# Curriculum Vitae
# Marcelo Mendes Disconzi

(updated: April 23, 2025)

## Contact information


Department of Mathematics
mail to: 1326 Stevenson Center
Vanderbilt University
Nashville, TN, 37240, USA

marcelo.disconzi@vanderbilt.edu
https://www.disconzi.net
Office: A1017, 17th & Horton (Sony bld)
Phone: (615) 322 7147


## Research interests

Partial differential equations, mathematical fluid dynamics, mathematical general relativity, geometric analysis, and mathematical physics.

## Primary appointments

Title: Associate Professor of Mathematics (tenured appointment).
Institution: Vanderbilt University.
Period: Fall 2021 – Present.

Title: Assistant Professor of Mathematics (tenure-track appointment).
Institution: Vanderbilt University.
Period: Fall 2014 – Spring 2021.

Title: Non-tenure track Assistant Professor of Mathematics (Post-doc).
Institution: Vanderbilt University.
Period: Fall 2012 – Fall 2014.
Mentor: Gieri Simonett.

## Secondary and visiting appointments

Title: Visiting Scholar.
Institution: Kavli Institute for Theoretical Physics, University of California, Santa Barbara, part of the semester program The Many Faces of Relativistic Fluid Dynamics.
Period: 06/05/2023 – 05/30/2023.

Title: Visiting Scholar.
Institution: Center of Mathematical Sciences and Applications, Harvard University, part of the semester program General Relativity.
Period: 05/01/2022 – 05/31/2022.

Title: Research Member.
Institution: Mathematical Sciences Research Institute (MSRI), part of the semester program Mathematical Problems in Fluid Dynamics.
Period: 01/19/2021 – 05/28/2021.

Title: Visiting Scholar.
Institution: Mathematical Research Institute of Oberwolfach (Germany), Research in Pairs program.
Period: 07/10/2016 – 08/06/2016.

## Degrees earned

Degree: Ph.D. in Mathematics.
Institution: Stony Brook University (State University of New York at Stony Brook).
Period: August 2006 – May 2012.
Advisor: Marcus A. Khuri.
Thesis title: Compactness and non-compactness for the Yamabe problem on manifolds with boundary.

Degree: M.S. in Mathematics.
Institution: Universidade Federal do Rio Grande do Sul, Brazil.
Period: June 2003 – July 2005.
Advisor: Alexandre T. Baraviera.
Thesis title: Transição de fases em redes de mapas acoplados (Phase transitions in coupled map lattices, in Portuguese).

Degree: M.S. in Physics.
Institution: Universidade Federal do Rio Grande do Sul, Brazil.
Period: March 2003 – March 2005.
Advisor: Leonardo G. Brunnet.
Thesis title: Sistemas extensos com dimensão instável invariante (Extended systems with invariant unstable dimension, in Portuguese).

Degree: B.Sc. in Physics.
Institution: Universidade Federal do Rio Grande do Sul, Brazil.
Period: March 1999 – December 2002.

## Articles in refereed journals (Click on title to access manuscript, when available)

### Mathematics papers (following the standards of the mathematics community):

1. Disconzi, M. M.; Isenberg, J.; Maxwell, D. *Initial Data for First-order Causal Viscous Conformal Fluids in General Relativity.* Journal of Mathematical Physics, Vol. 65, Issue 12, 122503, 23 pages (2024).

2. Disconzi, M. M.; Shao, Y. *Strongly hyperbolic quasilinear systems revisited, with applications to relativistic fluid dynamics.* Asymptotic Analysis, Vol. 140, No. 3-4, pp. 281-302 (2024).

3. Disconzi, M. M. *Recent developments in mathematical aspects of relativistic fluids.* Living Reviews in Relativity, Vol. 27, No. 6, 218 pages (2024).

4. Disconzi, M. M.; Hoang, V.; Radosz, M. *Breakdown of smooth solutions to the Müller-Israel-Stewart equations of relativistic viscous fluids.* Letters in Mathematical Physics, Vol. 113, No. 3, 55 pages (2023).

5. Disconzi, M. M.; Ifrim, M.; Tataru, D. *The relativistic Euler equations with a physical vacuum boundary: Hadamard local well-posedness, rough solutions, and continuation criterion.* Archive for Rational Mechanics and Analysis, Vol. 245, pp. 127-182 (2022).

6. Disconzi, M. M.; Luo, C.; Mazzone, G.; Speck, J. *Rough sound waves in 3D compressible Euler flow with vorticity.* Selecta Mathematica, Vol. 28, No. 2, Paper No. 41, 153 pages (2022).

7. Bemfica, F. S.; Disconzi, M. M.; Graber; P. J. *Local well-posedness in Sobolev spaces for first-order barotropic causal relativistic viscous hydrodynamics.* Communications in Pure and Applied Analysis, Vol. 20, No. 9, pp. 2885-2914 (2021).

8. Bemfica, F. S.; Disconzi, M. M.; Rodriguez, C.; Shao, Y. *Local existence and uniqueness in Sobolev spaces for first-order conformal causal relativistic viscous hydrodynamics.* Communications in Pure and Applied Analysis, Vol. 20, No. 6, pp. 2279-2290 (2021).

9. Disconzi, M. M.; Luo, C. *On the Incompressible Limit for the Compressible Free-Boundary Euler Equations with Surface Tension in the Case of a Liquid.* Archive for Rational Mechanics and Analysis, Vol. 237, Issue 2, pp. 829-897 (2020).

10. Disconzi, M. M.; Kukavica, I.; Tuffaha, A. *A Lagrangian interior regularity result for the incompressible free boundary Euler equation with surface tension.* SIAM Journal on Mathematical Analysis, Vol. 51, No. 5, pp. 3982-4022 (2019).

11. Disconzi, M. M.; Kukavica, I. *A priori estimates for the free-boundary Euler equations with surface tension in three dimensions.* Nonlinearity, Vol. 32, No. 9, pp. 3369-3405 (2019).

12. Disconzi, M. M.; Kukavica, I. *A priori estimates for the 3D compressible free-boundary Euler equations with surface tension in the case of a liquid.* Evolution Equations and Control Theory, Vol. 8, No. 3, pp. 503-542 (2019).

13. Disconzi, M. M.; Speck, J. *The relativistic Euler equations: Remarkable null structures and regularity properties.* Annales Henri Poincaré, Vol. 20, Issue 7, pp. 2173-2270 (2019).

14. Disconzi, M. M. *On the existence of solutions and causality for relativistic viscous conformal fluids.* Communications in Pure and Applied Analysis, Vol. 18, No. 4, pp. 1567-1599 (2019).

15. Disconzi, M. M.; Kukavica, I. *On the local existence for the Euler equations with free boundary for compressible and incompressible fluids.* Comptes Rendus de l'Académie des Sciences - Paris, Vol. 356, No. 3, pp. 306-311 (2018).

16. Chan, C. H.; Czubak, M.; Disconzi, M. M. *The formulation of the Navier-Stokes equations on Riemannian manifolds.* Journal of Geometry and Physics, Vol. 121, pp. 335-346 (2017).

17. Disconzi, M. M.; Ebin, D. G. *Motion of slightly compressible fluids in a bounded domain, II.* Communications in Contemporary Mathematics, Vol. 19, No. 4, pp. 1650054, 57 pages (2017).

18. Disconzi, M. M.; Khuri, M. A. *Compactness and non-compactness of the Yamabe problem on manifolds with boundary.* J. Reine Angew. Math. (Crelle's Journal), Vol. 2017, Issue 724, pp. 145-201 (2017).

19. Disconzi, M. M.; Ebin, D. G. *The free boundary Euler equations with large surface tension.* Journal of Differential Equations, Vol. 261, Issue 2, pp. 821-889 (2016).

20. Czubak, M.; Disconzi, M. M. *On the well-posedness of relativistic viscous fluids with non-zero vorticity.* Journal of Mathematical Physics, Vol. 57, Issue 4, pp. 042501, 21 pages (2016).

21. Disconzi, M. M.; Shao, Y.; Simonett, G. *Some remarks on uniformly regular Riemannian manifolds.* Mathematische Nachrichten, Vol. 289, No. 2-3, pp. 232-242 (2016).

