CURRICULUM VITAE

MEURIG BEYNON

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Personal details

Full name	William MEURIG Beynon
Home address	8, Belvedere Road, Earlsdon, Coventry CV5 6PF
Telephone	024 7667 3798
Nationality	British / Welsh
Marital Status	Married, two children
Date of Birth	26th August 1948

Details of education, degrees, professional affiliations

1966-1972 King's College, University of London
BSc (Maths) Honours Class 1 - 1969
PhD (London) March 1973

PhD thesis (243 pages) entitled:
"Geometric Aspects of Partially-Ordered Algebraic Systems"

Member

London Mathematical Society
European Association for Theoretical Computer Science

Associate Fellow (1970-96)

The Institute of Mathematics and its Applications

Professional Career

Emeritus Reader in Computer Science, University of Warwick	
Reader in Computer Science, University of Warwick	1999-2010
Senior Lecturer in Computer Science, University of Warwick	1991-99
Lecturer in Computer Science, University of Warwick	1975-91
SRC Postdoctoral Research Fellow, Mathematics, University College, Swansea	1973-5
Research Assistant, Department of Mathematics, The Open University	1972-3

Other professional responsibilities

Secretary, British Colloquium for Theoretical Computer Science	1986-8
Consultant, British Telecom Research Laboratories	1988
Consultant, Micro Electronics Support Unit (DES)	1988

I have served on programme committees for several international conferences, including: Shape Modelling International; Cognitive Technology; Computation for Metaphors, Analogy and Agents; Eurographics Workshops on Programming Paradigms in Graphics; and Advanced Learning Technologies.

I have acted as a reviewer for the National Science Foundation, the Canadian National Sciences and Engineering Research Council, the London Mathematical Society, the IEEE (New York), for the journals: Theoretical Computer Science, CAD, Pragmatics, Mind and Machines and for numerous conferences and publishers. I was on the editorial board of the *Cognition and Technology* journal. I have examined PhD theses at Warwick, Edinburgh, Sheffield and Bournemouth universities.

Research

My research activity is classified under Publications, Research Grants and Conference Organisation. Much of my research output is associated with the Empirical Modelling Project, a research programme that I initiated and have directed since its inception. This project originated from an idea conceived in 1984 and has since been the focus for collaboration that has become broad both in scope and in nature. Further background and additional information about publications, software tools and demonstration models associated with this project can be found at the Empirical Modelling website: `http://www.dcs.warwick.ac.uk/modelling`

Publications

I have organised my publications under 3 headings:

A. Refereed Publications
B. Unrefereed Reports
C. Other Output

In a few cases, variants of refereed publications have also appeared as reports.

A. Refereed Publications (I am the principal author of all but the asterisked papers)

1. Combinatorial aspects of piecewise-linear maps,
   Journal London Math Soc (2) 7, 1974, 719-727
2. Duality theorems for finitely-generated vector lattices
   Proc London Math Soc (3) 31, 1975, 114-128
3. On rational subdivisions of polyhedra with rational vertices
   Can J Math 29 (2) 1977, 238-242
4. Applications of duality in the theory of finitely-generated lattice-ordered Abelian groups
   Can J Math 29 (2) 1977, 243-254
5. Vector lattices freely generated by distributive lattices
   Math Proc Camb Phil Soc 81, 1977, 193-200
6. (with G Lustzig) Some numerical results on the characters of exceptional Weyl groups
   Math Proc Camb Phil Soc 84, 1978, 417-426
7. On the structure of free finite state machines
   Theoretical Computer Science 11, 1980, 167-180
8. A formal account of some elementary continued fraction algorithms
   Journal of Algorithms 4, 1983, 221-240
9. (with N Spaltenstein) Green functions of finite Chevalley groups of type E_n (n=6,7,8)
   Journal of Algebra, Vol 88, No 2, June 1984, 584-614
10. Replacement in monotone boolean networks: an algebraic perspective
    Lecture Notes in Computer Science 181, Springer-Verlag 1984, 165-178
11. Replaceability and computational equivalence for monotone boolean functions
    Acta Informatica 22, 1985, 433-449
12. (with C S Iliopoulos) Computing a basis for a finite Abelian p-group
    Information Processing Letters 20 (3), April 1985, 161-163
13. Definitive notations for interaction,
    Proc hci'85, ed Johnson & Cook, Cambridge University Press, 1985, 23-34
14. Free constructions in lattice-ordered Abelian groups and monoids
    Algebra and Order, ed S Wolfenstein, Heldermann Verlag, Berlin 1986, 47-61
15. (with M T Norris) Comparison of SDL and LSD
    Proc SDL'87, ed R Saracco & P A J Tilanus, North-Holland, 1987, 201-209
16. (with J F Buckle) On the planar monotone computation of Boolean functions
    Theoretical Computer Science 53, 1987, 267-279
17. Definitive principles for interactive graphics
    Theoretical Foundations of Computer Graphics and CAD, NATO ASI Series F, Vol 40, Springer-Verlag 1988, 1083-1097
18. (with Y W Yung) Implementing a definitive notation for interactive graphics
    New Trends in Computer Graphics, Springer-Verlag 1988, 456-468
19. A definitive programming approach to the implementation of CAD software
    Intelligent CAD Systems II: Implementation Issues, Springer-Verlag 1989, 126-45
    (Appendix with A J Cartwright) A definitive notation for geometric modelling
    Proc 2nd Eurographics ICAD Workshop, CWI Amsterdam, April 1988
20. (with M T Norris, M D Slade) Definitions for modelling and simulating concurrent systems
    Proc IASTED conference ASM'88, Acta Press 1988, 94-98
21. (with M D Slade, Y W Yung) Parallel computation in definitive models
    CONPAR'88, British Computer Society WS Series CUP 1989, 359-367

Refereed publications (cont.)

