

DR J M BROMLEY¹

Curriculum vitae

April 2014

1 HIGHER EDUCATION

1.1 Degrees

1983-87 PhD in Biophysics [23], Physics Department, Imperial College

1980-83 BSc (Hons) in Physics, Imperial College

1.2 Modules and MOOCs

2014 Introduction to Dynamical Systems and Chaos², Santa Fe Institute

2013 Introduction to Complexity³, Santa Fe Institute

2012 Learn to Program: The Fundamentals, Coursera

2009 Design and the web (T183, 10 credits), The Open University

2008 The Story of maths (TM190, 10 credits), The Open University

2006 Robotics & the meaning of life: a practical guide to things that think (T184, 10 credits), The Open University

1.3 Awards

2002 Bell Laboratories President's Gold Award 2002

1985 W.D. Wright Award from The Colour Group of Great Britain for talk [15]

2 APPOINTMENTS AND EXPERIENCE

2012- Research Fellow, agINFRA FP7 project, The Open University (AC3, 0.7 contract)

2009-12 Research Associate, ASSYST FP7 project, The Open University

2005-09 Visiting Research Fellow in Robotics Outreach, The Open University. Teaching material and activities for teachers and school pupils.

2004-09 Classroom Assistant at various primary schools in Milton Keynes

¹ See also <http://www9.open.ac.uk/mct/people/j.m.bromley>

² <http://www.complexityexplorer.org/online-courses/4>

³ <http://www.complexityexplorer.org/online-courses/3>

- 1999-03 Project Manager, Bell Laboratories / Lucent Technologies
- 1994-98 Member of Technical Staff, Bell Laboratories, Lucent Technologies. Productizing Machine Learning projects.
- 1990-93 Post-doctoral Researcher, Adaptive Systems Research Department, Bell Laboratories, AT&T
- 1986-89 Post-doctoral Researcher, Imperial College / The Royal London Hospital

3 CONTRIBUTIONS TO OPEN UNIVERSITY TEACHING AND STUDENT SUPPORT

(b) Contributions to teaching materials and methods

- 2014 Design for engineers T218 E&A Board
- 2005 Developing Geometric Thinking ME627 (30 credits). Critical Reader
- 2007-08 T160 Return to SET (10 credits) Maintenance and improvement of database of former students; follow up with some students

(c) Contributions to staff and student support and associated activities

- 2009 Mentored OU research associate and a work experience student.

(d) Contributions to teaching outside the Open University

- 2013 Taught SPARQL and application of linked data at a hackathon, Athens.
- 2013 Ran activities using the Sense board at Techmix Digital Summer Camp, Hackney with Neil Smith and Michel Wermelinger.
- 2008-10 KS2 Computing and Control, devised and presented series of six lessons classes to fit in with the creative curriculum at Loughton School.
- 2006-10 Robotics outreach activities to inspire children to learn STEM subjects, includes judging at robotics competitions, running robotics clubs, coached the UK primary champions for robot dance and took them to compete in the finals in Suzhou, China 2008.
- 2006-07 English editor for *Roberta – Girls discover Robots* teaching material produced under Roberta-EU FP6 project⁴ with Fraunhofer Institute for Intelligent Analysis and Information Systems.
- 2006-date School Governor with responsibility for curriculum and target tracking, familiarity with governance and performance management.
- 1984-89 Teaching Assistant for class and lab work; supervision of undergraduate projects, Imperial College.

⁴ http://www.iais.fraunhofer.de/uploads/media/RobertaEU-Final_Report_01.pdf

4 CONTRIBUTIONS TO ADMINISTRATION AND MANAGEMENT

Open University

- 2014- Member of Computing Department's Self Assessment team for Athena Swan Bronze Award.
- 2013- MCT Staff Forum, researcher member
- 2013- Member of organising committee for International Conference on Technology Policy and Innovation (ICTPI) to be held at the Open University June 2015
- 2010 BrightGreenYouth, organised and ran this two day conference at the OU, along with Prof Jeff Johnson, for over 60 students from seven Milton Keynes secondary schools
- 2009- Run the Design group coffee club and Wednesday meet ups.

5 RESEARCH AND SCHOLARSHIP

Research interests

Human perception – how we do it and how machines can carry out the same tasks.

I started out studying the human visual system, in particular higher level neuronal processing [10], [12], [13],[14], and then moved to artificial neural networks as a way to model the visual system. I then moved into making machines for perceptual tasks, machine learning, through methods like convolutional neural networks (now called deep learning), and was part of the team that made probably the first commercial deployment of a neural network in the early 90s [5], [6], [7], [8], [9],[11]. I now look more broadly at the extraction of knowledge from data in general.

