

Curriculum Vitae

Raymond F. Bishop

1. Personal Details

Name: Raymond Francis Bishop, MA, PhD, CSci, CMath, CPhys, FIMA, FInstP, Fellow APS

Date of Birth: 27 August 1945

Place of Birth: Berkhamsted, Herts., England

Marital Status: Married (to Zofia Katarzyna Bishop)

Children: 2 sons

Nationality: British

2. Education

Institution	Dates	Subject	Degree
The Queen's College, Oxford University	1963–66	Physics	B.A. (Hons. Class I)
Stanford University, U.S.A.	1966–71	Theoretical Physics	Ph.D.

Ph.D. Thesis Title: “On the Theory of Interacting Fermi Systems”

Ph.D. Thesis Advisor: Professor J.D. Walecka

3. Academic Honours and Distinctions

State Scholarship to Oxford University (1963–1966)

Open Scholarship at The Queen’s College, Oxford (1963–1966)

SRC/NATO Postgraduate Scholarship at Stanford University (1966–1969)

Fulbright Fellowship (1966–1972)

Postgraduate Fellowship from Stanford University (1966–1968)

SRC Postdoctoral Research Fellowship (1972–1973)

Fellow of the Institute of Physics (FInstP) (1981)

Fellow of the Institute of Mathematics and its Applications (FIMA) (1984)

Awardee, Rector’s Medal of Honour from the University of Helsinki (1990)

Member of the International Association of Mathematical Physics (1991)

Fellow of the American Physical Society (2004)

with the citation:

“for pioneering development of the coupled-cluster method and its innovative application across the full spectrum of subfields of physics, as well as for his leadership of the international community of many-body theorists”

The International Conference on *Microscopic Approaches to Many-Body Theory* was held in Manchester in honour of my 60th birthday (2005)

Awardee, Eugene Feenberg Memorial Medal in Many-Body Physics (2005)

with the citation:

“for his development of the coupled-cluster method toward a comprehensive ab initio approach, and innovative applications across the full spectrum of subfields of quantum many-body physics”

4. Visiting Appointments

Visiting Professor (during sabbatical leave) at Fine Theoretical Physics Institute, School of Physics and Astronomy, University of Minnesota, Minneapolis, USA; 1 October 2007–31 July 2008

Visiting Professor, Department of Physics, Loughborough University, UK; 1 December 2016–30 November 2022

Visiting Professor, School of Physics and Astronomy, University of Minnesota, Minneapolis, USA; 2 December 2016–1 December 2022

5. Employment Record

(1) **Institute of Theoretical Physics, Stanford University, U.S.A.**

- i. Teaching Assistant (1966–1968)
- ii. Research Assistant (1968–1971)
- iii. Research Associate (1971–1972)

(2) **Department of Physics, Manchester University, U.K.**

- i. SRC Research Fellow (1972–1973)
- ii. Senior Research Associate (1973–1974)
- iii. Lecturer in Theoretical Physics (1974–January 1978)

(3) **Science Research Council, Daresbury Laboratory, U.K.**

- i. Consultant to the Theory Group (1974–January 1978)

(During the period October 1974–January 1978, I held a joint appointment. While principally hired by Manchester University as a Lecturer, I spent half my time on secondment to Daresbury Laboratory as a Consultant.)

(4) **Lawrence Berkeley Laboratory, University of California, U.S.A.**

- i. Staff Scientist (January 1978–July 1979)

(5) **Department of Physics, University of California at Berkeley, U.S.A.**

- i. Lecturer in Physics (1978–1979)

(From October 1978 I held a joint appointment. While principally employed in the Nuclear Science Division at LBL, I spent one third of my time as a Lecturer seconded by the Physics Department at UCB.)

(6) **Department of Mathematics, UMIST, U.K.**

- i. Lecturer in Mathematics (Mathematical Physics) (1979–1983)
- ii. Senior Lecturer in Mathematics (Mathematical Physics) (1983–1986)
- iii. Reader in Theoretical Physics (1986–1988)
- iv. Professor of Theoretical Physics (1988–1995), and
- v. Head of Department (1991–1995)

(7) **Department of Physics, UMIST, U.K.**

- i. Professor of Theoretical Physics (1995–2004)
- ii. Head of Department (1996–1997)

(8) **School of Physics & Astronomy, The University of Manchester, U.K.**

- i. Professor of Theoretical Physics (2004–2007)
- ii. Distinguished University Research Professor of Theoretical Physics (2007–2010)
- iii. Distinguished Emeritus Professor of Theoretical Physics (2010–present)

6. University Service, Management and Leadership

Since joining UMIST in 1979 I have served on many committees and in a large number of leadership and management roles within the university. I list below only a brief selection of some of the more demanding and important such roles:

(1) Department of Mathematics, UMIST; 1979–1995

- Chair, Departmental Academic Board (1981–1984)
- Departmental Budget Officer (1986–1995)
- Chair, Departmental Research Committee (1988–1991)
- Head, Theoretical Physics Research Group (1991–1995)
- Head of Department (1991–1995)

(2) Department of Physics, UMIST; 1995–2004

- Departmental Budget Officer (1996–2004)
- Chair, Departmental Research Committee (1997–2003)
- Head, Theoretical Physics Research Group (1995–2004)
- Head of Department (1996–1997)

(3) School of Physics and Astronomy, The University of Manchester; 2004–2010

- Member, Senior Leadership Team (2004–2008)
- Chair, Estates and Space Management Committee (2004–2008)

(4) UMIST; 1979–2004

- Member, Academic Board (1982–1985, 1988–2004)
- Member, Academic Establishment Committee (1984–1989)
- Member, Budget Committee (1986–1989)
- Member, Dean's Committee on the Assessment of Teaching (1986–1988)
- Member, Standing Committee of Academic Board (1989–1992)
- Member, Academic Development and Resources Committee (1990–1995)
- Member, Academic Board Executive Committee (1992–1998)
- Member, Court of Governors (1997–2003)
- Member of Council (1997–2000)
- Member, Council Committee to Select the New Principal and Vice-Chancellor (2000)

(5) Faculty of Technology, UMIST and Victoria University of Manchester; 1979–2004

- Member of Senate (1984–1987, 1989–1992)
- Member, Faculty Review Committee (1984–1986)
- Member, Undergraduate Courses Committee (1985–1988)

(6) The University of Manchester; 2004–2010

- Member, Faculty of Engineering and Physical Sciences Estates Strategy Group (2004–2007)
- Member of Senate (2004–2008)
- Member of General Assembly (2004–06)

7. Teaching Experience and Course Development

Both in the USA and in the UK I have taught a wide range of courses in physics and mathematics, from elementary undergraduate level through to advanced postgraduate level. I have taught groups varying in size and style from small group tutorials containing 4 undergraduate students to examples classes of 20 students; and from postgraduate or advanced undergraduate lecture classes of 15 students to 1st-year undergraduate mathematics service courses of 500 students. By now the range of material that I have taught covers most of the core undergraduate syllabus in theoretical physics and applied mathematics. Examples of the courses that I have taught include the following (where I indicate the level of each course and the number of contact hours each year I taught it):

