Curriculum Vitae

Brian James Ross

Personal Information

- Birth place: Winnipeg, Manitoba, Canada
- Citizenship: Canadian

Research Interests

- Artificial intelligence: evolutionary computation, language induction, machine learning
- Computation paradigms: logic programming, process algebra, formal systems
- Multimedia: computer graphics, computer music

Academic Qualifications

Degree	*Institution*	*Date*
PhD	Dept. of Artificial Intelligence University of Edinburgh (Edinburgh, Scotland)	Nov 1992
MSc	Dept. of Computer Science University of British Columbia (Vancouver, Canada)	Oct 1988
BCSc (Hon)	Dept. of Computer Science University of Manitoba (Winnipeg, Canada)	May 1984

Academic Distinctions and Awards

Award	*Institution*	*Date*
Edinburgh University Studentship	UofE	Oct 88 – Sept 91
Overseas Research Students Award	UofE	Oct 88 – Sept 91
UBC Postgraduate Summer Fellowship	UBC	May 88 – Aug 88
First Class Honours	UofM	1984
Dean's List	UofM	1979 – 1984

Positions Held

Institution	*Position*	*Date*
Brock U	Full professor	July 2003
Brock U	Associate professor, tenure	June 1996 – June 2003
Brock U	Assistant professor	June 1992 – May 1996
BC Govt.	Software consultant (p.t.)	Jan 1992 – Mar 1992
U of Victoria (BC)	Visiting assistant professor	Sept 1991 – May 1992
UBC	Research asst. (p.t.)	1987 – 1988
Radian Corp. (Texas)	Engineer scientist	June 1984 – May 1986
Various universities	Teaching assistant (p.t.)	1982 – 1984, 1986 – 1991

Research grants

- NSERC Operating grant, "The Inference of Concurrent Systems Using Genetic Programming", $12700 (2006-2011).
- NSERC Operating grant, "Formal Language Inference Using Genetic Programming", $12705 (2002-2005).
- NSERC Operating grant, "Genetic Programming and Concurrent Software Development", $12100 (1998-2001).
- NSERC Operating grant, "Algebraic Modeling of Natural and Abstract Systems", $10000 (1996-1997).
- NSERC Operating grant, "Semantics of Concurrent Logic Programming Languages", $17000 per year (1993-1996).
- NSERC General internal grant (Brock U), $7000 towards equipment (1992).

University service

- Awards and Bursaries (2000-1)
- Computing and Communications Policy (1997-8)
- Instructional Development (1996-7)
- Campus Development (1995-7, 2000-1)
- Vice-President's Committee on Electronic Classroom(1995-7)
- Graduate committee, Faculty of Science and Mathematics (1994-8, 2000-5)
- President's Fine Arts Committee (1993-6)

Department service

- Faculty sponsor, student ACM committee (1993-9)
- Hardware committee chair (1994-5, 2000-1)
- Curriculum committee (chair 2000-3; 2003-5; 2008-9)
- Faculty search committee chair (2000-3)
- Technical report editor (1994-9, 2000-5)
- MSc Committee (2007-8)
- Graduate Program Director (2008-9)
- Undergraduate advisor (1996-9)

Publications

Theses

- "An Algebraic Semantics of Prolog Control", PhD thesis, U of Edinburgh, 1992. Supervisors: Dr Alan Smaill and Dr Colin Stirling.
- "The Semantics and Transformation of Imperative Programs Using Horn Clauses", MSc thesis, U of British Columbia, 1988. Supervisor: Dr Harvey Abramson.

Book chapters

- Brian J Ross and Janine Imada. "Using Multi-objective Genetic Programming to Synthesize Stochastic Processes". In *Genetic Programming Theory and Practice VII*, R. Riolo, U.-M. O'Reilly and T. McConaghy (eds.), Springer, 2010.
- Craig Neufeld, Brian J Ross, William Ralph. "The Evolution of Artistic Filters". In *The Art of Artificial Evolution*, P. Machado and J. Cardalda (eds.), Springer, 2007.
- Brian J Ross. "The Evolution of Concurrent Systems". In *Evolution of Engineering and Information Systems and Their Applications*, L.C. Jain (ed.), CRC Press, 1999. Chapter 2, pp. 31–64.
- Brian J Ross. "A Lamarckian Evolution Strategy for Genetic Algorithms". In *Practical Handbook of Genetic Algorithms (v. 3)*, L. Chambers (ed.), CRC Press, 1999. Chapter 1, pp. 1–16.
- Brian J Ross. "A Semantic Approach to Prolog Program Analysis". In *Constructing Logic Programs*, edited by J.-M. Jacquet, John Wiley and Sons, 1993. Chapter 8, pp. 165–187.

