

# David J.C. MacKay, B.A., Ph.D.

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## Education

1978–85 Newcastle-under-Lyme School, Staffordshire. Ten O-levels, grade A. Six A-levels and two S-levels: Maths (A), Further Maths (A), Physics (A1), Chemistry (A2), Biology (A), General Studies (A).  
1985–88 Trinity College, Cambridge:  
B.A., Natural Sciences (Physics and Theoretical Physics). Triple first.  
1988–91 California Institute of Technology, U.S.A.:  
PhD, Computation and Neural Systems.

## Employment

1986,87 Undergraduate summer research, R.S.R.E.  
1992–95 Royal Society Smithson Research Fellow, Darwin College, Cambridge.  
1995–99 University Lecturer, Department of Physics, Cambridge University.  
1999– Reader in Natural Philosophy, Department of Physics, Cambridge University.  
2002– Gatsby Senior Research Fellowship.  
2003– Professor of Natural Philosophy, Department of Physics, Cambridge University.

## Prizes and awards

1985 International Physics Olympiad, Yugoslavia: silver medal overall; first prize for experimental work.  
1986–8 Senior scholarship, Trinity College.  
1986,7,8 Tripos Prize, Trinity College.  
1986,7 Science Essay Prize, Trinity College.  
1987 Bursary from Thorn E.M.I. funded attendance at I.C.N.N., San Diego.  
1993 Winner of ASHRAE prediction competition.  
1993 Merit increment, Royal Society.  
1999 Communications Society Leonard G. Abraham Prize Paper Award (with R.J. McEliece and J.-F. Cheng).

1999 IBM Partnership Award.  
2001 IBM Partnership Award.

## Research grants

1988 Fulbright scholarship.  
1988 Parsons fellowship, Caltech.  
1989–91 S.E.R.C. studentship.  
1992–95 Royal Society Smithson Research Fellowship.  
1995 Co-applicant, E.P.S.R.C. grant GR K23263.  
1995 Gatsby charitable foundation: Computer support (£25,000).  
1994 Consultant for grant R01-NS33787-01, National Institute for Neurological Disorders and Stroke. Principal investigator: K. Miller, U.C.S.F.  
1996 Co-applicant, E.P.S.R.C. grant GR L10239, supporting one PDRA for 18 months.  
1998 Gatsby charitable foundation. ‘Teaching Physics’. Support for one PDRA for three years (£122,581).  
1999 Applied Systems Limited: support for research in human–computer interfaces.  
1999 IBM Partnership Award (\$40,000).  
2001 IBM Partnership Award (\$30,000).  
2001 Gatsby charitable foundation. ‘Teaching Physics’. Support for one PDRA for three years (£114,400).  
2002 Gatsby charitable foundation. Associate Lectureship for Sanjoy Mahajan, replaces above PDRA (£200,000).  
2002 Gatsby charitable foundation. Senior Research Fellowship (five years) (£300,000).  
2002 Gatsby charitable foundation. RA for the Dasher Project (2 years) (£90,000).

## Recent invited talks

1998 International Conference on Artificial Neural Networks, Sweden. (Plenary speaker.)  
1998 Beckmann Institute, Illinois.  
1998 Allerton Conference on Communication, Control, and Computing  
1998 U.C. San Francisco, Department of Physiology.  
1998 Jet Propulsion Laboratory  
1998 Stanford University, Department of Computer Science  
1998 U.C. Berkeley, Department of Computer Science  
1998 U.C. San Diego, Center for Magnetic Recording Research  
1998 Univ. of New Mexico, Dept. of Computer Science  
1998 Stanford Research Institute

