

CURRICULUM VITAE

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STUDIES

Ph.D. in Mathematics	Laval University	1996
M.Sc. in Mathematics	Laval University	1989
B.Sc. in Mathematics	Laval University	1986

PROFESSIONAL EXPERIENCES

Assistant Chair	Math. & Stat., University of Ottawa	2014-17
Professor	Math. & Stat., University of Ottawa	2009-
Associate Professor	Math. & Stat., University of Ottawa	2004-09
Assistant Professor	Math. & Stat., University of Ottawa	1999-04
Research Assistant Professor	Mech. Eng., Concordia University	1997-99
Research Associate	CFD Lab, Concordia University	1995-97
Lecturer	Laval University	1993-95
Research Assistant	EPFL - Switzerland	1990-92
Lecturer	Laval University	1987-89

RESEARCH CONTRIBUTIONS AND PRACTICAL APPLICATIONS

REFEREED PUBLICATIONS

Journal Papers

- [1] S. Keita, A. Beljadid and Y. Bourgault. Mass-conservative and positivity preserving second-order semi-implicit methods for high-order parabolic equations. *Journal of Computational Physics*, 25 pages, 440, 2021;110427.
- [2] S.C.E.R. Koyaguerebo-Ime and Y. Bourgault. Arbitrary order A-stable and B-convergent methods for ordinary differential equations via deferred correction. *BIT Numerical Mathematics*, 32 pages, April, 2021.
- [3] S. Keita, A. Beljadid and Y. Bourgault. Implicit and semi-implicit second-order time stepping methods for the Richards equation. *Advances in Water Resources*, 15 pages, 148, 2021;103841.
- [4] S. Keita, A. Beljadid and Y. Bourgault. Efficient second-order semi-implicit finite element method for fourth-order nonlinear diffusion equations. *Computer Physics Communications*, 11 pages, 258, 2021;107588.
- [5] T. Roy, Y. Bourgault and C. Pierre. Analysis of time-stepping methods for the monodomain model. *Computational and Applied Mathematics*, 32 pages, 39:230, 2020.

- [6] A. Davidović, Y. Coudière and Y. Bourgault. Modelling the action potential propagation in a heart with structural heterogeneities: From HR-MRI to numerical simulations. *International Journal for Numerical Methods in Biomedical Engineering*, Special Issue paper, 19 pages, 2020;e3322.
- [7] S. Keita and Y. Bourgault. Eulerian models with particle pressure for air-particle flows. *European Journal of Mechanics - B/Fluids*, 78:263-275, 2019.
- [8] K.C. Loy and Y. Bourgault. Robust high-order semi-implicit backward difference formulae for Navier-Stokes equations. *International Journal for Numerical Methods in Fluids*, 90:195-216, 2019.
- [9] S. Keita and Y. Bourgault. An Eulerian droplet model: Delta-shock waves and solution of the Riemann problem. *Journal of Mathematical Analysis and Applications*, 472:1001-1027, 2019.
- [10] E. Boey, Y. Bourgault and T. Giordano. Anisotropic residual based a posteriori mesh adaptation in 2D: Element based approach. *Journal of Computational and Applied Mathematics*, 349:1-20, 2019.
- [11] B. Parackal, H. Khakdaman, Y. Bourgault and M. Ternan. An investigation of direct hydrocarbon (propane) fuel cell performance. *International Journal of Electrochemistry*, Volume 2018, Article ID 5919874, 18 pages, 2018.
- [12] Y. Bourgault. Activité électrique des cellules: du qualitatif au quantitatif. *Bulletin de l'Association mathématique du Québec*, 58(3):10-19, 2018.
- [13] K.C. Loy and Y. Bourgault. On efficient high-order semi-implicit time-stepping schemes for unsteady incompressible Navier–Stokes Equations. *Computer & Fluids*, 148:166-184, 2017.
- [14] D.V. Pongui-Ngoma, Y. Bourgault and H. Nkounkou. Parameter identification for a non-differentiable ionic model used in cardiac electrophysiology. *Applied Mathematical Sciences*, 9(150):7483-7507, 2015.
- [15] H.R. Khakdaman, Y. Bourgault and M. Ternan. A mathematical model of a direct propane fuel cell. *Journal of Chemistry*, vol. 2015, Article ID 102313, 13 pages, 2015.
- [16] M. Doyle, S. Tavoularis and Y. Bourgault. Application of fluid-structure interaction to numerical simulations in the left ventricle. *Transactions of CSME*, 39(4):749-766, 2015.
- [17] Y. Bourgault, D. Broizat and P.-E. Jabin. Convergence rate for the method of moments with linear closure relations. *Kinetic and Related Models*, 8(1):1-27, March 2015.
- [18] M. McLeod and Y. Bourgault. Mixed finite element methods for addressing multi-species diffusion using the Maxwell-Stefan equations. *Comp. Methods Appl. Mech. Engrg.*, 279:515-535, 2014.
- [19] Y. Belhamadia, A. Fortin and Y. Bourgault. On the performance of anisotropic mesh adaptation for scroll wave turbulence dynamics in reaction-diffusion systems. *Journal of Computational and Applied Mathematics*, 271:233-246, 2014.
- [20] Y. Coudière, Y. Bourgault and M. Rioux. Optimal monodomain approximations of the bidomain equations used in cardiac electrophysiology. *M3AS: Mathematical Models and Methods in Applied Sciences*, 24(6):1115-1140, 2014.
- [21] M. Doyle, S. Tavoularis and Y. Bourgault. Simulation of the static inflation of the passive left ventricle to an end-diastolic state. *Transactions of CSME*, 37(4):1091-1104, 2013.
- [22] M. Rioux and Y. Bourgault. A predictive method allowing the use of a single ionic model in numerical cardiac electrophysiology. *M2AN: Mathematical Modelling and Numerical Analysis*, Invited Paper in a Special Issue on “Direct and inverse modeling of the cardiovascular and respiratory systems”, 47(4):987-1016, July 2013.

- [23] M. Picasso and Y. Bourgault. Anisotropic a posteriori error estimates and adaptive finite elements for the space discretization of the transient transport equation. *SIAM Journal on Scientific Computing*, 35(2):1192-1211, April 2013.
- [24] A. Iolov, A. Kane, Y. Bourgault, R.G. Owens and A. Fortin. Finite element methods for a microstructure-based model of blood. *International Journal for Numerical Methods in Biomedical Engineering*, 27(9):1321-1349, September 2011.
- [25] H.R. Khakdaman, Y. Bourgault and M. Ternan. Computational modeling of a direct propane fuel cell. *Journal of Power Sources*, 196(6):3186-3194, March 2011.
- [26] M. Doyle, S. Tavoularis and Y. Bourgault. Adaptation of a rabbit myocardium material model for use in a canine left ventricle simulation study. *ASME Journal of Biomechanical Engineering*, 132:041006, April 2010, 12 pages.
- [27] M. Doyle, S. Tavoularis and Y. Bourgault. Application of parallel processing to the simulation of heart mechanics. *Lecture Notes in Computer Sciences*, 5976:30-47, 2010.
- [28] H.R. Khakdaman, Y. Bourgault and M. Ternan. Direct propane fuel cell anode with interdigitated flowfields: 2D model. *Industrial & Engineering Chemistry Research*, 49(3):1079-1085, 2010.
- [29] Y. Belhamadia, A. Fortin and Y. Bourgault. Towards accurate numerical method for monodomain models using a realistic heart geometry. *Mathematical Biosciences*, 220:89-101, August 2009.
- [30] Y. Bourgault, Y. Coudière and C. Pierre. Existence and uniqueness of the solution for the bidomain model used in cardiac electrophysiology. *Nonlinear Analysis: Real World Applications*, 10(1):458-482, February 2009.
- [31] Y. Bourgault, M. Picasso, F. Alauzet and A. Loseille. On the use of anisotropic a posteriori error estimators for computing 3-D inviscid compressible flows. *International Journal for Numerical Methods in Fluids*, 59:47-74, 2009.
- [32] G. Psfogiannakis, Y. Bourgault, B. Conway and M. Ternan. The electro-catalytic and mass transfer components of the electrode potential loss in a PAFC cathode determined using a numerical model. *International Journal of Energy, Environment and Economics*, 16(4):381-417, 2008.
- [33] M. Doyle, J.-B. Vergniaud, S. Tavoularis and Y. Bourgault. Numerical simulations of blood flow in artificial and natural hearts with fluid-structure interaction. Invited Paper in Special Issue of *Artificial Organs*, 32(11):870-879, 2008.
- [34] M. Ethier and Y. Bourgault. Semi-implicit time-discretization schemes for the bidomain model. *SIAM Journal on Numerical Analysis*, 46(5):2443-2468, 2008.
- [35] G. Psfogiannakis, Y. Bourgault, B. Conway and M. Ternan. Mathematical model for direct propane phosphoric acid fuel cell. *Journal of Applied Electrochemistry*, 36:115-130, January 2006.
- [36] Y. Bourgault and A. El Boukili. A mortar element method for hyperbolic problems. *C.R. Acad. Sciences Paris - Ser. I, Mathématiques*, 338:249-254, 2004.
- [37] Y. Bourgault, M. Ethier and V.G. LeBlanc. Simulation of Electrophysiological Waves with an Unstructured Finite Element Method. Invited Paper in Special Issue of *Mathematical Modelling and Numerical Analysis on Biological and Biomedical Applications*, 37:649-661, July/August 2003.
- [38] J. Dompierre, M-G. Vallet, Y. Bourgault, M. Fortin and W.G. Habashi Anisotropic Mesh Adaptation: Towards User-Independent, Mesh-Independent and Solver-Independent CFD Solutions: Part III: Unstructured Meshes. *International Journal for Numerical Methods in Fluids*, 39:675-702, July 2002.

