

- Contact [malcolmiwroberts@gmail.com](mailto:malcolmiwroberts@gmail.com)  
Information [malcolmiwroberts.com](http://malcolmiwroberts.com)
- Education PhD in Applied Mathematics **University of Alberta**, 2011  
• Supervisor: John C. Bowman
- MSc in Applied Mathematics **University of Alberta**, 2006
- BSc Honors Applied Mathematics **University of Alberta**
- Work History Postdoctoral Researcher, **IRMA**, University of Strasbourg, France, since 2014.  
• Member of the TONUS project for numerical simulation in Tokamaks.  
• Developed a OpenCL/GPU-based Discontinuous Galerkin solver for numerical solution of the Vlasov equation.
- Postdoctoral Researcher, **M2P2**, Aix-Marseille University, France, 2012 to 2014.  
• Designed software for simulating magneto-hydrodynamic turbulence in a grid computing environment using spectral methods and penalisation.  
• Aided in the supervision of PhD students.
- Sessional Lecturer, **University of Alberta**, Canada, 2010.  
• Lectured engineering differential equations.  
• Design and deliver lectures and exams in a team-teaching environment.
- Graduate Student, **University of Alberta**, Canada, 2003 to 2011.  
• Develop a coherent research program.  
• Write papers and present results at international conferences.  
• Teach undergraduate math labs and help sessions.
- English Teacher, South Korea, 2003 to 2004.  
Summer Undergraduate Researcher, **University of Alberta**, Canada, 1998 to 2000.

- Submitted Articles “Implicitly Dealiased Convolutions on Shared Memory Architectures”. By Malcolm Roberts and John C. Bowman. In: *SIAM Journal of Scientific Computing* (2016). Submitted. URL: <http://malcolmroberts.github.io/publications/dealias2.pdf>
- SEME 2016: OptionWay Project Report*. By Malcolm Roberts et al. 2016. URL: [http://malcolmroberts.github.io/publications/sem\\_optionway.pdf](http://malcolmroberts.github.io/publications/sem_optionway.pdf)
- Peer-Reviewed Articles “Asynchronous OpenCL/MPI numerical simulations of conservation laws”. By Philippe Helluy et al. In: *Lecture Notes in Computational Science and Engineering* (2016). To appear. URL: <http://malcolmroberts.github.io/publications/sppexa2016.pdf>
- “Lagrangian/Eulerian Solvers and Simulations for Vlasov”. By Sebastien Guisset et al. In: *ESAIM: Proceedings and Surveys* (2016). To appear. URL: <http://malcolmroberts.github.io/publications/lessive-cemracs2014.pdf>
- “Adaptive Matrix Transpose Algorithms for Distributed Multi-core Processors”. By John C Bowman and Malcolm Roberts. In: *Interdisciplinary Topics in Applied Mathematics, Modeling and Computational Science*. Springer, 2015, pp. 97–103. URL: <http://malcolmroberts.github.io/publications/transpose0.pdf>
- “Self-organization of helically forced MHD flow in confined cylindrical geometries”. By Malcolm Roberts et al. In: *Fluid Dynamics Research* 46.6 (2014), p. 061422. URL: <http://stacks.iop.org/1873-7005/46/i=6/a=061422>
- “Pseudospectral Reduction of Incompressible Two-Dimensional Turbulence”. By John C. Bowman and Malcolm Roberts. In: *Communications in Nonlinear Science and Numerical Simulation* 17.5 (2012), pp. 2008–2013. URL: <http://malcolmroberts.github.io/publications/psr.pdf>
- “Efficient Dealiased Convolutions without Padding”. By John C. Bowman and Malcolm Roberts. In: *SIAM J. Sci. Comput.* 33.1 (2011), pp. 386–406. URL: <http://malcolmroberts.github.io/publications/dealias.pdf>

- “Dealiased convolutions for pseudospectral simulations”. By Malcolm Roberts and John C. Bowman. In: *Journal of Physics: Conference Series* 318.7 (2011), p. 072037. URL: <http://stacks.iop.org/1742-6596/318/i=7/a=072037>
- “Links between dissipation, intermittency, and helicity in the GOY model revisited”. By J. C. Bowman et al. In: *Physica D* 218 (2006), pp. 1–10. URL: <http://malcolmroberts.github.io/publications/smallscales.pdf>
- Dissertations “Multispectral Reduction of Two-Dimensional Turbulence”. By Malcolm Roberts. PhD thesis. Edmonton, AB, Canada: University of Alberta, 2011. URL: [http://malcolmroberts.github.io/publications/roberts\\_phd.pdf](http://malcolmroberts.github.io/publications/roberts_phd.pdf)
- “A Multi-Spectral Decimation Scheme for Turbulence Simulations”. By Malcolm Ian William Roberts. MA thesis. University of Alberta, 2006. URL: [http://malcolmroberts.github.io/publications/roberts\\_msc.pdf](http://malcolmroberts.github.io/publications/roberts_msc.pdf)
- Conference Proceedings *Report on the Math-Stat Graduate Education Round table*. By Malcolm Roberts. 2011. URL: <http://malcolmroberts.github.io/publications/report10w2062.pdf>
- “The Multispectral Method: Progress and Prospects”. By Malcolm Roberts, John C Bowman, and Bruno Eckhardt. In: *Advances in Turbulence XII*. Springer, 2009, pp. 791–794. URL: <http://malcolmroberts.github.io/publications/etc12articleroberts.pdf>
- General Statistical Design of an Experimental Problem for Harmonics*. By Sean Bohun et al. 2008. URL: <http://malcolmroberts.github.io/publications/etc12articleroberts.pdf>
- Software FFTW++: *A fast Fourier transform C++ header class for the FFTW3 library*. By John C. Bowman and Malcolm Roberts. 2010-2016. URL: <http://fftwpp.sourceforge.net>