22. Evaluating definitive principles for interactive graphics
    New Advances in Computer Graphics, Springer-Verlag 1989, 291-303
23. (with S B Russ)
    The Development and Use of Variables in Mathematics and Computer Science
    The Mathematical Revolution Inspired by Computing, IMA Conf Series 30, 1991, 285-95
24. Definitions as a framework for design
    Proc 3rd Eurographics ICAD Workshop, CWI Amsterdam 1989
25. Parallelism in a definitive programming framework
    Parallel Computing 89, Advances in Parallel Computing Vol. 2, North-Holland 1990, 425-430
26. (with M T Norris, R A Orr, M D Slade) Definitive specification of concurrent systems
    Proc UKIT'90, IEE Conference Publications 316, 1990, 52-57
27. (with Y P Yung) Definitive Interfaces as a Visualisation Mechanism
    Proc Graphics Interface '90, Canadian Information Processing Soc., 1990, 285-292
28. (with S B Russ, Y P Yung) Programming as Modelling: New Concepts and Techniques
    Proc ISLIP'90, Computing & Info Science Dept, Queen's University, Kingston, Canada 1990
29. (with A J Cartwright, S B Russ, Y P Yung)
    Programming Paradigms and the Semantics of Geometric Symbols
    Proc W/S "Visual Interfaces to Geometry" in conjunction with CHI'90, Seattle, April 1990
30. Boolean Function Complexity: a Lattice-Theoretic Perspective
    Proc LMS Symposium on Boolean Function Complexity, Durham, July 1990, in Boolean Function Complexity, ed. M. S. Paterson, LMS Lecture Notes Series 169, CUP 1992, 35-56
31. (with Y P Yung, M D Atkinson, S R Bird)
    Programming Principles for Visualisation in Mathematical Research
    Proc Compugraphics'91: 1st Int Conf on Computational Graphics & Visualisation Techniques, 288-298
32. (with I Bridge, Y P Yung) Agent-oriented Modelling for a Vehicle Cruise Controller
    Proc 1992 Eng. Systems Design and Analysis Conference, ASME PD-Vol. 47-4, 159-165
33. (with A J Cartwright) Enhancing Interaction in Computer-Aided Design
    Proc International Conference on Design and Automation, Hong Kong, Aug 1992, 643-8
34. (with Y P Yung, A J Cartwright, P J Horgan)
    Scientific Visualization: Experiments and Observations
    Proc 3rd Eurographics W/S: Visualization in Scientific Computing, Viareggio, 1992, 157-173
35. (with Y P Yung) Agent-oriented Modelling for Discrete-Event Systems,
    Proc IEE Coll. "Discrete-Event Dynamic Systems", Digest No 1992/138, June 1992, 2/1-2/4
36. (with M S Joy) Modelling a Canal System using Definitive Principles
    Pro. 1st National G.I.S. Conference, University of Keele, 1993, 140-149
37. (with A J Cartwright) Agent-oriented Modelling for Engineering Design
    Proc CAD93: New Information Technologies in Science, Education and Business,
    Yalta, May 1993, 49-53
38. (with Adzhiev, V.D., Cartwright, A.J., Yung, Y.P.)
    A Computational Model for Multi-agent Interaction in Concurrent Engineering,
    Proc CEEDA'94, Bournemouth Univ., 1994, 227-232
39. (with Adzhiev, V.D., Cartwright, A.J., Yung, Y.P.)
    A New Computer-Based Tool for Conceptual Design,
    Proc Workshop Computer Tools for Conceptual Design, Univ. of Lancaster, 1994, 171-188

Refereed publications (cont.)

40. (with Ness, P.E., Yung, Y.P.) Applying Agent-oriented Design to a Sail Boat Simulation, *Proc ESDA 1994*, Vol.6, 1994, 1-8

41. (with Adzhiev, V.D., Pasko, A.A.) Interactive Geometric Modelling based on R-functions, *Proc CSG'94: Set-Theoretic Solid Modelling: Techniques and Applications*, Winchester, Information Geometers, 1994, 253-272
42. (with Adzhiev, V.D., Cartwright, A.J., Yung, Y.P.) An Agent-oriented Framework for Concurrent Engineering, *Proc IEE Colloquium: Issues of Cooperative working in Concurrent Engineering*, October 1994, Digest No 1994/177, 9/1-9/4
43. (with Yung, Y.P.) A Computer-Aided Script Generator for Computer Aided Design *Proc Pacific Graphics'94 / CADDM'94*, Vol. 2, pp. 369-74
44. (with Sidebotham, C.J., Yung, Y.P.) Computer-Assisted Jigsaw Construction: a Case-Study in Empirical Modelling *Proc 5th Eurographics WS: Programming Paradigms in Graphics*, Maastricht 1995, 37-50
45. (with Cartwright, R.I.) Empirical Modelling Principles for Cognitive Artefacts *Proc IEE Colloquium: Design Systems with Users in Mind: the Role of Cognitive Artefacts*, IEE Digest #95/231, 8/1-8/8, Dec. 1995
46. (with Gehring, D.K., Yung, Y.P., Cartwright, R.I., Cartwright, A.J.)* Higher-order constructs for interactive graphics *Proc Eurographics UK*, 14th Annual Conference, 179-192, 1996
47. (with Cartwright, R.I.) Empirical Modelling Principles in Application Development for the Disabled *Proc IEE Coll. Computers in the Service of Mankind: Helping the Disabled*, IEE Digest #97/117, 4/1-4/3, March 1997
48. Empirical Modelling for Educational Technology *Proc Cognitive Technology '97*, IEEE, 54-68, 1997
49. (with Allderidge, J.A., Cartwright, R.I., Yung, Y.P)*, Enabling Technologies for Empirical Modelling in Graphics *Proc Eurographics UK, 16th Annual Conference*, 199-213, 1998
50. (with Sun, P-H) Empirical Modelling: A New Approach for Understanding Requirements *Proceedings of the 11th Int Conf on Software Engineering and its Applications*, Paris Dec 1998
51. Empirical Modelling and the Foundations of Artificial Intelligence, *Computation for Metaphors, Analogy, and Agents*, LNAI 1562, Springer, 322-364, 1999
52. (with Rungrattanaubol, J, Sinclair, J) Formal Specification from an Observation-oriented Perspective, *Journal of Universal Computer Science*, Vol. 6(4), 2000, 407-421
53. (with Cartwright, R I, Sun, P-H, Ward, A) Interactive Situation Models for Information Systems Development *Proceedings of SCT'99 and ISAS'99*, Orlando, 1999, Vol 2, 9-16
54. (with P-H Sun) Computer-mediated Communication: a Distributed Empirical Modelling Perspective *Proceedings of Cognitive Technology 99*, San Francisco, 1999
55. (with Chen, Y-C, Russ, S B)* Empirical Modelling for Business Process Re-engineering: an Experience-Based Approach *Proc Workshop on Perspectives in Business Informatics Research*, Rostock, Germany 2000

Refereed publications (cont.)

