

# JONAS LÜHRMANN

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## CONTACT INFORMATION

University of Cologne  
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RESEARCH      Nonlinear Dispersive and Hyperbolic PDEs, Mathematical Physics

EMPLOYMENT    *University of Cologne*, Professor (W2)  
August 2025 – present

*Texas A&M University*, Associate Professor  
September 2024 – July 2025

*Texas A&M University*, Assistant Professor  
August 2019 – August 2024

*Johns Hopkins University*, J.J. Sylvester Assistant Professor  
August 2016 – June 2019

EDUCATION     *ETH Zurich*, Ph.D. in mathematics  
April 2016

Thesis advisor: Prof. Dr. Michael Struwe

Thesis co-advisor: Prof. Dr. Joachim Krieger

Thesis title: Deterministic and Probabilistic Global Existence Results for  
Nonlinear Wave Equations

*LMU Munich*, Diplom Mathematik (Master's degree in mathematics)  
July 2011

Thesis advisor: Prof. Dr. László Erdős

Thesis title: Mean-field quantum dynamics with magnetic fields

## PUBLICATIONS    **Preprints**

[21] *On the Gross-Pitaevskii evolution linearized around the degree-one vortex*, with W. Schlag and S. Shahshahani, arXiv:2503.07345, 68 pp.

[20] *Asymptotic stability of the sine-Gordon kink*, with G. Chen, arXiv:2411.07004, 181 pp.

[19] *Asymptotic stability of solitary waves for the 1D focusing cubic Schrödinger equation under even perturbations*, with Y. Li, arXiv:2408.15427, 91 pp.

## **Refereed Journal Articles**

[18] *On codimension one stability of the soliton for the 1D focusing cubic Klein-Gordon equation*, with W. Schlag, **Comm. Amer. Math. Soc.** 4 (2024), 230–356.

[17] *Stability of the catenoid for the hyperbolic vanishing mean curvature equation outside symmetry*, with S.-J. Oh and S. Shahshahani, **Invent. Math.** 240 (2025), no. 3, 903–1044.

[16] *Soliton dynamics for the 1D quadratic Klein-Gordon equation with symmetry*, with Y. Li, **J. Differential Equations** 344 (2023), 172–202.

[15] *The wave maps equation and Brownian paths*, with B. Bringmann and G. Staffilani, **Comm. Math. Phys.** 405 (2024), no. 3, Paper No. 60, 115 pp.

- [14] *Asymptotic stability of the sine-Gordon kink under odd perturbations*, with W. Schlag, **Duke Math. J.** 172 (2023), no. 14, 2715–2820.
- [13] *On modified scattering for 1D quadratic Klein-Gordon equations with non-generic potentials*, with H. Lindblad, W. Schlag, and A. Soffer, **Int. Math. Res. Not.** 2023 (2022), no. 6, 5118–5208.
- [12] *Probabilistic small data global well-posedness of the energy-critical Maxwell-Klein-Gordon equation*, with J. Krieger and G. Staffilani, **Arch. Ration. Mech. Anal.** 247 (2023), no. 4, 109 pp.
- [11] *Asymptotics for 1D Klein-Gordon equations with variable coefficient quadratic nonlinearities*, with H. Lindblad and A. Soffer, **Arch. Ration. Mech. Anal.** 241 (2021), no. 3, 1459–1527.
- [10] *Asymptotic stability of harmonic maps on the hyperbolic plane under the Schrödinger maps evolution*, with A. Lawrie, S.-J. Oh, and S. Shahshahani, **Comm. Pure Appl. Math.** 76 (2023), no. 3, 453–584.
- [9] *Decay and asymptotics for the 1D Klein-Gordon equation with variable coefficient cubic nonlinearities*, with H. Lindblad and A. Soffer, **SIAM J. Math. Anal.** 52 (2020), no. 6, 6379–6411.
- [8] *Local smoothing estimates for Schrödinger equations on hyperbolic space*, with A. Lawrie, S.-J. Oh, and S. Shahshahani, **Mem. Amer. Math. Soc.** 291 (2023), no. 1447, v+165 pp.
- [7] *Almost sure local well-posedness and scattering for the 4D cubic nonlinear Schrödinger equation*, with B. Dodson and D. Mendelson, **Adv. Math.** 347 (2019), 619–676.
- [6] *Almost sure scattering for the 4D energy-critical defocusing nonlinear wave equation with radial data*, with B. Dodson and D. Mendelson, **Amer. J. Math.** 142 (2020), no. 2, 475–504.
- [5] *Concentration Compactness for Critical Radial Wave Maps*, with E. Chiodaroli and J. Krieger, **Annals of PDE** 4 (2018), no. 1, Art. 8, 148 pp.
- [4] *Concentration Compactness for the Critical Maxwell-Klein-Gordon Equation*, with J. Krieger, **Annals of PDE** 1 (2015), no. 1, Art. 5, 208 pp.
- [3] *On the almost sure global well-posedness of energy sub-critical nonlinear wave equations on  $\mathbb{R}^3$* , with D. Mendelson, **New York J. Math.** 22 (2016), 209–227.
- [2] *Random data Cauchy theory for nonlinear wave equations of power-type on  $\mathbb{R}^3$* , with D. Mendelson, **Comm. Partial Differential Equations** 39 (2014), no. 12, 2262–2283.
- [1] *Mean-field quantum dynamics with magnetic fields*, **J. Math. Phys.** 53 (2012), no. 2, 19 pp.