22. Disconzi, M. M. *Remarks on the Einstein-Euler-Entropy system.* Reviews in Mathematical Physics, Vol. 27, No. 6, pp. 1550014, 45 pages (2015).

23. Disconzi, M. M. *On the well-posedness of relativistic viscous fluids.* Nonlinearity, Vol. 27, No. 8, pp. 1915-1935 (2014).

24. Disconzi, M. M. *On a linear problem arising in dynamic boundaries.* Evolution Equations and Control Theory, Vol. 3, No. 4, pp. 627-644 (2014).

25. Disconzi, M. M.; Pingali, V. P. *On the Choquet-Bruhat – York – Friedrich formulation of the Einstein-Euler equations.* Modern Physics Letters A, Vol. 29, No. 39, pp. 1450205, 16 pages (2014).

26. Dabholkar, S. P.; Disconzi, M. M.; Pingali, V. P. *Remarks on positive energy vacua via effective potentials in string theory.* Letters in Mathematical Physics, Vol. 104, Issue 7, pp. 893-910 (2014).

27. Disconzi, M. M.; Ebin, D. G. *On the limit of large surface tension for a fluid motion with free boundary.* Communications in Partial Differential Equations, Vol. 39, Issue 4, pp. 740-779 (2014).

28. Disconzi, M. M.; Douglas, M. R.; Pingali, V. P. *On the boundedness of effective potentials arising from string compactifications.* Communications in Mathematical Physics, Vol. 325, Issue 3, pp. 847-878 (2014).

29. Disconzi, M. M. *A priori estimates for a critical Schrödinger-Newton equation.* Electronic Journal of Differential Equations, Ninth MSU-UAB, Conference 20, pp. 39-51 (2013) (refereed conference proceedings).

30. Disconzi, M. M. *A note on quantization in the presence of gravitational shock waves.* Modern Physics Letters A, Vol. 28, No. 31, pp. 1350111, 17 pages (2013).

31. Disconzi, M. M.; Khuri, M. A. *The charged Penrose inequality for a spherically symmetric black hole.* Res. Inst. Math. Sci. Kôkyûroku, Kyoto Univ., 1862, 6 pages (2013).

32. Disconzi, M. M.; Khuri, M. A. *On the Penrose inequality for charged black holes.* Classical and Quantum Gravity, Vol. 29, No. 24, pp. 245019, 18 pages (2012).

33. Di Cerbo, L. F.; Disconzi, M. M. *Yamabe solitons, determinant of the Laplacian and the Uniformization Theorem for Riemann surfaces.* Letters in Mathematical Physics, Vol. 83, No. 1, pp. 13-18 (2008).

**Physics papers (following the standards of the physics community):**

34. Gavassino, L.; Disconzi, M. M.; Noronha, J. *Universality Classes of Relativistic Fluid Dynamics I: Foundations.* Physical Review Letters, Vol. 132, Issue 22, pp. 222302, 7 pages (2024).

35. Gavassino, L.; Disconzi, M. M.; Noronha, J. *Universality Classes of Relativistic Fluid Dynamics II: Applications.* Physical Review D, Vol. 109, Issue 9, pp. 096041, 13 pages (2024).

36. Gavassino, L.; Disconzi, M. M.; Noronha, J. *Dispersion relations alone cannot guarantee causality.* Physical Review Letters, Vol. 132, Issue 16, pp. 162301, 12 pages (2024).

37. Lerman, A. Disconzi, M. M.; Noronha, J. *Local well-posedness and singularity formation in non-Newtonian compressible fluids.* Journal of Physics A: Mathematical and Theoretical, Vol. 57, No. 1, pp. 015201, 20 pages (2023).

38. Speranza, E.; Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *Challenges in Solving Chiral Hydrodynamics.* Physical Review D, Vol. 107, Issue 5, pp. 054029, 12 pages (2023).

39. Gavassino, L.; Disconzi, M. M. *Subluminality of relativistic quantum tunneling.* Physical Review A, Vol. 107, Issue 3, pp. 032209, 10 pages (2023).

40. Bemfica, F. S.; Disconzi, M. M.; Noronha, J.; Scherrer, R. J. *Cosmological consequences of first-order general-relativistic viscous fluid dynamics.* Physical Review D, Vol. 107, Issue 2, pp. 023512, 11 pages (2023).

41. Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *First-order General-Relativistic Viscous Fluid Dynamics.* Physical Review X, Vol. 12, Issue 2, pp. 021044, 42 pages (2022).

42. Bemfica, F. S.; Disconzi, M. M.; Hoang, V.; Noronha, J.; Radosz, M. *Nonlinear Constraints on Relativistic Fluids Far From Equilibrium.* Physical Review Letters, Vol. 126, Issue 22, pp. 222301, 18 pages (2021).

43. Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *Nonlinear causality of general first-order relativistic viscous hydrodynamics.* Physical Review D, Vol. 100, Issue 10, pp. 104020, 13 pages (2019).

44. Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *Causality of the Einstein-Israel-Stewart Theory with Bulk Viscosity.* Physical Review Letters, Vol. 122, Issue 22, pp. 221602, 11 pages (2019).

45. Benson, B. A.; Disconzi, M. M. *A note on a Newtonian approximation in a Schwarzchild background.* The African Review of Physics, Vol. 13, No. 0, 7 pages (2018).

46. Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *Causality and existence of solutions of relativistic viscous fluid dynamics with gravity.* Physical Review D, Vol. 98, Issue 10, pp. 104064, 26 pages (2018).

47. Disconzi, M. M.; Kephart, T. W.; Scherrer, R. J. *On a viable first order formulation of relativistic viscous fluids and its applications to cosmology.* International Journal of Modern Physics D, Vol. 26, No. 13, pp. 1750146, 52 pages (2017).

48. Silvestrini, M.; Brunnet, L. G.; Disconzi, M. M.; Brito, C. *Initial condition dependence and wave-function confinement in the Schrödinger-Newton equation.* General Relativity and Gravitation, Vol. 47, Issue 11, pp. 129, 23 pages (2015).

49. Disconzi, M. M.; Kephart, T. W.; Scherrer, R. J. *New approach to cosmological bulk viscosity.* Physical Review D, Vol. 91, Issue 4, pp. 043532, 6 pages (2015).

50. Baraviera, A. T.; Disconzi, M. M. *Asymptotic states in coupled map lattices.* International Journal of Bifurcation and Chaos, Vol. 18, Issue 2, pp. 285-311 (2008).

51. Disconzi, M. M.; Brunnet, L. G. *Analysis of high dimensional non-hyperbolic coupled systems through finite-time Lyapunov exponents.* Physica A, Vol. 387, Issues 2-3, pp. 425-431 (2008).

52. Disconzi, M. M.; Brunnet, L. G. *Dynamics at the interface dividing collective behavior and synchronized states in a CML.* Physica A, Vol. 360, Issue 2, pp. 159-170 (2006).

**Pre-prints** (Click on title to access manuscript, when available)

53. Disconzi, M. M.; Speck, J. *The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* In preparation.

**Books**

54. Bemfica, F. S.; Disconzi, M. M.; Noronha, J. *Relativistic Viscous Fluids.* Springer (scheduled for 2025).

55. Disconzi, M. M. *Who Me? I'm a Mathematician Now!* (Mathematics outreach book for children.) World Scientific, Who Me? Series, ISBN-13: 978-981-128-240-9, DOI: 10.1142/13572, 44 pages (2024).

**Book chapters**

56. Disconzi, M. M. *A brief overview of recent developments on mathematical aspects of relativistic fluids.* CMSA Special Year Program on General Relativity and Scalar Curvature, Harvard CMSA book series, vol. 4, Harvard University Press (scheduled for 2025).

**Edited and contributed works**

57. Shabnam, B.; Disconzi, M. M.; Hoang, V. *Mini-Workshop: Relativistic Fluids at the Intersection of Mathematics and Physics.* Oberwolfach Reports, Vol. 17, No. 4, pp. 2093-2115 (2020).

58. Disconzi, M. M.; Toundykov, D.; Webster, J. T. *Front matter [Preface].* Evolution Equations and Control Theory, Vol. 5, No. 4, pp. i-iii (2016).

