Jason Torchinsky

Email: jason.torchinsky@wisc.edu
Website: jasonltorchinsky.github.io
Phone: (413) 242-4702
OrcID: 0000-0002-2179-4386

RESEARCH INTERESTS

Applied math, computational math, stochastic processes
Data assimilation, multiscale modelling, adaptive mesh refinement
Climate science, atmospheric science, radiative transfer

EDUCATION

University of Wisconsin-Madison, Madison, WI
Ph.D., Mathematics, Expected May 2023

Union College, Schenectady, NY,
Bachelor of Science, Mathematics and Physics, June 2018

CURRENT PROJECTS

Adaptive Mesh Refinement for Radiative Transfer: Developing an adaptive mesh refinement algorithm for the angular part of the domain for radiative transfer problems in the atmosphere. Advised by Professor Sam Stechmann in collaboration with Shukai Du.

Multi-Model Communication Using Data Assimilation Methods: Creating a method to allow complex models to communicate with simplified models throughout a simulation, based on data assimilation methods such as the ensemble Kalman filter. Advised by Professor Sam Stechmann.

Modelling Ventilation Perfusion: Formulating a model relating ventilation perfusion to partial pressure of oxygen and carbon dioxide, temperature, pH, and 2,3-bisphosphoglyceric acid, for use in medical student education. Advised by Dr. Chris Green in collaboration with Kate Baldwin.

PREVIOUS PROJECTS

Improved Vertical Remapping Accuracy in the NH-HOMME Atmosphere Dynamical Core
Sandia National Laboratories, Albuquerque, NM — Summer 2021
Investigated four alternative modifications to the modified piecewise-parabolic method currently used in the NH-HOMME atmosphere dynamical core. Eliminated unwanted noise at the model top and planetary surface in six DCMIP test cases. Advised by Mark Taylor.

Parallelizing a Serial Code: Open–Source Module, EZ Parallel 1.0, and Geophysics Examples
University of Wisconsin-Madison, Madison, WI — Fall 2018 - Fall 2020
Developed a modern Fortran library to ease the process of upgrading a serial geophysical fluid dynamics code to a parallel one, with the ability to parallelize finite difference methods and discrete Fourier transforms. Advised by Professor Sam Stechmann.

Statistical Analysis of Richtmyer-Meshkov Instabilities
Los Alamos National Laboratory, Los Alamos, NM — Summer 2018
Conducted a statistical analysis on the interfacial properties of fluids undergoing an impulse-driven instability based on the initial interface perturbation using the xRage Hydrodynamic Solver. Advised by Jesse Canfield and Juan Saenz.

HONORS AND AWARDS

DOE Computational Science Graduate Fellowship — 2019 - 2022
Awarded by Krell Institute, Ames, IA

Phi Kappa Phi Honor Society — 2022
Awarded by University of Wisconsin-Madison, Madison, WI

NERSC AY 2020 Exploratory Allocation Award 2020
Awarded by the National Energy Research Scientific Computing Center, Berkeley, CA

George H. Catlin (1867) Prize 2018
Awarded by Union College, Schenectady, NY

Omicron Delta Kappa Honor Society 2017
Awarded by Union College, Schenectady, NY

Phi Beta Kappa Honor Society 2017
Awarded by Union College, Schenectady, NY

Pi Mu Epsilon Honor Society 2017
Awarded by Union College, Schenectady, NY

Sigma Pi Sigma Honor Society 2017
Awarded by Union College, Schenectady, NY

COMMUNITY AND MENTORING

DOE CSGF Fellow and Alumni Social Organizer Fall 2020 - Present
DOE Computational Science Graduate Fellowship, Madison, WI

UW-Madison QGrads Organizer and Representative Spring 2020 - Present
University of Wisconsin-Madison Gender and Sexuality Campus Center, Madison, WI

Graduate Peer Mentor Fall 2019 - Present
University of Wisconsin-Madison Department of Mathematics, Madison, WI

Directed Reading Program Mentor Fall 2022
University of Wisconsin-Madison Department of Mathematics, Madison, WI

PUBLICATIONS

A framework for idealized climate simulations with spatiotemporal stochastic clouds and planetary-scale circulations, Huang, T., Stechmann, S. N., and Torchinsky, J. L., Phys. Rev. Fluids, 7 (2022).

Improved vertical remapping accuracy in the NH-HOMME atmosphere dynamical core, Torchinsky, J. L., and Taylor, M. A., CSRI Summer Proceedings 2021, (2021), pp. 352–364.

Elementary computational fluid dynamics using finite-difference methods, Torchinsky, J. L., and LaBrake, S., Union Digital Works Honors Theses, 1581 (2018), pp. 1–27.[1]

Introduction to computational topology using simplicial persistent homology, Torchinsky, J. L., Johnson, B., and Gasparovic, E., Union Digital Works Honors Theses, 1660 (2018), pp. 1–129.[1]

TALKS

Sherlock and Watson in the Case of the Tropical Climate Spring 2022
University of Wisconsin-Madison Math Department Graduate Student Seminar
Madison, WI

Improved Vertical Remapping Accuracy for NH-HOMME Fall 2021
University of Wisconsin-Madison SIAM Student Seminar
Madison, WI

Boundary Treatment for Vertical Remapping in the E3SM Summer 2021
Sandia National Labs Climate Modelling Seminar Series

[1] Name changed in late 2020 from "Jason Louis Turner" to "Jason Louis Torchinsky".

Albuquerque, NM

Improved Vertical Remapping Accuracy for the E3SM Summer 2021
CSRI Summer 2021 Poster Blitz
Albuquerque, NM

Statistical Analysis of Richtmyer-Meshkov Instabilities Summer 2018
Los Alamos 2018 Computational Physics Summer Workshop
Los Alamos, NM