

Gareth John Conduit

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Nationality: British
E-mail: gjc29@cam.ac.uk

Employment

Jan 2015– **Royal Society University Research Fellow**
Department of Physics, University of Cambridge
College Lecturer, Gonville & Caius College, Cambridge

Oct 2011 **Research Fellow at Gonville & Caius College, Cambridge**
–Dec 2014 Department of Physics, University of Cambridge

Oct 2009 **Royal Commission for the Exhibition of 1851 Research Fellow**
–Sep 2011 Koshland Fellow at Weizmann Institute of Science, Israel

Aug–Oct 2006 **Institute of Astronomy, University of Cambridge**

Jul–Aug 2006 **Colour Design Research Centre, Kingston University**

Aug–Sep 2005 **Theory of Condensed Matter, University of Cambridge**

Jul–Sep 2004 **Theoretical Astronomy Group, University of Leicester**

Jul–Sep 2003 **Ford Motor Company, Basildon**

Jul–Sep 2001 **Newman & Spurr Consultancy Ltd, Camberley**

Grants

£90,000 *“Modelling to select molecules with optimal properties for lubricant base oils”*
Principal investigator of BP plc research grant (2017–2020)

£21,600 Principal investigator of industrial research grant (2016–2017)

£11,750 Student support from Cambridge Trust, Lundgren fund, and Christ’s College (2016–2017)

£568,000 Royal Society University Research Fellowship (2015–)

£30,000 Principal investigator of *“Concurrent materials design”*
Royal Society Brian Mercer Feasibility award (2014–15)

\$2,700 Visiting expert to US army (2014)

\$300,000 Principal investigator of *“High-temperature DFT design of new materials”*
Samsung Electronics Co Ltd Global Research Outreach grant (2013–16)

£37,000 Principal investigator of *“Sampling of seismic reflection surveys”*
BP plc research grant (2013–14)

£6,000 Principal investigator of *“Few-fermion coherent tunneling”*
MPhil in Scientific Computing studentship (2013–14)

£165,000 Research Fellowship at Gonville and Caius College, Cambridge (2011–15)

\$60,000 Koshland Fellowship at Weizmann Institute of Science, Israel (2010–11)

£100,000 Royal Commission for the Exhibition of 1851 Research Fellowship (2009–11)

\$50,000 Kreitman Post-Doctoral Fellowship at Ben Gurion University, Israel (2009–11)

£1,000 Nuffield Foundation Research Bursary (2005)

Education

- 2006–09** **PhD, Theory of Condensed Matter Group, University of Cambridge**
Awards Abdus Salam thesis prize (2008), Corfield Research Scholar (2006–09)
- 2002–06** **MA & MSci, Selwyn College, University of Cambridge**
2006 Part III Experimental & Theoretical Physics (first class, 2nd out of 110 candidates)
2005 Part II Experimental & Theoretical Physics (first class, 2nd out of 135 candidates)
2004 Part IB Advanced Physics, Physics & Mathematics (first class, 1st out of 606 candidates)
2003 Part IA Chemistry, Materials, Maths & Physics (first class, 1st out of 597 candidates)
Awards Siddans prize (2006), Braybrook prize (2005), BP Advanced Physics prize (2004),
University Part IB Mathematics prize (2004), Agilent Technologies Prize (2003)
- 1995–02** **Royal Grammar School, Guildford**
2002 4A's in 'A' level Mathematics, Further Mathematics, Physics & Chemistry
2001 Distinction in the Mathematics Advanced Extension Award
1999 Radio Amateurs' Examination (full license)
Awards Bronze medal at 2002 International Physics Olympiad in Bali
Gold medal in 2002 British Physics Olympiad & NPL Experimental Physics Prize
Gold medal & national finalist in 2002 British Informatics Olympiad
Nationally in the top five of 'A' level Physics candidates