**Grants**

**Research grants and research fellowships:**

Title: Mathematical Problems in Relativistic Fluid Dynamics.
Funding agency: National Science Foundation (Applied Mathematics Program).
Type: Research grant.
Role: Principal Investigator.
Amount: $305,000.
Period: 07/01/2024 – 6/30/2027.

Title: Theoretical and numerical investigation of first-order causal relativistic viscous hydrodynamics with applications.
Funding agency: Department of Energy (Nuclear Physics Theory Program).
Type: Research grant.
Role: Principal Investigator.
Amount: $260,000.
Period: 06/01/2024 – 05/31/2027.

Title: Chancellor's Faculty Fellowship.
Funding agency: Vanderbilt University.
Type: Research fellowship.
Role: N/A.
Amount: $80,000.
Period: 07/01/2023 – 06/30/2025.

Title: Mathematical Questions in Relativistic Fluids.
Funding agency: National Science Foundation (Applied Mathematics Program).
Type: Research grant.
Role: Principal Investigator.
Amount: $215,000.
Period: 06/15/2021 – 05/31/2025.

Title: Foundations of the mathematical theory of general-relativistic stars.
Funding agency: Vanderbilt University (Global Engagement Research Seed Grants).
Type: Research grant.
Role: Principal Investigator.
Amount: $3,000.
Period: 01/10/2025 – 07/15/2025.

Title: Neutron star mergers at the intersection of mathematics and physics.
Funding agency: Vanderbilt University (Seeding Success Grant).
Type: Research grant.
Role: Principal Investigator.
Amount: $120,000.
Period: 06/01/2022 – 06/30/2024.

Title: Research Membership for the semester program Mathematical Problems in Fluid Dynamics.
Funding agency: Mathematical Sciences Research Institute.
Type: Research fellowship.
Role: N/A.
Amount: $3,750 per month, not exceeding $15,000.
Period: 01/19/2021 – 05/28/2021.

Title: Dean's Faculty Fellowship.
Funding agency: Vanderbilt University.
Type: Research fellowship.
Role: N/A.
Amount: $30,000.
Period: 08/16/2019 – 08/15/2021.

Title: Mathematical Questions in Classical and Relativistic Fluids and Applications.
Funding agency: National Science Foundation (Applied Mathematics Program).
Type: Research grant.
Role: Principal Investigator.
Amount: $119,999.
Period: 08/01/2018 – 07/31/2021.

Title: Sloan Research Fellowship.
Funding agency: Alfred P. Sloan Foundation.
Type: Research fellowship.
Role: N/A.
Amount: $65,000.
Period: 09/15/2018 – 09/14/2022.

Title: Relativistic fluids in the age of gravitational waves.
Funding agency: Vanderbilt University (Discovery Grant).
Type: Research grant.
Role: Principal Investigator.
Amount: $26,940.
Period: 07/01/2018 – 06/30/2020.

Title: Analytic Problems in the Physics of Fluids, Gravitation and Conformal Geometry.
Funding agency: National Science Foundation (Mathematical Physics Program).
Type: Research grant.
Role: Principal Investigator.
Amount: $93,424.
Period: 09/01/2013 – 08/31/2017.

Title: The Navier-Stokes equations in curved backgrounds.
Funding agency: Vanderbilt University (International Research Grant).
Type: Research grant.
Role: Principal Investigator.
Amount: $8,000.
Period: 5/13/2015 – 6/30/2017.

**Conference and training grants:**

Title: NRT-WoU: Establishing Multimessenger Astronomy Inclusive Training.
Funding agency: National Science Foundation (Division Of Graduate Education).
Type: Training grant.
Role: Co-Principal Investigator.
Amount: $3,000,000.
Period: 09/01/2021 – 05/31/2026.

Title: The Recruitment and Preparation of Next Generation STEM Teachers.
Funding agency: National Science Foundation (Robert Noyce Scholarship Program).

Type: Research and training grant.
Role: Co-Principal Investigator.
Amount: $1,196,302.
Period: 06/01/2019 – 05/31/2025.

Title: Workshop on Geometry and Analysis of Fluid Flows.
Funding agency: National Science Foundation (Analysis Program).
Type: Conference grant.
Role: Principal Investigator.
Amount: $46,400.
Period: 10/01/2022 – 09/30/2023.

Title: 2020 Shanks Workshop on Mathematical Aspects of Fluid Dynamics.
Funding agency: National Science Foundation (Analysis & Applied Mathematics Programs).
Type: Conference grant.
Role: Co-Principal Investigator.
Amount: $12,000.
Period: 03/01/2020 – 02/28/2021.

Title: 2018 Shanks Workshop on Mathematical Aspects of Fluid Dynamics.
Funding agency: National Science Foundation (Analysis Program).
Type: Conference grant.
Role: Co-Principal Investigator.
Amount: $12,000.
Period: 03/01/2018 – 02/28/2019.

Title: International Conference on Evolution Equations.
Funding agency: National Science Foundation (Analysis Program).
Type: Conference grant.
Role: Co-Principal Investigator.
Amount: $40,000.
Period: 04/01/2016 – 09/30/2017.

Title: Improving Academic Performance Through a STEM Learning Community.
Funding agency: Vanderbilt University (EDI office).
Type: Training grant.
Role: Principal Investigator.
Amount: $3,180.
Period: 5/15/2017 – 6/30/2017.

Title: Shanks Workshop on Geometric Analysis.
Funding agency: National Science Foundation (Geometric Analysis Program).
Type: Conference grant.
Role: Principal Investigator.
Amount: $12,000.
Period: 03/01/2016 – 02/28/2017.

Title: Shanks Workshop on Mathematical Aspects of Fluid Dynamics.
Funding agency: National Science Foundation (Analysis Program).
Type: Conference grant.
Role: Principal Investigator.

Amount: $10,650.
Period: 12/15/2014 – 11/30/2015.

## Honors and awards

Invited Address of the 2025 Fall Southeastern Sectional Meeting of the American Mathematical Society, New Orleans, LA, October 2025.

Chancellor's Faculty Fellowship, Vanderbilt University, 2023 – 2025.

Invitation as Visiting Scholar for the semester program The Many Faces of Relativistic Fluid Dynamics, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, Spring 2023.

Invitation as Visiting Scholar for the semester program General Relativity, Center of Mathematical Sciences and Applications, Harvard University, Spring 2022.

Research Membership for the semester program Mathematical Problems in Fluid Dynamics, Mathematical Sciences Research Institute, Spring 2021.

Dean's Faculty Fellowship, Vanderbilt University, 2019 – 2021.

Sloan Research Fellowship, Alfred P. Sloan Foundation, 2018 – 2022.

Research in pairs at the Mathematical Research Institute of Oberwolfach, July 10 – August 6, 2016. Oberwolfach, Germany.

Aldroubi-Azhari Prize for Excellence in Postdoctoral Research, Mathematics Department, Vanderbilt University, Spring 2014.

Chairman's Award for Excellence in Teaching, Mathematics Department, Stony Brook University, 2012.

Stony Brook University Nominee for the 2012 MSRI Summer Graduate Workshop in Mathematical Relativity, MSRI, CA, July, 2012.

Assistantship–Scholarship, Mathematics Department, Stony Brook University, 2006 – 2012.

Presidential Fellowship, Stony Brook University, 2008 – 2010.

Distinction in the Ph.D. Oral Exam, Mathematics Department, Stony Brook University, 2008.

Fulbright-CAPES Graduate Fellowship (declined), 2005.

Graduate Research Fellowship, CNPq, Brazil, 2003 – 2005.

Undergraduate Fellowship, FAPERGS, Brazil, 2000 – 2002.

## Invited talks (Click on title to access video/notes/slides, when available)

### Year 2026:

(upcoming) *TBA.* General Relativity Conference: Singularities and Cosmic Censorship, from Vacuum to Matter, part of the Thematic Program on Shocks and Singularities: Nonlinear evolution equations in physical and life sciences, Fields Institute, Toronto, Canada, May 2026.

**Year 2025:**

(upcoming) *TBA.* Invited Address of the 2025 Fall Southeastern Sectional Meeting of the American Mathematical Society, New Orleans, LA, October 2025.

(upcoming) *TBA.* A week-long series of lectures at the Summer School on Advances in Hyperbolic Balance Laws, Hirschegg, Austria, September 2025.

