Nilima Nigam

Academic Experience

07/13– **Professor**, *Department of Mathematics*, Simon Fraser University.

07/08–06/13 **Associate Professor**, *Department of Mathematics*, Simon Fraser University.

07/08–04/10 **Associate Scientific Director/CTO**, *MITACS NCE/Mitacs Inc.*.

06/08–12/08 **Associate Professor**, *Department of Mathematics and Statistics*, McGill University.

07/01–06/08 **Assistant Professor**, *Department of Mathematics and Statistics*, McGill University.

07/99–06/01 **Industrial Postdoctoral Fellow**, *Institute for Mathematics and its Applications*, University of Minnesota.
(Industrial Partner: Seagate Technologies)

Education

1999 **Ph.D.**, *Applied Mathematics*, Department of Mathematics, University of Delaware.

1996 **M.S.**, *Applied Mathematics*, Department of Mathematics, University of Delaware.

1994 **B.Sc.(Honours)**, *Physics*, Indian Institute of Technology, Kharagpur.

Editorial Boards

Journals

- Math-in-Industry Case Studies, 2007–present
- J. of Engineering Mathematics, 2011-15
- SIAM J. of Applied Mathematics, 2012–2020
- SIAM News, 2012–present
- Canadian Bulletin of Mathematics, 2016–2020
- Canadian J. of Mathematics, 2016–2020
- Computers and Mathematics with Applications, 2012 –present

Books

- SIAM Book Series on Mathematical Modeling and Computation, SIAM. 2018-present
- CMS/CAIMS Book Series on Mathematics, Springer. 2020-present

arXiV

- Co-moderator of arXiV/math.na, 2016– present

Select Professional Service

2017-2021 SIAM Committee on Gene Golub SIAM Summer School

2020-21 SIAM Polya Prize in Exposition Selection Committee *chair*

2018-2019 Institute for Mathematics and its Applications Prize Committee

2018-2020 AWM-SIAM Kovalevsky Lecture Prize Committee *chair, 2019 cycle*

2014-2018 Natural Sciences and Engineering Research Council Evaluation Group

2017 SIAM Outstanding Paper Prize Committee *chair*

2011-2014 Canadian Industrial and Applied Mathematics Society *Member-at-large*

Select Honours/Awards

2008-14 **Tier II Canada Research Chair**, *Applied Mathematics*, Simon Fraser University.

2007 **Discovery Accelerator Supplement**, *Natural Sciences and Engineering Research Council of Canada*,
Award to "accelerate progress and maximize the impact of established, superior research programs".

2005 **Principal's Prize for Excellence in Teaching**, *McGill University*,
For excellence in teaching at the Assistant Professor level.

2005 **Academic mentor, Ben-Fusaro Award**, *COMAP Mathematical Contest in Modeling*.

2002 **SIAM 100-dollar, 100-digit challenge**,
with Martin Gander, Felix Kwok, Sebastian Loisel, and Paul Tupper. One of 20 winning teams..

1997 **Graduate Student Scholarship**, *College of Arts and Sciences, University of Delaware.*,
Nomination for excellence in academic achievement..

1997 **Baxter-Sloyer Award**, *Department of Mathematical Sciences, University of Delaware.*,
Awarded for excellence as a teaching assistant..

1991 **Gold Medalist**, *Indian National Graduate Physics Examination*,
Nation-wide competition in Physics for undergraduate and graduate students.

1991 **Gold medalist**, *Mahindra Search for Talent Scholarship*, St. Xavier's College, Bombay.,
Awarded for highest CGPA in the freshmen class..

Synergistic activities in industrial/interdisciplinary settings

2008-2010: Associate Scientific Director, MITACS NCE

- Member of the MITACS Research Management Committee, and Theme Leader for the *Environment and Natural Resources* theme.
- Responsible for scientific review process for Mitacs NCE research projects, Mitacs-Globalink international student exchange proposals
- Responsible for restructuring MITACS- Accelerate internship proposal review process to expand from mathematical-sciences to an all-disciplines program
- Co-creator of new programs, including the MITACS International Focus Periods, MITACS Globalink student exchanges, the MITACS-Elevate industrial postdoctoral programs and the MITACS Centers program
- Co-authored successful renewal of Canadian federal funding ($34.4M) for the Mitacs-Accelerate Intership Program

Service to Industrial Mathematic community

2008-2010 Canadian Applied Mathematics representative on the ICIAM/ICME international study on integrating industrially-relevant applications into mathematics education.