- [39] Y. Bourgault, H. Beaugendre and W.G. Habashi. Development of a Shallow Water Icing Model in FENSAP-ICE. *Journal of Aircraft*, 37:640-646, 2000.
- [40] M. Fortin, W.G. Habashi, J. Dompierre, M-G. Vallet, Y. Bourgault, D. Ait-Ali-Yahia. Anisotropic Mesh Adaptation: Towards User-Independent, Mesh-Independent and Solver-Independent CFD Solutions: Part I: General Principles. *International Journal for Numerical Methods in Fluids*, 32:725-744, March 2000.
- [41] Y. Bourgault, Z. Boutanios and W.G. Habashi. An Eulerian Approach to 3-D Droplet Impingement Simulation Using FENSAP-ICE. Part I: Model, Algorithm and Validation. *Journal of Aircraft*, 37:95-103, 2000.
- [42] Y. Bourgault, W.G. Habashi, J. Dompierre and G. S. Baruzzi. A Finite Element Method Study of Eulerian Droplets Impingement Models. *International Journal for Numerical Methods in Fluids*, 29:429-449, 1999.
- [43] W.G. Habashi, M. Fortin, J. Dompierre, M-G. Vallet and Y. Bourgault. Certifiable CFD through Mesh Optimization. Invited Paper in Special Issue of *AIAA Journal* on Credible Computational Fluid Dynamics Simulations, 36:703-711, 1998.
- [44] Y. Bourgault, Ph. Caussignac and L. Renggli. Finite element methods for parabolized Navier-Stokes equations. *Comp. Methods Appl. Mech. Engrg.*, 111:265–282, 1994.
- [45] Y. Bourgault and Ph. Caussignac. Ill-posedness of a shock-fitting problem for parabolized Navier-Stokes equations. *Eur. J. of Mech., B/ Fluids*, 11:309–315, 1992.

Papers Submitted to a Journal

- [46] Y. Bourgault and A. Garon. Variable-step deferred correction backward differentiation formulae for ordinary differential equations. Submitted to *BIT Numerical Mathematics*, July, 2021, 31 pages, log.BITN-D-21-00108.
- [47] J.S. MacDonald, Y. Bourgault and F. Lutscher. Moving-habitat models: A numerical approach. Submitted to *Mathematical Biosciences*, May, 2021, 43 pages, log.MBS-S-21-00337.

Conferences with Proceedings

- [48] J. Pearce-Lance, M. Pop and Y. Bourgault. A numerical method for the optimal adjustment of parameters in ionic models accounting for restitution properties. *Functional Imaging and Modelling of the Heart (FIMH 2019)*, Bordeaux, France, 6-8 June, 2019. Published in *Lecture Notes in Computer Science* 11504:46-54.
- [49] D.V. Pongui-Ngoma, Y. Bourgault, M. Pop and H. Nkounkou. Adjustment of parameters in ionic models using optimal control problems. *Functional Imaging and Modelling of the Heart (FIMH 2017)*, Toronto, Canada, 11-13 June, 2017. Published in *Lecture Notes in Computer Science* 10263:322-332.
- [50] A. Davidović, Y. Coudière and Y. Bourgault. Image-based modeling of the heterogeneity of propagation of the cardiac action potential. Example of rat heart high resolution MRI. *Functional Imaging and Modelling of the Heart (FIMH 2017)*, Toronto, Canada, 11-13 June, 2017. Published in *Lecture Notes in Computer Science* 10263:260-270.
- [51] A.S. Kane, Y. Bourgault, A. Iolov, R.G. Owens and A. Fortin. Computation of blood flows accounting for red-blood cell aggregation/fragmentation. *Seventh International Symposium on Turbulence and Shear Flow Phenomena*, Ottawa, Canada, 28-31 July, 2011, 6 pages.
- [52] M. Doyle, S. Tavoularis and Y. Bourgault. Computation of Blood Flow in the Left Ventricle with Fluid-Structure Interaction. *Seventh International Symposium on Turbulence and Shear Flow Phenomena*, Ottawa, Canada, 28-31 July, 2011, 6 pages.

- [53] M. Rioux, Y. Bourgault, Y. Belhamadia and O. Rousseau. Numerical computations of cardiac action potential using level set based geometries. *8th International Symposium on Noninvasive Functional Source Imaging of the Brain and Heart*, Banff, Canada, 13-16 May, 2011, 6 pages.
- [54] Y. Belhamadia, A. Fortin and Y. Bourgault. Efficient simulation of scroll wave turbulence in a three-dimensional reaction-diffusion system. *10th International Conference on Computational and Mathematical Methods in Science and Engineering (CMMSE 2010)*, 27-30 June, 2010, 8 pages.
- [55] O. Rousseau, C. Pierre, Y. Bourgault. Towards patient-specific electro-mechanical models of the heart including fiber architecture. *IV European Conference on Computational Mechanics*, Paris, France, May 16-21, 2010, 2 pages.
- [56] H.R. Khakhdaman, Y. Bourgault and M. Ternan. A direct propane fuel cell with interdigitated flow-fields: 2D model. *International Symposia on CAtalysis in MUltiphase REactors (CAMURE-7) and on Multifunctional Reactors (ISMR-6)*, part of *8th World Congress on Chemical Engineering (WCCCE8)*, Montreal, August 23-26, 2009, 6 pages.
- [57] A. Iolov, Y. Bourgault, A. Fortin, A. Kane and R. Owens. Finite Element Methods for a Mesoscopic Constitutive Model of Blood. *1st International Conference on Mathematical and Computational Biomedical Engineering (CMBE2009)*, Swansea, UK, June 29-July 1, 2009, 4 pages.
- [58] M. Doyle, S. Tavoularis and Y. Bourgault. Simulation of passive left ventricle filling. *ASME 2009 Summer Bioengineering Conference*, Resort at Squaw Creek, Lake Tahoe, CA, USA, June 17-21, 2009, 2 pages.
- [59] M. Doyle, S. Tavoularis and Y. Bourgault. Application of Parallel Processing to the Simulation of Heart Mechanics. *High Performance Computing Symposium 2009*, Kingston, Ontario June 14-17, 2009, 3 pages.
- [60] Y. Belhamadia, Y. Bourgault and A. Fortin. Mathematical Simulation of the Electrical Activity of the Heart. *32nd Conference of the Canadian Medical and Biological Engineering Society*, Calgary, Alberta, May 20-22, 2009, 4 pages.
- [61] Y. Bourgault and M. Thiriet. Critical aspects of flow and aerosol simulations in the airway tract. *European Conference on Computational Fluid Dynamics – ECCOMAS CFD 2008*, Venice, Italy, June 30-July 4, 2008, 2 pages.
- [62] Y. Bourgault, M. Picasso, F. Alauzet and A. Loseille. Inviscid flow simulations around a supersonic aircraft using an anisotropic *a posteriori* error estimator. *16th Annual Conference of the CFD Society of Canada*, University of Saskatchewan, Saskatoon, Canada, June 8-10, 2008, 7 pages.
- [63] Y. Bourgault. Computing gas-particle flows in airways with an Eulerian model. *European Conference on Computational Fluid Dynamics – ECCOMAS CFD 2006*, Egmond aan Zee, The Netherlands, September 5-8, 2006, 10 pages.
- [64] Y. Bourgault. Eulerian modelling of aerosols in airways. *14th Annual Conference of the CFD Society of Canada*, Kingston, ON, Canada, July 16-18, 2006, 7 pages.
- [65] C. Coros and Y. Bourgault. Numerical investigations of periodically forced internal flows. *14th Annual Conference of the CFD Society of Canada*, Kingston, ON, Canada, July 16-18, 2006, 8 pages.
- [66] J. Saleh, Y. Bourgault and M. Ternan. Bubble management at the interface of the anode channel and the anode backing layer in a direct methanol fuel cell. *Sixth International Symposium on New Materials for Electrochemical Systems*, Montreal, July 9-12, 2006.
- [67] Y. Bourgault and M. Ethier. Comparison of numerical schemes for the bidomain model. *Third MIT Conference on Computational Fluid and Solid Mechanics*, Massachusetts Institute of Technology, Cambridge, MA, June 14-17, 2005, pages 1048–1051.
- [68] M. Doyle, S. Tavoularis and Y. Bourgault. Simulation of a closed-loop flow in a ventricular assist device coupled with a circulatory system model. *Third MIT Conference on Computational Fluid and Solid Mechanics*, Massachusetts Institute of Technology, Cambridge, MA, June 14-17, 2005, pages 972–974.

- [69] M. Doyle, S. Tavoularis and Y. Bourgault. Computation of blood flow in a diaphragm-type ventricular assist device. *12th Annual Conference of the CFD Society of Canada*, Ottawa, ON, Canada, May 9-11, 2004.
- [70] M. Doyle, S. Tavoularis and Y. Bourgault. Computation of blood flow in a representative diaphragm-type ventricular assist device. *Proc. IASTED International Conference on Biomechanics*, H.M. Hamza (Editor), Rhodes, Greece, June 30-July 2, 2003, pages 92–96.
- [71] Y. Bourgault and M. Ethier. Unstructured finite element method for a 3-D anisotropic bidomain model. *Second MIT Conference on Computational Fluid and Solid Mechanics*, Massachusetts Institute of Technology, Cambridge, MA, June 17-20, 2003, pages 1634–1637.
- [72] P. Tremblay, Y. Bourgault and S. Tavoularis. Control of discretization error for time-continuous space-time FEM through mesh movement. *Second MIT Conference on Computational Fluid and Solid Mechanics*, Massachusetts Institute of Technology, Cambridge, MA, June 17-20, 2003, pages 2156–2159.
- [73] Y. Bourgault and M. Ethier. Simulation of electrophysiological waves with an unstructured finite element method. (Invited speaker) *MS4CMS'02*, INRIA-Rocquencourt, Paris, France, November 12-15, 2002, pages 12–16.
- [74] Y. Bourgault. A mortar element for coupling hyperbolic and parabolic problems. *10th Annual Conference of the CFD Society of Canada*, University of Windsor, Windsor, Ontario, Canada, June 9-11, 2002, pages 343–346.
- [75] P. Tremblay, Y. Bourgault and S. Tavoularis. Time-accurate CFD through mesh adaptation on completely unstructured space-time grids. *10th Annual Conference of the CFD Society of Canada*, University of Windsor, Windsor, Ontario, Canada, June 9-11, 2002, pages 323–326.
- [76] A. El Boukili and Y. Bourgault. Domain decomposition with mortar elements for hyperbolic problems. *First MIT Conference on Computational Fluid and Solid Mechanics*, Massachusetts Institute of Technology, Cambridge, MA, June 12-14, 2001, pages 830–832.
- [77] W.G. Habashi and Y. Bourgault. A new PDE-based Icing Model in FENSAP-ICE. *Canadian Aeronautics and Space Institute, 7th CASI Aerodynamics Symposium*, Montreal, Quebec, Canada, May 2-5, 1999, pages 475-482.
- [78] Y. Bourgault, H. Beaugendre and W.G. Habashi. Development of a Shallow Water Icing Model in FENSAP-ICE. AIAA Paper 99-0246, *37th AIAA Aerospace Science Meeting and Exhibit*, Reno, NV, January 1999.
- [79] Y. Bourgault, H. Beaugendre, W.G. Habashi, C. Y. Lepage and G. Croce. FENSAP-ICE: A new Equilibrium Model for Ice Accretion, including Film Runback and Conjugate Heat Transfer. In *Fourth ECCOMAS Computational Fluid Dynamics Conference* vol. 1., Athens, Greece, September 1998. John Wiley, pages 723–728.
- [80] W.G. Habashi, Y. Bourgault, Z. Boutanios, G. Baruzzi, G. Wagner and G. Croce. Putting Computer on Ice: A CFD Integrated Approach to the In-Flight Icing Problem. In *Fourth ECCOMAS Computational Fluid Dynamics Conference* vol. 2., Athens, Greece, September 1998. John Wiley, pages 512–517.
- [81] Z. Boutanios, Y. Bourgault, S. Cober, G. A. Isaac and W.G. Habashi. 3D Droplets Impingement Analysis around an Aircraft's Nose and Cockpit using FENSAP-ICE. AIAA Paper 98-0200, *36th AIAA Aerospace Science Meeting and Exhibit*, Reno, NV, January 1997.
- [82] J. Dompierre, D. J. Cronin, Y. Bourgault, G. Baruzzi, W.G. Habashi and G. A. Wagner. Numerical simulation of performance degradation of ice contaminated airfoils. AIAA Paper 97-2235, *15th AIAA Applied Aerodynamics Conference*, Atlanta, GA, June 1997.
- [83] W.G. Habashi, Y. Bourgault, J. Dompierre, G. S. Baruzzi, D. J. Cronin and G. A. Wagner. A Modern CFD Look at In-Flight Icing Phenomena. *16th Canadian Congress of Applied Mechanics*, Quebec City, Quebec, Canada, June 1-8, 1997.