(upcoming) *The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* PDE and Analysis Seminar, The Institute of Mathematical Sciences, The Chinese University of Hong Kong, Hong Kong, May 2025.

(upcoming) *The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Colloquium, Department of Mathematics, City University of Hong Kong, Hong Kong, May 2025.

*The dynamic TOV equations and the mathematics of general-relativistic stars.* Colloquium, Department of Physics and Astronomy, Western Kentucky University, Bowling Green, KY, April 2025.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Princeton Gravity Initiative Seminar, Princeton University, Princeton, NJ, March 2025.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Spring Central Sectional Meeting of the AMS, University of Kansas, Lawrence, KS, March 2025.

**Year 2024:**

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* 14th AIMS Conference, New York University in Abu Dhabi, Abu Dhabi, United Arabs Emirates, December 2014.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* General Relativity Seminar, Center of Mathematical Sciences and Applications, Harvard University, Cambridge, MA, November 2024.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Fall Southeastern Sectional Meeting of the AMS, Georgia Southern University, Savannah, GA, October 2024. (Canceled due to hurricane Helene.)

*General-relativistic viscous fluids.* Fall Southeastern Sectional Meeting of the AMS, Georgia Southern University, Savannah, GA, October 2024. (Canceled due to hurricane Helene.)

*Causality, local well-posedness, and all that.* A week-long series of lectures at the Illinois Center for Advanced Studies of the Universe, University of Illinois Urbana-Champaign, Urbana-Champaign, IL, September 2024.

*The dynamic TOV equations and the mathematics of general-relativistic stars.* ICASU Seminar, Illinois Center for Advanced Studies of the Universe, University of Illinois Urbana-Champaign, Urbana-Champaign, IL, September 2024.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Analysis Seminar, Department of Mathematics, Clemson University, Clemson, SC, September 2024.

*The Einstein-Euler system with a physical vacuum boundary in spherical symmetry.* Analysis of dissipation in compressible and inviscid fluids, University of Konstanz, Konstanz, Germany, June 2024.

*General-relativistic viscous fluids.* Meeting of the American Physical Society, Sacramento, CA, April 2024.

*General-relativistic viscous fluids.* Applied Mathematics Seminar, Department of Mathematics, Texas Tech University, Lubbock, TX, March 2024. (Online talk.)

**Year 2023:**

*General-relativistic viscous fluids.* International Physics Institute, Universidade Federal do Rio Grande do Norte, RN, Brazil, December 2023.

*The relativistic Euler equations with a physical vacuum boundary.* Geometric Analysis Seminar, Department of Mathematics, University of Miami, Miami, FL, October 2023.

*General-relativistic viscous fluids.* Colloquium, Department of Mathematics, University of Miami, Miami, FL, October 2023.

*From free-boundary fluids to the constraint equations.* Colloquium, Department of Mathematics, Stony Brook University, jointly with the workshop Mass, the Einstein Constraint Equations, and the Penrose Inequality Conjecture, Simons Center for Geometry and Physics, Stony Brook, NY, September 2023.

*The relativistic Euler equations with a physical vacuum boundary.* SIAM Conference on Control and Its Applications, Philadelphia, PA, July, 2023.

*Causality, local well-posedness, and all that.* Kavli Institute for Theoretical Physics, University of California, Santa Barbara, part of the semester program The Many Faces of Relativistic Fluid Dynamics, June 2023.

*The relativistic Euler equations with a physical vacuum boundary.* KUMUNU-ISU Conference on PDE, Dynamical Systems, and Applications (Universities of Kansas, Missouri-Columbia, Nebraska-Lincoln, and Iowa State annual conference), Iowa State University, Ames, IA, April 2023.

*The relativistic Euler equations with a physical vacuum boundary.* Analysis and PDE Seminar, Department of Mathematics, The University of North Carolina at Chapel Hill, Chapel Hill, NC, April 2023.

*General-relativistic viscous fluids.* Colloquium, Department of Mathematics, The University of North Carolina at Chapel Hill, Chapel Hill, NC, April 2023.

*The relativistic Euler equations with a physical vacuum boundary.* Plenary speaker at the 12th Ohio River Analysis Meeting, Cincinnati, OH, March 2023.

**Year 2022:**

*General-relativistic viscous fluids.* Mathematical Physics Seminar, Department of Mathematics, Rutgers University, NJ, November 2022. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Analysis Seminar, Department of Mathematics, The University of Alabama, Tuscaloosa, AL, November 2022.

*General-relativistic viscous fluids.* Fall Southeastern Sectional Meeting of the AMS, University of Tennessee-Chattanooga, Chattanooga, TN, October 2022.

*The relativistic Euler equations with a physical vacuum boundary.* Fall Southeastern Sectional Meeting of the AMS, University of Tennessee-Chattanooga, Chattanooga, TN, October 2022.

*The relativistic Euler equations with a physical vacuum boundary.* PDE Seminar, Penn State University, State College, PA, October 2022.

*General-relativistic viscous fluids.* General Relativity Seminar, Center of Mathematical Sciences and Applications, Harvard University, Cambridge, MA, September 2022. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Analysis and PDE Seminar, University of Kentucky, Lexington, KY, September 2022. (Online talk.)

*Recent developments in relativistic fluids.* A week-long series of lectures at the Advanced Studies Institute in Mathematical Physics (International Research Experience for Students), Institute of Mathematics, Urgench State University, Urgench, Uzbekistan, July-August 2022.

*General-relativistic viscous fluids.* First Al-Khorezmi International Conference on Modern problems of Mathematics, dedicated to the 75th anniversary of Azimbay Sadullae, Urgench State University, Urgench, Uzbekistan, July 2022.

*General-relativistic viscous fluids.* Workshop on Nonlinear Waves in Discrete and Continuum Systems, Mathematics Research Center at the University of Pittsburgh, Pittsburgh, PA, June 2022.

*General-relativistic viscous fluids.* Black Hole Initiative Conference, Harvard University, Cambridge, MA, May 2022.

*A brief overview of recent developments in relativistic fluids.* A six-hours series of lectures at the semester program General Relativity, Center of Mathematical Sciences and Applications, Harvard University, Cambridge, MA, May 2022. (Click here for second video.)

*General-relativistic viscous fluids.* General Relativity Conference, Center of Mathematical Sciences and Applications, Harvard University, Cambridge, MA, April 2022. (Online talk.)

*General-relativistic viscous fluids.* PDE and Geometric Analysis Seminar. Department of Mathematics, University of Wisconsin-Madison, Madison, WI, April 2022. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Spring Central Sectional Meeting of the AMS, Purdue University, West Lafayette, IN, March 2022. (Online talk.)

**Year 2021:**

*The relativistic Euler equations with a physical vacuum boundary.* PDE and Differential Geometry Seminar, Department of Mathematics, University of Connecticut, Storrs, CT, September 2021. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* SIAM Annual Meeting, Spokane, WA, July 2021. (Online talk.)

*General-relativistic viscous fluids.* Workshop on QGP Phenomenology, Institute for Research in Fundamental Sciences (IPM), Iran, May 2021. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* PDE Seminar, Institute of Mathematical Sciences, the Chinese University of Hong Kong, Hong Kong, April 2021. (Online talk.)

*General-relativistic viscous fluids.* Applied Analysis Seminar, Department of Mathematics, Louisiana State University, Baton Rouge, LA, April 2021. (Online talk.)

*General-relativistic viscous fluids.* Princeton Gravity Initiative Seminar, Princeton University, Princeton, NJ, April 2021. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Rocky Mountain Mathematical Physics Seminar, University of Colorado Boulder, Boulder, CO, April 2021. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Water Waves / Interface Problems Seminar, part of the MSRI special semester Mathematical Problems in Fluid Dynamics, Berkeley, CA, March 2021. (Online talk.)

*General-relativistic viscous fluids.* Colloquium, Zu Chongzhi Center for Mathematics and Computational Sciences, Duke Kunshan University, Kunshan, Suzhou, Jiangsu, China, March 2021. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Center for Nonlinear Analysis Seminar, Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA, February 2021. (Online talk.)