- Small Group Tutorials in Core Physics (1st year, 2nd year, 3rd year) [24 hours]
- Small Group Tutorials in Pure Mathematics (1st year) [24 hours]
- Small Group Tutorials in Applied Mathematics (1st year) [24 hours]
- Classical Mechanics (1st year) [40 hours] [*]
- Electricity and Magnetism (1st year) [40 hours] [*]
- Vectors, Fields and Relativity (1st year) [24 hours] [+]
- Vibrations and Waves (1st year) [24 hours]
- Linear Algebra (1st year) [24 hours]
- Mathematics for Physical Sciences and Engineering [1st year] [48 hours] [*]
- Physical Field Theory (2nd year) [24 hours]
- Introductory Quantum Mechanics (2nd year) [24 hours] [*]
- Lagrangian Dynamics (2nd year) [24 hours]
- Thermal and Statistical Physics (2nd year) [24 hours]
- Mathematics for Engineering (2nd year) [36 hours] [*]
- Electromagnetic Theory (3rd year) [24 hours] [+]
- Nuclei and Particles (3rd year) [24 hours] [+]
- Quantum Mechanics (3rd year) [24 hours] [*]
- Atomic and Molecular Physics (3rd year) [24 hours] [+]
- Advanced Mathematical Methods for Physics (3rd year) [24 hours]
- Quantum Statistical Mechanics (3rd year) [24 hours]
- Examples Classes in Theoretical Physics (3rd year) [24 hours]
- General Relativity (3rd/4th year) [24 hours] [*]
- Advanced Quantum Mechanics (4th year) [24 hours] [*]
- Advanced Electrodynamics (4th year) [24 hours] [*]
- Quantum Many-Body Theory (postgraduate) [36 hours] [*]
- Advanced Nuclear Theory (postgraduate) [60 hours] [*]
- Quantum Information Theory (postgraduate) [48 hours] [*]

During my time in UMIST I was responsible for leading a team that completely redesigned the entire suite of undergraduate theoretical physics courses offered. Of the courses listed above, 12 (denoted by [*]) were introduced, designed and taught for the first time by me, and a further 4 (denoted by [+]) were completely re-designed by me before I taught them.

During my entire teaching career I have consistently scored above average on student satisfaction questionnaires.

I have also lectured at 8 international physics summer schools for postgraduate students and young post-doctoral researchers, including the first ever such venture in China after the Cultural Revolution, and the first in Iran after the overthrow of the Shah. In both cases some of the lectures were recorded and shown on national television.

8. Research Interests

My main field of research has been microscopic quantum many-body theory and its applications to systems in nuclear physics, subnuclear physics and quantum field theory, condensed matter physics, quantum fluids and ultra-dense matter, statistical physics, and quantum information theory.

Specific examples of problems and topics on which I have worked or have current interests include:

- dense nuclear (and baryonic) matter, and
- neutron stars and beta-stable matter;
- finite atomic nuclei;
- hypernuclei and hypernuclear matter, and
- the general problem of impurities in Fermi systems;
- a two-fluid model of nuclear rotations and surface vibrations;
- translationally-invariant cluster methods in coordinate space, as an efficient alternative to shell-model expansions;
- the electron liquid and electron correlations (metals and plasmas), and
- other Coulombic liquids;
- the liquids ^3He and ^4He ;
- condensation in interacting Bose systems, and
- the general theory of critical phenomena;
- pairing and higher-order clustering in Fermi systems;
- constrained variational theories of dense quantum liquids;
- general development of the coupled cluster method, and its applications to
- anharmonic oscillators and nonlinear systems in quantum field theory,
- quantum (antiferro)magnets and low-dimensional quantum spin arrays,
- strongly correlated lattice electrons, e.g., the Hubbard model,
- lattice gauge field theories, e.g., $U(1)$, $Z(2)$, $SU(2)$ models,
- chiral lattice field theories, and
- the Rabi Hamiltonian and other models in quantum optics, quantum electronics, and solid-state optoelectronics;
- the development of the extended coupled cluster method, and its applications to
- a generalised bosonisation procedure as an exact mapping of quantum many-body/field theory into classical Hamiltonian mechanics,
- an exact hierarchical generalisation of the random-phase approximation for many-body mean fields,
- the holomorphic representations of simple model field theories,
- quantum fluid mechanics, and
- charged impurities in polarisable media, e.g., positron annihilation in metals;
- generalised coherent states,
- new classes of mixed coherent states, including thermal coherent states,
- generalised thermofield dynamics, and
- noisy bases in Hilbert space.

Since coming to Manchester I have supervised the doctoral studies of some 20 postgraduate students who have successfully submitted and been awarded their PhD degrees. Over the same period I have also worked with and mentored approximately 20 postdoctoral research associates whom I have funded from research grants awarded to me by various grant-awarding bodies (– mostly EPSRC and its predecessors), and whose careers I have successfully managed.

9. (a) Invitations and Professional Meetings

Invited participant in the Ninth Symposium on Many-Body Theory and Statistical Mechanics, London; December 1973.

Participant in the 15th Scottish Universities Summer School in Physics (on the Liquids Helium), St. Andrews; 22 July–10 August 1974.

Invited visitor to Ruhr-Universität Bochum, W. Germany; 7-17 December 1975.

Invited summer visitor to Stanford University, California, USA; July–August 1976.

Invited speaker at the Workshop on Dense Matter, Washington University, St. Louis, Missouri, USA; 27-29 September 1976.

Invited visitor, M.I.T., USA; 30 September–5 October 1976.

Recipient of a grant from the Heinrich-Hertz-Stiftung to visit Ruhr-Universität Bochum, W. Germany; 7-28 February 1977.

Visiting Professor at Ruhr-Universität Bochum, W. Germany; 11 July–30 September 1977.

Joint Organizer, 1978 Lawrence Berkeley Laboratory Summer Theory Workshop (on High Energy Heavy Ion Physics), Berkeley, California, USA; 17 July–31 August 1978.

Invited participant in the Fourth Summer Study on High Energy Nuclear Collisions, Lawrence Berkeley Laboratory, California, USA; 24-28 July 1978.

Invited Visitor, University of Utah, Salt Lake City, USA; 6-8 December 1978.

Invited participant in the First Workshop on Ultra-Relativistic Nuclear Collisions, Lawrence Berkeley Laboratory, California, USA; 21-24 May 1979.

Invited participant in the International Conference on Band Structure and Nuclear Dynamics, Tulane University, New Orleans, USA; 28 February–1 March 1980.

Session chairman and speaker at the I.o.P. Conference “Trends in Nuclear Structure Physics,” Manchester, England; 16-18 April 1980.

Invited participant in the Workshop in Nuclear Physics, Drexel University, Philadelphia, USA; 1-3 September 1980.

Guest distinguished visitor to the Institute of Nuclear Physics of the Czechoslovak Academy of Sciences, Řež (near Prague); 8-15 September 1980 (co-sponsored by The British Council).

Invited speaker and discussion leader at the 5th Pan-American Workshop on Condensed Matter Theories, University of Mexico, Mexico City; 5-9 January 1981.

Invited speaker at the 2nd International Conference on Recent Progress in Many-Body Theories, Oaxtepec, Morelos, Mexico; 12-17 January 1981.

Speaker at the XVI International Conference on Low Temperature Physics, Los Angeles, California, USA; 19-25 August 1981.

Speaker at the European Physical Society 2nd General Conference of the Condensed Matter Division, Manchester; UK; 22-25 March 1982.

Visiting Professor at the Institute of Nuclear Physics of the Czechoslovak Academy of Sciences, Řež near Prague); July–August 1982 (co-sponsored by The British Council).

Invited speaker and discussion leader at the 6th Pan-American Workshop on Condensed Matter Theories, Washington University, St. Louis, Missouri, USA; 20 September–1 October 1982.