2009-2012 Member, Canadian Industrial Problem-Solving Coordination Group

Industrial Study-Groups.

- CRM 6th Industrial Problem Solving Workshop, 2015. Co-organizer/Scientific Committee.
- Graduate Student Math Modeling Camp, Oxford, UK, 2014. Academic Mentor
- 5th Fields-Mitacs Industrial Problems Workshop, 2014. Co-organizer/Scientific Committee.
- CRM 5th Industrial Problem Solving Workshop, 2013. Co-organizer/Scientific Committee.
- 4th Fields-Mitacs Industrial Problems Workshop, 2012. Co-organizer/Scientific Committee.
- 3rd Fields-Mitacs Industrial Problems Workshop, 2010.Co-organizer/Scientific Committee.
- 2nd Fields-MITACS Industrial Problems Workshop, 2008, Fields. Co-organizer/Scientific Committee.
- Graduate Student Math Modeling Camp, 2007, RPI. Academic Mentor.
- 1st Fields-Mitacs Industrial Problems Workshop, 2006. Co-organizer/Scientific Committee.
- 10th PIMS-MITACS Industrial Problem Solving Workshop, 2006, SFU. Participant.

- 8th PIMS-MITACS Industrial Problem Solving Workshop, 2004, UBC. Participant.
- 7th PIMS-MITACS Industrial Problem Solving Workshop, 2003, Calgary. Participant.
- Industrial modeling camp for graduate students, IMA, 1998. Participant.

Industrial Mathematics book chapters/reports (see also 'Publications')

Nilima Nigam. Mathematics in industry, mathematics in the classroom: analogy and metaphor. In Susan Oesterle, editor, *Canadian Mathematics Education Study Group 2014*.

Solomon Garfunkel, Rolf Jeltsch, and Nilima Nigam. Communication and collaboration. In *Educational Interfaces between Mathematics and Industry*, pages 319–332. Springer International Publishing, 2013.

Nilima Nigam and José Francisco Rodrigues. University and academic technical/vocational education. In *Educational Interfaces between Mathematics and Industry*, pages 173–183. Springer International Publishing, 2013.

Selected Industrial/SG Reports

H. Zhang, J. Barralet, S. Bohun, C. Budd, J. Fehribach,H, Huang, J. Keener, O. Olobatuyi and N. Nigam , Oxygen gradients in oxygen perfusion delivery systems, In *Proceedings of the Fields-MPrime Problem Solving Workshop, 2014.*

H. Kurkcu and N. Nigam , Signal processing in geophysics with sub-Nyquist sampling (with SG Geophysics]), MITACS-Accelerate Internship project report, 2009-2010

R. Donaldson and N. Nigam , Modeling of water-injection-based oil recovery (with McMillan-McGhee), MITACS-Accelerate Internship project report, 2009-2010

N. Nigam and O. Trichtchenko, Detection of unexploded ordnance via stress demagnetization (with Sky Research), MITACS-Accelerate Internship project report, 2009

D. Cottrell, H Huang and N.Nigam, Incorporating Estimation Error into Optimal Portfolio Allocation, In *Proceedings of the First Fields-Mitacs Problem Solving Workshop, 2006.*

C.S. Bohun, O. Dubois, H. Guo, V. Mendiratta, N. Nigam, V. Stepankevych and T. Vassilev Modelling quality and warranty cost, In: *Canadian Applied Mathematics Quarterly, v.12 (2004) n.1, pp.37-66.* (Proceedings of the 7th PIMS IPSW study group).

R. Aggarwala, C.S. Bohun, R. Kuske, G. Labute, W. Lu,N. Nigam and F. Youbissi Product-driven data mining In: *Canadian Applied Mathematics Quarterly, v.12 (2004) n.1, pp.1–24.* (Proceedings of the 7th PIMS IPSW study group)

N. Nigam, *Joint IMA-Seagate report on numerical micromagnetics*. Technical report and code documentation, IMA/Seagate Technologies, May 2001.

A. Beltukov, J. Choi, L. Hoffnung, N. Nigam, D. Sterling and P. Tupper *Problems in ultra-high precision GPS position estimation,* IMA Preprint Series, 1998.

Software development

Developed software for Seagate Technologies in 2001 for read-head design in disk drives. Including a fast-multipole algorithm for the solution of potential problems, non-uniform meshing, and a Lie-group based integrator for timestepping, this 22,000-line C-code was a fully 3-D package used in Seagate's R& D facility in Eagan, Minnesota.