Professional activities

- Elected to 12-member Gonville & Caius College Council, the charity board of Trustees (2015–19)
Member, OPTIMADE consortium, responsible for the output format of the materials data API (2016–)
Member, steering group for the £142k Gonville & Caius Estate Master Plan (2016–17)
Member, Gonville & Caius Investment Property sub-committee managing £80 m (2016–)
Member, Gonville & Caius Investment committee with £170 m under management (2014–)
Member, National Centre for Universities and Business 50 Under 30 steering group (2014–15)
Consultant for Granta Design Ltd, analyzing materials databases (2014–)
Member, Gonville & Caius Works and Accommodation committee with £2.4 m annual budget (2012–2015)
Consultant for cromocn™, developing algorithms to assess visibility of signs for the visually impaired (2008–)
Organized Cambridge physics Graduate Students' Conference with over 200 attendees (2008)

Teaching experience

- Director of Studies in Natural Sciences at Gonville & Caius College (2016–17)
Member, interview panel for Cambridge CDT in computational modelling in materials science (2016)
Postgraduate lecture series "*Phases of itinerant matter*" at University of Cambridge (2016)
Undergraduate admissions interviews at Gonville & Caius College (2015–)
Created new postgraduate lecture series and accompanying examinations in "*Many-body physics*" at Bristol University CDT in Condensed Matter Physics (2014)
Postgraduate lecture series "*Ultracold atomic gases as quantum simulators*" at University of Cambridge (2013)
Winner of the Institute of Physics "3 Minute Wonder" outreach competition (2012)
Tutorials for undergraduate students at University of Cambridge (2006–09 & 2011–)

Research supervision

P. Verpoort	2017–	PhD
D.C.W. Foo	2016–17	Master's
L.Y. Yang	2016–	PhD
V. Kouzmanov	2016	Internship, continued with third year at University of Cambridge
L. Schonenberg	2015–	PhD
M. Michael	2015–16	Master's, subsequently PhD at Harvard University
H. Neitzel	2015–16	Master's, followed by research at University of Tübingen
M. Zimet	2015	Internship, then senior year at Harvard University
T.M. Whitehead	2014–	PhD
A. Ireland	2014–15	Master's, subsequently associate at OC&C Strategy Consultants
N. Kongsuwan	2014–15	Master's, afterward PhD at Imperial College, London
P. Vanya	2013–14	Master's, followed by PhD at University of Cambridge
D. Oliveira Sánchez	2013–14	Master's, subsequently analyst at Citigroup Inc.
J.A. Lofthouse	2012–13	Master's, next at Government Operational Research Service
C.W. von Keyserlingk	2010	Internship, followed by D.Phil at University of Oxford

Publications & patents**Effective range dependence of resonant Fermi gases***L.M. Schonenberg and G.J. Conduit*Phys. Rev. A **95**, 013633 (2017).**Jastrow correlation factor for periodic systems***T.M. Whitehead, M.H. Michael, and G.J. Conduit*Phys. Rev. B **94**, 035157 (2016).**Pseudopotential for the 2D contact interaction***T.M. Whitehead, L.M. Schonenberg, N. Kongsuwan, R.J. Needs, and G.J. Conduit*Phys. Rev. A **93**, 042702 (2016).**Pseudopotentials for an ultracold dipolar gas***T.M. Whitehead, and G.J. Conduit*Phys. Rev. A **93**, 022706 (2016).**Pseudopotential for the electron-electron interaction***J.H. Lloyd-Williams, R.J. Needs, and G.J. Conduit*Phys. Rev. B **92**, 075106 (2015).**Extracting semiconductor band gap zero-point corrections from experimental data***B. Monserrat, G.J. Conduit & R.J. Needs*Phys. Rev. B **90**, 184302 (2014).**High-fidelity pseudopotentials for the contact interaction***P.O. Bugnion, P. López Ríos, R.J. Needs & G.J. Conduit*Phys. Rev. A **90**, 033626 (2014).**A New Nickel Based Superalloy for a Combustor Liner and Other high Temperature Applications***H.J. Stone, B.D. Conduit & G.J. Conduit*

Patent application GB1408536 (2014).

