

Mitchell A. Taylor

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ABOUT ME

I am a Hermann-Weyl instructor as well as an ETH fellow at ETH Zurich mentored in my first two years by Rima Alaifari and in the upcoming year by Alessio Figalli. Before this, I completed my PhD at UC Berkeley working under the supervision of Daniel Tataru. My main areas of expertise include dispersive and fluid equations, functional analysis, order structures, spectral theory and phase retrieval. In PDE, I have worked on nonlinear Schrödinger equations, free boundary Euler equations, magnetohydrodynamics and the hot spots conjecture. In functional analysis, I began by studying the various connections between minimal topologies, unbounded topologies, u_0 -convergence and universal completions. More recently, I have focused on metric properties of function spaces, e.g., free Banach lattices, positive bases, subspace structure, maximal inequalities and connections to harmonic analysis and descriptive set theory. Finally, I have made several contributions to approximation theory and signal processing; more specifically, on stable phase retrieval, frame theory, saturation recovery, unlimited sampling and greedy algorithms.

EDUCATION

- **ETH Zurich**
Hermann-Weyl and ETH fellow *September 2023 - September 2026*
- **University of California, Berkeley**
PhD under Daniel Tataru GPA 4.0/4.0
September 2018 - May 2023
- **University of Alberta**
Master of Science, Mathematics, under Vladimir Troitsky GPA 4.0/4.0, 9 courses
September 2016 - May 2018
- **University of Alberta**
Bachelor of Science (Honors), Mathematical Physics GPA 3.97/4.0, 46 courses
September 2012 - May 2016

TEACHING EXPERIENCE

- **Co-teaching with H. Kwon, ETH Zurich, 2026:** Mathematical Theory in Fluid Mechanics (Topics course)
- **Lead Instructor, ETH Zurich, 2025:** Function space theory (Topics course)
- **Lead Instructor, ETH Zurich, 2024:** Stability of phase retrieval problems (Seminar course)
- **Lead Graduate Instructor, UC Berkeley, 2023:** Math 1A (Calculus)
- **Graduate Student Instructor, UC Berkeley, 2021-2022:** Math 1B (Calculus), taught both in Spring and Fall.
- **Graduate Student Instructor, UC Berkeley, 2020-2021:** Math 1B (Calculus)
- **Graduate Student Instructor, UC Berkeley, 2019-2020:** Math 202A/B (Graduate Analysis)
- **Graduate Student Instructor, UC Berkeley, 2018-2019:** Grading for Math 104, GSI for Math 53 (Calculus III)
- **Teaching Assistant, University of Alberta, Fall 2016:** Grading for Math 314 (Analysis)
- **Graduate Student Researcher:** Spring 2021 and Fall 2022 (Berkeley), May 2017-Sep 2018 (AB)
- **NSERC Undergraduate Student Research Award (USRA):** Summer 2015/2016, under the supervision of Xinwei Yu
- **Referee for dozens of papers:** Inventiones, JEMS, Advances, IMRN, FOCM, etc.

SELECTED AWARDS

- Selected by ETH D-MATH as their representative at the *Global Young Scientists Summit 2026* in Singapore.
- Hermann-Weyl instructorship - 2023-2026
- ETH Fellowship - 2023-2026
- Herb Alexander prize for outstanding dissertation in pure mathematics - 2022-23
- Outstanding GSI Award - 2021
- Math Summer Grant Award - 2021
- James H. Simons Fellowship - 2020
- Dean's Excellence Award - 2017
- Dean's Silver Medal in Science - 2016
- Queen Elizabeth II Graduate Scholarship (Master's) - 2016
- Dr. Kenneth Newbound Memorial Scholarship in Physics - 2015
- Jason Lang Scholarship - 2015
- Louise Mckinney Post-Secondary Scholarship - 2014
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- University of Alberta Academic Excellence Award - 2012
- Faculty of Science Academic Excellence Award - 2012
- Alexander Rutherford Scholarship - 2012

