

Michael S. Inkpen

Assistant Professor of Chemistry, University of Southern California
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Appointments

Assistant Professor of Chemistry, Department of Chemistry, University of Southern California, USA 2019-Present

Education and Training

Marie Skłodowska-Curie Fellow 2015-2018
Columbia University, USA and University of Rennes 1, France (Advisors: [Prof. Latha Venkataraman](#) and [Prof. Philippe Hapiot](#))

Research Associate 2013-2015
Imperial College London, UK (Advisors: [Prof. Nicholas J. Long](#), [Prof. Tim Albrecht](#))

Ph.D. in Organometallic Chemistry 2008-2013
Imperial College London, UK (Advisors: [Prof. Nicholas J. Long](#), [Prof. Tim Albrecht](#))
Thesis title: "Branched organometallic complexes for molecular electronics"

M.Chem. w/ Industrial Project, 1st class Honours 2004-2008
Durham University, UK
Thesis title: "The controlled release of volatile organic molecules from dry paint films"

Research Experience

Marie Skłodowska-Curie Fellow, University of Rennes 1, France 2015-2018
Advisors: [Prof Philippe Hapiot](#)

Marie Skłodowska-Curie Fellow, Columbia University, USA 2015-2017
Advisor: [Prof Latha Venkataraman](#)

Research Associate, Imperial College London, UK 2013-2015
Advisors: [Prof Nicholas J. Long](#), [Prof Tim Albrecht](#) (now at University of Birmingham)

Ph.D. Student, Imperial College London, UK 2008-2013
Advisors: [Prof Nicholas J. Long](#), [Prof Tim Albrecht](#) (now at University of Birmingham)

Research Student, ICI Paints/AkzoNobel, Slough, UK 2007-2008
Advisors: Tom Munhoven, Manish Sarkar

Honors, Fellowships and Awards

CAREER Award, National Science Foundation 2023

Doctoral New Investigator Grant, ACS Petroleum Research Fund 2021

Small Instrumentation Grant, Anton B. Burg Foundation, USC 2020, 2023

ACS Postdoc to Faculty (P2F) Workshop, Washington, DC 2017

MRSEC Three-Minute Pitch, Columbia University, USA 2016

Marie Skłodowska-Curie Global Fellowship, European Commission 2015-2018

Travel Grant, Faraday Division, Royal Society of Chemistry 2014

Imperial Postdoc Sandpit Challenge, Imperial College London, UK 2013

GlaxoSmithKline Book Prize, Durham University, UK 2005

Publications

Key: corresponding authors are underlined; † indicates co-first authors (equal contribution); ^{PD*}, ^{GR*}, and ^{UG*} indicate mentored postdoctoral scholar, graduate, and master's/undergraduate students, respectively.

Peer Reviewed Journal Articles at USC – Manuscripts Published

- 23) C. D. M. Trang^{GR*}, T. Saal, M. S. Inkpen, “Methyldisulfide groups enable the direct connection of air-stable metal bis(terpyridine) complexes to gold surfaces,” *Dalton Trans.*, 2023, **52**, 7836-7842.
- From the themed collection: [Spotlight Collection: Inorganic Molecular Electronics](#)
- 22) Z. Miao^{UG*}, T. Quainoo, T. M. Czyszczonek-Burton^{GR*}, N. Rotthowe^{PD*}, J. M. Parr^{GR*}, Z.-F. Liu, M. S. Inkpen, “Charge transport across dynamic covalent chemical bridges,” *Nano Lett.*, 2022, **22**, 8331-8338.
- 21) J. M. Parr^{GR*}, C. Olivar^{GR*}, T. Saal, R. Haiges, M. S. Inkpen, “Pushing steric limits in osmium(IV) tetraaryl complexes,” *Dalton Trans.*, 2022, **51**, 10558-10570.

