

Career highlights:

Notable achievements include the *first near-linear f-block complex*, the *first trigonal planar actinide complex*; and finally, the synthesis of the much sought after “dysprosocenium cation” (*Nature*, **2017**; *J. Am. Chem. Soc.*, **2017**) a motif that has eluded chemists for half a century and a single molecule magnet that functions at 60 K. This complex breathed new life into the molecular magnetism field, which *hadn't seen a breakthrough in high-temperature magnetism for over a decade*. I lead efforts to synthesize the first crystallographically characterized americium organometallic complex (*Angewandte*, **2019**). Most recently, I have reported the first ferrocene, manganocene, and cobaltocene anions; featuring formal M(I) metal centers and the latest new oxidation state in early metallocene chemistry (*Nature Chemistry*, **2020**). My research contributions to the field of chemistry have been cited over 1,400 times (H index 13) since I began my PhD in 2013.

Research Career:

- **2018–2021:** J. Robert Oppenheimer Fellowship at Los Alamos National Lab with Dr. A. J. Gaunt.
- **2017–2018:** EPSRC Doctoral Prize Fellowship, project: “New Frontiers in Low Oxidation State Lanthanide Chemistry” with Dr. D. P. Mills.
- **2013–2017:** PhD completed in 3.5 years, an EPSRC Doctoral Studentship. Project titled: “Synthesis and Properties of Early Metal Bulky Silylamide Complexes” with Dr. D. P. Mills.
- **2012–2013:** Awarded a 1st class Master’s degree. Final year MChem project: “Are Boronium Cations Suitable as Electron Transport Materials for use in OLED Devices?” with Dr. M. J. Ingleson.

Awards and Grants:

- Awarded prestigious “Distinguished Postdoctoral Performance Award” at LANL (2019) for my trans-uranium research and its contributions to the labs’ goal of excellence in actinide chemistry.
- Awarded several rounds of internal LANL Postdoctoral research funding (\$5,000 to further Cf research with Thomas Albrecht-Schmitt at FSU; ~\$25,000 for spectroscopy equipment).
- RSC Dalton Emerging Researcher 2018 award.
- University of Manchester “Outstanding Achievement Award”.
- J. Robert Oppenheimer Fellowship – A competitive 3-year fellowship at Los Alamos National Laboratory (USA) for my own research in Inorganic Isotopes and Actinide Chemistry (~\$300,000).
- EPSRC Doctoral Prize Fellowship – 1-year fellowship at The University of Manchester to explore new avenues opened up during my PhD studies (~\$70,000).
- RSC Researcher Mobility Fellowship 2015 (~\$8,000) – collaborated with Prof. W. J. Evans (UC Irvine, USA). 3 month stay resulted in two published papers (both in *Inorg. Chem.*).

Publications:

27. S. M. Greer, Ö. Üngör, R. J. Beattie, J. L. Kiplinger, B. L. Scott, B. W. Stein, C. A. P. Goodwin, Low-spin 1,1'-diphosphametallocenates of Chromium and Iron. *Chem. Commun.* **2020**, *Accepted*.
26. C. A. P. Goodwin, M. J. Giansiracusa, S. M. Greer, H. M. Nicholas, P. Evans, M. Vonci, S. Hill, N. F. Chilton, D. P. Mills, Isolation and electronic structures of derivatized manganocene, ferrocene and cobaltocene anions. *Nat. Chem.* **2020**, *Accepted*.
25. C. J. Windorff, J. M. Sperling, T. E. Albrecht-Schönzart, Z. Bai, W. J. Evans, A. N. Gaiser, A. J. Gaunt, C. A. P. Goodwin, D. E. Hobart, Z. K. Huffman, D. N. Huh, B. E. Klamm, T. N. Poe, E. Warzecha, A single small scale plutonium redox reaction system yields three crystallographically-characterizable organoplutonium complexes. *Inorg. Chem.* **2020**, *Accepted*.
24. C. A. P. Goodwin, Blocking Like It’s Hot: A Synthetic Chemists’ Path to High-Temperature Lanthanide Single Molecule Magnets. *Dalton Trans.* **2020**, *Accepted in principle*.

