

# Benjamin Aaron Storer

Department of Mechanical Engineering  
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## Education

2013–2018     Ph. D., Applied Mathematics, University of Waterloo  
Thesis: *Development and Application of Models and Diagnostics for Geophysical Fluid Flows*  
Supervisor: Francis Poulin  
2008–2013     B. Math, Honours Pure Mathematics with distinction  
Co-operative Program, Applied Mathematics Minor  
University of Waterloo

## Teaching

2019-2021	ME201, Applied Boundary Value Problems	Univ. of Rochester	Co-instructor
2016	MATH127, Calculus 1 for the Sciences	Univ. of Waterloo	Instructor
2011	TMAT100, Technical Mathematics	Humber College	Instructor

## Academic Positions

Feb 2019 - Present	Postdoctoral Research Associate	University of Rochester
		Supervisor: Hussein Aluie

## Software Development

FlowSieve( <a href="#">github</a> )	Role : primary developer  Highly parallelized HPC codebase for analysing multi-scale energetics of oceanic flows, and is broadly applicable to flows in other spherical settings (atmospheric, stellar, etc). Works in spherical geometries and has built-in diagnostics for extracting metrics of energy and enstrophy cascades. Includes Helmholtz decomposition tools for analysing general flow fields.
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## Publications

### Accepted

[1] Magill M., Coutino A., **Storer, B. A.**, Stastna, M., & Poulin, F. J. (2019). *Dynamics of*

*nonlinear Alfvén waves in the shallow water magnetohydrodynamic equations*. Physical Review Fluids, 4(5), 053701.

- [2] **Storer, B. A.**, Poulin, F. J., & Ménesguen, C. (2018). *The Dynamics of Quasigeostrophic Lens-Shaped Vortices*. Journal of Physical Oceanography, 48, 937–957.
- [3] Poulin, F. J., Borrisov, A., **Storer, B. A.**, & Stastna, M. (2018). *A shallow water model of the solar tachocline: A numerical approach to determine wave structure*. Dynamics of Continuous, Discrete and Impulsive Systems Series B: Applications and Algorithms, 25(3–4), 219–231.
- [4] Willick, K., **Storer, B. A.**, & Wesolkowski, S. (2013). *A new principal curve algorithm and standard deviation clouds for non-parametric ordered data analysis*. In 2013 IEEE Congress on Evolutionary Computation, CEC 2013 (pp. 1459–1466).

## Technical Skills

- Programming Languages
  - Highly skilled in Python and Matlab, particularly in scientific and computational applications
  - Experienced in computational applications of and developing in C++
  - Experienced with parallel computation in Python (MPI) and C++ (MPI, OpenMP, and hybrid parallelization)
  - Skilled in bash scripting, including developing efficient work-flows for high-powered computing environments
  - Familiar with Fortran
- Data Processing and Visualization
  - Experience writing functions to read various output types into usable structures (e.g. reading binary outputs in python), as well as converting outputs into more user-friendly formats (e.g. NetCDF)
  - Highly skilled with one- and two-dimensional graphics in Python
  - Experienced in using three-dimensional visualization tools *VisIt* and *ParaView*
  - Experience generating interactable three-dimensional *stl* objects
- Laboratory Skills
  - Experience designing and implementing basic experimental equipment for rotating and non-rotating tank set-ups, including computer fans for wind forcing, lighting grids for improved visualization, and recording equipment.
  - Experience post-processing experiment recordings to produce presentable and informative videos

## Soft Skills

- During my doctoral studies I had the opportunity to work with several undergraduate research assistants. In many cases I assisted the students in understanding some of the technical material relevant to their work, and occasionally guided students on possible directions for their investigations
- Through lecturing, co-lecturing, and several conference presentations, I have developed strong communication skills, particularly with presenting technical information to a non-specialist audience.
- Experience working and writing with collaborators in other cities / countries

## Conference Presentations

- [1] **Storer, B. A.** & Aluie, H. (November 2019). Baroclinic Energy Transfer in the Ocean. Oral Presentation. *American Physical Society's Division of Fluid Dynamics*, Seattle, Washington, USA.
- [2] **Storer, B. A.**, Poulin, F. J., & Menésguen, C. (February 2018). The Dynamics of Quasi-geostrophic Lens-Shaped Vortices. Poster presentation. *Ocean Sciences*, Portland, Oregon, USA.
- [3] **Storer, B. A.**, Poulin, F. J., & Menésguen, C. (June 2017). The Dynamics of Quasigeostrophic Lens-Shaped Vortices. Oral presentation. *Canadian Meteorological and Oceanographic Society*, Toronto, Ontario, Canada.
- [4] **Storer, B. A.**, Poulin, F. J., & Subich, C. (June 2017). QG SPINS: A Parallel, Spectral, Three-Dimensional Quasi-Geostrophic Model with Channel and Doubly-Periodic Geometries. Poster presentation. *Canadian Meteorological and Oceanographic Society*, Toronto, Ontario, Canada.
- [5] **Storer, B. A.** & Poulin, F. J., (June 2015). The occurrence of Yanai Waves in Constrained Geometries. Poster presentation. 20<sup>th</sup> *Conference on Atmospheric and Oceanic Fluid Dynamics*, Minneapolis, Minnesota, USA.
- [6] **Storer, B. A.**, Poulin, F. J., (June 2014). Large-Scale Coriolis Effects and Model Comparisons. Poster presentation. *International Workshop on Modelling the Oceans*, Halifax, Nova Scotia, Canada.

## Selected Honours and Awards

2015-2019                      Ontario Graduate Scholarship

## Professional Activities

- *Attendee.* Ontario High Performance Computing Summer School. Jul 13-17, 2015.

## Teaching Assistant

2017	MATH 227: Calculus 3 for Honours Physics	University of Waterloo
—  —	AMATH 741: Numerical Solutions of Partial Differential Equations	—  —
2015	MATH 137: Calculus 1 for Honours Mathematics	—  —
2014	MATH 117: Calculus 1 for Engineering	—  —
—  —	MATH 117: Calculus 1 for Engineering	—  —
—  —	AMATH 353: Partial Differential Equations 1	—  —
2013	MATH 117: Calculus 1 for Engineering	—  —