

Curriculum Vitae

Peter Derrick

Summary of Academic Employment

Massey University (2007-present)

Professor of Physical Chemistry and Chemical Physics (2007-present)

Head, Institute of Fundamental Sciences (2007-present)

University of Warwick, UK (1987-2007)

Professor of Chemistry (1987-2007)

Director, Institute of Mass Spectrometry (1988-2007)

Kratos Research Professor of Mass Spectrometry (1987-1994)

Head, Department of Chemistry (1995-2007)

University of New South Wales, Australia (1981-1987)

Professor of Physical Chemistry (1981-1987)

Head, Department of Physical Chemistry (1981-1987)

Head, School of Chemistry (1985-1987)

La Trobe University, Australia (1975-1981)

Lecturer, Department of Physical Chemistry (1975-1977)

Senior Lecturer, Department of Physical Chemistry (1977-1978)

Reader, Department of Physical Chemistry (1978-1981)

University College London, UK (1973-1975)

Ramsay Memorial Fellow, Department of Chemistry

University of California, Berkeley, USA (1971-1972)

Postgraduate Research Chemistry, Space Sciences Laboratory (1971)

Assistant Research Chemistry, Space Sciences Laboratory (1972)

Royal Institute of Technology, Stockholm, Sweden (1969-70)

Royal Society European Fellow, Institute for Physics

Personal

Australian and British Citizenship

Married Kaersti (nee Axell) 1975 – Swedish national

Children Emma and Oliver – both Australian nationals

Education

Churchers College, Petersfield, Hampshire (1956-1957)

Peter Symonds School, Winchester, Hampshire (1957-1963)

Kings College London (1963-1969) : BSc Honours Chemistry, 1966, and PhD Physical Chemistry, 1969

Learned Societies

Fellow of the Royal Society of New Zealand

Ramsay Fellow

President-Elect, New Zealand Institute of Physics

Fellow of the New Zealand Institute of Physics

Fellow of the New Zealand Institute of Chemistry

Fellow of the Institute of Physics (UK)

Fellow of the Royal Society of Chemistry (UK)

Fellow of the Royal Australian Chemical Institute

American Society for Mass Spectrometry

Australian and New Zealand Society for Mass Spectrometry

Overview of Research Career

My research career has been pursued for the most part within Universities, but there have been significant interactions with industry and government organisations. I have consulted extensively for pharmaceutical companies, chemical and oil companies and manufacturers of scientific instruments. Some of these interactions have extended over considerable periods of time (for example, a quarter of a century in the case of both Shell and Bruker). Projects with government organisations have spanned a wide range, from questions in pure physics for the Atomic Energy Commission (Aldermaston, UK) to questions around food purity (UK's food research institute in Norwich) and medicine (Marston, leading Cancer Research Institute in London).

My early academic research (as a postgraduate student) fell in what now would be considered to be classic nanoscience, in the guise of growth of carbon nanostructures on surface. The major contribution early in my career concerned extremely fast chemical reactions, more specifically development of a method of measuring rates of unimolecular reactions in the picosecond time-frame. These measurements, published in the Proceedings of the Royal Society, were arguably the first to be made in this time-frame. I returned to this field a few years later at the University of California, Berkeley, and as a Ramsay Memorial Fellow at University College London. The method became known as "field ionisation kinetics". I was awarded the Meldola Medal by the Royal Institute of Chemistry, as was, for the development of picosecond reaction dynamics.

I took up the first ever Royal Society European Fellowship at the Royal Institute of Technology (KTH) in Stockholm. One contribution was to understanding ion-molecule reactions of interest in atmospheric chemistry (characterised reactions of excited electron state). The most significant piece of work concerned electronic structures of medium-sized organic molecules (benzene, furan). The papers on electronic structures of heteroaromatic molecules are the most heavily cited which I have published, despite being in a field in which citation rates are low. The papers fall in experimental chemical physics, but did also present some of the first examples of applications of molecular orbital theory (now an area of excellence within NZIAS).

My most far-reaching research contributions arose in Australia with again the development of a method, this time for sequencing proteins and other biomolecules and probing assembly of biomolecules. Drawing on skills acquired at King's College London and the Royal Institute of Technology, a novel and literally massive mass-measuring device (mass spectrometer) was designed and fabricated. The field of proteomics grew out of this project. An interest in chemical dynamics runs throughout my career, and quite a large number of significant findings concerning dynamics of isolated proteins or protein assemblies have been reported by one or other of the research groups I have led.

