

Ian Tobasco

- CONTACT INFORMATION Professor Ian Tobasco *phone:* (312) 996-8616
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Department of Mathematics, Statistics, and Computer Science (M/C 249) *web:* www.iantobasco.com
851 S. Morgan Street
Chicago, IL 60607-7045 USA
- RESEARCH INTERESTS Calculus of Variations and Partial Differential Equations,
with specific interests in Elasticity Theory, Fluid Dynamics, and Spin Glasses
- EMPLOYMENT **University of Illinois at Chicago**, Chicago, IL
August 2019–
Assistant Professor of Mathematics
- EDUCATION **University of Michigan**, Ann Arbor, MI
September 2016–July 2019
James Van Loo Postdoctoral Fellow
- Courant Institute of Math. Sciences**, New York University, New York, NY
September 2011–September 2016
Ph.D. in Mathematics
- Thesis Title: *Variational analysis of compressed thin elastic sheets and the phase diagrams of mean field spin glasses*
 - Advisor: Robert V. Kohn
- University of Michigan**, Ann Arbor, MI
September 2007–April 2011
B.S.E. in Aerospace Engineering
- Graduated *Summa Cum Laude*
 - Minor in Mathematics
- PUBLICATIONS **Submitted**
1. I. Tobasco, *Optimal Cooling of an Internally Heated Disc*. preprint available at arXiv:2110.13291
 2. Y. Zheng, I. Niloy, P. Celli, I. Tobasco, and P. Plucinsky, *A Continuum Field Theory for the Deformations of Planar Kirigami*. preprint available at arXiv:2108.00336
 3. I. Tobasco, Y. Timounay, D. Todorova, G. C. Leggat, J. D. Paulsen, and E. Katifori, *Exact Solutions for the Wrinkle Patterns of Confined Elastic Shells*. preprint available at arXiv:2004.02839

Accepted

1. I. Tobasco, *Curvature-Driven Wrinkling of Thin Elastic Shells*, Arch. Ration. Mech. Anal. **239** (2021) 1211-1325.
2. A. Souza, I. Tobasco, and C. R. Doering, *Wall-to-Wall Optimal Transport in Two Dimensions*, J. Fluid Mech. **889** (2020) A34.
3. C. R. Doering and I. Tobasco, *On the Optimal Design of Wall-to-Wall Heat Transport*, Comm. Pure Appl. Math. **72** (2019) 2385-2448.
4. A. Jagannath and I. Tobasco, *Bounds on the Complexity of Replica Symmetry Breaking for Spherical Spin Glasses*, Proc. Amer. Math. Soc. **146** (2018) 3127–3142.
5. I. Tobasco, D. Goluskin, and C. R. Doering, *Optimal Bounds and Extremal Trajectories for Time Averages in Nonlinear Dynamical Systems*, Phys. Lett. A **382** (2018) 382–386.
6. I. Tobasco, *Axial Compression of a Thin Elastic Cylinder: Bounds on the Minimum Energy Scaling Law*, Comm. Pure Appl. Math. **71** (2018) 304–355.
7. I. Tobasco and C. R. Doering, *Optimal Wall-to-Wall Transport by Incompressible Flows*, Phys. Rev. Lett. **118** (2017) 264502.
8. A. Jagannath and I. Tobasco, *Low Temperature Asymptotics in Spherical Mean Field Spin Glasses*, Comm. Math. Phys. **352** (2017) 979–1017.
9. S. Conti, H. Olbermann, and I. Tobasco, *Symmetry Breaking in Indented Elastic Cones*, Math. Models Methods Appl. Sci. **27** (2017) 291–321.
10. A. Jagannath and I. Tobasco, *Some Properties of the Phase Diagram for Mixed p -Spin Glasses*, Probab. Theory Related Fields **167** (2017) 615–672.
11. A. Jagannath and I. Tobasco, *A Dynamic Programming Approach to the Parisi Functional*, Proc. Amer. Math. Soc. **144** (2016), 3135–3150.
12. D. Sanjaya, K. Fidkowski, and I. Tobasco, *Adjoint-Accelerated Statistical and Deterministic Inversion of Atmospheric Contaminant Transport*, Computers and Fluids **100** (2014), 291–307.
13. D. Viswanath and I. Tobasco, *Navier-Stokes Solver Using Green's Functions I: Channel Flow and Plane Couette Flow*, J. Computational Physics **251** (2013), 414–431.