Refereed journals

- Janine Imada and Brian J Ross. "Evolutionary Synthesis of Stochastic Gene Network Models using Feature-based Search Spaces". (accepted) *New Generation Computing*, 2010.
- Brian J Ross and Eduardo Zuviria. "Evolving Dynamic Bayesian Networks using Multi-objective Genetic Algorithms". *Applied Intelligence*, v.26, n.1, February 2007, pp. 13-23.
- Beatrice Ombuki, Frank Hanshar, Brian J. Ross. "A Multi-Objective Genetic Algorithm Approach to the Vehicle Routing Problem with Time Windows". *Applied Intelligence*, v.24, n.1, Feb 2006, pp. 17-30.
- Brian J. Ross, Anthony G. Gualtieri, Frank Fueten, Paul Budkewitsch. "Hyperspectral Image Analysis Using Genetic Programming", *Applied Soft Computing*, v.5, n.2, January 2005, pp. 147–156.
- Adam Hewgill and Brian J Ross. "Procedural 3D Texture Synthesis Using Genetic Programming", *Computers and Graphics*, v.28, n.4, 2004, pp.569–584.

- Brian J Ross and Han Zhu. "Procedural Texture Evolution Using Multiobjective Optimization", *New Generation Computing*, v.22, n.3, 2004, pp.271–293.
- Brian J Ross. "The Evolution of Stochastic Regular Motifs for Protein Sequences", *New Generation Computation*, v.20, n.2, Feb 2002, pp. 187–213.
- Andrea L. Wiens and Brian J Ross. "Gentropy: Evolving 2D Textures", *Computers and Graphics*, v.26, n.1, Feb 2002, pp. 75–88.
- Brian J Ross. "Logic-based Genetic Programming with Definite Clause Translation Grammars", *New Generation Computing*, v.19, n.4, 2001, pp. 313–337.
- Brian J Ross, Frank Fueten, and Dmytro Y. Yashkir. "Automatic Mineral Identification Using Genetic Programming", *IEEE Machine Vision and Applications Journal*, v.13, n.2, 2001, pp. 61–69.
- Brian J Ross. "Probabilistic Pattern Matching and the Genetic Programming of Stochastic Regular Expressions", *Applied Intelligence*, v. 13, n. 3, Nov/Dec 2000, pp. 285–300.
- Brian J Ross. "The Evolution of Concurrent Programs", *Applied Intelligence*, v.8, n.1, Jan 1998, pp. 21–32.
- Brian J Ross. "Running Programs Backwards: the Logical Inversion of Imperative Computation", *Formal Aspects of Computing*, v.9, 1997, pp. 331–348.
- Brian J Ross and Stephen Brooks. "Automated Composition from Computer Models of Biological Behavior", *Leonardo Music Journal*, v.6, 1996, pp. 27–31.

Refereed conference proceedings

- Corrado Coia and Brian J. Ross. "User-Guided Evolution of Granular Synthesis". (accepted) International Computer Music Conference 2010, NY.
- Steve Bergen and Brian J. Ross. "Evolutionary Art using Summed Multi-Objective Ranks". (accepted) Genetic Programming Theory and Practice Workshop, Ann Arbor, MI, May 2010.
- Brian J. Ross and Janine Imada. "Using Multi-objective Genetic Programming to Synthesize Stochastic Processes". Genetic Programming Theory and Practice Workshop, Ann Arbor, MI, May 2009.
- Brian J. Ross and Janine Imada. "Evolving Stochastic Processes Using Feature Tests and Genetic Programming". GECCO 2009, Montreal, July 2009.
- Brian J. Ross. "Using Genetic Programming to Synthesize Monotonic Stochastic Processes". Computational Intelligence 2007, Banff, AB, July 2007, pp. 71-78.
- Brian J. Ross, William Ralph, Hai Zong. "Evolutionary Image Synthesis Using a Model of Aesthetics". Conference on Evolutionary Computation (CEC 2006), Vancouver, BC, July 2006.
- Brian J. Ross. "Evolving Protein Motifs Using a Stochastic Regular Language with Codon-Level Probabilities", Intl. Conf. on Artificial Intelligence and Soft Computing (ASC 2002), Banff, AB, ed. H. Leung, ACTA Press, July 2002, pp. 134–139.