MENTORING

- **Jason Hu, Bachelor thesis, ETH Zurich, co-advised with A. Figalli, starting 2026:**
- **Isabel Dahlgren, Semester project, ETH Zurich, co-advised with A. Figalli, 2025:**
Focusing on frame theory and phase retrieval.
- **André Dabrowski, Reading course, ETH Zurich, co-advised with H. Kwon, 2025:**
Topics in function space theory.
- **Alexandre Zwahlen, Master thesis, ETH Zurich, co-advised with A. Bandeira, 2025:**
Injectivity and stability of the ReLU measurement operator.
- **Peiyang Yu, Bachelor thesis, ETH Zurich, co-advised with H. Kwon, 2025:**
Characterization and properties of bibasic sequences and uniformly quasi-greedy bases.
- **Derk Steffens, Semester project, ETH Zurich, co-advised with P. Hintz, 2024-2025:**
Nonlinear Dispersive Equations.
- **Victoire Laurent, Bachelor thesis, ETH Zurich, co-advised with R. Alaifari, 2024-2025:**
(Non-)uniqueness of STFT phase retrieval for general window functions.
- **Member of the thesis committee of David de Hevia, Oct. 24, 2025:**
The Complemented Subspace Problem in Banach Lattices.
- **Manuel Camuñez, Enrique García-Sánchez and David de Hevia, ICMAT doc-course, 2023:**
Resulting in the paper: *A characterization of complex stable phase retrieval in Banach lattices*, accepted in *Proc. Amer. Math. Soc.*, 2025

GRANTS, SEMINARS AND CONFERENCES ORGANIZED

- **Conference on Phase retrieval and Applications:** Upcoming 2026, RWTH Aachen, with R. Alaifari, J. de Dios Pont, D. Freeman and P. Tradacete.
- **Conference on Phase retrieval and Banach lattices:** May 5-9, 2025, ETH Zurich, with R. Alaifari, D. Freeman and P. Tradacete.
- **Research term on Lattice Structures in Analysis and Applications:** April 1-June 15, 2024, ICMAT Madrid, with A. Avilés and P. Tradacete.
- **DFG-AEI grant on Operator Theory on Free Banach lattices:** 2025-2027, with principal investigators J. Gluck and P. Tradacete.
- **Organizer of the ETH – Institute for Theoretical Studies “Chalk & Cheese” seminar:** Fall 2026, with C. Meroni.

SELECTED TALKS AND RESEARCH VISITS

- **Colloquium talk – The motion of waves: From phase recovery problems to the dynamics of fluids and plasmas:**
Carnegie Mellon University, USA, Dec. 15-16, 2025.
- **Colloquium talk – The motion of waves: From phase recovery problems to the dynamics of fluids and plasmas:**
University of Toronto, Canada, Dec. 10-11, 2025.
- **Zoom talk – The motion of waves: From phase recovery problems to the dynamics of fluids and plasmas:**
IMPA, Dec. 8, 2025.
- **Invited semi-plenary conference talk – Basic sequences in Banach lattices:**
Functional Analysis in the Pacific Northwest, University of Oregon, USA, Nov. 8-11, 2025.
- **Conference talk – Sharp well-posedness for the free boundary Euler and MHD equations:**
2nd Atlantic Conference in Nonlinear PDEs, Lisbon, Portugal, Nov. 3-7, 2025.
- **Member of the thesis committee of David de Hevia:**
The Complemented Subspace Problem in Banach Lattices, ICMAT and Universidad Complutense, Madrid, Oct. 20-25, 2025.
- **Seminar talk – On the exact failure of the hot spots conjecture:**
CUNEF Universidad, Madrid, Oct. 22, 2025, hosted by Elona Agora.
- **Host for Zhongkai Tao:**
ETH Zurich, Oct. 12-17, 2025.
- **Host for Lukas Liehr:**
ETH Zurich, Oct. 7-12, 2025.
- **Seminar talk – Recent advances in phase retrieval:**
Université de Bordeaux, France, Oct. 1-4, 2025, hosted by Philippe Jaming.
- **Invited speaker – A comparison of declipping and unlimited sampling:**
Workshop on Mathematical Signal Processing, RWTH Aachen, Germany, Sept. 22-25, 2025.
- **Host for Pedro Tradacete:**
ETH Zurich, Sept. 15-19, 2025.
- **Invited minisymposium talk – Phase retrieval in function spaces:**
Sampling Theory and Applications (SampTA), Vienna, Austria, July 28-Aug. 1, 2025.
- **Host for Dan and Nikki Freeman:**
ETH Zurich, July 25-27 and Aug. 2-8, 2025.