INVITED TALKS

- Applied Mathematics Seminar, TU Dresden (Nov. 2021)*
- Aerospace Engineering Seminar, Univ. of Michigan (Nov. 2021)
- SIAM Math. Aspects of Materials Science (May 2021)*
- Nonlinear Analysis Seminar, Rutgers Univ. (May 2021)*
- Applied Analysis Seminar, Heidelberg Univ. (Apr. 2021)*
- Engineering Mathematics Seminar, Univ. of Bristol (Apr. 2021)*
- Math Colloquium, Univ. of Wisconsin–Madison (Mar. 2021)*
- APS March Meeting (Mar. 2021)*
- Soft Matter Series Seminar, NORDITA (Mar. 2021)*
- Aerospace and Mechanical Engineering Seminar, Univ. of Southern California (Feb. 2021)*
- Applied Math Colloquium, Northwestern Univ. (Feb. 2021)*

*online

- Applied Math Seminar, Univ. of Washington (Jan. 2021)*
- IPAM Workshop on Transport and Mixing in Complex and Turbulent Flows, UCLA (Jan. 2021)*

- Computational, Applied Math. and PDE Seminar, Univ. of Chicago (Nov. 2020)*
- Plenary Talk at Chicago Area SIAM Student Conference, Northwestern Univ. (Nov. 2020)*
- Plenary Talk at UIC Chicago Undergraduate Math. Symposium, Univ. of Illinois at Chicago (Nov. 2020)*
- Analysis, Dynamics and Applications Seminar, Univ. of Arizona (Oct. 2020)*
- SIAM/CAIMS Annual Meeting, Toronto, Canada (Jul. 2020)*
- SIAM Math. Aspects of Materials Science, Bilbao, Spain (May 2020)†
- AMS Spring Central Sectional Meeting, Purdue Univ. (Apr. 2020)†
- Complex Systems Seminar, Univ. of Michigan (Feb. 2020)
- PDE & Differential Geometry Seminar, Univ. of Connecticut (Feb. 2020)
- Aspen Center for Physics Workshop on Low-dimensional Solids, Aspen, CO (Feb. 2020)

- SIAM Conference on Analysis of PDE, La Quinta, CA (Dec. 2019)
- Workshop RAM3, Rome, Italy (Nov. 2019)
- SES Technical Meeting, St. Louis, MO (Oct. 2019)
- ICIAM, Valencia, Spain (Jul. 2019)
- GLSIAM Spring Meeting, Univ. of Michigan (Apr. 2019)
- MRS Spring Meeting, Phoenix, AZ (Apr. 2019)
- Fields Institute Workshop on Scientific Computing Across Scales, Toronto, Canada (Apr. 2019)
- 83rd Midwest PDE Seminar, Indiana Univ. (Mar. 2019)
- APS March Meeting, Boston, MA (Mar. 2019)
- Joint Math/Physics Colloquium, Syracuse Univ. (Feb. 2019)
- Applied Math Colloquium, MIT (Feb. 2019)
- Math & Stat Colloquium, Queens's Univ. (Feb. 2019)
- Math Colloquium, Univ. of Toronto (Jan. 2019)
- Math Colloquium & Applied Math Seminar, Univ. of Utah (Jan. 2019)
- Applied Math Seminar, Univ. of Waterloo (Jan. 2019)
- Math Colloquium, UCLA (Jan. 2019)
- Frontiers in Computing + Mathematical Sciences, Caltech (Jan. 2019)

