing and optimising a highly efficient system based on coinage metal complexes (Ag, Cu, and Au) for synthesising cyclic α -alkylidene carbonates/carbamates by incorporating CO₂ into substituted alkynes with alcohol or amine groups. We proposed a new, faster, and greener way to synthesise cyclic carbonates and carbamates. These products are employed as precursors or intermediates for drugs and polymers with biological, pharmaceutical, and agrochemical applications. I had also the opportunity to pursue a 3-month industry placement as a Process and Development Research Assistant at Clarochem Ireland, an API manufacturing plant of the CFM group. Outside my research, I have been very actively involved in the EDI Committee of the School of Chemistry at UCD and other EDI-related outreach activities.

Publications:

In preparation.