
Dr. Ronald D. Haynes (PhD)
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## Summary


Professor of Applied and Computational Mathematics in the Department of Mathematics and Statistics at Memorial University of Newfoundland. Award winning instructor of undergraduate and graduate mathematics. Approximately $5 million in research funding in parallel, adaptive, numerical methods for PDEs and large scale optimization and data analytics. Chair of the Scientific Computing Graduate Programs at Memorial, President-elect of the Canadian Applied and Industrial Mathematics Society, and previously the (acting) Associate Dean of the School of Graduate Studies. A proven track record of industrially supported projects.


## Education

**Simon Fraser University** *1998-2003*

PhD in Applied and Computational Mathematics
• The numerical solution of differential equations : grid selection for boundary value problems and adaptive time integration strategies

MSc in Applied and Computational Mathematics

**Memorial University of Newfoundland** *1992-1996*

BSc (Hons) in Applied Mathematics

## Academic Positions

**Memorial University** *2009-present*

(Acting) Associate Dean of Graduate Studies 2023

Professor 2015-present, Associate Professor 2009-2015

**Dalhousie University** *2006-2023*

Adjunct Professor

**Saint Mary's University** *2008-2018*

Adjunct Professor

**Acadia University** *2004-2009*

Adjunct Professor 2009-2014, Tenured 2009, Associate Professor 2008-2009, Assistant Professor 2004-2008

**University of Waterloo** *2003-2004*

NSERC Postdoctoral Research Fellow, School of Computer Science and Department of Applied Mathematics

## Awards

- Dean of Science Distinguished Teaching Award, Memorial University, 2019
- Memorial University President's Award for Outstanding Research, 2018
- Memorial University Student's Union Excellence in Teaching Award, 2016
- NVIDIA, Professor Partnership Program, 2011
- Natural Science and Engineering Research Council Post Graduate Scholarship (PhD) 1998
- Natural Science and Engineering Research Council Post Graduate Scholarship (MSc) 1996
- University Mathematics Medal, convocation award (B.Sc.), Memorial University, 1996
- Governor General of Canada Silver Medal (B.Sc.), Memorial University of Newfoundland, 1996

## 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: approximately $5M

- Mitacs Business Strategy Internship Program, 2023-2024, $30,000. Optimization of Mooring Strategies with Canadian Global Maritime Ltd.
- NSERC Discovery Grant, 2023-2028, $46,000 per year, total $230,000. Adaptive and parallel methods for PDEs on general surfaces.
- AARMS CRG, *Mathematical foundations and applications of Scientific Machine Learning*, $50,000, 2021
- AARMS CRG, *Numerical Solution of Geophysical Inverse Problems*, $37,500, 2021
- NL Offshore Oil and Gas Industry Recovery Assistance (OGIRA) Fund, total $1,863,329, 2020. Drilling: A Data Analytics Approach to Energy and Safety Improvements
- NSERC Discovery Grant, 2018-2023, $41,000 per year, total $205,000. Analysis and Implementation of Parallel Solvers for PDE Based Mesh Generation and Coupled Systems
- Mitacs Elevate PostDoctoral Funding, 2018-2020, $100,000 (with Igor Zakharov, C-Core)
- AARMS CRG in Numerical Analysis and Scientific Computing 2015–2017, $18,000 per year, total $36,000
- AARMS DD Workshop $28,000 total from NSF, NSERC Atlantic, AARMS, Fields
- AARMS Adaptivity Workshop $19,000 total from NSF, CRM, MUN, AARMS
- 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
- CFI–LOF/RDC Leverage, GPU–based HPC for Geophysical Applications, 2012, $158,992.50
- NVIDA Professor Partnership Program, 2011, $1500
- ACOA Atlantic Innovation Fund, J.P. Whitehead, C. Hurich, C. Farquharson, R. Haynes, $867,500
- IRIF/RDC Research Grant, 2010–2012, Optimization problems in the development of energy technologies, total $100,000
- NSERC Discovery Grant, 2008–2013, Implementation and Analysis of Adaptive Algorithms for the Numerical Solution of Partial Differential Equations, $15,000 per year, total $75000
- Acadia University Research Fund (Article 25.55), 2007-2008 $2000
- NSERC Research Tools and Instruments (Equipment) Grant, 2007 $50,638 (co–applicant)
- MITACS Networking Proposal 2007 $5,000 (co–applicant)
- NSERC Discovery Grant 2005–2007 $13,000 per year, total $39000
- Acadia University Research Fund (Article 25.55) 2004–2005 $2500
- Acadia University Research Startup Award 2004–2005 $15000

## Publications

71 Published, 6 Under Revision or Submitted

Published

[H1] 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.

[H2] Haynes, R.D., Kennedy, S.C. and Trummer, M.R., Persistently Positive Inverses of Perturbed M–Matrices, Linear Algebra and Applications, Vol. 422, Issue 2-3, Pages 742-754, 2007.

[H3] 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.

[H4] 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.

[H5] Haynes, R.D., Huang, W., and Russell, R.D. A Moving Mesh Method for Time–dependent Problems based on Schwarz Waveform Relaxation, Domain Decomposition Methods in Science and Engineering XVII, Lecture Notes in Computational Science and Engineering (LNCSE), Springer–Verlag, Vol. 60, pp. 229–236, 2008.

[H6] 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.

[H7] 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.

[H8] 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.

[H9] 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.

[H10] Haynes, R.D., Recent Advances in Schwarz Waveform Moving Mesh Methods, Domain Decomposition Methods in Science and Engineering XIX, Lecture Notes in Computational Science and Engineering (LNCSE), Vol. 78, Springer–Verlag, pp. 253–260, 2010.

[H11] Ranjan, P., Haynes, R.D. and Karsten, R., A Computationally Stable Approach to Gaussian Process Interpolation of Deterministic Computer Simulation Data, Technometrics, Vol. 53, No. 4, pages 366—378.

[H12] Haynes, R.D., Huang, J., and Haung, T-Z., Monotonicity of Perturbed Tridiagonal M-matrices, SIAM Journal of Matrix Analysis and Applications, Vol. 33, Issue 2, pp. 681-700, 2012.

[H13] Gander, M.J., Haynes, R.D. Domain Decomposition approaches for mesh generation via the Equidistribution Principle, SIAM Journal of Numerical Analysis, Vol. 50, Issue 4, pp. 2111-2135, 2012.

[H14] 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.

[H15] 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.

[H16] 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, Vol. 6, No. 2, pp. 364–383, May 2013.

[H17] Gander, M.J., Haynes, R.D. and Howse, A.M., Alternating and Linearized Alternating Schwarz Methods for Equidistributing Grids, Domain Decomposition Methods in Science and Engineering XX, Lecture Notes in Computational Science and Engineering, pp. 395-402, Vol. 91, 2013.