Publications

Journals

1. George C. Hsiao and Nilima Nigam. A transmission problem in the exterior of thin domain. In *Homage to Gaetano Fichera*, volume 7 of *Quad. Mat.*, pages 177–205. Dept. Math., Seconda Univ. Napoli, Caserta, 2000.

2. Nilima Nigam. A variational method in acoustics related to an impenetrable scatterer coated by a thin penetrable shell. In *Mathematical and numerical aspects of wave propagation (Santiago de Compostela, 2000)*, pages 90–95. SIAM, Philadelphia, PA, 2000.
3. G. C. Hsiao, P. B. Monk, and N. Nigam. Error analysis of a finite element-integral equation scheme for approximating the time-harmonic Maxwell system. *SIAM J. Numer. Anal.*, 40(1):198–219, 2002.
4. G. C. Hsiao and N. Nigam. A transmission problem for fluid-structure interaction in the exterior of a thin domain. *Adv. Differential Equations*, 8(11):1281–1318, 2003.
5. D. Lewis and N. Nigam. Geometric integration on spheres and some interesting applications. *J. Comput. Appl. Math.*, 151(1):141–170, 2003.
6. Catalina Anghel, Gary Margrave, and Nilima Nigam. Locating anomalous seismic attenuation: a mathematical investigation. *Can. Appl. Math. Q.*, 12(4):439–478, 2004.
7. David P. Nicholls and Nilima Nigam. Exact non-reflecting boundary conditions on general domains. *J. Comput. Phys.*, 194(1):278–303, 2004.
8. Dmitry Jakobson, Michael Levitin, Nikolai Nadirashvili, Nilima Nigam, and Iosif Polterovich. How large can the first eigenvalue be on a surface of genus two? *Int. Math. Res. Not.*, (63):3967–3985, 2005.
9. Debra Lewis, Nilima Nigam, and Peter J. Olver. Connections for general group actions. *Commun. Contemp. Math.*, 7(3):341–374, 2005.
10. Sherwin Maslowe. Kelvin modes with nonlinear critical layers on a vortex with a continuous velocity profile. In *APS Division of Fluid Dynamics Meeting Abstracts*, volume 1, 2005.
11. Inti Zlobec, Russ Steele, Nilima Nigam, and C. Compton, Caroline. A predictive model of rectal tumor response to preoperative radiotherapy using classification and regression tree methods. *Clin Cancer Res.*, 11(15), 2005.
12. David P. Nicholls and Nilima Nigam. Error analysis of an enhanced DtN-FE method for exterior scattering problems. *Numer. Math.*, 105(2):267–298, 2006.
13. Leonid Chindelevitch, David P. Nicholls, and Nilima Nigam. Error analysis and preconditioning for an enhanced DtN-FE algorithm for exterior scattering problems. *J. Comput. Appl. Math.*, 204(2):493–504, 2007.
14. George C. Hsiao, Nilima Nigam, and Anna-Margarete Sändig. Innovative solution of a 2D elastic transmission problem. *Appl. Anal.*, 86(4):459–482, 2007.
15. S. A. Maslowe and N. Nigam. The nonlinear critical layer for Kelvin modes on a vortex with a continuous velocity profile. *SIAM J. Appl. Math.*, 68(3):825–843, 2007.
16. T. Akchurin, T. Aissiou, N. Kemeny, E. Prosk, N. Nigam, and S. Komarova. Complex dynamics of osteoclast formation and death in long-term cultures. *PLoS One*, 3(5), 2008.
17. S. Gemmrich and N. Nigam. A boundary integral strategy for the Laplace-Beltrami-Dirichlet problem on the sphere S^2. In *Frontiers of applied and computational mathematics*, pages 222–230. World Sci. Publ., Hackensack, NJ, 2008.
18. S. Gemmrich, N. Nigam, and O. Steinbach. Boundary integral equations for the Laplace-Beltrami operator. In *Mathematics and computation, a contemporary view*, volume 3 of *Abel Symp.*, pages 21–37. Springer, Berlin, 2008.
19. Sherwin A. Maslowe and Nilima Nigam. Vortex Kelvin modes with nonlinear critical layers. In *IUTAM Symposium on Hamiltonian Dynamics, Vortex Structures, Turbulence*, volume 6 of *IUTAM Bookser.*, pages 163–175. Springer, Dordrecht, 2008.
20. Tommy L. Binford, Jr., David P. Nicholls, Nilima Nigam, and T. Warburton. Exact non-reflecting boundary conditions on perturbed domains and hp-finite elements. *J. Sci. Comput.*, 39(2):265–292, 2009.