- [84] W.G. Habashi, Y. Bourgault, J. Dompierre, G. S. Baruzzi, D. J. Cronin and G. A. Wagner. Putting Computer on Ice: A CFD Integrated Approach to the In-Flight Icing Problem. *Canadian Aeronautics and Space Institute, 6th CASI Aerodynamics Symposium*, Toronto, Ontario, Canada, April 28-30, 1997.
- [85] D. J. Cronin, J. Dompierre, Y. Bourgault, G. S. Baruzzi, W.G. Habashi and G. A. Wagner. Numerical simulation of performance degradation due to small-scale roughness. *Canadian Aeronautics and Space Institute, 6th CASI Aerodynamics Symposium*, Toronto, Ontario, Canada, April 28-30, 1997.
- [86] Y. Bourgault, W.G. Habashi, J. Dompierre, Z. Boutanos and W. Di Bartolomeo. An Eulerian approach to supercooled droplets impingement calculations. *AIAA Paper 97-0176, 35th AIAA Aerospace Science Meeting and Exhibit*, Reno, NV, January 1997.
- [87] J. Dompierre, M.-G. Vallet, M. Fortin, Y. Bourgault and W.G. Habashi. Anisotropic Mesh Adaptation: Towards a Solver and User Independent CFD. *AIAA Paper 97-0861, 35th AIAA Aerospace Science Meeting and Exhibit*, Reno, NV, January 1997.
- [88] W.G. Habashi, M. Fortin, J. Dompierre, M.-G. Vallet and Y. Bourgault. A mesh optimizer for CFD. *ASME International Congress on Fluid Dynamics & Propulsion*, Cairo, Egypt, December 29-31, 1996.
- [89] Y. Bourgault, W.G. Habashi, J. Dompierre, G. Baruzzi and G. Chevalier. An Eulerian computational approach to ice droplets impingement. In *Third ECCOMAS Computational Fluid Dynamics Conference*, Paris, September 1996. John Wiley, pages 827–833.
- [90] M. Fortin, M.-G. Vallet, J. Dompierre, Y. Bourgault and W.G. Habashi. Anisotropic mesh adaptation: Theory, validation and 2-D applications. In *Third ECCOMAS Computational Fluid Dynamics Conference*, Paris, September 1996. John Wiley, pages 174–180.
- [91] M.-G. Vallet, J. Dompierre, Y. Bourgault, M. Fortin and W.G. Habashi. Coupling flow solvers and grid through an edge-based adaptive grid method. In *ASME Fluids Engineering Conference, FED-Vol. 238*, volume 3, pages 209–215, San Diego, California, July 1996.
- [92] Y. Bourgault, W.G. Habashi, J. Dompierre and G. Chevalier. A finite element Eulerian approach to the in-flight icing problem. In *15th International Conference on Numerical Methods in Fluid Dynamics*, Monterey, California, Springer-Verlag, June 1996.
- [93] Y. Bourgault, W.G. Habashi, J. Dompierre, G. Chevalier and W. Di Bartolomeo. An Eulerian approach to ice droplets impingement calculations. In *FAA International Conference on Aircraft In-flight Icing*, Washington, D.C., May 1996. FAA, US Department of Transportation, pages 275–284.
- [94] M. Fortin, Y. Bourgault, W.G. Habashi, J. Dompierre and M.-G. Vallet. Mesh adaptation for viscous compressible flows. In M. Morandi Cecchi, K. Morgan, J. Périaux, B. A. Schrefler and O. C. Zienkiewicz, editors, *Ninth International Conference on Finite Element in Fluids, New Trends and Applications*, Venezia, Italy, October 1995. John Wiley, pages 1151–1160.
- [95] J. Dompierre, M.-G. Vallet, M. Fortin, W.G. Habashi, D. Aït-Ali-Yahia, S. Boivin, Y. Bourgault and A. Tam. Edge-base mesh adaptation for CFD. In *Conference on Numerical Methods for the Euler and Navier-Stokes Equations*, pages 265–299, Montréal, September 1995. CRM-CERCA.
- [96] Y. Bourgault, Ph. Caussignac and L. Renggli. Numerical methods for parabolized Navier-Stokes equations. In *Proc. 10th Internat. Conf. on Computing Methods in Applied Sciences and Engineering*, Paris, 1992. INRIA

NON-REFEREED PUBLICATIONS

Chapters in books

- [97] G. Psfogiannakis, Y. Bourgault, B.E. Conway, M. Ternan. The electro-catalytic and mass transfer components of the electrode potential loss in a PAFC cathode determined using a numerical model, in *Polymer Electrolyte Membrane Fuel Cells and Electrocatalysts*, (ed. Richard Esposito and Antonio Conti) Novascience, New York, 2009.

Journal Papers

- [98] W.G. Habashi, G. Guèvremont, Y. Bourgault, G. Chevalier, J. Dompierre, G. Wagner, P.L. Kotiuga, , W. Di Bartolomeo, A. Tremblay and F. Tezok. Newly formed research consortium explores ways to achieve optimal design of ice protection systems. *International Civil Aviation Organization (ICAO) Journal*, 50:14–17, October 1995.

Workshops and Specialized Courses, with Proceedings

- [99] W.G. Habashi and Y. Bourgault. A Modern Approach to CFD Simulation of Aircraft and Engine Icing Phenomena. Kansas University Icing Course, San Diego, September 1998.
- [100] W.G. Habashi, M. Fortin, D. Aït-Ali-Yahia, S. Boivin, Y. Bourgault, J. Dompierre, M. P. Robichaud, A. Tam and M.-G. Vallet. Anisotropic mesh optimization: Towards a solver-independent and mesh-independent CFD. VKI Lecture Series 1996-06, 1996.
- [101] W.G. Habashi, M. Fortin, J. Dompierre, M.-G. Vallet and Yves Bourgault. Anisotropic mesh adaptation: A step towards a grid-independent and user-independent CFD. Invited Keynote Address at ICASE-NASA Langley Research Center *Workshop on Barriers and Challenges in CFD*, Hampton, VA, August 1996 (published in a book by Kluger).

Conferences without Proceedings

[C73] Y. Bourgault, S. Keita and A. Beljadid. *Mass-conservative and positivity preserving second-order methods for high order parabolic equations*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Waterloo, Waterloo, 21-24 June, 2021.

[C72] D. Fokoué and Y. Bourgault. *Various numerical methods for the microscopic cardiac electrophysiology model*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Waterloo, Waterloo, 21-24 June, 2021.

[C71] S. Keita, A. Beljadid and Y. Bourgault. *Unsaturated flow and transport in arid and semi-arid regions: An efficient high-order numerical model for capillary-driven flows*, Summer School on Hydroinformatics, Mohammed VI Polytechnic University (UM6P), Benguerir, Morocco, 8-12 July, 2019.

[C70] D. Fokoué and Y. Bourgault. *Numerical methods for the microscopic cardiac electrophysiology model*, Annual Meeting of the Society for Mathematical Biology, Montreal, 22-26 July, 2019.

[C69] S. Keita, A. Beljadid and Y. Bourgault. *Efficient high-order finite element methods for fourth-order nonlinear equations*, 1st Spring School on Complexity Analysis of Industrial Systems and Advanced Modeling (CAISAM), Mohammed VI Polytechnic University (UM6P), Benguerir, Morocco, 25-27 April, 2019.

[C68] D. Fokoué and Y. Bourgault. *Numerical methods for the microscopic cardiac electrophysiology model*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Ryerson University, Toronto, 4-7 June, 2018.

[C67] S. Keita and Y. Bourgault. *An Eulerian droplet model: Mathematical analysis and improvement*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Ryerson University, Toronto, 4-7 June, 2018.

[C66] S.C.E.R. Koyaguerebo-Ime and Y. Bourgault. *Arbitrary order A-stable methods for ordinary differential Equations via deferred correction*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Ryerson University, Toronto, 4-7 June, 2018.

[C65] Y. Bourgault. *How close can be the solutions of the monodomain and bidomain models?*, Applied Analysis Day, Carleton University, Ottawa, 20 October, 2017. In celebration of the 25th anniversary of the Fields Institute.