[H18] Haynes, R.D. and Ong, B., MPI-OpenMP algorithms for the parallel space-time solution of time dependent PDEs, Domain Decomposition Methods in Science and Engineering XXI, Lecture Notes

in Computational Sciences and Engineering, pp. 179–188, Vol. 98, 2014.

[H19] Haynes, R.D. and Howse, A.J.M, Generating Equidistributed Meshes in 2D via Domain Decomposition, Domain Decomposition Methods in Science and Engineering XXI, Lecture Notes in Computational Science and Engineering, pp. 167–178, Vol. 98, 2014.

[H20] Humphries, T.D., Haynes, R.D., and James, L.A., Simultaneous and sequential approaches to joint optimization of well placement and control, Computational Geosciences, Volume 18, number=3-4, pp. 433–448, 2014. DOI:10.1007/s10596-013-9375-x

[H21] Butler, A., Humphries, T.D., Ranjan, P. and Haynes, R.D., Efficient Optimization of the Likelihood Function in Gaussian Process Modelling, Computational Statistics and Data Analysis, Vol. 73, pp. 40–52, 2014.

[H22] Haynes, R.D. and Howse, A.J.M, Alternating Schwarz Methods for partial differential equation-based mesh generation, Int. J. Comput. Math., Vol. 92, Issue 2, pp. 349-376, 2015

[H23] Bihlo A., Haynes R.D., A Stochastic Domain Decomposition Method for Time Dependent Mesh Generation. In: Dickopf T., Gander M., Halpern L., Krause R., Pavarino L. (eds) Domain Decomposition Methods in Science and Engineering XXII. Lecture Notes in Computational Science and Engineering, Vol. 104, Springer, Cham, 2016.

[H24] Bihlo, A., and Haynes, R.D., Parallel Stochastic Methods for PDE grid generation, Computers and Mathematics with Applications, Vol. 68, Issue 8, pages 804–820, October 2014.

[H25] Belliveau, P., Farquharson, C., and Haynes, R.D., ArjunAir: Updating and parallelizing an existing time domain electromagnetic inversion program. SEG Technical Program Expanded Abstracts 2014: pp. 875-880, 2014. doi: 10.1190/segam2014-1433.1

[H26] Belliveau, P., Farquharson, C., and Haynes, R.D., ArjunAir: Updating and parallelizing an existing time domain electromagnetic inversion program. Society of Exploration Geophysicists International Exposition and 84th Annual Meeting Seg 2014 , 2014, pp. 2915–2919

[H27] Haynes, R.D. and Humprhies, T.D., Joint optimization of well placement and control for nonconventional well types, submitted July 2014, accepted December 2014, Journal of Petroleum Science and Engineering, Vol. 126, pp. 242-253, 2015.

[H28] Carosio, G., Humphries, T.D., Haynes, R.D. and Farquharson, C. A Closer Look At Differential Evolution For The Optimal Well Placement Problem. In Proceedings of the 2015 on Genetic and Evolutionary Computation Conference (GECCO '15), Sara Silva (Ed.). ACM, New York, NY, USA, 1191-1198, 2015.

[H29] Bihlo, A., Haynes, R.D. and Walsh, Emily J., Stochastic domain decomposition for time dependent adaptive mesh generation, J. Math. Study, Vol. 48, No. 2, pp. 106–124, 2015.

[H30] Haynes, Ronald D. and Huang, Weizhang, Preface Adaptive Moving Mesh Methods, J. Math. Study, Vol. 48, No. 2, pp. i–iii, 2015.

[H31] Haynes, R.D. and Kwok, F., Discrete analysis of Domain Decomposition Algorithms for Grid Generation via the Equidistribution Principle, MATHEMATICS OF COMPUTATION, Vol. 86, No. 303, pp. 233–-273, Janary 2017.

[H32] Haynes, R.D., Ladd, K., and Ong, B. W., Algorithm 965: RIDC Methods: A Family of Parallel Time Integrators, ACM Transactions on Mathematical Software (TOMS), Vol. 43 Issue 1, August 2016. doi:10.1145/2964377

[H33] Wang, X., Feng, Q., and Haynes, R.D., Optimization of Well Placement and Production for Large-scale Mature Oil Fields, Journal of Engineering Science and Technology Review, 8(5):134-140, December 2015

[H34] Haynes, R.D. and Wang, X., A Multilevel Coordinate Search Algorithm for Well Placement, Control and Joint Optimization, Computers & Chemical Engineering, Vol. 95, pp. 75-96, 5 December 2016, http://dx.doi.org/10.1016/j.compchemeng.2016.09.006

[H35] Bihlo, A., Haynes, R.D., Farquharson, C., Loredo-Osti, J.C., Probabilistic Domain Decomposition for the Solution of the Two-Dimensional Magnetotelluric Problem, Comput. Geosciences, Vol. 21,

Issue 1, pp. 117–129, 2017.

[H36] Hillier, S.H, Reid, G.D., Haynes, R.D., Robertson, Z., Robertson, M.D. On the Role of the Second-Order Derivative Term in the Calculation of Convergent Beam Electron Diffraction Patterns, Ultramicroscopy, Vol. 179, pp. 73-80, 2017.

[H37] Haynes, R.D., Domain decomposition approaches for PDE based mesh generation. Domain Decomposition Methods in Science and Engineering XXIV, Springer LNCSE, vol. 125, pp. 73–86, 2018.

[H38] Mohagheghian, E., Haynes, R.D., and James,L. Optimization of Hydrocarbon Water Alternating Gas (WAG) in the Norne Field: Application of Evolutionary Algorithms, Fuel, January 2018, Volume 223, 1 July 2018, Pages 86-98

[H39] Ahmed, F. and Haynes, R.D., Linearized Domain Decomposition Approaches for Nonlinear Boundary Value Problems with a Nonlinear Dependence on the Derivative of the Solution, Journal of Computational and Applied Mathematics, vol. 346, pp. 620–637, Jan 2019

[H40] Esraa A. Makled, Animesh Yadav, Octavia A. Dobre and Ronald D. Haynes, Hierarchical Full-Duplex Underwater Acoustic Network: A NOMA Approach, (Extended Abstract) OCEANS 2018 MTS/IEEE Charleston, October 22-27, 2018, Charleston, SC, USA, 8604904

[H41] DiPietro, K., Haynes, Ronald D., Huang, Weizhang, Lindsay, Alan, and Yu, Yufei, Moving Mesh simulation of contact sets in two dimensional models of elastic-electrostatic deflection problems, Journal of Computational Physics, vol. 375, December 15, 2018, pp. 763–782

[H42] Wang, X., and Haynes, R.D., Well Control Optimization using Derivative-Free Algorithms and a Multiscale Approach, Computers and Chemical Engineering, vol. 123, pp. 12–33, 6 April 2019

[H43] May, I., Haynes, R.D., and Ruuth, Steven J. Domain Decomposition for the Closest Point Method, Domain Decomposition Methods in Science and Engineering XXV, LNCSE vol. 138, pp. 458–465, 2020.

