

Hung Tran

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Appointments

Texas Tech University, Assistant Professor, 2019-.

Texas Tech University, W. Dayawansa VAP (Mentor: Magdalena Toda), 2017-2019.

University of California at Irvine, VAP (Mentor: Richard Schoen), 2014-2017.

Education

Ph.D. Mathematics (Thesis Advisor: Xiaodong Cao), Cornell University, 2014.

B.A. in Mathematics and Economics (summa cum laude), Berea College, 2009.

Research Interests

Minimal Surfaces, Four-dimensional Manifolds, Geometric Flows, Einstein Structures, and Eigenvalues.
Applications of Differential Geometry in Biology, Mathematical Physics, and Data Sciences.

Grants

(PI) NSF Grant DMS-2104988: The Geometry of Minimal Surfaces and Four-Dimensional Manifolds, \$212000, 2021-2024.

(PI) Simons Foundation Collaboration Grant: Minimal Surfaces, Four-Dimensional Manifolds, and Applications, \$ 42000, 2020-25 (early termination in 2022 due to the activation of NSF grant).

(co-PI) Vietnam Institute for Advanced Study in Mathematics Collaborative Grant:

Geometric aspects of Riemannian and complex manifolds, \$50000, Summer 2021.

Geometric Analysis on Manifolds, \$30000, Summer 2019.

AMS Travel Grant for International Congress of Mathematics, \$3300, Summer 2018.

Other Recent Proposals

(Sole PI) NSF CAREER: Geometry of Surfaces and Four-Dimensional Manifolds, \$ 401670, 2021-26.

(Lead PI) NSF REU Site: Training Research for Undergraduate Students in Texas (TRUST) at Texas Tech University, \$ 253264, 2021-23.

(Co-PI) NIH Collaborative Grant: Unified Regression Framework for Heterogeneous Data with Applications to Drug Response Prediction, \$ 1,761,582.00, 2020-25.

(Co-PI) NSF Collaborative Grant: Unified Structure Aware Framework for Prediction from Heterogeneous Datasets, \$840000, 2020-24.

(Sole PI) NSF Grant: Minimal Surfaces and Four-Dimensional Manifolds, \$88000, 2019-2022.

Selected Awards and Honors

Best Mentor Award: For excellence in advising graduate students, Texas Tech University, 2018.

Robert John Battig Prize: For excellence and promise in mathematics, Cornell University, 2013.

Hutchinson Fellowship: For outstanding in research and teaching. Cornell University, 2012.

Graduate Fellowship: For outstanding entering graduate students, Cornell University, 2009-10.

Wood Achievement Award: For an outstanding graduating senior, Berea College, 2009.

Ballard-McConnell-Willis Scholarship: For excellence in mathematics, Berea College, 2007-09.

Austin's Scholar: For Academic excellence, Berea College, 2007.

2nd prize in Virginia Tech Regional Mathematics Contest, 2006.

Bronze medalist in Vietnamese Mathematical Olympiad, 2004.

