Lan-Hsuan Huang

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Research Interests

Geometric analysis and mathematical relativity, with emphasis on scalar curvature, positive mass theorems, stationary vacuum metrics, and quasi-local mass; applications of minimal surfaces to mechanical engineering.

Academic Positions

University of Connecticut

2020–present Professor
2016–2020 Associate Professor
2012–2016 Assistant Professor

2018–2019 **Institute for Advanced Study, Princeton**
von Neumann Fellow (on leave from UConn)

2009–2012 **Columbia University**
Ritt Assistant Professor

Education

2009 **Stanford University**, PhD in Mathematics
Advisor: Richard Schoen

2004 **National Taiwan University**, BS in Mathematics

Honors and Awards

2025–2026 Simons Fellow in Mathematics
2024 Fellow of the American Mathematical Society
2018–2019 Simons Fellow in Mathematics
2015 NSF CAREER Award

Selected Invited Talks

2026 Plenary Speaker, Union College Mathematics Conference
2026 Plenary Speaker, Women in Mathematics in Chicago Conference, University of Chicago
2023 van Winter Memorial Lecturer in Mathematical Physics, University of Kentucky
2023 Plenary Speaker, International Congress of Basic Science (ICBS), Beijing
2021 Invited Speaker, International Congress of Mathematical Physics (ICMP), Geneva, Switzerland

Selected Colloquia. UC Santa Cruz, Chinese University of Hong Kong, Brown, Rutgers–Newark, Dartmouth, Tennessee, Duke, Wisconsin–Madison, UNC Chapel Hill, University of Minnesota, University of Colorado.

Selected Publications

Mathematics

1. *Bartnik mass minimizing initial data sets and improvability of the dominant energy scalar* (with D. Lee). **Journal of Differential Geometry** 126, 2 (2024), 741–800.
2. *Static vacuum extensions with prescribed Bartnik boundary data near a general static vacuum metric* (with Z. An). **Annals of PDE** 10, 6 (2024), 57 pp.
3. *Scalar curvature deformation and mass rigidity for ALH manifolds with boundary* (with H. C. Jang). **Transactions of the AMS** 375 (2022), 8151–8191.
4. *Existence of static vacuum extensions with prescribed Bartnik boundary data* (with Z. An). **Cambridge Journal of Mathematics** 10 (2022), no. 1, 1–68.
5. *Equality in the spacetime positive mass theorem* (with D. Lee). **Communications in Mathematical Physics** 376 (2020), no. 3, 2379–2407.
6. *Intrinsic flat stability of the positive mass theorem for graphical hypersurfaces of Euclidean space* (with D. Lee and C. Sormani). **Journal für die reine und angewandte Mathematik (Crelle's Journal)** 727 (2017).
7. *Spacetime positive mass theorem in dimensions less than eight* (with M. Eichmair, D. Lee, and R. Schoen). **Journal of the European Mathematical Society** 18 (2016), no. 1, 83–121.
8. *Hypersurfaces with nonnegative scalar curvature* (with D. Wu). **Journal of Differential Geometry** 95 (2013), 249–278.
9. *Specifying angular momentum and center of mass for vacuum initial data sets* (with R. Schoen and M.-T. Wang). **Communications in Mathematical Physics** 306 (2011), no. 3, 785–803.
10. *Foliations by stable spheres with constant mean curvature for isolated systems with general asymptotics*. **Communications in Mathematical Physics** 300 (2010), no. 2, 331–373.

Mechanical Engineering

11. *Stress-constrained topology optimization of multi-scale structures made of triply periodic minimal surface (TPMS) lattice* (with Nguyen-Van, Hartman, Manogharan, and Norato). **Computer Methods in Applied Mechanics and Engineering** (2026).
12. *Surrogate models of stress for triply periodic minimal surface lattices* (with Nguyen-Van, Manogharan, and Norato). **Computer Methods in Applied Mechanics and Engineering** 444 (2025), Paper No. 118119, 23 pp.

