

Ronald D. Haynes (PhD)

CONTACT INFORMATION

Department of Mathematics & Statistics
Memorial University of Newfoundland
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CURRENT AFFILIATIONS

Memorial University, St. John's, Newfoundland and Labrador
Associate Professor

As of September 2009

Acadia University, Wolfville, Nova Scotia
Adjunct Professor
Department of Mathematics and Statistics

October 2009 – present

Saint Mary's University, Halifax, Nova Scotia
Adjunct Professor
Department of Mathematics and Computing Science

August 2008 – present

Dalhousie University, Halifax, Nova Scotia
Adjunct Professor
Department of Mathematics and Statistics

June 2006 – present

PREVIOUS AFFILIATION

Acadia University, Wolfville, Nova Scotia
Associate Professor
Tenured

July 2008

July 2009

Assistant Professor
Department of Mathematics and Statistics

July 2004 – June 2008

EDUCATION

Simon Fraser University, Burnaby, B.C. Canada

Ph.D., Applied and Computational Mathematics, March 2003

- Supervisors: Dr. Manfred Trummer and Dr. Robert Russell

M.Sc., Applied and Computational Mathematics, 1998

- Supervisor: Dr. Manfred Trummer

Memorial University of Newfoundland, St. John's, Newfoundland, Canada

B.Sc. (Hons), Applied Mathematics, May, 1996

- Supervisor: Dr. Herman Brunner and Dr. Richard Charron

RESEARCH INTERESTS

Broadly my interests involve aspects of scientific computing and numerical analysis with particular interest in the numerical solution of ordinary and partial differential equations. Specifically I work with adaptive numerical methods known as moving mesh methods for PDEs. Related interests include numerical linear algebra, domain decomposition methods including Schwarz waveform relaxation, large scale optimization, and multirate methods for ODEs.

RESEARCH GRANTS **Total grants as PI or co-investigator: \$1,491,130.50**

AARMS CRG in Numerical Analysis and Scientific Computing 2013–2015, \$12,000 per year, total \$24,000

NSERC Discovery Grant 2013–2018, \$30,000 per year, total \$150,000

- Parallel Space–Time Approaches for the Numerical Solution of Partial Differential Equations

CFI–LOF/RDC Leverage \$158,992.50

- GPU–Based High Performance Computer for Geophysical Applications

NVIDA Professor Partnership Program, 2011, \$1500

- An Introductory Evaluation of GPUs for Optimization and Grid Generation

Atlantic Innovation Fund, J.P. Whitehead, C. Hurich, C. Farquharson, R. Haynes, \$867,500

- Seismic Modeling and Inversion (ends 2013)

IRIF/RDC Research Grant 2010–2012, total \$100,000

- Optimization problems in the development of energy technologies.

NSERC Discovery Grant 2008–2013, \$15,000 per year, total \$75000

- Current research grant and first renewal with an increase in funding. Proposal entitled *Implementation and Analysis of Adaptive Algorithms for the Numerical Solution of Partial Differential Equations*.

Acadia University Research Fund (Article 25.55) 2007–2008 \$2000

- University wide competition. Proposal entitled *Grid Selection for Two Point Boundary Value Problems*.

NSERC Research Tools and Instruments (Equipment) Grant 2007 \$50,638 (co–applicant)

- Funds used to purchase Acadia University’s first high performance computing cluster. Proposal entitled *Computing Equipment for Mathematical and Statistical Modelling*.

MITACS Networking Proposal 2007 \$5,000 (co–applicant)

- MITACS funds used to support AARMS–ACENET HPC Workshop and Conference, Acadia University, July 9–14, 2007.

NSERC Discovery Grant 2005–2007 \$13,000 per year, total \$39000

- Initial NSERC research grant.

Acadia University Research Fund (Article 25.55) 2004–2005 \$2500

- University wide competition. Proposal entitled *Practical Aspects of Adaptive Mesh Computations*.

Acadia University Research Startup Award 2004–2005 \$15000

TEACHING GRANTS Acadia University Teaching & Learning Enhancement Award 2008–2009, \$9500

Acadia University Teaching Innovation and Improvement Fund 2005 \$18571

HONORS AND AWARDS

Natural Science and Engineering Research Council Post Doctoral Fellowship, 2003

Special Graduate Entrance Scholarship (Ph.D.) 1998

Natural Science and Engineering Research Council Post Graduate Scholarship (Ph.D. Level) 1998

Best Student Exhibit Award, British Columbia Advanced Systems Institute Exchange, 1998.