Publications

1. Xiaodong Cao and Hung Tran. Four-manifolds of pinched sectional curvature. *Pacific J. Math.*, Accepted, 2022.
2. Hung Tran. The Gauss map of a free boundary minimal surface. *Comm. Anal. Geom.*, 29 (2): 483-499, 2021.
3. Graham Smith, Ari Stern, Hung Tran, and Detang Zhou. On the Morse index of higher-dimensional free boundary minimal catenoids. *Calc. Var. Partial. Differ. Equ.*, 60 (208), 2021.
4. Anthony Gruber, Magdalena Toda, and Hung Tran. Willmore-Stable Minimal Surfaces. *American Institute of Physics Proceedings of the 18th International Conference of Numerical Analysis and Applied Mathematics*. Accepted 2020.
5. Hung Tran. Index characterization for free boundary minimal Surfaces. *Comm. Anal. Geom.*, 28 (1): 189-222, 2020.
6. Eugenio Aulisa, Anthony Gruber, Magdalena Toda, and Hung Tran. New Developments on the p-Willmore Energy of Surfaces. *Bulgarian Academy of Sciences Proceedings - Avangard Prima 2020 (21st Intern. Conference on Geometry, Integrability and Quantization)*, 57-65, 2020.
7. Anthony Gruber, Magdalena Toda, and Hung Tran. On the variation of curvature functionals in space forms with application to a generalized Willmore energy. *Annals of Global Analysis and Geometry*, 56 (1): 147-165, 2019.
8. Xiaodong Cao and Hung Tran. Einstein four-manifolds of pinched sectional curvature. *Adv. Math.*, 335: 322-342, 2018.
9. Hung Tran. On closed manifolds with harmonic Weyl curvature. *Adv. Math.*, 322: 861-891, 2017.
10. Mihai Bailesteanu and Hung Tran. Heat kernel estimates under the Ricci-Harmonic map flow. *Proc. Edinb. Math. Soc. (2)*, 60(4): 831-857, 2017.
11. Richard Schoen and Hung Tran. Complete manifolds with bounded geometry and spectral gaps. *J. Differential. Equations.*, 261(4): 2584-2606, 2016.

12. Xiaodong Cao and Hung Tran. The Weyl tensor of Gradient Ricci Solitons. *Geom. Top.*, 20: 389-346, 2016.
13. Xiaodong Cao, Hongxin Guo, and Hung Tran. Estimates for conjugate heat kernel on evolving manifolds. *Math. Z.*, 281(1): 201-214, 2015.
14. Xiaodong Cao and Hung Tran. Mean value inequalities and conditions to extend the Ricci flow. *Math. Res. Lett.*, 22 (2): 417-438, 2015.
15. Hung Tran. Harnack estimates for Ricci flow on warped Products, *J. Geom. Anal.*, 26 (3): 1838-1862, 2015.
16. Hung Tran. Aspects of the Ricci flow. *PhD Thesis*, Cornell University, 2014.
17. Edward Newkirk, Jonathan Dahlberg, Alexander Dubbs and Hung Tran. Regions in the plane with density r^p . *New York J. Math.*, 16: 31-51, 2010.

Preprints

1. Pyo Juncheol, Dung Nguyen, Hung Tran. First Stability Eigenvalue of Singular Hypersurfaces with Constant Mean Curvature in Spheres. *Submitted*, 2021.
2. Xiaodong Cao, Matthew Gusky, Hung Tran. Curvature of the Second Kind and a Conjecture of Nishikawa . *Submitted*, 2021.
3. Hung Tran and Detang Zhou. On the Morse index with constraints: An abstract formulation. *Submitted.*, 2020.
4. Hung Tran and Detang Zhou. On the Morse index with constraints for Capillary Surfaces. *Submitted.*, 2020.
5. Anthony Gruber, Magdalena Toda, and Hung Tran. Stationary Surfaces with Boundaries. *Submitted (arxiv.org: 1912.07103)*, 2020.

Colloquium and Conference Invited Talks

Colloquium, Wichita State University, April 8th, 2022.

Geometric Analysis: Past, Present and Future (Keynote Speaker), Virtual, March 2022.

Yorkshire Durham Geometry Day, (Virtual) Durham University (UK), Dec 8th, 2021.

Colloquium, Texas Tech University, Oct 7th, 2021.

Mini-Workshop on Geometric Analysis, VIASM-Vietnam, July 21st, 2021.

Colloquium, Vin University (Vietnam), June 2021.

Workshop on Differential Geometry, Universidade Federal Fluminense, Feb 08-09, 2021.

18th International Conference of Numerical Analysis and Applied Mathematics, Virtual, Sep 19, 2020.

Special Section on Recent Trends in Geometric PDEs and Mathematical Physics, AMS Sectional Meeting, Binghamton University, Oct 12, 2019.

Geometric Analysis on Manifolds Workshop, VIASM-Vietnam, July 31st, 2019.

Vietnam-USA Joint Mathematical Meeting, (Quy Nhon, Vietnam), June 10-13, 2019.

Colloquium, Texas Tech University, Jan 24th, 2019.