Particularly at the University of Warwick, the groups I led made many novel findings in structural biology and chemical biology. The central tools would always have been mass spectrometers and collaboration was typically strong with life scientists. Contributions arose in a diverse range of fields, with perhaps a focus around cancer research.

I have published extensively on synthetic organic polymers, with particularly significant papers concerning the fine details of stereochemistry in novel materials. A programme initiated in Australia and taken to Warwick addressed dynamics of metallic nanoclusters, and some of the findings made are proving to have significance in catalysis.

At Massey, I have been interested in petroleomics, now an established field which a French colleague and I initiated at Warwick. This field grows in importance at an almost monthly perceptible rate, as realisation of the finite nature of crude oil reserves deepens. The practical discussions around how to exploit these reserves, which at present tend to be thought of as fuels but in the long term will be seen as starting points for chemical synthesis, demand a knowledge of the compositions of oils (notably naphthenic acids). My group at the time was one of, if not the, first to measure naphthenic acids, using Fourier transform ion cyclotron resonance (FT-ICR).

I have in recent years developed an interest in organic photovoltaics, to lead in partnership with Associate Professor Ashton Partridge the programme "High-Efficiency Organic Photovoltaics" funded by the Ministry of

Science and Innovation. This project, ambitious in the sense of spanning from fundamental chemistry through polymer engineering to practical devices on roofs, looks highly promising in terms of delivering an economically significant outcome.

The creation of novel designs for devices which transmit and control charged particles has been an enduring passion. The citation for my Fellowship of the Royal Society of New Zealand mentioned every state-of-the-art mass spectrometer in recent decades having been developed in laboratories I have directed. A touch of hyperbole, but certainly involvement and commitment were always there. Together with co-inventors, patents have been held on tandem mass spectrometry, ideal fields for time-of-flight measurements, matrix-assisted laser desorption/ionization, radiofrequency devices for collimating and controlling ion beams and other subjects. Commercialisation of high-field Fourier transform ion cyclotron resonance (FT-ICR) for biology began in a laboratory I directed.

Major Industrial Consultancies

Bruker (founder member of Scientific Advisory Board of Bruker Daltonics,) : Faellanden (Switzerland), Bremen (Germany) and Billerica (USA) sites

Kratos/Shimadzu : Manchester (UK) and Kyoto (Japan) sites

Bio-Ion, Uppsala (Sweden)

Shell Research and Shell Global Solutions: Amsterdam (Netherlands) and Thornton (UK) sites

Atomic Weapons Establishment (AWE), Aldermaston (UK)

BP Research, Sunbury-on-Thames (UK)

GlaxoSmithKline (UK)

Pfizer, Sandwich (UK)

Unilever, Chester (UK)

Cambridge Scientific Instruments, Cambridge (UK)

ICI, Wilton (UK)

AstraZeneca, Macclesfield (UK)

Surface Analysis Instruments, Manchester (UK)

AmershamPharmaciaBiotech/Amersham Biosciences/GE Healthcare, Uppsala (Sweden)

ELF Attochem, Paris (France)

Nobel Foundation

Nobel Chemistry Committee on occasions and regular consultations

Industrial Positions

Kratos/Shimadzu (1987-1995)

I worked at Kratos (Manchester, UK), later Shimadzu (Manchester, UK and Kyoto, Japan), as special adviser to the Chairman and Chief Executive Officer. The company shifted focus during the period, moving into biological and medical fields. The technology marketed was changed, moving from the magnetic-sector devices which had been the Kratos' strength into new technologies notably time-of-flight. The intellectual property basis for the new time-of-flight technology stemmed in large part from the work of my research group. The future Nobel Laureate (Koichi Tanaka) was a member of the team developing time-of-flight.

Pharmacia, Amersham Biotech and GE Healthcare (1997-present)

I have been involved in an advisory capacity in both scientific and marketing aspects of Amersham Pharmacia Biotech's (later Amersham Biosciences and now GEHealthcare) move into the mass spectrometry business. Current products rest on intellectual property from my research group. Engineering design of the Ettan MALDI TOF mass spectrometer was carried out in collaboration with the group.

