Joanna J. Bryson

Harvard University
William James Tower, suite 970
33 Kirkland Street
Cambridge, MA 02139

email:	jbryson@wjh.harvard.edu
web:	http://www.ai.mit.edu/~joanna
phone:	+1 (617) 515 5735
updated:	*June 20, 2002*

Education

PH.D. IN COMPUTER SCIENCE — June 2001
THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Dissertation Title: Intelligence by Design: Principles of Modularity and Coordination for Engineering Complex Adaptive Agents

Courses Include: Principles of Computing Systems, Embodiment and Cognition, Computer Architecture, Artificial Intelligence, Theory of Computation

M.PHIL. IN PSYCHOLOGY — January 2000
THE UNIVERSITY OF EDINBURGH

Dissertation Title: The Study of Sequential and Hierarchical Organization of Behavior via Artificial Mechanisms of Action Selection

M.SC. IN ARTIFICIAL INTELLIGENCE — November 1992
UNIVERSITY OF EDINBURGH

Dissertation Title: The Subsumption Strategy Development of a Music Modelling System

Courses Include: Knowledge Representation and Inference, Intelligent Sensing and Control, Neural Networks, Software for Parallel Architectures, Expert Systems

B.A. IN BEHAVIORAL SCIENCE — June 1986
THE COLLEGE OF THE UNIVERSITY OF CHICAGO

Courses Include: Human Information Processing, Perception, Human Interaction, Developmental Neuropsychology, Ethology

Employment

PRIMATE COGNITIVE NEUROSCIENCE LABORATORY — Harvard University, Cambridge USA
Postdoctoral Fellow with Prof. Marc D. Hauser, working on modeling specialized learning in primates and its applications to safe learning in software agents. Funded by an NSF Biological Information Technology & Systems SGER.
October 2001 – *present*

FRANKLIN W. OLIN COLLEGE OF ENGINEERING — Needham, MA, USA
Visiting Postdoctoral Fellow with Prof. Lynn Andrea Stein, working on the interaction between autonomous agents and the semantic web in the context of DAML-S.
June 2001 – September 2001

HUMAN COMMUNICATION RESEARCH CENTER — University of Edinburgh, Scotland
Short-term contract Research Assistant to Prof. Johanna Moore. Position created to facilitate the transfer of Prof. Moore's research in automated planning, tutoring and dialog to Edinburgh. From May primary work was pure research on the use of reactive or situated planning in natural language dialog systems, particularly for tutoring.
Jan 1999 – March 2000

LEGO — Boston, MA and Billund, Denmark

Consultation and research for the toy company. LEGO is traditionally associated with constructive and educational play. First employed at LEGO Futura in Boston, which developed technologically-oriented play concepts for the parent company. Left position to study in Europe. Later worked for Special Project Unit Darwin in Billund Denmark developing a proprietary intelligent character architecture for virtual reality applications. LEGO dissolved both units in late 1998.

April 1995 – December 1995, February 1998 – December 1998

MARBLE ASSOCIATES, INC. — Waltham, MA, USA

Senior Associate (1993) / Intern (1994) for a technology consulting agency. Primary assignment was a large-scale reengineering effort for a technology manufacturer with 30,000 employees worldwide. Initially positioned in the "Core Object Support" team, which was responsible for the corporate software library, integrating other teams (e.g. order entry, tracking, product configuration) and for interfacing with the corporate databases and other legacy systems. After three months, made Technical Project Lead. Also served as AI expert, engaged in business development. Company dissolved in 1997.

January 1993 – August 1993, Summer 1994

A M INVESTORS — Chicago, IL, USA

Project Leader for automating the exchange floor staff. Delivered a real-time trading support system with a 20 minute maximum downtime. Required purchasing, development, integrating processes for separate departments, administration, and managing staff training and changeover. A M Investors was a Chicago futures and options trading firm of approximately 70 employees, with a technical staff of five; it dissolved in 1994, but the software system continued as an asset to subsequent ventures.

September 1988 – July 1991

LAWRENCE I. SCHULMAN & CO. / FIRST OPTIONS OF CHICAGO — Chicago, IL, USA

Sole technical employee in the unit, responsible for providing custom trading and bookkeeping tools for the proprietary trading unit of the world's largest options clearing firm. Designed, built and administered networked PC trading program Arb-Net, which operated on two exchange floors and in executive offices. Modified software still in use (as of 1999) by on-line trading company.

July 1986 – September 1988

Teaching

THE DEPARTMENT OF PSYCHOLOGY — University of Edinburgh

Part-time undergraduate lecturer for the Department of Psychology. Courses: The Biological Basis of Behavior (1st year); Cognitive Psychology (AI unit – 3rd year); 1st–4th year tutorials.

Jan 1996 – Dec 1997

THE DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE — MIT

Teaching Assistant for 3 terms. Courses: The Structure and Interpretation of Computer Programs (6.001); Artificial Intelligence (6.034).

Sept 1994 – Dec 1995

THE DEPARTMENT OF COMPUTER SCIENCE — University of Chicago

Course Tutor for both introductory and graduate level computer science classes.