[C64] K.C. Loy and Y. Bourgault. *Efficient high-order time-stepping methods for 3d incompressible flows*, 14th U.S. National Congress on Computational Mechanics (USNCCM14), Montreal, 17-20 July, 2017.

[C63] E. Boey, Y. Bourgault and T. Giordano. *Anisotropic a posteriori error estimation and mesh adaptation for the monodomain model in cardiac electrophysiology*, 14th U.S. National Congress on Computational Mechanics (USNCCM14), Montreal, 17-20 July, 2017.

- [C62] D.V. Pongui-Ngoma, Y. Bourgault and H. Nkounkou. *Numerical methods for parameter identification of cardiac electrophysiology models*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Alberta, Edmonton, 26-30 June, 2016.
- [C61] E. Boey, Y. Bourgault and T. Giordano. *Anisotropic residual space-time adaptation: applications to cardiac electrophysiology*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Alberta, Edmonton, 26-30 June, 2016.
- [C60] K.C. Loy and Y. Bourgault. *On Several high-order semi-implicit time-stepping schemes for non-stationary incompressible flows*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Alberta, Edmonton, 26-30 June, 2016.
- [C59] B. Parackal, J. Malette, Y. Bourgault and M. Ternan. *Progress toward a low temperature direct propane fuel cell with modified zirconium phosphate electrolyte and silver-nickel catalyst*, 24th Canadian Symposium on Catalysis, University of Ottawa, Ottawa, 8-11 May, 2016.
- [C58] B. Parackal, H. El-Bairam, Y. Bourgault and M. Ternan. *A low-temperature direct methane fuel cell having a modified zirconium phosphahate electrolyte*, 65th Canadian Chemical Engineering Conference, Calgary, 4-7 October, 2015.
- [C57] D.V. Pongui-Ngoma, Y. Bourgault and H. Nkounkou. *Numerical methods for parameter identification of cardiac electrophysiology models*, Applied Mathematics, Modeling and Computational Science (AMMCS) and Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Wilfrid Laurier University, Waterloo, 7-12 June, 2015.
- [C56] K.C. Loy and Y. Bourgault. *High-Order Semi-Implicit Time-Stepping Methods for Navier-Stokes Equations*, Applied Mathematics, Modeling and Computational Science (AMMCS) and Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Wilfrid Laurier University, Waterloo, 7-12 June, 2015.
- [C55] S. Keita and Y. Bourgault. *Eulerian modelling of air-droplets flow: Perspectives and numerical solutions*, Applied Mathematics, Modeling and Computational Science (AMMCS) and Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Wilfrid Laurier University, Waterloo, 7-12 June, 2015.
- [C54] T. Roy and Y. Bourgault. *Time-Stepping Methods in Cardiac Electrophysiology*, Applied Mathematics, Modeling and Computational Science (AMMCS) and Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), Wilfrid Laurier University, Waterloo, 7-12 June, 2015.
- [C53] K.C. Loy and Y. Bourgault. *On second and third order semi-implicit time integration schemes for incompressible Navier-Stokes Equations*, 8th Montreal Scientific Computing Days, 11-12 May, 2015.
- [C52] G.L. Ndetchoua Kouamo and Y. Bourgault. *Dirichlet-Neumann domain decomposition methods for the pure Neumann problem*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Saskatoon, 22-26 June, 2014.
- [C51] E. Boey, Y. Bourgault and T. Giordano. *Anisotropic element based mesh adaptation with residual a posteriori error estimators*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Saskatoon, 22-26 June, 2014.
- [C50] Y. Bourgault, Y. Coudière, C. Pierre and M. Rioux. *Optimal monodomain approximations of the bidomain model used in cardiac electrophysiology*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Université Laval, Quebec City, 16-20 June, 2013.
- [C49] M. Rioux and Y. Bourgault. *Anisotropic mesh adaptation for electrical waves in a heart-torso geometry*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Université Laval, Quebec City, 16-20 June, 2013.
- [C48] M. McLeod and Y. Bourgault. *Mixed finite element methods for multi-species diffusion using Stefan-Maxwell equations*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Université Laval, Quebec City, 16-20 June, 2013.
- [C47] J. Hussain Al-Smail and Y. Bourgault. *On the Optimal Geometric Design for the Cathode Air Channel of Hydrogen Fuel Cells*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Université Laval, Quebec City, 16-20 June, 2013.
- [C46] M. McLeod and Y. Bourgault. *Mixed finite element methods for multi-species diffusion using Stefan-Maxwell equations*, 7th Montreal Scientific Computing Days, 13-15 May, 2013.

- [C45] H. Khakdaman, Y. Bourgault and M. Ternan. *Domain Decomposition Methods for Modelling Mass Transfer in Fuel Cells*, Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Fields Institute, Toronto, 24-28 June, 2012.
- [C44] J.H. Al-Smail, Y. Bourgault and A. Novruzi. *Optimal Shape Design of the Cathode Channel of Hydrogen Fuel Cells*, 1st Ottawa Fuel Cell Colloquium, Carleton University, Ottawa, 29 April, 2011.
- [C43] H. Khakdaman, Y. Bourgault and M. Ternan. *Computational modeling of a direct propane fuel cell*, 1st Ottawa Fuel Cell Colloquium, Carleton University, Ottawa, 29 April, 2011.
- [C42] Y. Bourgault, O. Rousseau and M. Rioux, *Défis du calcul en électrophysiologie cardiaque*, Journée en hommage à Michel Fortin, Conférence CRM-GIREF, Quebec City, 25-27 May, 2010.
- [C41] M. Rioux, Y. Bourgault and O. Rousseau, *Le couplage coeur-thorax avec interfaces définies par ensembles de niveaux*, Conférence CRM-GIREF, Quebec City, 25-27 May, 2010.
- [C40] H.R. Khakdaman, Y. Bourgault and M. Ternan. *A mathematical model showing temperature variations in a direct propane fuel cell*, 217th Electrochemical Society Meeting, Vancouver, 25-30 April, 2010.
- [C39] M. Doyle, S. Tavoularis and Y. Bourgault, *Simulations of heart mechanics during a heartbeat*, 1000 Islands Fluid Conference, Kingston, Ontario, April, 2010.
- [C38] M. Doyle, S. Tavoularis and Y. Bourgault, *Simulations of heart mechanics over the cardiac cycle*, 62nd Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis, MN, 22-24 November, 2009.
- [C37] A. Iolov, Y. Bourgault, R. Owens and A. Fortin, *Microstructure-based rheological fluid flow simulations applied to blood*, 6ièmes Journées montréalaises de calcul scientifique, 4-6 May, 2009.
- [C36] O. Rousseau and Y. Bourgault, *An hybrid active contour method for heart segmentation*, 6ièmes Journées montréalaises de calcul scientifique, 4-6 May, 2009.
- [C35] M. Rioux, Y. Bourgault, Y. Belhamadia and O. Rousseau, *Coupling methods for problems in cardiac electrophysiology*, 6ièmes Journées montréalaises de calcul scientifique, 4-6 May, 2009.
- [C34] M. Doyle, S. Tavoularis and Y. Bourgault, *Simulations of heart mechanics*, 1000 Islands Fluid Conference, Kingston, Ontario, April, 2009.
- [C33] Y. Bourgault, *Simulation of flow and aerosol in the airway tract*, CMS Winter Meeting 2008, Ottawa, 6-8 December, 2008.
- [C32] O. Rousseau and Y. Bourgault, *An iterative active contour algorithm applied to heart segmentation*, SIAM Conference on Imaging Science, San Diego, CA, 7-9 July, 2008.
- [C31] O. Rousseau and Y. Bourgault, *An iterative active contours algorithm applied to heart segmentation*, First CRM-INRIA-MITACS Meeting, Université de Montréal, Montréal, 5-9 May, 2008.
- [C30] M. Doyle, S. Tavoularis and Y. Bourgault, *Blood flow and left ventricular myocardium motion*, First CRM-INRIA-MITACS Meeting, Université de Montréal, Montréal, 5-9 May, 2008.
- [C29] M. Doyle, S. Tavoularis and Y. Bourgault, *Adaptation of a hyperelastic material model for use in simulations of left ventricular myocardium motion*, 1000 Islands Fluid Conference, Kingston, Ontario, 25-27 April, 2008.
- [C28] Y. Bourgault and M. Thiriet, *Simulation of aerosols in the airway tract with a 3-D Eulerian model*, 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, 16-20 July, 2007.
- [C27] Frederic Alauzet, Yves Bourgault, Adrien Loseille et Marco Picasso, *A comparison of error estimators for the anisotropic mesh adaptation in 3-D compressible flow simulations*, 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, 16-20 July, 2007.
- [C26] M. Doyle, S. Tavoularis and Y. Bourgault, *Numerical Simulation of Left and Right Ventricle Filling with Fluid-Structure Interaction*, Fourth MIT Conference on Computational Fluid and Solid Mechanics, Massachusetts Institute of Technology, Cambridge, MA, June 13-13, 2007.
- [C25] M. Doyle, S. Tavoularis and Y. Bourgault, *Numerical simulation of blood flow in the canine heart with fluid-structure interaction*, 1000 Islands Fluid Conference, Kingston, Ontario, 4-6 May, 2007.
- [C24] O. Rousseau and Y. Bourgault, *An iterative active contour algorithm applied to heart segmentation*, The Fourth Montreal Scientific Computing Days, CRM, Université de Montréal, Montréal, 16-17 April, 2007.

