SON N.T. TU

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August 23, 2025

Research Interests: Hamilton–Jacobi equations, free boundary problems, integro-differential equations, optimal control, homogenization, dynamical systems

Academic Appointments

- *Assistant Professor* — Aug 2025 – Present
  Department of Mathematics, Baylor University, Waco, TX
- *Visiting Assistant Professor* — Aug 2022 – Jul 2025
  Department of Mathematics, Michigan State University (MSU), East Lansing, MI
- *Teaching Assistant* — 2015 – 2016
  Vietnam National University, Ho Chi Minh City (VNU-HCMC), Vietnam

Education

- Mathematics Ph.D., University of Wisconsin-Madison (UW-Madison) — 2016 – 2022
  Advisor: Hung Tran
- B.S. Honor program in Mathematics, University of Science, VNU-HCMC — 2011 – 2015

Publications and Preprints

Preprints and Submitted Manuscripts

11. Prerona Dutta, Khai T. Nguyen, and **Son N. T. Tu**. "On the rate of convergence in superquadratic Hamilton–Jacobi equations with state constraints". *Submitted (2025)* · *arxiv:2508.01528 [math.AP]*
10. **Son N. T. Tu** and Jianlu Zhang. "Vanishing discount limits for first-order fully nonlinear Hamilton-Jacobi equations on noncompact domains". *Submitted (2025)* · *arxiv:2507.20472 [math.AP]*
9. Russell Schwab, **Son N. T. Tu**, and Olga Turanova. "Well-posedness for viscosity solutions of the one-phase Muskat problem in all dimensions". *Submitted (2024)* · *arxiv:2404.10972 [math.AP]*

Published

8. Bingyang Hu, **Son N. T. Tu**, and Jianlu Zhang. "Polynomial convergence rate for quasiperiodic homogenization of Hamilton–Jacobi equations". *Communications in Partial Differential Equations 50, no. 1–2 (February 1, 2025): 211–244.*
7. **Son N.T. Tu** and Jianlu Zhang. "On the regularity of stochastic effective Hamiltonian". *Proceedings of the American Mathematical Society 153 (2025), pp. 1191-1203.*
6. **Son N.T. Tu** and Jianlu Zhang. "Generalized convergence of solutions for nonlinear Hamilton–Jacobi equations with state-constraint". *Journal of Differential Equations 406 (Oct. 2024), 87-125.*
5. Farid Bozorgnia, Dohyun Kwon, and **Son N.T. Tu**. "The regularity with respect to domains of the additive eigenvalues of superquadratic Hamilton–Jacobi equation". *Journal of Differential Equations, 402, (Sep. 2024), 518-553.*
4. Yuxi Han and **Son N.T. Tu**. "Remarks on the vanishing viscosity process of state-constraint Hamilton–Jacobi equations". *Applied Mathematics & Optimization, 86(3) (Jun. 2022).*
3. **Son N.T. Tu**. "Vanishing discount for Hamilton–Jacobi equation in nested domains". *Journal of Differential Equations, 317, (Apr. 2022), 32-69.*

2. Yeon-Eung Kim, Hung Vinh Tran, and **Son N.T. Tu**. "State-constraint static Hamilton–Jacobi equations in nested domains". *SIAM Journal on Mathematical Analysis, 52(5) (Sep. 2020), 4161–4184.*

1. **Son N.T. Tu**. "Rate of Convergence for Periodic Homogenization of Convex Hamilton–Jacobi Equations in One Dimension". *Asymptotic Analysis, 121(2) (Jan. 2021), 171–194.*

Refereed conference proceedings & papers

1. Thu Nguyen, Quang M. Le, **Son N.T. Tu**, and Binh Nguyen. "Unequal Covariance Awareness for Fisher Discriminant Analysis and Its Variants in Classification". *2022 International Joint Conference on Neural Networks (IJCNN), (Jul. 2022).*

Awards and Honors

- *Research Travel Support from the Office of Postdoctoral Affairs*, MSU 2024
- *2023–2024 Postdoctoral Prize for Excellence in Teaching*, Department of Mathematics, MSU 2024
- *Teaching Assistant Superior Rating* FA 2017, FA 2018, FA 2019, FA 2020
  Mathematics Department, UW-Madison
- *Graduate Research Travel Grant*, Graduate School, UW-Madison 2021
- *GSSC Fellowship*, Graduate School, UW-Madison 2021
- *Excellence in Research Award*, Mathematics Department, UW-Madison 2020
- *Outstanding Teaching Assistant Award*, Mathematics Department, UW-Madison 2020
- *Vietnam Education Foundation (VEF) Fellowship* (declined) 2016
- *Valedictorian Award*, University of Sciences, VNU-HCMC, Vietnam 2015
- *Third prize, Vietnam Mathematical Olympiad* (VMO) 2011
- *World Finalist*, Shing-Tung Yau High School Mathematics Awards, Beijing, China 2010

