Professor Nicholas J. Long, FRSC, FEurAS
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The Sir Edward Frankland Endowed Professor of Inorganic Chemistry (2011-present), ***Imperial College London.***
Research interests in synthetic organometallic and inorganic chemistry of d- and f-block elements, with applications in functional materials, biomedical imaging and catalysis.

- **Deputy Head of Department, Professor, Reader, Lecturer in Inorganic Chemistry** (1995-2011), *Imperial College London;* **The Adrian Research Fellow** and **Fixed-Term Lecturer** (1992-1994), *University of Cambridge;* **Demonstrator** (1990-1991), *University of Exeter;* **Ph.D. Organometallic Chemistry** (1986-1990), *University of Exeter;* **B.Sc. Chemistry** (1st class) (1983-1986), *University of Durham.*

Research Profile

World-leading research programme, focussed on fundamental and applied organometallic chemistry.

- **Publications: 321 research articles** *(Science, Nature group x6, PNAS, JACS x11, Angew Chem x12).*
- **H-index: 57**; **i10-index 168;** 15156 citations (*googlescholar 11.06.24*). 3 book chapters. **5 patents**.
- **Textbooks**: '*Metallocenes*', Blackwell Science, 1998; '*Chemistry of Molecular Imaging'*, Wiley, 2015.
- **Funding:** Career programme, project and centre grant funding – **over £40M**. Currently: (i) British Heart Foundation, PG/24/11640, 2024-2026, **£291k**; (ii) 'Next generation molecular imaging with radionuclides' – Programme grant, EPSRC, EP/S032789/1, 2019-2025, **£6.44M** (Blower, Long et al); (iii) 'Quantum engineering of energy-efficient molecular materials (QMol)' – Programme grant, EPSRC, EP/X026876/1, 2023-2028, **£7.14M** (Lambert, Long et al); (iv) EPSRC 'CDT in Medical Imaging, KCL/ICL', **£5.70M** (2013-2022), Renewal **£6.12M** (2019-2027); (v) InnoHub Cluster in Biomedical Research (Hong Kong ITC) HK$500M (**£2.65M** to Imperial), 2020-2025.

Major Awards, Prizes

- **Royal Society of Chemistry Interdisciplinary Prize,** 2023.
- **Fellow, European Academy of Sciences**, 2021.
- **Royal Society of Chemistry Frankland Award for Organometallic Chemistry**, 2020.
- **Royal Society Wolfson Merit Award**, 2018-22.
- **Fellow, Royal Society of Chemistry,** 2011.

Measures of Esteem, Leadership

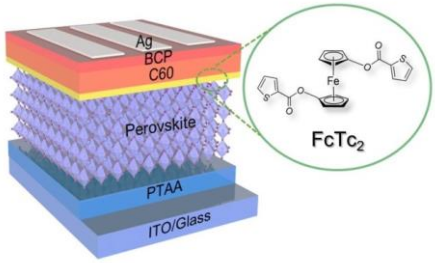
Significant leadership for organometallic chemistry and biomedical imaging communities; International circuit for keynote/invited lectures; Respected opinion for international funding agencies, committees and editorial boards.

- **Keynote and Plenary Conference Lectures**: (*last 5 years*): South African Chemical Society International meeting - Plenary (June 2024); ACS National Meeting, New Orleans - Invited (March 2024); International Conference on Sustainable Chemistry, Hong Kong - Keynote (Nov 2023); International Conference on Sustainable Chemistry and Catalysis, Singapore - Keynote (Sept 2022); RSC Dalton Division Southern Meeting, Oxford - Plenary (2019); Society of German Chemists, Konstanz, Germany - Plenary (2018);
- **Invited Lectures:** >110 University Departments and Schools outreach lectures.
- **Visiting Professorships:** University of Hong Kong (2019-22), Baptist University of Hong Kong (2021-24).
- **Editorial Boards**: Scientific Reports (Nature group); American Journal of Nuclear and Medical Imaging; Comprehensive Coordination Chemistry III (Elsevier), volume editor.
- **Steering Committees**: UK Dementia Network; EPSRC EPR National Facility; UK PET Network.
- **Funding & Assessment Panels**: EPSRC (Chemistry panel); Singapore Public Funding Scheme (x4); Ireland Science Programme Grants (chair x3); Finland Physical Sciences Grants (chair x2); Hong Kong Research Grants Council (2018-2020); **UK REF2021 Sub-Panel Member (Chemistry).**
- **Research Advisor**: *Previous*: 16 PDRA, 62 PhD students graduated; *Current*: 7 PDRA, 8 PhD, 4 Masters. 15 group members now academics (e.g. Oxford, USC, Imperial, King's, Portugal, Denmark, China).

Research Highlights

Overview of key areas of research excellence and impact.