Special Graduate Entrance Scholarship (M.Sc.) Simon Fraser University 1996

Natural Science and Engineering Research Council Post Graduate Scholarship (M.Sc.Level) 1996

University Mathematics Medal, convocation award (B.Sc.), Memorial University of Newfoundland,

1996

Governor General of Canada Silver Medal (B.Sc.), Memorial University of Newfoundland, 1996

OTHER ACADEMIC
EXPERIENCE

University of Waterloo, Waterloo, Ontario

NSERC Postdoctoral Research Fellow

September 2003–June 2004

School of Computer Science and Department of Applied Mathematics, Dr. Bruce Simpson (Computer Science) and Dr. Kevin Lamb (Applied Math) supervisors.

Simon Fraser University, Burnaby, B.C.

Research Associate

May–August 2003

Continued development of a Schwarz Waveform Moving Mesh Solver with Professor Robert Russell.

Teaching Assistant

September 1996 - December 2002

Duties included presentation of tutorials, assignments and exam grading for undergraduate courses including Linear Algebra, Numerical Analysis and Discrete Mathematics.

OTHER WORK
EXPERIENCE

- **Research Assistant, MITACS–PIMS MMSC Group & Ballard Power Systems**, Burnaby, B.C.
- **Coordinator of Parallel Computing Study Group**, Department of Mathematics and Statistics, SFU, Burnaby, B.C.

TEACHING
EXPERIENCE

Memorial University, St. John's, NL

- 2013–2014 TBD
- 2012–2013 MATH 3132 Numerical Analysis, MATH 3260 Ordinary Differential Equations I (2 Sections)
- 2011–2012 MATH 3132 Numerical Analysis, MATH 4162 Numerical Methods for Differential Equations, MATH 6210 Numerical Methods for Differential Equations
- 2010–2011 MATH 6210 Numerical Methods for Differential Equations, MATH 4160 Partial Differential Equations, MATH 3132 Numerical Analysis, CS 6739 Nonlinear Optimization
- 2009–2010 AMATH 4162 Numerical Methods for Partial Differential Equations, MATH 6210 Numerical Methods for Differential Equations

Acadia University, Wolfville, Nova Scotia

- 2008–2009 Calculus I (Differential), Numerical Methods, Calculus II (Integral), Advanced Numerical Methods (Graduate), Differential Equations I
- 2007–2008 Calculus I (Differential), Numerical Methods, Calculus IV (Vector), Advanced Numerical Methods
- 2006–2007 Calculus I (Differential), Calculus II (Integral), Calculus IV (Vector), Numerical Methods
- 2005–2006 Calculus I (Differential), Calculus II (Integral), Calculus IV (Vector), Numerical Methods, Advanced Numerical Methods
- 2004–2005 Numerical Methods, Calculus II (Integral), Calculus IV (Vector)

Simon Fraser University, Burnaby, British Columbia

- 2000–2001 Numerical Analysis
- 1999–2000 Precalculus

SUPERVISION

Post-Doctoral Fellows

- Thomas Humphries, 2011–2013

Optimization Problems in the development of Energy Technologies

PhD Students

- Khaled Mohammad, 2010–present

Numerical Solution of Time Dependent PDEs using Moving Method of Lines and Multirate Approaches

MSc Students

- Abu Naser Sarker, 2013–present

TBD

- Faysol Ahmed, 2013–present (with A. Hurford, Math/Biology)

TBD

- Patrick Belliveau, 2012–present (with C. Farquharson, Earth Sciences, MUN)

Parallelization of the 2.5D Inversion Program ArjunAir

- Siva Prasad, 2011–present

Storm Surge Modelling for coastal Newfoundland and Labrador

- Alexander Howse, 2011–2013

Domain Decomposition Algorithm for Mesh Generation

- Shaun Hiller, 2011–2012

Efficient Computation of Simulated Transmission Electron Microscope Images

- Khaled Mohammad, 2009–2010

Multirate Rosenbrock Methods for Stiff Systems of Ordinary Differential Equations with Matlab

- Yuheng Wu (with H. Chipman @Acadia), 2006–2008

Industrial Risk Classification Using Credibility Theory and Hierarchical Clustering

Honours Students

- Nathan King, NSERC USRA, 2012

Local and Global Error Control for Blowup problems

- Andrew Butler, 2012

Efficient Optimization of the Likelihood Function in Gaussian Process Modelling

- Alexander Howse, NSERC USRA, 2011

Domain Decomposition Methods for Nonlinear Diffusion Equations and Mesh Equidistribution in 2D