- **Host for Antonio Avilés:**
ETH Zurich, July 6-12, 2025.
- **Conference talk – Stable phase retrieval:**
12th International Conference on Harmonic Analysis and Partial Differential Equations, El Escorial, June 9-13, 2025.
- **Conference talk – The phase retrieval problem:**
Modern trends in Fourier analysis, CRM, Barcelona, May 27-June 6, 2025.
- **Visit to ICMAT:**
Hosted by P. Tradacete, Madrid, May 19-24, 2025.
- **Invited speaker – Sharp well-posedness for the free boundary Euler and MHD equations:**
Nonlinear Dispersive Equations: Advances and Perspectives, CIRM, May 12-16, 2025.
- **Conference organizer – Phase retrieval and Banach lattices:**
ETH Zurich, May 5-9, 2025.
- **Seminar talk – Recent advances in the phase retrieval problem:**
DACO seminar, ETH Zurich, April 10, 2025.
- **Seminar talk – Sharp well-posedness for the free boundary Euler and MHD equations:**
PDE and Mathematical Physics seminar, ETH Zurich and UZH, March 27, 2025.
- **Seminar talk – Almost everywhere convergence of series and descriptive set theory:**
ICMAT Madrid, hosted by P. Tradacete, March 10-15, 2025.
- **Seminar talk – Stable phase retrieval in function spaces:**
ETH Zurich Analysis seminar, March 4, 2025.
- **Invited minisymposium talk – Sharp well-posedness for the free boundary Euler equations:**
Conference on Mathematics of Wave Phenomena, Karlsruhe, Germany, Feb. 24-28, 2025.
- **Host for Ben Pineau:**
ETH Zurich, Feb. 20-23 and March 1-4, 2025.
- **Seminar talk – Stable phase retrieval:**
Seminário de Análise e Equações Diferenciais, Lisbon, Portugal, hosted by J. Ramos, Feb. 11-15, 2025.
- **Host for João Ramos:**
ETH Zurich, Feb. 1-7, 2025.
- **Seminar talk – Stable phase retrieval in function spaces:**
University of Alberta, Edmonton, Canada, hosted by Vladimir Troitsky, Jan. 20-24, 2025.
- **Seminar talk – Almost everywhere convergence of series and descriptive set theory:**
Jagiellonian University, Krakow, Poland, hosted by Tomasz Kania, Dec. 1-6, 2024.
- **Host for João Ramos:**
ETH Zurich, Nov. 21-Dec. 1, 2024.
- **Arbeitsgemeinschaft – The nonlinear Fourier transform for better than square summable:**
Oberwolfach: Quantum signal processing and nonlinear Fourier analysis, Oct. 6-11, 2024.
- **Host for Pedro Tradacete:**
ETH Zurich, Aug. 19-25, 2024.
- **Invited minisymposium talk – Free Banach lattices:**
International workshop on operator theory and applications (IWOTA), University of Kent, Canterbury, Aug. 12-16, 2024.
- **Conference participant:**
Phase retrieval in mathematics and applications, Lorentz center, Leiden, Netherlands, Aug. 5-9, 2024.
- **Conference talk – Stable phase retrieval in function spaces:**
Strobl24, June 9-15, 2024. Visit to the Acoustics Research Institute and University of Vienna, June 15-20, 2024.
- **Seminar talk – Sharp Hadamard well-posedness for the incompressible free boundary Euler equations:**
PDEs and Fluid Mechanics seminar, ICMAT, May 22, 2024.
- **Conference Organizer – Lattice Structures in Analysis and Applications:**
ICMAT, Madrid, May 6-30, 2024.
- **Seminar talk – On the dynamics of the free boundary Euler equations:**
ETH Zurich, symposium on PDE and Mathematical Physics, April 23, 2024.
- **Seminar talk – Stable phase retrieval in function spaces:**
EPFL number theory seminar, hosted by João Ramos and Maryna Viazovska, March 26, 2024.
- **Seminar talk – Sharp well-posedness for the free boundary Euler equations:**
Cambridge PDE seminar, Feb. 26, 2024.
- **Host for Dan Freeman:**
ETH Zurich, Nov. 27-Dec. 3, 2023.
- **Talk at Oberwolfach – Low regularity solutions to the general quasilinear Schrödinger equation:**
Scattering Resonances in Quantum Mechanics, General Relativity and Hyperbolic Dynamics, Nov. 19-24, 2023.