The 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications (Taipei, Taiwan), July 5-9, , 2018.

Junior Scholar Symposium, Texas Tech University, Feb 20th, 2018.

Global Scientist Forum, Southern University of Science and Technology (Guangdong, China), Jan 6-7, 2018.

Special Section on Analysis and PDEs in Geometry, AMS Sectional Meeting, University of North Texas, Sep 9-10th, 2017.

Special Section on Integrable Systems and Applications, AMS Sectional Meeting, University of North Texas, Sep 9-10th, 2017.

Summer Seminar and School, Vietnam National University, July 27th- August 3rd, 2017.

Colloquium, Texas Tech University, Feb 20th, 2017.

Colloquium, University of Tennessee, January 23rd, 2017.

Young Geometric Analysts' Forum, Sanya China, Jan 09-13th, 2017.

Colloquium, Washington University, December 5th, 2016.

AMS Sectional Meeting, SUNY at Stony Brook, March 19-20, 2016.

Frankfest, Williams College, February 7th, 2016.

Special Geometric Structures, Mathematics Conference, Union College, October 19-20, 2013.

AMS Sectional Meeting, Temple University, October 12-13, 2013.

Workshop on Geometric and Analytic Aspects of the Ricci Flow, Nanjing University of Science and Technology, June 15-17, 2013.

AMS Sectional Meeting, Rochester Institute of Technology, September 22-23, 2012.

Symposium for Undergrads in Mathematic Sciences, Brown University, March 2009.

MathFest, University of Wisconsin at Madison, August 2008.

Selected Seminar Talks

Geometric Analysis Seminar, Iowa State University, March 7th, 2022.

BPL Geometry Seminar, Pusan National University (Korea), Dec 14th, 2021.

Probability, Differential Geometry, and Mathematical Physics, Texas Tech University, March 10th, 2021.

Elasticity Seminar, Texas Tech University, Oct 28th 2020.

Applied Math Seminar, Texas Tech University, Oct 28th 2020, Feb 7th 2018.

Analysis Seminar, Texas Tech University, Nov 25 2019, Dec 3rd 2018, Oct 9th 2017.

Geometry Topology Dynamical Systems Seminar, UT Dallas, Nov 18, 2019.

Analysis Seminar, Cornell University, Oct 2019, April 2018, September 2016, September 2013, October 2012.

Singular Minimal Hypersurfaces, VIASM, several talks, July 2019.

Differential Geometry Seminar, UCI, May 2018, October 2016, November 2014.

Geometry Seminar, Stanford University, May 2018, June 2016.

Applied Math Seminar, Texas Tech University, Feb 7th, 2018.

Geometry Seminar, Texas Tech University, June 9th 2017.

Geometry Seminar, NYU, May 2017.

Geometry and Topology Seminar, University of Sydney, March 2017.

PDE Seminar, University of Wollongong, March 2017.

Geometric Analysis Seminar, University of Chicago, November 29th, 2016.

Geometry and Topology Seminar, Cal State Fullerton, September 30th, 2016.

Geometric Analysis Seminar, CUNY Graduate Center, September 13th, 2016 and November 12th, 2013.

Analysis Seminar, Vietnam National University, December 18th, 2015.

Differential Geometry Seminar, UCR, May 8th, 2015.

Geometry-Topology Seminar, University of Pennsylvania, January 30th, 2014.

Topology and Geometry Seminar, Vietnam Institute of Mathematics, January 2nd, 2014.

Nonlinear Analysis Seminar, Rutgers University, October 23rd, 2013.

Geometry and Topology Seminar, Syracuse University, October 3rd, 2013.

PhD Students Advised

Miraj Samarakkody, since Oct 2021.

(co-advising with Dung Nguyen) Dung Tuan Ha, Vietnam National University at Ha Noi, since Jan 2020.

(committee member) Maik Reddiger, (expected) graduate Aug 2022.

(committee member) Madusha Atampalage, Texas Tech University, graduated 2021.

(co-advising with Magdalena Toda) Anthony Gruber, Texas Tech University, graduated Aug 2019.

