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# Professor John Peter Brodholt

Department of Earth Sciences,  
University College London  
Gower Street, London WC1E 6BT  
+44-(0)20-7679-2622  
[j.brodholt@ucl.ac.uk](mailto:j.brodholt@ucl.ac.uk)

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## EDUCATION

- **Ph.D.** Geology, **University of Bristol**, 1992.  
“*Molecular Dynamics Simulations of Aqueous Solutions at High Pressures and Temperatures*”, supervisor Prof. Bernie Wood.
  - **M.S.** Geological Sciences, **Northwestern University**, 1988
  - **B.A.** Geology, **State University of New York at Buffalo**, 1985. Winner of the Pegrum Award.
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## EMPLOYMENT

- **Professor of Mineral Physics**, Department of Earth Sciences, UCL. **2005-now**
  - **Reader in Mineral Physics**, Department of Geological Sciences, UCL. **2000-2005**.
  - **Royal Society University Research Fellow**, Geological Sciences, UCL. **1994-2002**.
  - **Post-Doctoral Research Fellow**. Istituto di Elettronica Quantistica, Florence, Italy **1993-1994**.
  - **N.E.R.C. Post-Doctoral Research Assistant**, Geology, University of Bristol, **1992-1993**.
  - **1974 to 1982** I held a variety of jobs including building-site labourer and factory worker.
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## AWARDS & HONOURS

- **Price Medal of the Royal Astronomical Society**, 2015
  - **Mineralogical Society of Great Britain and Ireland Distinguished Lecturer**, 2012-2013
  - **Schlumberger Medal of the Mineralogical Society of Great Britain and Ireland**, 2009.
  - **Elected Fellow of the Mineralogical Society of America**, 2005.
  - **European Mineralogical Union Medal for Research Excellence**, 2002.
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## COMMITTEES & ENABLING (non-UCL)

- **Research Council of Norway Expert Committee** (2016)  
Grant review and ranking of proposals.
- **NERC Science Board** (2014-present)  
Science Board (previously SISB) in one of the two senior boards of NERC that provides key advice to NERC Council on science strategy, balance of the science portfolio, national capability, research and training, and other strategic matters.
- **Editor, Earth and Planetary Science Letters** (2014-present)  
EPSL is a leading journal of Earth sciences across the entire Earth and planetary science community. I handle ~120 papers a year.
- **NERC Pool of Chairs**, (2010-2014)  
In 2010 NERC appointed 10 academics from across the whole of the UK to be standing chairs for all their peer-review panels. This included the following activities:  
Chair for 8 Standard Grant Panel Meetings  
Chair for 4 Fellowship Panel Meetings  
Peer Review Working Group (2012)  
Co-Chaired Peer Review College Recruitment Panel – vetting applications and proposing

