

VINCENT QUENNEVILLE-BÉLAIR

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SUMMARY

My current research is in the area of numerical analysis and scientific computing. My focus is on the development of new finite element methods for physical sciences and wave propagation simulation. The application is on gravitational waves in the framework of Einstein's theory of general relativity.

Programming Skills: Python, C, Fortran, Matlab, CUDA, OpenMP, MPI.

EDUCATION

- PhD. Applied Mathematics.** *Adviser: Prof. Douglas N. Arnold, University of Minnesota.* 2015
Best Poster Design and Presentation at SIAM CSE
University of Minnesota Doctoral Dissertation Fellowship (1 year)
NSERC Alexander Graham Bell Canada Graduate Scholarship for Doctoral Studies (3 years)
FQRNT Doctoral Research Scholarship (3 years; declined)
- MCS. Master of Computer Science.** *University of Minnesota.* 2014
- MSc. Applied Mathematics.** *Adviser: Prof. Bernardo Cockburn, University of Minnesota.* 2011
FQRNT Master's Research Scholarship (2 years)
- BSc. First Class Honours in Mathematics and Physics.** *McGill University, Canada.* 2008
COMAP Mathematical Contest in Modeling: Meritorious Winner (twice)

EXPERIENCE

- Chu Assistant Professor of Applied Mathematics.** *Columbia University.* 2015-
- Schlumberger-Doll Research Center Intern.** *Adviser: Dr.ir. Aria Abubakar.* 2011
Develop forward elastic scattering code in 3D based on different Frequency Domain Finite Difference methods.
Integrate the Fortran code in Schlumberger's commercial software.
- Research Assistant for Starkey Hearing Technology.** *Adviser: Prof. Fadil Santosa, University of Minnesota.* 2009
Predict the elastodynamic response of an idealized ear canal using Fortran-based seismic modeling.

SELECTED PUBLICATIONS

- B. Cockburn and V. Q.-Bélaïr. *Uniform-in-time superconvergence of the HDG methods for the acoustic wave equation.* Mathematics of Computation, 83(285):65–85, 2014.
- A. Ortan, V. Q.-Bélaïr, B. S. Tilley, and J. Townsend. *On Taylor Dispersion Effects for Transient Solutions in Geothermal Heating Systems.* International Journal of Heat and Mass Transfer, 52(21–22):5072–5080, 2009.

INDUSTRIAL WORKSHOPS

- Fields-MITACS Industrial Problem-Solving Workshop** 2008
 Model and detect highly synchronized event in brain recordings.
Problem by the Hospital for Sick Children, Canada.
- IMA Math Modeling in Industry Workshop** 2007
 Classify Earth-orbiting objects from worldwide data of astronomical telescopes using clustering techniques.
Problem by The Aerospace Corporation
- Mathematical Problems in Industry at University of Delaware** 2007
 Predict filter saturation from a simple filtration process through porous media.
Problem by W.L. Gore Associates
- Graduate Student Mathematical Modeling Camp at Rensselaer Polytechnic Institute** 2007
 Optimize an underground geothermal heating system through water flow modeling.
Adviser: Prof. Burt S. Tilley, Olin College

TECHNICAL REPORTS

- V. Q.-Bélaïr, G. Pan, and A. Abubakar. *Second Order Staggered Grid Frequency-Domain Finite Difference (FDFD) for Elastodynamics in Three Dimensions*. Technical report, Schlumberger-Doll Research Center, Cambridge, Massachusetts, 2011.
- H. Ahmed, P. Chidyagwai, K. Gou, Y. Liu, T. Milgrom, and V. Q.-Bélaïr. *Associating Earth-Orbiting Objects Detected by Astronomical Telescopes*. Technical report, Mathematical Modeling in Industry XI, IMA, Minnesota, 2007.
- A. Atena, Q. Chen, P. Green, A. Ortan, M. Ozlem, V. Q.-Bélaïr, A. Rubio, and P. D. Vu. *My Air Conditioner? You're Standing on It!* Technical report, Rensselaer Polytechnic Institute, USA, 2007. Graduate Student Mathematical Modeling Camp.

SELECTED PRESENTATIONS

- V. Q.-Bélaïr. *A New Approach to Finite Element Simulation of General Relativity*. APAM, Columbia University, 2015.
- *Poster: Finite Element Methods for the Evolution Problem in General Relativity*. SIAM CSE Conference, 2015.
 - *Poster: Finite Element Methods for the Evolution Problem in General Relativity*. IMA Special Workshop: Structure-Preserving Discretizations of Partial Differential Equations, 2014.
 - *Poster: Finite Element Methods for the Evolution Problem in General Relativity*. SIAM Annual Meeting, 2014.
 - *Finite Element Methods for the Evolution Problem in General Relativity*. Student Days: SIAM Student Chapter Presentations, SIAM Annual Meeting, 2013.
 - *A Priori Error Analysis for the Hybridizable Discontinuous Galerkin method on Acoustic Waves*. Invited Minisymposium on Discontinuous Galerkin Methods, 11th US National Congress on Computational Mechanics (USNCCM), 2011.
 - *A Priori Error Analysis for the Hybridizable Discontinuous Galerkin method on Acoustic Waves*. Invited Minisymposium on Discontinuous Galerkin Methods, 7th International Congress on Industrial and Applied Mathematics (ICIAM), 2011.

ACADEMIC ACTIVITIES

- COMAP Modeling Contest in Math Mentoring, 3 Meritorious Winners and 5 Honorable Mentions, 2010-2015.
 Founding the SIAM Student Chapter at the University of Minnesota: 2010-2015.
 Founding the McGill Undergraduate Mathematics Magazine: 2 issues, 50 pages, 400 copies each, in 2006-2008.