Bruker/Bruker Daltonics (1985-present)

I have worked with Bruker (now Bruker Daltonics) for 25 years on development of Fourier transform ion cyclotron resonance (FTICR) for mass spectrometry. I was involved with the decision by Bruker Daltonics to manufacture high-field (9.4 T) Fourier transform ion cyclotron resonance (FTICR) instruments. The first of these high-field instruments was placed in my laboratories at Warwick, and my research group has contributed to the acceptance of this technology by the scientific community.

Commercialisation

The instrumentation company HD Technologies was spun-off from the University of Warwick (in 1994) in collaboration with Kratos (Shimadzu). HD Technologies was acquired by Thermoelectron (in 2001). Warwick Analytical Services (WAS) was spun-off from the University of Warwick in 2001.

One other company was successfully spun-off from the Department of Chemistry at the University of Warwick during my time as Head, and a further ten to twelve enterprises were at different stages of development.

Commercialisation of patented technology is in progress through Massey University.

University Management and Governance

Massey University, New Zealand

Head of the Institute of Fundamental Sciences (2007-present)

The Institute of Fundamental Sciences consists of Chemistry and Biophysics, Mathematics and Mathematical Physics and Statistics and Bioinformatics. The Institute offers Majors and Doctoral Programmes in Nanoscience, Chemistry, Physics, Mathematics and Statistics.

University of Warwick, UK

Chair (1995-2007) and Deputy Chair (1992-1995), Department of Chemistry and Director, Institute of Mass Spectrometry (1988-2007)

University Senate (1995-2001), University Council (1995-1998) and University Court (1992-1998)

The Departments are the effective administrative units at the University of Warwick. Chairs of departments report directly to the Vice-Chancellor. The Chair of the Department has full financial responsibility.

My brief as Chair of Department was to change the culture and “turn the Department through one hundred and eighty degrees”. Research aims and areas were re-defined, management was restructured, undergraduate teaching and research laboratories were entirely refurbished and the undergraduate syllabus overhauled. The Department was awarded grade 5A in the 2001 Research Assessment Exercise, an improvement of two levels in the five-level scale over the previous grading (in 1996), and was awarded “Excellent” for teaching (Quality Assurance Agency 2003), an improvement over “Satisfactory” in the previous assessment. Chemistry at Warwick was places fifth (5th) overall in the THES assessment in 2005, compared to positions consistently below fiftieth (50th) a decade before.

During my period of leadership of Chemistry, interdisciplinary centres for research and postgraduate teaching acted as major instruments of change in the physical sciences at Warwick. Centre for Scientific Computing, Doctoral Training Centre (Molecular Organisation and Aggregation in Cells), Centre for Systems Biology and most recently the High-Field Magnet Centre have all been established.

University of New South Wales, Australia

1981-1987 Head, Department of Physical Chemistry

1982-1987 Head (1985-1987) and Deputy Head (1982-1984), School of Chemistry

1981-1987 Professorial Board

Joining the School of Chemistry at the University of New South Wales as the youngest-ever Professor of Physical Chemistry in Australia, there was an opportunity to revitalize the Department of Physical Chemistry and the School of Chemistry. Organized “Little Bay Workshop” addressing the question “Whither chemistry?”. The professors (organic, inorganic and analytical chemistry), who were to manage the School for the next two decades, were appointed under my leadership. As Chair of the School’s Undergraduate Studies Committee, I restructured and revised the undergraduate course in chemistry.

La Trobe University, Australia

1976-1978 Academic Board (elected representative of School of Physical Sciences)

1979-1981 School of Physical Sciences Board of Studies (elected representative of Department of Physical Chemistry)

1979-1981 Research Committee (elected representative of School of Physical Sciences)

1980 Chairman, Working Party to review distribution of University’s Special Research Grant from Tertiary Education Committee

I was involved with major changes in governance of the University.

University of California, Berkeley, USA

1972 Acting Director of Mass Spectrometry Resource, Space Sciences Laboratory. NASA’s Apollo Program. The Laboratory had responsibility for the analysis of moon rocks from the Apollo missions.

University Teaching

Massey University 2011

Honours course on mass spectrometry.

University of Warwick 1987-2007

Lecture courses in quantum mechanics, advanced reaction dynamics, basic chemical kinetics, colloid science, surface science, analytical science and instrumentation.

Established the degree programme “Chemistry with Psychology”.

Established taught-Masters Degree.

Intensive courses for industry and other external bodies in the area of analytical science.