- PRC new members (2012)
- Research Quality Review Group (2010)
- Member of NERC Responsive Mode Working Group (2010)
- **ARCHER Project Board** (2012-2013)  
Procurement of latest UK national High-Performance Computing Facility (£110M)
- **Governor, Brookfield Primary School, London** (2010-2014)  
Had a remit of improving science teaching and provision. School was awarded a Gold level Primary Science Quality Mark in 2013.
- **Archer eCSE Grant Review Panel** (2014)  
Peer review of computational support applications
- **Hong Kong 2014 RAE Physical Sciences Panel** (2013)
- **Fellow of the Centre for Advanced Studies, Norwegian Academy of Sciences** (2010-2011)  
Invited Visitor (April to July, 2011)
- **Committee Member of the British Geophysical Association** (2010-2015)  
The BGA is a joint association of the Geological Society of London and the Royal Astronomical Society, and whose aims are to promote the subject of Geophysics.
- **Editor, Geophysical Journal International** (2009-2013)
- **Advisory Board of Elements Magazine** (2009-2013)
- **External Examiner for University of Bristol Earth Sciences Degrees** (2008-2010)  
Reviewed all final year exams. Provided advice and feedback on course structure.
- **HECTOR DCSE Grant Review Panel** (2007-2013)  
Reviewing and ranking applications for distributed computational support.
- **Chair of National HPC Science Advisory Committee** (2009-2013)  
Providing scientific and technical advice to UK Research Councils on UK's national High-Performance Computing services.
- **Research Council of Norway Expert Committee** (2009)  
Grant review and ranking of proposals.
- **HECTOR Science Advisory Committee** (2007-2009)
- **ESF Pool of Reviewers** (2006-2010)
- **NERC High Performance Computing Steering Committee** (2004-now)  
Provide guidance to NERC on its High-Performance Computing strategy.  
Review and allocation of applications for national HPC resources to NERC scientists.
- **IMA Commission on Physics of Minerals** (2005)
- **HECToR Procurement Working Group** (2004-2007)  
Responsible for drafting requirements for procurement of the UK's national HPC facility (~£120M).
- **Chair Mineral Physics Group of the Mineralogical Society of Great Britain & Ireland** (2003-2007)  
Responsible for promoting the aims of the Mineralogical Society. Organised meetings, agreed expenditure and allocation of small grants.
- **Advisory Board of Goldschmidt** (2004)
- **NERC Earth Science Peer Review College Member** (2003-2005)  
Review grants and member of four Standard Grant panels.
- **NERC Earth Science Peer Review Committee Member** (2002-2003)  
Member of old Peer Review Committee before introduction of Peer Review College.
- **Selection Panel Member, European Large-Scale Geochemical Facility (UK)** (2002-2003)  
Review and select proposals for use of the European Large-Scale Geochemical Facility (UK).
- **Treasurer Mineral Physics Group of the Mineralogical Society of Great Britain** (1996-2001)
- **Council Member of the Mineralogical Society** (1997-2000)

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## COMMITTEES & ENABLING (UCL)

- **Departmental Athena SWAN lead** (2014 to now)

Bronze award 2016.

- **Director of Research in Earth Sciences** (2013 to now)  
Responsible for internal reviewing and guidance on grant proposals submitted by all members of staff to research councils and other. Provide guidance to HOD on all research matters and funding opportunities.
- **Chair of UCL Research Computing Governance Group** (2012-2015)  
Provides advice and strategic lead on UCL's provision of research computing, including hardware, training and support.
- **UCL Data Centre Working Group** (2014 – now)  
UCL is facing two major issues. One is to find replacement space for the data centre in Wolfson house which is due to be destroyed by HS2, the other is to maximize space on the main campus by making best use of an off-site data centre (Slough). There are considerable logistical and financial issues to be considered, and the working group is providing oversight and guidance for both.
- **Research Information and IT Services Group (RIISG) and RIISG Executive** (2011-15)  
Provide high-level strategy for UCL's research computing landscape. Including long-term data storage, computational hardware, training, software and budget requests.
- **Chair of the UCL RAE 2008 Staff Selection Review Committee** (2007)  
Responsible for reviewing all the cases of UCL staff not selected for the RAE. Responsible for reviewing the demographic makeup of UCL staff not selected.
- **Member of UCL Nursery Management Group** (2001 to 2008)  
Responsible for the strategy and running of the UCL Day Nursery (~50 children)
- **Treasurer of the UCL Academic Staff Common Room** (1998-2002)
- **Warden, Connaught Hall (University of London Hall of Residence)** (1997-2009)  
Pastoral care for ~220 students in a University of London hall of residence.

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## CURRENT OUTREACH ACTIVITIES

- **London Schools Outreach Bus:** I have obtained ~£500k to develop a London-based mobile outreach facility for primary school. The bus will visit London schools and provide educational resources and workshops for primary school aged children. The vision is to engage primary school children in science. I am currently employing someone to drive the project forward and help obtain longer-term funding from industry/commerce/benefactors to make the bus viable in the longer term.
- **Regular Primary School Rocks and Minerals Workshops:** For the last four years I have been part of a small group of academics in the Earth Science department to visit primary schools to run workshop on rocks and minerals. The visits map directly on to Year 3&4 rocks and soils curriculum.
- **Small-group maths help at local primary school:** For several years I have provided one-on-one or one-on-two maths support for Year 6 children who are struggling to meet national expectations (level 4).

