Amir Sagiv

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Academic and Professional Experience

Technion - Israel Institute of Technology
Senior Lecturer (tenure-track Assistant Professor) 2023–present

Columbia University
Term Assistant Professor in Applied Mathematics and Associate Research Scientist 2019–2023

Yale University
Visiting Graduate Student 2018–2019

Tel Aviv University
Junior Lecturer and Teaching Assistant 2016–2018

Education

Tel Aviv University
Ph.D. in Applied Mathematics 2016–2019

Tel Aviv University
M.Sc. in Applied Mathematics 2014–2016

Hebrew University of Jerusalem
B.Sc. in Mathematics and Physics (*"Talpiot" program*) 2006–2009

Grants and Awards

- Binational Science Foundation (BSF) Grant 2022254 ($118,000) *"Floquet Media - a Dynamic and Spectral Approach,"* PI, with M.I. Weinstein, 09/23–09/27
- AMS-Simons Travel Grant ($5,000) 07/21–07/23
- SIAM Early Career Travel Award (CSE21) 03/21
- SIAM Student Travel Award (CSE19) 02/19
- Israel Ministry of Science and Technology Doctoral Student 11/18
- Tel Aviv University Distinguished Ph.D. Award (School of Mathematics) 06/18
- SIAM Student Travel Award (NWCS18) 06/18
- Tel Aviv University Distinguished M.Sc. Award (School of Mathematics) 05/15
- Dean's List Excellence Award (Hebrew University of Jerusalem) 03/09

Papers

1. Joseph Kraisler, **A. Sagiv,** and Michael I. Weinstein, "Dispersive decay estimates for Dirac equations with a domain wall." *arXiv:2307.06499 (under review).*

2. **A. Sagiv** and Michael I. Weinstein, "Near invariance of quasi-energy spectrum of Floquet Hamiltonians." *arXiv:2304.10685 (under review).*

3. R. Baptista, B. Hosseini, N.B. Kovachki, Y.M. Marzouk, and **A. Sagiv**, "An Approximation Theory Framework for Measure-Transport Sampling Algorithms." *arXiv:2302.13965 (under review).*

4. Q. Du and **A. Sagiv**, "Minimizing optimal transport for functions with fixed-size nodal sets." **J. of Nonlinear Science,** 33:95, 2023.

5. S.N. Hameedi, **A. Sagiv**, and M.I. Weinstein, "Radiative decay of edge states in Floquet media." **SIAM Multiscale Modeling and Simulations,** 21, 925–962, 2023.

6. **A. Sagiv**, "Spectral Convergence of Probability Densities for Forward Problems in Uncertainty Quantification." **Numerische Mathematik** 150, 1165–1185. 2022.

7. **A. Sagiv** and M.I. Weinstein, "Effective Gaps in Continuous Floquet Hamiltonians." **SIAM J. on Mathematical Analysis,** 54, 986–1021, 2022.

8. O. Lindenbaum*, **A. Sagiv***, G. Mishne, and R. Talmon, "Kernel-Based Parameter Estimation of Dynamical Systems with Unknown Observation Functions." **Chaos:** *An Interdisciplinary Journal of Nonlinear Science, 31, 043118, 2021.*

   *Indicates equal contribution

9. **A. Sagiv** and S. Steinerberger. "Transport and Interface: an Uncertainty Principle for the Wasserstein Distance." **SIAM J. on Mathematical Analysis**, *52, 3039—3051, 2020.*

10. **A. Sagiv**, A. Ditkowski, R.H. Goodman, and G. Fibich. "Loss of Physical Reversibility in Reversible Systems." **Physica D**, *410, 132515, 2020.*

11. **A. Sagiv**. "The Wasserstein Distances Between Pushed-Forward Measures with Applications to Uncertainty Quantification." **Communications in Mathematical Sciences**, *18, 707–724, 2020.*

12. A. Ditkowski, G. Fibich, and **A. Sagiv**. "Density Estimation in Uncertainty Propagation Problems Using a Surrogate Model." **SIAM/ASA J. on Uncertainty Quantification**, *8, 261–300, 2020.*

13. G. Patwardhan, X. Gao, **A. Sagiv**, A. Dutt, J. Ginsberg, A. Ditkowski, G. Fibich, and A.L. Gaeta. "Loss of Polarization of Elliptically Polarized Collapsing Beams." **Physical Review A**, *99, 033824, 2019.*

14. **A. Sagiv**, A. Ditkowski, and G. Fibich. "Loss of Phase and Universality of Stochastic Interactions Between Laser Beams." **Optics Express**, *25, 24387–24399, 2017.*