Teaching Experience

At Texas Tech University:

Math 6331, Riemannian Geometry, Spring 2022.

Math 1452, Calculus II, Fall 2021, Spring 2022.

Math 4350, Advanced Calculus, Spring 2021.

Math 3354, Differential Equations, Fall 2020.

Math 2360, Linear Algebra, Fall 2019 (Honor Class), Spring 2018.

Math 3350, Higher Mathematics for Engineers and Scientists, Spring 2019, Summer 2018, Fall 2017.

Math 2450, Calculus III, Fall 2018.

At University of California at Irvine:

Math 130A, Probability and Stochastic Processes, Spring 2017.

Math 140A, Elementary Analysis, Winter 2017.

Math 2A-B-D, Calculus I-II-IV, Summer 2015, Fall 2016, Summer 2016.

Math 161, Modern Geometry, Spring 2015, Winter 2016, Spring 2016.

Math 121A, Theoretical Linear Algebra, Fall 2015.

Math 120A, Introduction to Group Theory, Winter 2015.

Math 3A, Linear Algebra, Fall 2014.

At Cornell University:

As an Instructor: Math 1910: Calculus for Engineers (Summer 2014), Math 1106: Calculus with Applications (Spring 2013), Math 1120: Calculus II (Fall 2012).

As a Teaching Assistant: Math 1120 (Fall 2011, Fall 2012, Spring 2011), Math 6520 (Fall 2010), Math 4280 (Spring 2014), CS 4220 (Spring 2014).

At Berea College:

As a Teaching Assistant: Discrete Math, Intro to Topology, Abstract Algebra, Microeconomics, International Economics, 2006-2009.

Educational and Mentoring Activities

Texas Tech Graduate School General Fellowship Evaluator, since Jan 2022.

Undergraduate Committee Member, since Sep 2021.

Undergraduate mentor for the President's Program in Inquiry and Investigative Thinking, TTU, 2018-.

Organizer and leader of the Emmy Noether Highschool Mathematics Day, TTU, 2018-.

Organizer and leader of Math Circle, TTU, 2018-2020.

Leader of Math Circle: Design and lead mathematics sessions for high school students, UCI, 2015-2017.

Instructor of Seminar on Mathematics: Design and teach a class on isoperimetric problems, mentor high school students to do basic research, Ithaca High School, Fall 2013.

Trainer of the Teaching Assistant Program: Train entering graduate students, Cornell University, Summers 2012, 13.

Leader of Math Explorers' Club: Design and lead activities for middle schoolers, Cornell University, Spring 2013.

Assistant to an REU program: Assist Prof Xiaodong Cao in organizing the REU group: brainstorm on open problems and advise on writing a paper, Cornell University, Summer 2012.

Other Professional Activities

Associate Member of Vietnam Institute for Advanced Study in Mathematics (VIASM).

Member of American Mathematical Society, Mathematics Association of America.

Conference Organization:

AMS Sectional Meeting Special Session at UTEP, Sep 2022.

(Hybrid) Mini-Workshop on Geometric Analysis, VIASM-Vietnam, July 2021.

(Virtual) AMS Sectional Meeting Special Session at UTEP, Sep 2020.

(Virtual) Texas Geometry and Topology Conference at TTU, April 2020.

Geometric Analysis on Riemannian Manifolds Workshop, VIASM-Vietnam, July 2019.

Seminar Organization:

Probability, Differential Geometry and Physics at TTU, 2020-.

Bochner Techniques and Curvature Conditions, VIASM, Summer 2021.

Singular Minimal Hypersurfaces at VIASM, Summer 2019.

Differential Geometry at UCI, 2015-17.

Learning Geometry at UCI, 2015-17.

Journal Referee: J. Differential Geom., Calc. Var. Partial. Differ. Equ., J. London Math. Soc., Comm. Anal. Geom., J. of Funct. Anal., Int. Math. Res. Not. (IMRN), Commun. Pure Appl. Anal., J. Geom, 2014-.

Reviewer: Mathematical Reviews, 2014-.