- Brian J. Ross, Anthony G. Gualtieri, Frank Fueten, Paul Budkewitsch. "Hyperspectral Image Analysis Using Genetic Programming", Proceedings of the Genetic and Evolutionary Computation Conference (GECCO 2002), ed. W.B.Langdon *et al.*, CA: Morgan Kaufmann, 2002, pp. 1196–1203.

- Brian J. Ross. "The Evaluation of a Stochastic Regular Motif Language for Protein Sequences", Proceedings of the Genetic and Evolutionary Computation Conference (GECCO-2001), ed. L. Spector *et al.*, Morgan Kaufmann, 2001, pp. 120–128.

- Brian J Ross, Frank Fueten, Dmytro Yashkir. "Edge Detection of Petrographic Images Using Genetic Programming", Proceedings Genetic Evolution and Computation Conference (GECCO-2000), ed. D. Whitley *et al.*, Morgan Kaufmann, 2000, pp. 658–665.

- Brian J Ross. "The Effects of Randomly Sampled Training Data on Program Evolution", Proceedings Genetic Evolution and Computation Conference (GECCO-2000), ed. D. Whitley *et al.*, Morgan Kaufmann, 2000, pp. 443–450.

- Brian J Ross. "Logic-based Genetic Programming with Definite Clause Translation Grammars", Proceedings Genetic Evolution and Computation Conference (GECCO-99), ed. J.R. Koza *et al.*, July 1999, Morgan Kaufmann, 1999, p. 1236.

- Brian J Ross. "Pairwise Sequence Comparison and the Genetic Programming of Iterative Concurrent Programs", Genetic Programming 98: Proceedings of the Third Annual Conference, J.R. Koza *et al.* (eds.), Morgan Kaufmann, July 1998, pp. 338–343.

- Robert Pringle and Brian J Ross. "A Symbiosis of Animation and Music", Proceedings 1996 International Computer Music Conference, Hong Kong, Aug 1996, pp. 316–319.

- Brian J Ross. "A Process Algebra for Stochastic Music Composition", *Proceedings 1995 International Computer Music Conference*, pp. 448–451. Also as Brock COSC Tech Report CS-95-02.

- Brian J Ross. "PAC Learning of Interleaved Melodies", *1995 IJCAI Workshop on Music and Artificial Intelligence*, Aug 1995, pp. 96–100.

- Brian J Ross. "MWSCCS: A Concurrent Stochastic Music Language", *Second Brazilian Symposium on Computer Music*, Canela, Brazil, July 1995.

- Brian J Ross. "The Inductive Inference of Cyclic Synchronized Interleaving", *Proceedings of the 1994 European Conference on Artificial Intelligence*, Amsterdam, The Netherlands, ed. A.G.Cohn. J Wiley and Sons, 1994, pp. 423–427.

- Brian J Ross. "A π–calculus Semantics of Logical Variables and Unification". *First North American Process Algebra Workshop*, Springer-Verlag, 1993, pp. 216–230.

- Brian J Ross. "Semantics–based Partial Evaluation of Prolog Programs", *Workshop on Logic Program Synthesis and Transformation*, Manchester, Springer–Verlag, 1992, pp. 221–237.

- Brian J Ross and Alan Smaill. "An Algebraic Semantics of Prolog Program Termination", *Proceedings of the ICLP 91*, MIT Press, 1991, pp. 316–330.

- Brian J Ross. "Using Algebraic Semantics for Proving Prolog Termination and Transformation", *Proceedings of the UKALP 91*, Springer–Verlag, pp. 135–155.

- Brian J Ross. "The Partial Evaluation of Imperative Programs Using Prolog", In *Meta–programming in Logic Programming*, edited by H. Abramson and M. Rogers, MIT Press, 1989, pp. 341–363.

