

CURRICULUM VITAE

NAME Richard Jeremy **GAITSKELL**

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EDUCATION

1989–93 St John's College, Oxford University, D. Phil. in Physics,
(Dark Matter Detector Development)
1988–89 London Business School, Corporate Finance Evening Course
1982–85 St John's College, Oxford University, BA Hons Degree in Physics

APPOINTMENTS

2008– **Spokesperson, LZ20 Collaboration, Co-PI** of LUX ZEPLIN dark matter experiment
(Proposed for operation at DUSEL)
2006– **Spokesperson (DOE), LUX Collaboration, PI** and co-leader of LUX dark matter
experiment (operated at Sanford Laboratory, Homestake, USA)
2005– **Associate Professor (Tenured)**, Department of Physics, Brown University, Providence,
RI 02912
2003– **Principle Investigator, DOE, XENON10 Experiment** (operated at LNGS, Italy)
2003– **DOE High Energy Physics**, Task leader on Rolling Grant at Brown University
2003–5 **DOE Outstanding Junior Investigator**, Dept. of Energy (DOE), USA
2002–7 **Member of Executive of XENON Collaboration** (operated at Gran Sasso National
Laboratory, Italy)
2001–5 **Assistant Professor**, Department of Physics, Brown University, Providence, RI 02912
2000–8 **Member of Executive/PI CDMS II Experiment** (operated at Soudan Mine, MN, USA)
2000–01 **Faculty (Senior Lecturer)** Department of Physics and Astronomy, University College
London (UCL), Gower Street, London WC1E 6BT, U.K.
1998–00 **Manager of Detector Fabrication/Testing Project for CDMS II Experiment**
1996–00 **Visiting Scholar**, Department of Physics, Stanford University, Stanford, CA 94305
1998–00 **Research Scientist**, Center for Particle Astrophysics, UC Berkeley, Berkeley, CA 94720
1995–98 **Center Fellow**, Center for Particle Astrophysics, UC Berkeley, Berkeley, CA 94720
1993–95 **Fellow by Examination**, Magdalen College, Oxford, OX1 4AU, UK
1992–93 **College Lecturer (Stipendiary)**, Trinity College, Oxford
1992–95 **Post Doctoral Research Fellowship**, PPARC UK

PUBLICATIONS

Preprints are available at arXiv.org and also at <http://particleastro.brown.edu>

MAJOR REVIEW ARTICLES / BOOKS

- [73]* R.J.Gaitskell, "Direct Detection of Dark Matter", *Annu. Rev. Nucl. and Part. Sci.* 54 (2004) 315-359.