- **Host for Ben Pineau:**
ETH Zurich, Nov. 10-19, 2023.
- **Seminar talk – Stable phase retrieval in function spaces:**
Cambridge University, Nov. 1, 2023. Additional stay in Peterhouse college Oct. 31-Nov. 3 and Trinity college Nov. 3-7.
- **Seminar talk – Low regularity well-posedness for the general quasilinear Schrödinger equation:**
Analysis seminar, ETH Zurich, Oct. 24, 2023.
- **Conference participant:**
SLMath, Mathematical Problems in Fluid Dynamics, Part 2, July 17-Aug. 11, 2023.
- **Seminar talk – Stable phase retrieval in function spaces:**
CodEx webinar, July 11, 2023.
- **Workshop Instructor:**
ICMAT-IMAG Doc-Course in Functional Analysis, Spain, June 12-30, 2023.
- **Conference talk – No pure capillary solitary waves exist in 2D:**
Recent Advances in Mathematical Fluid Dynamics, Duke University, May 20-24, 2023. Additional visit with D. Freeman and I. Daubechies.
- **Host for Pedro Tradacete and Antonio Avilés:**
Alberta, May 12-17, 2023.
- **Invited speaker – Stable phase retrieval in function spaces:**
Recent Advances in Banach lattices, BIRS, May 7-12, 2023.
- **Host for Niels Laustsen and Timur Oikhberg:**
Alberta, May 3-7, 2023.
- **Seminar talk – Stable phase retrieval in function spaces, Part II:**
Banach spaces webinar, Feb. 17, 2023.
- **Seminar talk – Stable phase retrieval in function spaces:**
Harmonic Analysis and Differential Equations Seminar (HADES), Berkeley, Feb. 14, 2023.
- **Job talk – Stable phase retrieval in function spaces:**
ETH Zurich, Oct. 12, 2022.
- **Seminar talk – “Free” constructions in analysis:**
Harmonic Analysis and Differential Equations Seminar (HADES), Berkeley, April 19, 2022.
- **Seminar talk – No pure capillary solitary waves exist in 2D:**
Harmonic Analysis and Differential Equations Seminar (HADES), Berkeley, Nov. 16, 2021.
- **Participant in graduate student fluid dynamics workshops:**
MSRI (2020) and Oberwolfach (2022).
- **Research visit:**
Chicago, hosted by Timur Oikhberg, July, 2021.
- **Seminar talk – Non-existence of pure capillary waves in two space dimensions:**
University of Toronto Graduate Analysis Seminar, June 11, 2021.
- **Conference participant:**
Summer Program in Partial Differential Equations, UT Austin, May 17-28, 2021.
- **Seminar talk – The subspace structure of free Banach lattices:**
Positivity Webinar, April 1, 2021.
- **Semester at MSRI:**
Mathematical Problems in Fluid Dynamics, Spring 2021.
- **Seminar talk – Free Banach lattices: Subspace structure and basic sequences:**
Banach spaces webinar, Oct. 16, 2020.
- **Seminar talk – Bases of non-negative functions in Hilbert spaces and free Banach lattices:**
Harmonic Analysis and Differential Equations Seminar (HADES), Berkeley, Feb. 18, 2020.
- **Conference talk – Extending topologies to the universal σ -completion of a vector lattice:**
Positivity X, Pretoria, July 8-12, 2019.
- **Research visit:**
Duke University, hosted by Dan Freeman, Feb. 10-19, 2019. Second visit to Durham, Aug. 12-20, 2022.
- **Conference poster – Minimal topologies on vector lattices:**
Recent Advances in Functional Analysis, Kent State University, Oct. 11-14, 2018.
- **Conference talk – Unbounded topologies with a view towards Banach lattices:**
Recent Advances in Banach Lattices, CMO/BIRS, Oaxaca, Mexico, April 29-May 4, 2018.
- **Seminar talk – Schauder bases with order convergent partial sums:**
Banach spaces seminar, hosted by Thomas Schlumprecht and Bill Johnson, Texas A&M, Feb. 23, 2018.

- **UC Berkeley talks 2018-2019:**

Two talks (basic sequences in Banach lattices and minimal topologies) at the Probabilistic Operator Algebras seminar, one talk (basic sequences in Banach lattices) at the Harmonic Analysis and Differential Equations Seminar (HADES).

- **Visits to ICMAT 2019-2023:**

Four visits to ICMAT (Madrid) including a talk at the Workshop on Banach spaces and Banach lattices I (minimal topologies), a plenary talk at the Workshop on Banach spaces and Banach lattices II (free Banach lattices), and two talks at the analysis seminar (bibases and phase retrieval). Additional visit to Murcia May 2022 and participation in the Workshop on Geometric Valuation Theory — from convex sets to functions, CIEM, Castro-Urdiales, June 2023.

- **Conference talk – Unbounded topologies and u_0 -convergence in locally solid vector lattices:**

Positivity IX, University of Alberta, July 17-21, 2017.