Alloy composition (Molybdenum-niobium alloy)*B.D. Conduit, G.J. Conduit, H.J. Stone & M.C. Hardy*

Patent application US20140322068 (2014), EP2796581 (2014), GB1307535 (2013).

A nickel alloy*M.C. Hardy, H.J. Stone, P.M. Mignanelli, B.D. Conduit & G.J. Conduit*

Patent application US20140348689 (2014), EP2805784 (2014), GB1403486 (2014).

Alloy composition (Molybdenum-hafnium alloy)*B.D. Conduit, G.J. Conduit, H.J. Stone & M.C. Hardy*

Patent application US 2014/223465 (2014), EP2796580 (2014), GB1307533 (2013).

Method and system for designing a material*G.J. Conduit & B.D. Conduit*

Patent application US20140236548 (2014), EP2778990 (2014), GB1302743 (2013).

Alloys based on Cr-Cr₂Ta containing Si*A. Bhowmik, R.E. Bennett, B. Monserrat, G.J. Conduit, L.D. Connor, J.E. Parker, R.P. Thompson, C.N. Jones & H.J. Stone*Intermetallics **48**, 62 (2014).**Inhomogeneous state of few-fermion superfluids***P.O. Bugnion, J.A. Lofthouse & G.J. Conduit*Phys. Rev. Lett. **111**, 045301 (2013).**Quantum Monte Carlo study of the two-dimensional ferromagnet***G.J. Conduit*Phys. Rev. B **87**, 184414 (2013).

Exploring exchange mechanisms with a cold atom gas

P.O. Bugnion & G.J. Conduit
Phys. Rev. A **88**, 013601 (2013).

Ferromagnetic spin correlations in a few-fermion system

P.O. Bugnion & G.J. Conduit
Phys. Rev. A **87**, 060502(R) (2013).

Grain growth behaviour during near- γ' solvus thermal exposures in a polycrystalline nickel-base superalloy

D.M. Collins, B.D. Conduit, H.J. Stone, M.C. Hardy, G.J. Conduit & R.J. Mitchell
Acta Materialia **61**, 3378 (2013).

Fluctuation-induced pair density wave in itinerant ferromagnets

G.J. Conduit, C.J. Pedder & A.G. Green
Phys. Rev. B **87**, 121112(R) (2013).

Itinerant ferromagnetism with finite ranged interactions

C.W. von Keyserlingk & G.J. Conduit
Phys. Rev. B **87**, 184424 (2013).

Development of a new nickel based superalloy for a combustor liner and other high temperature applications

B.D. Conduit, G.J. Conduit, H.J. Stone & M.C. Hardy
Rolls-Royce Group plc Invention submission NC13006 (2013).

Line of Dirac monopoles embedded in a Bose-Einstein condensate

G.J. Conduit
Phys. Rev. A **86**, 021605(R) (2012).
Selected as a Kaleidoscope in August 2012.

Development of new high strength highly processable nickel based superalloys for turbine disc applications

B.D. Conduit, G.J. Conduit, H.J. Stone & M.C. Hardy
Rolls-Royce Group plc Invention submission NC12261 (2012).

Field-Tuned Quantum Phase Transition in the Insulating Regime of Ultrathin Amorphous Bi Films

G.J. Conduit & Y. Meir
Phys. Rev. Lett. **108**, 159701 (2012).

First-principles calculation of electronic transport in low-dimensional disordered superconductors

G.J. Conduit & Y. Meir
Phys. Rev. B **84**, 064513 (2011).

Combinatorial development of a polycrystalline alloy using importance sampling

B.D. Conduit, G.J. Conduit, M.C. Hardy & H.J. Stone
Rolls-Royce Strategic Partnership (2011).

Strategies for improving the efficiency of quantum Monte Carlo calculations

R.M. Lee, G.J. Conduit, N. Nemec, P. López Ríos & N.D. Drummond
Phys. Rev. E **83**, 066706 (2011).