**Year 2020:**

*General-relativistic viscous fluid dynamics.* Workshop on Relativistic Hydrodynamics: Foundations, Novel Applications and Interdisciplinary Connections, virtual workshop jointly organized by the Gravity, Quantum Fields and Information group at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute) and the Illinois Center for Advanced Studies of the Universe at the University of Illinois Urbana-Champaign. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* PDE Seminar, Department of Mathematics, University of Maryland Baltimore County, Baltimore, MD, November 2020. (Online talk.)

*General-relativistic viscous fluids.* Webinar on quark matter and relativistic hydrodynamics, Physics Department, Sharif University of Technology, Tehran, Iran, November 2020. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Fluids Seminar, Department of Mathematics, Princeton University, Princeton, NJ, November 2020. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* PDE Seminar, Department of Mathematics, Brown University, Providence, RI, November 2020. (Online talk.)

*General-relativistic viscous fluids.* Workshop on Mathematical and Computational Approaches for the Einstein Field Equations with Matter Fields, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI, October 2020. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Fall Western Sectional Meeting of the AMS, Salt Lake City, UT, October 2020. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Fall Southeastern Sectional Meeting of the AMS, Chattanooga, TN, October 2020. (Online talk.)

*The relativistic Euler equations with a physical vacuum boundary.* Fall Eastern Sectional Meeting of the AMS, State College, PA, October 2020. (Online talk.)

*Rough sound waves in the three-dimensional compressible Euler system.* Applied Math Colloquium, Department of Mathematics, University of Maryland Baltimore County, Baltimore, MD, April 2020. (Online talk.)

*TBA.* Mathematical Physics Mini-Symposium, Karlsruhe Institute of Technology, Karlsruhe, Germany, March 2020. (Canceled due to the COVID-19 outbreak.)

*Strichartz estimates for the compressible Euler equation with vorticity and low-regularity solutions.* Workshop on Dynamics in Geometric Dispersive Equations and the Effects of Trapping, Scattering and Weak Turbulence, Banff International Research Station for Mathematical Innovation and Discovery, Alberta, Canada, February 2020.

**Year 2019:**

*Rough Solutions to the Compressible Euler Equations.* Applicable Analysis and Control Theory for Fluid and Fluid-Structure PDE, SIAM Conference on Analysis of Partial Differential Equations, La Quinta, CA, December 2019.

*Strichartz estimates for the compressible Euler equation with vorticity and low-regularity solutions.* Fall Southeastern Sectional Meeting of the AMS, Gainesville, FL, November 2019.

*Strichartz estimates for the compressible Euler equation with vorticity and low-regularity solutions.* PDE/Analysis Seminar, Massachusetts Institute of Technology, Cambridge, MA, September 2019.

*Rough solutions to the compressible Euler equations.* Fall Central Sectional Meeting of the AMS, Madison, WI, September 2019.

*Rough solutions to the three-dimensional compressible Euler equations with vorticity and entropy.* Analysis and PDE seminar, Michigan State University, East Lansing, MI, September 2019.

*Recent developments in the theory of relativistic fluids.* A week-long series of lectures at the Summer School on Recent Advances in Mathematical Fluid Dynamics, University of Southern California, Los Angeles, CA, May 2019.

*The relativistic Euler equations: Remarkable null structures and regularity properties.* Spring Southeastern Sectional Meeting of the AMS, Auburn, AL, March 2019.

*Recent developments in the mathematical theory of relativistic fluids.* Colloquium, Department of Mathematics, University of Texas San Antonio, San Antonio, TX, March 2019.

*Viscous fluids in relativity theory.* Colloquium, Department of Physics, Kent State University, Kent, OH, February 2019.

*A new formulation of the relativistic Euler equations.* Colloquium, Department of Mathematics, University of Tennessee at Knoxville, Knoxville, TN, February 2019.

**Year 2018:**

*The incompressible limit of the compressible free-boundary Euler equations with surface tension.* Fall Central Sectional Meeting of the AMS, Ann Arbor, MI, October 2018.

*A new formulation of the relativistic Euler equations.* Colloquium, Center for Applied Mathematical Sciences, University of Southern California, Los Angeles, CA, October 2018.

*The incompressible limit of the compressible free-boundary Euler equations with surface tension.* Analysis and PDE Seminar, University of Southern California, Los Angeles, CA, October 2018.

*A new formulation of the relativistic Euler equations.* Colloquium, Department of Mathematics, University of Nebraska-Lincoln, Lincoln, NE, September 2018.

*Recent advances in classical and relativistic fluids.* A week-long series of lectures at the Summer School on Mathematical General Relativity and the Geometric Analysis of Waves of Fluids, Massachusetts Institute of Technology, Cambridge, MA, June 2018.

*An introduction to the free-boundary Euler equations.* Fisk University Biomathematics-Bioinformatics seminar, Fisk University, Nashville, TN, June 2018.

*On the evolution problem for relativistic fluids.* International Conference on Mathematics and Statistics, University of Memphis, Memphis, TN, May 2018.

*Recent developments in the theory of relativistic fluids.* Colloquium, Department of Mathematics, Georgia Southern University, Statesboro, GA, April 2018.

*The incompressible limit of the compressible free boundary Euler equations with surface tension.* Spring Central Sectional Meeting of the AMS, Columbus, OH, March 2018.

*The underlying geometry of the relativistic fluid dynamic equations.* Differential Geometry Seminar, UC Riverside, Riverside, CA, March 2018.

*The incompressible limit of the compressible free-boundary Euler equations with surface tension.* Applied Math & PDEs Seminar, UC Davis, Davis, CA, March 2018.

*Recent developments in the theory of relativistic fluids.* Colloquium, Department of Mathematics, University of Colorado Boulder, Boulder, CO, February 2018.

*The incompressible limit of the compressible free-boundary Euler equation with surface tension.* Joint Mathematics Meetings, San Diego, CA, January 2018.

**Year 2017:**

*The Einstein-Navier-Stokes system.* Analysis, control and inverse theory of flows, material structures, acoustics, and their interactions, SIAM Conference on Analysis of Partial Differential Equations, Baltimore, MD, November 2017.

*Viscous fluids in general relativity.* 3rd Annual Meeting of SIAM Central States Section, Fort Collins, CO, September 2017.

*Viscous fluids in general relativity.* Colloquium, Department of Mathematics, Baylor University, Waco, TX, September 2017.

*On the regularity of solutions to the three-dimensional free-boundary compressible Euler equations with surface tension in the case of a liquid.* PDE Seminar, Department of Mathematics, University of Tennessee at Knoxville, Knoxville, TN, August 2017.

*Viscous fluids in general relativity.* Plenary speaker at the Second USA and Uzbekistan Joint Math Conference, Urgench, Uzbekistan, August 2017.

*The three-dimensional free-boundary Euler equations with surface tension.* Spring Eastern Sectional Meeting of the AMS, New York, NY, May 2017.

*The three-dimensional free boundary Euler equations with large surface tension.* Analysis and PDE seminar, University of Southern California, Los Angeles, CA, March 2017.

*Viscous fluids in general relativity and the Einstein-Navier-Stokes equations.* Colloquium, Department of Mathematics, University of Southern California, Los Angeles, CA, March 2017.

*Existence, regularity, and convergence results for the free-boundary Euler equations.* PDE, Complex Analysis and Differential Geometry Seminar, University of Notre Dame, South Bend, IN, March 2017.

*A priori estimates for the free-boudary Euler equations with surface tension in three dimensions.* Spring Southeast Sectional Meeting of the AMS, Charleston, SC, March 2017.

*The three-dimensional free boundary Euler equations with surface tension.* PDE Seminar, Purdue University, West Lafayette, IN, February 2017.

**Year 2016:**

*The three-dimensional free boundary Euler equations with surface tension.* Analysis and PDE Seminar, UC Berkeley, Berkeley, CA, September 2016.

*Viscosity in General Relativity.* AstroCoffee, Goethe University and Frankfurt Institute of Advanced Studies, Frankfurt, Germany, July 2016.

*The free boundary Euler equations in 3D.* 11th AIMS conference on Dynamical Systems, Differential Equations and Applications, Orlando, FL, July 2016.

*The three-dimensional free boundary Euler equations with surface tension.* Workshop on Recent Advances in Hydrodynamics, Banff International Research Station for Mathematical Innovation and Discovery, Alberta, Canada, June 2016.

*The free boundary Euler equations in 3D.* Analysis and PDE Seminar, University of Kentucky, Lexington, KY, March 2016.