56. (with Rasmequan, S, Russ, S B)
The Use of Interactive Situation Models for the Development of Business Solutions
Proc Workshop on Perspectives in Business Informatics Research, Rostock, Germany 2000
57. (with Rasmequan, S, Russ, S B) An Experience-Based Approach to Decision Support Systems
Position paper for IFIP TC8 Working Group 8.3, International Conference on *Decision Support through Knowledge Management*, Stockholm, Sweden, 2000
58. (with K Fernandes, V Raja, J Keast, M Joy, P S Chan)* Business and IT perspectives on a Methodology for Object-oriented Re-engineering of Enterprises
Systems Engineering for Business Process Change: New Directions, (ed P. Henderson) Springer-Verlag, Dec. 2001, 274-97
59. (with Soha Maad) Empirical Modelling of Real-life Financial Systems: the need for Integration of Enabling Tools and Technologies
Journal of Integrated Design and Process Science, Volume 6, Issue 1, January 2002, 43-58.
60. (with Soha Maad) Integrated Environments for Virtual Collaboration
Proc 5th World Conference on Integrated Design and Process Technology, Texas 2000
61. (with Ward, A, Maad, S, Wong, A, Rasmequan, S and Russ, S B)
The Temposcope: a Computer Instrument for the Idealist Timetabler
Proc 3rd International Conference on the Practice and Theory of Timetabling, Constance, Germany, August 2000, 153-175
62. (with Chen, Y-C, Russ, S B)* Participative Process Modelling
Proc IEEE conference SMC 2000: Cybernetics Evolving to Systems, Humans, Organizations and their Complex Interactions, Tennessee, USA, October 2000
63. (with C Fischer)* Empirical Modelling of Products
Proc Int Conf on Simulation and Multimedia in Engineering Education, Phoenix, Arizona, January 2001, The Society for Modelling and Simulation International, 2001, 20-26
64. (with C Roe, C Fischer)* Empirical Modelling for the Conceptual Design and Use of Products,
Proc. International Conf on Simulation and Multimedia in Engineering Education, Phoenix, Arizona, January 2001, The Society for Modelling and Simulation International, 2001, 27-32
65. (with Yih-Chang Ch'en, Hsing-Wen Hseu, Soha Maad, Suwanna Rasmequan, Chris Roe, Jaratsri Rungrattanaubol, Steve Russ, Ashley Ward, Allan Wong) The Computer as Instrument,
Proc Cognitive Technology: Instruments of Mind, University of Warwick, August 2001, LNAI 2117, Springer-Verlag, 2001, 476-489
66. (with Chris Roe, Ashley Ward and Allan Wong)
Interaction Situation Models for Cognitive Aspects of User-Artefact Interaction,
Proc Cognitive Technology: Instruments of Mind, University of Warwick, August 2001, LNAI 2117, Springer-Verlag, 2001, 356-372
67. (with C Fischer)* Empirical Modelling in Product Design
Proc 16th Brazilian Congress of Mechanical Engineering, November 2001, 218-225
68. (with M Evans, C Fischer)*
Empirical Modelling for the Logistics of Rework in the Manufacturing Process
Proc 16th Brazilian Congress of Mechanical Engineering, November 2001, 226-234
69. (with Soha Maad, Samir Garbaya)* Realising Virtual Trading: what price Virtual Reality?
Usability Evaluation and Interface Design: Cognitive Engineering, Intelligent Agents and Virtual Reality, M.J. Smith,G. Salvendy, D. Harris, R.J. Koubek (editors), Lawrence Erlbaum Associates, Mahwah, N.J., 2001, 1007-1011

Refereed publications (cont.)

70. Liberating the Computer Arts
    Proc 1st International Workshop on Digital and Academic Liberty of Information, University of Aizu, Japan, March 2001 (25pp)
71. (with S Rasmequan, S B Russ) A New Paradigm for Decision Support
    Special Issue of the *Journal of Decision Support Systems*, vol 33 (2002), 127-142

72. (with Chris Roe)* Empirical Modelling principles to support learning in a cultural context, *Proceedings of 1st International Conference on Educational Technology in Cultural Context*, University of Joensuu, Finland, 2002, 151-172
73. Radical Empiricism, Empirical Modelling and the nature of knowing, *Proceedings of the WM 2003 Workshop on Knowledge Management and Philosophy*, Luzern, April 3-4, 2003.
    In *Cognitive Technologies and the Pragmatics of Cognition*, (ed. Itiel E Dror), *Pragmatics and Cognition* 13:3, December 2005, 615-646.
    In Dror, Itiel E. (ed.), *Cognitive Technologies and the Pragmatics of Cognition*, Benjamin, 2007, 155-184.
74. (with A.H.Bhalerao, Chris Roe, Ashley Ward)
    A computer-based environment for the study of relational query languages,
    Proc Teaching, Learning and Assessment in Databases W/S, Coventry, UK, July 2003, 104-108
75. (with Chris Roe) Computer support for constructionism in context
    Proc. of ICALT'04, Joensuu, Finland, August 2004, 216-220
76. (with Antony Harfield and Sunny Chang)
    Alternative model-building for the study of socially interactive robots.
    Proc. AISB'05 Symposium on Robot Companions Hard Problems and Open Challenges in Human-Robot Interaction, University of Hertfordshire, UK, April 2005, 5-15.
77. (with Steve Russ and Willard McCarty) Human Computing: Modelling with Meaning.
    Literary and Linguistic Computing 21(2), 2006, 141-157.
78. (with Antony Harfield) Empirical Modelling in Support of Constructionist Learning: a Case Study from Relational Database Theory
    Proc 5th IEEE International Conference on Advanced Learning Technologies (ICALT'05)
    Kaohsiung, Taiwan, July 2005, 396-8
79. Computational Support for Realism in Virtual Environments
    Proc 11th International Conference on Human-Computer Interaction (HCII 2005): Volume 10 - Internationalization, Online Communities and Social Computing: Design and Evaluation, Las Vegas, NV, 22-27 July 2005 (7pp. published on CD)
80. (with Antony Harfield and Ilkka Jormanainen)
    Varieties of Concretisation: an illustrative case-study
    Proceedings of 5th Annual Finnish/Baltic Sea Conference on Computer Science Education (Koli Calling 2005), December 2005, 153-6.
81. (with Chris Roe) Enriching Computer Support for Constructionism.
    In Eshaa Alkhalifa (ed.) *Cognitively Informed Systems: Utilizing Practical Approaches to Enrich Information Presentation and Transfer*, Idea Group Publishing, 2006, 209-233.
82. (with R.C.Boyatt and S.B.Russ) Rethinking Programming
    Proceedings IEEE Third International Conference on Information Technology: New Generations (ITNG 2006), April 10-12, 2006, Las Vegas, Nevada, USA 2006, 149-154

Refereed publications (cont.)

83. (with R R Klein)
    Métis meets Empirical Modelling: from ancient wisdom to emerging technology.
    Proc. IST-Africa 2006 (eds. Paul and Miriam Cunningham), IIMC International Information Management Corporation ISBN: 1-905824-01-7, 2006 (13pp - published on CD).
84. (with Antony Harfield) Rethinking Life-long Learning: the Empirical Modelling Approach. In *Proc 6th IEEE International Conference on Advanced Learning Technologies (ICALT 2006)* Kerkrade, The Netherlands, July 2006, 854-858
85. (with Russell Boyatt, Antony Harfield)* Learning about and through Empirical Modelling. *Proc 6th IEEE International Conference on Advanced Learning Technologies (ICALT 2006)* Kerkrade, The Netherlands, July 2006, 662-666