- 1999 California Institute of Technology, Department of Electrical Engineering.
- 1999 ISCTA'99, Ambleside.
- 1999 IMA, Minneapolis: 'Codes, Systems and Graphical Models'
- 1999 IBM Zürich, Workshop on Magnetic Recording.
- 1999 Dublin Institute for Advanced Studies.
- 2000 Rank Prize Fund Meeting on 'Model Selection and Learning in Computer Vision', Grasmere.
- 2000 IBM Zürich.
- 2000 Information-Based Induction Sciences, Shizuoka, Japan.
- 2000 Department of Electrical Engineering, Waseda University, Tokyo, Japan.
- 2000 Nippon Steel, Tokyo, Japan.
- 2000 Sony Corporation, Tokyo, Japan.
- 2000 2nd International Symposium on Turbo Codes, Brest, France.
- 2000 Physics dept., Warwick University.
- 2001 Eighth International Workshop on Artificial Intelligence and Statistics, Key West, Florida (Tutorial speaker).
- 2001 Workshop on statistical mixtures and latent structure analysis, Edinburgh.
- 2001 Workshop on Statistical Physics and Capacity-Approaching Codes, Trieste, Italy.
- 2001 California Institute of Technology.
- 2002 MFCSIT2002, Galway
- 2002 Statistics Department, University of Kent at Canterbury.
- 2003 Rank Prize Fund Meeting on 'The Probabilistic Brain', Cambridge.
- 2003 Department of Mathematics, Warwick.
- 2003 Division of Informatics, Edinburgh University.
- 2003 Computer Science, University College London.
- 2003 Computer Science, University of Birmingham.
- 2004 Maximum entropy and Bayesian methods, Munich.

### Academic contributions

- 1991 'Methods of computational neuroscience', Woods Hole. Postgraduate lectures on neural networks.
- 1991 'Neural Information Processing Systems', Denver: Organizer of workshop on *Bayesian methods for neural networks*.
- 1989– Reviewer for IEEE Transactions on Communications, Electronics Letters, IEEE Transactions on Pattern Analysis and Machine Intelligence, Neural Computation, Neural Networks, IEEE Transactions on Neural Networks, Machine Learning, Artificial Intelligence and other journals.
- 1992– Supervisor of several undergraduate research projects, five MPhil students, and twelve PhD students, Cavendish laboratory.
- 1992–97 Visiting Researcher, Department of Computer Science, University of Toronto.
- 1993,4 Organizer of two workshops on *Inference and*

*Learning*, Cambridge.

- 1995 Graduate lectures on information theory.
- 1994–8 Lecturer, Cambridge Programme for Industry courses on: 'Modelling Uncertainty' (DPMMS); 'Neural Networks' (CUED); 'Modelling phase transformations in steels' (DMSM).
- 1994– Editorial Board, Neural Processing Letters.
- 1996 Co-organizer of workshop on *Random Processes in Cells*, Cambridge.
- 1997 Organizer of workshop on *Stimulating Theories in Molecular Neuroscience*, Cambridge.
- 1998– Visiting Researcher, Gatsby Computational Neuroscience Unit, University College London.
- 1998 Visiting Faculty, Department of Physiology, U.C. San Francisco.
- 2000 Organizer, Cambridge Philosophical Society meeting on *Inference and Learning*, Cambridge.
- 2001 Organizer, Session on Iterative Decoding, Information Theory Workshop, Cairns, Australia.
- 2001–03 Council, Cambridge Philosophical Society.
- 2003,4 Lecturer, African Institute of Mathematical Sciences, Cape Town.

### Publications

Papers on Bayesian methods for machine learning; error-correcting codes, especially low-density parity-check codes and sparse-graph codes; neural networks; and information-efficient human-computer interfaces, especially 'Dasher'.

D. J. C. MacKay. (2003) *Information theory, inference, and learning algorithms*. Textbook, 640 pages.

[www.inference.phy.cam.ac.uk/mackay/itila/](http://www.inference.phy.cam.ac.uk/mackay/itila/). Cambridge University Press.

### Non-academic offices held, voluntary work

- 1990–91 Chair, Caltech Environmental Task Force.
- 1990–91 Executive committee member, Caltech Y.
- 1992–2000 Computer committee, Council, Family committee, and Music committee, Darwin College.
- 2000–03 Librarian, Darwin College.
- 1994–2003 Senior Treasurer, Cambridge Ultimate.

### Recreational interests

Ultimate frisbee. Classical music. Outdoor pursuits.