Peer Reviewed Journal Articles Prior to USC

- 20) W. Lee, L. Li, M. Camarasa-Gómez, D. Hernangómez-Pérez, X. Roy, F. Evers, M. S. Inkpen, L. Venkataraman, “Photooxidation driven formation of Fe-Au linked ferrocene-based single-molecule junctions,” *Nature Commun.*, 2024, **15**, 1439.
- 19) M. Camarasa-Gómez[†], D. Hernangómez-Pérez[†], M. S. Inkpen, G. Lovat, E.-D. Fung, X. Roy, L. Venkataraman, and F. Evers, “Mechanically Tunable Quantum Interference in Ferrocene-Based Single-Molecule Junctions,” *Nano Lett.*, 2020, **20**, 6381-6386.
- 18) Y. Zang[†], I. Stone[†], M. S. Inkpen, F. Ng, T. H. Lambert, C. Nuckolls, M. L. Steigerwald, X. Roy, L. Venkataraman, “In situ coupling of single molecules driven by Au-catalyzed electrooxidation,” *Angew. Chem. Int. Ed.*, 2019, **58**, 16008-16012.
- 17) M. S. Inkpen, Z.-F. Liu, H. Li, L. M. Campos, J. B. Neaton, L. Venkataraman, “Non-chemisorbed gold-sulfur binding prevails in self-assembled monolayers,” *Nature Chem.*, 2019, **11**, 351-358.
- “[A not-so-strong bond](#)” (G. Pacchioni, *Nature Rev. Mater.*, 2019, **4**, 226)
- 16) G. Lovat, E. A. Doud, D. Lu, G. Kladnik, M. S. Inkpen, M. L. Steigerwald, D. Cvetko, M. S. Hybertsen, A. Morgante, X. Roy, L. Venkataraman, “Determination of the structure and geometry of N-heterocyclic carbenes on Au(111) using high-resolution spectroscopy,” *Chem. Sci.*, 2019, **10**, 930-935.
- 15) E. A. Doud[†], M. S. Inkpen[†], G. Lovat, E. Montes, D. W. Paley, M. L. Steigerwald, H. Vázquez, L. Venkataraman, X. Roy, “In Situ Formation of N-Heterocyclic Carbene-Bound Single-Molecule Junctions,” *J. Am. Chem. Soc.*, **140**, 8944-8949.
- 14) H. Li, T. A. Su, M. Camarasa-Gómez, D. Hernangómez-Pérez, S. E. Henn, V. Pokorný, C. D. Caniglia, M. S. Inkpen, R. Korytár, M. L. Steigerwald, C. Nuckolls, F. Evers, L. Venkataraman, “Silver Makes Better Electrical Contacts to Thiol Terminated Silanes than Gold,” *Angew. Chem. Int. Ed.*, 2017, **56**, 14145-14148.
- 13) R. Leber, L. E. Wilson, P. Robaschik, M. S. Inkpen, D. Payne, N. J. Long, T. Albrecht, C. F. Hirjibehedin, S. Heutz, “High vacuum deposition of biferrocene thin films on room temperature substrates,” *Chem. Mater.*, 2017, **29**, 8663-8669.
- 12) H. Li, M. H. Garner, T. A. Su, A. Jensen, M. S. Inkpen, M. L. Steigerwald, L. Venkataraman, G. C. Solomon, C. Nuckolls, “Extreme Conductance Suppression in Molecular Siloxanes,” *J. Am. Chem. Soc.*, 2017, **139**, 10212-10215.