Sept 1983 – June 1987

Journal Articles and Reviewed Commentary

Joanna J. Bryson and Jonathan C. S. Leong "Primate Errors in Transitive Inference" *in preparation, to be submitted to Animal Cognition*.

Joanna J. Bryson, "Intelligent Control Requires More Structure than the Theory of Event Coding Provides", commentary on Hommel et al. in *Behavioral and Brain Sciences*, *in press*.

Joanna J. Bryson and Kristinn R. Thórisson, "Dragons, Bats & Evil Knights: A Three-Layer Design Approach to Character Based Creative Play", *Virtual Reality*, **5**(2): 57–71.

Joanna J. Bryson, "Cross-Paradigm Analysis of Autonomous Agent Architecture", *Journal of Experimental and Theoretical Artificial Intelligence* **12**(2):165–190, 2000.

Joanna J. Bryson and Will Lowe, "Cognition without Representational Redescription", commentary on Ballard et al. in *Behavioral and Brain Sciences*, 1998.

Conference Publications and Reviewed Book Chapters

Joanna J. Bryson and Jessica C. Flack, "Action Selection for an Artificial-Life Model of Social Behavior in Non-Human Primates", *Proceedings of the International Workshop on Self-Organization and Evolution of Social Behaviour*, C. Hemelrijk ed., *forthcoming*.

Joanna J. Bryson, David Martin, Sheila I. McIlraith and Lynn Andrea Stein, "Agent-Based Composite Services in DAML-S: The Behavior-Oriented Design of an Intelligent Semantic Web", in *Web Intelligence*, Springer, year = 2002, N. Zhong, J. Liu and Y. Yao, eds, *forthcoming book chapter on Springer, concise version to be published in IEEE Computer*.

Joanna J. Bryson, "Stable Configurations for Cooperation in Complex Agents with Minimal Communication", *First GSFC/JPL Workshop on Radical Agent Concepts (WRAC)*, January 2002. *book chapter forthcoming on Springer, W. Truskowski ed.*.

Joanna J. Bryson and Marc D. Hauser, "What Monkeys See and Don't Do: Agent Models of Safe Learning in Primates", *Proceedings of the AAAI Symposium on Safe Learning Agents*, M. Barley and H. W. Guesgen, eds., AAAI Press March 2002.

Joanna J. Bryson, "Embodiment vs. Memetics: Does Language Need a Physical Plant?" in *Developmental Embodied Cognition (DECO-2001)*, R. Pfeifer and G. Westermann, eds.; Edinburgh, July 2001.

Joanna J. Bryson and Lynn Andrea Stein, "Modularity and Design in Reactive Intelligence", in *The Seventeenth International Joint Conferences on Artificial Intelligence (IJCAI)*, Seattle WA, pp. 1115–1120, Morgan Kaufmann, 2001.

Joanna J. Bryson and Lynn Andrea Stein, "Modularity and Specialized Learning: Mapping Between Agent Architectures and Brain Organization", in *The Second International Workshop on Emergent Neural Computational Architectures Based on Neuroscience*, S. Wermter, J. Austin and D. Willshaw, eds.; Springer, Berlin, pp. 98–113, 2001.

Joanna J. Bryson, "Hierarchy and Sequence vs. Full Parallelism in Action Selection", Simulation of Adaptive Behavior 6, Paris, 2000 pp. 147–156 (originally in *Intelligent Virtual Agents 2*, ed. Daniel Ballin, 1999.)

Joanna J. Bryson and Lynn Andrea Stein, "Modularity and Specialized Learning in the Organization of Behaviour", in *Connectionist Models of Learning, Development and Evolution: The Sixth Neural Computation and Psychology Workshop (NCPW6)*, ed. Robert French and Jacques Sougné, pp. 53–62, Springer, 2001.

Joanna J. Bryson, Will Lowe and Lynn Andrea Stein, "Hypothesis Testing for Complex Agents", *NIST Workshop on Performance Metrics for Intelligent Systems*, Washington, DC, 2000.

Joanna J. Bryson and Lynn Andrea Stein, "Architectures and Idioms: Making Progress in Agent Design", *The Seventh International Workshop on Agent Theories, Architectures and Languages (ATAL)*, Boston, 2000.

Joanna J. Bryson, Keith Decker, Scott DeLoach, Michael Huhns and Michael Wooldridge, "Agent Development Tools", *The Seventh International Workshop on Agent Theories, Architectures and Languages (ATAL)*, Boston, 2000.

Joanna Bryson, "Making Modularity Work: Combining Memory Systems and Intelligent Processes in a Dialog Agent", *AISB'00 Symposium on Designing a Functioning Mind*, ed. Aaron Sloman, pp. 21–30; Birmingham UK, 2000.

Joanna Bryson, "A Proposal for the Humanoid Agent-builders League (HAL)", *AISB'00 Symposium on Artificial Intelligence, Ethics and (Quasi-)Human Rights*, ed. John Barnden, pp. 1–6; Birmingham UK, 2000. (Abstract also appeared in the AISB Quarterly No. 104, Summer/Autumn 2000, ed. Blay Whitby)

Joanna Bryson, "The Study of Sequential and Hierarchical Organisation of Behaviour via Artificial Mechanisms of Action Selection", unpublished MPhil Dissertation, The Department of Psychology, The University of Edinburgh, 2000.