University of New South Wales 1981-1987

Lecture courses in introductory physical chemistry, advanced chemical physics, advanced surface science and mass spectrometry. Physical chemistry laboratories.

La Trobe University 1975-1981

Lecture courses in physical chemistry for biology and agriculture students, colloid and surface science, polymer chemistry, and mass spectrometry. Advanced physical chemistry laboratory.

University College London 1972-1975

Advanced course on gas-phase kinetics.

Postgraduate Research Supervision

Roger P Morgan, 1976, University College London, PhD

Co-supervisor: Alex G Loudon, "Kinetics and mechanisms of the decompositions of some small radical cations following field ionisation"

Michael G Darcy, 1979, La Trobe University, MSc

"Field ionisation studies using a quadrupole mass filter"

David E C Rogers, 1980, La Trobe University, PhD

"A mass spectrometer for the analysis of nonvolatile biological compounds"

Phillip T Mead, 1980, La Trobe University, MSc

Co-supervisor: John R Christie, "Unimolecular decompositions of gaseous organic ions"

Gregory M Neuman, 1983, La Trobe University, PhD

"Mass spectrometry of peptides"

Kein F Donchi, 1983, University of New South Wales, PhD

"Unimolecular decomposition of organic cations"

Anthony G Craig, 1984, University of New South Wales, PhD

"Mass spectrometry of organic polymers"

Bruce A Rumpf, 1985, University of New South Wales, PhD

"Determination of translational energy release distributions in the decompositions of metastable ions"

Colin E Allison, 1986, University of New South Wales, PhD

"Kinetic isotope effects in unimolecular decompositions of metastable ions"

Peter G Cullis, 1987, University of New South Wales, PhD

"A mass spectrometer for the analysis of thermally labile compounds"

Margaret M Sheil, 1987, University of New South Wales, PhD

"Collision-induced decomposition of multiatomic ions"

Stephen C Davis, 1988, University of New South Wales, PhD

"Formation, trajectories and collisions of beams of multiatomic ions"

Wilbert W Hope, 1988, University of New South Wales, PhD

"Mass spectrometry of poly(methyl methacrylate)s of low molecular weight"

Muljadji Agma, 1989, University of New South Wales, PhD

Co-supervisor: Gary D Willett, "Production and analysis by mass spectrometry of beams of polyglycol ions"

Thank H Nguyen, 1989, University of New South Wales, PhD

Co-supervisor: Gary D Willett, "Excimer laser desorption Fourier transform mass spectroscopic studies of synthetic porphyrins"

Daniel R Jardine, 1989, University of New South Wales, PhD

"Tandem time-of-flight mass spectrometry"

Caroline D Bradley, 1992, University of Warwick, PhD

"Mechanism of collision-induced decomposition of gaseous multiatomic ions"

T-W Dominic Chan, 1992, University of Warwick, PhD

"Matrix-assisted ultraviolet laser desorption/ionisation mass spectrometry of macromolecules"

Pui Y Yau, 1994, University of Warwick, PhD

“Thresholds for production of gaseous ions in matrix-assisted laser desorption/ionisation mass spectrometry of bio-molecules”

Anastassios E Giannakopoulos, 1994, University of Warwick, PhD

“Matrix-assisted laser desorption/ionisation collisions of bio-molecules”

Paul J Gates, 1995, University of Warwick, MSc

“Matrix-assisted laser desorption/ionisation mass spectrometry of saccharides”

Helen J Cooper, 1995, University of Warwick, PhD

“Mass spectrometric studies of collisional activation and target capture”

Ulla N Andersen, 1995, Odense University, PhD

Co-supervisor: Gustav Bojesen, “Investigation of the gas phase chemistry of multiply charged transition metal complexes”

Emmanuel N Raptakis, 1996, University of Warwick, PhD

“High resolution, high sensitivity tandem mass spectrometry of macromolecules using time-of-flight techniques”

Jacqueline A Mosely, 1996, University of Warwick, PhD

“Collisional activation and target capture with massive ions by means of magnetic-sector mass spectrometry”

Tracey L Shield, 1997, University of Warwick, PhD

“Mass spectrometric characterisation of the 3-hydroxy-pyridinium collagen cross-link molecules and derivatives”

Julie E Varney, 1997, University of Warwick, PhD

“Production and analysis of beams of synthetic polymers by mass spectrometry”

Paul M Lloyd, 1998, University of Warwick, PhD

“Matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry of synthetic polymers”