- Alexander Howse, NSERC USRA, 2010

Domain Decomposition Methods for Differential and Integral Equations

- Amber Corkum, NSERC USRA, (with R. Karsten @Acadia), 2010

The Ability of Particle Swarm Optimization to Optimally Place Tidal Turbines in the Bay of Fundy

- Amanda Swan, NSERC USRA (with R. Karsten @Acadia), 2010

A Model of Power Output for Tidal Turbines

- Matthew Rideout, NSERC USRA, 2008–2009

An Update Strategy for Numerically Solving Boundary Value Problems

- Megan Lickley, NSERC USRA, (with R. Karsten @Acadia), 2008–2009
Determining the Potential for Tidal Power in the Bay of Fundy and Optimizing Turbine Placement
- Shannon Kennedy, NSERC USRA, 2007–2008
Perturbing Tridiagonal M -matrices while Maintaining Inverse Non-Negativity
- Dayang Wang, 2006–2007
Parallel Programming with MPI
- Braden Dulong, NSERC USRA (with M. Robertson Physics @Acadia), 2006–2007
Determining Efficient Numerical Methods for Transmission Electron Microscope Image Simulation
- Colin Turner, NSERC USRA (with H. Teismann @Acadia), 2005–2006
An Investigation of Blow-up Times for the Maxwell–Debye System and like Equations
- Yifan Yang, 2005–2006
Energy Conserving Methods for Ordinary Differential Equations

Research Assistants

- Amber Corkum, 2009–2010
 - Amanda Swan, 2009–2010
 - Donald Patterson, 2008–2009
 - Justine MacMillan, 2008–2009
 - Shannon Kennedy, 2006–2007
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- Xiao Yu (PhD), Memorial University, 2012, Supervisory Committee
 - Aghil Khangha (PhD), Memorial University, Supervisory Committee, 2012.
 - Yi Zhang (MSc), Memorial University, 2012, Internal Examiner.
 - Cao, Jie (PhD), Faculty of Engineering and Applied Science, Memorial University of Newfoundland, 2012.
 - Ali Souril Laki (PhD), Faculty of Engineering and Applied Science, Memorial University of Newfoundland, 2012.
 - Zahangir Hossain (MSc), Memorial University, 2011, Internal Examiner.
Towards the development of a multi-scale model for thermally driven circulation
 - Sadegheh Haghshenas (PhD), Memorial University, 2011, Supervisory Committee.
 - Yuxiang Zhang (PhD), Memorial University, 2011, Examination Committee.
 - Fan Bai (MSc), Memorial University, 2011, Internal Examiner
Collocation Methods for Weakly Singular Volterra Integral Equations with Vanishing Delays
 - Liangjie He (MSc), Memorial University, 2010, Internal Examiner
A Travel-time Engine for Seismic Petroleum Applications Using Evolving Methods
 - Ling Lin (MSc), Saint Mary's University, 2009
High Order Collocation Software for the Numerical Solution of Fourth Order Parabolic PDEs
 - Brian Johansen (MSc), Memorial University, 2008
Numerical Investigations of the Korteweg-de Vries (KdV) Equation
 - Rania Ghanan (MSc), Dalhousie University, 2007
A Suite of Matlab Functions for the Solution of Linear Systems Arising from Collocation with B-Splines and with Monomial Splines