#### Proceedings and Reports

- *On asymptotic stability of classical solitons in 1D nonlinear scalar field theories*, **Oberwolfach Reports** 30 (2022), pp. 1700–1703.
- *On asymptotic stability of solitons in classical 1D scalar field theories*, **Oberwolfach Reports** 26 (2022), pp. 1439–1442.
- *Probabilistic scattering for the 4D energy-critical defocusing nonlinear wave equation*, **Oberwolfach Reports** 27 (2017), pp. 1712–1715.

AWARDS &  
GRANTS

NSF CAREER Grant DMS-2235233, PI, 2023–2025

*NSF Analysis Program Grant DMS-1954707, PI, 2020–2023*  
*NSF Conference Grant DMS-2331234, Co-PI, 2023*  
*NSF Conference Grant DMS-2230164, Co-PI, 2022*  
*AMS-Simons Travel Grant, 2017–2019*  
*ETH Medal for outstanding doctoral thesis, 2017*  
*Scholarship of the German National Academic Foundation, 2007–2011*

TEACHING

**Texas A&M University: Instructor**

Math 410 Advanced Calculus II, Spring 2024  
Math 308 Differential Equations, Spring 2024  
Math 612 Partial Differential Equations, Spring 2023  
Math 308 Differential Equations, Spring 2023  
Math 611 Introduction to Ordinary and Partial Differential Equations, Fall 2022  
Math 308 Differential Equations, Spring 2022  
Math 410 Advanced Calculus II, Spring 2021  
Math 689 Topics Course on Nonlinear Waves and Dispersive Equations, Spring 2021  
Nonlinear Waves Working Seminar, Fall 2020  
Math 410 Advanced Calculus II, Spring 2020  
Math 412 Theory of Partial Differential Equations, Fall 2019

**Johns Hopkins University: Instructor**

Math 302 Differential Equations with Applications, Spring 2019 (two sections)  
Math 632 Partial Differential Equations II, Fall 2018  
Math 417 Partial Differential Equations with Applications, Spring 2018  
Math 302 Differential Equations with Applications, Fall 2017 (two sections)  
Math 405 Analysis I, Spring 2017  
Math 106 Calculus I (Biology and Social Sciences), Fall 2016 (two sections)

**ETH Zurich: Graduate Teaching Assistant**

Measure and Integration, Spring 2016  
Functional Analysis I, Fall 2015  
Functional Analysis II, Spring 2015  
Functional Analysis I, Fall 2014  
Differential Geometry II, Spring 2014  
Differential Geometry I, Fall 2013  
Differential Geometry II, Spring 2013  
Differential Geometry I, Fall 2012  
Measure and Integration, Spring 2012  
Analysis III, Fall 2011