Christopher P Ball, 1998, University of Warwick, PhD

“The investigation of gas phase non-covalent interactions of cyclodextrins by mass spectrometry”

Anne-Mette Hoberg, 1998, University of Warwick, PhD

Co-supervisor: David M Haddleton, “Intricacies regarding matrix-assisted laser desorption/ionisation of synthetic polymers”

Andrew West, 1999, University of Warwick, PhD

“Investigations by mass spectrometry of the interaction of novel serine protease inhibitors with herpes simplex virus type 2 and human cytomegalo virus proteases”

C Paul Myatt, 1999, University of Warwick, PhD

“The development of a matrix-assisted laser desorption/chemical ionisation time-of-flight mass spectrometer”

James I Wallace, 1999, University of Warwick, PhD

“The analysis of biological molecules by electrospray ionisation Fourier transform ion cyclotron resonance (ESI-FTICR) mass spectrometry”

Nicholas C Charnley, 2000, University of Warwick, PhD

Co-supervisor: Paul C Taylor, “Developing new matrices for matrix-assisted laser desorption/ionisation mass spectrometry”

Andrew R Bottrill, 2000, University of Warwick, PhD

“High-energy collision-induced dissociation of macromolecules using tandem double-focussing/time-of-flight mass spectrometry”

Benjamin Thomas, 2000, University of Warwick, PhD

“Tandem time-of-flight mass spectrometry incorporating quadratic-field technology”

Liam A McDonnell, 2001, University of Warwick, PhD

“Characterisation of macromolecules using electrospray ionisation and Fourier transform ion cyclotron resonance mass spectrometry”

Sajid Bashir, 2001, University of Warwick, PhD

“The development of matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry and its application to the study of polymers and biopolymers”

Mark S Woodward, 2001, University of Warwick, PhD

“Fundamental studies and instrumental methodology in the mass spectrometric analysis of low-mass polymeric systems”

Phillip Green, 2001, University of Warwick, PhD

“Biochemical applications of electrospray ionisation coupled with Fourier transform ion cyclotron resonance mass spectrometry”

Yi Bing Zhang, 2002, University of Warwick, PhD

“Development of electrospray ionisation of biomolecules on a magnetic sector mass spectrometer”

Marjaana Nousiainen, 2002, University of Joensuu, PhD

Co-supervisor: Professor P Vainiotalo, “Osteocalcin, calmodulin, and troponin C: Metal ion and peptide binding study by electrospray ionisation Fourier transform ion cyclotron resonance mass spectrometry”

Alexander W Colburn, 2002, University of Warwick, PhD

“The design, fabrication and performance of a time-of-flight mass spectrometer incorporating a quadratic-field reflectron”

Jennifer K. Mitchell, 2003, University of Warwick, PhD

“Whole Protein Studies using Electrospray Ionisation. Fourier transform Ion Cyclotron Resonance Mass Spectrometry. Focusing on the Calmodulin System”

William Burkitt, 2006, University of Warwick, PhD

“Metal-binding proteins in the gas phase”

Stephanie Geoffroy, 2007, University of Warwick, PhD

“Troponin function studied by Fourier transform ion cyclotron resonance mass spectrometry”

Marie Anderson, 2007, University of Warwick, PhD

“Ion Cyclotron Resonance Studies of the Reactions of Charged Transition Metal Clusters with Small Molecules”

John Bomphrey, 2007, University of Warwick, MSc

“An FT-ICR Investigation into the Reactivity and Dynamics of Cationic Niobium Clusters with Respect to Small Neutral Molecules”

Lewis Mark, 2009, University of Warwick, PhD

“Carbon Nanotubes and other Highly Curved Surfaces for Field Emission and Field-promoted Ionisation”

Matthew Gill, 2010, University of Warwick, PhD

“The Ion Conveyor: an Ion Focussing and Conveying Device for Mass Spectrometry”

Penelope Bilton, 2010, Massey University, MAppStats

“A Statistical Model to Characterize the Naphthenic Acid Component of Petroleum”

Research Record

Massey University (2007-present) : Nanoscience, Instrumentation, Proteomics

Electrodynamical ion optics

Petroleomics and oil chemistry

Photovoltaics

Aggregation of proteins probed by electrospray ionisation (ESI) mass spectrometry.

Folding and unfolding of proteins studied by mass spectrometry.

High-field (9.4 T) FTICR.