- Harvey Abramson, Matthew Crocker, Brian Ross and Douglas Westcott. "A Fifth Generation Translator Writing System: Towards and Expert System for Compiler Development", *International Workshop on Programming Language Implementation and Logic Programming;* INRIA, Orleans, France, 1988.

Non-refereed publications and technical reports

- Corrado Coia and Brian J. Ross. "User-guided Evolution of Granular Synthesis", Technical report CS-09-09, Brock University, Dept. of Computer Science, July 2009.

- Janine Imada and Brian J. Ross. "Using Feature-based Fitness Evaluation in Symbolic Regression with Added Noise", GECCO 2008 Late Breaking Papers, Atlanta, July 2008. Also as Brock COSC TR CS-08-03, April 2008.

- Brian J. Ross. "Evolutionary Learning and Stochastic Process Algebra". First Intl Workshop on Induction of Process Models, ICML 2007, Corvallis, OR, June 2007.

- Craig Neufeld, Brian J. Ross and William Ralph. "The Evolution of Artistic Filters", poster at Evolutionary Art Competition, CEC 2006, Vancouver, BC, July 2006.

- Brian J. Ross and Eduardo Zuviria. "Evolving Dynamic Bayesian Networks with Multiobjective Genetic Algorithms". Brock COSC TR CS-05-03, May 2005.

- Ramon Lefuel and Brian J. Ross. "Parsing Probabilistic Context Free Languages using Multi-Objective Genetic Algorithms". Proceedings GECCO-2004 Late-Breaking Papers. Also as Brock COSC TR CS-04-08, May 2004.

- Beatrice M. Ombuki, Brian J. Ross, Frank Hanshar. "A Multi-Objective Genetic Algorithm Approach to the Vehicle Routing Problem with Time Windows". Brock COSC TR CS-04-02, January 2004.

- Adam Hewgill and Brian J Ross. "The Evolution of 3D Procedural Textures", Proceedings GECCO-2003 Late-Breaking Papers, Chicago ILL, pp. 146-147.

- Adam Hewgill and Brian J Ross. "Procedural 3D Texture Synthesis Using Genetic Programming", Technical report CS-03-06, Brock University, Dept. of Computer Science, April 2003.

- Brian J Ross. "Searching for Search Algorithms: Experiments in Meta-search", Technical report CS-02-23, Brock University, Dept. of Computer Science, December 2002.

- Brian J Ross and Han Zhu. "Procedural Texture Evolution Using Multiobjective Optimization", Technical report CS-02-18, Brock University, Dept. of Computer Science, July 2002.

- Cameron Wellock and Brian J Ross. "An Examination of Lamarckian Genetic Algorithms", Proceedings GECCO-2001 Late Breaking Papers, pp.474-481, San Francisco, CA, 2001.

- Andrea Weins and Brian J Ross. "Automatic Texture Evolution Using Genetic Programming", Proceedings GECCO-2000 Late-breaking Papers, Las Vegas, NV, pp. 418–424. Also Brock TR CS-00-02, May 2000.
- Brian J Ross. "Probabilistic Pattern Matching and the Genetic Programming of Stochastic Regular Expressions", *Proceedings GECCO-99 Late-Breaking Papers*, Orlando, FL, 1999, pp. 229-237. (Also technical report CS-99-01, Brock University, Dept. of Computer Science, May 1999.)
- Brian J Ross. "The Inductive Inference of Finite Interleaving with Synchronization", Technical report CS-94-04, Brock University, Dept. of Computer Science, June 1994.
- Brian J Ross. "A Process Algebra for Sequential and Concurrent Logic Programming", Technical report CS-94-01, Brock University, Dept. of Computer Science, June 1994.