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## TEACHING

- GEOL 1004 **The Dynamic Earth** (1st year UGs).
- GEOL 3037 **Deep Earth and Planetary Modelling** (3rd year UGs)
- **First year field course** to South West England.
- B169 **Foundations of Physical Geoscience** (1st year UGs)
- C365 **Physics of Planetary Interiors** (3rd & 4th year UGs)
- B172 **Earth and Planetary Physics** (2nd year UGs)
- **Third year field course in Southern Spain.**

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## POSTDOCTORAL SUPERVISION

- **David Dobson**, (1996-1998) NERC. "The electrical conductivity of mantle minerals"
- **Tracy Chaplin** (1998-2001) NERC. "The effect of Aluminum on the properties of perovskite"
- **Duncan Harris** (1999-2001) NERC. "Simulations of aqueous solutions"
- **Dominic Fortes**, (2003) PPARC funded. "The properties of planetary forming ices"
- **Stephen Stackhouse** (2003-2006) NERC. "High-temperature elasticity of the lower mantle"
- **Paul Wilson** (2002-2003) NERC. "The development of a Condor pool (eScience)"
- **Maria Alfredsson** (2002-2007) NERC. "The properties of Fe-bearing minerals"
- **Alex Cote** (2005-2009) NERC. "Light elements in the core"
- **Peter Grindrod** (2006-2007) PPARC funded. "The evolution of icy moons"
- **Ester Sola** (2007-2008) NERC. "QMC calculations on Fe"
- **Michael Amman** (2010-2012) NERC. "Thermal conductivity of lower mantle minerals"
- **Benjami Martorell Masip** (2011-now) NERC. "The properties of Ni in the Earth's core"
- **Paolo de Cono** (2012-now) NERC. "The properties of melts under high P&T"
- **Alex Lindsay-Scott** (2012-now) NERC. "Novel fluoride post-perovskites"
- **Joshua Muir** (2012-now) NERC. "The origin of ULVZs"
- **Andrew Thompson** (2014 to now) NERC. "Deep Earth Volatiles"
- **Yunguo Li** (2015 to now) NERC. "Pre-melting in the Earth's core"

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## PH.D. STUDENT SUPERVISION

- **Nicola Richmond**, NERC funded (1996-2000).
- **Artem Oganov**, Graduate School Funded (1999-2002).
- **Dominic Fortes**, Graduate School Funded (2001-2004)
- **Pritchard Benjamin**, EPSRC funded (2005-2008)
- **Simon Hunt**, NERC funded (2005- 2009)
- **Michael Ammann**, EU funded (2007-2010)
- **Richard McCormack**, EU funded (2007-2011)
- **Alex Lindsay-Scott**, NERC funded (2007-2011)
- **Kai Wang** (2013-2015)
- **Isra Ezhad** (2015-now)
- **Kiran Chotalia** (2015-now)
- **Jac Van Driel** (2016-now)

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## PUBLICATION SUMMARY

- ~145 Papers, 10 in Nature or Science,
- WOS >4400 citations, h-index = 38
- Google Scholar >5500 citations, h-index = 45
- Full list can be found at <http://www.es.ucl.ac.uk/people/brodholt/papers.html>

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## INVITED TALKS (accepted only from 1996-2016)

- **CEED, University of Oslo**. Layers in the Earth's outer core. **2016**
- **EMPG (Zurich)**. Ab initio constraints on layers in the Earth's outer core. **2016**
- **West Sussex Geological Society**. The Earth's Core. **2015**
- **IPGP**. Outer core composition and layering from first principles. **2015**
- **Deep Earth Processes Conference (GeoSoc)** He Diffusion in Mantle Minerals, **2014**
- **CCP5 Summer School (University of Manchester)** Ab Initio Molecular Dynamics and the Deep Earth, **2014**
- **IPGP (Paris)**. The Composition of Layers in the Outer Core, **2014**
- **UCL Department Seminar**. D" and ten years of post-perovskite, **2014**
- **University of Muenster, Dept. of Physics**. "D" – Caught between a rock and a hot core", **2013**