[H44] Donzelli, F., Gander, M.J., and Haynes, R.D. A Schwarz Method for the Magnetotelluric Approximation of Maxwell's equations, Domain Decomposition Methods in Science and Engineering XXV, LNCSE vol. 138, pp. 417–424, 2020.

[H45] Haynes, R.D. and Mohammad, K. Fully Discrete Schwarz Waveform Relaxation on Two Bounded Overlapping Subdomains, Domain Decomposition Methods in Science and Engineering XXV, LNCSE vol. 138, pp. 159–166, 2020.

[H46] A.R. Dehghani-Sanija, S. MacLachlan, G.F. Naterer, Y.S. Muzychka, R.D. Haynes, V. Enjilela, Multistage Cooling and Freezing of a Saline Spherical Water Droplet, International Journal of Thermal Sciences, Vol. 147, pp. 106095, 2020.

[H47] Tang, H.S., Haynes, R.D., and Houzeaux, G. A Review of Domain Decomposition Methods for Simulation of Fluid Flows: Concepts, Algorithms, and Applications, Archives of Computational Methods in Engineering (ARCO), Vol. 28, pp. 841–873, 2020.

[H48] Jahandari, H., MacLachlan, S., Haynes, R.D., and Madden, N. Finite element modelling of geophysical electromagnetic data with goal-oriented hr-adaptivity. Computational Geosciences, 24, pp. 1257–1283, 2020.

[H49] May, I., Haynes, R.D. and Ruuth, S. Schwarz solvers and preconditioners for the closest point method, SIAM Journal on Scientific Computing, 2020, 42(6), pp. A3584-A3609

[H50] Well placement optimization based on pressure gradient distribution; Applicable to CO2 sequestration,Derijani, H. ,Haynes, R.D. ,James, L.A. 1st Geoscience and Engineering in Energy Transition Conference Get 2020, 2020, 202021034

[H51] Cai, X.-C. ,Halpern, L. ,Haynes, R.D. , Maclachlan, S. ,Widlund, O. Preface, Lecture Notes in Computational Science and Engineering, 2020, 138, pp. v-ix

[H52] Prasad, S., Zakharov, I., Haynes, R.D. and Puestow, T. Estimation of sea ice parameters using an assimilated sea ice model with a variable drag formulation. Ocean Modeling, vol. 158, February 2021, pp. 101739

[H53] Haynes, Ronald D., Huang, Weizhang, Sulman, Hohammed, Domain Decomposition Parabolic Monge-Ampeŕe Approach for Fast Generation of Adaptive Moving Meshes, Computers and Mathematics with Applications, Vol. 84, February 15, 2021, pp. 97–111

[H54] Derijani, H., James, L.A., and Haynes, Ronald D. Evaluation of interFoam solver in the prediction of immiscible two phase flow in imbibition and drainage on the pore-doublet system. The 34th International Symposium of the Society of Core Analysts, SCA 2021, (1-8) Conference Date: 2021/9

[H55] Evaluation of the interFoam solver in the prediction of immiscible two-phase flow in imbibition and drainage on the pore-doublet system, Derijani, H., James, L.A., Haynes, R.D. E3s Web of Conferences, 2023, 366, 01017

[H56] Kowsari, M., James, L.A., Haynes, R.D. The Effect of Relative Permeability Hysteresis on the Design of an Optimal Water-Alternating-Gas (WAG) Process, February 2022, SPE Res Eval & Eng 25 (01): 125-145. Paper Number: SPE-208583-PA https://doi.org/10.2118/208583-PA

[H57] Haynes, R.D., Ruuth, S., and Yazdani, A. A Convergence Analysis of the Parallel Schwarz Solution of the Continuous Closest Point Method, July 2022, In: Domain Decomposition Methods in Science and Engineering XXVI. DD 2020. Lecture Notes in Computational Science and Engineering, Springer, Cham.

[H58]. Haynes, R.D., Mohammad, K. A multirate accelerated Schwarz Waveform Relaxation Method, July 2022, In: Domain Decomposition Methods in Science and Engineering XXVI. DD 2020. Lecture Notes in Computational Science and Engineering, Springer, Cham. PDF

[H59]. May, Ian, Haynes, R.D., and Ruuth, S. A closest point method library for PDEs on surfaces with parallel domain decomposition solvers and preconditioners. Numerical Algorithms, Volume 93, pages 615-637, 2023.

[H60]. Automatic Classification of PDC Cutter Damage Using a Single Deep Learning Neural Network Model, A Ali, H Singh, D Kelly, D Hender, A Clarke, MM Ghiasi, R Haynes, L. James SPE/IADC International Drilling Conference and Exhibition, Paper Number: SPE-212503-MS, 2023

[H61]. Haynes, R.D. and Mohammad, Khaled. Fully Discrete Schwarz Waveform Relaxation Analysis for the Heat Equation on a Finite Spatial Domain. ESAIM: M2AN, Volume 57, Number 4, July-August 2023, Pages 2397-2426

[H62]. Haynes, R.D., Sarker, Abu, and Robertson, Michael. Moving Mesh Simulations of Pitting Corrosion, CAIMS MSI, AIMS Mathematics, 2024, 9(12): 35401-35431.

[H63]. Erfan Mohagheghian, Donald G. Hender, Mohammed Mokhtar Ebeid Said, Mohammad Mojammel Huque, Alan Clarke, Ronald D. Haynes and Lesley James, Data-driven prediction of drilling strength ahead of the bit, Geoenergy Science and Engineering, 2024, 243, 213318

[H64] Never Stop Thinking About Our Students: Reading with Hogan and Sathy's Inclusive Teaching, Transformative Dialogues: Teaching and Learning Journal, 2023.

[H65]. Yazdani, A., Haynes, R.D, and Ruuth, S. Optimized Schwarz Domain Decomposition Algorithms for the Closest Point Method on Closed Manifolds, Numerical Algorithms, p. 1-32, 2024.