23. C. A. P. Goodwin, B. L. L. Réant, J. G. C. Kragoskow, M. J. Giansiracusa, I. M. DiMucci, K. M. Lancaster, D. P. Mills, S. Sproules, Heteroleptic samarium(III) chalcogenide complexes: opportunities for giant exchange coupling in bridging σ - and π -radical lanthanide dichalcogenides. *Inorg. Chem.* **2020**, *59*, 7571.
22. A. Chiesa, F. Cugini, R. Hussain, E. Macaluso, G. Allodi, E. Garlatti, M. Giansiracusa, C. A. P. Goodwin, F. Ortu, D. Reta, J. M. Skelton, T. Guidi, P. Santini, M. Solzi, R. De Renzi, D. P. Mills, N. F. Chilton, S. Carretta, Understanding magnetic relaxation in single-ion magnets with high blocking temperature. *Phys. Rev. B* **2020**, *101*, 174402.
21. C. A. P. Goodwin, F. Ortu, D. Reta, Strangely attractive: Collaboration and feedback in the field of molecular magnetism. *Int. J. Quantum Chem.* **2020**, *120*, e26248. (All three joint corresponding authors).
20. P. Evans, D. Reta, C. A. P. Goodwin, F. Ortu, N. F. Chilton, D. P. Mills, A double-dysprosocenium single-molecule magnet bound together with neutral ligands, *Chem. Commun.* **2020**, *56*, 5677.
19. H. M. Nicholas, M. Vonci, C. A. P. Goodwin, S. W. Loo, S. R. Murphy, D. Cassim, R. E. P. Winpenny, E. J. L. McInnes, N. F. Chilton, D. P. Mills, Electronic structures of bent lanthanide(III) complexes with two N-donor ligands. *Chem. Sci.* **2019**, *10*, 10493. **Assigned as a "2019 Hot Article"**.
18. J. T. Brewster II, D. N. Mangel, A. J. Gaunt, D. P. Saunders, H. Zafar, V. M. Lynch, M. A. Boreen, M. E. Garner, C. A. P. Goodwin, N. S. Settineri, J. Arnold, J. L. Sessler, In-Plane Thorium(IV), Uranium(IV), and Neptunium(IV) Expanded Porphyrin Complexes. *J. Am. Chem. Soc.* **2019**, *141*, 17867.
17. A.-M. Ariciu, D. H. Woen, D. N. Huh, L. E. Nodarakaki, A. K. Kostopoulos, C. A. P. Goodwin, N. F. Chilton, E. J. L. McInnes, R. E. P. Winpenny, W. J. Evans, F. Tuna, Engineering electronic structure to prolong relaxation times in molecular qubits by minimising orbital angular momentum. *Nat. Commun.* **2019**, *10*, 3330.
16. C. A. P. Goodwin, J. Su, T. E. Albrecht-Schmitt, A. V. Blake, E. R. Batista, S. R. Daly, S. Dehnen, W. J. Evans, A. J. Gaunt, S. A. Kozimor, N. Lichtenberger, B. L. Scott, P. Yang, [Am(C₅Me₄H)₃]]: An Organometallic Americium Complex. *Angew. Chem. Int. Ed.* **2019**, *58*, 11695. **Times cited: 9**.
15. F. Ortu, D. Reta, Y.-S. Ding, C. A. P. Goodwin, M. P. Gregson, E. J. L. McInnes, R. E. P. Winpenny, Y.-Z. Zheng, S. T. Liddle, D. P. Mills, N. F. Chilton, Studies of hysteresis and quantum tunneling of the magnetisation in dysprosium(III) single molecule magnets. *Dalton Trans.* **2019**, *48*, 8541.
14. J. Liu, D. Reta, J. A. Cleghorn, Y. X. Yeoh, F. Ortu, C. A. P. Goodwin, N. F. Chilton, D. P. Mills, Light Lanthanide Metallocenium Cations Exhibiting Weak Equatorial Anion Interactions. *Chem. Eur. J.* **2019**, *25*, 7749.
13. C. A. P. Goodwin, D. Reta, F. Ortu, J. Liu, N. F. Chilton, D. P. Mills, Terbocenium: completing a heavy lanthanide metallocenium cation family with an alternative anion abstraction strategy. *Chem. Commun.* **2018**, *54*, 9182. **Times cited: 16**.
12. H. M. Nicholas, C. A. P. Goodwin, J. G. C. Kragoskow, S. J. Lockyer, D. P. Mills, Structural Characterization of Lithium and Sodium Bulky Bis(silyl)amide Complexes. *Molecules* **2018**, *23*, 1138.
11. C. A. P. Goodwin, B. L. L. Réant, J. G. C. Kragoskow, I. M. DiMucci, K. M. Lancaster, D. P. Mills, S. Sproules, Heteroleptic Sm(III) halide complexes probed by fluorescence-detected L₃-edge X-ray absorption spectroscopy. *Dalton Trans.* **2018**, *47*, 10613.
10. J.-D. Leng, C. A. P. Goodwin, I. J. Vitorica-Yrezabal, D. P. Mills, Salt metathesis routes to homoleptic near-linear Mg(II) and Ca(II) bulky bis(silyl)amide complexes. *Dalton Trans.* **2018**, *47*, 12526.
9. C. A. P. Goodwin, F. Tuna, E. J. L. McInnes, D. P. Mills, Exploring Synthetic Routes to Heteroleptic U^{III}, U^{IV} and Th^{IV} Bulky Bis(silyl)amide Complexes. *Eur. J. Inorg. Chem.* **2018**, *25*, 7749. **Assigned as a "Hot Paper"**.
8. C. A. P. Goodwin, D. Reta, F. Ortu, N. F. Chilton, D. P. Mills, Synthesis and Electronic Structures of Heavy Lanthanide Metallocenium Cations. *J. Am. Chem. Soc.* **2017**, *139*, 18714. **Times cited: 56**.
7. C. A. P. Goodwin, F. Ortu, D. Reta, N. F. Chilton, D. P. Mills, Molecular magnetic hysteresis at 60 kelvin in dysprosocenium. *Nature* **2017**, *548*, 439. **Times cited: 763. In the top 1% of all scientific articles by citation.**
6. C. A. P. Goodwin, N. F. Chilton, L. S. Natrajan, M. -E. Boulon, J. W. Ziller, W. J. Evans, D. P. Mills, Investigation into the Effects of a Trigonal Planar Ligand Field on the Electronic Properties of Lanthanide(II) Tris(silylamide) Complexes (Ln = Sm, Eu, Tm, Yb). *Inorg. Chem.* **2017**, *56*, 5959. **Times cited: 28**.
5. C. A. P. Goodwin, N. F. Chilton, G. F. Vettese, E. Moreno Pineda, I. F. Crowe, J. W. Ziller, R. E. P. Winpenny, W. J. Evans, D. P. Mills, Physicochemical properties of near-linear Ln(II) bis-silylamide complexes (Ln = Sm, Eu, Tm, Yb).