THESIS
COMMITTEES

- Josh Gould (MSc), Acadia University, 2007

Age-Structured Population Models for Species of Pest Mites

PUBLICATIONS IN
REFEREED
JOURNALS

- [1] Cao W., Haynes, R.D., and Trummer, M.R. Preconditioning for a Class of Spectral Differentiation Matrices. *J. Sci. Comput.* Vol. 24, No.3, pp. 343–371, September 2005.
- [2] Haynes, R.D., Kennedy, S.C. and Trummer, M.R., Persistently Positive Inverses of Perturbed M–Matrices, *Linear Algebra and Applications*, Volume 422, Issue 2-3, Pages 742-754, 2007.
- [3] Turner, C., Haynes, R.D. A Numerical and Theoretical Study of Blow-up for a System of Ordinary Differential Equations using the Sundman Transformation. *Atlantic Electronic Journal of Mathematics*, Vol. 2, No. 1, Summer Issue, 2007.
- [4] Haynes, R.D., and Russell, R.D. A Schwarz Waveform Moving Mesh Method. *SIAM J. Sci. Comput.*, Vol. 29, No. 2, pp. 656–673, 2007.
- [5] Haynes, R.D., Huang, W., and Russell, R.D. A Moving Mesh Method for Time–dependent Problems based on Schwarz Waveform Relaxation, *Proceedings of the 17th International Domain Decomposition Methods Meeting, Lecture Notes in Computational Science and Engineering (LNCSE)*, Springer–Verlag, Vol. 60, pages 229–236, 2008.
- [6] Dulong, B., Haynes, R.D., Robertson, M. A study in the computation time required for the inclusion of strain field effects in Bloch-wave simulations of TEM diffraction contrast images, *Ultramicroscopy*, Vol. 108, Iss. 5, pp. 415–425, 2008.
- [7] Karsten, R., McMillan, J., Lickley, M., Haynes, R.D. Assessment of Tidal Current Energy for Minas Passage, Bay of Fundy, *Proc. IMechE Part A: J. Power and Energy*, Vol. 222, pp. 493–507, 2008.
- [8] McMillan, J., Lickley, M., Karsten, R., Haynes, R.D. Potential of Tidal Power and its Effects on the Bay of Fundy. *SIAM Undergraduate Research Online*, Vol. 1, Iss. 1, 2008.
- [9] Kennedy, S. and Haynes, R.D. Inverse Positivity of Perturbed Tridiagonal M-Matrices, *Linear Algebra and its Applications*, Vol. 430, Issues 8–9, pp. 2312–2323, 2009.
- [10] Haynes, R.D., Recent Advances in Schwarz Waveform Moving Mesh Methods, *Lecture Notes in Computational Science and Engineering (LNCSE)*, Volume 78, Springer–Verlag, pp. 253–260, 2010.
- [11] Ranjan, P., Haynes, R.D. and Karsten, R., A Computationally Stable Approach to Gaussian Process Interpolation of Deterministic Computer Simulation Data, *Technometrics*, Volume 53, No. 4, pages 366–378.
- [12] Huang, J., Haynes, R.D., and Haung, T-Z., Monotonicity of Perturbed Tridiagonal M-matrices, *SIAM Journal of Matrix Analysis and Applications*, In Press
- [13] Gander, M.J., Haynes, R.D. Domain Decomposition approaches for mesh generation via the Equidistribution Principle, *SIAM Journal of Numerical Analysis*, In Press.
- [14] Haynes, R.D., Huang, W., Zegeling, P.A., A Numerical Study of Blowup in the Harmonic Map Heat Flow using the MMPDE moving mesh method, *Numerical Mathematics: Theory, Methods and Applications*, In Press.

[15] Gander, M.J., Haynes, R.D. and Howse, A.M., Alternating and Linearized Alternating Schwarz Methods for Equidistributing Grids.

[16] Christlieb, A., Haynes, R.D. and Ong, B., A Parallel Space–Time Algorithm, SIAM J. Sci. Comput., Vol. 34, No. 5, pp. CC233–C248, 2012.

[17] Humphries, T.D., Haynes, R.D., and James, L.A., Simultaneous Optimization of Well Placement and Control using a Hybrid Global-Local Strategy, In: Proceedings of the 13th European Conference on the Mathematics of Oil Recovery (ECMOR XIII), Biarritz, France, 10-13, September 2012.

UNDER REVISION

[18] Haynes, R.D. and Ong, B., MPI-OpenMP algorithms for the parallel space-time solution of time dependent PDEs, Submitted LNCSE, DD21, October 31, 2012.

[19] Haynes, R.D. and Howse, A.J.M, Generating Equidistributed Meshes in 2D via Domain Decomposition, Submitted LNCSE, DD21, October 25, 2012.

SUBMITTED

[20] Haynes, R.D. and Howse, A.J.M, Alternating Schwarz Methods for Mesh Equidistribution, Submitted ETNA, October 5, 2012.

[21] Humphries, T.D., Haynes, R.D., and James, L.A., Simultaneous and sequential approaches to joint optimization of well placement and control, Submitted to Computational Geophysics, February 10, 2013.

PREPRINTS

[22] Haynes, R.D., Howse, A.J.M, and Wu, S-L., Overlapping Optimized Schwarz Algorithms for Equidistributed Meshes.

[23] Haynes, R.D. and Kwok, F., Discrete analysis of Domain Decomposition Algorithms for Grid Generation via the Equidistribution Principle.

[24] Haynes, R.D., Ladd, K., and Ong, B. W., A OpenMP Parallel in Time Wrapper for the Solution of Time Dependent PDEs.

[25] Haynes, R.D., High, S., and Ong, B.W., Fault Tolerant Schwarz Iterations for the Parallel Solution of Elliptic Partial Differential Equations.

[26] Haynes, R.D., and Ong, B.W., An RIDC-OSM Space-Time Parallel Approach for the Solution of Time Dependent Partial Differential Equations.

