

Curriculum Vitae: Leroy (Lee) Cronin FRSE

Regius Professor of Chemistry, School of Chemistry, University of Glasgow, Glasgow, G12 8QQ, UK

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Researcher ID: <http://www.researcherid.com/rid/B-7752-2008>

Personal details:

Name: Leroy (Lee) Cronin
Date of Birth: 1st June 1973 (aged 43)

Education:

1994 - 1997 University of York
1991 - 1994 University of York

Qualifications:

BSc (1994): First Class Honours, Pure Chemistry (York University)
DPhil (1997): Inorganic Chemistry (York University)



Awards, Recognition, Fellowships, & Highlights:

2016 Feature Profile in Chemistry World "Searching for Complexity" <http://tinyurl.com/zdzvc2d>
2015 RSC Tilden Prize
2015 European Research Council Advanced Grant (2015-2020)
2015 Spin out company Listed on the AIM stock exchange CroninGroupPLC (raising ca. £6 M)
2015 1st Annual Pearlman Lecture at the Weizmann Institute of Science
2015 Solvay Lecture at the University of Belgium
2014 RISE Award (1 of the UK's top 10 Inspiring Sciences and Engineers)
2014 UK Science Council One of the top 100 UK practising Sciences
2014 EPSRC Programme Grant on Digital Synthesis (2014-2019)
2013 RSE/BP Hutton Prize
2012 RSC Corday Morgan Medal and Prize
2012 81st Henry Lecture at the Philosophical Society of Washington
2012 Visiting Professor, UPMC - University Pierre and Marie Curie, France
2011 RSC Bob Hay Lectureship
2011 Speaker and opening lecture at TEDGlobal2011 in Edinburgh
2010 Invited Lecturer, 3^{ème} cycle de Chimie, Switzerland
2009 Royal Society-Wolfson Research Merit Award
2009 Elected to the Royal Society of Edinburgh
2008 Morino Foundation Prize
2007 Philip Leverhulme Prize (£70,000)
2006 Finalist and winner (silver medal) of the Young European Chemists Award
2005 EPSRC Advanced Fellowship
1999 Alexander von Humboldt Research Fellowship
1998 Monbusho-JSPS Fellowship
1996 ICI Scientists Scholarship

Employment History:

2015 - Founding Scientific Director, CroninGroup PLC – listed on AIM since Sept 2015
2013 - Regius Chair of Chemistry (appointed by HM Queen Elizabeth II) Established in 1817
2009 - 2013 Gardiner Chair of Chemistry, Glasgow University
2006 - 2011 EPSRC Advanced Research Fellowship, Glasgow University
2006 - 2009 Professor of Chemistry, Glasgow University
2005 - 2006 Reader in Chemistry, Glasgow University
2002 - 2005 Lecturer in Chemistry, Glasgow University
2000 - 2002 Lecturer in Chemistry, Birmingham University
1999 - 2000 Alexander von Humboldt Research Fellowship
1997 - 1999 Research Fellow, University of Edinburgh

Research Examples/Highlights:

2016 Quantifying the origins of life on a planetary scale (PNAS)

2016 Sizing of clusters in solution using ion mobility mass spec (JACS)
 2016 Solution discovery of Pd₇₂ nanoring (ACIE)
 2015 Programmable peptide synthesis (Nat Comm)
 2015 Trapping Reactive Phosphorous Atoms in Cluster Cages (ACIE)
 2015 New method of Hybrid Inorganic-Peptide Synthesis (JACS)
 2014 Robotically mediated chemical evolution (Nature Comm.)
 2014 Polyoxometalate-based flash memory devices and new types of memory device (Nature)
 2014 Decoupled catalytic hydrogen evolution from an electron-coupled-proton-buffer (Science)
 2013 New types of cluster-based electron transfer reagents (ACIE)
 2013 Combined 3D printed and robotically organised synthetic system (Chem. Sci.)
 2012 Self-assembly of the largest macrocycle ever, {W₂₀₀Co₈O₆₆₀}, within a network reactor (ACIE)
 2012 3D printing of chemical reactions and reactors with the development of 'reactionware' (Nature Chem)
 2012 Engineering of a chemically powered nanoscale cluster oscillator (JACS)
 2011 Inorganic Chemical Cells potential towards Inorganic Biology (ACIE)
 2011 Pioneered the development of Variable Temperature Mass Spectrometry (Nature Chem)
 2010 Trapping the transient in the assembly of molybdenum blue (Science)
 2010 Assembly of Zeolitic structures using molecular oxide synthons (Nature Chem)
 2009 Emergent Tubular Architectures and Networks (Nature Chem)
 2009 Molecular Metal Oxide Field Effect Transistor (Nature Nano)
 2008 Confined Electron Transfer Reactions in Molecular Cages (ACIE)
 2007 Observing molecular self-assembly with mass spectrometry (ACIE)
 2006 Control of molecular self-assembly by symmetry transfer (JACS)

Selected Active Research Grants Grants listed below with FEC value. Total value of research portfolio >£13M.