86. (with R R Klein, Steve Russ) Humanities' Computings (extended abstract only). *Digital Humanities 2006: 1st International Conference of the Alliance of Digital Humanities Organisations*, Conference Abstracts, Paris-Sorbonne, France, July 2006, 17-20
87. Towards Technology for Learning in a Developing World.
    Proc. IEEE 4th International Workshop on Technology for Education in Developing Countries, Iringa, Tanzania, July 2006, 88-92
88. Meurig Beynon. Dissolving dualities in mind, music and mechanism (abstract only).
    International Conference on Music and Consciousness: Abstracts, The Department of Music, The University of Sheffield, July 2006, 10-11
89. Mathematics and Music - Models and Morals.
    Proc Bridges London 2006: *Mathematical Connections in Art, Music, and Science* (eds. Sarhangi and Sharp), Tarquin Books, 2006, 437-444.
90. (with Zhan En Chan)
    A conception of computing technology better suited to distributed participatory design
    NordiCHI Workshop on Distributed Participatory Design, Oslo, Norway, October 2006
91. Computing technology for learning - in need of a radical new conception
    Journal of Educational Technology & Society, 10 (1), 94-106
92. (with Antony Harfield)
    Lifelong Learning, Empirical Modelling and the Promises of Constructivism
    Journal of Computers, Volume 2, Issue 3, May 2007, 43-55
93. (with Chris Roe)* Dependency by definition in Imagine-d Logo: applications and implications. In Ivan Kalaš (ed.) *Proc. of the 11th European Logo Conference* 19-24 August 2007, Bratislava, Slovakia (11pp - published on CD ISBN: 978-80-89186-20-4)
94. Visualisation using Empirical Modelling principles and tools.
    AHRC ICT Methods Network Expert Workshop "*From Abstract Data Mapping to 3D Photorealism: Understanding Emerging Intersections in Visualisation Practices and Techniques"*, June 19th 2007, Birmingham UK
95. (with Antony Harfield and Mikko Vesisenaho)
    Contextualising Information and Communications Technology in Developing Countries.
    Proceedings of 7th Annual Finnish/Baltic Sea Conference on Computer Science Education (Koli Calling 2007), Conferences on Research and Practice in Information Technology, Vol. 88, November 2007, 31-40
96. (with Russell Boyatt and Zhan En Chan) Intuition in Software Development Revisited.
    Proceedings of 20th Annual Psychology of Programming Interest Group Conference, Lancaster University, UK, September 2008

Refereed publications (cont.)

97. (with Steve Russ) Experimenting with Computing
    Journal of Applied Logic 6 (2008), pp. 476-489
98. (with Antony Harfield and Richard Myers)*
    Web Eden and Moodle: an Empirical Modelling approach to web-based education.
    Proceedings of the Eighth IASTED International conference on Web-Based Education, 16-18th March 2009, Phuket, Thailand, 272-278
99. Constructivist Computer Science Education Reconstructed
    HEA-ICS *ITALICS e-Journal*, Volume 8 Issue 2, June 2009, 73-90
100. (with Antony Harfield and Richard Myers) Web Eden: support for computing as construction?
    Proc Koli Tools 2009, to appear
101. (with Ilkka Jormanainen and Erkki Sutinen)*
    Understanding open learning processes in a robotics class. *Koli Calling 2009*, to appear
102. (with Daniel Keer, Steve Russ)*
    Computing for construal: an exploratory study in ant navigation
    Proc. Int. Conf. on Computational Science 2010, Amsterdam, May-June 2010, in *Procedia Computer Science*, Volume 1, Issue 1, May 2010, 2201-2210
103. (with Antony Harfield) Constructionism through Construal by Computer
    Proceedings Constructionism 2010, The American University of Paris, August 16-20, 2010
104. From formalism to experience: a Jamesian perspective on music, computing and consciousness
    Book chapter in *Music and Consciousness* (ed. David and Eric Clarke), OUP, 2010, to appear
105. (with Nicolas Pope)* Empirical Modeling as an unconventional approach to software development, Proc. SPLASH 2010 Workshop on Flexible Modeling Tools, Reno/Tahoe Nevada, USA, October 2010, to appear

B. Reports

1. (with J N Buxton) The ICS3 computer (12pp)
   Computer Centre Report 22, University of Warwick 1979
2. On the structure of free finite state machines (20pp)
   Theory of Computation Report, University of Warwick 1979
3. On Raney's binary encoding for continued fractions, generalisations of Pell's equation, and the theory of factorisation (48pp)
   Theory of Computation Report 34, University of Warwick 1981
4. (with C S Iliopoulos)
   On Gauss' algorithm for the solution of quadratic Diophantine equations (26pp)
   Theory of Computation Report 37, University of Warwick 1981
5. (with N Spaltenstein) The computation of Green functions of finite Chevalley groups of type E_n (n=6,7,8) (16pp+157pp of tables)
   Computer Centre Report 23, University of Warwick 1982
6. Coset enumeration as closure computation (19pp)
   Theory of Computation Report 42, University of Warwick 1982
7. A definition of the ARCA notation (34pp)
   Theory of Computation Report 54, University of Warwick 1983
8. Replaceability and computational equivalence in finite distributive lattices (23pp), Theory of Computation Report 61, University of Warwick 1984

Reports (cont.)

9. Monotone Boolean functions computable by planar circuits (10pp)
   Theory of Computation Report 67, University of Warwick 1984
   (presented at 1st British TCS Colloquium, Leeds 1985)
10. (with J F Buckle) Computational equivalence and replaceability in finite algebras (19pp),
    Theory of Computation Report 72, University of Warwick 1985
    (presented at 2nd British TCS Colloquium, Warwick 1986)
11. ARCA - a notation for displaying and manipulating combinatorial diagrams (11pp), CS-RR-78,
    University of Warwick 1986
12. Paradigms for programming (13pp)
    Report on University Stirling Workshop on Functional & Logic Programming,
    Alvey Software Engineering Mailshot, December 1986
13. (with David Angier, Tim Bissell and Steve Hunt)
    DoNaLD: a line drawing notation based on definitive principles (12pp)
    CS-RR-86, University of Warwick 1986
14. The LSD notation for communicating systems (15pp)
    Computer Science Research Report 87, University of Warwick 1986
    (presented at 3rd British TCS Colloquium , Leicester 1987)
15. Definitive principles for interactive graphics (16pp)
    CS-RR-93, University of Warwick 1987
16. Monotone Boolean functions as combinatorially piece-wise linear maps (31pp) CS-RR-109,
    University of Warwick 1987
    (presented at 4th British TCS Colloquium, Edinburgh 1988)
17. An alternative model for free distributive lattices (8pp)
    Workshop on Ordered Algebras, Le Mans, November 1987
18. (with Y W Yung) Implementing a definitive notation for interactive graphics (13pp)
    CS-RR-111, University of Warwick 1987
19. (with M T Norris, M D Slade)
    Definitions for modelling and simulating concurrent systems (11pp)
    CS-RR-124, University of Warwick 1988
20. (with K S H Halstead, S B Russ)
    Definitions for the specification of educational software (7pp)
    Report for MESU, Dept of Education and Science, University of Warwick 1988
21. (with M D Slade, Y W Yung) Parallel computation in definitive models (9pp)
    CS-RR-127, University of Warwick 1988
22. (with A G Cohn)
    Representing design knowledge in a definitive programming framework (15pp)
    IFIP WG 5.2 on Intelligent CAD, Cambridge, Sept 1988
23. Definitive programming for parallelism (11pp)
    CS-RR-132, University of Warwick 1988
24. Evaluating definitive principles for interaction in graphics (15pp),
    CS-RR-133, University of Warwick 1988
25. (with Y W Yung) The EDEN Handbook, University of Warwick 1988
26. (with S B Russ) Variables in Mathematics and Computer Science (25pp)
    CS-RR-141, University of Warwick 1989

Reports (cont.)

