Alan F. Blackwell

C U R R I C U L U M V I T A E

PERSONAL

Date of Birth	17 September 1962
Marital Status	Married, one child
Nationality	British
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EDUCATION AND PROFESSIONAL QUALIFICATIONS

1999	PhD, Psychology, Cambridge University (Darwin College) Dissertation title: *Metaphor in diagrams*
1989	MSc, Computer Science, Victoria University of Wellington Dissertation title: *Spatial reasoning for robots: A qualitative approach*
1988	NZ Professional Engineering examination (= UK Chartered Engineer)
1982	BE(Hons), Electrical Engineering, Auckland University

TEACHING

2002-2003	Software Engineering and Design (new course)
2001-2002	Software Engineering and 2nd Year Group Design Project
2001-2003	Information Architecture (new course for CU Moving Image Studio)
2000-2002	Object Oriented Software Design (contribution to Part II Additional Topics)
1999-2003	Human Computer Interaction (new course)
2000-2003	Director of Studies in Computer Science, Darwin College
1996	Prolog for Artificial Intelligence (Open University summer tutor) Component of D309 *Cognitive Psychology*

TEACHING-RELATED AWARDS

2002	Proposed and supervised the project entered by Timothy Hospedales, awarded Computer Science student of the year in the National Science and Technology Student of the Year awards.
2001	Proposed and supervised the project entered by Hanna Wallach, awarded Computer Science student of the year in the National Science and Technology Student of the Year awards.

RESEARCH FUNDING

CMI	2001 – Cambridge-MIT Institute Fellowship
	2001 – Three year grant for evaluation of remote design collaboration
	2002 – co-investigator on funded projects investigating i) best practice for design & ii) durable digital depositories
ACE	2001 – Arts Council of England new technology arts fellowship scheme
NSF	2000 – International consultant on end-user software engineering.
EU	2002 – Two year grant on tangible interfaces to the Web
	2002 – Network of excellence on end-user development
EPSRC	1998 – Three year grant for work on new paradigms in visual interaction.
	2002 – One year grant on cognitive ergonomics for ubiquitous computing
ESRC	1996 – Conference funding for Thinking with Diagrams workshop.
MRC	1995 – Three year grant for industrial collaborative studentship

EMPLOYMENT HISTORY

2000-present **University of Cambridge** **University Lecturer**	Alan Blackwell is a Lecturer in the Cambridge Computer Laboratory. His research and teaching addresses Human Computer Interaction, Software Product Design, Psychology of Programming and Visual Languages. He also works in collaboration with academic researchers around the world, and as consultant to a wide range of research and technology companies.
2000-present **Darwin College** **Fellow**	Alan is Director of Studies in Computer Science, and official Information Architect at Darwin College. He chairs the College Computing committee, and has served on committees for Music, and Education & Research. He founded the Darwin choir in 1997, leading successful tours of Portugal in 1999 and 2000. He convened, with David Mackay, the prestigious Darwin College Lecture Series for 2002.
2001-present **Crucible** **Co-Director**	Alan is co-director of Crucible, the Cambridge network for research in interdisciplinary design. Crucible has been instrumental in attracting funding to the Cambridge-MIT Institute, has facilitated more than 30 research proposals and funded projects in departments across the University, and has approximately 50 academic and industrial associates.
1998-2000 **University of Cambridge** **Senior RA**	Alan was previously a Senior Research Associate in the Computer Lab., funded by a 3-year project grant, "New Paradigms for Visual Interaction". This developed the finding from his PhD that visual metaphor, often considered a core benefit in graphical interfaces, is neither necessary nor sufficient for the range of abstract tasks that computer users encounter.
1995-1998 **MRC Applied Psychology Unit** **PhD Student**	This project, funded collaboratively by the Medical Research Council and the Hitachi Advanced Software Centre, investigated cognitive factors involved in designing new Visual Programming languages. It led to a general critique of the use of metaphor in graphical interfaces and diagrams. When presented at the September 1999 IEEE conference on Visual Languages in Tokyo, this work received the award for best presentation at the conference.
1992-1995	The Advanced Software Centre of Hitachi was established as an international arm of the 6,000 strong Software Development Centre in Japan. Alan led a