[H66] Derijani, H., Haynes, R.D. James, L. Development of Integrated Material Balance and Simple Well Model for Reservoir Production Prediction, 85th EAGE Annual Confererence, 2024, 7, pp. 4674-4678

[H67] Utilizing Computer Vision and Unsupervised Data Clustering for Oil Drill Bit Blade Identification and Numbering Hasan, M.M.U., Abdulbaset, A., Shahidi, R., Haynes, R.D., James, L. 85th Eage Annual Conference and Exhibition 2024, 2024, 7, pp. 4639–4643

[H68]. Gander, M.J., Haynes, R.D., and Kwok, F. Corrigendum: Domain Decomposition Approaches for Mesh Generation via the equidistribution principle, SIAM J. Numer. Anal., Vol. 63, Iss. 1, 2025.

[H69]. Sarker, A., Haynes, R.D., and Robertson, M., A moving mesh method for pitting corrosion of heterogeneous materials, Computers & Mathematics with Applications Vol. 191, 1 August 2025, pp. 48-59

[H70]. Haynes, R.D., Schwarz methods for mixed-type problems, Accepted May 2025, Springer LNCSE, p. 1-8.

[H71] Shayanfar, H., Miranda A., Haynes, RD., and Doyle, K. Automation and optimization of mooring line designs, Proceedings of the ASME 2025 44th International Conference on Ocean, Offshore and Arctic Engineering OMAE2025 June 22-27, 2025, Vancouver, British Columbia, Canada OMAE2025-156359

### Submitted

[H72] Haynes et al. Optimization of Mooring Designs, Submitted January 2025.

[H73] Bihlo, A., Donzelli, F., Farquharson, C., Gander, M.J., Haynes, R.D., Non-Overlapping Optimized Schwarz Methods for Magnetotelluric Approximations of Maxwell's Equations, Submitted to ESAIM, 21 Feb 2024.

[H74] Derijani, H., Haynes, R.D., James, L. Reduced-Physics-Based Proxy Development Using Material Balance and Well Performance with Adjoint Method for Water Injection Optimization, ECMOR 2024.

[H75] A Computer Vision and Unsupervised Data Clustering Approach to Drill Bit Blade Identification and Numbering, IEEE Access, June 2025.

[H76] A positivity-preserving unigrid method for elliptic PDEs, Ronald D. Haynes; Scott MacLachlan; Dawei Wang,

[H77] Systematic Data Preparation for Machine Learning Model Development and Exploratory Data Analysis: A Case Study Using Offshore Newfoundland Drilling Data Corresponding Author: Dr. Mohammad Mojammel Huque Co-Authors: Mohammed Mokhtar Ebeid Said; Alan Clarke; Ronald D Haynes; Lesley Anne James Manuscript Number: JGSE-D-25-01320

### Published Teaching Materials

[H78] 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

### Other Contributions

[H79] Haynes, Ronald D., Book Review. "Numerical Linear Algebra. An Introduction", by Holger Wendland, Cambridge Texts in Applied Mathematics, 2017. CMS Notes, 2019.

## Supervision

### Post-Doctoral Fellows (8)

- Dr. Farhad Patel, 2025
- Dr. Hormoz Jahandari (with Scott MacLachlan Math & Stats), 2020
- Dr. Fabrizio Donzelli, 2019
- Dr. Siva Prasad (with Igor Zakharov, C-Core), 2018-2019
- Dr. Hormoz Jahandari (with Scott MacLachlan), 2017-2018
- Dr. Grazieli Carosio (with Colin Farquharson), 2014–2015
- Dr. Alexander Bihlo, 2014–2015
- Dr. Thomas Humphries, 2011–2013

### PhD Students (6)

- Hosein Derijani, (with Lesley James, Process Engineering, Memorial University), 2020–present, *WAG Optimization*
- Abu Sarker, 2017–2023, *Discrete Analysis of Domain Decomposition for Nonlinear Problems*

- Mohammad Kowsari (with Lesley James, Process Engineering, Memorial University), 2016–present (currently on leave), *Optimizing Water-Alternating-Gas Processes subject to uncertainty*
- Khaled Mohammad, 2010–present (currently on leave), *Title: Numerical Solution of Time Dependent PDEs using Moving Method of Lines and Multirate Approaches*
- Xiang Wang (with Qihong Feng, Chinese University of Petroleum Engineering) 2014–2016, *Title: Well Placement and Production Optimization for Water-flooding Oil Fields*
- Nathan King (Visiting PhD Student Simon Fraser University), 2015–2017 (with S. Ruuth SFU), *Withdrawn: currently employed with Rutter Technologies*

MSc Students (19)

- Lucas Bennett (with Scott MacLachlan), 2023-present
- Gerry Harris-Pink (with Scott MacLachlan), 2022-2024
  - 2nd place for best interdisciplinary poster at the Memorial University SEA conference 2023
- Emmeline Williams (with Alex Bihlo), 2022-2024
  - 1st place for best interdisciplinary poster at the Memorial University SEA conference 2023
- Miranda Boutilier, 2019–2021
- Alireza Yazdani (with Steve Ruuth, SFU), 2019–2021
- Dawei Wang (with Scott MacLachlan), 2017–2019, *Multigrid Solvers and Efficient Solvers for PDE based Mesh Generation*, Fellow of the School of Graduate Studies, Hillier Memorial Scholarship
- Ian May (with Steve Ruuth, SFU), 2017–2018, *Domain Decomposition Methods for the Closest Point Method for PDEs on Surfaces*
- Oleksandr Abramov (with Alex Biho), 2016–2018, *Atreya-Haritha Scholarship, Fellow of the School of Graduate Studies Analysis and Implementation of PDE based Mesh Generators*
- Bilal Uddin, 2016–2018, *A Parallel Moving Methods of Lines Approach*
- Benjamin Kary (with C. Farquharson, Earth Sciences, MUN), 2014–2017, *Investigating Schwarz Domain Decomposition Based Preconditioners for Efficient Geophysical Electromagnetic Field Simulation*
- Erfan Mohagheghian (with L. James, Engineering, MUN), 2014-2016, *An Application of Evolutionary Algorithms to WAG Optimisation in the Norne Field*
- Abu Naser Sarker, 2013–2015, *Optimized Schwarz Methods for PDE Based Mesh Generation*, Awarded the 2015–2016 Shaun Hillier Thesis Scholarship
- Faysol Ahmed, 2013–2015, *Linearized Iterations for Parallel PDE Based Mesh Generation*
- Patrick Belliveau (with C. Farquharson, Earth Sciences, MUN), 2012-14, *Parallelization of the 2.5D Inversion Program ArjunAir*
- Siva Prasad, 2011–2013, *Towards a Tidal and Storm Surge Model for coastal Newfoundland and Labrador*
- Alexander Howse, 2011–2013, *Domain Decomposition Algorithms for Mesh Generation*, Awarded Fellow of the School of Graduate Studies, NSERC CGS Scholarship, Ontario Graduate Scholarship

- Shaun Hiller, 2011–2012, *Efficient Computation of Simulated Transmission Electron Microscope Images*, passed away during the degree program
- 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 Hierachical Clustering*