Itinerant ferromagnetism in an interacting Fermi gas with mass imbalance

C.W. von Keyserlingk & G.J. Conduit
Phys. Rev. A **83**, 053625 (2011).

Effect of three-body loss on itinerant ferromagnetism in an atomic Fermi gas

G.J. Conduit & E. Altman
Phys. Rev. A **83**, 043618 (2011).

Itinerant ferromagnetism in a two-dimensional atomic gas*G.J. Conduit*Phys. Rev. A **82**, 043604 (2010).**Dynamical instability of a spin spiral in an interacting Fermi gas as a probe of the Stoner transition***G.J. Conduit & E. Altman*Phys. Rev. A **82**, 043603 (2010).**Theory of quantum paraelectrics and the metaelectric transition***G.J. Conduit & B.D. Simons*Editors' Suggestion in Phys. Rev. B **81**, 024102 (2010).**A repulsive atomic gas in a harmonic trap on the border of itinerant ferromagnetism***G.J. Conduit & B.D. Simons*Phys. Rev. Lett. **103**, 200403 (2009).**Inhomogeneous phase formation on the border of itinerant ferromagnetism***G.J. Conduit, A.G. Green & B.D. Simons*Editors' Suggestion in Phys. Rev. Lett. **103**, 207201 (2009).Spotlit with accompanying Viewpoint commentary in Physics **2**, 93 (2009).**Itinerant ferromagnetism in an atomic Fermi gas: Influence of population imbalance***G.J. Conduit & B.D. Simons*Phys. Rev. A **79**, 053606 (2009).**Diffusion Monte Carlo study of a valley degenerate electron gas and application to quantum dots***G.J. Conduit & P.D. Haynes*Phys. Rev. B **78**, 195310 (2008).**Many-flavor electron gas approach to electron-hole drops***G.J. Conduit*Phys. Rev. B **78**, 035111 (2008).**Superfluidity at the BEC-BCS crossover in two-dimensional Fermi gases with population and mass imbalance***G.J. Conduit, P.H. Conlon & B.D. Simons*Phys. Rev. A **77**, 053617 (2008).**Visibility prediction software: five factors of contrast perception for the vision impaired in the real world***H. Dalke, A. Corso, G.J. Conduit & A. Riaz*

6th Cambridge Workshop on Universal Access and Assistive Technology (2012).

Visual Impairment: Design, Research and Application*H. Dalke, A. Corso & G.J. Conduit*

Fifth International Conference on Design Principles and Practices in Rome (2011).

Designing Inclusive Futures: Colour contrast assessment system*H. Dalke, G.J. Conduit, B.D. Conduit, R. Cooper, A. Corso & D. Wyatt*

Universal Access in the Information Society, Springer Verlag (2010).

Colour contrast assessment system: design for people with visual impairment*H. Dalke, G.J. Conduit, B.D. Conduit, R. Cooper, A. Corso & D. Wyatt*

Designing Inclusive Interactions, Springer Verlag, pp. 101-112 (2010). ISBN: 978-1-84996-165-3.

5th Cambridge Workshop on Universal Access and Assistive Technology (2010).

British Standard BS 8493:2008+A1:2010 Light reflectance value (LRV) of a surface. Method of test*H. Dalke, A. Corso, G.J. Conduit & A. Riaz*

ISBN 978-0-58-067695-6 (2010).

Measurement for a more visible world: colour contrast and visual impairment

H. Dalke, G.J. Conduit, B.D. Conduit & A. Corso

Measurement, sensation and cognition, pp. 134-138 (2009). ISBN: 978-0-946754-56-4.

Measuring the Impossible Workshop, National Physical Laboratory (2009).

cromocon™ system for determining sign visibility

H. Dalke, G.J. Conduit, R. Cooper & S. Cole

Online website & manual (2009).

British Standard BS 8493:2008 Light reflectance value (LRV) of a surface. Method of test

H. Dalke, G.J. Conduit & A. Corso

ISBN 978-0-58-057517-4 (2008).