## **LMU Munich: Undergraduate Teaching Assistant**

Functional Analysis I, Spring 2010

Analysis III, Fall 2009

Analysis II, Spring 2009

### ADVISING

Postdoc Michael McNulty  
(University of Cologne, August 2025 – present)

Graduate Student Yongming Li  
(Texas A&M University, September 2021 – present, expected to graduate in Spring 2026)

Postdoc Robert Booth  
(Texas A&M University, September 2019 – May 2021)

Undergraduate Research by Jordan Hoffart  
(Texas A&M University, November 2019 – August 2020)

Undergraduate Research by Jack Dalberg  
(Texas A&M University, November 2019 – August 2020)

Independent Study “Lie Groups and the Peter-Weyl Theorem” by Advika Rajapakse  
(Johns Hopkins University, Spring 2019)

Semester thesis project “Strichartz Estimates for the Schrödinger Equation” by Christian Brennecke (ETH Zurich, Spring 2014)

Bachelor’s thesis “Variants of the Minimax Principle” by Thomas Coutandin  
(ETH Zurich, Spring 2012)

### OUTREACH

SEE-Math 2020, 2021 Lecturer

Volunteer at the Texas A&M Mathematics and Statistics Fair  
(22 February 2020, 26 February 2022)

Texas A&M University Math Circle Activity (25 January 2020)

### SERVICE

#### **Conference and Workshop Organization**

Organizer of the “Spring School on Soliton Dynamics”, Texas A&M University, 14-16 March 2024

Co-organizer of the “Texas Analysis and Mathematical Physics Symposium 2024”, Texas A&M University, 9-11 February 2024

Organizer of the workshop “Trends in Soliton Dynamics and Singularity Formation for Nonlinear Dispersive PDEs”, Texas A&M University, 21–23 October 2022

Co-organizer of mini-symposium “Nonlinear Waves and Applications” at the 3<sup>rd</sup> SIAM TX-LA Annual Meeting at Texas A&M University (via Zoom), 17 October 2020

Co-organizer of mini-symposium “Nonlinear Waves and Applications” at the 2<sup>nd</sup> SIAM TX-LA Annual Meeting at Southern Methodist University, Dallas, TX, 1–3 November 2019

Co-organizer of special session “Nonlinear Dispersive Equations” at the AMS Sectional Meeting at the University of Central Florida, Orlando, FL, 23–24 September 2017

#### **Seminar and Lecture Series Organization**

Co-organizer of the TAMU Foias Lectures 2023

Co-organizer of the TAMU Nonlinear PDEs Seminar since Fall 2020

Co-organizer of the TAMU MPHA Seminar since Fall 2019

Co-organizer of the JHU Analysis & PDE Seminar 2017–2019

## Refereeing

Advances in Mathematics, American Journal of Mathematics, Analysis & PDE, Annales scientifiques de l'École normale supérieure, Annales de l'Institut Fourier, Annals of PDE, Calculus of Variations and Partial Differential Equations, Communications in Mathematical Physics, Discrete and Continuous Dynamical Systems – Series A, Dynamics of PDE, International Mathematics Research Notices, Inventiones, Journal of Differential Equations, Journal of Functional Analysis, Journal of Mathematical Physics, Journal of the European Mathematical Society, Journal of Spectral Theory, Mathematical Research Letters, Mathematische Annalen, Memoirs of the American Mathematical Society, Nonlinearity, Proceedings of the American Mathematical Society, Pure and Applied Analysis, SIAM Journal on Mathematical Analysis, Stochastics and Partial Differential Equations: Analysis and Computations, Transactions of the American Mathematical Society

## Editorial Boards

Advances in Discrete and Continuous Models (Associate Editor)