Visiting Graduate Student

- Natalia Galvan Camara (2022)

Honours and NSERC USRA students (25)

- Maggie McCarthy, BSc Hons, 2025
- Erik Knee, BSc Hons, 2025
- Erik Knee, BSc Hons, 2024
- Maggie McCarthy, BSc Hons, NSERC USRA, 2024
- Maggie McCarthy, NSERC USRA, 2023
- Gerry Harris-Pink, BSc Hons, 2021-2022
- Miranda Boutilier, BSc Hons, 2018-2019
- Riley Brooks NSERC USRA (with Scott MacLachlan), 2016
- Leah Genge, BSc Hons (with Alex Bihlo), *Parallel Stochastic Domain Decomposition*, 2016
- Devin Grant, BSc Hons, *Coarse corrections for $r$–refined meshes generated by domain decomposition*, 2014-2015
- Andrew Rose, BSc Hons, *Domain decomposition for implicitly smoothed meshes*, 2014-2015
- Brendan Cooke, BSc Hons, Fall 2013 (Discontinued)
- Nathan King, NSERC USRA, *Local and Global Error Control for Blowup problems*, 2012
- Andrew Butler, BSc Hons, *Efficient Optimization of the Likelihood Function in Gaussian Process Modelling*, 2012
- Alexander Howse, NSERC USRA, *Domain Decomposition Methods for Nonlinear Diffusion Equations and Mesh Equidistribution in 2D*, 2011
- Alexander Howse, NSERC USRA, *Domain Decomposition Methods for Differential and Integral Equations*, 2010
- Amber Corkum, NSERC USRA (with R. Karsten @Acadia), *The Ability of Particle Swarm Optimization to Optimally Place Tidal Turbines in the Bay of Fundy*, 2010
- Amanda Swan, NSERC USRA (with R. Karsten @Acadia), *A Model of Power Output for Tidal Turbines*, 2010
- Matthew Rideout, NSERC USRA, *An Update Strategy for Numerically Solving Boundary Value Problems*, 2008-09
- Megan Lickley, NSERC USRA (with R. Karsten @Acadia), *Determining the Potential for Tidal Power in the Bay of Fundy and Optimizing Turbine Placement*, 2008-09

- Shannon Kennedy, NSERC USRA, *Perturbing Tridiagonal $M$–matrices while Maintaining Inverse Non–Negativity*, 2007-08
- Dayang Wang, BSc Hons, *Parallel Programming with MPI*, 2006-07
- Braden Dulong, NSERC USRA (with M. Robertson Physics @Acadia), *Determining Efficient Numerical Methods for Transmission Electron Microscope Image Simulation*, 2006-07
- Colin Turner, NSERC USRA (with H. Teismann @Acadia), *An Investigation of Blow–up Times for the Maxwell–Debye System and like Equations*, 2005-06
- Yifan Yang, BSc Hons, *Energy Conserving Methods for Ordinary Differential Equations*, 2005-06

Research Assistants (12)

- Gerry Harris-Pink, 2022
- Maggie McCarthy, 2022
- Kathleen Burton (WISE), 2018
- Farhana Akter (SWASP), 2018-2019
- Kiera van der Sande (with Colin MacDonald, UBC), 2017-2018
- Leah Genge, 2016
- Ezekiel Robertson (with Michael Robertson, Acadia), 2015
- Amber Corkum, 2009–2010
- Amanda Swan, 2009–2010
- Donald Patterson, 2008–2009
- Justine MacMillan, 2008–2009
- Shannon Kennedy, 2006–2007

## Research Presentations

Invited Plenary Talks (2)

- PDE based mesh generation and domain decomposition methods, DD24 International Conference on Domain Decomposition Methods, Svalbard, Norway, February 6, 2017.
- Some domain decomposition results for PDE based mesh generation, Adaptivity Workshop, Bath, United Kingdom, June 14, 2016.

Invited Talks (50)

- Partitioning and phase changes,DD29, June 23, 2025, Milano
- Domain decomposition preconditioners, solvers and software for PDEs intrinsic to surfaces, Ronald D. Haynes, DD28, Kaust Saudi Arabia, January 2024
- Domain decomposition preconditioners, solvers and software for PDEs intrinsic to surfaces, CAIMS, June 2024, Kingston Ontario
- Parallel, PDE based (surface) mesh generation, Ronald D. Haynes, CAIMS 2023, June 14, 2023, Fredericton, NB, Canada

- DD approaches for surface PDEs solved by the closest point method, Ronald D. Haynes, ICIAM 2023, Aug 24, 2023, Tokyo, Japan
- Optimized Schwarz domain decomposition for surface intrinsic positive Helmholtz equations, Alireza Yazdani, Ronald D. Haynes, Steven Ruuth, ICIAM 2023, Aug 24, 2023, Tokyo, Japan
- A closest point method library for PDEs on surfaces with parallel domain decomposition solvers and preconditioners, Ian C.T. May, Ronald D. Haynes, Steven J. Ruuth, Scicade 2022, July 25 – 29, 2022 | Reykjavík, Iceland
- A fully discrete analysis of Schwarz Waveform relaxation for the heat equation, SIAM Central Meeting, October 2, 2021
- Parallel methods for PDE based mesh generation and other nonlinear problems, Department of Mathematics and Statistics, University of Kansas, November 28, 2018
- Parallel methods for PDE based mesh generation and other nonlinear problems, Department of Mathematics and Statistics, University of Geneva, November 13, 2018
- Parallel PDE based mesh generation, BIRS Adaptivity Workshop - May 27-31, 2018, Banff, Alberta, Canada
- Parallel methods for PDE based mesh generation and other nonlinear problems, Department of Mathematics and Statistics, Memorial University, October 18, 2018
- Linearized Parallel Solvers for Nonlinear BVPs and PDE based Mesh Generation, CAIMS 2016, Edmonton, Alberta, June 28, 2016.
- Parallel approaches for PDE based mesh generation, ICSCA, Toronto, Ontario, June 7, 2016.
- Some optimal and optimized Schwarz iterations for Nonlinear BVPs, CAIMS–AMMCS 2015, Waterloo, Ontario, June 10, 2015.
- An Accelerated Domain Decomposition method for Time Dependent Problems, SIAM CSE, Salt Lake City, Utah, March 14–18, 2015.
- An Overview of some DD methods for PDE based mesh generation, University of Geneva, February 17, 2015.
- Recent Developments in Parallel PDE based Mesh Generation, CAIMS 2014, Saskatoon, Saskatchewan, June 25, 2014.
- Optimized RIDC - DD methods for time dependent PDEs, DD22, Lugano, Switzerland, September 20, 2013.
- A probabilistic domain decomposition method for equidistributing meshes, DD22, Lugano, Switzerland, September 17, 2013.
- (Towards) a multicore adaptive space time method for PDEs, AMMCS 2013, Waterloo, Ontario, Canada, August 29, 2013.
- Parallel in space (and time) algorithms for PDEs, CAIMS 2013, Quebec, Quebec, June 16–20, 2013.
- 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, $21^{st}$ 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, $20^{th}$ International Conference on Domain Decomposition Methods, San Diego, CA, USA, February 7, 2011.
- Domain Decomposition for Time Dependent Problems, CAIMS (Canadian Applied and Industrial Mathematics Society) Conference 2010, St. John's, Newfoundland, July 18, 2010.
- 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, $19^{th}$ 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 Univeristy, 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, $17^{th}$ 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 (21)

