Mitchell A. Taylor

ETH Zurich Department of Mathematics
Ramistrasse 101, 8092, Zurich, Switzerland

Website: mitchtaylormath.ca
Email: mitchell.taylor@math.ethz.ch

About me

I am a Hermann-Weyl instructor as well an ETH fellow at ETH Zurich. 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, and phase retrieval. In PDE, I have worked on nonlinear Schrödinger equations, free boundary Euler equations, and magnetohydrodynamics. In functional analysis, I began by studying the various connections between minimal topologies, unbounded topologies, uo-convergence and universal completions. More recently, I have focused on metric properties of function spaces, e.g., free Banach lattices, positive bases, and subspace structure. Finally, I have done some work in approximation theory and signal processing; more specifically, on stable phase retrieval, frame theory, and greedy algorithms.

Education

- **ETH Zurich**
  Hermann-Weyl and ETH fellow — September 2023 - September 2026

- **University of California, Berkeley** — GPA 4.0
  PhD under Daniel Tataru — September 2018 - May 2023

- **University of Alberta** — GPA 4.0, 9 courses taken
  Master of Science, Mathematics, under Vladimir Troitsky — September 2016 - May 2018

- **University of Alberta** — GPA 3.97, 46 courses taken
  Bachelor of Science (Honors), Mathematical Physics — September 2012 - May 2016

Experience

- **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 15+ papers**:

Selected Awards

- Hermann-Weyl instructorship - 2023-2026
- ETH Fellowship - 2023-2025
- 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
- Louise Mckinney Post-Secondary Scholarship - 2013
- University of Alberta Academic Excellence Award - 2012
- Faculty of Science Academic Excellence Award - 2012
- Canadian Federation of University Women Scholarship - 2012
- Alexander Rutherford Scholarship - 2012

Selected talks and research visits

I have visited various universities for research visits and conferences. This includes four visits to ICMAT (Madrid) to do research with Pedro Tradacete, to attend conferences and to present a plenary lecture at the *Workshop on Banach spaces and Banach lattices II, 2022*. I have visited Duke University to do research with Dan Freeman, Texas A&M to visit Thomas Schlumprecht and Bill Johnson, Murcia to visit Antonio Avilés, and Chicago to visit Timur Oikhberg. I spent a semester at MSRI for the fluid dynamics program, and attended graduate student workshops in fluid dynamics at Oberwolfach and at MSRI. I have contributed to conferences at Kent State University, the University of Pretoria, the University of Alberta, MSRI, Oaxaca, ICMAT, and others. I have also given numerous talks at research seminars, including at EPFL, ETH, UC Berkeley and Cambridge. I was a main speaker at the conference *Recent Advances in Banach lattices* at BIRS in 2023 and an invited lecturer at the three week summer school *ICMAT-IMAG Doc-Course in Functional Analysis, 2023*. I have also attended conferences at Duke, taken part in the MSRI fluids program and had research visits at ETH Zurich. In 2024, I will co-organize the *Research term: Lattice Structures in Analysis and Applications* at ICMAT and in 2025 I will co-organize the *FIM workshop on Phase retrieval and Banach lattices* at ETH Zurich.

Publications

My publication list includes [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16].

References

[1] Michael Christ, Ben Pineau, and Mitchell A. Taylor. Examples of Hölder stable phase retrieval. *Math. Res. Lett., to appear*, 2023.

[2] Daniel Freeman, Timur Oikhberg, Ben Pineau, and Mitchell A. Taylor. Stable phase retrieval in function spaces. *Math. Ann., to appear*, 2024.

[3] 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.

[4] Enrique García-Sánchez, Denny H. Leung, Pedro Tradacete, and Mitchell A. Taylor. Banach lattices with upper p-estimates: free and injective objects. *arXiv preprint arXiv:2402.19152*, 2024.

[5] 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.

[6] 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. *arXiv preprint arXiv:2309.05625*, 2023.

[7] 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.

[8] Marko Kandić and Mitchell A. Taylor. Metrizability of minimal and unbounded topologies. *J. Math. Anal. Appl.*, 466(1):144–159, 2018.

[9] Timur Oikhberg, Mitchell A. Taylor, Pedro Tradacete, and Vladimir G. Troitsky. Free Banach lattices. *J. Eur. Math. Soc. (JEMS), to appear*, 2024.

[10] Ben Pineau and Mitchell A. Taylor. Global well-posedness for the generalized derivative nonlinear Schrödinger equation. *arXiv preprint, arXiv:2112.04648*, 2021.

[11] Ben Pineau and Mitchell A. Taylor. Low regularity solutions for the general quasilinear ultrahyperbolic Schrödinger equation. *arXiv preprint arXiv:2310.19221*, 2023.

[12] Mitchell A. Taylor. Completeness of unbounded convergences. *Proc. Amer. Math. Soc.*, 146(8):3413–3423, 2018.

[13] Mitchell A. Taylor. Unbounded convergences in vector lattices. *MSc. thesis, University of Alberta*, 2019.

[14] Mitchell A. Taylor. Unbounded topologies and uo-convergence in locally solid vector lattices. *J. Math. Anal. Appl.*, 472(1):981–1000, 2019.

[15] Mitchell A. Taylor. A collection of results on nonlinear dispersive equations, Banach lattices and phase retrieval. *PhD thesis, University of California, Berkeley*, 2023.

[16] Mitchell A. Taylor and Vladimir G. Troitsky. Bibasic sequences in Banach lattices. *J. Funct. Anal.*, 278(10):108448, 33, 2020.