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- [4]* N. E. Booth, R. J. Gaitskell, D. J. Goldie, C. Patel and G. L. Salmon, *Nucl. Instr. and Meth.* **A315**, 201 (1992).
- [7]* R. J. Gaitskell, N. E. Booth and G. L. Salmon, in *Low Temperature Detectors for Neutrinos and Dark Matter IV*, eds. N. E. Booth, G. L. Salmon, (Editions Frontières, Gif-sur-Yvette, France, 1992), p. 435.
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- [9]* R. J. Gaitskell, *Non-Equilibrium Superconductivity in Niobium and its Application to Particle Detection*, D.Phil. Thesis, Oxford University (1993).
- [10]* R. J. Gaitskell, *Cryogenic Particle Detectors: Phonon Physics in Niobium*, eds., T. Paszkiewicz, K. Rapcewicz, "Die Kunst of Phonons" The Proceedings of the XXIX Winter School of Theoretical Physics (Plenum Press, New York, Kudowazdroj, Poland, 1993)
- [11]* N. E. Booth, P. L. Brink, R. J. Gaitskell, D. J. Goldie, A. D. Hahn, G. L. Salmon and A. M. Swift, *Superconducting Tunnel Junctions and Quasiparticle Trapping*, *J. Low Temp. Phys.* **93**, 521 (1993).
- [12]* R. J. Gaitskell, A. D. Hahn, N. E. Booth, G. L. Salmon and D. L. Kazakovtsev, *Modelling the thermalisation of non-equilibrium phonon distributions in bulk single crystals*, *J. Low Temp. Phys.* **93**, 683 (1993).
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- [14]* N. E. Booth, P. L. Brink, R. J. Gaitskell, D. J. Goldie, A. D. Hahn, G. L. Salmon and A. M. Swift, *Low temperature detectors for elementary particles*, *Physica B* **197**, 39 (1994).
- [15]* A. M. Swift, D. J. Goldie, N. E. Booth, P. L. Brink, R. J. Gaitskell, A. D. Hahn and G. L. Salmon, *Development of a high resolution cryogenic detector with applications in beta-spectroscopy and solar neutrino searches*, *Nucl. Phys. B (Proc. Suppl.)* **35**, 405 (1994).
- [17]* R J Gaitskell, L C Angrave, N E Booth, A D Hahn, G L Salmon and A M Swift, *A Measurement of the Beta Spectrum of ^{63}Ni using a New Type of Calorimetric Cryogenic Detector*, eds., P. J. Bussey, I. G. Knowles, 27th International Conference on High Energy Physics (IOP Publishing, Glasgow, UK, 1994).
- [18] R.J.Gaitskell, *The Application of Cryogenic Detectors to Particle Physics Experiments*, IoP High Energy Particle Physics Group Newsletter, March 1995.
- [19]* R.J. Gaitskell, L.C. Angrave, N.E. Booth, A.D. Hahn, G.L.Salmon and A.M.Swift, *A measurement of the beta spectrum of Ni-63 using a new type of cryogenic detector*, *Phys Lett B* **370** (1996) 163
- [20]* R.J. Gaitskell, L.C. Angrave, N.E. Booth, A.D. Hahn, G.L.Salmon and A.M.Swift, *A measurement of the beta spectrum of Ni-63 using a new type of cryogenic detector*, *Nucl. Instrum. and Methods A* **370** (1996) 250
- [21]* R.J. Gaitskell, L.C. Angrave, N.E. Booth, E. Esposito, T.J. Giles, C. Höss, E.P. Houwman, G.L. Salmon, M. van den Putte and S. Wänninger, *The design of a cryogenic dark matter detector based on the detection of the recoil direction of target nuclei*, *ibid.* p.162
- [22]* E. Esposito, L.C. Angrave, N.E. Booth, R.J. Gaitskell, T.J. Giles, C. Höss, E.P. Houwman, G.L. Salmon, M. van den Putte and S. Wänninger, *Development of a dark matter detector using series arrays of superconducting tunnel junctions*, *ibid.* p.31
- [23]* M. van den Putte, C. Höss, T.J. Giles, L.C. Angrave, N.E. Booth, E. Esposito, R.J. Gaitskell, E.P. Houwman, G.L. Salmon, and S. Wänninger, *Status of a facility for measuring nuclear recoils by neutron scattering from cryogenic particle detectors*, *ibid.* p 271
- [24]* R.J. Gaitskell, P.D. Barnes, Jr., A. Da Silva, B. Sadoulet and T. Shutt, *The Statistics of Background Rejection in Direct Detection Experiments for Dark Matter*, *Nucl. Phys. B (Proc.Suppl.)*, **51B** (1996) 279.