Professional Services

- *Co-organizer: AMS 2025 Fall Southeastern Sectional Meeting*, Tulane University Oct 01-03, 2025
  New Orleans, LA, USA
- *Co-organizer: AMS 2025 Spring Central Sectional Meeting*, University of Kansas Mar 29-30, 2025
  Lawrence, KS, USA
- *Co-organizer, Madison PDEs Conference*, UW-Madison
  Originally scheduled for April 2020; canceled due to COVID-19
- *Co-organizer, AMS Student Chapter Seminar*, UW-Madison 2018–2019
- Referee for Mathematics Journals:

  Journal of Mathematical Physics (2023; 1 reviews), *Journal of Geometric Analysis* (2023; 1 review), *Discrete and Continuous Dynamical Systems* (2023; 1 review), *Proceedings of the American Mathematical Society* (2024; 1 review), *Advances in Continuous and Discrete Models* (2025; 1 review), *Journal of Differential Equations* (2025; 1 review), *Transactions of the American Mathematical Society* (2025; 1 review)

Outreach

- Interactive STEM demonstration Mar 01, 2025
  for middle school students, as part of the *Girls Math and Science Day*, MSU
- Lead an interactive STEM demonstration table on "*Soap Bubbles and Minimal Surfaces*" Mar 09, 2024
  for middle school students, as part of the *Girls Math and Science Day*, MSU
- Judge for *University Undergraduate Research and Arts Forum 2023 (UURAF 2023)*, MSU Apr 14, 2023

Teaching

BAYLOR UNIVERSITY	Role	# Students	Term
Calculus I, MTH 1311	Instr. of Record	38	Fall 2025
Multivariable Calculus (Calculus III), MTH 2321	Instr. of Record	27	Fall 2025

MICHIGAN STATE UNIVERSITY	Role	# Students	Term
Topic in Optimal Control Theory, MTH 496-002 (Capstone course)	Instr. of Record	22	Spring 2025
Multivariable Calculus, MTH 234	Instr. of Record	191	Fall 2024
Matrix Algebra with Computational Applications, MTH/CMSE 314	Instr. of Record	30	Summer 2024
Directed Reading, MTH 490 (Introduction to Optimal Control Theory)	Instr. of Record	1	Spring 2024
Multivariable Calculus, MTH 234	Instr. of Record	170	Spring 2024
Multivariable Calculus, MTH 234	Instr. of Record	60	Fall 2023
Linear Algebra and Application to Data Science, MTH/CMSE 314	Instr. of Record	60	Spring 2023
Linear Algebra and Application to Data Science, MTH/CMSE 314	Instr. of Record	60	Fall 2022

UNIVERSITY OF WISCONSIN–MADISON	Role	# Students	Term
College Algebra, Math 112	Instr. of Record	60	Fall 2021
College Algebra, Math 112	Instr. of Record	30	Spring 2021
Undergraduate PDE, Math 619	Teaching Assistant	~ 30	Spring 2021
Business Calculus, Math 211	Recitation Instr.	~ 30	Fall 2020
Mathematical Analysis I, Math 521	Teaching Assistant	~ 30	Summer 2020
College Algebra, Math 112	Recitation Instr.	~ 60	Fall 2019
Multi-variable Calculus, Algebra & Differential Equations, Math 375	Recitation Instr.	~ 30	Spring 2019
Multi-variable Calculus, Algebra & Differential Equations, Math 376	Recitation Instr.	~ 30	Fall 2018
Business Calculus, Math 211	Recitation Instr.	~ 60	Fall 2017
Linear Algebra & Differential Equations, Math 319	Recitation Instr.	~ 60	Spring 17
Multi-variable Calculus 2, Math 222	Recitation Instr.	~ 60	Fall 2016

VIETNAM NATIONAL UNIVERSITY, HCMC	Role	# Students	Term
Calculus II, MATH2153 (Excellent Program - Univ. of Informatics)	Recitation Instr.	~ 60	Spring 2016
Calculus III, MATH253 (Adv. Comp. Sci. - Univ. of Science)	Recitation Instr.	~ 60	Fall 2015

Undergraduate Research Mentoring

- *Undergraduate Research Mentor* for Minh Nguyen, MSU — Summer 2024 – Summer 2025
  Uniqueness set for Hamilton-Jacobi equations with state-constraints
  Awarded *College of Natural Science Undergraduate Research Support Scholarship* for Summer 2024.
- *Directed Studies* (MTH490): Minh Nguyen, MSU — Spring 2024
  Topic: *Optimal control theory and viscosity solutions to Hamilton–Jacobi equations*
  with *Best Presentation Award* at the *21st Math Student Conference*, MSU
- *Directed Reading Program:* William Robert Korbitz and Luanda Cai, UW-Madison — Spring 2019
  Topic: *Optimal Control for Linear Systems*
- *Undergraduate PDEs Summer School:* Daotong Ge and Hangyu Pi, UW-Madison — Summer 2017
  Co-mentored with Hung Tran

