

CURRICULUM VITAE John S. McCaskill

Personal details			
Full name	Prof. Dr	John Simpson	McCaskill
Present position	Professor/ Honorary Research Fellow		
Organisation/Employer	European Centre for Living Technology, Venice		
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Academic qualifications

1983	D.Phil.(PhD)	Theoretical Chemistry, Oxford University (New College,1982)
1979	B.Sc. Hons	Theoretical Chemistry, Sydney University (1978)
1978	B.Sc.	Physics and Pure Mathematics, Sydney University (1977)
1977	A. Mus. A.	Piano, NSW State Conservatory of Music (1977)

Professional positions held

2017-2020	Honorary Research Fellow European Centre for Living Technology, Venice
2018	Research Consultant for Sydney University (Nanorobotic Surgery)
2004-2017	Guest Professor at the Ruhr University Bochum. Coordinator of multiple multinational European Union FP6 and FP7 projects.
2006-2008	External faculty member, Santa Fe Institute.
2005-2017	Inaugural director of the European Centre for Living Technology, Venice. Science Board Member 2007-2016.
1999-2004	Head of Biomolecular Information Processing, an independent research unit of the Fraunhofer Gesellschaft (Originally 1999-2003 Helmholtz Institute, GMD - German National Research Center for Information Technology).
1992-2008	Full Professor (C4) at Friedrich-Schiller Univ. in Jena (FSU), Theoretical Biochemistry.
1992-1999	Head of Dept. of Molecular Information Processing at the Institute for Molecular Biotechnology, Jena.
1987-1992	Group leader (C3) in Molecular Self-Organization at MPI for Biophysical Chemistry, Göttingen.
1985-1987	Research Fellow (QE II) with Prof. Edward Fackerell in Applied Mathematics, Sydney University, Australia.
1984-1985	Research Fellow (Otto Hahn) with Prof. Bruno Zimm in Chemistry at UCSD, USA.
1982-1984	Post-doctoral Stipendium with Prof. Manfred Eigen at Max Planck Institute for Biophysical Chemistry, Göttingen.
1979-1982	Oxford University (New College, 1982), D.Phil student with Prof. Norman March in Theoretical Chemistry (Non-equilibrium Quantum Statistical Mechanics).
1979	Research Assistantship, Sydney University, Theoretical Chemistry.

Present research/professional speciality

McCaskill's research concerns information processing in evolving and self-organizing molecular and electronic systems, spanning theoretical and experimental approaches. In the last decade he has established a chemical microprocessor technology for electronically programmable microscale chemistry, and applied it to the development of novel approaches towards artificial cells and DNA processing systems. Most recently his research has led to the development of novel autonomous and programmable electronic-chemical microparticles (labeled) opening a wide range of potential applications in basic and applied research. Over the past 30 years he has contributed to the theory of molecular evolution and introduced the experimental study of microscale spatially-resolved chemical evolution. He developed an ensemble approach to RNA structure prediction, now in wide

use, and the first reconfigurable computing hardware to simulate long-term chemical evolution. He developed microfluidic systems for analysing biomolecular evolution and developed the first programmable in vitro ecosystems. He designed and with his group implemented an optically programmable DNA computer and electronically programmable biomolecular processor using microsystem technology. This has seeded an international initiative to investigate electronically evolvable artificial chemical cells. His current work is centred on modelling the essential interplay of self-organization and evolution in life-like chemical systems and exploring the potential of hybrid IT technology based on these properties. He has produced over 100 scientific publications, taught courses and supervised PhD theses in disciplines ranging from chemistry, physics and biology to computer science, and his multidisciplinary work straddling theory and experiment has been recognized in invited lectures at international conferences around the world. While McCaskill's main work is in basic science, it has spawned several start-up companies and continues to involve the coordination of major collaborative projects fostering novel links between science and industry.

Total years research experience	40 years
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Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc)

1994-2019	Member of the Bunsengesellschaft for Physical Chemistry
2016-2019	Member of the American Chemical society
2011-2012	Reviewer for the European Commission
2005-2019	Science Board member, European Centre for Living Technology, Venice.
2005-2010	CEO Protostream GmbH
2000-2012	Editorial board: Journal of Artificial Life
2001-2008	Vice President, International Society of Artificial Life
2006	External faculty member, Santa Fe Institute.
1992	Haber Prize Deutsche Bunsengesellschaft, (Physical Chemistry)
1985-1987	Queen Elizabeth II Fellowship, Commonwealth
1984	Otto Hahn Medal and Travel Scholarship, Max-Planck-Gesellschaft
1979-1982	Rhodes Scholarship, New College Oxford
1979	University Medal, Sydney University

Total number of peer reviewed publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents
	86	13	28	9

Major engineered devices: PI with direct involvement and leading a team effort

1990-1	Parallel travelling wave capillary reactor for studying spatial molecular evolution.
1992-4	NGEN: massively parallel reconfigurable computer for long time spatial evolution.
1994-7	Spatially resolved silicon-glass microreactors for synthetic biology and evolution
1996	Self-assembling magnetic bead based stirrer for microreactors
1997	Polyp: massively parallel reconfigurable computer with optical interconnect
1995-9	Spatially resolved single molecule tracking system using photosensitized particle detector
2000-1	Meregen: massively parallel reconfigurable computer to study evolution of genetic coding
2001-2	Optically programmable DNA Computer microsystem using magnetic beads
2002-3	Microelectrode actuated flow reactor system for biotechnology (BMBF biopro)
2004-8	The omega machine: an adaptive artificial cell life support system (EU PACE)
2005-8	Chemical microprocessors (μ Chip, Protostream GmbH)
2009-11	Electronic chemical cell device (EU ECCell)
2010-12	Programmable microfluidic droplet processor (EU MatchIT)
2010-12	Tandem confocal fluorescence microscope/macroscope using cylinder optics
2013-14	Programmable combinatorial nl droplet generator (EU CADMAD)
2012-17	Smart electronic chemical surface using CMOS microelectrode array (EU MICREAgents)
2012-17	Lablets: Microscopic reactive programmable electronic chemical particles (MICREAgents)
2018	Design of Surgical Nanorobots (Research Consultancy)