- [25]* T. Shutt et al. [CDMS Collaboration], *Progress of the Cryogenic Dark Matter Search (CDMS) Experiment, Nucl. Phys. B (Proc. Suppl.)*, **51B** (1996) 318
- [36]* L.C. Angrave, N.E. Booth, R.J. Gaitskell, G.L. Salmon and M.R. Harston, *Measurement of the Atomic Exchange Effect in Nuclear β Decay*, *Phys. Rev. Lett.*, **80** (1998) 1610.
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- [44]* T. Saab, R.M. Clarke, B. Cabrera, R.A. Abusaidi, R. Gaitskell, *Design of QET Phonon Sensors for the CDMS Zip Detectors* *NIM A* **444** (2000) 300.
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- [47]* R. J. Gaitskell, et al. [CDMS Collaboration], *Latest Results on the WIMP–Nucleon Cross Section from the Cryogenic Dark Matter Search (CDMS)*, Proceedings of TAUP99 Conference, September 1999, Paris, France
- [48]* R. Abusaidi et al. [CDMS Collaboration], *Results on the WIMP–Nucleon Cross Section from the Cryogenic Dark Matter Search (CDMS)*, *Phys. Rev. Lett.* **84** (2000) 5699
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- [54]* R. Abusaidi et al. [CDMS Collaboration], *Results on the WIMP–Nucleon Cross Section from the Cryogenic Dark Matter Search (CDMS)*, *Phys. Rev. Lett.* **84** (2000) 5699
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- [60]* D. Abrams et. al, (CDMS Collaboration) *Exclusion Limits on the WIMP-Nucleon Cross-Section from the Cryogenic Dark Matter Search* *Phys. Rev. D* **66**, 122003 (2002), (astro-ph/0203500)
- [62]* P.L. Brink et al., "Further results from the CDMS experiment" *NIM A* **520** (2004) 105-107.
- [63]* D.A. Akerib et al. "First Results of the Silicon ZIP Detector, operated under elevated bias voltage", *NIM A* **520** (2004)
- [64]* V. Mandic et al., "Study of the dead layer in germanium for the CDMS detectors", *NIM A* **520** (2004) 171-174.
- [69]* C.L. Chang et al., "Installation and commissioning of the CDMSII experiment at Soudan", *NIM A* **520** (2004) 116-119.
- [70]* D.S. Akerib et al. (CDMS Collaboration), "New results from the Cryogenic Dark Matter Search (CDMS) Experiment", *Phys. Rev. D* **68** (2003) 082002, hep-ex/0306001.
- [71]* D.S. Akerib et al. (CDMS Collaboration), "First Results from the Cryogenic Dark Matter Search in the Soudan Underground Lab", *Phys. Rev. Lett* **93** (2004) 211301, astro-ph/0405033.
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- [81]* M. J. Attisha, PhD Thesis, (April, 2006) Brown University. (Gaitskell, Advisor)

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- [102] P. Sorensen et al. (XENON10 Collaboration). “Determination of the scintillation and ionization yield of liquid Xe from the XENON10 experiment.” Submitted to Phys. Rev C, arXiv:0807.0459 [astro-ph]