- Applied and Interdisciplinary Math. Seminar, Univ. of Michigan (Dec. 2018)
- MSCS Colloquium, Univ. of Illinois at Chicago (Nov. 2018)
- Saturday Morning Physics Lecture, Univ. of Michigan (Nov. 2018)
- Applied Math Seminar, Univ. of Utah (Oct. 2018)

*online

†cancelled due to COVID-19

- Analysis Seminar, Courant Institute (Oct. 2018)
- Oberwolfach Workshop on Calculus of Variations, Oberwolfach, Germany (Jul. 2018)
- SIAM Math. Aspects of Materials Science & Annual Meetings, Portland, OR (Jul. 2018)
- WHOI Geophysical Fluid Dynamics Program, Woods Hole, MA (Jul. 2018)
- BIRS Workshop on Topics in the Calculus of Variations, Banff, Canada (May 2018)

- APS Division of Fluid Dynamics Annual Meeting, Denver, CO (Nov. 2017)
- Analysis of Fluids Seminar, Princeton Univ. (Oct. 2017)
- Applied and Interdisciplinary Math. Seminar, Univ. of Michigan (Sept. 2017)
- GLSIAM Spring Meeting, Oakland Univ. (Apr. 2017)
- Analysis and Applied Math Seminar, Univ. of Toronto (Apr. 2017)
- Applied Math Seminar, Courant Institute (Mar. 2017)
- PDE and Analysis Seminar, Univ. of Pittsburgh (Jan. 2017)

- Differential Equations Seminar, Univ. of Michigan (Dec. 2016)
- APS Division of Fluid Dynamics Annual Meeting, Portland, OR (Nov. 2016)
- Analysis/Probability Seminar, Univ. of Michigan (Oct. 2016)
- SIAM Math. Aspects of Materials Science, Philadelphia, PA (May 2016)
- Applied Math Colloquium & Level Set Collective Group Meeting, UCLA (Jan. 2016)

- SIAM Conference on Analysis of PDE, Scottsdale, AZ (Dec. 2015)
- Applied and Interdisciplinary Math. Seminar, Univ. of Michigan (Dec. 2015)
- KI-Net Young Researchers Workshop, Univ. of Maryland (Nov. 2015)
- PDE–Applied Math Seminar, Univ. of Maryland (Nov. 2015)
- Oberseminar Analysis, Univ. of Bonn IAM (May 2015)
- Materials Working Group, Courant Institute (Apr. 2015)

- KI-Net Young Researchers Workshop, Univ. of Maryland (Oct. 2014)
- Materials Working Group, Courant Institute (Oct. 2014)

POSTER SESSIONS

- CNA Workshop on Math Models for Pattern Formation, CMU (Mar. 2019)
- Nonconvexity, Nonlocality and Incompatibility—L. Truskinovky’s 60th Birthday, Univ. of Pittsburgh (May 2017)
- 6th Midwest Workshop on Control and Game Theory, Univ. of Michigan (Apr. 2017)
- NYU–Oxford Workshop on Math. Models of Defects and Patterns, Courant Institute (Jan. 2016)
- IMA Special Workshop on Mathematics and Mechanics, Eugene, OR (Oct. 2015)
- PIRE Workshop on Grain Boundaries and Stochastic Homogenization, Univ. of Leipzig, Germany (Jul. 2015)