Joanna Bryson, "Creativity by Design: A Behaviour-Based Approach to Creating Creative Play", *AISB'99 Symposium on Creativity in Entertainment and Visual Art*, ed. Frank Nack, Edinburgh, 1999.

Joanna Bryson and Phil Kime, "Just Another Artifact: Ethics and the Empirical Experience of AI", *Fifteenth International Congress on Cybernetics*, pp. 385–390, Namur, 1998.

Joanna Bryson and Brendan McGonigle, "Agent Architecture as Object Oriented Design", *The Fourth International Workshop on Agent Theories, Architectures and Languages (ATAL97)*, pp. 15–30, ed. Munindar P. Singh, Springer-Verlag, Providence, 1998.

Joanna Bryson, "The Design of Learning for an Artifact", *The AISB Workshop on Learning in Robots and Animals*, ed. Noel Sharkey et. al., Brighton UK, 1996.

Joanna Bryson, "Primitive Parallax and Parallax Primitives", *The Third European Conference on Artificial Life,* June 1995. Poster and abstract.

Joanna Bryson, "The Reactive Accompanist: Adaptation and Behavior Decomposition in a Music System", *The Biology and Technology of Intelligent Autonomous Agents*, pp. 365–376, ed. Luc Steels. Springer, Trento, 1995.

Joanna Bryson, Alan Smaill, Geraint Wiggans, "The Reactive Accompanist: Applying Subsumption Architecture To Software Design", University of Edinburgh Department of Artificial Intelligence Research Paper 606, 1992.

Joanna Bryson, "The Subsumption Strategy Development of a Music Modelling System", unpublished MSc Dissertation, The Department of Artificial Intelligence, The University of Edinburgh, 1992

Invited Talks

"Modularity, specialization, and an innate bias for reason", Division of Informatics Programme of Reasoning Seminar, University of Edinburgh, *forthcoming* 2 August 2002.

"Representing Cognitive Phenomena in Biological Systems", talk and paper for the *Theoretical Fundamentals of Intelligent Systems* Workshop of the Joint Conference on Information Sciences, A. Meystel ed., 11 March 2002.

"Modularity in Artificial and Natural Intelligence", Computer Science Department at the University of Vermont, 26 February 2002

"Intelligence by Design: Principles of Modularity and Coordination for Engineering Complex Adaptive Agents", BBN, Cambridge MA, 16 October, 2001

"Simple Heuristics in Complex Agents", Adaptive Behavior and Cognition Group, The Max Planck Institute of Human Development, Berlin, 28 August 2001.

"Intelligence by Design: Principles of Modularity and Coordination for Engineering Complex Adaptive Agents", Cambridge Basic Research (Nissan), 23 April, 2001

"Making Modularity Work: Progress in Complete Agent Architectures", Oberlin College, Department of Computer Science, 3 November, 2000

"Intelligence by Design" for the *It's In Your Head* project, Generator Studios, Dundee, Scotland; 11 August, 1999

"Intelligence by Design: Specialized Learning and Behavior-Based AI" Machine Learning Research Group, The University of Bristol; 30 May, 1999

"What's Wrong with Behavior-Based AI (and How to Fix It)" University of Aarhus (Denmark), Department of Computer Science; 26 May, 1998

"Dynamic Cognitive Architectures and Artificial Intelligence", Glasgow Caledonian University, Department of Psychology; 18 October, 1996

"What's Wrong with Behavior-Based AI (and How to Fix It)" University of Wales, Aberystwyth; Department of Computer Science; 25 July, 1996

"What's Wrong with Behavior-Based AI (and How to Fix It)" Free University of Brussels, Artificial Intelligence Laboratory; 20 June, 1996

"What's Wrong with Behavior-Based AI (and How to Fix It)" University of Zurich, Artificial Intelligence Laboratory; 18 June, 1996

"The Human-Computer Interface — Applications in AI", Living Neurons on Silicon Group, University of Edinburgh 15 May, 1996

"When Robots Hum Along: Music meets Behavior-Based AI" AI and Music Group, University of Edinburgh; 8 May, 1996

"Complex Behavior in Reactive, Behavior-Based Systems" Robot and Vision Group, University of Edinburgh; June, 1995

"The Humanoid Project (or What's Happening at MIT)", Computer Science Department, Trinity College, Dublin; 25 March 1994

Professional Activities

Program Committee for: Simulation of Adaptive Behavior 7, 2002; Intelligent Virtual Agents 3, 2001; Niche Autonomous Robots (at The 14^{th} International FLAIRS Conference), 2001; Autonomy Control: Lessons from the Emotional (at the 15^{th} European Meeting on Cybernetics and Systems Research), 2000.

Additional Reviews for: Cognitive Science 2000, International Workshop on Biologically-Inspired Machine Learning 1999.

Member of The Society for the Study of Artificial Intelligence and the Simulation of Adaptive Behaviour since 1996, Cognitive Science since 1998.

Moderator of the international mailing list autonomous-robots October 1997-June 2001.