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- [3] R.J.Gaitskell, D.J.Goldie, N.E.Booth and G.L.Salmon, *Low temperature superconducting detectors for dark matter and solar neutrinos experiments*. Published in *Massive Neutrinos, Tests of Fundamental Symmetries*, XXVIth Rencontre de Moriond, Les Arcs, France, eds. O.Fackler, G.Fontaine and J.Tran Thanh Van (Editions Frontières, January 1991) p. 191.
- [5] D.J.Goldie, N.E.Booth, R.J.Gaitskell and G.L.Salmon, *Particle detection with superconducting tunnel junctions - modelling the non-equilibrium state generated by particle interactions*, in *Superconducting Devices and their Applications*, H. Koch, H. Lübbig, eds. (Springer-Verlag, Berlin, 1991), p. 474.
- [6] N.E.Booth, R.J.Gaitskell, D.J.Goldie, A.C.Howman, C.Patel and G.L.Salmon, *Cryogenic detectors based on superconducting tunnel junction arrays for elementary particles*. Published in *The Vancouver Meeting, Particles and Fields '91*, eds. D.Axen, D.Bryman and M.Comyn (World Scientific, 1992) Vol. 2, p. 922.
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- [26] R.J. Gaitskell, *et al.* [CDMS Collaboration], *The Cryogenic Dark Matter Search (CDMS) Experiment.*, ed. N J C Spooner, Proceedings of the First International Workshop on The Identification of the Dark Matter, Sheffield, UK, (World Scientific, September 1996)
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- [33] S.W. Nam, *et al.* [CDMS Collaboration], *Status and Results from the Cryogenic Dark Matter Search (CDMS)*, *ibid.* pp. 217-220
- [34] L.C. Angrave, N.E. Booth, R.J. Gaitskell, A.D. Hahn, G.L. Salmon and A.M. Swift, *Measurement of the Atomic Exchange Effect in ^{63}Ni* , *ibid.* pp. 178–180
- [35] D.S. Akerib, *et al.* [CDMS Collaboration], *Preliminary Limits on the WIMP–Nucleon Cross Section from the Cryogenic Dark Matter Search (CDMS)*, Nuclear Physics B, Proc. Suppl., **70** (1999) 64
- [37] R. Schnee, *et al.*, *Results and Status of the Cryogenic Dark Matter Search (CDMS)* Physics Reports **307** (1998) 283
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- [39] D. Bauer, *et al.*, *A Search for Dark Matter Using Cryogenic Detectors* to appear in Proceedings of the XXIX Conference on High Energy Physics, Vancouver, Canada, July 23-29, 1998.
- [40] Jochum, J., *et al.*, *CDMS Dark Matter Experiment* to appear in Proceedings of the 5th International WEIN Symposium on the Physics of the Standard Model, Santa Fe, New Mexico, 14-21 June 1998.
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- [49] R J Gaitskell, *Dark Matter Detection*, Proceedings of Structure Formation in the Universe NATO Advanced Study Institute Summer School (Cambridge, UK, September 1999)
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- [94] D.S. Akerib et al., (CDMS Collaboration), “The SuperCDMS proposal for dark matter detection”, *NIM A*, Volume 559, Issue 2, *Proceedings of the 11th International Workshop on Low Temperature Detectors - LTD-11* (April 2006)
- [95] P. L. Brink et al., (CDMS Collaboration), “Latest Results From The CDMS-II Cold Dark Matter Search”, AIP Conf. Proc. 850, 1617 (September 2006)
- [96] D.S. Akerib et al., (CDMS Collaboration), “CDMS, Supersymmetry and Extra Dimensions”, *Nucl. Phys. B (Proc. Suppl.)* 173, *Proceedings of the 7th UCLA Symposium on Sources and Detection of Dark Matter and Dark Energy in the Universe* (2007), astro-ph/0609714
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INVITED LECTURES & SUMMER SCHOOLS (MOST RECENT FIRST)
COPIES OF MANY OF THE TALKS ARE AVAILABLE AT
HTTP://PARTICLEASTRO.BROWN.EDU

Invited Plenary Talk, Brookhaven National Lab Forum 2008, October 2008
Invited Plenary Talk, ICFA (International Committee on Future of Accelerators),
SLAC/Stanford, October 2008
Colloquium, Stony Brook, October 2008
International Organizing Committee for Identification of Dark Matter Conference August
2008, Stockholm, Sweden.
Colloquium, LBL, June 2008
Radio Interview, Sioux Falls, SD, May 2008
Outreach Talk, Faber Theater, University of South Dakota, May 2008
Colloquium, Dept. of Physics, University of South Dakota, May 2008
Colloquium, Dept. of Physics, Stanford University, May 2008
Invitation to give opening symposium at the inaugural meeting of the new "The Institute for
the Physics and Mathematics of the Universe" Tokyo University, Japan , March 2008
Dark Matter 2008 Conference, UCLA, LUX 1 tonne Detector, Feb 2008
Colloquium, UMich, Feb 2008
Outreach Talk at Ladd Observatory, Brown University, Feb 2008