Speaker at the I.o.P. Conference on Nuclear Structure and Particle Physics, University of Liverpool, UK; 23-25 March 1983.

Visiting Professor at the Institute of Nuclear Research, Warsaw, Poland; 29 May–19 June 1983 (co-sponsored by The British Council).

Invited speaker and session chairman at the 1983 International Summer School on the Nucleon-Nucleon Interaction and Nuclear Many-Body Problems, Jilin University, Changchun, People's Republic of China; 25 July–1 August 1983 (co-sponsored by The British Council and Academia Sinica), followed by an extensive lecture tour of China, sponsored by Academia Sinica.

Invited speaker and discussion leader at the 7th (Pan-American) Workshop on Condensed Matter Theories, Altenberg, Nordrhein-Westfalen, W. Germany; 22-27 August 1983.

Invited speaker and session chairman at the 3rd International Conference on Recent Progress in Many-Body Theories, Altenberg, Nordrhein-Westfalen, W. Germany; 29 August–3 September 1983.

Invited visitor to Centre d'Études Nucléaires de Saclay, CEA, Gif-sur-Yvette, France; 4-6 January 1984.

Visiting Professor at Research Institute for Theoretical Physics, University of Helsinki, Finland; 28 March–7 April 1984.

Invited visitor to Michigan State University, USA; 17-18 April 1984.

Visiting Professor at the Institute of Nuclear Research, Warsaw, Poland; 3-18 June 1984 (co-sponsored by The British Council).

Invited speaker and session chairman at the 8th Workshop on Condensed Matter Theories, Granada, Spain; 17-28 September 1984.

Invited participant in the Workshop on Skyrmions, SERC Rutherford Appleton Laboratory, UK; 17-18 November 1984.

Speaker at the I.o.P. Conference on Nuclear Physics, University of Surrey, UK; 25-27 March 1985.

Visiting Professor at Department of Nuclear Physics, University of Granada, Spain; 2-16 June 1985 (co-sponsored by The British Council).

Visiting Professor at Universidad Nacional Autonoma de Mexico, Mexico City; 8-20 July 1985 (co-sponsored by The British Council).

Invited speaker and session chairman at the 9th International Workshop on Condensed Matter Theories, San Francisco, USA; 5-10 August 1985.

Invited speaker and session chairman at the 4th International Conference on Recent Progress in Many-Body Theories, San Francisco, USA; 12-17 August 1985.

Visiting Professor at Research Institute for Theoretical Physics, University of Helsinki, Finland; 15-22 December 1985.

Invited speaker and session chairman at the 10th International Workshop on Condensed Matter Theories, Argonne, Illinois, USA; 21-26 July 1986.

Invited speaker and session chairman at the Nuclear Theory Workshop, Manchester, UK; 17-23 August 1986.

Speaker at the “IUPAP International Nuclear Physics Conference,” Harrogate, UK; 25-30 August 1986.

Visiting Professor at Research Institute for Theoretical Physics, University of Helsinki, Finland; 7-15 April 1987.

Visiting Professor at Department of Physics, University of Coimbra, Portugal; 27 May–6 June 1987 (co-sponsored by The British Council).

Invited speaker and session chairman at the 11th International Workshop on Condensed Matter Theories, Oulu, Finland; 27-31 July 1987.

Invited speaker and session chairman at the 5th International Conference on Recent Progress in Many-Body Theories, Oulu, Finland; 2-8 August 1987.

Visiting Professor at Department of Modern Physics, University of Granada, Spain; 31 August–14 September 1987 (co-sponsored by The British Council).

Invited speaker and session chairman at the Workshop and Symposium on “Aspects of Many-Body Effects in Molecules and Extended Systems,” Calcutta, India; 1-10 February 1988 (followed by an extensive lecture tour of India, sponsored by The British Council).

Invited speaker and session chairman at the 12th International Workshop on Condensed Matter Theories, Taxco, Mexico; 14-20 August 1988.

Visiting Professor at the Institute of Nuclear Physics of the Czechoslovak Academy of Sciences, Řež (near Prague); 12-19 December 1988 (co-sponsored by The British Council).

Visiting Professor at Department of Modern Physics, University of Granada, Spain; 9-16 April 1989.

Visiting Professor at Research Institute for Theoretical Physics, University of Helsinki, Finland; 1-10 June 1989.

Invited speaker and session chairman at the 13th International Workshop on Condensed Matter Theories, Campos do Jordão, Brazil; 6-12 August 1989.

Invited speaker and session chairman at the 6th International Conference on Recent Progress in Many-Body Theories, Arad, Israel; 5-10 November 1989.

Invited plenary speaker at the Thirtieth Anniversary 1990 Sanibel Symposia, St. Augustine, Florida, USA; 17-24 March 1990.

Visiting Professor at Department of Physics, Texas A & M University, USA; 25-31 March 1990.

Invited speaker and session chairman at the 14th International Workshop on Condensed Matter Theories, Elba, Italy; 17-23 June 1990.

Invited keynote speaker at the I.o.P. Meeting on Few-Body Methods in Nuclear Structure and Reactions, SERC Daresbury Laboratory, UK; 4 July 1990.

Invited speaker and session chairman at the Workshop on Coupled-Cluster Theory at the Interface of Atomic Physics and Quantum Chemistry, Cambridge, Mass., USA; 6-11 August 1990.

Invited keynote speaker and discussion leader at the Roundtable Workshop on the Frontiers of Condensed Matter Physics, Manchester, UK; 24-25 September 1990.

Visiting Professor at Department of Theoretical Physics, University of Helsinki, Finland; 1-10 November 1990.

Invited principal lecturer, session chairman and meeting rapporteur at the Spring College on Many-Body Techniques, Isfahan, Iran; 20 April–1 May 1991.

Visiting Professor at Department of Atomic and Nuclear Physics, University of Valencia, Spain; 26 May–2 June 1991.

Invited speaker at the 7th International Conference on Recent Progress in Many-Body Theories, Minneapolis, USA; 26-31 August 1991.

Visiting Professor at the Institute of Nuclear Physics of the Czechoslovak Academy of Sciences, Řež (near Prague); 15-22 December 1991 (co-sponsored by The British Council).

Invited speaker at the meeting on The Mathematics of Superconductivity, International Centre for Mathematical Sciences, Edinburgh; 30-31 January 1992.

Visiting Professor at Institute for Theoretical Physics, University of Köln, Germany; 18-22 March 1992.

Invited speaker and session chairman at the 22nd Annual Symposium on “Electronic Structure of Solids,” Schellerhau (near Dresden), Germany; 23-27 March 1992.

Visiting Professor at Department of Physics, Kent State University, Ohio, USA; 19-23 April 1992.

Invited speaker at the John Dirk Walecka 60th Birthday Symposium, CEBAF, Newport News, Virginia, USA; 24-25 April 1992.

Invited speaker at the 16th International Workshop on Condensed Matter Theories, San Juan, Puerto Rico; 1-6 June 1992.

Visiting Professor at Department of Physics, University of Coimbra, Portugal; 20-26 July 1992 (co-sponsored by The British Council).

Visiting Professor at Department of Atomic and Nuclear Physics, University of Valencia, Spain; 28 January–4 February 1993.

Session chairman at the “Requiem for an Accelerator: A Celebration of Excellence at the NSF,” SERC Daresbury Laboratory, UK; 13-14 March 1993.