- Ronald Haynes. Parallel methods for PDE based mesh generation, Department of Mathematics and Statistics, Memorial University, November 21, 2019
- Ronald Haynes. Parallel methods for PDE based mesh generation and other nonlinear problems, Department of Mathematics and Statistics, Memorial University, October 18, 2018
- Ronald Haynes. Parallel methods for PDE based mesh generation and other nonlinear problems, Department of Mathematics and Statistics, Dalhousie University, September 20, 2018
- Ronald Haynes. Parallel iterations for nonlinear boundary value problems, CAIMS Annual Meeting, Toronto, Canada, June 4, 2018.
- Ronald Haynes, Alex Bihlo, Leah Genge. Probabilistic domain decomposition for parallel mesh generation, February 7, 2017.
- 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 Talks

- Xiang Wang*, Ronald D. Haynes, Evaluating Multiscale Regularization Framework for Well Production Optimization, Poster, 11 December 2018, AGU Fall Meeting 2018
- Khaled Mohammad Ronald D. Haynes, Discrete Schwarz Waveform Relaxation Analysis of Rosenbrock Methods for the Heat equation, Invited Minisymposia Talk, DD25, St. John's, NL, 2018
- Hormoz Jahandari Scott MacLachlan Ronald D. Haynes, Combining h- and r-adaptivity for finite-element models with jumping coefficients, Invited Minisymposia Talk, DD25, St. John's, NL, July 2018
- Ian May*, Ronald D. Haynes, Steven Ruuth, Schwarz methods for the implicit closest point method, Contributed Talk, DD25, St. John's, NL, Canada 2018
- Fabrizio Donzelli*, Alexander Bihlo, Colin G. Farquharson, Martin J. Gander, Ronald D. Haynes, Convergence of classical and optimized Schwarz method for the 2-dimensional Maxwell's equations with discontinuous coefficients and generalizations, Contributed Talk, DD25, St. John's, NL, July 2018
- Fabrizio Donzelli Oleksandr Abramov Alexander Bihlo Ronald D. Haynes, 2D Winslow Mesh Generation: general theory and stochastic solution, Invited Minisymposia Talk, DD25, St. John's, NL, July 2018
- Oleksandr Abramov Alexander Bihlo Fabrizio Donzelli Ronald D. Haynes, Parallelization of variational mesh adaptation based on Winslow method, Invited Minisymposia Talk, DD25, St. John's, NL, July 2018
- Jahandari, Hormoz, Combining h- and r-adaptivity for finite-element models with jumping coefficients, BIRS Adaptivity Workshop, Banff, Alberta, May 31, 2018
- May, Ian, Domain decomposition and the implicit closest point method, PDEs on Surfaces, PIMS Workshop, Look, Lake, BC, June 13th, 2017
- King, Nathan, The closest point method, Applied and Computational Math Seminar, Memorial University of Newfoundland, Nov 6, 2016.

- Faysol Ahmed, Linearized Domain Decomposition Approaches for Boundary Value Problems, Thesis Presentation, August 26, 2015, Department of Scientific Computing, Memorial University of Newfoundland, St. John's, NL, Canada.
- G .L. C. Carosio, T. D. Humphries, R.D. Haynes and C.G. Farquharson. "A closer look at differential evolution for the optimal well placement problem." *Genetic and Evolutionary Computation Conference*, Madrid, Spain. July 2015. (Conference paper)
- K. Mohammad, A multirate accelerated Schwarz Waveform Relaxation Method, CAIMS–AMMCS, Waterloo, Ontario, June 9, 2015.
- Faysol Ahmed, Linearized Domain Decomposition Approaches for Mesh Generation Based on Equidistribution Principle, March 30, 2015, Student Research Forum, Department of Computational Science, Memorial University of Newfoundland, St. John's, NL, Canada.
- P. Belliveau, Parallelizing the Geophysical Inversion Program ArjunAir: A Hybrid Distributed/Shared Memory Approach, February 20, 2014.
- T. Humphries, Approaches for joint optimization of oil well placement and control. Applied Math and Computation Seminar, Oregon State University, January 2014.
- P. Belliveau, Parallelizing the 2.5D electromagnetic inversion program ArjunAir, November 22, 2013.
- T. Humphries. Simulation and Optimization. 2013 Blundon Seminar, Memorial University, May 2013.
- 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. (Presentation).
- King, Nathan, Local and global error control for initial value problems and blow-up problems. Mathematics Honours Thesis Seminar, Memorial University of Newfoundland. April 8, 2013.
- Prasad, Sivad, Towards a regional tidal and storm surge model for Newfoundland using the Regional Ocean Modelling System (ROMS), Research Day Presentation, February 18, 2013, Department of Mathematics and Statistics, Memorial University
- King, Nathan, Error control techniques for initial value problems with blow-up solutions. Summer undergraduate research forum. Memorial University of Newfoundland. October 2, 2012.
- Andrew Butler, Efficient Optimization Techniques for Performance Maximization of a Gaussian Process Model, October 2, 2012.
- T. Humphries, R. Haynes and L. James, Simultaneous optimization of well placement and control using a hybrid global-local strategy. *13th European Conference on the Mathematics of Oil Recovery*, Biarritz, France, September 2012. (Presentation/Conference Paper).
- T. Humphries, R. Haynes and L. James, Simultaneous optimization of well placement and control using a hybrid global-local strategy. *Canadian Applied and Industrial Mathematics Society Annual Meeting*, Toronto, Canada, June 2012.
- T. Humphries. Simultaneous optimization of well placement and control using a hybrid global-local strategy. Computational and Applied Mathematics Seminar, Memorial University, April 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.
- Howse, A.J.M., Applications of Domain Decomposition to the Mesh Equidistribution Problem, AMAT 419B Honours Presentation, Memorial University of Newfoundland, St. John's, Newfoundland, April 8, 2011.
- Howse, A.J.M., New Applications of Domain Decomposition Methods, Summer Undergraduate Research Forum 2010, Memorial University of Newfoundland, St. John's, Newfoundland, September 30, 2010.
- 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.