Hitachi Europe Limited **Senior Engineer**	team of 10 developers design tools for object-oriented software development. He took ObjectReuser from concept through market research, development, product release, sales and establishment of commercial partnerships. He also worked on a multimedia hypertext architecture, for which he designed and implemented the first browser, as well as working on specification teams for server software and communication protocols.
1989-1992 **Cambridge Consultants** **Senior Engineer / Project Manager**	Cambridge Consultants is a private research and development company, wholly owned by Arthur D. Little. Alan led four engineers in the Artificial Intelligence Group developing a high-speed diagnostic system to advise train drivers in emergencies. It is now in use on London Underground trains. He also developed security protocols for a smartcard electronic cash system, now used by British Gas in domestic gas meters, and acted as consultant on AI research projects including distributed agents for real-time control, heuristic reactive scheduling and benchmarking RISC architectures for AI applications.
1983-1989 **Progeni Systems** **Senior Engineer / Project Manager**	During the 1980s Progeni was the largest software company in New Zealand. Alan was the senior engineer in the Control Systems division, where he led development teams designing laboratory and factory automation systems. His technical speciality was novel user interfaces for industrial workers having no previous computer experience. These included programming languages for experiment and factory control, mixing physical and screen elements. He also developed a real-time software infrastructure for use within the company, including networking protocols, a real-time executive for early PC-class machines, and embedded debugging monitor tools.

PROFESSIONAL ACTIVITIES

EPSRC Peer Review College
Elected to College in 2002
Served as panel member in 2001

IEEE Symposium on End User Programming:
Chair and Proceedings Editor (2003)
Program Committee member (2001-2003)

Psychology of Programming Interest Group:
Chair and Proceedings Editor (2000)
Program Committee member (1996-2003)

Int. Conf. on Theory and Application of Diagrams:
Chair (2004)
Steering Committee member (2000-2004)

IEEE Symposium on Visual Languages:
Program Committee member (2000-2001)

Workshop on The Visual End User
Program Committee member (2000)

INSERC Workshop on Software Ergonomics
Programme Committee member (2001)

EPSRC Workshop on Music and Information Technology
Steering Committee member (2001)

Conference on Collaboration and Ownership in the Digital Economy
Steering Committee member (2001)

Interdisciplinary Journal on the Theory and Application of Diagrams
Founding member of editorial board (2000)

Artificial Intelligence Review
Guest editor (2001)

Thinking with Diagrams Workshop:
Co-chair and Proceedings Editor (1997)
Program Committee member (1998)

Diagrammatics and Design Workshop:
Program Committee member (2002)

Empirical Studies of Programmers Workshop:
Program Committee member (1998)

AAAI Symposium on Formalizing Reasoning with Visual and Diagrammatic Representations
Program Committee member (1998)

RESEARCH COLLABORATIONS

Simon Peyton Jones (Microsoft Research) – User defined functions in spreadsheets

Claudia Eckert (Engineering Design Centre) – Best practice across design disciplines

Michael Harrison (Kettles Yard Gallery) – New technology arts fellowships

James Leach (Social Anthropology) – Creativity in technological collaborations

Andrew Barry (Goldsmiths College) – Software tools for drug design processes

Pat Hall (Open University) – Text-free computing

Natasa Milic-Frayling (Microsoft Research) – Contextual studies of next generation web usage

Margaret Burnett (Oregon State University) – End user software engineering

Kim Marriott (Monash University, Australia) – Visual attention in display use

David Greaves (Computer Laboratory) – User programming of domestic networks

Ross Anderson (Computer Laboratory) – Password mnemonics and security

David Mackay (Cavendish Laboratory) – Keyboardless text entry

Chris Roast (Sheffield Hallam University) – Abstraction in user interfaces

Thomas Green (University of Leeds) – Cognitive dimensions of notations

PATENTS

US Patent Filed:
User defined spreadsheet functions (November 2002, co-inventor)

UK Patent Filed:
Remote control system for defining interaction between electronic devices (January 2000)

PUBLICATIONS

Journal publications

Jansen, A.R., Blackwell, A.F. and Marriott, K. (in press). A tool for tracking visual attention: The Restricted Focus Viewer To appear in Behavior Research Methods, Instruments, and Computers.