My current work on the agINFRA project centres on extraction of agriculturally relevant information from pre-digital texts [16], and linked data as the method to share data. I am particularly keen to apply machine learning methods to understanding texts, handwritten or printed. I wish to make links with organisations like Google and Facebook that are using machine learning techniques to help people to sift through the masses of information they are daily bombarded with (so called big data).

Research funding

Contributed to the following funded bids: ASSYST, TOPDRIM, NESS, Etoile, GSDP. And non-funded: BIGDATA, DOCS, FuturICT, Polifolio, hIghCitiles.

Extensive FP7 project management on: ASSYST (lead partner, all reporting), agINFRA (financial and time reporting)

The Royal Society "Parliamentary Grant-In-Aid" to fund three month visit to AT&T Bell Laboratories, November 1989

6 POSTGRADUATE STUDENT SUPERVISION

- 2013 Editorial input on the English version of PhD thesis *Reading the News Through its Structure: New Hybrid Connectivity Based Approaches* David Manuel de Sousa Rodrigues, Instituto Universitário de Lisboa
- 2012- Co-supervise Cristian Jimenez-Romero, a full-time postgraduate student, thesis title *Intelligent and socially intelligent assessment systems for massive open online education*

7 EXTERNAL ACADEMIC ACTIVITIES

Membership or offices held in learned societies and professional bodies

- 2012- Member of Flossie, a network of women interested in using free and open source software, and girlgeekdinners.com
- 2008- Member of the Complex Systems Society. Elected council member since 2012.
- 1983- Member of the Institute of Physics

Invited Talks

Signature verification using a "Siamese" time delay neural network at London Finance Meeting in 1995

8 PUBLICATIONS⁵

Chapters in Books

- [1] Guyon, I.; Bromley, J. M.; Matić, N.; Schenkel, M. and Weissman, H. (1996). Penacée: a neural net system for recognizing on-line handwriting. In: Domany, E.; Van Hemmen, J. L. and Schulten, K. eds. *Models of Neural Networks III: Association, Generalization and Representation. Physics of Neural Networks, 3*. New York: Springer, pp. 255–279.
- [2] Jackel, L. D.; Battista, M. Y.; Ben, J.; Bromley, J.; Burges, C. J. C.; Baird, H. S.; Cosatto, E.; Denker, J. S.; Graf, H. P.; Katseff, H. P.; Le Cun, Y.; Nohl, C. R.; Sackinger, E.; Shamilian, J. H.; Shoemaker, T.; Stenard, C. E.; Strom, B. I.; Ting, R.; Wood, T. and Zuraw, C. R. (1994). Neural network applications in character recognition and document analysis. In: Yuhas, Ben and Ansari, Nirwan eds. *Neural Networks in Telecommunications*. Boston: Kluwer Academic Publishers, pp. 271–285.
- [3] Alkhateeb, W.; Bromley, J. M.; Ibbotsen, V.; Javadnia, A.; Ruddock, K. H. and Terry, A. (1989). Parallel and sequential processing in visual discrimination of simple geometrical patterns. In: Kulikowski, J. J.; Dickinson, C. M. and Murray, I. J. eds. *Seeing Contour and Colour: Proceedings of the Third Symposium of the Northern Eye Institute*, Manchester, UK, 9-13 August 1987. Vision and Visual Health Care (3). Oxford: Pergamon Press, p. 419.

⁵ Most papers are available here <http://oro.open.ac.uk/view/person/jmb995.type.html>