University of Warwick (1987-2007) : Physical Chemistry, Instrumentation and Biophysics

Artificial intelligence programme in collaboration with Professor G V Jones (Psychology, Warwick). Developed expert system for state-of-the-art mass spectrometers.

Formation and characterisation of naked metal-clusters. Chemisorption of gases on gaseous metal clusters. Reactivities of isomers by laser spectroscopy and mass spectrometry.

Electrodynamical ion optics

Petroleomics and oil chemistry. High-field (9.4 T) FTICR. Complex mixture analysis.

Assembly and aggregation of proteins probed by electrospray ionisation (ESI) mass spectrometry.

Folding and unfolding of proteins studied by ESI mass spectrometry.

Metal-binding proteins. Modes of action elucidated by ESI and Fourier transform ion cyclotron resonance (FTICR).

Collision experiments with a unique mass spectrometer (MMM) (relocated to Coventry from Sydney). Development of impulsive collision theory for collisions of high-energy biomacromolecular ions with atoms (small molecules).

Developed four-sector tandem mass spectrometry for structural characterisation of biomolecules. Focal plane detection.

Time-of-flight (TOF) mass spectrometry. Developed quadratic-field ion mirror technology ("ideal" ion mirrors), in particular for tandem mass spectrometers. Designed and built magnetic-sector/quadratic-field TOF, TOF/quadratic-field TOF (TOF/TOF) and pulsed-source (delayed extraction) quadratic-field TOF instruments.

Laser-based methods for production of gaseous ions from proteins and other biomolecules.

Elucidation of mechanism of matrix-assisted laser desorption/ionization (MALDI).

Applications of MALDI to peptide mixtures and proteins.

Designed and fabricated electrospray ionization (ESI) ion sources for operation at high potentials with magnetic-sector and TOF mass spectrometers. Effects of ion optics, fluid dynamics and reactive collisions.

Designed and fabricated gas chromatography/magnetic-sector technology for environmental applications.

Pioneered applications of matrix-assisted laser desorption/ionization (MALDI) for characterisation of synthetic polymers.

Applications of magnetic-sector mass spectrometry to identification and characterisation of biomolecules (major histocompatibility complex peptides, glycosphingolipids, pituitary peptides).

University of New South Wales (1981-1987) : Physical Chemistry

Developed high-mass tandem mass spectrometry and field desorption for characterisation of biomolecules (peptides) and synthetic polymers, using the unique mass spectrometer (MMM) (relocated to Sydney from Melbourne).

Pioneered time-of-flight (TOF) and tandem time-of-flight (TOF/TOF) for characterisation of biomolecules.

Pioneered Fourier transform ion cyclotron resonance (FTICR) for tandem mass spectrometry of biomolecules. Laser desorption and field desorption by FTICR.

Theory of collisional activation and collision-induced dissociation of biomolecular ions. Energy shifts (so called "Derrick shifts").

Structures and reactions of small isotopically labeled organic ions. Molecular orbital calculations.

La Trobe University (1975-1981) : Physical Chemistry

Pioneered tandem mass spectrometry and field desorption for structural characterisation of peptides (and proteins), oligosaccharides and other biomolecules. Designed and fabricated high-mass tandem mass spectrometer (MMM) for biomolecular analysis.

Unimolecular rate theory. Theory of energy partition in unimolecular decomposition of organic ions.

University College London (1972-1975) : Gas Kinetics (Postdoctoral Fellow with the late Professor A Maccoll)

Developed field ionization kinetics. Appearance energies and thermochemistry of organic ions. Ion structures.

University of California Berkeley (1971-1972) : Analytical Science (Postdoctoral Fellow and Research Scientist with Professor A L Burlingame)

Developed and applied field ionization kinetics to isotopically labeled organic molecules (cyclohexene). Elucidated mechanisms of classic rearrangements of gaseous organic ions. Proposed distonic ions (as species were subsequently named) as intermediates in unimolecular gas-phase rearrangements of organic ions.

Royal Institute of Technology, Stockholm (1969-1970) : Atomic Spectroscopy (Postdoctoral Fellow with the late Professor E Lindholm)

Charge exchange. Electron spectroscopy. Four-sector tandem mass spectrometry. Molecular orbital calculations. Rydberg series. Elucidated electronic structures of heteroaromatics (furan, pyrrole, thiophene, cyclopentadiene).