- [C23] M. Doyle, S. Tavoularis and Y. Bourgault, *Blood flow and wall motion in an idealized left ventricle*, 59th Annual Meeting of the APS Division of Fluid Dynamics, University of Florida, Tampa Bay, Florida, 19-21 November, 2006.
- [C22] M. Doyle, M. Paciocco, G. Desjardins, J.-B. Vergniaud, S. Tavoularis and Y. Bourgault, *Numerical and experimental modelling of blood flow in artificial and natural hearts with fluid-structure interaction*, 16th World Congress of the World Society of Cardio-Thoracic Surgeons, Ottawa, Ontario, 17-20 August, 2006.
- [C21] J. Saleh, Y. Bourgault and M. Ternan, *Two-Phase Counter-Current Gas-Liquid Flow in the Backing Layer of a Methanol Fuel Cell*, Workshop on Numerical, Mathematical and Modeling Analysis related to Fluid Dynamics in Hydrogen Fuel Cells, University of Ottawa, Ottawa, Ontario, 10-12 May, 2006.
- [C20] M. Doyle, S. Tavoularis and Y. Bourgault, *Numerical simulation of blood flow in the canine heart with fluid-structure interaction*, 1000 Islands Fluid Conference, Kingston, Ontario, 6-7 May, 2006.
- [C19] C. Olah and Y. Bourgault, *Numerical investigations of periodically forced internal flows*, The Third Montreal Scientific Computing Days, CRM, Université de Montréal, Montréal, 25-26 February, 2006.
- [C18] C. Olah and Y. Bourgault, *Numerical investigations of periodically-driven flows*, Third MIT Conference on Computational Fluid and Solid Mechanics, Massachusetts Institute of Technology, Cambridge, MA, June 14-17, 2005.
- [C17] M. Doyle, S. Tavoularis and Y. Bourgault, *Computation of blood flow in a ventricular assist device with fluid-structure interaction effects*, Workshop on “Procédures mini-invasives en médecine et chirurgie: défis mathématiques et numériques”, CRM, Université de Montréal, Montréal, 23-27 May, 2005.
- [C16] C. Olah and Y. Bourgault, *Numerical investigations of periodically-driven flows*, Workshop on “Procédures mini-invasives en médecine et chirurgie: défis mathématiques et numériques”, CRM, Université de Montréal, Montréal, 23-27 May, 2005.
- [C15] C. Olah and Y. Bourgault, *Numerical investigations of periodically-driven flows*, Workshop on “Numerical and analytical methods in fluid dynamics”, Fields Institute/Carleton University, Ottawa, 5-7 May, 2005.
- [C14] P. Tremblay, Y. Bourgault and S. Tavoularis, *Time-continuous versus time-discontinuous finite element methods for the Navier-Stokes equation*, 1000 Islands Fluid Conference, Kingston, Ontario, 7-9 May, 2004.
- [C13] M. Doyle, S. Tavoularis and Y. Bourgault, *Blood flow simulation in a ventricular assist device*, 1000 Islands Fluid Conference, Kingston, Ontario, 7-9 May, 2004.
- [C12] C. Olah and Y. Bourgault, *Time-periodic solutions of PDE's*, Journées Montréalaises de Calcul Scientifique, CRM, Montreal, 28-29 February, 2004.
- [C11] G. Psfogiannakis, Y. Bourgault, B. Conway and M. Ternan, *Modeling of a direct hydrocarbon fuel cell*, 18th Canadian Catalysis Symposium, Montreal, 16-19 May, 2004.
- [C10] M. Doyle, S. Tavoularis and Y. Bourgault, *Simulation of blood flow in an artificial heart with fluid-structure interaction*, 56th Ann. Meet. Amer. Phys. Soc., New Jersey, USA, to appear in Bull. Amer. Phys. Soc. 48, 2003.
- [C9] M. Doyle, S. Tavoularis and Y. Bourgault, *Computation of blood flow in a diaphragm-type ventricular assist device*, 1000 Islands Fluid Conference, Kingston, Ontario, 9-11 May, 2003.
- [C8] P. Tremblay, Y. Bourgault and S. Tavoularis, *Space-time mesh adaptation for computational fluid dynamics*, 1000 Islands Fluid Conference, Kingston, Ontario, 9-11 May, 2003.
- [C7] G. Psfogiannakis, Y. Bourgault, B. Conway and M. Ternan, *A mathematical model for a direct propane phosphoric acid fuel cell*, 203rd Meeting of The Electrochemical Society, Paris, France, 27 April-2 May, 2003.
- [C6] Y. Bourgault, *A mortar element for coupling hyperbolic and parabolic problems*, Canadian Mathematical Society Winter Meeting, Ottawa, 8-10 December, 2002.
- [C5] G. Psfogiannakis, Y. Bourgault, B. Conway and M. Ternan, *A One-Dimensional Model of a Direct Propane Fuel Cell*, 52nd Canadian Chemical Engineering Conference, Vancouver, B.C., 20-23

October, 2002.

[C4] P. Tremblay, Y. Bourgault and S. Tavoularis, *Time-Accurate CFD Through Mesh Adaptation on Completely Unstructured Space-Time Grids*, 1000 Islands Fluid Conference, Kingston, Ontario, 3-5 May, 2002.

[C3] P. Tremblay, Y. Bourgault and S. Tavoularis, *Towards Time-Accurate CFD Through Space-Time Mesh Adaptation*, 1000 Islands Fluid Conference, Kingston, Ontario, 4-6 May, 2001.

[C2] Y. Bourgault, *An Eulerian approach to in-flight icing droplets impingement*, 1000 Islands Fluid Conference, Kingston, Ontario, 11-13 April, 1997.

[C1] Y. Bourgault, *Les méthodes d'éléments finis et leur capacité à calculer de bonnes positions de chocs*, 43ième Colloque des Sciences Mathématiques du Québec, Université du Québec à Chicoutimi, 22-23 April, 1995.

Plenary Talks and Public Lectures

[PL2] *Calcul numérique et modélisation mathématique: Pourquoi a-t-on besoin de supercalculateurs?*, Talk at the Undergraduate Math Club, Department of Mathematics and Statistics, University of Ottawa, 30 November, 2017.

[PT6] *Les mathématiques du battement cardiaque*, Opening talk at the 61ème Congrès de l'Association mathématique du Québec "Les mathématiques au service de l'être humain", CEGEP de l'Outaouais, Gatineau, 13-14 October, 2017.

[PL1] *Calcul numérique et modélisation mathématique: Pourquoi a-t-on besoin de supercalculateurs?*, Public lecture at the CEGEP de l'Outaouais, Gatineau, 18 September, 2013.

[PT5] *Modèles et calculs en électrophysiologie cardiaque*, Plenary talk at the "XVI Colloque panquébécois des étudiants de l'ISM", McGill University, Montréal, 17-19 May, 2013.

[PT4] *Understanding the Heart - Problems, models and methods*, Plenary talk at the "4th Annual Ottawa Mathematics Conference", University of Ottawa, 13-14 May, 2011.

[PT3] *Modéliser le vivant à l'échelle des organes*, Plenary talk at the "Colloque panquébécois ISM des étudiants avancés en mathématiques et statistique", Université Laval, Québec, 23-25 May, 2006.

[PT2] *Problèmes, modèles et calculs en cardiologie*, Plenary talk at the 60ème Colloque des sciences mathématiques du Québec, Ottawa, Ontario, 4 October, 2003.

[PT1] *Update on FENSAP-ICE – Presentation of the Shallow Water Icing Model*, Society for Automotive Engineering, AC-9C Subcommittee Meeting on Aircraft Icing Technology, Bridgeport, Connecticut, 13 October, 1998.

Invited Seminars

[S36] *Modélisation numérique de phénomènes complexes - Applications aux coeur, poumons et piles à combustible*, Seminar of the International Water Research Institute, Mohammed VI Polytechnic University, Morocco, 21 February, 2019.

[S35] *Estimation d'erreur et adaptation anisotrope de maillages pour les équations de réaction-diffusion*, Séminaire de mathématiques et leurs applications, Université de Pau et des Pays de l'Adour, 28 septembre, 2017.

[S34] *Méthodes numériques pour l'identification de paramètres en électrophysiologie cardiaque*, Séminaire de calcul scientifique et modélisation, Institut de mathématiques de Bordeaux, Université de Bordeaux, 17 mars, 2016.

[S33] *Problems and numerical methods for fuel cell modelling, Part I: Solving Maxwell-Stefan equations*, Seminar, Department of Mathematics and Statistics, King Fahd University of Petroleum and Minerals, Dammam, Saudi Arabia, 5 May, 2014.

[S32] *Problems and numerical methods for fuel cell modelling, Part II: Solving pure Neumann problems*, Seminar, Department of Mathematics and Statistics, King Fahd University of Petroleum and Minerals, Dammam, Saudi Arabia, 7 May, 2014.

[S31] *Divers travaux de modélisation en électrophysiologie cardiaque*, Séminaire de l'IHU-LIRYC, Institut de Rythmologie et de modélisation Cardiaque, Institut hospitalo-universitaire, Bordeaux, 18 November, 2013.