Session chairman at the I.o.P. Conference on Nuclear and Particle Physics, University of Glasgow, UK; 30 March–1 April 1993.

Session chairman at the session “New Pathways in Mathematical Physics” of the I.o.P. Congress, Brighton; 19-22 April 1993.

Invited speaker and session chairman at the European Workshop on “Current Studies in Quantum Many-Body Theory,” Bad Honnef, Germany; 7-9 June 1993.

Invited speaker and session chairman at the “Conference on Many-Body Physics,” Coimbra, Portugal; 20-25 September 1993.

Speaker at the XI International Symposium on Lattice Field Theory (“Lattice ’93”), Dallas, USA; 12-16 October 1993.

Speaker and symposium leader at the 34th Sanibel Symposium, Ponte Vedra Beach, Florida, USA; 12-19 February 1994.

Invited speaker at the I.o.P. Nuclear Physics Conference, Brighton, UK; 11-13 April 1994.

Invited speaker at the Workshop on Quantum Spin Chains, Sheffield, UK; 15 April 1994.

Invited speaker and session chairman at the 18th International Workshop on Condensed Matter Theories, Valencia, Spain; 6-10 June 1994.

Invited keynote speaker and session chairman at the 8th International Conference on Recent Progress in Many-Body Theories, Schloss Seggau (near Graz), Austria; 22-27 August 1994.

Invited keynote speaker and session chairman at the Workshop on “Non-Perturbative Many-Body Methods: From Quantum Field Theory to Chemistry,” Bad Honnef, Germany; 24-26 October 1994.

Visiting Professor at Department of Atomic and Nuclear Physics, University of Valencia, Spain; 5-12 February 1995.

Visiting Professor at Research Institute for Theoretical Physics, University of Helsinki, Finland; 21 March–4 April 1995.

Invited speaker, session chairman and symposium leader at the 19th International Workshop on Condensed Matter Theories, Caracas, Venezuela; 12-17 June 1995.

Invited speaker and session chairman at the Hayashibara Forum '95: International Symposium on Coherent Approaches to Fluctuations, Kyoto, Japan; 17-20 July 1995.

Invited lecturer at the 5th International Summer School, Jyväskylä, Finland, to give a course of 15 lectures on Quantum Many-Body Theory; 14-25 August 1995.

Invited lecturer at the Euro-Workshop on Microscopic Quantum Many-Body Theory, Köln, Germany; 4-6 January 1996.

Visiting Professor at Department of Physics, University of Pretoria, South Africa; 1-16 August 1996.

Invited speaker and session chairman at the International Workshop on "Theory of Spin Lattices and Lattice Gauge Models," Bad Honnef, Germany; 14-16 October 1996.

Invited speaker and convenor of the Working Group on the Nuclear Ground State and Many-Body Methods at the International Workshop on "Microscopic Many-Body Methods for Fermi and Bose Systems: Nuclear and Neutron Matter, Finite Nuclei and Helium Droplets," at ECT* (European Centre for Theoretical Studies in Nuclear Physics and Related Areas), Trento, Italy; 26 May-6 June 1997.

Invited lecturer at the 6th Hispalensis International Summer School on "Many-Body Theory of Correlated Fermion Systems," Sevilla, Spain, to give a course of 3 lectures on Strongly Correlated Quantum Magnets; 9-13 June 1997.

Invited speaker and member of the discussion panel at the Coupled Cluster Theory and Electron Correlation Workshop: "Fifty Years of the Correlation Problem," Cedar Key, Florida, USA; 15-19 June 1997.

Invited plenary speaker and session chairman at the 9th International Conference on Recent Progress in Many-Body Theories, Sydney, Australia; 20-26 July 1997.

Invited lecturer at the 7th International Summer School, Jyväskylä, Finland, to give a course of 15 lectures on Quantum Many-Body Theory; 4-15 August 1997.

Invited lecturer at the European Summer School on Microscopic Quantum Many-Body Theories and Their Applications, Valencia, Spain, to give a course of 12 lectures on The Coupled Cluster Method and Its Applications; 8-20 September 1997.

Invited speaker, session chairman and workshop leader at the 21st International Workshop on Condensed Matter Theories, Luso, Portugal; 22-27 September 1997.

Invited speaker and workshop leader at the 22nd International Workshop on Condensed Matter Theories, Nashville, Tennessee, USA; 1-6 June 1998.

Invited speaker, session chairman and discussion leader at the International Workshop on "Microscopic Approaches to the Structure of Light Nuclei," UMIST, Manchester, UK; 8-13 June 1998.

Visiting Professor at Institute for Theoretical Physics, University of Cologne, Germany; 11-15 November 1998.

Visiting Professor at the Centre for Theoretical Physics, University of Coimbra, Portugal; 29 May-6 June 1999.

Invited speaker and discussion leader at the 23rd International Workshop on Condensed Matter Theories, Ithaca, Greece; 17-23 June 1999.

Invited speaker at the Argonne Theory Institute on “Advanced Computational Methods in the Nuclear Many-Body Problem,” Argonne, Illinois, USA; 2-6 August 1999.

Invited keynote speaker and session chairman at the International Workshop on “Microscopic Theories of Phase Transitions: Quantum Versus Thermal Fluctuations,” Bad Honnef, Germany; 13-15 December 1999.

Invited participant at the research programme on Strongly Correlated Electron Systems, Isaac Newton Institute, Cambridge, UK; 10-28 January 2000.

Invited keynote speaker at the Tenth International Light-Cone Meeting on Non-Perturbative QCD and Hadron Phenomenology: “From Hadrons to Strings,” Heidelberg, Germany; 12-17 June 2000.

Invited speaker and session chairman at the International Conference on “150 Years of Quantum Many-Body Theory: A Conference in Honour of the 65th Birthdays of John W. Clark, Alpo J. Kallio, Manfred L. Ristig, and Sergio Rosati,” Manchester, UK; 10-14 July 2000.

Invited speaker and discussion leader at the 24th International Workshop on Condensed Matter Theories, Buenos Aires, Argentina; 12-17 September 2000.

Invited speaker and session chairman at the 11th International Conference on Recent Progress in Many-Body Theories, Manchester, UK; 8-13 July 2001.

Invited keynote speaker at the International Workshop on “Modern Aspects of Many-Electron Theory,” Bad Honnef, Germany; 21-24 October 2001.

Invited speaker and session chairman at the 25th International Workshop on Condensed Matter Theories, Canberra, Australia; 3-7 December 2001.

Visiting Professor at School of Physics, University of Melbourne, Australia; 10-14 December 2001.

Invited speaker and session chairman at the 8th International Workshop on Similarity in Diversity, Buffalo, New York, USA; 15-17 May 2002.

Invited speaker and session chairman at the 26th International Workshop on Condensed Matter Theories, Luso, Portugal; 2-7 September 2002.

Invited plenary speaker at the 18th European Conference on Few-Body Problems in Physics, Bled, Slovenia; 8-13 September 2002.

Invited speaker and session chairman at the International Workshop on “Quantum Magnetism: Microscopic Techniques for Novel States of Matter,” Bad Honnef, Germany; 3-6 November 2002.

Invited speaker and session chairman at the International Workshop on Strongly Correlated Electrons in New Materials, Loughborough, UK; 15-17 December 2002.

Session chairman at the International Workshop on Nuclear Structure Theory, Guildford, Surrey, UK; 9-11 January 2003.