*The Einstein-Navier-Stokes system.* AMS Sectional Meeting, Stony Brook University, Stony Brook, NY, March 2016.

*The free boundary Euler equations in 3D.* AMS Sectional Meeting, Stony Brook University, Stony Brook, NY, March 2016.

*The free boundary Euler equations in 3D.* AMS Sectional Meeting, University of Georgia Athens, Athens, GA, March 2016.

*The free boundary Euler equations in 3D.* Applied Math & PDEs Seminar, UC Davis, Davis, CA, February 2016.

**Year 2015:**

*Coupling Einstein and Navier-Stokes equations.* Nonlinear Parabolic Equations and Applications, SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ, December 2015.

*From mathematics to cosmology.* Colloquium, Vanderbilt University, Nashville, TN, September 2015.

*The Einstein-Navier-Stokes system.* Geometry and Topology Seminar, Department of Mathematics, University of Tennessee at Knoxville, Knoxville, TN, March 2015.

*The Einstein-Navier-Stokes system.* AMS Sectional Meeting, University of Alabama in Huntsville, Huntsville, March 2015.

**Year 2014:**

*The incompressible limit of the Euler equations in a domain with boundary.* Southeastern Atlantic Regional Conference on Differential Equations, Memphis, TN, October 2014.

*The relativistic Navier-Stokes and Einstein's equations.* Colloquium, Vanderbilt University, Nashville, TN, April 2014.

*The evolution problem for Einstein's equations coupled to viscous fluids.* PDE and Differential Geometry Seminar, Department of Mathematics, University of Connecticut, CT, March 2014.

*The free boundary Euler equations with large surface tension.* Analysis and Geometry Seminar, University of Colorado at Boulder, Boulder, CO, March 2014.

*The relativistic Navier-Stokes and Einstein's equations.* Colloquium, Department of Mathematics, Rutgers University, NJ, March 2014.

*Slightly compressible fluids in a bounded domain.* The 4th Ohio River Analysis Meeting, Lexington, KY, March 2014.

*The Compressible and Incompressible Euler equations: existence, regularity and convergence results.* Colloquium, University of Hawaii, Honolulu, HI, February 2014.

*The Compressible and Incompressible Euler equations: existence, regularity and convergence results.* Colloquium, Vanderbilt University, Nashville, TN, January 2014.

**Year 2013:**

*Existence, regularity, and convergence results for the compressible Euler equations.* Analysis and Partial Differential Equations Seminar, John Hopkins University, Baltimore, MD, November 2013.

*On the well-posedness of relativistic viscous fluids.* Analysis Seminar, Binghamton University, Binghamton, NY, October 2013.

*Curved backgrounds, singularities, and renormalization: why is it so difficult to quantize gravity?* Colloquium, Instituto de Física, UFRGS, Brazil, May 2013.

*The Einstein system for inviscid and viscid relativistic fluids.* Colloquium, Instituto de Matemática e Estatística, USP, Brazil, May 2013.

*Large surface tension and other limits for the Euler equations.* Applied Math & PDEs Seminar, UC Davis, Davis, CA, April 2013.

**Year 2012:**

*On the Einstein Equations for Relativistic Fluids.* Plenary speaker at the XXI Southeast Geometry Seminar, University of Tennessee, Knoxville, December 2012.

*Motion of Slightly Compressible Fluids in a Bounded Domain.* Analysis Seminar, Binghamton University, Binghamton, NY, March 2012.

**Year 2011:**

*Compactness and Non-compactness of the Yamabe Problem on Manifolds with Boundary.* Geometry and Analysis Seminar, Columbia University, New York, NY, October 2011.

*Compactness and Non-compactness of the Yamabe Problem on Manifolds with Boundary.* Differential Geometry Seminar, CUNY Graduate Center, New York, NY, October 2011.

*Holographic Renormalization and Correlation Functions.* Complex Systems Seminar, Instituto de Física, UFRGS, Brazil, June 2011.

**Year 2009:**

*Holographic Renormalization and Correlation Functions.* RTG Seminar in Geometry and Physics, Stony Brook University, Stony Brook, NY, May 2009.

**Year 2008:**

*Some Geometry on the Chains and Cochains of a Manifold.* Graduate Student Seminar, Stony Brook University, Stony Brook, NY, December 2008.

*Feynman Diagrams in $\varphi^4$ Theory.* Series of three talks presented at the RTG Seminar in Geometry and Physics, Stony Brook University, Stony Brook, NY, November 2008.

*Some ideas in Conformal Field Theory.* RTG Seminar in Geometry and Physics, Stony Brook University, Stony Brook, NY, February 2008.

**Years 2012 – Present:**

Several seminars presented at Vanderbilt University. PDE Seminar; Simpletic and Differential Geometry Seminar; Joint Differential and Non-Commutative Geometry Seminar;

## Contributed talks

**Year 2015:**

*The free-boundary Euler equations: existence and convergence results.* The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 2015.

**Year 2014:**

*The free boundary Euler equations with large surface tension.* Mini Conference on Topics in Euler's equation for incompressible fluids, University of Notre Dame, South Bend, IN, May 2014.

**Year 2012:**

*On the Fluid Motion with Free Boundary and Strong Surface Tension.* 9th Differential Equations and Computational Simulations, Mississippi State University, Starkville, MS, October 2012.

**Year 2011:**

*A Compactness Theorem for the Yamabe Problem on Manifolds with Boundary.* 68th Midwest PDE Seminar, University of Notre Dame, South Bend, IN, November 2011.

*A Compactness Theorem for the Yamabe Problem on Manifolds with Boundary.* 2011 Barrett Memorial Lectures in Mathematical Relativity, University of Tennessee, Knoxville, TN, May 2011.

## Conferences attended

Simons Center's 2025 Simons Math Summer Workshop, July 07 – 25, 2021, Simons Center for Geometry and Physics, Stony Brook, NY.

New Mechanisms for Regularity, Singularity, and Long Time Dynamics in Fluid Equations, July 25 – 30, 2021, Banff International Research Station for Mathematical Innovation and Discovery, Alberta, Canada. (Online conference.)

Mathematical Perspectives of Gravitation beyond Vacuum Regime, February 22 – 25, 2021, The Erwin Schrödinger International Institute for Mathematics and Physics, University of Vienna, Vienna, Austria. (Online conference.)

Twenty-sixth Southeast Geometry Seminar, February 26, 2017. Georgia Institute of Technology, Atlanta, GA.

General Relativity: a celebration of the 100th anniversary, November 16 – 20, 2015, Institut Henri Poincaré, Paris, France.

Mathematical Problems in General Relativity, Workshop, January 19 – 23, 2015, Simons Center for Geometry and Physics, Stony Brook University, Stony Brook, NY.

Geometrical Aspects of Hydrodynamics, Workshop, May 19 – 23, 2014, Simons Center for Geometry and Physics, Stony Brook University, Stony Brook, NY.

29th Annual Geometry Festival. Stony Brook University, Stony Brook, NY, April 2014.

International Conference on Cycles, Calibrations and Nonlinear Partial Differential Equations: Celebrating Blaine Lawson's 70th Birthday, Stony Brook University, NY, October 2012.

Evolution Equations: A Workshop in Honor of Terence Tao, Northwestern University, Evanston, IL, May 2012.

Mathematical Foundations of Quantum Field Theory, Stony Brook University, Stony Brook, NY, January 2012.

7th Simons Workshop in Mathematics and Physics, Stony Brook University, Stony Brook, NY, July – August 2009.

24th Annual Geometry Festival. Stony Brook University, Stony Brook, NY, April 2009.

6th Simons Workshop in Mathematics and Physics, Stony Brook University, Stony Brook, NY, June – July 2008.

Stony Brook Dialogues in Mathematics and Physics: A Symposium in Honor of Chen N. Yang and James H. Simons, Stony Brook University, Stony Brook, NY, March 2008.

5th Simons Workshop in Mathematics and Physics, Stony Brook University, Stony Brook, NY, July – August 2007.

International Congress on Mathematical Physics, Rio de Janeiro, RJ, Brazil, August 2006.

