Dr. Malcolm Roberts — Résumé

Contact Information
malcolmiwroberts@gmail.com
malcolmiwroberts.com

Education

PhD in Applied Mathematics — **University of Alberta**, 2011
MSc in Applied Mathematics — **University of Alberta**, 2006
BSc Honors Applied Mathematics — **University of Alberta**, 2001

Work History

Postdoctoral Researcher, **IRMA**, Université de Strasbourg, France, since 2014.

- Implement a discontinuous Galerkin solver in `OpenCL` to numerically solve general hyperbolic conservation laws using `CPU`s, `GPU`s, and `MIC`s.
- Increased software performance by an order of magnitude.

Postdoctoral Researcher, **M2P2**, Aix-Marseille University, France, 2012 to 2014.

- Designed software for simulating magneto-hydrodynamic turbulence.
- Ported code to a grid computing environment with thousands of cores.

Sessional Lecturer, **University of Alberta**, Canada, 2010.

- Lectured differential equations in a team-teaching environment.
- Authored an open-source textbook.

Graduate Student, **University of Alberta**, Canada, 2003 to 2011.

- Developed a coherent research program in applied mathematics.
- Presented at conferences and publish articles in peer-reviewed journals.
- Ran undergraduate math labs and help sessions.

Undergraduate Researcher, **University of Alberta**, 1998 to 2000.

Selected Projects

`fftw++` (`fftwpp.sf.net`).

- Implementation of implicitly dealiased convolutions:
  - Twice as fast and half the memory.
  - Applications to image processing, machine learning, simulations.
- `MPI`/`OpenMP` implementation of FFTs and convolutions for grid computing.
- Resulted in 5 publications and several conference presentations so far.
- Over 11 000 downloads.

`schnaps` (`schnaps.gforge.inria.fr`).

- A discontinuous-Galerkin solver for general numerical simulations.
- Written in `C` and `OpenCL`. Runs on `CPU`s, `GPU`s, and `MIC`s.
- Resulted in 1 publication and several conference presentations so far.

Subgrid models for turbulence.

- Technique for simulating fluid flows with reduced computational cost.
- Subject of my doctoral and masters dissertations.

Skills

Collaboration and project management.
Public speaking and scientific writing. Proficient in English and French.

Expertise in mathematical modelling and high-performance computing.
Knowledge of dynamical systems, numerical methods, and statistics.

I program in `C++`, `C`, `OpenCL`, `Python`, and `FORTRAN`, using `OpenMP` and `MPI`.

Linux scripting, version control, grid computing environments.
Data analysis and visualization: LaTeX, `R`, Asymptote, and Paraview.