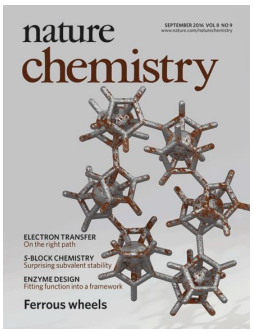
(I) Organometallic Chemistry for Materials: In April 2022, Long demonstrated in ***Science*** https://www.science.org/doi/10.1126/science.abm8566 that organometallic compounds can enhance the efficiency and stability of new types of solar cells, making them commercially viable. The devices



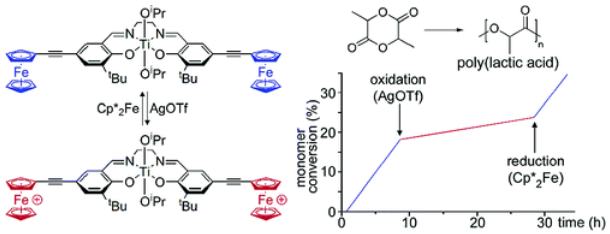
made with ferrocenyl thiophene carboxylate are world-leading perovskite solar cells, reaching both the efficiency standard of silicon cells (25%) and being able to maintain >98% of their initial efficiency after operating at maximum power for 1,500 hours. ***This truly, disruptive technology, and has already been cited over 600 times in 24 months***. The findings have been patented and the technology has received significant media attention e.g. https://www.independent.co.uk/tech/solar-power-cell-perovskite-b2062365.html. This has been followed up in JACS in 2024 (https://pubs.acs.org/doi/10.1021/jacs.4c02220) showing effective scale-up of the cells.

Long has taken the design and application of organometallic https://pubs.acs.org/doi/10.1021/jacs.9b13578) and all-organic molecules (https://pubs.rsc.org/en/content/articlelanding/2022/sc/d2sc00078d) further within the field of molecular electronics in a series of high impact publications. Electrical conductance of single molecules can be controlled in a deterministic manner, by chemically varying their connectivity to external electrodes. The data represent a critical step toward ultra-thin-film devices for thermoelectric and molecular-scale electronics applications.

(II) Functional Ferrocene Chemistry: Long has shown how ferrocene units can be fused directly to one another to give macrocyclic oligomers (https://www.nature.com/articles/nchem.2553). The beautifully simple series of oligoferrocenes has been isolated in differing ring sizes (n = 5, 6, 7, 9) with the six-membered version representing an organometallic analogue of benzene. This new structural framework containing strongly interacting metal centres supports substantial charge delocalisation and thus holds possibilities for molecular electronics and nanotechnology applications. The work has attracted significant media attention (http://cen.acs.org/articles/94/i27/Presenting-ferrocene-Ferris-wheel.html) and was highlighted in *Nature Chemistry* (https://www.nature.com/articles/nchem.2584). This new family of organometallic compounds has recently been extended with efficient and high yielding synthetic routes to novel alkynyl-conjugated ferrocene- and biferrocene-cyclic compounds, followed by in-depth electrochemical studies (https://onlinelibrary.wiley.com/doi/10.1002/ange.201702006).



(III) Redox-active Catalysis and Single-Site Polymerisation Catalysts: Long has pioneered the use of **redox-active and single-site polymerisation catalysts** and engineered new metal-ligand complexes as initiators for the ring-opening polymerisation of *rac*-lactide. Long's expertise in *ferrocene chemistry and organometallic ligand design and manipulation* led to an influential paper (https://pubs.acs.org/doi/10.1021/ja061398n) where redox-control of single-site polymerisation catalysts was demonstrated for the first time. The redox-switch was designed to oscillate a catalyst between sites of differing activities. The methodology captured other leading researchers' imaginations and has undoubtedly helped to shape the field. Long has taken his insight into the design of **initiators for *stereoselective* lactide polymerisation**. He has reported a series of new initiators combining high activities with significant stereocontrol and heterobimetallic catalysts demonstrating co-operative effects (https://onlinelibrary.wiley.com/doi/10.1002/anie.201403643).



(IV) Metal-Organic Probe Design and Methodology in Biomedical Imaging: In recent years, Long has shown impact and leadership within the interdisciplinary area of biomedical imaging. Publication highlights include (a) ***'Smart' fluorescent probes*** – a coumarin-porphyrin FRET break-apart probe (right) for Heme Oxygenase-1 (HO-1) (https://pubs.acs.org/doi/10.1021/jacs.0c12864) leading to development of new probes to detect HO-1 activity, with potential applications in live fluorescence imaging and point of care medical devices; (b) ***'Dual-functional' probes*** - a novel fluorescent probe for Zn^{2+} chelation and monitoring the the Epstein–Barr virus (EBV) (https://www.pnas.org/doi/full/10.1073/pnas.2002334117) and small molecule dual-functional probes for the EBV oncoprotein LMP1 and metal detection (https://pubs.acs.org/doi/10.1021/jacsau.1c00187); (c) ***Nanoparticle (NP) probes*** - iron oxide-based NPs for targeted MRI imaging and cancer diagnosis (https://www.ntno.org/v04p0184.htm).