Kings College London (1966-1969) : Surface Science (Postgraduate Student with the late Professor A J B Robertson)

High-vacuum techniques. Developed method (later named "field ionisation kinetics") for measuring picosecond lifetimes of field-ionised organic molecules.

Research Funding

Massey University (2007-present)

Ministry of Science and Innovation

High-efficiency organic photovoltaics (NZ\$5.8M over six years)

Engineering and Physical Sciences Research Council (EPSRC)

Ion conveyor and nanostructures (approximately NZ\$500k)

European Union

Transfer of Knowledge Programme with Czech Academy of Science (approximately NZ\$100k)

University of Warwick (1987-2007)

Engineering and Physical Sciences Research Council (EPSRC)

Grant income from EPSRC during the decade prior to 2007 totaled over three million pounds from the seven major grants.

Biotechnology and Biological Sciences Research Council (BBSRC) and Rowatt Research Institute

Grant income from BBSRC during the decade prior to 2007 exceeded one million pounds for four-sector tandem mass spectrometry of metabolites and cell-signaling peptides and for structural proteomics.

Industrial Research Contracts

Contracts in the past decade totalled about three million pounds from instrumentation companies and from pharmaceutical/ chemical companies. Major contracts with Bruker (£500k), Shell (£400k), Kratos/Shimadzu (£400k), GlaxoSmithKline, Kentech, Cambridge Scientific Instruments, ICI, Elf Attochem, Astra Zeneca, BP, Unilever, Pfizer, Courtaulds (Accordis), Syngenta, Avecia.

European Union

Two research networks, one on “Mass Spectrometry of Biomolecules” and one on “Gas Phase Ion Chemistry” (total support approximately 2M ECU). Marie Curie Research Training Site in “Instrumental Aspects of Biomacromolecular Mass Spectrometry and Bioanalytical and Biophysical Chemistry” (total support approximately 300k ECU).

Royal Society London

Grants amounting to £142k for studies in the area of time-of-flight technology for biological mass spectrometry.

University of New South Wales, Sydney, Australia (1981-1987) and La Trobe University, Melbourne, Australia (1975-1981)

Australian Research Committee (ARC)

Continuous funding for two lines of research (mass spectrometry of macromolecules and gas-phase ion chemistry) over twelve years. Funding for Fourier transform ion cyclotron resonance (FTICR) in final three years.

Invited Lectures

Include: American Society for Mass Spectrometry Pan-Pacific Meeting, Vancouver, 2012
Russian Academy of Science, Moscow, 2011
New Zealand Institute of Chemistry, Hamilton, 2011
Italian Chemical Society, Palermo, 2011
Max Planck Institute, Göttingen, 2011
Analysdagarna, Uppsala, 2010
Biennial NZ Oil & Gas Industry Outlook Conference, Wellington, 2009
Australian and New Zealand Mass Spectrometry Conference, Sydney, 2009
Proteome, Novosibersk, 2006
Czech Meeting on High-Performance Liquid Chromatography, Doubice, 2006
Lake Louise Meeting, Canada 2005
Inaugural Conference of Russian Mass Spectrometry Society, Moscow, 2003
Biochemical Society Focused Meeting Intermolecular Associations in 2D and 3D, Nottingham, 2003
International Congress of Electrophoretic Societies. Proteomics: Current Perspectives and Future Challenges, Glasgow, 2003
RNomics and Functional Genomics. Mass Spectrometry in Molecular Biology, Stockholm, June 2002
Proteome Information Exchange, Münster, May 2003 and May 2002
European Fourier Transform Mass Spectrometry Workshop, Rolduc, 2001
AmershamPharmacia Biotech European Proteomics Tour (2000 and 1999)
Desorption 2000, St Malo, and Desorption 2004, St Petersburg
Pittcon Conference (New Orleans 2000 and New Orleans 1994)
French Society for Mass Spectrometry 2000
French Academy of Science, Paris, 1999
North American Fourier Transform Mass Spectrometry Workshop, San Diego, 1999
Chinese Academy of Science, Beijing, 1999
German Society for Mass Spectrometry 1998
Asilomar Conference on Mass Spectrometry, 1996 and 1987
Italian Society for Mass Spectrometry, Palermo 1996