CMAME: Journal Impact Factor 7.6 (2025)

Editorial Service

2022–present Associate Editor, *Journal of Mathematical Physics*

Selected Program Organization

The following highlights major research programs and graduate summer schools; conferences organized are not listed.

Fall 2024	SLMath **semester-long research program** "New Frontiers in Curvature: Flows, General Relativity, Minimal Submanifolds, and Symmetry"
Summer 2023	SLMath summer graduate school "Topics in Geometric Flows and Minimal Surfaces"
Summer 2018	UConn summer graduate school "Minimal Surfaces, Flows, and Relativity"
Fall 2013	**Inaugural Special Semester in Differential Geometry**, University of Connecticut

Research Funding

2026–2028 DMS-2604040: *Einstein Manifolds and General Relativity* (PI, $100,000)

2025–2026 Simons Fellow in Mathematics, Simons Foundation ($134,492)

2023–2027 DMS-2304966: *Geometric Boundary Value Problems in General Relativity* (PI, $350,358)

2022–2025 CMMI-2130668: *Collaborative Research: Computational Design of Multi-functional Minimal-Surface Lattice Structures* (co-PI, $281,459)

2022–2023 DMS-2231711: *Conference: NEWGA—Northeast Workshop in Geometric Analysis* (PI, $31,999)

2020–2024 DMS-2005588: *Mass Rigidity and Curvature Problems in Mathematical Relativity* (PI, $250,336)

2018–2019 Simons Fellow in Mathematics, Simons Foundation ($122,378)

2015–2023 NSF CAREER Award (PI, $400,648)

2013–2016 DMS-1308837: *Geometric Partial Differential Equations in General Relativity* (PI, $282,249)

2010–2013 DMS-1005560 (DMS-1301645): *Geometric Problems in General Relativity* (PI, $125,645)

Mentorship

Current PhD Students

Eric Lian

Matthew Castillo

Yeorgia Kafkoulis

Aidan Wood (PhD expected 2027)

Completed PhD Students

2026 **Paul Tee**
Placement: Software Engineer, IBM

2020 **Hyun Chul Jang**
Placement: Harry Bateman Research Instructor, Caltech

2018 **Daniel Martin**
Tenured Associate Professor, University of Hartford

Postdoctoral Researchers

Zhongshan An
Tenure-track Assistant Professor, University of Science and Technology of China

Armando Cabrera
Placement: Postdoctoral Researcher, University of Tübingen

Alan Parry
Placement: Tenure-track Assistant Professor, Utah Valley University

Recent and Upcoming Presentations

2027 Summer School "Géométrie de la courbure scalaire", University of Montpellier, June 7–11
Mathematical Relativity Session, APS Global Physics Summit (American Physical Society), Atlanta, April 11–16

2026 Dartmouth Geometry Symposium, Dartmouth College, November 7–8
Plenary Speaker, Union College Mathematics Conference, September 18–20
ICM Satellite Conference on Conformal Geometry and Einstein Manifolds, Penn State, July 23–30
Mathematical General Relativity Mini-Symposium, Uppsala University, June 4
Conference on Fifty Years of Geometric Analysis, YMSC, Tsinghua University, Beijing, May 11–18
Plenary Speaker, Women in Mathematics in Chicago Conference, University of Chicago, May 2–3
Seminar, SCGP Program on Einstein Manifolds, Stony Brook, February 5
Conformal Geometry, Einstein Metrics, and General Relativity, Simons Center, Stony Brook, January 28
Special Session on Women in Geometry, Joint Mathematics Meetings, January 7

2025 Geometric Analysis Seminar, MIT, November 19
Schoenfest: Geometric Analysis: Past, Current, and Future, SIMIS, Shanghai, October 23
Geometric Analysis Seminar, NCTS, Taiwan, October 20
Geometric Analysis Seminar, Columbia University, October 3
Seminar, Geometry and Convergence in Mathematical General Relativity Program, Simons Center, August 26
Geometric Analysis and Differential Geometry, University of Pisa, June 23–27
Mathematical Relativity Masterclass, University of Copenhagen *(eight-hour lecture course)*
Upper New York State Geometric Analysis Workshop, Cornell University, April 12