A Device for contrast assessment

Patent GB0712610 (2007).

Future Integrated Transport Environments: Colour Design, Lighting and Visual Impairment

Department for Transport (DfT) (2005).

Invited seminars & conference talks

- 2017** Mar Seminar at DPG Spring meeting, Dresden, Germany
 Mar Seminar at DPG Spring meeting, Dresden, Germany
 Jan Seminar at University of Cambridge, UK
 Jan Invited talk at Frontiers in Condensed Matter Physics, Bristol, UK
- 2016** Nov Seminar at University of Cambridge, UK
 Nov Graduate lecture series at University of Cambridge, UK
 Oct Colloquium at Lorentz Center, Netherlands
 Sep Synoptic talk at Gonville & Caius College, UK
 Sep Invited talk at RAMS2016, University of Lancaster, UK
 Sep Invited talk at University of Cambridge, UK
 Jul Outreach talk at Gonville & Caius Summer School, UK
 May Invited talk at Granta Design Ltd, UK
 May Seminar at University of Warwick, UK
 May Seminar at University of Oxford, UK
 Apr Invited talk at Today's Data Predicting Tomorrow, Loughborough University, UK
 Mar Invited talk at RAMM2016, Queen Mary University of London, UK
 Feb Invited talk at Cambridge Enterprise, UK
 Jan Seminar at University of Cambridge, UK
- 2015** Dec Seminar at University of Trento, Italy
 Nov Seminar at University of Cambridge, UK
 Nov Seminar at Lancaster University, UK
 Oct Soirée at Imperial College London, UK
 Oct Seminar at University of Cambridge, UK
 Oct Colloquium at University of Cambridge, UK
 Jul Outreach talk at Gonville & Caius Summer School, UK
 Jul Colloquium at National Centre for Universities and Business, UK
 Apr Colloquium at University of Cambridge, UK
 Mar Blackboard talk at Theory of Condensed Matter Group, University of Cambridge, UK
 Mar Invited speaker at Quantum Winter School, University of Oxford, UK
 Mar Colloquium at Cambridge University Physics Society Access Event, UK
- 2014** Nov Seminar at School of Physics, Bristol University, UK
 Nov Lecture series at CDT in Condensed Matter Physics, Bristol University, UK
 Nov Seminar at Samsung Advanced Institute of Technology, Republic of Korea
 Oct Seminar at Surfaces, Microstructure and Fracture Group, University of Cambridge, UK
 Oct Invited speaker at Samsung R&D Institute, UK
 Sep Invited speaker at Abu Dhabi Investment Authority, UK
 Jul Invited speaker at QMC versus density functional theory conference, Tuscany, Italy
 Jul Invited speaker at NanoDTC symposium, UK
 Jul Seminar at School of Engineering, University of Edinburgh, UK
 Jun Seminar at Department of Chemistry, University College London, UK
 Jun Invited speaker at Tec[^]Edge Innovation & Collaboration Center, USA
 May Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
 May Blackboard talk at Theory of Condensed Matter Group, University of Cambridge, UK
 May Talk at School of Physical Sciences, University of Kent, UK
 May Seminar at School of Physics and Astronomy, University of Edinburgh, UK
 Apr Invited speaker at Samsung GRO launch day, University of Cambridge, UK
 Feb Seminar at Strategic Analysis, Arlington, USA
 Feb Seminar at Aberdeen Proving Grounds, Maryland, USA
 Feb Outreach talk at Caius Sciences Study Day, UK
 Jan Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
 Jan Talk at Department of Materials Science & Metallurgy, University of Cambridge, UK