Invited lecturer and session chairman at the UK Quantum Circuits Network Summer School, Ilkley, Yorkshire, UK; 21-23 May 2003.

Invited keynote speaker at the Workshop on Quantum Information Processing in Condensed Matter, Loughborough, UK; 15 September 2003.

Invited speaker and session chairman at the 27th International Workshop on Condensed Matter Theories, Toulouse, France; 15-21 September 2003.

Invited plenary speaker and session chairman at MBS2003: International Workshop on “The Structure of Many-Body Systems at Different Scales,” Catania, Sicily, Italy; 6-8 October 2003.

Invited plenary speaker at the International Workshop on Microscopic Approaches to Nuclear Structure Calculations, Manchester, UK; 4-8 July 2004.

Invited speaker at the 12th International Conference on Recent Progress in Many-Body Theories, Santa Fe, New Mexico, USA; 23-27 August 2004.

Invited main speaker at the Workshop on “30 Years of Many-Body Physics in Spain: Looking into the Future,” Peñíscola, Spain; 24-25 September 2004.

Invited speaker and session chairman at the 28th International Workshop on Condensed Matter Theories, St. Louis, Missouri, USA; 27 September–2 October 2004.

Invited speaker and session chairman at the International Summer School and Conference on “Arrays of Quantum Dots and Josephson Junctions,” Kiten (near Bourgas), Bulgaria; 9-24 June 2005.

Invited speaker and session chairman at the 29th International Workshop on Condensed Matter Theories, Kizu, Kyoto, Japan; 13-17 September 2005.

Invited speaker at the International Workshop on “Correlations in Quantum Systems: Quantum Dots, Quantum Gases and Nuclei,” Palma de Mallorca, Spain; 26-30 September 2005.

Invited speaker at TQMFA05: International Conference on “New Trends in Quantum Mechanics: Fundamental Aspects and Applications,” Palermo, Sicily, Italy; 11-13 November 2005.

Invited speaker at the 13th International Conference on Recent Progress in Many-Body Theories, Buenos Aires, Argentina; 5-9 December 2005.

Invited speaker at the International Conference on “Modern Trends in Atomic Physics II: A Symposium in Honour of the 75th Birthday of Ingvar Lindgren,” Gothenburg, Sweden; 2-3 June 2006.

Invited plenary speaker and session chairman at the 30th International Workshop on Condensed Matter Theories, Dresden, Germany; 5-10 June 2006.

Invited speaker at the International Conference on “Quantum Complexities in Condensed Matter,” Cambridge, UK; 4-7 July 2006.

Invited speaker, Manchester and District Branch of the Institute of Physics, Manchester, UK; 11 December 2006.

Invited speaker at the Institute of Physics Conference on “Computational Magnetism,” London, UK; 13 December 2006.

Invited plenary speaker at the International Conference on “Recent Trends in Many-Body Methods for Electronic Structure and Properties of Atoms and Molecules,” Toshali Sands, Puri, India; 11-13 January 2007.

Invited speaker at the International Conference on Quantum Information and Quantum Many-Body Systems, Pisa, Italy; 26-31 March 2007.

Invited speaker and session chairman at ICSSUR 2007: the 10th International Conference on Squeezed States and Uncertainty Relations, Bradford, UK; 31 March–4 April 2007.

Invited speaker at CEWQO 2007: the 14th Central European Workshop on Quantum Optics, Palermo, Sicily, Italy; 1-5 June 2007.

Invited speaker at the 14th International Conference on Recent Progress in Many-Body Theories, Barcelona, Spain; 16-20 July 2007.

Invited opening speaker and session chairman at QSCP-XII: the 12th European Workshop on Quantum Systems in Chemistry and Physics, Royal Holloway, University of London, UK; 30 August–5 September 2007.

Invited keynote speaker at the International Symposium on Advanced Methods of Quantum Chemistry and Physics, Toruń, Poland; 2-6 September 2007.

Invited speaker at the International Conference on “Frontiers of Josephson Physics and Nanoscience,” Palinuro, Italy; 23-29 September 2007.

Visiting Professor at Fine Theoretical Physics Institute, School of Physics and Astronomy, University of Minnesota, Minneapolis, USA; 1 October 2007–31 July 2008.

Invited speaker at the Second International Workshop on Nuclei and Mesoscopic Physics, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan, USA; 20-22 October 2007.

Invited plenary speaker and session chairman at the 31st International Workshop on Condensed Matter Theories, Bangkok, Thailand; 3-8 December 2007.

Session chairman at the APS March Meeting of the American Physical Society, New Orleans, Louisiana, USA; 10-14 March 2008.

Invited plenary speaker at the Symposium on “50 Years of Coupled Cluster Theory,” Seattle, USA; 30 June–2 July 2008.

Invited Visiting Scholar at the Institute for Nuclear Theory (INT), University of Washington, Seattle, USA and invited participant in the research program on “Atomic, Chemical, and Nuclear Developments in Coupled Cluster Methods,” 29 June–12 July 2008.

Session chairman at the 32nd International Workshop on Condensed Matter Theories, Loughborough, UK; 13-18 August 2008.

Mahendra Lal Sircar Memorial Endowed Lecture at the International Symposium on “Current Trends in Theoretical Chemistry and Physics,” Indian Association for the Cultivation of Science, Kolkata, India; 3 January 2009 (followed by an extensive lecture tour of India).

Invited speaker and session chairman at the International Workshop on “Higher-Order Actions and Their Applications in Many-Body, Few-Body, and Classical Problems,” Barcelona, Spain; 24-26 March 2009.

Invited speaker and session chairman at the ECT* Workshop on “Linking Nuclei, Molecules, and Condensed Matter: Computational Quantum Many-Body Approaches,” Trento, Italy; 6-10 July 2009.

Invited speaker at the 15th International Conference on Recent Progress in Many-Body Theories, Columbus, Ohio, USA; 27-31 July 2009.

Invited speaker and session chairman at the 33rd International Workshop on Condensed Matter Theories, Quito, Ecuador; 16-22 August 2009.

Invited speaker and session chairman at Mahabaleshwar Condensed Matter School and Conference (Condensed Matter Programme 2009, International Centre for Theoretical Sciences, Tata Institute for Fundamental Research), Mahabaleshwar, India; 5-23 December 2009.

Invited speaker at the Third International Workshop on Nuclei and Mesoscopic Physics, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan, USA; 5-9 March 2011.

Invited speaker at the Symposium in Honor of Brian Serot, Indiana University Center for Exploration of Energy and Matter, Bloomington, Indiana, USA; 6 March 2013.

Invited speaker and session chairman at the 17th International Conference on Recent Progress in Many-Body Theories, Rostock, Germany; 8-13 September 2013.

Visiting Senior Professor at Indian Institute of Astrophysics, Bangalore, India; 12-26 December 2013.

Invited speaker and session chairman at the Fourth Conference on Nuclei and Mesoscopic Physics, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, Michigan, USA; 5-9 May 2014.

Invited speaker and session chairman at the Conference on Computational Challenges in Nuclear and Many-Body Physics, NORDITA, Stockholm, Sweden; 15-19 September 2014.

Invited participant and session chairman at the Workshop on Computational Challenges in Nuclear and Many-Body Physics, NORDITA, Stockholm, Sweden; 22-26 September 2014.

Invited speaker and session chairman at the 18th International Conference on Recent Progress in Many-Body Theories, Niagara, New York, USA; 16-21 August 2015.

Visiting Professor at Tokyo Institute of Technology, Tokyo, Japan; 5-13 April 2016.