[27] Butler, A., Haynes, R.D., Humphries, T.D., and Ranjan, P., Efficient Optimization of the Likelihood Function in Gaussian Process Modelling.

PUBLISHED
TEACHING
MATERIALS

[28] Brown, M. and Haynes, R.D. Student Solution’s Manual for *Numerical Analysis and Scientific Computation: Jeffrey Leader*, Addison–Wesley, ISBN-10: 0321257332 ISBN-13: 9780321257338

NON–REFEREED
PAPERS

Haynes, R.D. and Promislow, K., 2002. Degenerate transport and phase change in a porous fuel cell electrode. (Technical Report)

Haynes, R.D., Charron, R. and Brunner, H., 1996. On the Collocation Solution of Ordinary Differential Equations with Blow–up Properties. (Technical Report)

RESEARCH
PRESENTATIONS

See next section for a list of student presentations

Invited Lectures

A Parallel Space-Time Approach for the Numerical Solution of Partial Differential Equations, CMS Winter Meeting, Montreal QC, December 9, 2012.

An Optimized Schwarz Method for the Generation of Equidistributed Grids, 21st International Conference on Domain Decomposition Methods, Inria, Rennes, France, June 29, 2012.

A RIDC-DD Space-Time Algorithm for Time Dependent Partial Differential Equations, 21st International Conference on Domain Decomposition Methods, Inria, Rennes, France, June 27, 2012.

Mesh Generation via Domain Decomposition Methods and a new space-time parallel approach for PDEs, December 7, 2011, Geneva, Switzerland.

Applications of Domain Decomposition Methods to Mesh Generation and Space-Time Parallelism for PDEs, Michigan State University, October 20, 2011.

Applications of Domain Decomposition Methods to Mesh Generation and Space-Time Parallelism for PDEs, University of Kansas, October 12, 2011.

Equidistributing Grids via Domain Decomposition, 20th International Conference on Domain Decomposition Methods, San Diego, CA, USA, February 7, 2011.

Special Session on Spectral Methods in the Analysis of Differential Equations, 2010 CMS Summer Meeting, University of New Brunswick, June 4-6 2010. (Unable to attend)

Moving Meshes, Domain Decomposition and other initiatives, Department of Mathematics and Statistics, Memorial University of Newfoundland, Dynamical Systems Seminar, December 4, 2009.

Recent Advances in Schwarz Waveform Moving Mesh Methods, 19th International Conference on Domain Decomposition Methods, Zhangjiajie, China, August 17, 2009.

Adaptive Space-Time Methods for Differential Equations, CAIMS 2009, London, Ontario, June 12, 2009.

Adaptive Space-Time Methods for Differential Equations, CMS/CSHPM 2009, St. John's, NL, June 7, 2009.

Multirate Moving Mesh Methods, Computational Science and Engineering Seminar Series, McGill University, February 8th, 2008.

Schwarz Waveform Moving Mesh Methods, Department of Mathematics and Statistics, Memorial University of Newfoundland, January 18th, 2008.

Schwarz Waveform Moving Mesh Methods, Department of Earth Sciences, Memorial University of Newfoundland, August 14, 2007.

Schwarz Waveform Moving Mesh Methods, Computational PDE Symposium, CAIMS*SCMAI 2007, BANFF Centre, Alberta, May 21, 2007.

The Story of two Schwarz Waveform Moving Mesh Methods, AARMS Session on Mathematical Modeling and Simulation, APICS Mathematics and Computer Science Conference, Sydney, N.S., October 14, 2006

Towards a 2D/3D Schwarz Waveform Moving Mesh Solver, 17th International Conference on Domain Decomposition Methods, St. Wolfgang/Strobl, Austria, July 3-7, 2006.

Towards a Schwarz Waveform Moving Mesh Method, Bluenose Numerical Analysis Day, St. Francis Xavier University, Antigonish, Nova Scotia, June 23, 2006.

Perturbed M -matrices and the Persistence of Positivity, Department of Mathematics and Statistics, Dalhousie University, May 26, 2006.

Persistently Positive Inverses of Diagonally Perturbed M -matrices, Department of Mathematics and Statistics, Memorial University of Newfoundland, February 24, 2006.

New Solution Strategies for Moving Mesh Partial Differential Equation Methods., Bluenose Numerical Analysis Day, Acadia University, May 28, 2004.

McGill Computational Science and Engineering Seminar Series, April 8, 2004.

Applied Mathematics Colloquium, University of Western Ontario, March 16, 2004.

Mathematics and Statistics Seminar, Wilfred Laurier University, February 12, 2004.