- [S30] *Problèmes et méthodes de calcul pour les piles à combustible*, Séminaire de calcul scientifique et modélisation, Institut de mathématiques de Bordeaux, Université de Bordeaux, 14 November, 2013.
- [S29] *Modélisation et calcul en électrophysiologie cardiaque*, Séminaire de calcul scientifique et modélisation, Institut de mathématiques de Bordeaux, Université de Bordeaux I, 25 October, 2012.
- [S28] *Le modèle bidomaine et son approximation*, Séminaire d'analyse numérique et de calcul scientifique, Institut d'Analyse et Calcul Scientifique – Ecole Polytechnique Fédérale de Lausanne, 20 May, 2009.
- [S27] *A posteriori error estimation and anisotropic mesh adaptation in 3-D compressible flow simulations*, Applied Mathematics Seminar, Department of Mathematics and Statistics, McGill University, 22 January, 2008.
- [S26] *A posteriori error estimation and anisotropic mesh adaptation in 3-D compressible flow simulations*, Department of Mechanical and Aerospace Engineering, Carleton University, 23 November, 2007.
- [S25] *Modélisation des aérosols dans les voies respiratoires*, Séminaire de mathématiques, Laboratoire de Mathématiques Appliquées, Université de Pau et des Pays de l'Adour, France, 5 April, 2007.
- [S24] *Modélisation des aérosols dans les voies respiratoires*, Séminaire de mathématiques appliquées, Laboratoire Jean Leray, Université de Nantes, France, 22 March, 2007.
- [S23] *Modélisation des aérosols dans les voies respiratoires*, Séminaire de l'équipe EDP, Laboratoire de Mathématiques (LAMA), Université de Savoie, Chambéry, France, 16 March, 2007.
- [S22] *Modélisation des aérosols dans les voies respiratoires*, Séminaire de mathématiques appliquées, Laboratoire de Mathématiques, Université Blaise Pascal, Clermont-Ferrand, France, 8 February, 2007.
- [S21] *Modéliser le vivant à l'échelle des organes*, Invited Seminar at the “Séminaire IACS à St-Luc – Hôtel Weisshorn”, EPFL, Lausanne, 13-15 September, 2006.
- [S20] *Mathematical properties and numerical methods for bidomain models*, Seminar Series in Quantitative Biology, Centre for Nonlinear Dynamics in Physiology and Medicine, Department of Physiology, McGill University, 11 November, 2004.
- [S19] *Calcul d'ondes électro-physiologiques à l'aide du modèle bi-domaine*, Séminaire de mathématiques appliquées, Laboratoire Jean Leray, Université de Nantes, France, 1 July, 2004.
- [S18] *Problems, models and computations in cardiology*, Department of Physics, University of Ottawa, 11 March, 2004.
- [S17] *Numerical modelling of electrophysiological waves with bidomain models*, Applied Mathematics Seminar, Department of Mathematics and Statistics, McGill University, 23 February, 2004.
- [S16] *Problems, Models and Computations in Cardiology*, Invited talk at the Third HPCVL Symposium, Queen's University, 24 October, 2003.
- [S15] *Simulation d'ondes électro-physiologiques*, GIREF, Université Laval, 28 October, 2002.
- [S14] *Méthode d'élément mortier pour couplage de modèles hyperboliques et paraboliques*, Laboratoire d'analyse numérique (LAN), Université Paris VI, 7 December, 2001.
- [S13] *Méthode d'éléments finis pour un modèle bi-domaine et ondes spirales*, INRIA, Rocquencourt, December 6, 2001.
- [S12] *Modélisation numérique du dépôt de glace*, GIREF, Université Laval, 11 May, 2000.
- [S11] *From Fluids to Computational Fluid Dynamics*, New Professor Lecture Program, Faculty of Science, University of Ottawa, 10 April, 2000.
- [S10] *The numerical modelling of in-flight icing*, Department of Mechanical Engineering, University of Ottawa, 12 November, 1999.
- [S9] *On the Use of Computational Fluid Dynamics for the Simulation of In-Flight Icing*, Department of Mathematics and Statistics, University of Ottawa, 18 February, 1999.
- [S8] *New Approaches to the Simulation of In-Flight Icing*, Department of Applied Mathematics, University of Western Ontario, 9 February, 1999.
- [S7] *FENSAP-ICE: A Modern, Integrated and Modular Code for the In-Flight Icing Problem – Presentation of the Eulerian Droplets model and the Shallow Water Icing Model*, Ohio Aerospace Institute & NASA Lewis, Cleveland, Ohio, 10 November, 1998.
- [S6] *Aero-Icing*, Pratt-Whitney Canada, Montreal, 18 December, 1997.
- [S5] *Aero-Icing using CFD*, Boeing, Seattle, 1-2 December, 1997.

[S4] *Aero-Icing using CFD*, Bombardier Aerospace, Montreal, 11 November, 1997.

[S3] *Numerical Simulation of In-Flight Icing*, Department of Aerospace, University of Illinois at Urbana-Champaign, 20 May, 1997.

[S2] *Finite element methods and their efficiency in computing shock position*, Department of Applied Mathematics and Statistics, State University of New York at Stony Brook, 29 March, 1995.

[S1] *Une simple corde vibrante*, Département de Mathématiques et de Statistique, Université Laval, 21 March, 1995.

Workshops and Specialized Courses, without Proceedings

[WC16] E. Boey, Y. Bourgault and T. Giordano. *Anisotropic a posteriori error estimators for the monodomain model*, Workshop on Mathematical Methods in Cardiac Electrophysiology, CNRS-ANR/Fields Institute Workshop, University of Ottawa, 4-6 November, 2017.

[WC15] K.C. Loy and Y. Bourgault. *On several high-order semi-implicit time-stepping schemes for unsteady Navier-Stokes equations*, Workshop on Applications and New Frontiers for the Finite Element Method, CRM Thematic Semester, Université Laval, Quebec City, 9-13 May, 2016.

[WC14] Y. Bourgault. *Numerical Modelling in Cardiac Electrophysiology*, Workshop on Recent Advances in Computational Mathematics and Applications, Tsinghua Sanya International Mathematics Forum (TSIMF), Sanya, China, 8-12 December, 2014.

[WC13] Y. Bourgault. *Partial differential equations, modelling and numerical methods*. Intensive graduate course at the African Institute of Mathematical Sciences (AIMS), Senegal, 6-24 January, 2014 (30 hours of lectures).

[WC12] M. Rioux, Y. Belhamadia, A. Fortin and Y. Bourgault. *Anisotropic mesh adaptation for electrophysiological computations*, Poster presented at the Workshop de L'Institut de Rythmologie et modélisation Cardiaque (LIRYC), Château Pape Clément, Bordeaux, France, 24-25 October, 2013.

[WC11] Y. Bourgault. *Error estimation and anisotropic mesh adaptation*, Invited talk at the Symposium on Current Research in Numerical Analysis, Graduate Center of CUNY, City University of New York, 25 April, 2013.

[WC10] Y. Bourgault. *Partial differential equations, modelling and numerical methods*. Intensive graduate course at the African Institute of Mathematical Sciences (AIMS), Senegal, 1-21 December, 2012 (30 hours of lectures).

[WC9] Y. Bourgault, M. Rioux and O. Rousseau. *Towards patient-specific electro-mechanical models of the heart*, Invited talk at the Cardiac Tissue Characterization and Image-Based Models Workshop, Sunnybrook Research Institute, Toronto, 25-27 June, 2012.

[WC8] Y. Bourgault. *Partial differential equations, modelling and numerical methods*. Intensive graduate course at the African Institute of Mathematical Sciences (AIMS), Senegal, 10-31 March, 2012 (30 hours of lectures).

[WC7] Y. Bourgault. *A finite element method for a rheological model of blood with red-blood-cell aggregation*. Nonstandard Discretizations for Fluid Flows, BIRS Workshop, 21-26 November, 2010.

[WC6] Y. Bourgault, Y. Coudière, C. Pierre, M. Rioux and O. Rousseau. *The bidomain operator and its approximation*. Workshop on Methods and Applications of Cardiac Electromechanical Models, Graz, Austria, 29-31 October, 2009.

[WC5] Y. Bourgault and M. Thiriet. *Critical aspects of flow and aerosol simulations in the airway tract*. First CRM-INRIA-MITACS Meeting, Université de Montréal, Montréal, 5-9 May, 2008.

[WC4] Y. Bourgault. *Écoulements compressibles, théorie et résolution numérique*. Doctoral School, EPFL, Lausanne, January, 2007 (4 1.5-hour lectures).

[WC3] Y. Bourgault. *Models of particles in bio-fluid flows*, Invited talk at the workshop on “Procédures mini-invasives en médecine et chirurgie: défis mathématiques et numériques”, CRM, Université de Montréal, Montréal, 23-27 May, 2005.

[WC2] Y. Bourgault. *Computing Waves with Finite Element Methods*, Invited speaker at the workshop on “Numerical and analytical methods in fluid dynamics”, Fields Institute/Carleton University, Ottawa, 5-7 May, 2005 (3 one-hour lectures).

[WC1] Y. Bourgault. *Modelling electrophysiological waves with bidomain models*, Invited talk at the CEA-INRIA-EDF Summer School “Electromechanical behavior of the heart: confronting models with

data towards medical applications”, Paris, France, 26-30 April, 2004.

Other Publications

[P12] Saint-Cyr Elvi Rodrigue Koyaguerebo-Imé, *Arbitrary high order A-stable time-stepping methods via deferred correction: Application to reaction-diffusion equations*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, August 2020.

[M18] Jacob Pearce-Lance, *Methods for parameter identification in the Mitchell-Shaeffer model*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, Septembre 2019.

[P11] Sana Keita, *Eulerian droplet models: Mathematical analysis, improvement and applications*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, July 2018.

[P10] Kak Choon Loy, *Efficient Semi-Implicit Time-Stepping Schemes for Incompressible Flows*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, July 2017.

[M17] Bhavana Parackal, *An Investigation of Low Temperature Direct Propane Fuel Cells*, Master Thesis, Department of Chemical and Biological Engineering, University of Ottawa, March 2017. Co-supervision with Marten TERNAN.

[P9] Edward Boey, *Anisotropic Residual Based Mesh Adaptation for Reaction-Diffusion Systems: Applications to Cardiac Electrophysiology*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, December 2016. Co-supervision with Thierry Giordano.

[P8] Diogène Vianney Pongui Ngoma, *Identification des paramètres dans les modèles ioniques en électrophysiologie cardiaque*, thèse de doctorat, Faculté des sciences et techniques, Université Marien Ngouabi, Congo-Brazzaville, octobre 2016. Co-supervision avec Hilaire Nkounkou.

[M16] Thomas Roy, *Time-Stepping Methods in Cardiac Electrophysiology*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, August 2015.

[M15] Douanla Lontsi Charlie, *Sensitivities of Electrocardiogram to Thoracic Organ Conductance*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2014. Co-supervision with Yves Coudière.

[M14] Aboubakry Ly, *Problème inverse pour la minimisation des effets de polarisation par électrode virtuelle*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2014. Co-supervision with Myriam Rioux.

[M13] Michael McLeod, *Mixed finite element methods for addressing multi-species diffusion using the Stefan-Maxwell equations*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, September 2013.

[M12] Saint-Cyr Elvi Rodrigue Koyaguerebo-Imé, *Extension des résultats d’unicité pour le modèle bidomaine utilisé dans l’électrophysiologie cardiaque*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2013.

[M11] Gerard Lionel Ndetchoua Kouamo, *Numerical methods for pure Neumann problems*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2013.

[M10] Sana Keita, *Comparaison des méthodes d’éléments finis pour un modèle eulérien air-gouttelettes*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2012.

[M9] Diogène Vianney Pongui Ngoma, *Identification des paramètres dans le modèle ionique de Mitchell-Schaeffer*, Master 2 Essay, African Institute of Mathematical Sciences (AIMS), Senegal, July 2012.

[P7] Hamidreza Khakdaman, *A Two Dimensional Model of a Direct Propane Fuel Cell with an Interdigitated Flow Field*, PhD Thesis, Department of Chemical and Biological Engineering, University of Ottawa, April 2012. Co-supervision with Marten TERNAN.

[P6] Jamal Hussain Alsmail, *Optimal Shape Design for Polymer Electrolyte Membrane Fuel Cell Cathode Air Channel: Modelling, Computational and Mathematical Analysis*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, March 2012.