Ward, D.J., Blackwell, A.F. & MacKay, D.J.C. (2002). Dasher: A gesture-driven data entry interface for mobile computing. *Human-Computer Interaction* 17, 199-228.

Blackwell, A.F. (2001). See What You Need: Helping end users to build abstractions. *Journal of Visual Languages and Computing*, 12(5), 475-499.

Blackwell, A.F. (2001). Pictorial representation and metaphor in visual language design. *Journal of Visual Languages and Computing*, 12(3), 223-252.

Blackwell, A.F. (2001). Thinking with Diagrams - guest editor's introduction. Artificial Intelligence Review 15(1), 1-3.

Whitley, K.N. and Blackwell, A.F. (2001). Visual programming in the wild: A survey of LabVIEW programmers. *Journal of Visual Languages and Computing*, 12(4), 435-472.

Blackwell, A.F., Whitley, K.N., Good, J. and Petre, M. (2001). Cognitive factors in programming with diagrams. *Artificial Intelligence Review* 15(1), 95-113.

Blackwell, A.F (2001). Vital Signs: Usable abstractions at home and at work. *I3 Magazine* 11, 10-13.

Petre, M. & Blackwell, A.F. (1999). Mental imagery in program design and visual programming. *International Journal of Human-Computer Studies*, 51(1), 7-30.

Blackwell, A.F. (1989). Spatial reasoning with a qualitative representation. *Knowledge-Based Systems*, 2(1), 37-45.

Blackwell, A. (1989). The Hotpress project: Improving performance in the test laboratory environment. *Automation and Control*, 20(1), 21-25.

Monographs and edited collections

Blackwell A.F., Ed. (2001), *Thinking with Diagrams*. Kluwer Academic.

Blackwell, A.F. & Bilotta, E., Eds. (2000). Proceedings of the 12th Annual Workshop of the Psychology of Programming Interest Group. Corigliano Calabro, Italy.

Blackwell, A.F., Ed. (1997). *Thinking with Diagrams Discussion Papers*. Interdisciplinary workshop on Thinking with Diagrams, Portsmouth, Jan. 9-10 1997

Refereed conference publications

Blackwell, A.F. (2002). First steps in programming: A rationale for Attention Investment models. In *Proceedings of the IEEE Symposia on Human-Centric Computing Languages and Environments*, pp. 2-10.

Blackwell, A.F. and Burnett, M. (2002). Applying Attention Investment to end-user programming. In *Proceedings of the IEEE Symposia on Human-Centric Computing Languages and Environments*, pp. 28-30.

Blackwell, A.F. and Wallach, H. (2002). Diagrammatic integration of abstract operations into software work contexts. In M. Hegarty, B. Meyer and N.H.Narayanan (Eds.), *Diagrammatic Representation and Inference*, Springer-Verlag, pp. 191-205.

Blackwell, A.F. (2002). What is programming? In *Proceedings of PPIG 2002*, pp. 204-218.

Rodden, K. and Blackwell, A.F. (2002). Class libraries: A challenge for programming usability research. In *Proceedings of PPIG 2002*, pp. 186-195.

Blackwell, A.F., Robinson, P., Roast, C, and Green, T.R.G. (2002). Cognitive models of programming-like activity. Proceedings of CHI'02, 910-911.

Blackwell, A.F. and Hague, R. (2001). AutoHAN: An Architecture for Programming the Home. In *Proceedings of the IEEE Symposia on Human-Centric Computing Languages and Environments*, pp. 150-157.