Applied Mathematics Seminar, University of Waterloo, October 2003.

Scicom Colloquium, School of Computer Science, University of Waterloo, May 2002.

Contributed Talks

Thomas Humphries, Ronald Haynes and Lesley James. Simultaneous and Sequential Approaches to Optimizing Well Placement and Control. 2013 Optimization Days/OPDE, Montreal, Quebec, Canada. May 6-8, 2013.

Computing Matrix Inverses — another look, Computational and Applied Mathematics Seminar, Memorial University of Newfoundland, March 21, 2012.

Domain Decomposition approaches for grid generation via the Equidistribution Principle, The 2011 Bluenose Computational and Applied Math Day, Saint Mary's University, Halifax, Nova Scotia, June 17, 2011.

Reflections on Negativity, Positivity and other Moods- a Matrix Theoretic Approach, Department of Mathematics and Statistics Seminar, Acadia University, Wolfville, Nova, November 21, 2008.

Inverse Positivity of Perturbed Tridiagonal M -Matrices, Bluenose Numerical Analysis Day, June 13, 2008, Dalhousie University, Halifax, Nova Scotia.

Jacobi-Based Moving Mesh Methods, AARMS/ACE-NET/MITACS HPC Workshop, Acadia University, July 14, 2007.

Persistently Positive Inverses of Diagonally Perturbed M -matrices, Department of Mathematics and Statistics, Acadia University, March 24, 2006.

Persistently Positive Inverses of Diagonally Perturbed M -matrices, Canadian Mathematics Society Winter Meeting, Victoria B.C., December 12, 2005.

An Introduction to \LaTeX . Graduate Student Seminar, Acadia University, October 28, 2004.

Front Dynamics in PEM Fuel Cells., Industrial Mathematics Symposia, Canadian Mathematics Society Winter Meeting, 2001.

Numerical Analysis of a Toy Model of Phase Change. PIMS Computational Fuel Cell Dynamics Workshop, 2001.

Preconditioning spectral methods for first-order equations. Copper Mountain Conference on Iterative Methods, 2000.

Invariant Manifolds: Theory and Computation. Canadian Mathematics Society Summer Meeting, 1999.

On the Computation of Blow-up Solutions of Differential Equations. Canadian Undergraduate Mathematics Conference, 1996.

Dynamics of a Discrete Quintic Map. Canadian Undergraduate Mathematics Conference, 1995.

Latent Chaos: The complicated Behaviour of a Quintic Map. Atlantic Provinces Council of the Sciences Mathematics Conference, 1994.

STUDENT
PRESENTATIONS

Nathan King, Error control algorithms used for initial value problems with blow-up solutions, October 2, 2012.

Andrew Butler, Efficient Optimization Techniques for Performance Maximization of a Gaussian Process Model, October 2, 2012.

Amanda Swan, Modeling Power Output for Tidal Turbines, Bluenose Computational and Applied Mathematics Day, June 17, 2011.

Alexander Howse, Classical Schwarz Domain Decomposition with Non-Separated Boundary Conditions, Bluenose Computational and Applied Mathematics Day, June 17, 2011.

Amber Corkum and Amanda Swan, Optimization of Tidal Turbine Power, Poster Presentation, CAIMS 2010, St. John's, NL.

Amber Corkum and Amanda Swan, Optimization of Tidal Turbine Power, Poster Presentation, Nova Scotial Energy Research and Development Forum 2010.

Amber Corkum, Optimization Strategies for Tidal Turbine Power, APICS, Dalhousie University, October 2009.

Amanda Swan, Optimizing Power Potential in the Bay of Fundy, APICS, Dalhousie University, October 2009.

Justine McMillan & Megan Lickley, Modelling the World's Highest Tides, Bluenose Numerical Analysis Day, Saint Mary's University, July 27, 2007.

Shannon Kennedy, Finding bounds on Perturbations of an M -matrix to Maintain Inverse Positivity, Canadian Undergraduate Mathematics Conference, Simon Fraser University, July 19, 2007.

Shannon Kennedy, Perturbations of M -matrices, APICS Mathematics and Computer Science Conference, Sydney, N.S., October 14, 2006

Braden Dulong, Efficient Numerical Methods for the Simulation of Transmission Electron Microscope Images, APICS Mathematics and Computer Science Conference, Sydney, N.S., October 14, 2006

Colin Turner, A Numerical and Theoretical Study of Blow-up for a System of Ordinary Differential Equations using the Sundman Transformation, Bluenose Numerical Analysis Day, St. Francis Xavier University, Antigonish, Nova Scotia, June 23, 2006.