SERVICE

University of Illinois at Chicago, Chicago, IL

Co-organizer

- 2026 Boulder School for Condensed Matter and Materials Physics on “Geometry and Topology of Soft Matter”
- AIM 2022 SQuaRE Workshop on “Studying PDE dynamics via optimization with integral inequality constraints”
- BIRS 2022 Focussed Research Group on “Studying PDE Dynamics via Optimization with Integral Inequality Constraints”
- BIRS 2022 Workshop on “Equilibrium and Non-Equilibrium Pattern Formation in Soft Matter: From Elastic Solids to Complex Fluids”
- SIAM 2021 Math. Aspects of Materials Science Meeting Mini-symposium on “Soft materials: patterns, instabilities, and controlled deformations”*
- AIM 2021 SQuaRE Workshop on “Studying PDE dynamics via optimization with integral inequality constraints”†
- BIRS 2020 Focussed Research Group on “Studying PDE Dynamics via Optimization with Integral Inequality Constraints”†
- SIAM 2020 Math. Aspects of Materials Science Meeting Mini-symposium on “Soft materials: patterns, instabilities, and controlled deformations”†
- UIC MSCS Dept. Colloquium series, Fall 2019–Winter 2020
- UIC Analysis and Applied Math Seminar series, Fall 2019–

University of Michigan, Ann Arbor, MI

Co-organizer

- AMS 2018 Fall Central Sectional Meeting Special Session on “Analytical and Numerical Aspects of Turbulent Transport”
- SIAM 2018 Annual Meeting Mini-symposium on “Transport, Mixing, and Optimality in Fluids”

Courant Institute of Math. Sciences, New York, NY

Co-organizer

- cSplash Senior Advisor, 2014
- cSplash Academics Coordinator, 2012–2013

Courant Splash (cSplash) is an annual one-day lecture series aimed at mathematically inclined high school students from New York City and surrounding areas (www.csplash.org).

TEACHING

University of Illinois at Chicago, Chicago, IL

Course Instructor

- Advanced Topics in Applied Math — Applied Variational Analysis, Fall 2021
- Multivariable Calculus, Fall 2021
- Advanced Partial Differential Equations, Fall 2020
- Intro. to Advanced Mathematics, Fall 2020
- Intro. to Probability, Fall 2019
- Reading course on Calculus of Variations, Fall/Winter 2019

*online

†cancelled due to COVID-19

Undergraduate Research Mentor

- Thomas Nguyen, Summer 2020

University of Michigan, Ann Arbor, MI

Course Instructor

- Graduate Minicourse on Elasticity and Geometry, Summer 2019
- Honors Multivariable Calculus, Fall 2018
- Honors Multivariable Calculus, Fall 2017
- Graduate Minicourse on Calculus of Variations, Summer 2017
- Honors Ordinary Differential Equations, Winter 2017
- Ordinary Differential Equations, Fall 2016

Undergraduate Research Mentor

- Stephen Jasina, Summer 2019 (REU)
- Anamaria Cuza, Yuqing Liu, Osama Saeed, Winter 2019 (UM Lab of Geometry)
- Charles Devlin and Jaeyoon Kim, Summer 2018 (REU)

Courant Institute of Math. Sciences, New York, NY

Teaching Assistant

- Intro. to Partial Differential Equations, Spring 2014
- Transformations and Geometry, Fall 2013
- Honors Calculus I, Fall 2013
- Intro. to Mathematical Analysis II, Spring 2013
- Intro. to Mathematical Analysis I, Fall 2012

University of Michigan, Ann Arbor, MI

Tutor

- Michigan Math Lab Tutor, 2009–2011
- Michigan Research Community Math/Physics Study Group Leader, 2008–2009

AWARDS

Grants and Fellowships

2018–2021	National Science Foundation Research Grant (PI: DMS-1812831, DMS-2025000)
2016–2019	James Van Loo Postdoctoral Fellowship University of Michigan Department of Mathematics
2013–2016	National Science Foundation Graduate Research Fellowship
2011–2016	Henry M. MacCracken Fellowship New York University Graduate School of Arts and Sciences

Honors and Prizes

2016	Courant Institute Kurt O. Friedrichs Prize “for an outstanding dissertation in mathematics”
2015	Courant Institute Wilhelm T. Magnus Memorial Prize “for significant contributions to the mathematical sciences”
2010	First place at AIAA Regional Student Conference
2008–2010	University of Michigan James B. Angell Scholar