Blackwell, A.F., Britton, C., Cox, A. Green, T.R.G., Gurr, C.A., Kadoda, G.F., Kutar, M., Loomes, M., Nehaniv, C.L., Petre, M., Roast, C. and Young, R.M. (2001) . Cognitive Dimensions of Notations: Design tools for cognitive technology. In M. Beynon, C.L. Nehaniv, and K. Dautenhahn (Eds.) *Cognitive Technology 2001* (LNAI 2117). Springer-Verlag, pp. 325-341

Blackwell, A.F. and Hague, R. (2001). Designing a programming language for home automation. In G. Kadoda (Ed.) *Proceedings of the 13th Annual Workshop of the Psychology of Programming Interest Group*, 85-103.

Blackwell, A.F. & Green, T.R.G. (2000). A cognitive dimensions questionnaire optimised for users. In Blackwell, A.F. & Bilotta, E., Eds. *Proceedings of the 12th Annual Workshop of the Psychology of Programming Interest Group*.

Blackwell, A.F., Jansen, A.R. and Marriott, K. (2000). Restricted Focus Viewer: A tool for tracking visual attention. In M. Anderson, P. Cheng & V. Haarslev (Eds.), *Theory and Applications of Diagrams. Lecture Notes in Artificial Intelligence* 1889. Berlin: Springer Verlag, pp. 162-177.

Ward, D.J., Blackwell, A.F. & MacKay, D.J.C. (2000). Dasher - a Data Entry Interface Using Continuous Gestures and Language Models. In *Proc. UIST 2000: The 13th Annual ACM Symposium on User Interface Software and Technology*.

Blackwell, A.F. & Green, T.R.G. (1999). Does metaphor increase visual language usability? In *Proceedings 1999 IEEE Symposium on Visual Languages VL'99*. pp. 246-253. (Best presentation award)

Blackwell, A.F. & Green, T.R.G. (1999). Investment of attention as an analytic approach to Cognitive Dimensions. In T. Green, R. Abdullah & P. Brna (Eds.) *Proceedings PPIG-11, Annual Workshop of the Psychology of Programming Interest Group*. pp. 24-35.

Blackwell, A.F. & Engelhardt, Y. (1998). A taxonomy of diagram taxonomies. In *Proceedings Thinking with Diagrams 98: Is there a science of diagrams*?, pp. 60-70.

Simos, M. & Blackwell, A.F. (1998). Pruning the tree of trees: The evaluation of notations for domain modeling. In J. Domingue & P. Mulholland (Eds.), *Proceedings PPIG-10*, *Annual Workshop of the Psychology of Programming Interest Group*. pp. 92-99.

Blackwell, A.F. (1997). Diagrams about thoughts about thoughts about diagrams. In M. Anderson (Ed.), *Reasoning with Diagrammatic Representations II*:, California: AAAI Press, pp. 77-84.

Petre, M. & Blackwell, A.F. (1997). A glimpse of expert programmer's mental imagery. In S. Wiedenbeck & J. Scholtz (Eds.), *Proceedings ESP-7, Workshop on Empirical Studies of Programmers*, pp. 109-123.

Whitley, K.N. & Blackwell, A.F. (1997). Visual programming: The outlook from academia and industry. In S. Wiedenbeck & J. Scholtz (Eds.), *Proceedings ESP-7*, *Workshop on Empirical Studies of Programmers*, pp. 180-208.

Blackwell, A.F. & Arnold, H. (1997). Simulating a software project: The PoP Guns go to war. In R. Osborn & B. Khazaei (Eds.), *Proceedings PPIG-9*, *Annual Workshop of the Psychology of Programming Interest Group*. pp. 53-60.

Blackwell, A.F. (1996). Metacognitive theories of visual programming: What do we think we are doing? In *Proceedings IEEE Visual Languages 96*, pp. 240-246.

Blackwell, A.F. (1996). Do programmers agree with computer scientists on the value of visual programming? In *Adjunct Proceedings HCI'96*, pp. 44-47.

Blackwell, A.F. (1996). Metaphor or analogy: How should we see programming abstractions? In P. Vanneste, K. Bertels, B. De Decker & J.-M. Jaques (Eds.), *Proceedings PPIG-8*, *Annual Workshop of the Psychology of Programming Interest Group*. pp. 105-113.