Talks

Seminar Talks

- **University of Washington** Applied Math seminar 11/23
- **Louisiana State University** Mathematical Physics and Spectral Theory online seminar 10/23
- **Stony Brook University** Analysis seminar 10/23
- **University of Michigan** PDE seminar 09/23
- **Michigan State University** Mathematical Physics Seminar 09/23
- **UC San Diego** Mathematics of Data, Information and Signals Seminar 06/23
- **UC Santa Barbara** Applied Mathematics Seminar 06/23
- **Yale University** Analysis Seminar 04/23
- **Princeton University** PACM Colloquium 03/23
- **University of Maryland** Numerical Analysis seminar 12/22
- **CUNY** Graduate Center Harmonic Analysis and PDE seminar 12/22
- **University of Minnesota**, Applied and Computational Mathematics seminar 11/22
- **University of South Carolina**, Applied and Computational Mathematics seminar (online) 11/22
- **New Jersey Institute of Technology** Fluid Mechanics and Waves seminar 11/22
- **TU Chemnitz and TU Freiberg**, Institute of Stochastics seminar (online) 07/22
- **UC Davis**, Center of Quantum Mathematics and Physics, Mathematics seminar 05/22
- **University of Washington**, Applied Mathematics Seminar 04/22
- **Ohio State University**, Analysis Seminar 03/22
- **Georgia Tech**, Applied and Computational Mathematics Seminar 11/21
- **University of Chicago**, Computational and Applied Mathematics 11/21
- **University of Illinois Urbana-Champaign**, PDE seminar 11/21
- **University of Colorado Boulder**, Waves seminar 10/21
- **Texas A&M**, Data Science Institute Tech Talks 10/21
- **Texas A&M**, PDE and Harmonic Analysis seminar 10/21
- **Yale**, Applied Mathematics Colloquium 10/21
- **MIT**, Aerospace Computational Design Laboratory seminar 09/21
- **Hebrew University of Jerusalem**, Analysis seminar 06/21
- **Tel Aviv University**, Applied Mathematics colloquium 06/21
- **UC San Diego**, Applied Mathematics seminar 03/21
- **Southern Methodist University**, Applied Mathematics colloquium 03/21
- **University of Minnesota**, IMA Data Science seminar 02/21
- **University of Maryland**, CSCAMM seminar 11/20
- **California Institute of Technology**, CMX seminar 02/20
- **UC Berkeley**, Applied Mathematics seminar 01/20
- **Flatiron Institute**, Numerical Analysis and CCM seminar 12/19

- **Rensselaer Polytechnic Institute**, Mathematical Sciences colloquium 10/19
- **New Jersey Institute of Technology**, Fluid Mechanics and Waves seminar 09/19
- **Tel Aviv University**, Applied Mathematics colloquium 06/19
- **Bar Ilan University**, Applied Mathematics seminar 05/19
- **Technion**, PDEs and Applied Mathematics seminar 04/19
- **Weizmann Institute**, Mathematical Analysis and Applications seminar 03/19
- **Columbia University**, Applied Mathematics colloquium 01/19
- **Stanford University**, Applied Mathematics seminar 10/18
- **UC Merced**, Applied Mathematics seminar 10/18
- **UC Irvine**, Applied Mathematics seminar 10/18
- **University of Colorado Boulder**, Waves seminar 09/18
- **Yale University**, Applied Mathematics seminar 09/18

Invited Conference Talks

- **SIAM New York-New Jersey-Pennsylvenia Section** Annual Meeting, Newark NJ, 10/23
- **SIAM Annual Meeting 2022**, Pittsburgh, PA 07/22
- **Approximation of high-dimensional parametric PDEs in forward UQ workshop**, Erwin Schrodinger Institute, Vienna (online) 05/22
- **SIAM UQ22**, Conference on Uncertainty Quantification, Atlanta, GA 04/22
- **Workshop on Perturbation of Spectral Bands and Gaps**, TU Dortmund, online 07/21
- **SIAM MS21**, Mathematical Aspects of Material Sciences, online 05/21
- **IMACS11**, Nonlinear Evolution Equations and Wave Phenomena, University of Georgia, 04/19
- **SIAM CSE19**, Computational Science and Engineering, Spokane, WA 02/19
- **SIAM NWCS18**, Conference of Nonlinear Waves and Coherent Structures, Orange, CA 06/18
- **IMU18**, Israel Mathematical Union annual meeting, Technion, Haifa, Israel 05/18