Invited speaker at the 13th International Workshop on Analytic and Algebraic Methods in Physics, Prague, Czech Republic; 6-9 June 2016.

Invited speaker at the Fifth Conference on Nuclei and Mesoscopic Physics, Facility for Rare Isotope Beams – National Superconducting Cyclotron Laboratory (FRIB/NSCL), Michigan State University, East Lansing,

Michigan, USA; 6-10 March 2017.

Invited speaker and session chairman at the 19th International Conference on Recent Progress in Many-Body Theories, Pohang, South Korea; 25-30 June 2017.

Invited speaker at the Tobias Brandes Memorial Colloquium, Berlin, Germany; 24 November 2017.

Invited speaker at the 16th Theoretical and Experimental Magnetism Meeting (TEMM) and IOP Magnetism–Theory of Condensed Matter Joint Group Symposium, Abingdon, UK; 23-25 July 2018.

Invited speaker and session chairman at the 20th International Conference on Recent Progress in Many-Body Theories, Toulouse, France; 9-13 September 2019.

(b) Research Colloquia and Conference Papers

Since 1980, I have given 248 talks on my research. These comprised:

- (1) 120 invited seminars or colloquia at universities or research institutes (including 27 in the UK, and 93 in more than 20 foreign countries); and
- (2) 128 papers at international conferences, of which 113 were by invitation.

10. Committees and other Professional Activities

Referee for the following archival journals:

Annals of Physics (NY)
Chemical Physics Letters
European Physical Journal B
EPL (Europhysics Letters)
International Journal of Modern Physics A and B
International Journal of Quantum Chemistry
Journal of Chemical Physics
Journal of Magnetism and Magnetic Materials
Journal of Mathematical Physics
Journal of Physics A, C and G
Journal of Physics: Condensed Matter
Modern Physics Letters A and B
Nature
Nuclear Physics A and B
Physica A, B, D and E
Physics Letters A and B
Physical Review A, B, C, D and E
Physical Review Letters
Reviews of Modern Physics
Science
Solid State Communications

Reviewer of proposals for research grants for the following agencies:

EPSRC (Engineering and Physical Sciences Research Council of Great Britain)
British Council
The Royal Society
The Leverhulme Trust

NSF (National Science Foundation of USA)
NATO Science Committee
EC (European Commission)
ESF (European Science Foundation)
NRF (National Research Foundation of South Africa)
GACR (Grant Agency of the Czech Republic)
FWF (Austrian Science Fund)
Academy of Finland
Research Council for Natural Sciences and Engineering of Finland
ETAg (Estonian Research Council)
CNCSIS (Romanian National University Research Council)
UEFISCDI (Executive Agency for Higher Education, Research, Development and
Innovation Funding of Romania)
NCN (National Science Centre of Poland)

Book reviews for various journals (e.g. Physics Bulletin, Contemporary Physics, etc.)

Consultant to:

John Wiley Publishers
Plenum Press
Gower Publishing Group
World Scientific Publication Co.
Nova Science Publishers
Oxford University Press
Cambridge University Press
CRC Press (Taylor & Francis Group)

for professional advice on potential publications

Half-time consultant to the Theory Group at SERC Daresbury Laboratory, UK; 1974–1978

Joint Organiser, 1978 Lawrence Berkeley Laboratory Summer Theory Workshop on High Energy Heavy Ion Physics, Berkeley, California, USA; July–August 1978

International Selection Committee for the Eugene Feenberg Memorial Medal in Many-Body Physics:

Member, 1983–1987

Chairman, 1985–1987

International Advisory Committee for the series of International Conferences on Recent Progress in Many-Body Theories:

Member, 1983–1987, 1999–present

Secretary, 1987–1991

Chairman, 1991–1999

Member, International Advisory Committee for the series of International Workshops on Condensed Matter Theories; 1983–present

Member, SERC Nuclear Physics Board — Advanced Fellowships Panel; 1984–1985

Member, Programme Committee for the 9th International Workshop on Condensed Matter Theories, San Francisco, USA; August 1985

Member, Series Editorial Board for “Condensed Matter Theories,” published by Plenum Press, 1985–1993; by Nova Science Publishers, 1994–2006; and by World Scientific, 2007–present

Member, SERC Nuclear Physics Board — Nuclear Physics Theory Sub-Committee; 1985–1990

Member, Organising Committee for the 10th International Workshop on Condensed Matter Theories, Argonne, Illinois, USA; July 1986

Scientific Co-Director, Nuclear Theory Workshop, Manchester, UK; August 1986

Member, SERC Nuclear Physics Board — Nuclear Structure Committee; 1986–1989

Member, Organising Committee for the 11th International Workshop on Condensed Matter Theories, Oulu, Finland; July 1987

Computing Coordinator for Nuclear Structure Theory for the SERC Nuclear Physics Board; 1987–90

Member, International Advisory Board for the 5th International Conference on Recent Progress in Many-Body Theories, Oulu, Finland; August 1987

Member, Series Editorial Board for “Recent Progress in Many-Body Theories,” published by Plenum Press; 1987–1997

Member, Organising Committee for the 12th International Workshop on Condensed Matter Theories, Taxco, Mexico; August 1988

Member, Programme Committee for the 13th International Workshop on Condensed Matter Theories, Campos do Jordão, Brazil; August 1989

Member, Organising Committee for the 6th International Conference on Recent Progress in Many-Body Theories, Arad, Israel; November 1989

Scientific Co-Director, 14th International Workshop on Condensed Matter Theories, Isola d’Elba, Italy; June 1990

Member, Organising Committee for the John Dirk Walecka 60th Birthday Symposium, CEBAF, Newport News, Virginia, USA; April 1992

Member, Committee of the Mathematical Physics Group of the UK Institute of Physics; 1992–1999

External Examiner, University of Liverpool, for undergraduate courses in:

Mathematical Physics, Physics and Mathematics, and Mathematics with Physics; 1992–1996

Mathematics (Applied and Theoretical Physics); 1994–1997

Member, Programme Committee for the 17th International Workshop on Condensed Matter Theories, Nathiagali, Pakistan; June 1993

Scientific Co-Director, European Workshop on “Current Studies in Quantum Many-Body Theory,” Bad Honnef, Germany; June 1993

Member, International Programme Committee for the 8th International Conference on Recent Progress in Many-Body Theories, Schloss Seggau, Austria; August 1994

Scientific Co-Director, Workshop on “Non-Perturbative Many-Body Methods: From Quantum Field Theory to Chemistry,” Bad Honnef, Germany; October 1994

Member, EPSRC Physics Programme College; 1995–2000

Member, Programme Committee for the 19th International Workshop on Condensed Matter Theories, Caracas, Venezuela; June 1995

Member, International Advisory Committee for the 15th European Conference on Few-Body Problems in Physics, Peñíscola, Spain; June 1995

Affiliate of the US National Institute for Nuclear Theory, University of Washington, Seattle, USA; 1995–present

Member, EPSRC Physics Programme Evaluation Panel; 1996–1997

Associate of ECT*, the European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy; 1996–present

Member, Committee of the Condensed Matter and Materials Physics Division of the UK Institute of Physics; 1997–1999

Member, International Programme Committee for the 9th International Conference on Recent Progress in Many-Body Theories, Sydney, Australia; August 1997

Member, International Advisory Committee for the European Summer School on Microscopic Quantum Many-Body Theories and Their Applications, Valencia, Spain; September 1997