2008

Colloquium Caltech Nov 2007
DUSEL Town Meeting, Dark Matter Working Group Co-Chair / Presentation, Nov 2007
Colloquium, Imperial College, London, UK, Oct 2007
Colloquium, Rutherford Appleton Laboratory, UK, Oct 2007
Colloquium Oxford University, UK, Oct 2007
Colloquium Florida State University, Dark Matter, Oct 2007
Colloquium Kentucky University, Dark Matter, Sept 2007
Colloquium Brown University, Dark Matter, Sept 2007
Japan, ICRR, Invited for Institute Progress Review, Noble Liquids, Aug 2007
Colloquium Brookhaven National Lab, Noble Liquid Detectors, June 2007
Darkside of the Universe, Invited Talk, Review of Dark Matter Direct Detection, Minnesota,
June 2007
Dark Matter Conference, Fermilab, XENON10 Results, May 2007
LBL Colloquium (RPM), March 2007
LLNL Seminar, March 2007
APS April Meeting (Florida): Invited Review Talk, Noble Liquid Detectors for Dark Matter,
April 2007
C2CR – Tahoe, CA, Invited Review Talk

2007

SLAC International Symposium: Detector Development for Particle, Astroparticle and
Synchrotron Radiation Experiments: Invited Talk: "Particle Astrophysics; The Science and
Challenges", April 2006
Presentation to Scientific Committee, LNGS, Italy, on behalf of XENON10 Collaboration,
Mar 06
DM06 UCLA, Chaired Dark Matter Session at Conference / Talk on "Detection and
Discrimination of Electron and Nuclear Recoils in Liquid Xenon", Feb 06
Homestake Workshop, Lead, SD, Invited Talk, "XENON Dark Matter Experiment", Feb 06
2006 Aspen Winter Conference on Particle Physics, Invited Talk "Particle Physics at the Verge
of Discovery" Direct Dark Matter Searches, Feb 06

2003 - 2006

Worcester Polytechnic Institute, Physics Department Colloquium, Nov 2005
 Gran Sasso Underground Laboratory (LNGS), Presentation to Science Committee, XENON Dark Matter Experiment, Oct 2005
 UK High Energy Physics Meeting, Coseners House, Summary of Current Direct Detection Experiments, May 2005
 Radio Interview, WBSR, "Hunt for Dark Matter", April 2005
 Dartmouth College Physics Department Colloquium, April 2005
 Rutgers Physics Department Colloquium, April 2005
 Co-organizer of "The Future of Dark Matter Detection", a workshop hosted by Center for Cosmological Physics, U Chicago (also giving talk on "Future of XENON dark matter detector). (<http://cfcpwork.uchicago.edu/kicpdev/website/public/workshops/dmd2004/>), Dec 2004
 Soudan Low Background Counting Facility, SNOLab Low Background Workshop, Dec 2004.
 Homestake Mine, S-2 proposal workshop, dark matter working group, Nov 2004
 Center for Cosmological Physics, U Chicago, Seminar, Nov 2004
 Brown Physics Department Colloquium, Oct 2004
 Conference Summary (Closing Talk), Identification of Dark Matter Conference, Edinburgh, UK, Sept 2004.
 DUSEL, Deep Underground Science and Engineering Lab, Progress Report, Identification of Dark Matter Conference, Edinburgh, UK, Sept 2004.
 CDMS Monte Carlo, Identification of Dark Matter Conference, Edinburgh, UK, Sept 2004.
 XENON Status, Identification of Dark Matter Conference, Edinburgh, UK, Sept 2004.
 Presentation to Scientific Assessment Group on Experimental Non-Accelerator Physics (SAGENAP) committee on XENON Dark, Apr 2004
 Presentation to Brown Technology Council, Feb 2004
 SLAC Colloquium, "Whither WIMPs – The Search for Cold Dark Matter", January 2004

TAUP Astrophysics and Underground Physics Conference, Seattle, WA, "The Dissemination of Dark Matter Experimental Data", Sept 2003
 "XENON – A Next Generation Dark Matter Search Experiment" European Physical Society, High Energy Physics Meeting, Aachen, Germany, June 2003
 "CDMS II – Cryogenic Dark Matter Search Experiment" European Physical Society, High Energy Physics Meeting, Aachen, Germany, June 2003 "
 "CDMS II – Cryogenic Dark Matter Search Experiment" - Conference on the Intersections of Nuclear and Particle Physics, New York, May 2003
 MIT Colloquium, Theoretical Physics, "Whither WIMPs – The Search for Cold Dark Matter", April 2003
 Columbia U. Colloquium, Physics Dept. "Whither WIMPs – The Search for Cold Dark Matter", April 2003

SERVICE (SUMMARY)

To Brown University

2008– Chair of Brown University Radiation Safety Committee

2007–2008 Chair Physics Dept Computer Committee

2002–2007 UTRA Undergraduate Research Program: Each summer I have hosted 2 or 3 undergraduates who have conducted research as part of our program.