## CONFERENCE TALKS

*CY Days in Nonlinear Analysis*, CY Cergy Paris University, France, 20 May 2025

*Spectral Analysis of Schrödinger Operators*, ICERM, Brown University, RI, 20 August 2024

*Nonlinear Waves and Relativity Workshop*, Erwin Schrödinger Institute, Vienna, Austria, 17 June 2024

*Harmonic and Stochastic Analysis of Dispersive Equations*, University of Bielefeld, Bielefeld, Germany, 7 June 2024

*Nonlinear Dispersive and Wave Equations*, Monash University, Melbourne, Australia, 12 December 2023

*Harmonic Analysis and Partial Differential Equations*, University of Bonn, Bonn, Germany, 1 June 2023

*Texas Differential Equations Conference*, Texas A&M, College Station, TX, 2 October 2022

*2<sup>nd</sup> IST Austria Summer School in Analysis and PDE*, IST Austria, Vienna, Austria, 26 July 2022

*Oberwolfach Workshop “Nonlinear Waves and Dispersive Equations”*, Mathematisches Forschungsinstitut Oberwolfach, Germany, 29 June 2022

*Oberwolfach Workshop “Deterministic Dynamics and Randomness in PDE”*, Mathematisches Forschungsinstitut Oberwolfach, Germany, 23 May 2022

*Workshop at BIRS: Dynamics in Geometric Dispersive Equations and the Effects of Trapping, Scattering and Weak Turbulence*, Banff, Canada, 3 February 2020

*Texas Analysis and Mathematical Physics Symposium*, Rice University, Houston, TX, 1 February 2020

*SIAM Texas-Louisiana Section Annual Meeting: Mini-symposium on Nonlinear Waves and Applications*, Southern Methodist University, Dallas, TX, 2 November 2019

*Workshop on Dispersive Wave Theory*, Central China Normal University, Wuhan, China, 16 July 2019

*IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Session on Dispersive Wave Equations and their Soliton Interactions*, University of Georgia, Athens, GA, 18 April 2019

*Joint Mathematics Meeting: AMS Special Session on Analysis and Geometry of Nonlinear Evolution Equations*, Baltimore, MD, 17 January 2019

*Nonlinear Phenomena in DC*, George Washington University, 24 April 2018

*AMS Sectional Meeting: Special Session on The Analysis of Dispersive Equations*, Northeastern University, Boston, MA, 22 April 2018

*AMS Sectional Meeting: Special Session on Nonlinear Dispersive Equations*, University of Central Florida, Orlando, FL, 24 September 2017

*Oberwolfach Workshop “Nonlinear Waves and Dispersive Equations”*, Mathematisches Forschungsinstitut Oberwolfach, Germany, 14 June 2017

*AMS Sectional Meeting: Special Session on Harmonic Analysis and Dispersive PDE*, North Carolina State University, Raleigh, NC, 12 November 2016

*Singularity formation and long-time behavior in dispersive PDEs*, The Mathematical Institute of the University of Bonn, 16 March 2016

SEMINAR &  
COLLOQUIUM  
TALKS

*Real Analysis Seminar*, UC San Diego, 24 April 2025

*MPHA Seminar*, Texas A&M University, 11 April 2025

*PDE Colloquium*, University of Münster, 17 December 2024

*Hausdorff Colloquium*, University of Bonn, 20 November 2024

*Graduate Seminar on Advanced Topics in PDE*, University of Bonn, 8 November 2024

*Analysis Seminar*, Princeton University, 16 September 2024

*Applied Mathematics Undergraduate Seminar*, Texas A&M University, 1 November 2023

*Analysis & Applied Math Seminar*, University of Toronto, 10 March 2023

*Caltech/UCLA/USC Joint Analysis Seminar*, Caltech, 7 March 2023

*Analysis & PDE Seminar*, University of North Carolina at Chapel Hill, 22 February 2023