27. (with S B Russ, M D Slade, Y P Yung , Y W Yung)
    Definitive principles and software specification (15pp)
    CS-RR-146, University of Warwick 1989
28. (with M T Norris, S B Russ, M D Slade, Y P Yung , Y W Yung)
    Software construction using definitions: an illustrative example (17pp)
    CS-RR-147, University of Warwick 1989
29. (with M D Slade, Y P Yung) Protocol Specification in Concurrent Systems Development (23pp)
    CS-RR-163, University of Warwick 1990
30. Computer Environments for Mathematical Research: a project report (20pp), University of Warwick, October 1990
31. Programming Principles for the Semantics of the Semantics of Programs (16pp), CS-RR-205, University of Warwick 1992
32. (with S B Russ)
    The Interpretation of States: a New Foundation for Computation (13pp),
    CS-RR-207, University of Warwick 1992
    Proc. PPIG'92, Loughborough, January 1992
33. New Paths for Programming in Theory and Practice,
    Paper prepared for a presentation at IBM Warwick, September 1992
34. (with M Farkas and Y P Yung)
    Agent-oriented Modelling for a Billiards Simulation (13pp)
    CS-RR-260, University of Warwick 1993
35. (with Cartwright, A.J., Yung, Y.P.)
    Databases from an Agent-oriented Perspective,
    CS-RR-278, Univ. of Warwick, January 1994
36. (with Joy, M.S.)
    Computer Programming for Noughts-and-Crosses: New Frontiers,
    Proc. PPIG'94, Open University, January 1994, 27-37
37. (with Russ, S.B.) Empirical Modelling for Requirements,
    CS-RR-277, Univ. of Warwick, September 1994
38. Agent-oriented Modelling and the Explanation of Behaviour,
    Invited Paper in Proc. International W/S "Shape Modeling: Parallelism, Interactivity and Applications", Department of Computer Software,
    TR 94-1-040, Univ. Aizu, Japan, Sept. 1994, 54-63
39. (with P E Ness, S B Russ) Worlds Before and Beyond Words (20pp),
    Proc. VF'95, Warwick University, 1995
40. (with Cartwright, R.I.) Empirical Modelling for Computer-based Geometric Instruments, extended abstract, Warwick University, September 1995
41. (with Cartwright, R I, Cartwright, A.J., Yung, Y.P.) Abstract Geometry for Design in an Empirical Modelling Context (20pp) CS-RR-319 December 1996
42. (with Sun, P-H.)
    Interactive Situation Models for Program Comprehension, CS-RR-352, October 1998
43. Modelling state in mind and machine (10pp), CS-RR-337, Univ. of Warwick, January 1998, presented at PPIG'98, Open University

Reports (cont.)

44. (with Rungrattanaubol, J, Sun, P-H., Wright, A.E.M.) Explanatory models for Open-Ended Human-Computer Interaction (13pp), CS-RR-346, July 1998
45. (with Cartwright, R.I., Sun, P-H., Rungrattanaubol, J.) Interactive Situation Models for Information Systems, CS-RR-353, October 1998
46. (with Sun, P-H, Chen, Y-C, Russ, S B) Cultivating Requirements in a Situated Requirements Engineering Process, CS-RR-357, May 1999
47. (with Russ, S B) Redressing the past: liberating computing as an experimental science (5pp) CS-RR-421 , January 2006
    Accessible online at Grand Challenges for Computing Research Conference Submissions, submission number 26, National e-Science Centre
48. (with Chan, Z E) Computing for construals in distributed participatory design - principles and tools (23pp), CS-RR-444, June 2009

C. Other output

Editorship of conference proceedings

(with C Nehaniv, K Dautenhahn) Proc Cognitive Technology: Instruments of Mind, University of Warwick, August 2001, LNAI 2117, Springer-Verlag, 2001, p476-489, ISBN 3-540-42406-7

Miscellaneous publications

1. Book Review - Eurographics 1988, Computer-Aided Design, Vol 21 No 7, Butterworths 1989
2. Computers and Commonsense, paper / poster prepared for University 25th Anniversary Open Day, University of Warwick, May 1991
3. (with Y P Yung) Agent-oriented programming for Visualisation, Conference Poster, HCI'92, University of York, September 1992
4. Report on 3rd Eurographics Workshop on Visualisation in Scientific Computing, Graphics Newsletter #24, August 1992
5. A New Paradigm for Parallelism in Engineering Applications, position paper at EASE W/S on Developing Parallel Engineering Applications, February 1993
6. Programming as an Act of Faith, Philosophy of Science Seminar Series, Dept. of Philosophy, Univ. of Warwick, November 1993
7. (with P E Ness) Empiricism in Computer-based Modelling, talk at 10th British Theoretical Computer Science Colloquium, Swansea 1995
8. (with Y P Yung) Programming Paradigms for Graphics, a discussion document prepared for 5th Eurographics WS: Programming Paradigms in Graphics, 1995
9. Radical Empiricism: a Philosophic Attitude for Empirical Modelling? Philosophy of Science Seminar Series, Department of Philosophy, University of Warwick, May 1997
10. Conference Report on 2nd Int Conference on Cognitive Technology, Digital Creativity 8(3/4) 160-164, 1997
11. Empirical Modelling for Education Technology, a half-day course for the Warwick Staff Development programme, November 1998
12. Software evolution and the semantic relation: an Empirical Modelling perspective, Software Evolution and Evolutionary Computation Symposium Abstracts, University of Hertfordshire, CSTR 364, February 2002, University of Hertfordshire, Hatfield, UK.

Other output (cont.)

13. (with J-P Dupont) Data Management for the JaM2 API, Project report commissioned by the BBC R&D Laboratories, November 2002 (22pp)
14. Not in the Notes: Empirical Modelling applied to Schubert's Erlkönig, poster presented at Association for Computing in the Humanities / Association for Literary and Linguistic Computing annual conference, University of Victoria, Canada, June 2005
15. The JUGS model: theme and variations, invited poster presented at the EU Kaleidoscope Network of Excellence Showcase Event at Oberhausen, Germany, July 2005
15. Classical Computer Science in the World of Pure Experience, invited poster presented at a Workshop on *Philosophy of the Information and Computing Sciences* at the Lorentz Center, Leiden, February 2010

I also helped to organise, and contributed to, three international one-day workshops relating to Empirical Modelling: *Thinking through Computing* (November 2007), *Perspectives on Collaboration and Computing* (August 2009), *Knowing and Computing* (May 2010).