Selected Presentations

Selected Invited talks

25. *Special Session: Dynamics and Variational Methods of Quasi-Hamiltonian Systems* — Jul 06-10, 2026
    15th AIMS Conference, Athens, Greece
24. *Baylor Applied Math Seminar* — Sep 08, 2025
    Baylor University, Department of Mathematics
23. *Workshop on Partial Differential Equations, Mathematical Physics and Numerics 2025* — Aug 16-17, 2025
    Texas A&M University, Department of Mathematics
22. Workshop: *"Recent progress in Hamilton–Jacobi equations and related topics"* — Jun 2-6, 2025
    Nanjing, China
21. PDEs Seminar, University of Tennessee - Knoxville — Nov 07, 2024
20. Colloquium, Minnesota State University - Mankato — Oct 29, 2024
19. Analysis Seminar, University of Maryland, College Park — Oct 24, 2024
18. Analysis and PDE Seminar, Michigan State University — Oct 16, 2024
17. (Online) Analysis Seminar, Texas Tech University — Oct 14, 2024
16. Mini-workshop: Summer School in PDEs and Applications 2024, VIASM and SGU — Jul 27, 2024
15. (Online) Virtual Student PDEs Seminar, UW–Madison — May 30, 2024
14. PDEs Seminar, The Ohio State University — Apr 09, 2024
13. (Online) Seminars on Analysis and Stochastic Analysis, Auburn University — Mar 27, 2024
12. (Online) Early Career Math Colloquium, University of Arizona — Mar 21, 2024
11. SIAM Great Lakes Meeting (SIAMGL) 2023, Michigan State University — Oct 15, 2023
    Minisymposium: Nonlinear PDEs & Optimal Transport with Applications
10. Differential Equations and Nonlinear Analysis Seminar, North Carolina State University — Nov 09, 2023
9. Applied Analysis Seminar, Stinghua University, China — Aug 03, 2023
8. Analysis Seminar, University of Science, VNU-HCMC — Jun 20, 2023
7. Madison PDEs Conference, UW-Madison — May 15-19, 2023
6. (Online) Academy of Mathematics and Systems Science, Chinese Academy of Science — Apr 19, 2023
5. (Online) Academy of Mathematics and Systems Science, Chinese Academy of Science — Apr 26, 2023
4. Applied Math Seminar, University of North Carolina - Charlotte — Sep 24, 2021
3. (Online) Graduate School of Mathematical Sciences, The University of Tokyo — Oct 27, 2020
2. PDEs and Geometric Analysis Seminar, UW-Madison — Sep 23, 2019
1. 11th Summer Meeting Conference, University of Science, VNU-HCMC — Jul 30, 2019

Selected Contributed Talks & Posters

8. Poster: IMSI's workshop Mathematical Modeling of Biological Interfacial Phenomena — Dec 09-13, 2024
   The Institute for Mathematical and Statistical Innovation, University in Chicago
7. Boston University/Keio University/Stinghua University Workshop 2024 — Jun 01, 2024
   on Differential Equations, Dynamical Systems and Applied Mathematics
6. Analysis and PDE Seminar, Michigan State University — Apr 17, 2024

5. 88th Midwest PDEs Seminar, The Ohio State University — Apr 26-28, 2024

4. Poster: 8th Annual Scholar Showcase — Apr 06, 2024
   Office of International Students and Scholars, Michigan State University

3. Concentration week on Geometry and Analysis, University of Texas A&M — Jul 29, 2022

2. Geometric and Harmonic Analysis 2019, University of Connecticut — Mar 30, 2019

1. Poster: CNA Workshop 2019: Mathematical Models for Pattern formation — Mar 08, 2019
   Carnegie Mellon University

Selected Conferences, Workshops Attended & Research Visits

6. *Workshop on Partial Differential Equations, Mathematical Physics and Numerics 2025* — Aug 16-17, 2025
   Department of Mathematics, Texas A&M University

5. American Institute of Mathematics — Apr 14-18, 2025
   AIM workshop: *Integro-differential equations in many-particle interacting systems*
   Richard N. Merkin Center for Pure and Applied Mathematics, Caltech

4. AMS 2025 Spring Central Sectional Meeting, University of Kansas — Mar 29-30, 2025

3. IMSI's workshop *Mathematical Modeling of Biological Interfacial Phenomena* — Dec 09-13, 2024
   The Institute for Mathematical and Statistical Innovation, University in Chicago

2. University of Seoul, hosted by Dohyun Kwon — Jul 04-08, 2024

1. Chinese Academy of Science, hosted by Jianlu Zhang — Jul 26-Aug 07, 2023

Other Skills

- Computing Proficiency: Python, Matlab, Linux