Journal Article

- [4] Johnson, J.; Buckingham Shum, S.; Willis, A.; Bishop, S.; Zamenopoulos, T.; Swithenby, S.; MacKay, R.; Merali, Y.; Lorincz, A.; Costea, C.; Bourguine, P.; Louçã, J.; Kapenieks, A.; Kelly, P.; Caird, S.; Bromley, J.; Deakin Crick, R.; Goldspink, C.; Collet, P.; Carbone, A. and Helbing, D. (2012). The FuturICT education accelerator. *European Physical Journal - Special Topics*, 214 pp. 215–243.
- [5] Bromley, Jane ; Bentz, James W.; Bottou, Léon; Guyon, Isabelle; LeCun, Yann; Moore, Cliff; Säckinger , Eduard and Shah, Roopak (1993). Signature verification using a "Siamese" time delay neural network. *International Journal of Pattern Recognition and Artificial Intelligence*, 7(4) pp. 669–688.
- [6] Bromley, Jane and Denker, John S. (1993). Improving rejection performance on handwritten digits by training with "rubbish". *Neural Computation*, 5(3) pp. 367–370.
- [7] Säckinger, Eduard; Boser, Bernhard E.; Bromley, Jane M.; LeCun, Yann and Jackel, Larry D. (1992). Application of the ANNA neural network chip to high-speed character recognition. *IEEE Transactions on Neural Networks*, 3(3) pp. 498–505.
- [8] Boser, Bernhard E.; Sackinger, Eduard; Bromley, Jane ; leCun, Yann and Jackel, Lawrence D. (1992). Hardware requirements for neural network pattern classifiers: a case study and implementation. *Micro, IEEE*, 12(1) pp. 32–40.
- [9] Matan, Ofer; Baird, Henry S.; Bromley, Jane M.; Burges, Christopher J. C.; Denker, John S.; Jackel, Lawrence D.; Le Cun, Yann ; Pednault, Edwin P. D.; Satterfield, William D.; Stenard, Charles E. and Thompson, Timothy J. (1992). Reading handwritten digits: a ZIP code recognition system. *Computer*, 25(7) pp. 59–63.
- [10] Alkhateeb, W.; Bromley, J. M.; Humphreys, G. W.; Javadnia, A.; Riddoch, M. J. and Ruddock, K. H. (1992). Abnormal responses to multielement spatial stimuli in a subject with visual form agnosia. *Clinical Vision Sciences*, 7(3) pp. 163–173.
- [11] Boser, Bernhard E.; Säckinger, Eduard; Bromley, Jane M.; Le Cun, Yann and Jackel, Lawrence D. (1991). An analog neural network processor with programmable topology. *IEEE Journal of Solid-State Circuits*, 26(12) pp. 2017–2025.
- [12] Bromley, J. M.; Javadnia, A. and Ruddock, K. H. (1987). Visual spatial filtering and pattern discrimination are abnormal in strabismic amblyopia. *Clinical Vision Sciences*, 1(3) pp. 209–218.
- [13] Blythe, Isobel M. ; Bromley, Jane M.; Kennard, C. and Ruddock, K. H. (1986). Visual discrimination of target displacement remains after damage to the striate cortex in humans. *Nature*, 320 pp. 619–621.
- [14] Blythe, I. M.; Bromley, J. M.; Ruddock, K. H.; Kennard, C. and Traub, M. (1986). A study of systematic visual perseveration involving central mechanisms. *Brain*, 109(4) pp. 661–675.
- [15] Blythe, Isobel M.; Bromley, Jane M.; Holliday, I. E. and Ruddock, K. H. (1986). The contribution of blue-sensitive cones to spatial responses of post-receptoral visual channels in man. *Spatial Vision*, 1(4) pp. 277–289.

Conference Item

- [16] Morse, David; Bromley, Jane and King, David (2013). agINFRA - where agriculture, biodiversity and information technology meet. In: *TDWG 2013*, 27 October - 1 November 2013, Florence, Italy.
- [17] Bromley, Jane M.; Guyon, Isabelle; LeCun, Yann; Sackinger, Eduard and Shah, Roopak (1994). Signature verification using a Siamese time delay neural network. In: *7th Annual Neural Information Processing Systems Conference*, 29 November - 02 December 1993, Denver, Morgan Kaufmann Publishers, pp. 737–744.
- [18] Boser, Bernhard E.; Säckinger, Eduard; Bromley, Jane ; LeCun, Yann; Howard, Richard E. and Jackel, Lawrence D. (1991). An analog neural network processor and its application to high-speed character recognition. In: *IJCNN-91- International Joint Conference on Neural Networks*, 8-14 July 1991, Seattle, WA, USA, pp. 415–420.
- [19] Jackel, L. D.; Stenard, C. E.; Baird, H. S.; Boser, B.; Bromley, J.; Burges, C. J. C.; Denker, J. S.; Graf, H. P.; Henderson, D.; Howard, R. E.; Hubbard, W.; LeCun, Y.; Matan, O.; Pednault, E., E.; Satterfield, W.; Sackinger, E. and Thomson, T. (1991). A neural network approach to handprint character recognition. In: *Compcon Spring'91. Digest of Papers*, 25 February - 1 March 1991, San Francisco, CA, USA, pp. 472–475.
- [20] Alkhateeb, Wafa; Bromley, Jane; Javadia, Atafeh and Ruddock, K. H. (1987). Functional mapping of stimulus colour in human subjects suffering a central visual defect. In: *Physiological Society Meeting*, Imperial College London, 13-14 February 1987, Imperial College London, p. 44.
- [21] Bromley, J. M.; Humphreys, G. W.; Javadnia, A.; Riddoch, M. J. and Ruddock, K. H. (1986). Pattern discrimination in a human subject suffering visual agnosia. In: *Physiological Society, University College London/Middlesex Meeting*, 25-26 March 1986, London/Middlesex, UK, 67P.
- [22] Blythe, I. M.; Bromley, J. M.; Kennard, C. and Ruddock, K. H. (1985). Abnormal prolongation of visual sensations in a human subject. In: *Physiological Society, St. Andrews Meeting*, 14-15 June 1985, St. Andrews, Scotland, UK, p. 20.

Other Publications

- [23] Bromley, Jane. (1987). *Visual Thresholds and Discriminations Measured for Spatial Patterns*. PhD Thesis, Imperial College