Inorg. Chem. **2016**, *55*, 10057. **Times cited: 46. An invited article to “New Trends and Applications for Lanthanides”.**

4. C. A. P. Goodwin, A. Smith, F. Ortu, I. J. Vitorica-Yrezabal, D. P. Mills, Salt metathesis versus protonolysis routes for the synthesis of silylamide Hauser base (R_2NMgX ; X = halogen) and amido-Grignard (R_2NMgR) complexes. *Dalton Trans.* **2016**, 6004. **Times cited: 17.**
3. C. A. P. Goodwin, K. C. Joslin, S. J. Lockyer, A. Formanuk, G. A. Morris, F. Ortu, I. J. Vitorica-Yrezabal, D. P. Mills; Homoleptic trigonal planar lanthanide complexes stabilized by superbuly silylamide ligands, *Organometallics* **2015**, *34*, 2314. **Times cited: 33.**
2. N. F. Chilton, C. A. P. Goodwin, D. P. Mills, R. E. P. Winpenny, The first near-linear bis(amide) f-block complex: a blueprint for a high temperature single molecule magnet. *Chem. Commun.* **2015**, *51*, 101. (Alphabetical author list) **Times cited: 165. Assigned as a “highly cited paper” by Thomson Reuters, in the top 1% of Chemistry papers.**
1. C. A. P. Goodwin, F. Tuna, E. J. L. McInnes, S. T. Liddle, J. McMaster, I. J. Vitorica-Yrezabal, D. P. Mills, $[U^{III}\{N(SiMe_2tBu)_2\}_3]$: A Structurally Authenticated Trigonal Planar Actinide Complex. *Chem. Eur. J.* **2014**, *20*, 14579. **Times cited: 35. Assigned as a “Very Important Paper”.**

Research Talks:

1. *Trans-uranic organometallic chemistry: Oxidation states, bonding, and electronic structure*, ACS Orlando, May 2019. **An invited talk**, in the Glenn T. Seaborg award symposium, honoring Prof. Thomas E. Albrecht-Schmitt.
2. *f-element Chemistry: Oxidation States, Bonding, and Electronic Structures*, The University of Cardiff, The University of Huddersfield, The University of Manchester, February 2019 as part of my **RSC Dalton Emerging Researcher Award**.
3. *Dysprosocenium: Molecular Magnetic Hysteresis at 60 K*, Dalton Younger Members Event, September 2017, University of Bath, UK. I received a prize for this presentation.
4. *Adventures in Low Oxidation-State f-Block Silylamide Chemistry*, Manchester Chemistry Postgraduate Conference 2016, June 2016, University of Manchester, UK.
5. *Unprecedented f-Block Geometries Using Super-Bulky Ligands*, Dalton 2016, March 2016, University of Warwick, UK.
6. *Unprecedented f-Block Geometries Using Super-Bulky Ligands*, Dalton Younger Members Event, September 2015, University of Leeds, UK. I received a prize for this presentation.
7. *Low Coordinate f-Block Complexes: How Low Can You Go?*, 4th European f-Element Network Conference (EUFEN4), April 2015, Lisbon, Portugal.

Book Chapters:

Silylamides: towards a half-century of stabilising remarkable f-element chemistry, C. A. P. Goodwin, D. P. Mills, in *SPR Organometallic Chemistry*, Eds. P. Elliot, N. Patmore, The Royal Society of Chemistry, Cambridge, UK, **2017**. **Times cited: 8.**