# Jason L. Torchinsky

✉ jason.torchinsky@wisc.edu
0000-0002-2179-4386
(413) 242-4702
github.com/jasonltorchinsky

## RESEARCH INTERESTS

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

## 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
***J. L. Torchinsky***, *M. Schmidt, J. Zenker, and L. Patel*

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

**Adaptive mesh refinement for radiative transfer** Fall 2021 - Present
***J. L. Torchinsky***, *S. N. Stechmann, and S. Du*

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

## PUBLICATIONS AND DELIVERABLES

9. **Generating well-characterized cloud droplets in an agile tabletop chamber**
   *J. Zenker,* ***J. L. Torchinsky****, C. A. Pattyn, M. Schmidt, B. Bentz, J. Wright, and L. Patel [Article in preparation.]*

8. **Interactive model of ventilation-perfusion for medical student education**
   ***J. L. Torchinsky****, K. Baldwin, and C. Green [Article in preparation.]*

7. **Mitigating model error via a multi-model method and application to tropical intraseasonal oscillations**
   ***J. L. Torchinsky*** *and S. N. Stechmann [Article submitted.]*

6. **Thermodynamic consistency of dynamics-physics couplings**
   ***J. L. Torchinsky****, M. A. Taylor, and O. Guba [Article under review.]*

5. **A framework for idealized climate simulations with spatiotemporal stochastic clouds and planetary-scale circulations**
   *T. Huang, S. N. Stechmann, and* ***J. L. Torchinsky****, Phys. Rev. Fluids, 7 (2022), pp. 1–28.*

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

3. **Parallelizing a serial code: Open–source module, EZ Parallel 1.0, and geophysics examples**
   ***J. L. Torchinsky*** *and S. N. Stechmann, (2020), pp. 1–28. [Preprint available.]*

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

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

## HONORS AND AWARDS

9. **John A. Nohel Prize** Awarded 2022
   *Awarded by the University of Wisconsin-Madison Department of Mathematics, Madison, WI*

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 - Spring 2022
*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 2021
*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 Virtual Talk 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 AMS Student Chapter 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 CUDA.

## REFERENCES

**Samuel N. Stechmann**
✉ stechmann@wisc.edu (608) 263–4351
*Doctoral dissertation advisor in the Department of Mathematics at the University of Wisconsin-Madison from fall 2018 to present on projects relating to data assimilation, multi-model methods, and adaptive mesh refinement.*

**Mark A. Taylor**
✉ mataylo@sandia.gov (505) 284-1874
*Research advisor at Sandia National Laboratories in Albuquerque, NM from spring 2021 to present on projects relating to the the dynamical core of the atmosphere component of the E3SM.*

**Lekha Patel**
✉ lpatel@sandia.gov (505) 313–3215
*Research advisor at Sandia National Laboratories in Albuquerque, NM from spring 2022 to present on a project relating to developing a particle-based model of a fog chamber.*