[P5] Myriam Rioux, *Numerical Computations of Action Potentials for the Heart-Torso Coupling Problem*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, December 2011.

[P4] Matthew Doyle, *Simulation of Myocardium Motion and Blood Flow in the Heart with Fluid-structure Interactions*, Department of Mechanical Engineering, University of Ottawa, August 2011. Co-supervision with Stavros Tavoularis.

- [P3] Olivier Rousseau, *Geometrical Modeling of the Heart*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, January 2010.
- [M8] Alexandre Iolov, *Finite Element Methods for a Microstructure-Based Model of Blood*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, November 2009.
- [M7] Melanie McKay, *Iterative Methods for Incompressible Flow*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, April 2009. Co-supervision with Rémi Vaillancourt.
- [P2] Pascal Tremblay, *2-D, 3-D and 4-D Anisotropic Mesh Adaptation for the Time-Continuous Space-Time Finite Element Method with Applications to the Incompressible Navier-Stokes Equations*, PhD Thesis, Department of Mechanical Engineering, University of Ottawa, January 2008. Co-supervision with Stavros Tavoularis.
- [M6] Marc Ethier, *Schémas de discrétisation en temps pour le modèle bidomaine*, Master Thesis, Department of Mathematics and Statistics, University of Ottawa, July 2006.
- [P1] Corina Olah, *Analysis of Partial Differential Equations with Time-Periodic Forcing, Applications to Navier-Stokes Equations*, PhD Thesis, Department of Mathematics and Statistics, University of Ottawa, May 2006.
- [M5] Jehad Saleh, *A Model of a Partially Flooded Anode-Backing Layer (ABL) in a Direct Methanol Fuel Cell (DMFC)*, Master Thesis, Department of Chemical Engineering, University of Ottawa, April 2006. Co-supervision with Marten Ternan.
- Kinneret Globerman, *The Numerical Heart*, profile article in *Tabaret*, Fall 2004. *Tabaret* is the alumni magazine of the University of Ottawa.
- [M4] M. Doyle, *Simulation of Blood Flow in a Ventricular Assist Device with Fluid-Structure Interaction Effects*, Master Thesis, Department of Mechanical Engineering, University of Ottawa, April 2004. Co-supervision with Stavros Tavoularis.
- [M3] G. Psfogiannakis, *A Mathematical Model for a Direct Propane Phosphoric Acid Fuel Cell*, Master Thesis, Department of Chemical Engineering, University of Ottawa, September 2003. Co-supervision with M. Ternan and B. Conway.
- [M2] Z. Boutanios, *A 3-D Eulerian Investigation of the Water Droplet Collection Efficiency on the Nose and Cockpit Windows of a Convair-580 Aircraft in Flight using FENSAP-ICE*, Master Thesis, Department of Mechanical Engineering, Concordia University, March 1999. Co-supervision with Wagdi G. Habashi.
- [M1] H. Beaugendre, *Modélisation du givrage*, DEA Report, Applied Mathematics, Ecole Supérieure de Mécanique de Marseille, August 1998. Supervision of the DEA Stage at Concordia University.
- Presentation of results at a report on In-Flight Icing during the program *Tomorrow's World Science* produced and presented by the BBC, January 1996.
- Presentation of a booth on the CFD Lab's In-Flight Icing Consortium, at the *International Icing Symposium*, American Helicopter Society, Montreal, September 18–21, 1995.

3. CONTRIBUTION TO THE TRAINING OF HIGHLY QUALIFIED INDIVIDUALS

Graduate Students - Principal Supervisor

Name	Years	Degree	Title of Project	Present Position
S.W. Perera	2020-	PhD Math.	TBD	
D. Fokoue	2016-	PhD Math.	Numerical model of the AP in the heart	
S.-C. Koyaguerebo	2015-2020	PhD Math.	Deferred correction time-stepping methods	
J. Pearce Lance	2017-2019	MSc Math.	Identification of parameters in electrophysiology models	Teacher High school, Gatineau
S. Keita	2012-2018	PhD Math.	Numerical methods & models for aerosol flows	Postdoctoral fellow UM6P & uOttawa
K.C. Loy	2011-2017	PhD Math.	Time-stepping methods for incompressible flows	Assistant Professor U. Malaysia Terengganu
T. Roy	2013-2015	MSc Math.	Time-stepping in electrophysiology	PhD student University of Oxford
L.G.K. Ndetchoua	2013-2014 8 months	Res. stage Math.	FEM methods for Neumann problems	PhD student Université Laval
M. McLeod	2011-2013	MSc Math.	Finite element methods for Maxwell-Stefan equations	Programmer high-tech company
S.-C. Koyaguerebo AIMS-Sénégal	2013	Master 2 Math.	Uniqueness of solutions of the bidomain model	PhD student University of Ottawa
L.G.K. Ndetchoua AIMS-Sénégal	2013	Master 2 Math.	FEM methods for Neumann problems	PhD student Université Laval
D. Pongui AIMS-Sénégal	2012	Master 2 Math.	Identification of parameters in the MS ionic model	Maitre-enseignant U. Marien Ngouabi
S. Keita AIMS-Sénégal	2012	Master 2 Math.	FEM for an Eulerian air-droplet model	Post-doc University of Ottawa
J.H. Alsmail	2010-2012	PhD Math.	Optimal geometric design of a fuel cell	Assistant Professor KFUPM, Saudi Arabia
M. Rioux	2006-2011	PhD Math.	Coupled heart-thorax electrophysiological model	Researcher Bio-tech company
O. Rousseau	2005-09	PhD Math.	Organ segmentation from medical imaging	Professor CEGEP de l'Outaouais
A. Iolov	2007-09	MSc Math.	Rheological model of blood flows	PhD student University of Ottawa
M. Ethier	2003-06	MSc Math.	Numerical schemes in electrophysiology	Assistant Professor Université de Saint-Boniface
C. Olah	2000-06	PhD Math.	Numerical methods for pulsating flows	Researcher high-tech company
H. Beaugendre	1998	DEA	Modélisation du givrage	Maître de conférence U. Bordeaux I, France

Graduate Students - Co-supervisor

Name	Years	Degree	Title of Project	Present Position
J. MacDonald (with F. Lutscher)	2017-	PhD Math.	Models of population dispersion	
B. Parackal (with M. Ternan)	2014-2017	M.A.Sc. Chem. Eng.	Low Temperature Direct Propane Fuel Cells	PhD student Danemark
E. Boey (with T. Giordano)	2013-2016	PhD Math.	Error estimation for electrophysiology models	Unknown
D. Pongui (with H. Nkounkou)	2012-2016	PhD Math.	Identification of parameters in ionic models	maitre-enseignant U. Marien Ngouabi
A. Ly AIMS-Sénégal	2014	Master 2 Math.	Optimal control of virtual electrodes	PhD student U. de Bordeaux
L.C. Douanla AIMS-Sénégal	2014	Master 2 Math.	Sensitivity analysis of the ECG	Postdoctoral fellow U. de Clermont-Ferrand
H. Khakdaman (with M. Ternan)	2007-2012	PhD Chem. Eng.	2-D model of hydrocarbon fuel cells	Research Engineer Company in Texas
M. Doyle (with S. Tavoularis)	2004-2011	PhD Mech. Eng.	Fluid-structure interactions in the heart	Researcher U. of Toronto
M. McKay (with R. Vaillancourt)	2006-09	M.Sc. Math.	Iterative methods for incompressible flows	Environmental Modeler A-Maps
P. Tremblay (with S. Tavoularis)	1999-2007	PhD Mech. Eng.	Adaptive Space-time FE methods	Research Engineer Michelin, France
J. Saleh (with M. Ternan)	2004-06	M.A.Sc Chem. Eng.	Numerical modeling of methanol fuel cells	Unknown
M. Doyle (with S. Tavoularis)	2001-04	M.A.Sc. Mech. Eng.	CFD modeling of a Ventricular Assist Device	Researcher U. of Toronto
G. Psfogiannakis (with M. Ternan)	2001-03	M.A.Sc. Chem. Eng.	Numerical modeling of propane fuel cells	Unknown
Z. Boutanios (with W.G. Habashi)	1997-99	M.A.Sc.	Droplet impingement on a Convair-580 aircraft	Technology Manager Real Numerix
D. Levesque (with W.G. Habashi)	1997	M.Aero. stage	CFD of clean and contaminated airfoils	Consulting Engineer Canadian Space Agency

Post-Doctoral Fellows

Name	Years	Degree	Title of Project	Present Position
Dr. S. Keita (with A. Beljadid)	2019-20	Post-doc	Numerical methods for groundwater flows	Long-Term Lecturer uOttawa
Dr. S. Keita	2018	Post-doc	Numerical methods & models for aerosol flows	Long-Term Lecturer uOttawa
Dr. E. Boey (with T. Giordano)	2017	Post-doc	Anisotropic meshes and singular interfaces	Unknown
Dr. A.S. Kane	2010-12	Post-doc	Blood flows with RBC aggregation	Researcher in financial analysis Bank in Montreal
Dr. C. Pierre	2005-07	Post-doc	Simulations in electrophysiology	Research Engineer CNRS, Université de Pau
Dr. A. El Boukili	2000-01	Post-doc	Mortar FE methods	Professor Al Akhawayn University
Dr. G. Croce (with W.G. Habashi)	1997	Post-doc	Conjugate Heat Transfer in an anti-icing system	Professor Università di Udine
Dr. D.J. Cronin (with W.G. Habashi)	1996-97	Post-doc	Turbulent flows with small-scale roughness	Engineering Manager Goodrich Sensor System Division

Undergraduate Supervision

Name	Years	Degree	Title of Project	Present Position
Y. Lamontagne (with B Dionne)	2004	NSERC Summer Stage	Bifurcation in a in a FitzHugh-Nagumo model	MSc student Université de Montréal
M. Ethier (with V. LeBlanc)	2002	NSERC Summer Stage	Numerical solution of a bidomain model	PhD student Université de Sherbrooke
P.A. Marguin (with W.G. Habashi)	1997	Undergrad stage	Méthodes de stabilisation d'écoulements fluides en EF	
G. Léger (with W.G. Habashi)	1997	Undergrad stage	Adaptive FE computation of axisymmetric impinging jets	
D. Ait Mani (with W.G. Habashi)	1996	Undergrad stage	Conditions limites non-réflexives en EF	

4. OTHER EVIDENCE OF IMPACT AND CONTRIBUTIONS**Visiting positions**

Visiting scholar, Centre de Recherches Mathématiques, Université de Montréal, Fall 2019.