Member, Programme Committee for the 21st International Workshop on Condensed Matter Theories, Luso, Portugal; September 1997

Chairman, Editorial Board for “Advances in Quantum Many-Body Theory,” published by World Scientific; 1997–present

Scientific Director, International Workshop on “Microscopic Approaches to the Structure of Light Nuclei,” UMIST, Manchester, UK; June 1998

Member, Scientific Advisory Committee for the Centro de Física Teórica, University of Coimbra, Portugal; 1998–present

Scientific Co-Director, International Workshop on “Microscopic Theories of Phase Transitions: Quantum Versus Thermal Fluctuations,” Bad Honnef, Germany; December 1999

Scientific Director, International Conference on “150 Years of Quantum Many-Body Theory: A Conference in Honour of the 65th Birthdays of John W. Clark, Alpo J. Kallio, Manfred L. Ristig and Sergio Rosati,” UMIST, Manchester, UK; July 2000

Member, EPSRC Physics Fellowships Panel; 2000–2001

Member, EPSRC Peer Review College; 2000–2005

Scientific Director and Chair, Programme Committee for the 11th International Conference on Recent Progress in Many-Body Theories, Manchester, UK; July 2001

Member, Selection Committee for Royal Society-Fulbright Postdoctoral Science Fellowships; 2001

External Examiner, Loughborough University, for all undergraduate courses in physics; 2002–2005

Member, International Advisory Committee for the 18th European Conference on Few-Body Problems in Physics, Bled, Slovenia; September 2002

Scientific Co-Director, International Workshop on “Quantum Magnetism: Microscopic Techniques for Novel States of Matter,” Bad Honnef, Germany; November 2002

Member, International Advisory Board for the 2nd International Workshop on “Pseudo-Hermitian Hamiltonians in Quantum Physics,” Prague, Czech Republic; June 2004

Scientific Co-Director, International Workshop on Microscopic Approaches to Nuclear Structure Calculations, Manchester, UK; July 2004

Elected Member-At-Large, Executive Committee of the Forum on International Physics of the American Physical Society; 2004–2007

Member, ESF (European Science Foundation) Pool of Reviewers; 2005–present

Member, International Programme Committee for the 13th International Conference on Recent Progress in Many-Body Theories, Buenos Aires, Argentina; December 2005

Member, Programme Committee for the 30th International Workshop on Condensed Matter Theories, Dresden, Germany; June 2006

Member, International Advisory Committee for the 10th International Conference on Squeezed States and Uncertainty Relations, Bradford, UK; March 2007

Member, Scientific Programme Advisory Committee for the 14th International Conference on Recent Progress in Many-Body Theories, Barcelona, Spain; July 2007

Member, Scientific Committee for the Symposium on “Advanced Methods of Quantum Chemistry and Physics,” Toruń, Poland; September 2007

Scientific Director and Chair, Programme Committee for the Workshop on Quantum Magnetism, Fine Theoretical Physics Institute, University of Minnesota, Minneapolis, USA; May 2008

Member, Scientific Program Committee for the 15th International Conference on Recent Progress in Many-Body Theories, Columbus, Ohio, USA; July 2009

Member, Scientific Program Committee for the 33rd International Workshop on Condensed Matter Theories, Quito, Ecuador; August 2009

Member, Scientific Advisory Committee for the 16th International Conference on Recent Progress in Many-Body Theories, Bariloche, Argentina; November 2011

Member, Physics Panel for the Romanian Research Assessment Exercise; 2011

Chairman, International Selection Committee for the Hermann Kmmel Early Achievement Award in Many-Body Physics; 2011–2013

Scientific Co-Director, International Workshop on “Quantum Magnetism in Low Spatial Dimensions,” Bad Honnef, Germany; April 2012

Member, Scientific Advisory Committee for the 17th International Conference on Recent Progress in Many-Body Theories, Rostock, Germany; September 2013

Member, Scientific Program Committee for the 18th International Conference on Recent Progress in Many-Body Theories, Niagara, New York, USA; August 2015

Member, ESF (European Science Foundation) College of Expert Reviewers; 20 October 2016–19 October 2019

Member, Scientific Advisory Committee for the Fifth Conference on Nuclei and Mesoscopic Physics, East Lansing, Michigan, USA; March 2017

Member, Scientific Program Committee for the 19th International Conference on Recent Progress in Many-Body Theories, Pohang, South Korea; June 2017

Member, Scientific Program Committee for the 20th International Conference on Recent Progress in Many-Body Theories, Toulouse, France; September 2019

Member, Editorial Board of the journal *Magnetochemistry*, 2020–present

11. Research Grants and Contracts

- (1) SRC Research Grant (GR/B/47362) (Science Board/Physics Committee) for £2,068, October 1980–September 1982, for investigations titled “Development and Applications of Coupled Cluster Theory of Electron and Other Correlations”.
- (2) SRC Research Grant (NG/09327) (Nuclear Physics Board) for £20,185, February 1981–February 1983, for investigations titled “Nuclear Correlations and Bound State Clusters”.
- (3) SRC Senior Visiting Fellowship Grant (GR/B/57781) (Science Board/Physics Committee) for £14,445, February 1981–February 1982, for visit of K.H. Lhrmann in connection with investigations titled “Coupled Cluster Theory of Quantum Many-Body Systems”.
- (4) SERC Research Grant (GR/B/61801) (Science Board/Physics Committee) for £20,125, October 1981–September 1983, for investigations titled “Applications of Soliton Theory in Statistical Mechanics,” jointly with R.K. Bullough.
- (5) SERC Research Grant (GR/C/65490) (Science Board/Physics Committee) for £21,885, October 1983–September 1985, for investigations titled “Statistical Mechanics of Integrable Classical and Quantum Field Theories and Applications,” jointly with R.K. Bullough.
- (6) SERC Research Grant (GR/C/56757) (Science Board/Physics Committee) for £26,700, October 1983–September 1985, for investigations titled “The Coupled Cluster Theory of Quantal

Many-Body Systems and Applications to Diverse Condensed Matter”.