## Professional Memberships

- Canadian Applied and Industrial Mathematics Society (CAIMS), since 2000, Currently President-Elect 2023-2025
- Society for Industrial and Applied Mathematics (SIAM), since 2004

## International and National Academic Service

### National/International Committee Positions

- President of CAIMS, 2025-2027
- President-elect of CAIMS, 2023-2025
- Parallel-in-time Methods International Steering Committee, Member, 2015–2018
- Chair, Organizing Committee, 25th International Conference on Domain Decomposition Methods, 2017-2019.
- Newfoundland and Labrador Computer Science and Computer Engineering Working Group, Memorial University, 2019-2020
- ACEnet Fellowship Committee, Member, 2014-2015
- Canadian Applied and Industrial Math Society (CAIMS) Board of Directors, Member-at-large, 2013-2016
- Canadian Applied and Industrial Math Society (CAIMS) Membership Committee, Chair, 2013-2015
- Canadian Mathematics Society (CMS) Board of Directors, Director Atlantic, 2011-2014
- The Atlantic Computational Excellence Network (ACEnet) Research Directorate, Member, 2012-2014

#### Grant Reviews

- CFI–JELF Review, 2023
- Global Excellence Initiative, Universities Canada, Sloan Fellowship Application, September 2020
- American Chemical Society Petroleum Research Fund, August 2019
- NSERC Discovery Grant Reviewer 2022,, 2021, 2019, 2017, 2014, 2013, 2009
- CFI-LOF Grant Reviewer 2017, 2010

### Editorial Duties

- Co Editor-in-Chief, Mathematics in Science and Industry (the official journal of CAIMS/SCMAI), 2023–present
- Associate Editor, Mathematics in Science and Industry (the official journal of CAIMS/SCMAI), 2020–2023
- Co-Editor, Proceedings of the 25th International Domain Decomposition Methods Conference, 2019, Springer LNCSE
- Guest Editor, Special issue of J. Math. Study (Vol. 48, No. 2) on Adaptive Moving Mesh Methods

### Selected Journal Referee Duties

- *Transactions on Mathematics Software*,Association for Computing Machinery
- *Mathematics of Computation*, American Mathematics Society
- *Applied Mathematics Letters*, Elsevier Publishing

- *SIAM Journal of Scientific Computing*, SIAM
- *SIAM Journal of Matrix Analysis and Applications*, SIAM
- *SIAM Journal of Numerical Analysis*, SIAM
- *Atlantic Electronic Journal of Mathematics*
- *Numerical Mathematics: Theory, Methods, and Applications*
- *Applied Mathematics and Computation*
- *Linear Algebra and its Applications*
- *Numerical Algorithms*
- *Springer Lecture Notes Computational Science and Engineering*
- *Computing*
- *IMA Journal of Numerical Analysis*
- *Electronic Transactions on Numerical Analysis*
- *Journal of Computional Physics*
- *AIAA*

Conference & Workshop Organization

- Oil, Gas and Ocean Industry Session, DD25, St. John's, NL, Canada, July 2018
- 25th International Conference on Domain Decomposition Methods, (Lead Local Organizer), July 23-27, 2018
- BIRS Workshop on Adaptive Methods for PDEs (with W. Huang and C. Budd), May 2018
- AARMS CRG Software Carpentry Workshop (with S. MacLachlan), Memorial University of Newfoundland, May 2017.
- AARMS CRG PetSc Workshop (with S. MacLachlan), Memorial University of Newfoundland, May 2017.
- BIRS Workshop on Parallel in Time Methods (with M. Emmett), November 2016
- AARMS CRG Workshop on Singular Perturbation Problems, Halifax, NS, July 2016 (with H. Brunner, S. MacLachlan, and P. Muir)
- AARMS Workshop on Domain Decomposition Methods for PDEs, Halifax, NS, August 2015 (with H. Brunner, Scott MacLaclan, and Paul Muir)
- *Minisymposium on Parallel–in–time Methods*, SIAM CSE 2015, Salt Lake City, Utah
- *AARMS-CRM Workshop on Adaptive Methods for PDEs*, St. John's, NL, August 17-22, 2014 (with H. Brunner and Paul Muir)
- *Scientific and High Performance Computing Theme - 8 minisymposia*, CAIMS 2014, June, 2014 (with S. Ruuth and A. Fortin).
- *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).
- Scientific Committee, CAIMS 2013, June 16–20, 2013, Quebec City, Quebec, Canada

- *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))

## Memorial University Service

### University Committees

- Member, Senate Planning and Budget Committee, 2024-present
- Member Faculty of Science Research Advisory Board, 2023-present
- Member Academic Council, School of Graduate Studies, 2023
- Member Academic Council Executive, School of Graduate Studies, 2023
- University Awards Advisory Committee, 2023-present
- Chair, CIHR CGS-D adjudication committee, October 2023
- Chair, NSERC Vanier adjudication committee, October 2023
- Chair, NSERC CGS-D adjudication committee, October 2023
- Chair, Banting Post-Doc adjudication committees (NSERC, SSHRC, CIHR), July 2023

- Terra Nova Young Innovator's Award Adjudication Committee, 2021
- University NSERC Vanier Scholarship Committee, Fall 2021
- Review, Seed, Bridge, Interdisciplinary Fund, Fall 2020
- Review, Seed, Bridge, Interdisciplinary Fund, Summer 2020
- Search Committee, Memorial University Provost and Vice-President Academic, 2020-2021
- Senate Executive, Memorial University of Newfoundland, 2019–present
- Academic Program Review Committee, Memorial's Interdisciplinary Phd program, 2019
- Search Committee, Research Chair in Marine Passenger Transportation Technology, School of Maritime Studies, Marine Institute.
- Memorial University Data Centre Task Force, 2018–2019
- University NSERC Banting PDF Review Committee, 2018
- Senate, Memorial University of Newfoundland, 2018–2021
- Collaborator on Memorial's digital Oilfield education project, 2018–present
- Committee Member, Memorial University of Newfoundland Review Committee, new program proposal, MEng in Energy Systems Engineering, March-April 2017
- Committee Member, Memorial University of Newfoundland Review Committee, new program proposal, MEng in Safety and Risk Engineering, March-April 2017
- Computer Science Headship Search Committee, 2016
- Committee Member, Faculty of Science Graduate Studies Committee, September 2015–present
- Chair, Board of Study, MSc Program in Scientific Computing, September 1, 2015–present.
- Senate Committee on Educational Technology, September 1, 2012–August 31, 2015.
- Dean of Science Review Committee, 2013.
- University Senate Committee on Academic Appeals, September 2010–2011.
- Board of Study for the MSc in Computational Science Interdisciplinary Program, October 2009 – August 31, 2015.