21. Marc D. Ryser, Nilima Nigam, and Svetlana V. Komarova. Mathematical modeling of spatio-temporal dynamics of a single bone multicellular unit. *J.Bone Miner. Res.*, 24(5):860–970, 2009.
22. H Rahemi, N Nigam, and JM Wakeling. Effects of muscle pennation on its kinematics and force development. In *INTEGRATIVE AND COMPARATIVE BIOLOGY*, volume 50, pages E285–E285. OXFORD UNIV PRESS INC JOURNALS DEPT, 2001 EVANS RD, CARY, NC 27513 USA, 2010.
23. Marc D. Ryser, Svetlana V. Komarova, and Nilima Nigam. The cellular dynamics of bone remodeling: a mathematical model. *SIAM J. Appl. Math.*, 70(6):1899–1921, 2010.
24. George C. Hsiao, Nilima Nigam, Joseph E. Pasciak, and Liwei Xu. Error analysis of the DtN-FEM for the scattering problem in acoustics via Fourier analysis. *J. Comput. Appl. Math.*, 235(17):4949–4965, 2011.
25. Harun Kurkcu, Nilima Nigam, and Fernando Reitich. An integral representation of the Green function for a linear array of acoustic point sources. *J. Comput. Phys.*, 230(8):2838–2856, 2011.
26. S. Gemmrich, J. Gopalakrishnan, and N. Nigam. Convergence analysis of a multigrid algorithm for the acoustic single layer equation. *Appl. Numer. Math.*, 62(6):767–786, 2012.
27. Nilima Nigam and Joel Phillips. High-order conforming finite elements on pyramids. *IMA J. Numer. Anal.*, 32(2):448–483, 2012.
28. Nilima Nigam and Joel Phillips. Numerical integration for high order pyramidal finite elements. *ESAIM Math. Model. Numer. Anal.*, 46(2):239–263, 2012.
29. Marc D. Ryser, Nilima Nigam, and Paul F. Tupper. On the well-posedness of the stochastic Allen-Cahn equation in two dimensions. *J. Comput. Phys.*, 231(6):2537–2550, 2012.
30. Mary-Catherine Kropinski and Nilima Nigam. Fast integral equation methods for the Laplace-Beltrami equation on the sphere. *Adv. Comput. Math.*, 40(2):577–596, 2014.
31. Hadi Rahemi, Nilima Nigam, and James M Wakeling. Regionalizing muscle activity causes changes to the magnitude and direction of the force from whole muscles - a modelling study. *Frontiers in Physiology*, 5(298), 2014.
32. Eldar Akhmetgaliyev, Oscar Bruno, and Nilima Nigam. A boundary integral algorithm for the Laplace Dirichlet-Neumann mixed eigenvalue problem. *J. Comput. Phys.*, 298:1–28, 2015.
33. M. Dewapriya, R. Rajapakse, and N. Nigam. Influence of hydrogen functionalization on the fracture strength of graphene and the interfacial properties of graphene-polymer nanocomposite. *Carbon*, 93:830–842, 2015.
34. ii Rahemi, Nilima Nigam, and James Wakeling. The effect of intramuscular fat on skeletal muscle mechanics: implications for the eldery and obese. *Journal of the Royal Society Interface*, 12(109), 2015.
35. Joe Coyle and Nilima Nigam. An hp-dg method for a class of transport equations with structured populations. *Comput. Math. Appl.*, 72(3):768–784, 2016.
36. Bamdad Hosseini, Nilima Nigam, and John Stockie. On regularizations of the δ distribution. *J. Comput. Phys.*, 305:423–447, 2016.
37. Nilima Nigam, Mary-Catherine Kropinski, and Bryan Quaife. Integral equation methods for the Yukawa-Beltrami equation on the sphere. *Adv. Comput. Math.*, 42(2):469–488, 2016.
38. Sebastian Dominguez, Nilima Nigam, and Bobak Shahriari. A combined finite element and bayesian optimization framework for shape optimization in spectral geometry. *Computers and Mathematics with Applications*, 2017.
39. Bamdad Hosseini and Nilima Nigam. Well-posed Bayesian Inverse Problems: Priors with exponential tails. *SIAM/ASA J. Uncertain. Quantif.*, 5(1):436–465, 2017.