- (7) SERC Research Grant (NG/13980) (Nuclear Physics Board) for £24,050, October 1983–September 1985, for investigations titled “Nuclear Clusters and Correlations”.
- (8) SERC Visiting Fellowship Research Grant (NG/14802) (Nuclear Physics Board) for £4,785, April–June 1985, for visit of J. Dąbrowski in connection with investigations titled “Development and Applications of Nuclear Matter Theory”.
- (9) SERC Visiting Fellowship Research Grant (NG/16073) (Nuclear Physics Board) for £5,315, April–September 1985, for visit of H.G. Kümmel in connection with investigations titled “Nuclear Many-Body Theory and Quantum Field Theory in the Coupled Cluster Formalism”.
- (10) SERC Research Grant (NG/16684) (Nuclear Physics Board) for £49,870, October 1985–September 1988, for investigations titled “A Coupled Cluster Theory of Nuclear Structure and Interacting Quantum Fields”.
- (11) British Council grant of £990 to support the Nuclear Theory Workshop, Manchester, 18-23 August 1986.
- (12) SERC Research Grant (NG/17131) (Nuclear Physics Board) for £2,100 to support the Nuclear Theory Workshop, Manchester, 18-23 August 1986, jointly with J.M. Irvine.
- (13) British/Spanish Joint Research Programme (Acciones Integradas) – administered jointly by The British Council and the Spanish Ministry of Education and Science – Research Grant of £1,580, April 1988–March 1989, to support a research collaboration with Professor R. Guardiola at University of Granada, for investigations titled “The Quantum Many-Body Problem”.
- (14) SERC Research Grant (GR/F10477) (Nuclear Physics Board) for £53,720, October 1988–September 1991, for investigations titled “The Coupled Cluster Method of Quantum Many-Body Theory and its Applications”.
- (15) SERC Visiting Fellowship Research Grant (GR/F23668) (Nuclear Physics Board) for £1,465, November–December 1988, for visit of J.S. Arponen in connection with investigations titled “The Extended Coupled Cluster Treatment of Quantum Field and Many-Body Theories”.
- (16) European Research Office of the US Army Research Contract for US \$12,000, April 1990, to organize and conduct an International Workshop on Condensed Matter Theories on Isola d’Elba, Italy; 18-23 June 1990.
- (17) SERC Visiting Fellowship Research Grant (GR/G36722) (Nuclear Physics Board) for £4,670, July–December 1991, for visit of R.A. Smith in connection with investigations titled “Confronting the Quantum Many-Body Problem: A Comparison of Techniques”.
- (18) SERC Research Grant (GR/H00765) (Nuclear Physics Board) for £39,310, April 1992–March 1994, for investigations titled “Fundamental Microscopic Techniques in Nuclear Many-Body Theory and Quantum Field Theory”.
- (19) British/Spanish Joint Research Programme (Acciones Integradas) – administered jointly by The British Council and the Spanish Ministry of Education and Science – Research Grant of £1,600, April 1992–March 1993, to support a research collaboration with Professor R. Guardiola at University of Valencia, for investigations titled “Microscopic Structure of Atomic Nuclei: An *Ab Initio* Treatment Using Quantum Many-Body Techniques”.

- (20) WE-Heraeus-Stiftung (Germany) Research Contract for DM 22,000 (jointly with M.L. Ristig) to organize and conduct a European Workshop on “Current Studies in Quantum Many-Body Theory” in Bad Honnef, Germany; 7-9 June 1993.
- (21) SERC Research Grant (GR/H94986) (National Committee for Superconductivity) for £100,660, December 1993–December 1996, for investigations titled “A Many-Body Treatment of Strongly Interacting Spin and Fermion Lattice Models for High- T_c Superconductivity,” jointly with J.B. Parkinson.
- (22) SERC Research Grant (GR/J21255) (Nuclear Physics Board) for £99,470, October 1993–September 1996, for investigations titled “Microscopic Many-Body Theory Applied to Nuclear Structure and Interacting Quantum Fields”.
- (23) EC Research Contract (CHRX-CT94-0456) for 150,000 ECU, January 1995–December 1997, for a Network under the Human Capital and Mobility Programme entitled “Microscopic Quantum Many-Body Theory: Applications to Traditional and Novel Forms of Matter,” with partners at SISSA (Trieste, Italy), University of Pisa (Italy), University of Cologne (Germany), University of Valencia (Spain), and Universities of Helsinki and Oulu (Finland).
- (24) EPSRC Special “Rolling” Research Grant (GR/L22331) (Nuclear Physics Programme) for £307,104, October 1996–September 2000, for investigations titled “UMIST Nuclear Theory Programme: Microscope Studies of Nuclear Structure and Subnuclear Fields,” jointly with N.R. Walet.
- (25) WE-Heraeus-Stiftung (Germany) Research Contract for DM25,000 (jointly with M.L. Ristig and J. Richter) to organize and conduct an International Workshop on “Microscopic Theories of Phase Transitions: Quantum Versus Thermal Fluctuations” in Bad Honnef, Germany; 13-15 December 1999.
- (26) EPSRC Research Grant (GR/N15672) (Nuclear Physics Programme) for £478,568, October 2000–September 2004, for investigations titled “UMIST-Manchester Nuclear Theory Programme: Microscopic Studies of Nuclei and Hadronic Matter,” jointly with N.R. Walet and M.A. Nagarajan.
- (27) EPSRC Visiting Fellowship Grant (GR/N15665) (Nuclear Physics Programme) for £15,230, January 2001–December 2002, for visits of several fellows and to organize workshops in connection with investigations titled “UMIST-Manchester Nuclear Theory Programme: Microscopic Studies of Nuclei and Hadronic Matter (Visitors),” jointly with N.R. Walet and M.C. Birse.
- (28) EPSRC Research Grant (GR/N25633/01) (Physics Networks) for £50,517, September 2000–August 2003 for a Network entitled “Quantum Circuits Network,” with partners at the Universities of Cambridge, Liverpool, Southampton and Sussex, Hewlett-Packard Research Laboratories and National Physical Laboratory.
- (29) EPSRC Contract (P014721) for £5,020, May–August 2001, for “EPSRC Contribution Towards the Student Day at the 11th International Conference on Recent Progress in Many-Body Theories”.
- (30) WE-Heraeus-Stiftung (Germany) Research Contract for €15,000 (jointly with D.J.J. Farnell, J. Richter and U. Schollwöck) to organize and conduct an International Workshop on “Quantum Magnetism: Microscopic Techniques for Novel States of Matter” in Bad Honnef, Germany; 4-6 November 2002.
- (31) EPSRC Research Grant (EP/B000117/1) (Physics Programme) for £7,688, May–July 2004, to organize and conduct an International Workshop on “Microscopic Approaches to Nuclear Structure Calculations” in Manchester, UK; 4-8 July 2004, jointly with N.R. Walet.

- (32) EPSRC Research Grant (GR/T27860/01) (Physics Networks) for £62,176, March 2005–February 2008 for a Network entitled “Network on Transport, Dissipation and Control in Quantum Devices,” with partners at 17 UK universities, National Physical Laboratory, Hewlett-Packard Research Laboratories, Qinetiq and Hitachi.
- (33) EPSRC Research Grant (EP/C005889/1) (Physics Programme) for £277,357, April 2005–September 2008, for investigations titled “Applications of the Coupled Cluster Method in Nuclear Physics,” jointly with N.R. Walet.
- (34) WE-Heraeus-Stiftung (Germany) Research Contract for €20,000 (jointly with D.J.J. Farnell, J. Richter and J. Schnack) to organize and conduct an International Workshop on “Quantum Magnetism in Low Spatial Dimensions” in Bad Honnef, Germany; 16-18 April 2012.
- (35) American Physical Society (APS) International Travel Grant Award for \$2,000, March 2013–March 2018, to support an international collaborative research project entitled “Strongly Correlated Lattice Models of Quantum Spins and Bosons,” jointly with B.P. Das.
- (36) The Leverhulme Trust (UK) Emeritus Fellowship (EM-2015-007) for £21,980, August 2015–July 2017, to conduct research on “Atoms on a Lattice: Studies in Frustration, Degeneracy and Novel Forms of Order”.
- (37) The Leverhulme Trust (UK) Emeritus Fellowship (EM-2020-013) for £24,000, June 2021–May 2023, to conduct research on “Quantum Phase-Space Techniques 70 Years On: Novel Extensions and Applications.”

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In addition to the above research grants, I have been the recipient of 18 separate awards from The British Council since 1980, totalling approximately £8,000. These comprised:

- 8 travel grants to co-sponsor visits to Poland, Czechoslovakia, W. Germany, Spain, Mexico, Brazil, China, and India for professional meetings and lecture tours; and
- 10 awards to further research collaborations and to establish academic links with research groups in Poland, Czechoslovakia, Spain and Mexico.