- **University of Galway, Geology Department.** "D" – Between a Rock and a Core", **2013**
- **University of St. Andrews,** "Defects, Diffusion and Deforming the Earth", **2013**
- **University of Brighton, Earth Sciences,** "Defects, Diffusion and Deforming the Earth", **2013**
- **University of Aberdeen, Geology Department,** "D" – Between a Rock and a Core", **2012**
- **College de France, Paris.** "Defects, Diffusion and Deformation in D", **2012**
- **Dublin Institute for Advanced Studies,** "D" - Between a Rock and a Core", **2012**
- **Kongsberg Meeting, Norway,** "Transport Properties from First Principles: Implications for the Lower Mantle and D'", **2011**
- **School of Earth and Environment, University of Leeds.** "D" – Done and Dusted or More to Learn", **2010**
- **CECAM Meeting, Switzerland.** "Simulating Diffusion from First Principles and Implications for the Earth", **2010**
- **Dept. of Earth Sciences, ETH, Zurich.** "D" and Post-perovskite: Done and Dusted or More to Learn", **2010**
- **MSA Short Course, Berkeley, USA.** "Simulating Diffusion", **2009**
- **Plenary Lecture, MAPt, Edinburgh.** " Rheological Properties of Post-Perovskite", **2009**
- **Goldschmidt Conference, Davos.** " Rheological Properties of Post-Perovskite and Implications for D'", **2009**
- **American Physical Society, New Orleans,** "The *ab initio* Melting Curve of MgSiO<sub>3</sub> Perovskite Using the Coexistence Method", **2008**
- **Unishigawa, Japan,** "Absolute Diffusion Rates in Perovskite and Post-Perovskite", **2008**
- **Department of Geophysics, ETH Zurich,** "What are Ultra-Low-Velocity-Zones made of?" **2007**
- **Dept. of Earth Sciences, University of Liverpool,** "What in Earth could Ultra-Low-Velocity-Zones be Made Of?" **2007**
- **Union Session, Fall AGU,** "Is Anelasticity Hiding Chemical Heterogeneity in the Earth's Lower Mantle?" **2006**
- **Mantle Dynamics Meeting, Munich,** "The High-Temperature and Pressure Elasticity of (Mg,Fe,Al)(Si,Al)O<sub>3</sub> Perovskite", **2006**
- **AGU, Baltimore,** "Ab Initio Calculations on Spin transitions in (Mg,Fe)SiO<sub>3</sub> perovskite", **2006**
- **Geophysical Laboratory, Washington DC,** "The Properties of Fe Bearing Minerals in the Lower Mantle: Implications for Chemical Heterogeneity, D", and ULVZs", **2006**
- **Tokyo, Japan** "Ab Initio Calculations on the Elastic Properties of Post-perovskite", **2005**
- **Schwabisch, Germany,** "Ab Initio Calculations on Iron Bearing Minerals in the Earth's Lower Mantle", **2005**
- **San Malo, France.** "The Properties of Iron Bearing Minerals in the Earth's Lower Mantle", **2005**
- **EMPG-X, Frankfurt,** "Constraining Chemical Heterogeneity in the Earth's Mantle" **2004**
- **Deep Earth Meeting, Maratea, Italy,** "Ab Initio Calculations on the Properties of Lower Mantle Minerals and Implications for Seismic Tomography", **2003**
- **Union Session, EGS-AGU-EUG Joint Assembly, Nice** "Are Computational Mineral Physics Results Accurate Enough to Detect Chemical Heterogeneity in the Earth's Mantle?" **2003**
- **Workshop of Mantle Composition, Structure and Phase Transitions, Frejus, France,** "The Properties of Al<sup>3+</sup> and Fe Bearing Perovskites", **2003**
- **Dept. of Earth Sciences, University of Bristol,** "The Physical Properties of Mantle Minerals: Towards Interpreting Seismic Tomography", **2002**
- **Earth Sciences, University of Leeds,** "The Physical Properties of Mantle Minerals" **2001**
- **Mantle Convection and Lithospheric Deformation Meeting, Aussois, France.** "Computational Mineral Physics and the Physical Properties of Mantle Minerals", **2001**
- **CECAM/Psi-k Workshop, Lyon France,** "The Effect of Aluminium on the Physical Properties of Perovskite" **2001**
- **Dept. of Earth Sciences, University of Oxford,** "The Physical Properties of Mantle Minerals: Towards Interpreting Seismic Tomography" **2001**
- **Mineralogical Society Winter Meeting, Manchester,** **1999**
- **IUGG, Birmingham,** "Hydrolytic Weakening in Forsterite" **1999.**
- **IMA, Toronto,** "Electrical Conductivity of Mantle Minerals and the Temperature of the Earth's