Invited Professor, Institut National de Recherche en Informatique et Automatique (INRIA), Bordeaux, France, June 2019 (3 weeks).

Invited Professor, International Water Research Institute, Mohammed VI Polytechnic University (UM6P), Morocco, February 2019 (1 week).

Invited Professor, Laboratoire de Mathématiques et de leurs Applications, Université de Pau et des Pays de l'Adour, France, September 2017 (2 weeks).

Invited Professor, Institut National de Recherche en Informatique et Automatique (INRIA), Bordeaux, France, March 2016 (2 weeks).

Invited Professor, King Fahd University of Petroleum and Minerals, Saudia Arabia, April-May 2014 (2 weeks).

Invited Professor, Groupe Interdisciplinaire de Recherche en Eléments Finis (GIREF), Université Laval, September 2013-June 2014 (8 days/month).

Professor, African Institute of Mathematical Sciences, Sénégal, January 2014 (3 weeks).

Invited Professor, Institut National de Recherche en Informatique et Automatique (INRIA), Bordeaux, France, October-November 2013 (2 months).

Professor, African Institute of Mathematical Sciences, Sénégal, December 2012 (3 weeks).

Invited Professor, Institut National des Sciences Appliquées (INSA) de Lyon, France, July 2012 (1 week).

Professor, African Institute of Mathematical Sciences, Sénégal, March 2012 (3 weeks).

Visiting scholar, Centre de Recherches Mathématiques, Université de Montréal, Fall 2010.

Invited Professor, EPFL, Lausanne, Switzerland, May 2009 (2 weeks).

Invited Professor, Université de Nantes, France, June 2008 (2 weeks).

Visiting scholar, Centre de Recherches Mathématiques, Université de Montréal, Winter 2008.

Invited Professor, EPFL, Lausanne, Switzerland, 2006-2007 (1 year).

Invited Professor, Université de Nantes, France, June-July 2004 (1 month).

Visiting scholar, Centre de Recherches Mathématiques, Université de Montréal, Winter 2004.

Conference organisation

Main organizer of the “Workshop on Controlling Error and Efficiency of Numerical Models: Methods, benchmarks, and case studies”, University of Ottawa, June, 2020. Sponsored by Fields Institute, CREATE program “Simulation-based Engineering” and University of Ottawa. Co-organizers: Catherine Mavriplis (U. of Ottawa), André Garon and David Vidal (Ecole Polytechnique, Montréal).

Member of the Standing Committee of the Canadian Symposium for Fluid Dynamics, Annual Meeting of the Canadian Applied & Industrial Mathematics Society (CAIMS/SCMAI), 2019-.

Main organizer of the “Workshop on Mathematical methods in cardiac electrophysiology”, University of Ottawa, 4-6 November, 2017. Sponsored by Fields Institute, Agence Nationale de la Recherche (ANR,

France) and University of Ottawa. Co-organizers: Y. Coudière (INRIA/U. de Bordeaux) and E. Vigmond (LIRYC, Bordeaux).

Member of the scientific committee of the conference “Mathematical Modeling and Computing in Electrocardiology”, Université de Nantes, 8-9 June, 2009.

Co-organizer with Michel Delfour (U. de Montréal), Marc Thiriet (LJL2-Paris VI and INRIA, Rocquencourt) and Fahima Nekka (U. de Montréal) of the “First CRM-INRIA-MITACS Meeting”, Université de Montréal, Montréal, 5-9 May, 2008.

External committees

Member of the NSERC Grant Selection Committee (mechanical engineering), June 2009 to June 2012, Co-chair, Fluids sub-committee, 2011-2012.

Member of the evaluation committee (mechanical engineering–fluids) for the program “Projet de recherche en équipe” of the FQRNT (2008).

Member of the Technical Analyst Support Program - Review Committee (TASP-RC) that administers the NSERC MFA grant jointly with C3.ca (\$600,000/year in 2002-04) for Canada wide high-performance computing technical support.

Member of the Postdoctoral Fellowship Evaluation Committee of the FQRNT (2001-2003).

Internal committees

Member of the Faculty Teaching Personal Committee (FTPC) of the Faculty of Science, University of Ottawa, January 2018-2020.

Member of the Hiring Committee, Applied Mathematics, Department of Mathematics and Statistics, University of Ottawa, 2019-2020.

Member of the Departmental Curriculum Committee, Department of Mathematics and Statistics, University of Ottawa, 2014-2018.

Assistant Chair, Department of Mathematics and Statistics, University of Ottawa, 2014-2017.

Member of the Faculty Curriculum Committee, Faculty of Science, 2014-2017.

Member of the Chair selection committee, Department of Mathematics and Statistics, University of Ottawa, January-May, 2013.

Interim Director of Graduate Studies, Department of Mathematics and Statistics, University of Ottawa, January-June, 2009.

Chair of the planning committee for the creation of a joint Master program in biomathematics, University of Ottawa, 2007-08.

Member of the strategic planning committee (CFI projects) for the Faculty of Science, University of Ottawa, 2007.

Member of the Departmental Teaching Personal Committee (DTPC) (academic year 2004-2006) of the Department of Mathematics and Statistics, University of Ottawa.

Member of the strategic planning committee “Vision 2010: Creating Knowledge” for the Faculty of Science, University of Ottawa, 2005.

Chair of the U. of Ottawa User Committee for the High Performance Computing Virtual Laboratory (HPCVL) (academic year 2001-2003). U of O representative and member of the Technical Advisory Committee (TAC) of HPCVL (2001-2007).

Thesis examination

External examiner of the “thèse d’habilitation” of Miguel A. Fernandez (Université Pierre et Marie Curie – Paris VI, 2010), Rodolphe Turpault (Laboratoire de mathématiques Jean Leray, Université de Nantes, 2012).

External examiner of the PhD thesis for David Lacasse (Mech. Eng., École Polytechnique de Montréal, U. de Montréal, 2004), Georges Djoumna (Math&Stat, Université Laval, 2006), Vittoria Rezzonico (Institut d’Analyse et Calcul Scientifique – Ecole Polytechnique Fédérale de Lausanne, 2007), Alexandra Franchitti (Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie, 2010), Lise Charlot (Mech. Eng., École Polytechnique de Montréal, U. de Montréal, 2011), Mohamed Belhout (Mathématiques, Université Claude Bernard Lyon 1, 2012), Saeed Torabi Ziaratgahi (Mathematics, University of Saskatchewan, 2015), Thomas Briffard (Math&Stat, Université Laval, 2017), Pierre-Elliot Bécue (Math&Stat, Université de Bordeaux, 2018), Fatima MRoue (Math&Stat, Université de Nantes, 2019).

Member of PhD thesis defence committees for Mohamad Sleiman (Mech. Eng., Concordia U., 1999), Nizar Ben Salah (Mech. Eng., ETS-Concordia U., 1999), Steve Desjardins (Math&Stat, U. of Ottawa, 2002), Mohamed Ali Hajji (Math&Stat, Carleton U., 2003), Jianguo Zhou (Mech. Eng., Carleton U., 2004), Adela Comanici (Math&Stat, U. of Ottawa, 2004), Dongil Chang (Mech. Eng., U. of Ottawa, 2006), Mahyar Asadi (Mech. Eng., Carleton U., 2011), Donald Alexander McLaren (Math&Stat, U. of Ottawa, 2012), Thu Huong Nguyen (Math&Stat, U. of Ottawa, 2012), Komeil Kazemi Zarkouei (Mech. Eng., Carleton U., 2014), Abdulrahman Karouma (Math&Stat, U. of Ottawa, 2015), Christian Jesus Garcia Lopez (Mech. Eng., Carleton U., 2015), Rym Mehri (Mech. Eng., U. of Ottawa, 2016), Bahareh Momenan (Mech. Eng., U. of Ottawa, 2017), Jason Bramburger (Math&Stat, U. of Ottawa, 2017), Marianna Lytova (Math&Stat, Carleton U., 2017), Yousef Alqawasmeh (Math&Stat, U. of Ottawa, 2017).

External examiner of the MSc thesis for Samuel M. Belliveau (Math&Stat, U. de Moncton, 2018).

Member of MSc thesis defence committees for Laurence Aoun (Math&Stat, Carleton U., 2003), Weibin Qi (Systems Science, U. of Ottawa, 2004), Dimitri Zelo (Math&Stat, U. of Ottawa, 2004), Bin Yin (Math&Stat, Carleton U., 2006), Yi Li (Systems Science, U. of Ottawa, 2007), Nijimbere Victor (Math&Stat, Carleton U., 2010), Michael MacNeil (Math&Stat, Carleton U., 2012), Hebah Rizq (Math&Stat, Carleton U., 2014), Chad Couture (Math&Stat, U. of Ottawa, 2017), Simon Tian (Math&Stat, Carleton U., 2020), Shiqi He (Mech. Eng., U. of Ottawa, 2020).

Peer review

Referee for Applied Mathematics and Computation, Applied Mathematics Research eXpress, Applied Numerical Mathematics, Biorheology, Chaos, Computer Methods in Applied Mechanics and Engineering, Computers and Mathematics with Applications, Optimization and Engineering, IMA Journal of Numerical Analysis, International Journal of Computational Fluid Dynamics, International Journal of Computer Mathematics, International Journal for Numerical Analysis and Modeling, International Journal for Numerical Methods in Biomedical Engineering, Journal of Applied Fluid Mechanics, Journal of Computational and Applied Mathematics, Journal of Computational Physics, Journal of Mathematical Analysis and Applications, Mathematical Biosciences, Mathematical Modelling and Numerical Analysis, Medical Image Analysis, SIAM Journal on Scientific Computing, The Canadian Applied Mathematics Quarterly, Zeitschrift für Naturforschung A.

Referee for the Canadian CFD Society “CFD 2006 Conference”.

Referee for the conference Functional Imaging and Modelling of the Heart (FIMH 2017, FIMH 2019).

External reviewer for the NSERC Discovery and CRD grant programs, the CNRS ACI program (France), the MITACS ACCELERATE internship program, the collaborative interdisciplinary NSF program and the Fonds National de la Recherche Scientifique (FNRS, Belgium).