40. Stephanie Ross, David Ryan, Sebastian Dominguez, Nilima Nigam, and James Wakeling. Size, history-dependent, activation and dimensionality effects on the work and power produced during cyclic muscle contractions. *Integrative and Comparative Biology*, 2018.
41. Stephanie A. Ross, Nilima Nigam, and James Wakeling. A modelling approach for exploring muscle dynamics during cyclic contractions. *PLoS Computational Biology*, 2018.
42. S. Dominguez, N. Nigam, and J. Sun. Revisiting the jones eigenproblem in fluid-structure interaction. *SIAM Journal of Applied Mathematics*, 2019.
43. H. Ammari, O. Bruno, K. Imeri, and N. Nigam. Wave enhancement through optimization of boundary conditions. *SIAM J. Scientific Computing*, 42(1), 2020.
44. Habib Ammari, Kthim Imeri, and Nilima Nigam. Optimization of Steklov-Neumann eigenvalues. *J. Comput. Phys.*, 406:109211, 15, 2020.
45. N. Nigam, B. Siudeja, and B. Young. A proof via finite elements for Schiffer's conjecture on a regular pentagon. *J. of Foundations of Computational Mathematics*, 2020.
46. David S. Ryan, Sebastián Domínguez, Stephanie A. Ross, Nilima Nigam, and James M. Wakeling. The energy of muscle contraction. ii. transverse compression and work. *Frontiers in Physiology*, 11:1392, 2020.
47. James M. Wakeling, Stephanie A. Ross, David S. Ryan, Bart Bolsterlee, Ryan Konno, Sebastián Domínguez, and Nilima Nigam. The energy of muscle contraction. i. Tissue force and deformation during fixed-end contractions. *Frontiers in Physiology*, 11:813, 2020.
48. Ryan N. Konno, Nilima Nigam, and James M. Wakeling. Modelling extracellular matrix and cellular contributions to whole muscle mechanics. *PLOS ONE*, 16(4):1–20, 04 2021.
49. N. Nigam and S. Pollock. A simple extrapolation method for clustered eigenvalues. *Numerical Algorithms*, 2021.
50. Stephanie A. Ross, Sebastián Domínguez, Nilima Nigam, and James M. Wakeling. The energy of muscle contraction. iii. kinetic energy during cyclic contractions. *Frontiers in Physiology*, 12:306, 2021.

Book Chapters

51. Nilima Nigam. Mathematics in industry, mathematics in the classroom: analogy and metaphor. In Susan Oesterle, editor, *Canadian Mathematics Education Study Group 2014*.
52. Solomon Garfunkel, Rolf Jeltsch, and Nilima Nigam. Communication and collaboration. In *Educational Interfaces between Mathematics and Industry*, pages 319–332. Springer International Publishing, 2013.
53. Nilima Nigam and José Francisco Rodrigues. University and academic technical/vocational education. In *Educational Interfaces between Mathematics and Industry*, pages 173–183. Springer International Publishing, 2013.

Select Conference/Workshop Organization

- Advances in Computational Scattering, BIRS, 2006. Co-organizer.
- First Fields-Mitacs Industrial Problems Workshop, 2006. Co-organizer.
- Diversity in the Mathematics and Scientific Communities, 2-day workshop at BIRS, 2007. Co-organizer
- MITACS-CORS Annual Conference, 2010. 400 participants. Lead organizer.
- WAVES 2011, Vancouver. 250 participants. Lead local organizer.
- CAIMS 2012 Annual meeting, Toronto. 200 participants. Lead organizer with H. Huang and A. Gumel.
- Advances in Boundary Element methods and related topics, Chongqing, China, August 2015.
- Canadian Mathematics Society Winter Meeting, Montreal, Canada, December 2015.
- Advances in Discontinuous Galerkin Methods, Heidelberg, Germany, December 2015.
- Canadian Mathematics Society Winter Meeting, Montreal, 2015. Scientific Committee. Co-organizer/Scientific Committee.