Lower Mantle" 1998

- **University of Oslo, Norway**,. "Molecular Dynamics Simulations of Fluids" 1997
- **Keynote lecture at the European Research Conference on Crustal Fluids, Selfeld, Austria**, "Molecular dynamics simulations of Aqueous Solutions" 1996

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**GRANTS** (PI = Principal Investigator, Co-I = Co-Investigator)

Past Funding

**1994-2002:** Royal Society University Research Fellowship, **£262,898** (PI)

**1996-1998:** NERC Standard Grant, **£114,059** (PI)

**1996-1997:** UCL Equipment Fund, **£3,300** (PI)

**1997-1998:** Royal Society Small Grant, **£9,800**. (PI)

**1997-2000:** NERC Small Grant, **£23,694** (PI)

**1998-2001:** NERC Standard Grant, **£106,902** (PI)

**1998-1999:** ESF Conference Series, **ECU 96,600** (PI)

**1998-2002:** NERC Super-Computing Consortium, **£804,299** (Co-I)

**1999-2003:** NERC Standard Grant, **£125,872** (PI)

**2001-2004:** JIF Infrastructure, **£1,332,473** (Co-I)

**2001-2004:** Paul Instrument Fund Instrumentation, **£42,700** (PI)

**2002-2005:** NERC eScience, **£1,657,644** ( UCL-PI)

**2002-2007:** NERC Consortium Grant, **£870,493** (Co-I)

**2004-2005:** DTI Research and Development, **£67,000** (Co-I)

**2005-2009:** PPARC Standard Grant, **£238,512** (Co-I)

**2005-2009:** NERC Standard Grant, **£163,000** (Co-I)

**2005-2008:** NERC eScience, **£1,335,601** (UCL-PI)

**2005-2009:** ESF EuroCore, 5 PDRAs & 3 PhD students in 4 countries, (Co-I)

**2007-2010:** EU Marie Curie Training Network, **€353,862** (Co-I)

**2009-2011:** NERC Small Grant, **£38,969** (Co-I)

**2010-2013:** NERC Standard Grant, **£412,802** (PI)

**2011-2014:** NERC Standard Grant **£154,304** (PI)

**2012-2012:** NERC Directed Grant **£19,920** (PI)

**2012-2015:** NERC Standard Grant **£531,939** (Co-I)

Current Funding (100% fEC)

**2012-2015:** NERC Standard Grant NE/I010734/1 **£460,124** (PI)

**2013-2016:** STFC Consolidated Grant **£664,460** (Co-I)

**2014-2019:** NERC NE/M00046X/1 Lead PI on consortium **£2.7M** (**£1.64M** to UCL)

**2014-2019:** NERC Directed Grant NE/M000125/1 **£165,000** (Co-1)

**2015-2018:** NERC Standard Grant **£860k** (Co-I)

**2015-2020:** NERC Programme Grant (Add on to NE/M00046X/1) **£1.23M** (PI)