## Mentoring and teaching-related activities

Post-doc mentor.
Mathematics Department, Vanderbilt University.
Mentees: Chenyun Luo (2017-2020), Lorenzo Gavassino (2022-2025), Henry Hirvonen (2024-2027), Teerthal Patel (2024-2027).

Graduate advisor.
Mathematics Department, Vanderbilt University.
Advisees (with graduation term): Brian B. Luczak (Summer 2024), Runzhang Zhong (Spring 2025), Brian F. Morton (current), Jose R. Arita-Escalante (master's student, Fisk-Vanderbilt Bridge program, current).

Host for visiting international scholars.
Mathematics Department, Vanderbilt University.
Visitors: Fábio Sperotto Bemfica, Professor, Escola de Ciência e Tecnologia, Universidade Federal do Rio Grande do Norte, Brazil, visiting Spring 2019, academic year 2024-2025.

Host and mentor for visiting international students.
Mathematics Department, Vanderbilt University.
Students: Nazish Iftikhar, PhD candidate, National University of Computer and Emerging Sciences, Pakistan, visiting Spring 2020. Jamshaid Iqbal, PhD candidate, COMSATS University Islamabad, Pakistan, visiting Fall 2024.

Undergraduate advisor.
Mathematics Department, Vanderbilt University.
Fall 2014 – Present.
Advisees (with graduation term): Samuel J. Malone (Spring 2027), Morgan C. Baskfield (Spring 2026), Yuchen Liu (Spring 2026), Daniel Noh (Spring 2026), Charles Poulin (Spring 2026), Kevin Taylor (Spring 2026), Eli S. Waisburd (Spring 2026), William F. Fiechtl (Spring 2025), Do Hun Kim (Spring 2025), Matthew Lu (Spring 2025), Liam J. Barron (Spring 2024), Emily D. Chandler (Spring 2024), Abigail W. Eisenklam (Spring 2024), Kennedy Ho (Spring 2024), Laura C. Tucker (Spring 2024), Jeffrey L. Andrews (Spring 2023), Hanqing Cao (Spring 2022), Elijah Sheridan (Spring 2022), Erika Anderson (Spring 2021), Sandeep K. Biswas (Spring 2021), Jacob G. Vest (Spring 2020), Alexander J. Link (Spring 2019), Teng Teng (Spring 2018), Reese E. Wilson (Spring 2018), Corey L. Lockridge (Spring 2017), Carter O. Portwood (Spring 2017), Lexie A. Tonelli (Spring 2017), Nicholas F. Beier (Spring 2016), Yanru Chen (Spring 2016). Cameron T. Togrye (Spring 2016),

Mentor, Vanderbilt University Summer Research Program.
Mathematics Department, Vanderbilt University.

Student: Hanxiang Yang.
Summer 2025.

Member of PhD Committee.
Physics Department, University of Illinois at Urbana-Champaign.
Student: Nick Clarisse (advisor: Jorge Noronha).
Fall 2024.

Member of Undergraduate Honors Thesis Committee.
Mathematics Department, Vanderbilt University.
Student: Kangbai Yan (advisor: Jared Speck).
Spring 2024.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: Trevor Gravely (advisor: Alexandru Lupsasca).
Spring 2023.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: Michael Padgett (advisor: Thomas W. Kephart).
Spring 2023.

Member of Undergraduate Honors Thesis Committee.
Mathematics Department, Vanderbilt University.
Student: Chenhang Huang (advisor: Jared Speck).
Spring 2023.

Member of the Master's Thesis Committee.
Mathematics & Computer Science Department, Fisk University.
Student: Richard Gumbel (advisors: Sait Umar and Arnold Burger).
Spring 2022 – Spring 2023.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: David S. Storm (advisor: Robert J. Scherrer).
Fall 2022 – Fall 2024.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Elijah Sheridan.
Spring 2022.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Samuel A. Rizzo (advisor: Ioana Suvaina).
Spring 2021 – Spring 2023.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Minh Quan H. Vu (advisor: Edward Saff).
Spring 2021 – Fall 2024.

Immersion Vanderbilt faculty advisor.
Mathematics Department, Vanderbilt University.
Student: Maxim E. Mukhin.
Fall 2020 – Spring 2021.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Jason P. Mitrovich.
Spring 2021.

Member of Undergraduate Honors Thesis Committee.
Mathematics Department, Vanderbilt University.
Student: Annan Yu (advisor: Jared Speck).
Spring 2021.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Sifan Yu (advisor: Jared Speck).
Fall 2020 – Spring 2023.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Michael Montgomery (advisor: Dietmar Bisch).
Spring 2020 – Spring 2022.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Zhongtian Hu.
Spring 2020.

Member of Undergraduate Honors Thesis Committee.
Mathematics Department, Vanderbilt University.
Student: Shaoyang Zhou (advisor: Jared Speck).
Spring 2020.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: Liang Chen (advisor: Thomas W. Kephart).
Spring 2019 – Spring 2021.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Yuhan Guo.
Spring 2019.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Min S. Kim.
Spring 2019.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.

Student: Hrvoje Stojanovic (advisor: Dietmar Bisch).
Spring 2019 – Fall 2021.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Blake H. Dunshee (advisor: Mark N. Ellingham).
Fall 2018 – Fall 2020.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Cristobal Villalobos Guillen (advisor: Douglas Hardin).
Fall 2018.

Member of PhD Committee.
Electrical Engineering and Computer Science Department, Vanderbilt University.
Student: Rachel Quinn (advisor: Lloyd W. Massengill).
Spring 2018 – Spring 2019.

Member of PhD Committee.
Electrical Engineering and Computer Science Department, Vanderbilt University.
Student: Hangfang Zhang (advisor: Bharat Bhuva).
Spring 2017 – Spring 2018.

Member of Undergraduate Honors Thesis Committee.
Physics Department, Vanderbilt University.
Student: Zachary F. Bednarke (advisor: Thomas W. Kephart).
Spring 2017.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: Mahmoud Parvizi (advisor: Robert J. Scherrer).
Spring 2017 – Spring 2019.

Member of Undergraduate Honors Thesis Committee.
Mathematics Department, Vanderbilt University.
Student: Yue Zhou (advisor: Glenn Webb).
Spring 2016.

Undergraduate Honors Thesis advisor.
Mathematics Department, Vanderbilt University.
Student: Tennesse Joyce.
Spring 2016.

Member of PhD Committee.
Mathematics Department, Vanderbilt University.
Student: Oleksandr Vlasiuk (advisor: Edward Saff).
Spring 2015 – Spring 2018.

Member of PhD Committee.
Physics Department, Vanderbilt University.
Student: Bradley L. Rachlin (advisor: Thomas W. Kephart).
Spring 2015 – Spring 2019.

Courses taught: single variable calculus, multivariable calculus, linear algebra, ordinary differential equations, partial differential equations, graduate analysis, graduate partial differential equations, several independent study courses.
See `https://www.disconzi.net/Teaching.php` for more information.

## Service

**Service to the department and university:**

Member of the Outreach Committee, Fall 2024 – Spring 2025 (Mathematics Department, Vanderbilt University).

Member of the Preliminary Examination Committee in Analysis for August 2024 exams (Mathematics Department, Vanderbilt University).

Chair of the Committee to Rethink Calculus, Spring 2024 (Mathematics Department, Vanderbilt University).

Director of Postdoctoral Training, 2023 – 2025 (Mathematics Department, Vanderbilt University).

Member of the University Diversity Council, Fall 2021 – Spring 2022 (Vanderbilt University).

Member of the Administrative Committee, Fall 2021 – Spring 2022 (Vanderbilt University).

Chair of the Committee to Rethink Calculus, Fall 2021 – Spring 2022 (Mathematics Department, Vanderbilt University).

Member of the Post-doc Recruitment Committee, 2021 – 2022 (Mathematics Department, Vanderbilt University).

Member of the Colloquium Committee, 2020 – 2022 (Mathematics Department, Vanderbilt University).

Member of the Senior Lecturer Search committee, Spring 2021 (Mathematics Department, Vanderbilt University).

Chair of the Subcommittee on Lower-level Undergraduate Courses, Spring 2021 (Mathematics Department, Vanderbilt University).

Member of the Preliminary Examination Committee in Analysis for August 2021 exams (Mathematics Department, Vanderbilt University).