- The 12th International Conference on Mathematical and Numerical Aspects of Waves (Waves 2015), Karlsruhe 2015. Scientific committee.
- The 2nd Chongqing Workshop on Computational and Applied Mathematics, Chongqing, 2015. Co-organizer.
- Séminaire de mathématiques supérieures, Geometric and Computational Spectral Theory, Field-CRM-MSRI 2015. Co-organizer
- Advances in Discontinuous Galerkin Methods and related topics, Heidelberg, 2015. Co-organizer.
- Minisymposium on computational spectral theory, WONAPDE, Concepcion, Chile, January 2016.
- The 13th International Conference on Mathematical and Numerical Aspects of Waves (Waves 2017), Minneapolis 2017. Scientific committee.
- Recent advances and challenges in discontinuous Galerkin methods, Minneapolis July 2017.
- Women In Numerical Methods for PDEs and their Applications, BIRS, 2019. Co-organizer.
- Foundations of Computational Mathematics, Vancouver, Summer 2020. (Cancelled due to COVID-19)
- Canadian Mathematics Society Winter Meeting, Montreal, Canada, December 2020. Scientific Committee
- Canadian Mathematics Society Winter Meeting,Vancouver, Canada, December 2021. Lead Co-organizer.

Select Presentations

Public lectures/Outreach

- Mathematics of Planet Earth Public Lecture, Winnipeg, April 22, 2013: *Mathematics, light and sound.*
- Mathematics of Planet Earth Public Lecture, Montreal, Feb. 15, 2013: *Mathematics, light and sound.*
- Teach-In! Issues at the frontline of climate change, SFU, Dec.2, 2014: *Divestment from fossil fuels and 'The Engaged University'*
- École Alpha Secondary 'what does a mathematician do?' presentation, April 2019, *The mathematics of zombie epidemics*
- SFU Café Scientifique, public engagement event, May 2019, *The science behind viruses and 'treatments*
- Canadian Mathematics Society Annual Meeting Public Lecture, June 2019, *When Mathematicians play the drums*
- AWM Speaker Series, online, University of Utah, November 2020, Careers in the mathematical sciences: no 'bad' choices

Selected Invited/Plenary Talks

- The CAIMS-Fields Industrial Mathematics Prize lecture, online, June 2021, *Our muscles aren't one-dimensional fibres: nonlinear elasticity for skeletal muscle mechanics*
- PIMS-UNBC Distinguished Lecture, online, U. Northern British Columbia, April 2021, *Why should we care about Steklov eigenproblems?*
- Claremont Colleges Colloquium Series, online,Harvey Mudd College, March 2021, *Our muscles aren't one-dimensional fibres.*
- AWM Speaker Series/Departmental Colloquium, online, University of Utah, November 2020, *A modification of Schiffer's conjecture*
- Scientific and Statistical Computing Seminar, Joint by the University of Chicago Departments of Statistics, Mathematics, Computer Science, and the Computation Institute, Chicago, United States, 2017, *Numerical approximation of Laplace eigenvalues of the Zaremba problem.*
- Computational Mathematics and Applications Seminar, Mathematics Institute, Oxford, 2016, *Numerical approximation of the Laplace eigenvalues with mixed boundary data*
- Applied Mathematics Colloquium, Dept. of Mathematical Sciences, New Jersey Institute of Technology, 2016, *High Accuracy Computation of Mixed Dirichlet-Neumann Eigenvalues*
- Canadian Math Society Plenary lecture, CMS Summer meeting, Charlottetown, 2015, *On numerical analysis and spectral geometry.*
- Plenary lecture, Canadian Mathematics Education Study Group, Edmonton, 2014:*Is there interesting mathematics in industry?*
- Colloque de mathématiques de Laval CRM - ISM, 2014: *On the well-posedness of the 2D stochastic Allen-Cahn equation.*
- U. British Columbia Institute of Applied Mathematics seminar, Vancouver, 2014: *A mathematical model of*

bone remodeling.
- Spectral Theory of Laplace and Schroedinger Operators, BIRS, July 2013: *Numerical analysis of spectral problems, validated numerics, and proof.*
- Mathematics of finite elements and applications (MAFELAP 14). Minisymposium on high order finite elements, Brunel, June 11, 2013 *High order finite elements on pyramids.*
- Colloque de mathématiques de Montréal CRM - ISM, 2013: *Eigenproblems, numerical approximation and proof*
- Winter 2013 Research Symposium: Alumni Lecture. University of Delaware, 2013: *On the well-posedness of the 2D stochastic Allen-Cahn equation.*
- Eigenvalues/singular values and fast PDE algorithms: acceleration, conditioning, and stability, BIRS, June 2012: *Eigenproblems on manifolds and the Hot Spot conjecture*
- Maseeh Colloquium in Applied Mathematics, Portland State University, 2012: *Mathematical models for bone remodeling and tumor growth*
- IRMACS Canda Research Chairs Seminar Series, 2011:Exterior calculus, approximation theory and numerical analysis: high-order FEM approximation on pyramids
- SFU Computational Science day plenary talk, SFU, 2010:*How do bones grow? From lab to desktop, a mathematical journey.*
- U. Delaware Dept. of Mathematical Sciences Colloquium, 2009:*Bone growth and destruction at the cellular level: a mathematical model*
- ICES Colloquium, U.of Texas at Austin, 2008: *High Order Pyramidal Finite Elements for the De-Rham complex*
- 5-day BIRS Workshop on Canada-China Industrial Mathematics, 2007: *A model of bone growth and destruction*.
- Rice Computational Science Colloquium, 2007: An error analysis for a combined DtN-FE method.
- Plenary speaker, Canadian Undergraduate Mathematics Conference, 2006: Is there really interesting mathematics in industry?
- Abel Symposium, 2006: Fast methods in computational scattering.
- Foundations of Computational Mathematics, Minneapolis, 2002: Geometric integration: a closer look at applications in material science.