Blackwell, A.F. (1986). Artificial intelligence and New Zealand manufacturing industry. In *Proceedings First National Conference on Robotics and Handling Automation*, pp. 31-36.

Book chapters

Blackwell, A.F., Green, T.R.G. & Hewson, R.L. (in press). Product design to support user abstractions. To appear in E. Hollnagel (Ed.) *Handbook of Cognitive Task Design*. Lawrence Erlbaum.

Blackwell, A.F. & Green, T.R.G. (in press). Notational Systems - the Cognitive Dimensions of Notations framework. To appear in John M. Carroll (Ed.) *HCI Models, Theories and Frameworks*. Morgan Kaufman.

Blackwell, A.F. and Engelhardt, Y. (2002). A meta-taxonomy for diagram research. In M. Anderson & B. Meyer & P. Olivier (Eds.), *Diagrammatic Representation and Reasoning*, Springer-Verlag.

Blackwell, A.F. (2002). Psychological perspectives on diagrams In M. Anderson & B. Meyer & P. Olivier (Eds.), *Diagrammatic Representation and Reasoning*, Springer-Verlag.

Blackwell, A.F. (2001). SWYN: A Visual Representation for Regular Expressions. In H. Lieberman (Ed.), *Your wish is my command: Giving users the power to instruct their software*. Morgan Kauffman , pp. 245-270.

Petre, M., Blackwell, A.F. and Green, T.R.G. (1998). Cognitive questions in software visualization. In J. Stasko, J. Domingue, M. Brown, & B. Price (Eds.) *Software visualization: Programming as a multi-media experience*. MIT Press, pp. 453-480.

Blackwell, A. F. (1988). Qualitative geometric reasoning using a partial distance ordering. In J.S. Gero. and R.Stanton (Eds) *Artificial Intelligence Developments and Applications*. North-Holland, pp. 217-229.

Keynote and invited presentations

Blackwell, A.F. (2001). People in the digital world. Invited address to annual meeting of the Construction Industry Computing Association.

Blackwell, A.F. (2000). Dealing with New Cognitive Dimensions. Discussion Paper presented at *Workshop on Cognitive Dimensions*, University of Hertfordshire.

Blackwell, A.F. (2000). Diagrammatic reasoning and visualisation of system behaviour. Invited unit at the *MONET summer school on Model-Based Systems and Qualitative Reasoning*, Bertinoro.

Blackwell, A.F., Green, T.R.G. & Nunn, D.J.E. (2000). Cognitive Dimensions and Musical Notation Systems Paper presented at ICMC 2000, Berlin: *Workshop on Notation and Music Information Retrieval in the Computer Age*.

Blackwell, A.F. (1999). What is knowledge? Invited opening address at the *ESTIEM Conference on Knowledge Management*, Judge Institute, Cambridge.

Green, T.R.G. & Blackwell, A.F. (1998). *Design for usability using Cognitive Dimensions*. Invited tutorial at British Computer Society conference on Human Computer Interaction HCI'98.

Blackwell, A.F. (1997). Correction: A picture is worth 84.1 words. In C. Kann (Ed.), *Proceedings First ESP Student Workshop*, pp. 15-22.

Green, T.R.G. and Blackwell, A.F. (1996). Ironies of abstraction. Invited contribution to *3rd International Conference on Thinking*. British Psychological Society, London.

Green, T.R.G. and Blackwell, A.F. (1996). Thinking about visual programs. Invited contribution to *IEE Computing and Control Division Colloquium*. IEE, London.

Blackwell, A.F. & Arnold, H.L. (1996). Simulating a programming project. Invited contribution to *First PPIG Student Workshop.*

Blackwell, A.F. (1996). Chasing the intuition of an industry: Can pictures really help us think? In M. Ireland (Ed.), *Proceedings First PPIG Student Workshop*, pp. 13-24.

Blackwell, A.F. (1995). The future of software components. Invited keynote address at *EXE Developer Show*, London.