PUBLICATIONS

My publication list includes [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23].

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- [2] Antonio Avilés, Christian Rosendal, Mitchell A. Taylor, and Pedro Tradacete. Coordinate systems in Banach spaces and lattices. *arXiv preprint arXiv:2406.11223*, 2024.
- [3] Michael Christ, Ben Pineau, and Mitchell A. Taylor. Examples of Hölder-stable phase retrieval. *Math. Res. Lett.*, 31(5):1339–1352, 2024.
- [4] Jaume de Dios Pont, Alexander W. Hsu, and Mitchell A. Taylor. Sharp bounds on the failure of the hot spots conjecture. *arXiv preprint arXiv:2508.16321*, 2025.
- [5] Daniel Freeman, Timur Oikhberg, Ben Pineau, and Mitchell A. Taylor. Stable phase retrieval in function spaces. *Math. Ann.*, 390(1):1–43, 2024.
- [6] Daniel Freeman, Alexander M. Powell, and Mitchell A. Taylor. A Schauder basis for L_2 consisting of non-negative functions. *Math. Ann.*, 381(1-2):181–208, 2021.
- [7] Daniel Freeman and Mitchell A. Taylor. The Cahill-Casazza-Daubechies problem on Hölder stable phase retrieval. *preprint*, 2025.
- [8] Enrique García-Sánchez, David de Hevia, and Mitchell A. Taylor. On the existence of large subspaces of $C(K)$ that perform stable phase retrieval. *preprint*, 2025.
- [9] Enrique García-Sánchez, Denny H. Leung, Mitchell A. Taylor, and Pedro Tradacete. Banach lattices with upper p -estimates: free and injective objects. *Math. Ann.*, 391(3):3363–3398, 2025.
- [10] Mihaela Ifrim, Ben Pineau, Daniel Tataru, and Mitchell A. Taylor. No pure capillary solitary waves exist in 2D finite depth. *SIAM J. Math. Anal.*, 54(4):4452–4464, 2022.
- [11] Mihaela Ifrim, Ben Pineau, Daniel Tataru, and Mitchell A. Taylor. Sharp well-posedness for the free boundary MHD equations. *arXiv preprint arXiv:2412.15625*, 2024.
- [12] Mihaela Ifrim, Ben Pineau, Daniel Tataru, and Mitchell A. Taylor. Sharp Hadamard Local Well-Posedness, Enhanced Uniqueness and Pointwise Continuation Criterion for the Incompressible Free Boundary Euler Equations. *Ann. PDE*, 11(1):Paper No. 16, 2025.
- [13] Héctor Jardón-Sánchez, Niels Jakob Laustsen, Mitchell A. Taylor, Pedro Tradacete, and Vladimir G. Troitsky. Free Banach lattices under convexity conditions. *Rev. R. Acad. Cienc. Exactas Fís. Nat. Ser. A Mat. RACSAM*, 116(1):Paper No. 15, 25, 2022.
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- [15] Timur Oikhberg, Mitchell A. Taylor, Pedro Tradacete, and Vladimir G. Troitsky. Free Banach lattices. *J. Eur. Math. Soc. (JEMS)*, to appear, 2024.
- [16] Ben Pineau and Mitchell A. Taylor. Low regularity solutions for the general quasilinear ultrahyperbolic Schrödinger equation. *Arch. Ration. Mech. Anal.*, 248(6):Paper No. 122, 67, 2024.
- [17] Ben Pineau and Mitchell A. Taylor. Global well-posedness for the generalized derivative nonlinear Schrödinger equation. *Nonlinearity*, 38(5):Paper No. 055022, 67, 2025.
- [18] Ben Pineau and Mitchell A. Taylor. On the optimal Sobolev threshold for evolution equations with rough nonlinearities. *arXiv preprint arXiv:2505.14966*, 2025.

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- [20] Mitchell A. Taylor. Unbounded convergences in vector lattices. *MSc. thesis, University of Alberta*, 2019.
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- [22] Mitchell A. Taylor. *A Collection of Results on Nonlinear Dispersive Equations, Banach Lattices and Phase Retrieval*. ProQuest LLC, Ann Arbor, MI, 2023. Thesis (Ph.D.)—University of California, Berkeley.
- [23] Mitchell A. Taylor and Vladimir G. Troitsky. Bibasic sequences in Banach lattices. *J. Funct. Anal.*, 278(10):108448, 33, 2020.