Students and Postdoctoral Fellows

Postdoctoral fellow supervision

- Dr. Harun Kurcku, 2008-2010, postdoctoral work on seismic data compression and Green's functions for quasi-periodic fields.
- Dr. Roger Donaldson, 2009-2010, postdoctoral work on pattern formation in Type-I superconductors.
- Dr. Ben Adcock, 2010-2012, postdoctoral work on non-polynomial methods for eigenfunction calculation and compressed sensing.
- Dr. Roberto Armenta, 2012-2014, postdoctoral work on high-order discretization for mixed boundary value problems in electromagnetics
- Dr. Aditi Ghosh, 2014-2015, postdoctoral work on fast multiple strategies on compact manifolds. Co-supervised with M. Kropinski.
- Dr. Kthim Imeri, 2021-, postdoctoral work on spectral optimization via boundary control.

Doctoral student supervision

- Inti Zlobec Department of Pathology, McGill. PhD 2007,
  on the development of predictive models for brachytherapy response in rectal cancers. Co-supervised with Prof. J. Jass in Pathology.
  Current position: Associate Professor of Experimental Medicine, University of Bern, Switzerland.
- Simon Gemmrich, PhD 2009, McGill University,
  on boundary integral equations on spheres, and multigrid preconditioning.
  Awards: Graduate scholarship, Institut des sciences mathématiques (ISM), Montréal.
  Current position: Fixed income quantitative analyst, Bank Vontobel,Zurich.

- Joel Phillips, PhD 2010, McGill University,
  on the use of differential complexes in the design and analysis of high-order finite elements for pyramids.
  Awards: NSERC Graduate Scholarship.
  Current position: Researcher, Jane Street Capital, London.
- Marc Ryser, PhD 2012, McGill University,
  on the modeling and analysis of bone remodeling, and on the numerical analysis of SPDE in two dimensions. Co-supervised with Prof. Tupper in Mathematics and S. Komarova in Biology.
  Awards: Canadian Mathematical Society Doctoral Award, 2013; Hydro-Quebec doctoral fellowship 2010.
  Current position: Assistant professor (tenure-track) of Mathematics and Population Health Sciences, Duke University.
- Hadi Rahemi,(Biomedical Physiology and Kinesiology), PhD 2015, Simon Fraser University,
  on the mathematical modeling and simulation of muscle-tendon units. Co-supervised with Prof. Wakeling in Kinesiology.
  Awards: President's PhD Scholarship, SFU. Current position: Chief Scientist at Circulation Concepts, Inc.
- Nuwan Dewapriya (Engineering Science) PhD 2016, Simon Fraser University,
  on combined MD and continuum models to study nanoscale fracture and interfacial dynamics in graphene sheets. Co-supervised with Prof. Rajapakse, Engineering Science, SFU.
- Bamdad Hosseini, Ph.D. 2018, Simon Fraser University,on Bayesian inverse problems with non-Gaussian priors. Co-supervised with Prof. Stockie.
  Awards: SIAM Student Paper Prize, 2017; Governor General's Academic Gold Medal, 2018; NSERC Postdoctoral Fellowship.
  Current position: Postdoctoral fellow and von Karman instructor, Caltech.
- Sebastian Dominguez, Ph.D. 2020, Simon Fraser University,
  on Bayesian optimization in spectral geometry and 3-D finite element methods for muscle mechanics.
  Current position: PIMS postdoctoral fellow, U. Saskatchewan
- David Ryan (Biomedical Physiology and Kinesiology), PhD 2020, Simon Fraser University,
  on the impact of transverse compression on muscle architecture, fibre curvature and force output. Co-supervised with Prof. Wakeling in BPK.
  Current position: Postdoctoral fellow, University of California at Riverside.
- Stephanie Ross (Biomedical Physiology and Kinesiology) , PhD. 2016-2021 on the impact of mass, history and muscle size on muscle dynamics. Co-supervised with Prof. Wakeling in BPK. Awards: Alexander Bell Doctoral Fellowship. Current position: Postdoctoral fellow, University of British Columbia.
- Javier Almonacid, Ph.D. 2020-current, on the spectra of 0th-order pseudodifferential operators and on adaptive FEM for muscle biomechanics.