Shannon Kennedy, Finding Numerical Evidence for the Bound on a Perturbation of an M -Matrix, Bluenose Numerical Analysis Day, St. Francis Xavier University, Antigonish, Nova Scotia, June 23, 2006.

Colin Turner, A Numerical Investigation of Blowup of Solutions to the Maxwell-Debye System, 29th Annual APICS Mathematics, Statistics and Computer Science Meeting, October 22, 2005.

OTHER ACADEMIC SERVICE

- Organizing Committee, AARMS Summer School, 2011, Memorial University of Newfoundland
- CFI Grant Reviewer, 2010.
- NSERC Discovery Grant Reviewer, 2009

JOURNAL REFEREE DUTIES

- *Transactions on Mathematics Software*, Association for Computing Machinery (2)
- *Mathematics of Computation*, American Mathematics Society (1)
- *Applied Mathematics Letters*, Elsevier Publishing (1)
- *SIAM Journal of Scientific Computing*, SIAM (5)
- *SIAM Journal of Matrix Analysis and Applications*, SIAM (1)
- *SIAM Journal of Numerical Analysis*, SIAM (1)
- *Atlantic Electronic Journal of Mathematics* (1)
- *Numerical Mathematics: Theory, Methods, and Applications* (1)
- *Applied Mathematics and Computation* (1)
- *Linear Algebra and its Applications* (1)
- *Numerical Algorithms* (1)
- *Springer Lecture Notes Computational Science and Engineering* (1)
- *Computing* (1)
- *IMA Journal of Numerical Analysis* (1)
- *Electronic Transactions on Numerical Analysis* (3)

CONFERENCE & WORKSHOP ORGANIZATION

- *First Canadian Symposium in Numerical Analysis and Scientific Computing (CSNASC)*, CAIMS 2013, June 16-20, 2013 – co-organizer (with J. Urquiza, R. Spiteri, R. Russell).
- *Spatial Error Estimation and Grid Refinement Techniques for the Numerical Solution of PDEs*, Minisymposium Organizer, Scicade 2011, Toronto, On, July 11–15.
- *The Eleventh Annual Bluenose Numerical Analysis Day*, Saint Mary's University, Halifax, Nova Scotia, June 17, 2011 (with P. Muir (SMU))
- 2011 AARMS Summer School Organizing Committee
- CAIMS-SCMAI 2010 Scientific Program Committee, St. John's, NL
- *Scientific Computing and Numerical Analysis*, Invited Minisymposium Organizer, CAIMS-SCMAI 2010, St. John's, NL

- *Parallelizing your Differential Equation Solver*, Contributed Session Organizer, CAIMS-SCMAI 2010, St. John's, NL
- APICS 2009 Special Session and Scientific Computing and Applied Mathematics, APICS, Dalhousie University, Halifax NS, October 24, 2009.
- *The Tenth Annual Bluenose Numerical Analysis Day*, Acadia University, Wolfville, Nova Scotia, July 10, 2009 (with R. Karsten (Acadia), P. Keast (DAL), P. Muir (SMU))
- *The Ninth Annual Bluenose Numerical Analysis Day*, Acadia University, Wolfville, Nova Scotia, June 13, 2008 (with R. Karsten (Acadia), P. Keast (DAL), P. Muir (SMU))
- *The Eight Annual Bluenose Numerical Analysis Day*, Acadia University, Wolfville, Nova Scotia, July 27, 2007 (with R. Karsten (Acadia), P. Keast (DAL), P. Muir (SMU))
- *AARMS-ACENET HPC Workshop and Conference*, July 9-14, 2007, (with H. Chipman & R. Karsten, Acadia)
- *APICS-AARMS Workshop on Mathematical Modelling and Simulation*, Sydney, Nova Scotia, October 13-15 2006 (with G. Chen, UCB)
- *The Seventh Annual Bluenose Numerical Analysis Day*, St. Francis Xavier University, Nova Scotia, June 23, 2006 (with P. Keast (DAL), P. Muir (SMU))
- *The Sixth Annual Bluenose Numerical Analysis Day*, Cape Breton University, Sydney, Nova Scotia, June 10, 2005 (with P. Keast (DAL), P. Muir (SMU))

PROFESSIONAL
MEMBERSHIPS

- Canadian Applied and Industrial Mathematics Society (CAIMS), since 2000
- Society for Industrial and Applied Mathematics (SIAM), since 2004

SERVICE

NATIONAL

Canadian Applied and Industrial Math Society Board of Directors

- Member-at-large, 2013-2016

Canadian Mathematics Society Board of Directors

- Director Atlantic, 2011-present

The Atlantic Computational Excellence Network (ACEnet)

- Member of the ACEnet Research Directorate, 2012-present

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

University Committees

- Dean of Science Review Committee, 2013.
- Senate Committee on Educational Technology, September 1, 2012-August 31, 2015.
- University Senate Committee on Academic Appeals, September 2010-2011.
- Board of Study for the MSc in Computational Science Interdisciplinary Program, October 2009 - present.