Member of the Tenure-Track Search committee, 2020 – 2021 (Mathematics Department, Vanderbilt University).

Member of the Teaching Committee, 2020 – 2021 (Mathematics Department, Vanderbilt University).

Member of the Committee on Faculty Awards and Nominations, Spring 2020 (Mathematics Department, Vanderbilt University).

Member of the Post-doc Recruitment Committee, 2019 – 2020 (Mathematics Department, Vanderbilt University).

Member of the Graduate Committee, 2019 – 2020 (Mathematics Department, Vanderbilt University).

Member of the Undergraduate Committee, 2018 – 2019 (Mathematics Department, Vanderbilt University).

Member of the Preliminary Examination Committee in Analysis for August 2018 exams (Mathematics Department, Vanderbilt University).

Member of the Tenure-Track Search Committee, 2017 – 2018 (Mathematics Department, Vanderbilt University).

Member of the Post-doc Recruitment Committee, 2016 – 2017 (Mathematics Department, Vanderbilt University).

Member of the Undergraduate Committee, 2016 – 2017 (Mathematics Department, Vanderbilt University).

Member of the Colloquium Committee, 2015 – 2016 (Mathematics Department, Vanderbilt University).

Member of the Graduate Committee, 2015 – 2016 (Mathematics Department, Vanderbilt University).

Chair of the Preliminary Examination Committee in Analysis for August 2016 exams (Mathematics Department, Vanderbilt University).

Member of the Preliminary Examination Committee in Analysis for January 2016 exams (Mathematics Department, Vanderbilt University).

Member of the Preliminary Examination Committee in Analysis for August 2015 exams (Mathematics Department, Vanderbilt University).

Member of the Graduate Student Recruitment Committee, 2014 – 2015 (Mathematics Department, Vanderbilt University).

Area representative in the Schedule of Classes Committee, 2014 – 2015 (Mathematics Department, Vanderbilt University).

**Service to the profession:**

Referee for several journals.

Reviewer, Mathematical Reviews, MR Database, MathSciNet.

Organizer, Partial Differential Equations Seminar (Mathematics Department, Vanderbilt University, 2014 – Present).

(upcoming) Organizer, *Partial differential equations at the intersection of gravity, fluids, and waves,* at the Fall Southeastern Sectional Meeting, Meeting # 1210 (Tulane University, New Orleans, LA, October 3-5, 2025).

Chair, *Seminar in the Analysis and Methods of PDE Webinar,* February 26, 2025.

Organizer (with G. Misiołek, S. Preston, and T. Drivas), *Workshop on the Geometry and Analysis of Fluid Flows* (Stony Brook University, Jan 16 – 20, 2023).

Organizer (with L. Abbrescia, G. Simonett, and J. Speck), *2022 Shanks Workshop on Mathematical Aspects of Fluid Dynamics* (Vanderbilt University, Feb 19 – 20, 2022).

Organizer (with S. Beheshti and D. N. V. Hoang), *Relativistic Fluids at the Intersection of Mathematics and Physics*, mini-workshop, Mathematical Research Institute of Oberwolfach, (originally scheduled at Oberwolfach, Germany, but held online due to the COVID-19 outbreak, December 13 – 19, 2020).

Organizer (with C. Luo, G. Simonett, and J. Speck), *2020 Shanks Workshop on Mathematical Aspects of Fluid Dynamics* (Vanderbilt University, March 14 – 15, 2020).
(Canceled due to the COVID-19 outbreak.)

Member of the External Advisory Committee for NSF Award HRD-1719450 (08/01/2018 – 07/31/2020).

Organizer (with G. Mazzone, C. Luo, and G. Simonett), *Evolution Equations and Applications* at the Spring Southeastern Sectional Meeting, Meeting # 1138 (Vanderbilt University, Nashville, TN, April 14 – 15, 2018).

Organizer (with G. Mazzone, C. Luo, and G. Simonett), *2018 Shanks Workshop on Mathematical Aspects of Fluid Dynamics* (Vanderbilt University, March 24 – 25, 2018).

Organizer (with I. Lasiecka), *Mini symposium on Free Boundary Problems and Fluid Interfaces* at the SIAM Conference on Analysis of Partial Differential Equations (Baltimore, MD, December 9 – 12, 2017).

Organizer (with J. Fu), *XXVII Southeast Geometry Seminar* (Vanderbilt University, August 26, 2017).

Grant reviewer, Xi'an Jiaotong-Liverpool University (China), May 2017.

Organizer (with G. Mazzone and G. Simonett), *2017 Shanks Workshop on Mathematical Aspects of Fluid Dynamics* (Vanderbilt University, April 8 – 9, 2017).

Organizer (with L. Bociu), *Free-boundary fluid models and related problems* at the Spring Southeastern Sectional Meeting, Meeting # 1126 (College of Charleston, Charleston, SC, March 10 – 12, 2017).

Guest editor, *Evolution Equations and Control Theory, Special Issue on Fuid-Structure Interactions.* Volume 4, Number 4, December 2016.

Co-chair, *International Conference on Evolution Equations in conjunction with the 31st annual Shanks Lecture, With a special tribute to the work of Jan Prüss on the occasion of his 65th birthday* (Vanderbilt University, May 16 – 20, 2016).

Organizer (with I. Suvaina), *Shanks Workshop on Geometric Analysis* (Vanderbilt University, March 11 – 12, 2016).

Organizer (with I. Lasiecka, J. Webster, and D. Toundykov), *Mini symposium on analysis and control of fluid models and flow-coupled systems* at the SIAM Conference on Analysis of Partial Differential Equations (Scottsdale, AZ, December 7 – 10, 2015).

Organizer (with G. Simonett), *Shanks Workshop in Mathematical Aspects of Fluid Dynamics* (Vanderbilt University, February 28 – March 1, 2015).

**Outreach:**

(upcoming) *TBA.* Dyer Observatory's Meet the Astronomer Talk + Telescope Viewing public lecture series, Nashville, TN, July 2025.

(upcoming) *TBA.* Guest lecturer at Peabody's SAVY program, Astronomy-Camp Week, Nashville, TN, July 2025.

(upcoming) *Meet the author.* Activity at J.T. Moore Middle School based on to the book Who Me? I'm a Mathematician Now!, Nashville, TN, May 2025.

*Meet the author.* Activity at Whitsitt Elementary School based on to the book Who Me? I'm a Mathematician Now!, Nashville, TN, March 2025.

*When mathematics and physics collide: black-hole mergers, neutron stars, and the Einstein theory of relativity.* Dyer Observatory's Meet the Astronomer Talk + Telescope Viewing public lecture series, Nashville, TN, November 2024.

*Meet the author.* Activity at Wright Middle School based on to the book Who Me? I'm a Mathematician Now!, Nashville, TN, November 2024.

*Parnassus Books In Store.* Public event based on the book Who Me? I'm a Mathematician Now!, Nashville, TN, October 2024.

*A model of the expanding universe.* Activity at the Dyer Observatory's summer camp, Nashville, TN, July 2024.

*Science Fair Judge.* LEAD Prep Southeast Public School, Nashville, TN, May 2017.

*Science Fair Judge.* LEAD Prep Southeast Public School, Nashville, TN, May 2015.

## Other academic experience

Research in pairs at the Mathematical Research Institute of Oberwolfach. July 10 – August 6, 2016. Oberwolfach, Germany.

High frequency vibrations and Riemannian geometry, IdeaLab 2014, Program for Early Career Researchers, August 11 – 15, 2014. Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI.

Mini Conference on Topics in Euler's equation for incompressible fluids, May 14 – 16, 2014. University of Notre Dame, IN.

Initial Data and Evolution Problems in General Relativity, Workshop, November 18 – 22, 2013. MSRI, CA.

MSRI Summer Graduate Workshop in Mathematical Relativity, 2 week workshop, July 2012. MSRI, CA.

Mathematical Foundations of Quantum Field Theory. Summer course, January – February, 2006, IMPA (National Institute of Pure and Applied Mathematics, Brazil).

Mathematics and Quantum Field Theory. Summer course, January – February, 2005, IMPA (National Institute of Pure and Applied Mathematics, Brazil).

## Membership

Member, American Mathematical Society, 2006 – Present.

Member, Society for Industrial and Applied Mathematics, 2023 – Present.