Masters supervision

- Martin Caberlin, MS thesis on "Stiff ordinary and delay differential systems in biological systems". M.S. awarded in Fall 2002.
- Ying Han, MS thesis on "The maximum likelihood of phylogentic trees. Joint supervision with Prof. D. Bryant. M.S. awarded in Fall 2003.
- Yuan-yuan Hua, MS on "The use of clustering techniques to analyze genetic data". Graduation date: Feb 2006. Joint supervision with R. Steele.
- Tobin Marchand, MS on "Magnetohydrodynamics and solar winds". Graduation date: Dec. 2004. Joint supervision with V. Jaksic.
- Jonathan Duquette, MS on "The nucleation and growth of carbon nanotubes". Graduation date: Summer 2005. Joint supervision with L. Cortelezzi.
- Olga Trichtchenko, MS on 'The preconditioning of the Kohn-Sham system for nanoelectronic devices'. Graduate date: Summer 2009.
- Gordon Hiscott, MS on 'The numerical analysis of age-structured populations in cyclical neutropenia'. Spring 2012.
- Lee Safranek, MS on 'The well-posedness of age-structured populations in cyclical neutropenia'. Fall 2014.
- Sebastian Dominguez Rivera (visiting from U. Concepcion), 2014.
- Ernesto Caceres (visiting from U. Concepcion), 2014.

- Mallory Carlu (visiting from Paris-Sud), 2014.
- Dillon Nasserden, 2014-2016.
- Javier Almonacid, 2019-2020, 'Internal wave attractors and spectra of zeroth-order pseudo-differential operators.'
- Cassidy Tam, 2019-present.
- Ryan Konno, 2020-present.

Undergraduate Honours Projects

- Jessica Conway, Spring 2002.
- Anna Sher, Spring 2002. Joint with Prof. M. Mackey.
- Catalina Anghel, Fall 2004.
- Erin Prosk, Winter 2007.
- Hannah Sutton, Fall 2017.
- Ryan Konno, Department of Physics, UBC, Fall 2019.
- Gerrik Wong, Fall 2021.

Undergraduate Summer Research

- Jessica Conway, Summer 2002.
- Steve Kanters, NSERC USRA, Summer 2002 (joint with Dr. P. Tupper)
- Simon Gemmrich, Summer 2002.
- Frederick Laliberte, NSERC USRA 2003.
- Ahmed Abu-Safia, NSERC USRA 2003.
- Leonid Chindelevitch, NSERC USRA, Summer 2005.
- Tayeb Aisseiou, Summer 2006 (joint with Prof. S. Komarova)
- Erin Prosk, NSERC USRA, Summer 2007 (joint with Prof. S. Komarova)
- Olga Trichtchenko, Summer 2007.
- Raymond Lee, NSERC USRA, Summer 2009
- Kanishk Kumar (IIT Kharagpur), Summer 2009.
- Gordon Hiscott, NSERC USRA, Summer 2010
- Michael deGuzman, Summer 2010
- Michael Wathen, Summer 2011
- Raghav Venkatraman (IIT Roorkee), Summer 2011
- Alex Vlasev, Summer 2012
- Sihao Wang (Sichuan University), MITACS Globalink fellowship 2014.
- Dillon Nasserden, NSERC USRA, Summer 2014.
- Nicole Cossey, Summer 2014.
- Kong Ruoyan (University of Science and Technology, China), Summer 2015.
- Ftouhi Ilias (U. Lorraine), Summer 2015.
- Hannah Redhead, Summer 2015.
- Daiju Matsunami, Summer 2015.
- Megan Monkman, Summer 2018.
- Cassidy Tam (McGill University), NSERC USRA, 2018.
- Ryan Konno (UBC), NSERC USRA, 2018.
- Ryan Konno (UBC), Summer 2019.
- Gerrik Wong, NSERC USRA, 2021.