*PDE Seminar*, GeorgiaTech, 21 February 2023

*Analysis Seminar*, University of Texas at Austin, 11 January 2023

*Colloquium*, Rice University, 17 November 2022

*Spectral Theory Seminar*, Rice University, 16 November 2022

*Analysis and PDE Seminar*, Johns Hopkins University, 14 November 2022

*Applied Analysis Seminar (via Zoom)*, Louisiana State University, 21 March 2022

*ICERM Semester Program Seminar*, ICERM, Brown University, 30 November 2021

*Analysis/PDE Seminar*, Brown University, 29 November 2021

*PDE/Applied Math Seminar (via Zoom)*, UC Davis, 18 November 2021

*PDE and Applied Math Seminar*, University of Maryland, 4 November 2021

*Applied Math Seminar (via Zoom)*, University of Victoria, Canada, 29 September 2021

*Nonlinear PDEs Seminar (via Zoom)*, Texas A&M University, 21 September 2021

*Analysis Seminar (via Zoom)*, University of Bielefeld, Germany, 20 November 2020

*Geometry & Analysis Seminar (via Zoom)*, Rice University, 18 November 2020

*Differential Equations Seminar (via Zoom)*, University of Michigan, 12 November 2020

*Seminario EDP (via Zoom)*, Universidad de Chile, Chile, 10 November 2020

*PDE/Analysis Seminar*, MIT, 10 March 2020

*MPHA Seminar*, Texas A&M University, 22 November 2019

*Analysis Seminar*, Wuhan University, China, 19 July 2019

*Analysis and PDE Seminar*, Michigan State University, 13 March 2019  
*Analysis Seminar*, Courant Institute, 13 September 2018  
*Mathematical Physics and Analysis Seminar*, IST Austria, 3 July 2018  
*CMC Seminar*, Korea Institute for Advanced Study, Seoul, 15 June 2018  
*Caltech/UCLA Joint Analysis Seminar*, Caltech, 11 May 2018  
*PDE/Analysis Seminar*, MIT, 8 May 2018  
*Analysis and PDE Seminar*, University of North Carolina at Chapel Hill, 7 February 2018  
*PDE and Applied Math Seminar*, University of Maryland, 26 October 2017  
*Calderón-Zygmund Analysis Seminar*, University of Chicago, 8 May 2017  
*Analysis Seminar*, University of Massachusetts Amherst, 12 April 2017  
*Analysis and Probability Seminar*, University of Connecticut, 24 March 2017  
*Analysis Seminar*, George Washington University, 6 December 2016  
*Analysis and PDE Seminar*, Johns Hopkins University, 19 September 2016  
*PDE Seminar*, University of Oxford, 25 February 2016  
*Analysis Seminar*, ETH Zurich, 15 December 2015  
*Mathematical Physics and Analysis Seminar*, IST Austria, 13 October 2015  
*Trimester Seminar*, Hausdorff Institute Bonn, 27 June 2014  
*Analysis Seminar*, EPF Lausanne, 23 May 2014  
*Zurich Graduate Colloquium*, ETH Zurich, 28 May 2013  
*Analysis and Mathematical Physics Seminar*, LMU Munich, 3 December 2010

ATTENDED  
CONFERENCES

*Colloquium Trimester Nonlinear Wave Equations*, IHES, June 2016  
*Nonlinear Evolution Problems*, Oberwolfach, May 2016  
*New challenges in PDE: Deterministic dynamics and randomness in high and infinite dimensional systems*, MSRI Berkeley, October 2015  
*Hausdorff Trimester Program Harmonic Analysis and Partial Differential Equations*, Bonn, June - July 2014  
*Winter School on Nonlinear PDEs and Geometric Analysis*, Ascona, January 2013  
*Oberwolfach Seminar: Dispersive Equations*, Oberwolfach, October 2012  
*Nonlinear Hamiltonian Equations*, Ascona, July 2012  
*Nonlinear Dispersive Equations*, Zurich, June 2011  
*Quantum Theory – From Small to Large Scales*, Les Houches, August 2010

LANGUAGES

German (Native), English (Fluent), French (Good), Spanish (Good)

Last Update: 1 August 2025