- "1D nanowire is world's worst conductor", *Chemistry World* (print issue: 07/2017)
 - "Siloxane nanowires are world's worst conductor", *Compound Interest*
- 11) O. A. Al-Owaedi, S. Bock, D. Costa-Milan, M. Oerthel, **M. S. Inkpen**, D. S. Yufit, A. N. Sobolev, N. J. Long, T. Albrecht, S. Higgins, M. R. Bryce, R. J. Nichols, C. Lambert, P. Low, "Insulated molecular wires: inhibiting orthogonal contacts in metal complex based molecular junctions," *Nanoscale*, 2017, **9**, 9902-9912.
 - 10) **M. S. Inkpen**, Y. R. Leroux, P. Hapiot, L. M. Campos, L. Venkataraman, "Reversible on-surface wiring of resistive circuits," *Chem. Sci.*, 2017, **8**, 4340-4346.
 - 9) M. Lemmer, **M. S. Inkpen**, K. Kornysheva, N. J. Long and T. Albrecht, "Unsupervised vector-based classification of single-molecule charge transport data," *Nature Commun.*, 2016, **7**, 12922.
 - 8) **M. S. Inkpen**, S. Scheerer, M. Linseis, A. J. P. White, R. F. Winter, T. Albrecht, N. J. Long, "Oligomeric ferrocene rings," *Nature Chem.*, 2016, **8**, 825-830.
 - "Molecule of the Year", the cyclic hexamer was one of seven molecules nominated by C&EN, coming third in their online poll (print issue: 2016-12-19)
 - *Journal front cover* (*Nature Chem.*, 2016, **8**(9))
 - *News and Views* (R. A. Musgrave and I. Manners, *Nature Chem.*, 2016, **8**, 819)
 - "Presenting a ferrocene Ferris wheel", *C&EN* (print issue: 2016-07-04)
 - "Bringing ferrocene full circle", *Chemistry World* (print issue: 2016-08)
 - 7) **M. S. Inkpen**, A. J. P. White, T. Albrecht, N. J. Long, "Complexes comprising 'dangling' phosphorous arms and tri(hetero)metallic butynynyl moieties," *J. Organomet. Chem.*, 2016, **812**, 145-150.
 - 6) **M. S. Inkpen**[†], S. Du[†], M. Hildebrand, A. J. P. White, N. M. Harrison, T. Albrecht, N. J. Long, "The unusual redox properties of fluoroferrocenes revealed through a comprehensive study of the haloferrocenes," *Organometallics*, 2015, **34**, 5461-5469.
 - 5) **M. S. Inkpen**, M. Lemmer, N. Fitzpatrick, D. Costa-Milan, R. J. Nichols, N. J. Long, T. Albrecht, "New insights into single-molecule junctions using a robust, unsupervised approach to data collection and analysis," *J. Am. Chem. Soc.*, 2015, **137**, 9971-9981.
 - 4) **M. S. Inkpen**, A. J. P. White, T. Albrecht, N. J. Long, "Avoiding problem reactions at the ferrocenyl-alkyne motif: a convenient synthesis of model, redox-active complexes for molecular electronics," *Dalton Trans.*, 2014, **43**, 15287-15290.
 - 3) **M. S. Inkpen**, T. Albrecht, N. J. Long, "Branched redox-active complexes for the study of novel charge transport processes," *Organometallics*, 2013, **32**, 6053-6060.
 - 2) **M. S. Inkpen**, A. J. P. White, T. Albrecht, N. J. Long, "Rapid Sonogashira cross-coupling of iodoferrocenes and the unexpected cyclo-oligomerization of 4-ethynylphenylthioacetate," *Chem. Commun.*, 2013, **49**, 5663-5665.
 - 1) **M. S. Inkpen**, S. Du, M. Driver, T. Albrecht, N. J. Long, "Oxidative purification of halogenated ferrocenes," *Dalton Trans.*, 2013, **42**, 2813-2816.

Other Journal Articles and Book Chapters Prior to USC

- 2) **M. S. Inkpen** and N. J. Long, "Metal σ -alkynyl complexes as molecular wires: a comparative study of electron density and delocalisation" in *Molecular Design and Applications of Photofunctional Polymers and Materials*, eds. W. -Y. Wong and A. S. Abd-El-Aziz, Royal Society of Chemistry, 2012, 4, 85-129 (book chapter).
- 1) **M. S. Inkpen** and T. Albrecht, "Probing electron transport in proteins at room temperature with single-molecule precision," *ACS Nano*, 2012, **6**, 13-16 (perspective article).