Contributed and other Talks

- **87th Midwest PDE Seminar**, Notre Dame University 05/23
- **Mid-Atlantic Numerical Analysis Day**, Temple University 10/22
- **Sayas Numerics Day**, University of Maryland Baltimore County 09/22
- **SIAM Annual Meeting 21**, self-organized minisymposium talk, online 07/21
- **SIAM CSE21**, self-organized minisymposium talk, Computational Science and Engineering, online 03/21
- **Symposium on Machine Learning and Dynamical Systems**, Fields Institute, online 09/20
- **Dynamics Days Digital**, online 08/20
- **One World Waves**, hosted by the ICMS, online 06/20
- **Dynamics Days 2020**, flash talk, Hartford CT 01/20
- **Brown-BU-UMass Dynamics and PDEs Workshop**, Brown, Providence, RI 11/19
- **Young Researchers Workshop**, Ki-Net network, CSCAMM, College Park, MD 10/19

- **OASIS7**, International Conference for Optics and Electro-Optics, Tel Aviv, Israel 04/19
- **IPS17**, Israel Physics Society annual meeting, Technion, Haifa, Israel 12/17
- **Frontiers in Optics 17**, OSA 101st Annual Meeting, Washington DC 09/17

Students Supervised

- Ruoxi Li (Columbia Applied Math '22). "Geometric Measure Theory" spring 2022.
- Jerry Qu (Columbia Applied Math '23). "Reproducing kernel Hilbert spaces and kernel PCA," summer 2021 (with MI Weinstein).
- Sameh N. Hameedi (Columbia Applied Math M.Sc. '21, currently Ph.D. student at Oxford University). "Defect mode decay in Floquet Media," 2020-2021 (with MI Weinstein).
- Ho Jia Xu Dion (Yale-NUS '21, currently Ph.D. student at Columbia University). "Solitary waves interactions with highly non-integrable nonlinearities," 2019 (with W Schlag).

Teaching Experience

Columbia University

- Multivariate Calculus for Engineering and Applied Sciences (APAM2000E) fall 2019, 2020, 2021
- Principles of Applied Mathematics (APMA4001E) spring 2020
- Applied Mathematics III: Dynamical Systems (APMA4101E) spring 2021, 2022, 2023

Tel Aviv University

- Numerical Analysis for Engineering spring 2018

Tel Aviv University - Teaching Assistant

- Numerical Analysis fall 2017
- Ordinary Differential Equations spring 2017
- Calculus I fall 2017
- Ordinary Differential Equations for Engineering spring 2016

Service and Organization

- **Workshop organizer** "Mathematics of Condensed Matter Physics" at ETH, Zurich (with GM Graf, J Shapiro, and MI Weinstein) 07/23
- **Referee:** SIAM J. Math Anal (SIMA), SIAM J. Appl Math (SIAP), SIAM J. Sci Comp (SISC), SIAM J. Num Anal (SINUM), Comm Math Phys (CMP), Bull London Math Soc, PRL, PRA, PRE, Phys Rev Res, J. Math Phys, Wave Motion, Int J. Uncer Quant, Data-Centered Eng, Comput Stats Data Analy, JOSA B, J Math Imag Vision.
- **Doctoral Committee**
  - Wen Ding, Columbia University, 08/22
  - Huaiyu Li, Columbia University, 08/23

- **Service,** Technion Faculty of Mathematics:
  - **Search Committee** 2023–2024
  - **Mathematics Entry and Classification Exam** 2023–2024
- **Service**, Columbia's Department of Applied Physics and Applied Mathematics:
  - **Seminar organizer** of the APAM Friday Research Conference spring 2020, 2021, 2022
  - **Secretary of the Faculty** fall 2019 – fall 2020, spring 2022
  - **Qualifying Exams** Spring 2020, 2021, 2022, 2023
- **Mini-Course** on dynamical systems at "Columbia Summer Undergraduate Research Experiences in Mathematical Modeling" summer 2021
- **Mini-symposium and special sessions organized:**
  - "Computational Measure Transport" for SIAM UQ24, Trieste, Italy (with R Baptista, A. Hsu, & B. Pandey) 02/24
  - "Optimal transport in uncertainty quantification and learning" for SIAM UQ22, Atlanta, GA (with C. Moosmueller) 04/22
  - "Machine Learning for Scientific Discovery" for SIAM Annual Meeting, online (with O. Lindenbaum) 07/21
  - "Recent Advances in Computational Probability" for SIAM CSE21, online (with B. Hosseini) 03/21
  - "Theory of Optical Waves in Novel Media" for Metamaterials 2020, online (with M.I. Weinstein) 09/20
- **Conference referee** for Metamaterials 2020 and Metamaterials 2021
- **Tutoring** for undergraduate students with physical disabilities and for supporting foreign students. Tel Aviv University 2016-2017