Jason Torchinsky

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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, GPA: 4.0 *Expected May 2023*

Dissertation Title: Mitigating Model Error via Multi-Model Methods and hp-Adaptivity: Application to Atmospheric Science and Radiative Transfer
Advisor: Samuel Stechmann

Union College Schenectady, NY
B.Sc., Mathematics and Physics, GPA: 3.97 *June 2018*

Dissertation One Title: Elementary Computational Fluid Dynamics Using Finite-Difference Methods
Advisor: Scott LaBrake

Dissertation Two Title: Introduction to Computational Topology Using Simplicial Persistent Homology
Advisors: Brenda Johnson, Ellen Gasparovic

CURRENT PROJECTS

Data-driven particle-based model of fog formation Summer 2022 - Present
Torchinsky, J. L., *Patel, L., Schmidt, M., and Zenker, J.*

Utilizing Dedalus to develop a particle-based fog model, leveraging data acquired from fog chamber experiments.

Thermodynamic consistency of dynamics-physics couplings Summer 2022 - Present
Torchinsky, J. L. *and Taylor, M. A.*

Investigating the effects of thermodynamic mis-matching in dynamics-physics couplings in atmosphere models, e.g., using constant-volume thermodynamics in a model with a vertical pressure coordinate.

Adaptive mesh refinement for radiative transfer Fall 2020 - Present
Torchinsky, J. L., *Stechmann, S., N., and Du, S.*

Developing an adaptive mesh refinement algorithm for the angular part of the domain for radiative transfer.

Multi-model communication using data assimilation methods Fall 2019 - Present
Torchinsky, J. L. *and Stechmann, S., N.*

Creating a method to allow models of varying sophistication to exchange information throughout a simulation, based on traditional data assimilation techniques.

PUBLICATIONS AND DELIVERABLES

7. **Multi-model communication using data assimilation methods**
   Torchinsky, J. L., *and Stechmann, S. N. (2022). [Article in preparation.]*

6. **Interactive model of ventilation-perfusion for medical student education**
   Torchinsky, J. L., *Baldwin, K., and Green, C. (2022). [Report in preparation.]*

5. **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).*

4. **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.*

3. **Parallelizing a serial code: Open–source module, EZ Parallel 1.0, and geophysics examples**
Torchinsky, J. L.*, and Stechmann, S. N., (2020). [Preprint available.]*

2. **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]

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]

HONORS AND AWARDS

8. **DOE Computational Science Graduate Fellowship** Awarded 2019 - 2023
Awarded by the Krell Institute, Ames, IA

7. **Phi Kappa Phi Honor Society** Inducted 2022
Awarded by the University of Wisconsin-Madison, Madison, WI

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

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

4. **Omicron Delta Kappa Honor Society** Inducted 2017
Awarded by Union College, Schenectady, NY

3. **Phi Beta Kappa Honor Society** Inducted 2017
Awarded by Union College, Schenectady, NY

2. **Pi Mu Epsilon Honor Society** Inducted 2017
Awarded by Union College, Schenectady, NY

1. **Sigma Pi Sigma Honor Society** Inducted 2017
Awarded by Union College, Schenectady, NY

COMMUNITY AND MENTORING

SIAM Career Opportunities Committee Member Term to Begin Winter 2023
Society for Industrial and Applied Mathematics, Philadelphia, PA

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

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

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

Student Representative Spring 2016 - Spring 2018
Union College Committee on LGBTQ+ Affairs, Schenectady, NY

Chapter President Winter 2015 - Spring 2018
Union College Society of Physics Students, Schenectady, NY

Treasurer and Public Educator Fall 2014 - Spring 2018
Union College - Union Pride, Schenectady, NY

Secretary and Outreach Coordinator Fall 2014 - Spring 2017
Union College - Virtual U, Schenectady, NY

INVITED TALKS

12. **Multi-Model Suites and Data Assimilation for Improving Model Dynamics** Spring 2022
American Mathematical Society Spring Central Virtual Sectional Meeting, Virtual

11. **Boundary Treatment for Vertical Remapping in the E3SM** Summer 2021
Sandia National Labs Climate Modelling Seminar Series, Albuquerque, NM

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

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

8. **Introduction to LaTeX: General Use and Resume Writing** Winter 2018
Union College Society of Physics Students Workshop Series, Schenectady, NY

7. **Ally Trainer Training: How to Engage the Greater Campus Community** Fall 2017
Union College - Union Pride LGBTQIA+ Workshop Series, Schenectady, NY

6. **Introduction to LaTeX: General Use and STEM Writing** Fall 2017
Union College Society of Physics Students Workshop Series, Schenectady, NY

5. **Introduction to Mathematica: The Best Classroom Calculator** Spring 2017
Union College Society of Physics Students Workshop Series, Schenectady, NY

4. **Ally Training: How to be an Effective Ally to the LGBTQIA+ Community** Spring 2017
Union College - Union Pride LGBTQIA+ Workshop Series, Schenectady, NY

3. **Hurricane Links** Spring 2017
Hudson River Undergraduate Math Conference 2017, Westfield, MA

2. **Ally Training: How to be an Effective Ally to the LGBTQIA+ Community** Fall 2016
Union College - Union Pride LGBTQIA+ Workshop Series, Schenectady, NY

1. **Ally Training: How to be an Effective Ally to the LGBTQIA+ Community** Winter 2016
Union College - Union Pride LGBTQIA+ Workshop Series, Schenectady, NY

CONTRIBUTED TALKS

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

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

12. **Persistent Homology of BuckyBall® Configurations** Spring 2018
Union College 2018 Steinmetz Day, Schenectady, NY

11. **The Dynamics of Everyday Fluid Flows** Spring 2018
Union College 2018 Steinmetz Day, Schenectady, NY

10. **Integrating Fluid Dynamics into the Undergraduate Curriculum** Spring 2018
APS March Meeting 2018, Los Angeles, CA

9. **Generalizations of Collatz Functions** Winter 2018
Union College Math Seminar Series, Schenectady, NY

8. **Generalizations of Collatz Functions to Geometric Algebras** Fall 2017
APS New York State Sectional Autumn 2017 Meeting, Schenectady, NY

7. **Generalizations of Collatz Functions to Geometric Algebras** Fall 2017
SACNAS, Salt Lake City, Utah

6. **Hurricane Links** Spring 2017
Union College 2017 Steinmetz Day, Schenectady, NY

5. **Hurricane Links** Spring 2017
Hudson River Undergraduate Math Conference 2017, Westfield, MA

4. **Development of a Quantum Optical Setup for Single Photon Experiments** Spring 2017
APS March Meeting 2017, New Orleans, LA

3. **Phase Transitions of Nano-Confined Alcohols** Spring 2016
Union College 2016 Steinmetz Day, Schenectady, NY

2. **Phase Transitions of Nano-Confined Alcohols** Spring 2016
APS March Meeting 2016, Baltimore, MD

1. **Melting Behavior of Nano-Confined Alcohols** Summer 2015
Union College 2015 Summer Research Seminar Series, Schenectady, NY

TECHNICAL SKILLS

Languages: Fortran, Python, C++, Matlab, and Wolfram Mathematica.
Libraries: MPI, FFTW3, netCDF, LAPACK, and CUDE