Department Service

- Graduate Studies Committee, 2013-2015.
- Blundon Seminar Co-organizer, 2013.
- Blundon Competition, Co-designer, 2013.

- Canadian Open Mathematics Challenge Newfoundland and Labrador Marking Co-ordinator, 2012.
- Webpage Committee, 2012–2014.
- Department Strategic Planning Committee, 2012.
- Blundon Competition, Co–designer, 2012.
- Hiring Committee, Statistics , Fall 2011.
- Annual Blundon Seminar Committee, Problems Session Co–ordinator, 2011.
- Hiring Committee, 3 Year Contractual Position, Fall 2010.
- Hiring Committee, 2 Statistics Positions, Fall 2010.
- Chair, PhD Intermediate Review Examination for Mariathas Hubert, September 3, 2010
- Chair, PhD Intermediate Review Examination for Vineetha Warriyar, September 2, 2010
- Invited Speaker, *Root–finding, Optimization, and other (numerical) Pursuits*, Department of Mathematics and Statistics Annual Blundon Seminar, May 20, 2010
- Undergraduate Studies Committee, 2010–2012
- Computing Committee, 2010–2012
- High School Competitions Committee, 2010–2011

Other University Service

- Workshop, *An introduction to Matlab, Population Dynamics and Root–Finding*, Shad Valley, St. John’s, NL, July 5, 2011.
- High School Interviewing Program Volunteer, Torbay, Spring 2010.

ACADIA UNIVERSITY

University Committees

- NSERC USRA Adjudication Committee, 2009
- NSERC PGS/CGS Adjudication Committee, 2008
- AUFA University Appointments Committee, 2008-2009
- Acadia Centre for Mathematical Modelling and Computation Board of Directors, 2007-2010
- Faculty Working Group for Student Recruitment, 2007–2009
- Faculty of Pure and Applied Sciences Student Recruitment Committee, 2007–2009
- Senate Graduate Studies Committee, 2007–2009
 - Special working group to investigate part–time graduate studies, 2008–2009
- Faculty of Pure and Applied Science Nominating Committee, 2006–2009
 - Chair 2008–2009
- Acadia Advantage Software Stream Committee, 2007–2008
- Senate Curriculum Committee, 2006–2007
- Research Funds Allocation Committee, 2005–2007

Department Service

- Acting Head, Department of Mathematics and Statistics, April 25 - May 1, 2009
- **Graduate Program Coordinator**, Department of Mathematics & Statistics, 2007–2009
- Coordinator and Editor, Department of Mathematics and Statistics Recruiting Newsletter, 2007–2009

- Calculus Co-ordinator, 2006–2007
- Computer, Co-op, Problem Solving Committees, & Student Society Liaison Committee 2006–2007
- Computer, Co-op, Recruiting, & Problem Solving Committees 2004–2006

OTHER ACTIVITIES

- Facilitator, 2012 COMC Marking Team, Newfoundland and Labrador, 2012.
- Coordinator, *2nd Annual Acadia Undergraduate Mathematics Competition* (with F. Mendivil), 2009.
- Acadia University Residence Faculty Mentor, Eaton House, 2008–09.
- Developer and Coordinator, *1st Annual Acadia Undergraduate Mathematics Competition* (with F. Mendivil), 2008.
- Marker, *2007 Maritime Mathematics Competition*,
- Presenter, *Annapolis Valley High School Math League Session*, February 2007.
- Marker, *2006 Maritime Mathematics Competition*,
- Problem Contributor, *2005 Maritime Mathematics Competition*,
- BC Advanced Systems Institute (ASI) Graduate Advisory Committee member, 1999–2001.
- Mentor, *IAM-CSC-PIMS Senior Undergraduate Math Modeling Workshop*, February 17–18, 2001 SFU/UBC.
- Invited Speaker, *Solving Polynomial Equations*, International Mathematical Olympiad Candidate Camp, Simon Fraser University, 2001.
- Co-organizer of the 1999 CMS summer meeting graduate session, St. John's, NL.
- Treasurer of Mathematics Graduate Society, Simon Fraser University, 1998–2000.