Invited lecture and workshop invitations

1. *Computation and Cognition*, First Psychology of Programming Interest Group Workshop, Warwick University, January 1989
2. (with A J Cartwright) *Models of Computation and the Management of CAD*, Research Seminar: "The Implementation of CAD/CAM Systems", Warwick Business School, Warwick University, October 1989
3. *Computational equivalence in general algebras*, Garrett Birkhoff 80th Birthday Symposium, Darmstadt, June 1991
4. *Monotone Boolean Functions from a Lattice-Theoretic Perspective*, LMS Symposium on Boolean Function Complexity, Durham, July 1990
5. *Empirical Modelling and the Explanation of Behaviour*, International Workshop: Shape Modelling, Interactivity and Applications, University of Aizu, Japan, September 1994
6. a. *Empirical Modelling for the Foundations of Information Science*, b. *Worlds before and Beyond Words: Virtual Formality for Virtual Reality?* c. *Empirical Modelling for Computer-Assisted Co-operative Working* Department of Information and Library Sciences, University of North Carolina, December 1996
7. *Empirical Modelling and the Foundations of Artificial Intelligence*, International Workshop on Computation for Metaphor, Analogy and Agents, University of Aizu, April 1998
8. *Empirical Modelling for Geometry* (short course delivered in collaboration with Dr Richard Cartwright) University of Aizu, Japan September 2000
9. *Liberating the Computer Arts*, First International Workshop on Digital and Academic Liberation of Information, University of Aizu, Japan, March 2001
10. *Alternative Computing for the Humanities: Reconciling Rhyme and Reason*, Centre for Computing in the Humanities, King's College, London, April 2005
11. *Exploiting Dependency in Computer-Assisted Learning*, invited international 5-day workshop for postgraduate students at Kiaohsiung University, Taiwan, in conjunction with ICALT'05
12. *Empirical Modelling for Computing and Business*, invited international 10-day Summer School for postgraduate students at University of Rostock, Germany, May 2006

Other output (cont.)

13. Seminars at Rostock University May 2006
    a. *Database theory and practice: past, present and future*, Business Informatics department
    b. *Rethinking programming* (with Steve Russ), Computer Science department
14. *Thinking through computing with Empirical Modelling*, Thinking Through Computing, Computer Science, University of Warwick, 2-3 November 2007
15. Colloquium (with Steve Russ) *Philosophy meets Computer Science: William James and the conception of Empirical Modelling* as a contribution to the module *William James' "Radical Empiricism" als Konzept des Empirical Modelling in der Computer Science*, delivered by Joachim Petsche in the Philosophy Department at the University of Potsdam, December 2008
16. *Constructivist Computing? Enriching Experience, Embracing Confusion*, at the International SciFest Symposium on *Multidisciplinary Perspectives on Science and Technology Education*, Joensuu Science Park, Finland, April 2009
17. Invited seminars during my visit to National Taiwan Normal University (NTNU), Taipei as a Visiting Scholar, December 5-18, 2009
    a. Educational Technology, Computer Science and constructivism, NTNU
    b. Making sense of computing as construction, National Chengchi University, Taipei
18. *Constructionist learning by computing for construal*, a half-day workshop given in collaboration with Antony Harfield at *Constructionism 2010*, Paris, August 2010
19. *Computing with construals* (with Steve Russ), at *History, Cognition, and Visualisation in Science: The David Gooding Memorial Meeting*. September 22-23, 2010, University of Bath, UK

Research Grants (asterisked grants are collaborative)

Nuffield Foundation £2000 Programming Methodology*	1977-9
Warwick Research and Innovations Fund £3500 ARCA project	1984-5
Warwick Research and Innovations Fund £1000 ARCA project	1986
BTRL Visiting Research Fellowship: Concurrent Systems	1986
Departmental Research Award 1500 DoNaLD project	1986
Warwick Research and Innovations Fund £1500 CADNO project*	1987
SERC Maths and CS Award £141,674 Computational Group Theory*	1987-90
BTRL Contract £10,410 Development of an LSD simulator	1987-8
BTRL Consultancy: Concurrent System Modelling and Simulation	1988
Warwick Research and Innovations Fund £1000 CADNO project*	1988
BT-SERC CASE Studentship:	
Definitive Principles for Telecommunications	1988-91
BP-SERC CASE studentship (awarded but unfilled):	
Definitive Principles for Business Software	1988
ESPRIT Basic Research Actions £31000 Algorithms and Complexity*	1989-91
RS/NSERC Anglo-Canadian Scientific Exchange Scheme $6300	1990
Computer Science Department, Carleton University, Ottawa $3000	1990
SERC Agent-oriented Modelling for Interactive Systems* £89150	1993-6
Royal Society Visiting Research Fellowship	
for Dr V D Adzhiev, Moscow Engineering Physics Inst £9714	1993-4
IBM-SERC CASE Studentship:	
Observation-oriented Modelling for Systematic Software Construction	1993-6

Research Grants (cont.)

Warwick Research and Innovations Fund £2400	
Comparative Software Development	1994
Matra Datavision - EPSRC CASE Studentship: Geometric Modelling	1994-7
Laboratory for Shape Modelling, University of Aizu, Japan £1500	1994
Warwick Research and Innovations Fund £3600 Classroom Interaction Simulation*	1995
University of North Carolina, USA £500	1996
Royal Society Travel Grant for study visit to Japan £1500	1997
Warwick Research and Innovations Fund £1K	
Empirical Modelling for Educational Technology*	1997
EPSRC A Methodology for Object-Orientation in Re-engineering Enterprises £132K	1998
Warwick Research and Innovations Fund £4.5K Attendance at CT1999	1999
Royal Society, UK-Japan Joint Project Award	
A web-based tool for geometric modelling £7.5K	1999-2001
BBC Carousel specification using definitive principles £5K	2000
Warwick Research and Teaching Development Fund £5K	
Assignment-driven IT support for coursework preparation and marking	2001
University of Aizu for attendance at DALI'2001 workshop £1K	2001
HEROBAC sponsorship for CT2001 at Warwick £10K	2001
BBC A GUI for the JaM2 tool £7K	2001
BBC Adding persistence to the JaM2 tool £6K	2002
Sponsored International postgraduate workshop at ICALT'05, Kiaohsiung, Taiwan, $1K	2005
Sponsored showcase for EU *Kaleidoscope* Network of Excellence (3K euros)	2005
Sponsored International Summer School at Rostock University, Germany, $1K	2006
Warwick Teaching Quality Enhancement Fund*, Environment for CS teaching, £3750	2008
Warwick Gifted and Talented Youth: 5 day online module *The Sudoku Experience* £1K	2008
University of Potsdam, Philosophy Department, invited colloquium (all expenses paid)	2008
Warwick North American Travel Fund: 1 week visit from Bonnie Nardi, Irvine, £750	2009
Visiting Scholarship, National Taiwan Normal University, Taipei (5/12-18/12)	2009