2001–2008 Advisor to a total of ~40 freshmen in last 7 years.

2002–2008 I also advised a total of 25 sophomores (in last 6 years) who selected me following contact in previous year.

2005– Member of Brown Radiation Safety Committee Member

2005 Organizer of Einstein’s Miraculous Year, Violin Concert at Brown, hosted by Physics Dept. with Jack Liebeck. Included physics talk given by myself.

2005 Nominated for Karen T Romer Award for excellence in advising and mentoring

2005-2006 Member of Physics Dept Qualifying Exam committee

2002–2005 Physics Honors Advisor (includes review of the Senior Theses submissions and lectures for the Physics concentrators).

Jan 2005 Technology in Teaching, Presentation to Faculty attending Brown Technology Group hosted forum.

Apr 2005 1 hour interview with Brown Radio Station on dark matter in the Universe.

2004–5 Physics Dept Publications and Outreach committee

2004–2008 Physics Dept Computer Committee

2002– Member of the Colloquium committee of the Physics Department.

Feb 2004 Presentation to Brown President’s Technology Group on use of technology in teaching (This is an external panel appointed by the President)

2003 Hosted the annual A O Williams Special Lecturer (Bernard Sadoulet).

Sept 2003 Gaitskell was interviewed for the video made by the Brown Technology Group: Academic Computing at Brown for Teaching and Research Technology (see <http://www.brown.edu/Facilities/CIS/Faculty/video.html>)

To Profession (also see list of talks)

Member of International Review Committee (NERC, Canada) for SNOLab, December 2008

International Organizing Committee for Identification of Dark Matter Conference, August 2008, Stockholm, Sweden

DUSEL Dark Matter Working Group Chair, (includes report Dec 2007 and coordination of meetings including Los Angeles, California, Feb 2008 and Homestake Meeting, April 2008)

Member of Visitors Committee (appointed 2008-2012) for Fermi Research Alliance. Annual review of full Fermilab research program.

External committee member on LDRD review at LANL , April 2008

Reviewer for Physical Review Letters 2007– on going

Lead organizer of LUX Collaboration meeting held at Brown involving 12 institutions/42 attendees (January 2008)

Nov 2007, Co Chair DUSEL Dark Matter Working Group

Apr 2007 April APS Meeting (Florida), Review of Noble Liquid Detectors for Dark Matter

Jan 2006 DUSEL (NSF) Working Group on Dark Matter – draftee of report for NSF S-1 Process

Feb 2005 Homestake Dark Matter Working Group

Jan 2005 Co-organizer of Dark Matter Working Group, Deep Underground Science and Engineering Laboratory (DUSEL), S-1 Meeting, Boulder, CO

Co-organizer of “The Future of Dark Matter Detection”, a workshop hosted by Center for Cosmological Physics, U Chicago (also giving talk on “Future of XENON dark matter detector). Dec 2004 (<http://cfcpwork.uchicago.edu/kicpdev/website/public/workshops/dmd2004/>)

I gave the Conference Summary Talk at the major international meeting in my field, Identification of Dark Matter Conference, Edinburgh, Sept 2004.

Teaching at SLAC (Stanford) Summer Institute, Aug 2004. (<http://www-conf.slac.stanford.edu/ssi/2004/>)

I have developed and maintain a web site that disseminates current (as well as historical) results in the field of particle dark matter research. This site is generally considered the standard reference for results in my field. (see <http://dmtools.brown.edu>) The site was featured in a Scientific American article at the start of 2003.