Papers presented at conferences

- "Evolutionary Learning and Stochastic Process Algebra". First Intl Workshop on Induction of Process Models, ICML 2007, Corvallis, OR, June 2007.
- "Using Genetic Programming to Synthesize Monotonic Stochastic Processes". CI 2007, Banff, AB, July 2007.
- "Evolutionary Image Synthesis Using a Model of Aesthetics", CEC 2006, Vancouver, BC, July 2006.
- "Evolving Protein Motifs Using a Stochastic Regular Language with Codon-Level Probabilities", Intl. Conf. on Artificial Intelligence and Soft Computing (ASC 2002), Banff, Alberta, July 2002.
- "Hyperspectral Image Analysis Using Genetic Programming", Genetic and Evolutionary Computation Conference 2002, New York, New York, July 2002.
- "The Evaluation of a Stochastic Regular Motif Language for Protein Sequences", Genetic and Evolutionary Computation Conference 2001, San Francisco, California, July 2001.
- "Gentropy: Evolutionary 2D Texture Generation", Genetic and Evolutionary Computation Conference 2000, Las Vegas, Nevada, July 2000.
- "Edge Detection of Petrographic Images Using Genetic Programming", Genetic and Evolutionary Computation Conference 2000, Las Vegas, Nevada, July 2000.
- "The Effects of Randomly Sampled Training Data on Program Evolution", Genetic and Evolutionary Computation Conference 2000, Las Vegas, Nevada, July 2000.
- "Logic-based Genetic Programming with Definite Clause Translation Grammars", GECCO-99, Orlando, Florida, July 1999. Also presented at the GECCO-99 Workshop on Advanced Grammar Techniques in Genetic and Evolutionary Computation.
- "Pairwise Sequence Comparison and the Genetic Programming of Iterative Concurrent Programs", Genetic Programming 98, Madison, Wisconsin, July 1998.
- "A Process Algebra for Stochastic Music Composition", 1995 International Computer Music Conference, Banff, Alberta, September 1995.
- "PAC Learning of Interleaved Melodies", 1995 IJCAI Workshop on Music and Artificial Intelligence, Montreal, Quebec, August 1995.
- "The Inductive Inference of Cyclic Synchronized Interleaving", 1994 European Conference on Artificial Intelligence, Amsterdam, The Netherlands, August 1994.
- "A π–calculus Semantics of Logical Variables and Unification", First North American Process Algebra Workshop, Stony Brook, NY, August 1992.
- "Semantics–based Partial Evaluation of Prolog Programs". Workshop on Logic Program Synthesis and Transformation, Manchester, England, July 1991.
- "An Algebraic Semantics of Prolog Program Termination", 8th International Conference on Logic Programming, Paris, France, June 1991.

- "A Semantic Approach to Prolog Program Analysis", ILPS Workshop in Constructing Logic Programs, Paris, France, June 1991.
- "Using Algebraic Semantics for Proving Prolog Termination and Transformation", 3rd UK Annual Conference on Logic Programming, Edinburgh, Scotland, April 1991.
- "The Partial Evaluation of Imperative Programs Using Prolog" Workshop in Meta–programming in Logic Programming, Bristol, England, June 1988.

Other scholarly activities

- Membership in Association of Computing Machinery, International Society of Genetic and Evolutionary Computation, International Computer Music Association.
- Referee (conferences): 1993 European Symposium on Programming, GECCO (1999, 2000, 2001, 2003, 2005, 2007, 2009), CEC (2001-2004, 2006-2009), ASPGP (2003, 2004, 2006), EvoMusArt Workshop (2007-9).
- Referee (journals): Applied Intelligence (review board: 1995-2001; editorial board: 2001-present), The Open Cybernetics and Systemics Journal (review board: 2007-present), The Computer Journal, Annals of Mathematics and AI, Intl. Journal of Systems Science, IEEE Trans. on Evolutionary Computation, Crossroads Magazine (ACM), Photogammetric Engineering and Remote Sensing, Information Processing Letters, Applied Soft Computing.
- Co-organizer special session on Grammars in Evolutionary Computation, CEC 2001.

Graduate student examination

- M.Ed. examiner: W. Greg McCaughey (Brock U., Canada)
- Ph.D. examiner: Andrew Song (RMIT University, Australia), July 2003.
- Ph.D. examiner: Talib Hussain (Queen's University, Canada), August 2003.
- Ph.D. examiner: X.H. Nguyen (University of New South Wales, Australia), February 2005.