Conference Organisation (at Warwick unless otherwise stated)

British Colloquium for Theoretical Computer Science, 1986 (Conference Chair)
European Software Engineering Conference, September 1989 (local organiser)
ICALP, July 1990 (local organiser)
IEE Colloquium on Human Factors, London, Nov 1995 (co-organiser)
Cognitive Technology 2001: Instruments of Mind (Conference Chair)

University Responsibilities during the period 1975-2010

Representative of Computer Science at Subfaculty of Science
Deputy Chairman, Senate General Purposes Committee
(in this role I deputised for the Vice-Chancellor to chair Assembly meetings)
Assembly Representative on Senate
Member of Senate Sex Equality Committee
Member of Senate University Savings Committee
Chairman of Computer Systems Engineering Committee

Consultant to the Centre for New Technologies Research in Education
Member of internal review panel for Psychology department
I have had a major role in setting up three new degree programmes:

- Mathematics and the Theory of Computation
- Computing Systems
- Discrete Mathematics

Undergraduate modules lectured, 1975-2010 (number of years in brackets):

1st-year:	Combinatorial Mathematics (2)
	Programming for Maths/Scientists (5)
	Foundations for Computer Science (2)
	Design of Information Structures (2)
	Professional Skills (4)
2nd-year:	Numerical Analysis I and II (3)
	Topics in Algorithmic Mathematics (3)
	Automata and Formal Languages (8)
	Information Structures (3)
	Implementation of High-Level Languages (1)
	Systems Programming A (1)
	Introduction to Computer Science (1)
	Logic for Computer Science (2)
	Introduction to Complexity (3)
	CS Lab: Prolog and parser generator projects (2)
	Declarative Programming (1)
	Introduction to Software Engineering (1)
	Databases Systems (7)
	Formal Specification and Verification (3)
3rd-year:	Complexity of Algorithms (8)
	Theory of Data Bases (17)
	Non-Procedural Languages (1)
	Computer Graphics (1)
4th-year:	An Introduction to Empirical Modelling (7)

I initiated "Topics in Algorithmic Mathematics" as a new course in 1977, and the new 4th year module “An Introduction to Empirical Modelling” on the CS MEng programme that was first taught in 2002. Complexity of Algorithms was nominated "Course of the Year" by the Computer Science undergraduates in 1982-3. I have been very active in supervision of final year and masters projects throughout my career, and eleven of my graduate students were first introduced to Empirical Modelling through such projects. Daniel Keer (2005) and Richard Myers (2008) won departmental prizes for their final year project work on themes relating to Empirical Modelling.

Postgraduate teaching

I devised and taught a 5 day MSc module: *Empirical Modelling for Concurrent Systems* (formerly known as *Definitive Methods for Concurrent Systems Modelling*) from 1992-9 and the *Introduction to Empirical Modelling* module that has been taught on the current MSc since 2007.

Postgraduate teaching (cont.)

I have supervised fourteen doctoral students to successful completion. I have also supervised eight MSc-by-research students. I am currently supervising one doctoral student at Warwick, and assisting in the supervision of a doctoral student at the University of Joensuu, Finland under the International Multidisciplinary PhD Studies in Educational Technology (IMPDET) programme.

PhD supervision:

C S Iliopoulos (1983): Computational Problems in the Theory of Abelian Groups
J A Dain (1990): Automatic Error Recovery for LR Parsers in Theory and Practice
J F Buckle (1990): Computational Aspects of Lattice Theory
Y P Yung (1993): Definitive Programming - a Paradigm for Exploratory Software Development
P E Ness (1997): Creative Software development: an Empirical Modelling Approach
R I Cartwright (1998): Geometric Aspects of Empirical Modelling: Design & Implementation
P-H Sun (1999): Distributed Empirical Modelling and its Application to Software System Development
S Maad (2002): An Empirical Modelling Approach to Software System Development in Finance: Applications and Prospects
J Rungrattanaubol (2002): A treatise on Modelling with definitive scripts
A K T Wong (2003): Before and Beyond Systems: An Empirical Modelling Approach
C Roe (2004): Computers for Learning: an Empirical Modelling Perspective
A Ward (2004): Interaction with Meaningful State: Implementing Dependency on Digital Computers
A J Harfield (2008): Empirical Modelling as a new paradigm for educational technology
Zhan En Chan (2009): Towards efficacious groupware development: an Empirical Modelling Approach

MSc-by-research supervision:

C S Iliopoulos (1981): Algorithms in the Theory of Integral Binary Quadratic Forms
S Meziani (1987): Denota an Interpreter for Definitive Notations
M D Slade (1990): Definitive Parallel Programming
Y W Yung (1990): EDEN: An Engine for Definitive Notations
R Wang (2003): Modelling for Software System Development: Object-Oriented and Empirical Modelling Perspectives
J-P Dupont (2004): Script partitioning in the comprehension and development of Empirical Modelling artefacts
G Efstathiou (2006): C-GRAPH: A case study in the design, implementation and application of a definitive notation
K G King (2007): Uncovering Empirical Modelling

I also supplied the central theme, and acted as a supervisor, for the doctoral thesis of A J Cartwright, formerly a lecturer in the Department of Engineering.

Doctoral students currently under my supervision are: Nicholas Pope, Ilkka Jormanainen.

Postgraduate teaching (cont.)

Prof Ian Stewart (Mathematics) and I jointly supervised K Dore as a part-time doctoral student under the auspices of the Interdisciplinary Mathematics Research Programme.

Empirical Modelling research has been the focus for invited international workshops for postgraduate students I have given on Educational Technology (a 5-day workshop in Kiaohsiung, Taiwan, 2005) and Computing and Business (a 10-day workshop at University of Rostock, 2006).

The LSD notation, first conceived by me in 1986, was the basis of supervised research at MSc and PhD level in Moscow Engineering Physics Institute in 1997 and 1998. This led to the development of the LSD-engine, a novel tool for software development using Empirical Modelling principles, implemented by A Rikhlinsky under the guidance of V D Adzhiev. This work was described and demonstrated at Warwick by its authors on a visit sponsored by the British Council in May 1998.

With my assistance, the principal Empirical Modelling tool, the EDEN interpreter, has recently been deployed in two independent projects by graduate students working at the University of Joensuu, Finland. One of these projects involved teaching robotics to schoolchildren in Johannesburg, the other to AIDS-related education in high schools in Uganda.

The connections I have identified between Empirical Modelling and the philosophical stance of "radical empiricism" introduced by William James (1842-1910) have attracted international interest from the philosophers Joachim Petsche (Potsdam University, Germany) and Marianne Janack (Hamilton College, New York State). Petsche introduced a masters level philosophy module based on this theme in 2008-9 and Janack – a specialist Jamesian scholar – visited Warwick in connection with the preparation of her book on the concept of experience in January 2009.