Chair of Dark Matter panel for the Ad Hoc Science Committee Review Panel in Support of the Homestake Underground Laboratory Conversion, November 2003.

During 2003 I was the Convener/Chair of Dark Matter Sessions of European Physical Society, High Energy Physics Meeting, Aachen, Germany, June 2003

I also organized a site visit to WIPP (Waste Isolation Pilot Plant) Underground Physics Laboratory, Sept 2003, at which we held discussions/gave presentations on future dark matter experiments at WIPP Underground Laboratory.

During 2002 there was considerable activity relating to major proposals for new deep laboratories for underground physics (such as solar neutrino and dark matter experiments). I served as a leader, or a member, of a number of panels/working groups that submitted reports to funding agencies, on the future of the field.

Served as the working group leader for the Dark Matter at International Workshop on Neutrinos and Subterranean Science (NESS 2002) September 19-21, 2002 in Washington, DC. (<http://www.physics.umd.edu/ness02/>).

Presented a summary of US dark matter field, and its requirements for a national underground laboratory to the NFAC Neutrino Facilities Assessment Committee (<http://www.nas.edu/bpa/projects/neutrino>), organized by the National Academy of Sciences, on July 25, 2002.

Presented on non-European dark matter programs to APPEC, Peer Review Committee of AstroParticle Physics European Coordination, a newly formed body aimed at promoting and facilitating the co-operation and collaboration within the growing European AstroParticle Physics community (July 2002).

Convener of the Aspen 2002 Summer Workshop on Direct Detection of Dark Matter. This meeting brought together representatives from most major US dark matter experiments.

Member of SNOLAB working group on Dark Matter, SNOLAB Meeting, Ottawa, Canada (Nov 2002).

To Community

2008 Outreach talk to Rhode Island Skyscrapers astronomy group

2007/8 Continuing outreach evenings at Ladd Observatory including talks.

2005 Organizer of Einstein’s Miraculous Year, Violin Concert (open to all) at Brown, hosted by Physics Dept. with Jack Liebeck. Included physics talk given by myself.

I continue to be involved in the open nights staged for the public, associated with the reopened Ladd Observatory (Brown). We run a continuing program of outreach that will occur at Ladd. The program will cover aspects of current and historical research in astronomy and cosmology.

Outreach talk on astronomy to French American School of Rhode Island (Feb 2004)

“Into the AntiWorld” I prepared and delivered lecture on physics, which followed West End Theater (Bloomsbury) production (4 nights, May 2001) about PAM Dirac and antimatter entitled “Into the AntiWord” (First performed at CERN in 1998). The audience was made up of general public. My lecture was designed to flesh out the physics (that was mentioned in the play) of antimatter, and also describe the role of antimatter in particle physics and cosmology. A group of physicists (which I lead) then had additional informal discussions with the public in the theater after the production, the session typically lasting 1-2 hours.

I assisted in the extensive Center for Particle Astrophysics (CfPA, UC Berkeley) education/outreach program. I regularly (1995-1998) contributed written material and illustrations to web site (<http://cfpa.berkeley.edu>) that was designed for non-specialists to get a better idea of our work in Particle Astrophysics and Dark Matter. I was also involved in preparing, and guiding use of, hands-on experiments that demonstrated astrophysics/astronomy concepts (such as luminosity- $1/r^2$, and scale of solar system/galaxy/Universe that were used with Berkeley Middle School students.