2016	EPSRC (EP/P00153X/1) Advanced Mass Spectrometry Kit for Controlling Chemical Robots and Exploring Complex Chemical Systems	£989,800
2015	ERC (670467) SMART-POM: Artificial-Intelligence Driven Discovery and Synthesis of Polyoxometalate Clusters	£2,439,992
2014	BBSRC (BB/M011267/1) Plug'n Play Photosynthetic for Rubisco Independent Fuels	£444,430
2014	EPSRC (EP/L023652/1) Programme Grant: Programmable 'Digital' Synthesis for Discovery and Scale-up of Molecules, Clusters and Nanomaterials	£3,993,970
2014	EC FP7 EVOBLISS	£672,548
2013	EC FP7 EVOPROG	£925,671
2013	EPSRC (EP/K023004/1) Hydrogen Production using a Proton Electron Buffer	£475,175
2013	EPSRC (EP/K038885/1) Synthetic Biology applications to Water Supply and Remediation	£930,778
2013	EC FP7 (318671) MICREAGENTS	£535,369
2012	EPSRC (EP/J015156/1) Platform Grant: Programmable Molecular Metal Oxides (PMMOs) - From Fundamentals to Application	£1,792,462

Selected Invited Presentations from 2015 and 2016 from a full list of over 325; selected international invites listed here

2016	Keynote Speaker, ICC42, Brest, July Plenary Speaker, FMOCS, Newcastle, July UK-Japan Solar Fuels Symposium, Tokyo, June GRC Biointerfaces, Les Doublets, June Keynote Speaker, World Biomaterials Congress, Montreal, May Tilden Prize Lecture, Bristol University March Oxford Chemistry, Chemical Biology Department, February
2015	Plenary Speaker, Modelling Origins of Life, Carnegie Institute, Washington, Nov Keynote Speaker, Advanced Functional Materials, Stony Brook, June Invited Lecture, AbSciCon, Chicago, June Swiss Nanoscience Institute Invited Lecture, Basel, May

1st Pearlman Lecture, Weizmann Institute of Science, April
Plenary speaker, Annual Chemical Society Meeting, University College Dublin, April
Solvay Colloquium, University of Brussels, February
Earth Life Systems Institute (plenary speaker), Tokyo, January