*clFFT++: A fast Fourier transform C++ header class for the clFFT library.* By Malcolm Roberts. 2016. URL: <https://github.com/dealias/clfftp>

*schnaps: Solver for Conservative Hyperbolic Non-linear systems Applied to PlasmaS.* by Malcolm Roberts, Philippe Helluy, and Emmanuel Franck. 2015-2016. URL: <https://schnaps.gforge.inria.fr>

*FLUSI: Fluid-Structure-Interaction / MHD Research Code.* By Thomas Engels, Malcolm roberts, and Dmitry Kolomenskiy. 2015-2016. URL: <https://github.com/pseudospectators/FLUSI>

Other Publications    *Notes for Differential Equations.* By Malcolm Roberts and Samantha Marion. 2015. URL: <https://github.com/malcolmroberts/denotes>

Selected Talks        *Self-organisation of helically forced MHD flow in confined cylindrical geometries, Instabilities and Transport in Magnetized Plasmas, Geophysical and Astrophysical Flows,* Institute for Advanced Study of Aix-Marseille University, 2014

*Helices in MHD Flow: Numerical Results from Penalized Pseudospectral Simulations* , Seminaire Equations aux derivees partielles, Strasbourg University, France, 2014

*Pseudospectral Simulations in Complex Geometry via Penalisation*, Journee Calcul scientifique performant en mecanique de la Federation Nicolas-Claude Fabri de Peiresc, Aix-Marseille University, France, 2013

*Implicitly Dealiasd Convolutions for DNS: Preliminary MPI results*, Euromech 542, Lyon, 2013

*Convolutions for HPC*, CEMRACS 12, Marseille, 2012

*Dice, Dice, Dice*, LogiCON, 2012

*Mathtastic!*, Sceptically Speaking, 2012

*Turbulence, Fine and Coarse*, Condensed Matter Physics Seminar, University of Alberta, 2011

*The Pseudospectral Method: Recent Advances and Prospects*, Kavli Institute for Theoretical Physics, The Nature of Turbulence Workshop, UCSB, 2011

*Dealiasing Convolutions for Pseudo-Spectral Simulations*, Computational Plasma Physics Research Group Seminar, Ruhr Universität Bochum, Germany, 2011

*Teaching Collaboration on Hot Topics and Outcomes for Graduate Students*, PIMS Math and Stat Graduate Education Round Table, BIRS, 2010.

*The Multispectral Turbulence Decimation Method*, Politecnico di Torino, Italy, 2009

*The Multi-Spectral Method*, 6<sup>th</sup> International Congress on Industrial and Applied Mathematics, Switzerland, 2007

*General Statistical Design of an Experimental Problem for Harmonics*, Eighth PIMS-MITACS Industrial Problem Solving Workshop, 2004

## Teaching

Lecturer, University of Alberta, 2010

- Lectured differential equations for engineers.
- Administered homework and exams.
- High student evaluations and outcomes.

Teaching Assistant, University of Alberta, 2004 to 2010

- Ran undergraduate help sessions covering a wide range of topics.
- Graded homework and exams.
- Lab instructor
  - Designed and delivered lectures and quizzes.
  - Excellent evaluation from students.
  - Instructor for 38 labs constituting more than 1000 students.

Private Tutor in Mathematics, 2004-2010

- English as a Second Language Instructor, South Korea, 2003 to 2004

- Service
- Thousand Faces Performance Art Festival
- President of the Board 2011 to 2013
- PIMS Mathematical and Statistical Graduate Education Round table
- Brought together faculty, students, and administration from seven universities, resulting in new policies and programs being implemented.
- Canadian Young Researchers Conference in Mathematics and Statistics
- Organizing Committee (2006, 2008, 2010)
- Volunteer Mechanic/Instructor, Edmonton Bicycle Commuter's Association, 2009 to 2013, Collectif Vélos en Ville, 2012 to 2013  
University of Alberta Mathematics and Statistics Grad Association
- President 2005 to 2006, Treasurer 2006 to 2007
- University of Alberta Math Fair and Math Outreach, 2004 to 2011
- Skills
- Technical skills:
- Programming languages: C/C++, OpenCL, Python, R, and FORTRAN.
  - Parallelism: OpenMP, MPI, and OpenCL (for GPUs).
  - Linux, Windows, and Mac operating systems.
  - Asymptote, L<sup>A</sup>T<sub>E</sub>X, ParaView, HDF5, gmsh.
  - Version control: git, Mercurial, svn.
- Project management and public speaking.  
Native English speaker, advanced French, intermediate German.