Invited Seminars and Conference Talks (since 2019)

- 24) "Probing Charge Transfer/Transport Through Os(aryl)₄ Complexes: A New Class of 3D Nodes for Conductive Porous Materials," *45th International Conference on Coordination Chemistry (ICCC)*, Fort Collins, CO, USA; July 28-Aug 3, 2024
- 23) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *University of California, San Diego*, San Diego, CA, USA; May 28, 2024 (Department of Chemistry)
- 22) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *University of California, Los Angeles*, Los Angeles, CA, USA; May 22, 2024 (Department of Chemistry)
- 21) "Probing Charge Transfer/Transport Through Os(aryl)₄ Complexes: A New Class of 3D Nodes for Conductive Porous Materials," *North America-Greece-Cyprus Conference on Paramagnetic Materials*, Protaras, Cyprus; April 22-26, 2024
- 20) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *Indiana University Bloomington*, Bloomington, IN, USA; February 21, 2023 (Department of Chemistry)
- 19) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *Purdue University*, West Lafayette, IN, USA; February 20, 2024 (Department of Chemistry)
- 18) "Forming junctions with non-Au metal electrodes under an inert atmosphere," *13th International Conference on Advanced Materials and Devices*, Jeju, Korea; December 4-8, 2023
- 17) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *North Carolina State University*, Raleigh, NC, USA; October 26, 2023 (Department of Chemistry)
- 16) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *University of North Carolina at Chapel Hill*, Chapel Hill, NH, USA; October 25, 2023 (Department of Chemistry)
- 15) "Molecular-Scale Electronics and Moore: From Interfacial Reactivity to Band Structure Design," *Duke University*, Durham, NC, USA; October 24, 2023 (Department of Chemistry)
- 14) "Probing Charge Transfer/Transport Through Os(aryl)₄ Complexes: A New Class of 3D Nodes for Conductive Porous Materials?," *Nanoporous Materials and Their Applications Gordon Research Conference*, Andover, NH, USA; August 6-11, 2023 (Short Presentation)
- 13) "Forming junctions with non-Au metal electrodes under an inert atmosphere," *Telluride Science Research Center*, Telluride, CO, USA; July 24-28, 2023 (Quantum Transport in Nanoscale Molecular Systems Workshop)
- 12) "Lewis-acid mediated reactivity in single-molecule junctions," *Weizmann Institute*, Rehovot, Israel; June 26-29, 2023 (Quantum Transport in Atomic and Molecular Junctions Meeting)
- 11) "Charge transport and self-assembly at the single-molecule limit," *University of California, Riverside*, Riverside, CA, USA; May 11, 2023 (Department of Chemistry)
- 10) "Charge transport and self-assembly at the single-molecule limit," *Boston University*, Boston, MA, USA; May 1, 2023 (Department of Chemistry)
- 9) "Charge transport and self-assembly at the single-molecule limit," *Columbia University*, New York, NY, USA; April 28, 2023 (Department of Chemistry)

- 8) "Charge transport and self-assembly at the single-molecule limit," *City University of New York*, New York, NY, USA; April 24, 2023 (Department of Chemistry)
- 7) "Charge transport through oligo-triarylamine single-molecule junctions," *Electrochemistry Gordon Research Conference*, Ventura, CA, USA; September 11-16, 2022 (Late Breaking Topic)
- 6) "Charge transport and self-assembly at the single-molecule limit," *Imperial College London*, London, UK; December 9, 2021 (Department of Chemistry)
- 5) "Charge transport and self-assembly at the single-molecule limit," *University of Southern California*, Los Angeles, CA, USA; April 21, 2021 (Department of Physics)
- 4) "Metal(IV) tetraaryl complexes," *National Meeting of the American Chemical Society*, Virtual Meeting; April 5-16, 2021
- 3) "Metal-appended wires and framework fragments," *(Bio)Molecular Electronics Colloquia*, Virtual Meeting; December 10, 2020 (University of Liverpool, UK)
- 2) "Building materials with chargeable molecular Legos," California State University, Los Angeles, CA, USA; September 17, 2019
- 1) "Extended molecular materials constructed from redox-active building blocks," *National Meeting of the American Chemical Society*, San Diego, CA, USA; August 25-29, 2019

