

# SON N.T. TU

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July 29, 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*

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](https://arxiv.org/abs/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](https://arxiv.org/abs/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 Mathematics Department, UW-Madison FA 2017, FA 2018, FA 2019, FA 2020
- 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 New Orleans, LA Oct 01-03, 2025
- Co-organizer: AMS 2025 Spring Central Sectional Meeting, University of Kansas Lawrence, KS Mar 29-30, 2025
- 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 for middle school students, as part of the *Girls Math and Science Day*, MSU Mar 01, 2025
- Lead an interactive STEM demonstration table on "Soap Bubbles and Minimal Surfaces" for middle school students, as part of the *Girls Math and Science Day*, MSU Mar 09, 2024
- Judge for *University Undergraduate Research and Arts Forum 2023 (UURAF 2023)*, MSU Apr 14, 2023

## 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

## Teaching

BAYLOR UNIVERSITY	Role	# Students	Term
Multivariable Calculus, MTH 2321	Instr. of Record		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

## Selected Presentations

### *Selected Invited talks*

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| 22. Workshop: "Recent progress in Hamilton–Jacobi equations and related topics"<br>Nanjing, China  | Jun 2-6, 2025   |
| 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<br>Minisymposium: Nonlinear PDEs & Optimal Transport with Applications | Oct 15, 2023    |
| 10. Differential Equations and Nonlinear Analysis Seminar, North Carolina State University   | Nov 09, 2023    |
| 9. Applied Analysis Seminar, Stingham 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*

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|---|-----------------|
| 8. <a href="#">Poster</a> : IMSI's workshop Mathematical Modeling of Biological Interfacial Phenomena<br>The Institute for Mathematical and Statistical Innovation, University in Chicago | Dec 09-13, 2024 |
| 7. Boston University / Keio University / Stingham University Workshop 2024<br>on Differential Equations, Dynamical Systems and Applied Mathematics  | Jun 01, 2024    |
| 6. Analysis and PDE Seminar, Michigan State University  | Apr 17, 2024    |
| 5. 88 <sup>th</sup> Midwest PDEs Seminar, The Ohio State University   | Apr 26-28, 2024 |
| 4. <a href="#">Poster</a> : 8th Annual Scholar Showcase<br>Office of International Students and Scholars, Michigan State University   | Apr 06, 2024    |
| 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. <a href="#">Poster</a> : CNA Workshop 2019: Mathematical Models for Pattern formation<br>Carnegie Mellon University  | Mar 08, 2019    |

## Selected Conferences, Workshops Attended, & Research Visits

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| 5. American Institute of Mathematics<br>AIM workshop: <i>Integro-differential equations in many-particle interacting systems</i><br>Richard N. Merkin Center for Pure and Applied Mathematics, Caltech | Apr 14-18, 2025     |
| 4. AMS 2025 Spring Central Sectional Meeting, University of Kansas   | Mar 29-30, 2025     |
| 3. IMSI's workshop <i>Mathematical Modeling of Biological Interfacial Phenomena</i><br>The Institute for Mathematical and Statistical Innovation, University in Chicago                                | Dec 09-13, 2024     |
| 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