AWARDS

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| 2003–2007 | Outstanding Junior Investigator, Department of Energy, High Energy Physics |
| 1995–00 | Center Fellowship, Center for Particle Astrophysics, UC Berkeley, 301 LeConte Hall, Berkeley, CA 94720, USA |
| 1995 | Lindemann Fellowship, The Lindemann Trust Committee, Dartmouth House, 37 Charles Street, London W1X 8AB, UK (stipend not taken up) |
| 1993–95 | Fellowship by Examination, Magdalen College, Oxford, OX1 4AU, UK |
| 1993–95 | Post Doctoral Research Fellowship, PPARC (Particle Physics and Astronomy Research Council) Polaris House, North Star Avenue, Swindon, Wilts SN2 1SZ, UK |
| 1993 | D.Phil. in Physics, St John's College, Oxford University, UK |
| 1989 | Graduate Studentship, SERC (Science and Engineering Research Council), UK (address as PPARC above) |
| 1989 | Corporate Finance Evening Course Graduate, London Business School, London, UK |
| 1987 | Qualified Registered Representative, London Stock Exchange, London, UK |
| 1985 | BA Hons. Degree in Physics, St John's College, Oxford University, UK |
| 1981 | Open Scholarship, St John's College, Oxford University, UK |
| 1981 | Scholarship, Worshipful Company of Scientific Instrument Makers, London, UK |

TEACHING

2001– Undergraduate Teaching & Advising, Brown University

2001– Graduate Supervision, Brown University

In Fall 2008 I taught PHYS2010 (Graduate Introduction to Experimental Physics)

In Spring 2008 I taught PHYS1280 (Introductory Cosmology)

In Fall 2007 and 2008 I taught PHYS2010 (Graduate Experimental Physics) to a class of 14 graduates.

In 2005-6 I taught PH0047 (Electricity and Magnetism, class size 42–60). This is the physics department's main course in Fall semester for Sophomore's who are continuing to pursue physics at an advanced level and who intend to concentrate in physics.

In 2002-5 I taught PH0008 (Quantum Mechanics and Special Relativity, class size 36–65). This is the physics department's main course in Spring semester for Freshmen who are pursuing physics at an advanced level.

In Fall 2002-4 I taught the PH0201 (Experimental Physics) laboratory course to 12–20 graduate students each year.

See Services to Brown section for **CAP (Freshmen) and Sophomore advising details**.

I supervise 2–5 **graduate students** at any one time doing physics research in my group at Brown.

I have also supervised 1–3 undergraduates for UTRA and other research projects with my group each year.

2000–2001 Undergraduate Teaching & Demonstrating, UCL

2000–2001 Graduate / PostDoc Supervision, UCL

In 2001, although I was granted an initial holiday from most teaching duties, I lectured an undergraduate introductory course to Particle Astrophysics (20 students). I also demonstrated in undergraduate experimental labs.

I supervised 2 graduate students, one of whom, was able to transfer with me to Brown. I also directed one PostDoc who I recruited at the start of my period at UCL.

1993–2000 Graduate Student Supervision, UC Berkeley, Stanford & Oxford

During my research at UC Berkeley, Stanford and Oxford I was responsible for the day-to-day supervision of a total of 9 graduate students. I also had responsibility for managing operations in a series of laboratories involving graduate students, undergraduates, technical and engineering staff.

1995–2000 Freshman Seminar Lectures, UC Berkeley

I gave lectures annually on Particle Astrophysics, and the Dark Matter Problem(s), as part of the Physics 24 Freshman seminar course (“Big Bang and the Early Universe”) at UCB.

1993–1995 Senior/Junior Dean of Arts, Magdalen College, Oxford

I was elected Senior Dean of Arts at Magdalen College in October 1994, after a spell as Junior Dean the previous year. During my time as a Dean of Arts I had extensive involvement with the administration, and welfare, of undergraduates and graduates of the College. I was an active member of the College Governing Body, and a member of a number of College administrative committees, including the Tutorial Board, Cases Committee and Senior Common Room Committee.

1990–1995 Physics Tutoring, Oxford

Over a period of 5 years I tutored undergraduates (four, or more, per annum) on the Physics course at Oxford. The subject matter I covered included

- 3rd year option papers in Nuclear and Particle Physics,
- 2nd year courses in Atomic Physics, Electromagnetism and Optics, Quantum Mechanics, Solid State Physics, and Nuclear and Particle Physics.

My formal teaching appointments were:

1993–1995 Physics Tutor, Magdalen College, Oxford
1992–1993 College Lecturer (Stipendiary), Trinity College, Oxford
1990–1992 Physics Tutor, Mansfield College, Oxford