Personal Interests

- computer music
- computer graphics
- fitness: weights, gym, mountain biking
- films, music, books
- travel: the Pacific northwest, the Rockies, Europe.
- sushi

Teaching

Courses taught at Brock University (year last taught)

- COSC 1P98 Intermediate Computer Applications (1995)
- COSC 2Y01 Prolog (1994)
- COSC 2Y06 Lisp (1994)
- COSC 2P93 Logic Programming (2004)
- COSC 3P13 Programming Languages (1993)
- COSC 3P71 Artificial Intelligence (2007)
- COSC 3P98 Computer Graphics (2008)
- COSC 3P92 Computer Architecture (2009)
- COSC 4P79 Expert Systems (2008)
- COSC 4P77 Evolutionary Computation (2005)
- COSC 4P98 Topics in Computer Graphics and Digital Audio (2009)
- COSC 5P71 Genetic Programming (2008)

Courses taught at U of Victoria (Sept 1991- April 1992)

- CSC 110 Computer Programming I
- CSC 200 Computers in Statistical Applications
- CSC 230 Computer Architecture and Assembly Language
- CSC 350 Computer Architecture

Graduate Student Supervision

- Janine Imada, MSc, Brock U. *Evolutionary Synthesis of Stochastic Gene Network Models Using Feature-based Search Spaces.* Feb 2009.
- Will Barry, MSc, Brock U. (in progress)
- Corrado Coia, MSc, Brock U. (in progress)
- Robert Flack, MSc, Brock U. (in progress)
- Steven Bergen, MSc, Brock U. (in progress)

COSC 4F90 Honours Thesis Supervision

- Calvin Tse, *A Pascal-Prolog Compiler* (1993)
- Paul Ulanowski, *AI and Strategic Wargaming* (1994)
- Robert Pringle, *Computer music and animation* (1995)
- Peter Vrhovsek, *3D Morphing* (1996)
- Kevin Keith, *Midi Editor for SPD-11 Drum Machine* (1996)
- Allan Munro, *Genetic Programming for Decision Tree Induction* (1997)
- Stephen Brooks, *3D Rotoscoping of Mesh Primitives* (1997)
- Eric Hoffman, *Voxel Editor* (1997)
- Brian Drennan, *Using Particle Systems to Model Flocking Objects* (1997)
- Tony Debat, *Genetic evolution of house floor plans* (1997)
- Brian Olmsted, *Lindenmayer Systems Modeller/Mutator* (1998)
- Will Barry, *Pool Ball Physics Simulator* (1998)
- Andrea Wiens, *Gentropy: Evolutionary 2D Texture Generation* (2000)
- Eric Sneek, *TAME: 3D Animated Music Environment* (2001)
- Sean Dwyer, *Physics Engine and Library for Electronic Games* (2001)
- Cameron Wellock, *An Examination of Lamarckian Evolution Models* (2001)
- Craig Bannister, *RoomMaker: A Reverberation Plugin for Cubase VST* (2001)
- Gordon Ellis, *GeoIdentifier* (co-sup; 2001)
- Jody Wallis, *A Comparative Study of Search Techniques on the Minimum Distance of BCH Codes* (co-sup; 2001)
- Anthony Gualtieri, *Hyperspectral Image Analysis Using Genetic Programming* (2002)
- Robert White, *Flight Editor 2002* (2002)
- Adam Hewgill, *3D Texture Evolution Using Genetic Programming* (2003)
- Jeff Mason, *Edge Correction Neural Network for Petrographic Images* (co-sup; 2003)
- Ramon Lefuel, *Genetic Algorithms and Probabilistic Context Free Grammars* (2004)
- Steve Biederman, *3D Granular Synthesis Modeler* (2005)
- Craig Neufeld, *Evolutionary Aesthetic Image Filter Synthesis* (2005)
- Corrado Coia, *User Guided Evolution of Granular Synthesis* (2008)
- Steve Bergen, *Evolving Stylized Images using Genetic Algorithms* (2009)

COSC 3P99 Thesis Supervision

- Chika Ishida, *Interactive Performance Interface to Digital Camera* (co-sup; 2001)
- Mark Mikulec, *Computer Graphics System Editor* (2003)
- Adam Hewgill, *Skeletal Animation Systems (survey)* (2003)
- Sean Wilkens, *Rendering Non-photorealistic Images by Means of a Genetic Algorithm* (2005)
- Joel Glanfield, *Sample Stutterer VST Plugin* (2005)
- Craig Maki, *Pixel and Vertex Shader Programming* (2009)