20 'Selected' References – Cronin

1. *Restraining symmetry in the formation of small polyoxomolybdates: Building blocks of unprecedented topology resulting from "shrink-wrapping" [H₂Mo₁₆O₅₂]¹⁰⁻-type clusters* D.-L. Long, P. Kögerler, L. J. Farrugia, L. Cronin *Angew. Chem. Int. Ed.* **42**, 4180–4183 (2003).
2. *Unveiling the transient template in the self-assembly of a molecular oxide nanowheel* H. N. Miras, G. J. T. Cooper, D.-L. Long, H. Bögge, A. Müller, C. Streb, L. Cronin *Science* **327**, 72–74 (2010).
3. *Decoupling hydrogen and oxygen evolution during electrolytic water splitting using an electron-coupled-proton buffer* M. D. Symes, L. Cronin *Nature Chem.* **5**, 403–409 (2013).
4. *A bio-inspired, small molecule electron-coupled-proton buffer for decoupling the half-reactions of electrolytic water splitting* B. Rausch, M. D. Symes, L. Cronin *J. Am. Chem. Soc.* **135**, 13656–13659 (2013).
5. *Decoupled catalytic hydrogen evolution from a molecular metal oxide redox mediator in water splitting* B. Rausch, M. D. Symes, G. Chisholm, L. Cronin *Science* **345**, 1326–1330 (2014).
6. *Design and fabrication of memory devices based on nanoscale polyoxometalate clusters* C. Busche, L. Vila-Nadal, J. Yan, H. N. Miras, D.-L. Long, V. P. Georgiev, A. Asenov, R. H. Pedersen, N. Gadegaard, M. M. Mirza, D. J. Paul, J. M. Poblet, L. Cronin *Nature* **515**, 545–549 (2014).
7. *Integrated 3D-printed reactionware for chemical synthesis and analysis* M. D. Symes, P. J. Kitson, J. Yan, C. J. Richmond, G. J. T. Cooper, R. W. Bowman, T. Vilbrandt, L. Cronin *Nature Chem.* **4**, 349–354 (2012).
8. *Combining 3D printing and liquid handling to produce user-friendly reactionware for chemical synthesis and purification* P. J. Kitson, M. D. Symes, V. Dragone, L. Cronin *Chem. Sci.* **4**, 3099–3103 (2013).
9. *3D Printed High-Throughput Hydrothermal Reactionware for Discovery, Optimization, and Scale-Up* P. J. Kitson, R. J. Marshall, D. Long, R. S. Forgan, L. Cronin *Angew. Chem. Int. Ed.* **53**, 12723–12728 (2014).
10. *Assembly of a Gigantic Polyoxometalate Cluster {W₂₀₀Co₈O₆₆₀} in a Networked Reactor System* A. R. de la Oliva, V. Sans, H. N. Miras, J. Yan, H. Zang, C. J. Richmond, D.-L. Long, L. Cronin *Angew. Chem. Int. Ed.* **51**, 12759–12762 (2012).
11. *A flow-system array for the discovery and scale up of inorganic clusters* C. J. Richmond, H. N. Miras, A. R. de la Oliva, H. Y. Zang, V. Sans, L. Paramonov, C. Makatsoris, R. Inglis, E. K. Brechin, D.-L. Long, L. Cronin *Nature Chem.* **4**, 1038–1044 (2012).
12. *Discovery of gigantic molecular nanostructures using a flow reaction array as a search engine* H.-Y. Zang, A. R. de la Oliva, H. N. Miras, D.-L. Long, R. T. McBurney, L. Cronin *Nat. Commun.* **5**, 3715 (2014).
13. *Evolution of oil droplets in a chemorobotic platform* J. M. P. Gutierrez, T. Hinkley, J. W. Taylor, K. Yanev, L. Cronin *Nat. Commun.* **5**, 5571 (2014).
14. *Confined electron-transfer reactions within a molecular metal oxide "Trojan horse"* D.-L. Long, H. Abbas, P. Kögerler, L. Cronin *Angew. Chem. Int. Ed.* **44**, 3415–3419 (2005).
15. *Reversible electron-transfer reactions within a nanoscale metal oxide cage mediated by metallic substrates* C. Fleming, D.-L. Long, N. Mcmillan, J. Johnston, N. Bovet, V. Dhanak, N. Gadegaard, P. Kögerler, L. Cronin, M. Kadodwala *Nature Nanotech.* **3**, 229–233 (2008).
16. *Probing the self-assembly of inorganic cluster architectures in solution with cryospray mass spectrometry: Growth of polyoxomolybdate clusters and polymers mediated by silver(I) ions* E. F. Wilson, H. Abbas, B. J. Duncombe, C. Streb, D.-L. Long, L. Cronin *J. Am. Chem. Soc.* **130**, 13876–13884 (2008).
17. *Observation of Fe(v)=O using variable temperature mass spectrometry and its enzyme-like C-H and C=C oxidation reactions* I. Prat, J. S. Mathieson, M. Güell, X. Ribas, J. M. Luis, L. Cronin, M. Costas *Nature Chem.* **3**, 788–793 (2011).
18. *Spontaneous assembly and real-time growth of micrometre-scale tubular structures from polyoxometalate-based inorganic solids* C. Ritchie, G. J. T. Cooper, Y.-F. Song, C. Streb, H. B. Yin, A. D. C. Parenty, D. A. MacLaren, L. Cronin *Nature Chem.* **1**, 47–52 (2009).
19. *Face-directed self-assembly of an electronically active Archimedean polyoxometalate architecture* S. G. Mitchell, C. Streb, H. N. Miras, T. Boyd, D.-L. Long, L. Cronin *Nature Chem.* **2**, 308–312 (2010).
20. *A self-optimizing synthetic organic reactor system using real-time in-line NMR spectroscopy* V. Sans, L. Porwol, V. Dragone, L. Cronin *Chem. Sci.* **2**, 1258–1264 (2014).