Contributed Conference Talks (since 2019)

- 5) "Single-molecule junction studies using low vapor pressure solvents," *National Meeting of the American Chemical Society*, New Orleans, IL; March 17-21, 2024
- 4) "*In situ* catalytic formation of conjugated organic wires," *National Meeting of the American Chemical Society*, Chicago, IL; August 21-25, 2022
- 3) "Redox-active SAMs built from metal bis(terpyridine) complexes," *National Meeting of the American Chemical Society*, San Diego, CA, USA; March 20-24, 2022
- 2) "Charge transport through single-molecule framework fragments," *National Meeting of the American Chemical Society*, Virtual Meeting; April 5-16, 2021
- 1) "Building materials with chargeable molecular Legos," *SoCal Organometallics Meeting*, University of Southern California, Los Angeles, CA, USA; February 10, 2019

Contributed Conference Posters (since 2019)

- 3) "Chemical reactions at metal surfaces probed through single-molecule junction measurements," *Electrochemistry Gordon Research Conference*, Ventura, CA, USA; January 7-12, 2024
- 2) "Probing Charge Transport Through Osmium(IV) Tetraaryl Complexes: A New Class of 3D Nodes for Conductive Porous Materials?," *Nanoporous Materials and Their Applications Gordon Research Conference*, Andover, NH, USA; August 6-11, 2023
- 1) "Charge Transport Through Redox-Active Oligo-Triarylamine (TAA) Molecular Junctions," *Electrochemistry Gordon Research Conference*, Ventura, CA, USA; September 11-16, 2022

Professional Activities

Professional Affiliations: Member of the American Chemical Society (2016-present), Royal Society of Chemistry (2013-present), International Society of Electrochemistry (2014-present).

Ad Hoc Referee for the Following Journals (~27 reviews since 2019): *ACS Nano*; *Advanced Functional Materials*; *Analytical Chemistry*; *Angewandte Chemie International Edition*; *Chemical*

Communications; Chemical Science; Current Opinion in Electrochemistry; European Journal of Inorganic Chemistry; Journal of Physical Chemistry; Journal of Physics: Condensed Matter; Journal of the American Chemical Society; Journal of the American Chemical Society Au; Nano Letters; Nanoscale; Nature Chemistry, Nature Reviews Physics; Physical Chemistry Chemical Physics; Science Advances (<https://publons.com/a/1475443>).

Funding Agency Panel Reviewer (~29 proposals since 2019): DOD NDSEG Fellowships (2018-2019); NSF MPS/CHE/SYN-CC Virtual Panel (02/2020); NSF MPS/CHE/SYN-CC Ad Hoc (03/2020); NSF MPS/CHE/CAT Ad Hoc (10/2020); NSF MPS/CHE/CDSM-B CAREER (11/2023).

Organized Symposia: COLL Symposium on “The Chemistry of Molecular Electronics” for ACS *National Meeting* (Spring 2018); PHYS Symposium on “The Chemistry of Molecular Electronics” for ACS *National Meeting* (Spring 2021); PHYS Symposium on “Physical Chemistry of Molecular Electronics” for ACS *National Meeting* (Spring 2024).

Database Curation: Development of a free, web-based, publicly accessible database containing information about every molecule that has ever been studied in a molecular junction. The “Molecular Junction Database” (MJD) will be searchable by simple string-based queries (author, title, year of publication), in addition to sub-structure and exact molecular structure searching using 3rd party cheminformatics web tools (<https://www.inkpenlab.org/outreach>).

Outreach

USC-Cerritos College Research Internship: My lab has hosted 1 undergraduate student per year since 2021 for an 8-week paid summer internship to expose them to the research process.

Conference Abstract Reviewer: Poster Abstract Reviewer for NOBCChE Conference (2020-present).

Ad Hoc Film Script Reviewer: Verifying the scientific accuracy of a science-relevant film script submitted to the Alfred P. Sloan Foundation through the USC School of Cinematic Arts (2020).