- 2013** Nov Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Oct Seminar at Physics Department, Loughborough University, UK
Oct Seminar at Department of Physics, University of Warwick, UK
Sep Seminar at University College London, UK
Sep Invited speaker at EUROMAT2013, Seville, Spain
Sep Seminar at Accelrys Inc., UK
Aug Invited speaker at UK-NL Condensed Matter Meeting, Bristol, UK
Aug Invited speaker at Dynamics of Complex Quantum Systems, Windsor, UK
Jul Invited speaker at QMC versus density functional theory conference, Tuscany, Italy
Jul Invited speaker at CMP in the City: Magnetism, London, UK
Jul Seminar at Granta Design Ltd, UK
Jul Invited speaker at BP compressive sensing symposium, UK
Jun Seminar at Department of Physics, University of Nottingham, UK
May Seminar at Thomas Young Centre, Imperial College London, UK
May Invited speaker at Worshipful Company of Armourers and Brasiers, London, UK
May Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Apr Colloquium at Easter Science School, UK
Mar Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Feb Outreach talk at Caius Sciences Study Day, UK
Feb Outreach talk at Whitgift School visit, UK
Feb Seminar at Quantum Matter Group, University of Cambridge, UK
Feb Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Jan Graduate lecture series at University of Cambridge, UK
- 2012** Nov Seminar at Rudolf Peierls Centre for Theoretical Physics, University of Oxford, UK
Nov Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Oct Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Sep Invited speaker at POLATOM Network Conference, UK
Jun Invited speaker at CMP in the City: Disorder and Magnetism, London, UK
Jun Invited speaker at CMP in the City: Superconductivity, London, UK
May Colloquium at University of Cambridge, UK
Apr Colloquium at Easter Science School, UK
Mar Seminar at Royal Holloway, University of London, UK
Mar Invited speaker at Royal Society, UK
Mar Invited speaker at Maria Waldrast meeting, Austria
Feb Outreach talk at Caius Sciences Study Day, UK
Feb Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
Jan Colloquium at Royal Commission for the Exhibition of 1851 Science Evening, UK
Jan “3 Minute Wonder” event at Institute of Physics, UK
Jan Seminar at University of York, UK
- 2011** Dec Contributed talk at CMMP11, UK
Oct Invited speaker at Cambridge University Physics Society, UK
May Invited speaker at Quantum Magnetism Conference, Israel
Mar Seminar at Durham University, UK
Mar Outreach talk at St Paul’s School, London, UK
Mar Seminar at London Centre for Nanotechnology, University College London, UK
Mar Seminar at Rudolf Peierls Centre for Theoretical Physics, University of Oxford, UK
Mar Seminar at Theory of Condensed Matter Group, University of Cambridge, UK
- 2010** Dec Blackboard talk at Weizmann Institute of Science, Israel
Dec Invited speaker at Israeli Physical Society Conference
Dec Blackboard talk at Ben Gurion University, Israel
Oct Invited speaker at Mizpe Ramon Scientific Retreat, Israel
May Seminar at Center for Ultracold Atoms, MIT, USA
May Invited speaker at CIFAR Quantum Materials Program Meeting, Canada
Apr Seminar at Ben Gurion University, Israel

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- Mar Contributed talk at APS March meeting, USA
 - Mar Seminar at St Andrews Condensed Matter Physics Group, UK
 - Jan Invited speaker at Newspin 2010 Conference, Utrecht University, The Netherlands
 - Jan Seminar at Weizmann Institute of Science, Israel
 - 2009** Dec Invited talk at Israeli Physical Society Conference
 - Jun Seminar at Weizmann Institute of Science, Israel
 - May Seminar at University of Birmingham, UK
 - Mar Contributed talk at APS March meeting, USA
 - Feb Seminar at University of Cambridge, UK
 - Jan Abdus Salam Prize talk at University of Cambridge, UK
 - 2008** Oct Seminar at University of St Andrews, UK
 - Sep Outreach talk at University of Cambridge, UK
 - Jun Seminar at University of Cambridge, UK
 - Feb Seminar at University of Cambridge, UK
 - Jan Seminar at University of Cambridge, UK
 - 2007** Sep Outreach talk at University of Cambridge, UK
 - May Seminar at University of Cambridge, UK
 - 2005** Feb Colloquium at BP Institute, UK
 - 2004** Sep Seminar at University of Leicester, UK