Informal Conference on Mass Spectrometry, Padova 1992 and 1988, Budapest 1995 and 1993
Tokay 2004
International Mass Spectrometry Conference (Budapest 1994 and Swansea 1985)
Norwegian Society for Mass Spectrometry, 20th Jubilee, Geilo 1993, and 11th Meeting,
Hafjell, 2005
Finnish Chemical Congress, Helsinki, 1991
Rigi Conference, Switzerland, 1991
British Mass Spectrometry Conference (London 1991 and 1984)
Sandbjerg Gods, Denmark, 1989
Nordic Conference on Mass Spectrometry, Geilo 1989
Japanese Society for Mass Spectrometry 1986
Colloquium Spectroscopicum Internationale, Garmisch Partenkirchen, 1985
Australian and New Zealand Mass Spectrometry Society, Sydney, Australia, 1981
American Society for Mass Spectrometry, Honolulu, USA, 1982
Gordon Conference on Analytical Chemistry, USA, 1973

Awards

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| 2011 | Fellow, Royal Society of New Zealand |
| 2009 | Australian and New Zealand Society for Mass Spectrometry Morrison Medal |
| 2007 | Royal Society of Chemistry (UK) Thermo Fisher Scientific Award |
| 2006 | Royal Society of Chemistry Thermolectron Award for Mass Spectrometry |
| 2005 | Czech Academy of Science Fellowship |
| 2004 | Japanese Society for Promotion of Science Fellowship (for Professor M Toyoda) |
| 2002 | Royal Society UK/Czech Fellowship (for Dr V Havlicek, Prague) |
| 2001 | Royal Society UK/Chinese Fellowship (for Professor Xiong, Chinese Academy of Science) |
| 1997 | Royal Society UK/NATO Fellowship (for Dr M V Kosevich, Ukraine) |
| 1985 | Japanese Society for Promotion of Science Fellowship |
| 1976 | Rennie Medal (Royal Australian Institute of Chemistry) |
| 1975 | Meldola Medal and Prize (Royal Institute of Chemistry) |
| 1973 | Ramsay Memorial Fellowship |
| 1970 | Royal Swedish Academy of Science Fellowship |
| 1969 | Royal Society European Fellowship |

Learned Journals

- 1990-1994 Editor-in-Chief, *Organic Mass Spectrometry (OMS)* – published by Wiley.
Australian Editor of *OMS* from 1982-1987.
- 1995-Present Founded *European Mass Spectrometry* in 1995, together with the late Professor Allan Maccoll and Ian Michael of IM Publications. Editor-in-Chief from 1997 to present (journal re-named *European Journal of Mass Spectrometry*)

Major International Conferences Organised

- Faraday Symposium 25 - Large Gas Phase Clusters 1990
2nd European Tandem Mass Spectrometry Conference, Warwick 1992
5th European Fourier Transform Mass Spectrometry Workshop, Warwick 1999
3rd International Symposium on Applied Mass Spectrometry in the Health Sciences and 3rd European Tandem Mass Spectrometry Conference, Barcelona 1995
Showcase Science, 2004 and 2006

Patents

- 1 “Tandem mass spectrometry systems based on time-of-flight analyser”, (co-investigators D S Alderdice, D R Jardine) 1990 – owned by University of New South Wales.
- 2 “Ion mirror for a time-of-flight mass spectrometer” (co-inventor S C Davis) 1990
- 3 “Mass spectrometry systems” (co-inventor S C Davis) 1990
- 4 “Tandem mass spectrometry systems” (co-inventors J D Waldron and S C Davis) 1990
- 5 “Combined magnetic-sector mass spectrometer and time-of-flight mass spectrometer” (co-inventors J D Waldron, M G Dowsett) 1990 – owned by Kratos/Shimadzu
- 6 “Tandem mass spectrometry apparatus” (co-inventors A Makarov, D Reynolds) 1994 – owned by University of Warwick
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PUBLICATIONS GROUPED BY SUBJECT

Professor Peter J Derrick

INDEX

| | | |
|---|---|----|
| A | Nanoscience and Interfaces..... | 18 |
| B | Molecular Reaction Dynamics | 19 |
| C | Molecular Spectroscopy..... | 21 |
| D | Gas Phase Ion Chemistry: Experiment and Theory..... | 21 |
| E | Molecular Collisions..... | 23 |
| F | Analytical Chemistry and Biochemistry..... | 23 |
| G | Polymer Science | 26 |
| H | Instrumentation..... | 27 |
| I | Proteomics and Protein Structure | 29 |
| J | Reviews in Mass Spectrometry | 31 |

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