Over the period 1992-99, in connection with my module on *Empirical Modelling for Concurrent Systems* on the MSc in Parallel Computers and Computation, I successfully supervised in total 20 MSc projects, two of which were awarded a distinction. This accounted for about 20% of the total MSc population.

Departmental administrative responsibilities

I have served as Computer Science Undergraduate Admissions Tutor (1976-9 and 1980-81), Postgraduate Admissions Tutor (1985-6), First-year Tutor (2006-10), Computer Science Course Manager (1991-3, 1996-2005, 2008-10) and as Chairman and departmental representative on the Computer Systems Engineering Committee (1994-6). I served on the Executive Committee (1991-2). I currently lead the Human Aspects of Computing research group and serve on the Computer Science Steering, Graduate Studies, and Undergraduate Studies committees. I have represented the Department at the Subfaculty of Science, and on committees for new appointments. My other responsibilities have included editing "Computer Science at Warwick", timetabling liaison, examinations secretary duties and organising internal and external seminars. I had a leading role in the organisation of seminars for 6th Form teachers designed to promote a better understanding of the relationship between Mathematics and Computer Science at university. I have also served as a mentor, both for new staff, and under the auspices of the Warwick Teaching Certificate scheme.

Other relevant experience

My teaching experience includes tutoring of the Open University second-level Mathematics course M202 at Summer Schools in 1973 and 1975-7. I have also given invited talks to 6th Form pupils at Dulwich and Ampleforth Colleges. I have been active in organising demonstrations for local schoolchildren under the auspices of the university ACE project and have also given workshops at local schools. In July 2008, I took the leading role in developing a 1-week online workshop ("The Sudoku Experience") for the Warwick Gifted and Talented Youth scheme. This workshop has since been further exercised in collaboration with Vik Nuckchady at Nokia, Finland, and with very able high school students working with him under Nokia's Toijala Center Scheme

I have programming experience in ALGOL, APL, POP2, C, Prolog and functional languages. I have made frequent use of programs in connection with theoretical research, and for illustrative purposes in lecture courses. My most ambitious projects have been

- the development of a suite of 15 annotated and documented programs in conjunction with 1st year programming courses (1976-7);
- the design and implementation (with John Buxton) of a simulation machine for the "Introduction to Computer Science" course;
- the computation of tables of invariants of algebraic groups (with George Lustzig - 1978, and Nicholas Spaltenstein - 1982)
- the development (with Chris Brown, Michael Evans and Ashley Ward) of an environment for studying relational query languages (2001).

Of these projects, the computation of the Green functions of finite Chevalley groups, using an algorithm devised by Nicholas Spaltenstein, was the most technically demanding. The entire project involved six months of intensive work: a number of auxiliary programs in C and APL were written to generate the input data (comprising some 36,000 integers) for one of the three main C programs.

In connection with my research on Empirical Modelling and definitive (definition-based) programming principles, I have supervised several hundred projects involving 2nd and 3rd year undergraduates and MSc/PhD students. Many of these projects can be viewed in the Empirical Modelling web archive at http://empublic.dcs.warwick.ac.uk/projects. These include the design and implementation of the definitive notations ARCA, DoNaLD and CADNO for interactive graphics, SCOUT for window layout, a concurrent systems simulator (ADM/LSD), an agent-oriented parser, several variants of the EDEN interpreter for the evaluation of definitive notations, as well as other platforms for dependency maintenance, such as the Dependency Assembler Maintainer (DAM), the Java Maintainer (JAM) and MoDD (Maintainer of Dynamic Definitions). JaM, developed by Richard Cartwright whilst working as a doctoral student under my supervision, was applied in ground-breaking research on Interactive Television at the BBC Research and Development Laboratories over the period 2002-5. Practical contributions to this research were made by two fourth-year CS MEng group projects jointly supervised by Cartwright and myself. I have also been personally responsible for the development of many models that have been used for educational purposes – primarily in connection with teaching Empirical Modelling, but also in connection with teaching other subjects on the standard computer science curriculum.

In October and November 2001, building on the project work of several students, I developed - and simultaneously deployed with a class of 250 database systems students - an environment for the

Other relevant experience (cont.)

study of relational query languages. This is implemented using a new observation-oriented parsing technique supported by the EDEN interpreter. It combines interpreters for SQL and for a variant of Stephen Todd's Information Systems Base Language, and was used from 2001-5 to highlight the problems inherent in relating and translating SQL to relational algebra. Using the web-enabled variant of EDEN developed by my final-year project student Richard Myers in 2008 with support from the Warwick Teaching Quality Enhancement Fund, this environment has since been deployed in the Virtual Studies in Computer Science (ViSCoS) programme at Joensuu, Finland (2008-10).

I have presented papers at international conferences on a wide variety of subject areas spanning pure mathematics and both theoretical and applied aspects of computer science, and featuring interdisciplinary research involving engineering, education, business, psychology, humanities computing, music and philosophy. I am a founder member of the British Colloquium for Theoretical Computer Science and of the international Cognitive Technology Society. My research travel has included visits to Canada, the USA, India, Japan, Turkey, France, Germany, Italy, Finland, South Africa, Tanzania, Taiwan and the Netherlands. I have given invited seminars on my research in Mathematics and Computer Science at NRC: Calgary; University of Calgary, University of Waterloo, Dalhousie, McGill, Simon Fraser, University of Alberta: Edmonton, University of Regina (1990); at UCLA, Tucson (1979), Yale, Brown, Columbia, NJIT: New Jersey (1985), University of Oregon, Eugene (1990), and UNC, Chapel Hill (1996); at TIFR Bombay, IIT Madras, IISc Bangalore, NPL and IIT New Delhi, Central University: Hyderabad, and the University of Kerala (1984); at the University of Aizu, Japan (1994, 1997, 2000, 2001), at Nagoya University, Japan (1997) and Hosei University, Tokyo (2000); at Istanbul Technical and Bosphorus Universities: Istanbul, Bilkent and Middle East Technical Universities: Ankara (1992); at the University of Genova, and at CSELT: Turin (1987); at CWI: Amsterdam (1981, 1987), the University of Amsterdam, and at Eindhoven Technical University (1981). I have also given invited seminars at many British universities, at the BP Information Technology Research Centre (1987) and at IBM Warwick Software Development Laboratory (1992).

Personal interests

Outside my profession, I have a deep and serious interest in music, and in playing piano and organ solo and chamber works. Whilst employed at the Open University in 1972-3, I accompanied the university opera group in complete performances of Mozart's Marriage of Figaro. I have also taken part in public performances of Schubert piano duets at King's College London, the quintets for piano and wind by Mozart and Beethoven at the University of Warwick, and piano and cello works by Schubert, Beethoven and Brahms at Keble College, Oxford. I have been the deputy organist at one of the Coventry City Centre Churches, and have regularly accompanied instrumentalists and singers in charity concerts and local music competitions. I performed a sponsored 8 hour programme of solo piano music to raise money for the Coventry Oxfam Group in December 1983.