### Department Service

- Department Core Search Commmittee, 2023-24
- Department Computing Commmittee, 2020-23
- Department Core Search Commmittee, 2019
- Hiring Committee, Department System's Administrator, 2019–present
- Blundon Seminar Co-organizer, 2019
- Department Strategic Plan Committee, 2019
- Department Academic Program Review Response Committee, 2019
- Department Headship Search Committee, 2017–2019

- Core Search Committee, 2017–2018
- Chair, Promotion and Tenure Committee, 2016–2017.
- Hiring Committee, 8 month instructor positions, Summer 2016.
- Chair, Promotion and Tenure Committee, 2015–2016.
- Dept. Prize Committee, 2015-2016.
- Blundon Competition Co-Designer and Co-ordinator, 2016.
- Blundon Competition Co-Designer and Co-ordinator, 2015.
- Blundon Competition Co-Designer and Co-ordinator, 2014.
- Hiring Committee, Winter 2014.
- 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.
- Facilitator, 2012 COMC Marking Team, Newfoundland and Labrador, 2012.
- Organizing Committee, AARMS Summer School, 2011, Memorial University of Newfoundland
- 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.
- Invited Speaker, *Root–finding, Optimization, and other (numerical) Pursuits*, Department of Mathematics and Statistics Annual Blundon Seminar, May 20, 2010
- Undegraduate Studies Committee, 2010–2012
- Computing Committee, 2010–2012
- High School Competitions Committee, 2010–2011

### Selected Thesis Committees

- Razan Abu-Labdeh (PhD), Mathematics and Statistics, Examiner, 2023
- Xushan Lu (PhD), Earth Sciences, Memorial University, Examiner, 2020
- Razan Abu Labdeh (MSc), Mathematics, Memorial University, Examiner, 2018
- Mohammad Abdelsadek (PhD), Engineering, Memorial University, Comprehensive Exam Examiner, July 2017.

- Mohammad Kowsari (PhD), Process Engineering, Memorial University, Comprehensive Exam Examiner, April 2017.
- Marina Kotovshchikova (PhD), Mathematics and Statistics, University of Manitoba, 2015, External Examiner
- Aghil Alaee (PhD), Mathematics and Statistics, Memorial University, 2015, Supervisory Committee
- Sadegheh Haghshena (PhD), Mathematics and Statistics, Memorial University, 2013-2015, Supervisory Committee
- Scott Cranford (MSc), Earth Sciences, Memorial University, 2014, Internal Examiner.
- Ali Souri Laki (PhD), Engineering, Memorial University, 2013-2015, Examination Committee
- Dlamini (MSc), University of Johannesburg, 2012, External Examiner.
- 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, Supervisory Committee, 2012.
- Ali Souri Laki (Phd), Faculty of Engineering and Applied Science, Memorial University of Newfoundland, Comprehensive Examing Committe, 2012.
- Zahangir Hossain (MSc), Memorial University, 2011, Internal Examiner.
- Sadegheh Haghshenas (PhD), Memorial University, 2011, Supervisory Committee.
- Yuxiang Zhang (PhD), Memorial University, 2011, Examination Committee.
- Fan Bai (MSc), Memorial Univerisity, 2011, Internal Examinar
- Liangjie He (MSc), Memorial University, 2010, Internal Examiner
- Ling Lin (MSc), Saint Mary's University, 2009, External Examiner
- Brian Johansen (MSc), Memorial University, 2008, External Examiner
- Rania Ghanan (MSc), Dalhousie University, 2007, External Examiner
- Josh Gould (MSc), Acadia University, 2007, Internal Examiner

## Acadia University Service

### 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
- Chair, Faculty of Pure and Applied Science Nominating Committee, 2006–2009
- Acadia Advantage Software Stream Committee, 2007–2008
- Senate Curriculum Committee, 2006–2007
- Research Funds Allocation Committee, 2005–2007

### Department Service

1. Acting Head, Department of Mathematics and Statistics, April 25 - May 1, 2009
2. Graduate Program Coordinator, Department of Mathematics & Statistics, 2007–2009
3. Coordinator and Editor, Department of Mathematics and Statistics Recruiting Newsletter, 2007–2009
4. Calculus Co-ordinator, 2006–2007
5. Computer, Co–op, Problem Solving Committees, & Student Society Liaison Committee 2006-2007
6. Computer, Co–op, Recruiting, & Problem Solving Committees 2004–2006

### Other Activities

- Invited speaker at the Memorial University Student's Union "Prof Talks" event
- Marking 2019 Euclid Mathematics Competition
- Dean's Representative Phd Comprehensive Exam for Mr. Zahara, Geography, Memorial University, April 2017
- Dean's Representative Phd Comprehensive Exam for Mr. Daigo Kamada, Biology, Memorial University, October 2015
- Workshop, *Matlab and Root–Finding*, Shad Valley, St. John's, NL, July 3, 2013.
- Workshop, *Root Finding and Discrete Population Dynamics using Matlab* , Shad Valley, St. John's, NL, July, 2012.
- 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.
- 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.

## Teaching

### Teaching Experience

#### Memorial University (9 distinct courses)

- *2022-2023* Math 3132 (Numerical Analysis), Math 4133/6202 Numerical Optimization, CMSC 6920 (Scientific Programming)
- *2021-2022* Math 3132 (Numerical Analysis), Math 4133/6202 Numerical Optimization, CMSC 6920 (Scientific Programming)
- *2020-2021* Math 3132 (Numerical Analysis), Math 1001 (Calculus II), Math 1001 (Calculus II)
- *2019-2020* Math 4133/6202 (Numerical Optimization), Math 1001 (Calculus II)
- *2018–2019* MATH 1001 Calculus II, MATH 6201 Numerical Methods for Time Dependent PDEs
- *2017-2018* MATH 3132 Numerical Analysis, MATH 4133 Numerical Optimization
- *2016–2017* MATH 1001 Calculus II, MATH 6202 Numerical Optimization
- *2015–2016* MATH 3132 Numerical Analysis, MATH 1001 Calculus II
- *2014–2015* MATH 3132 Numerical Analysis, MATH 1001 Calculus II
- *2013–2014* MATH 3132 Numerical Analysis, MATH 1001 Calculus II, MATH 6201 Numerical Methods for Time Dependent PDEs
- *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

- *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

- *2000-2001* MACM 316 Numerical Analysis
- *1999-2000* MATH 100 Precalculus

Teaching Mentorship Memorial University

- Polina Zheglova, 2012
- Alexander Howse, 2013
- Yunhui He, 2018