

Jeffrey Schenker

Curriculum Vitae

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| CONTACT INFORMATION | Department of Mathematics Michigan State University 619 Red Cedar Road East Lansing, MI 48823 | (517)-944-2438 schenke6@msu.edu |
| EDUCATION | Princeton University University of Wyoming | Ph.D. in Mathematics (2002). Advisor: Michael Aizenman M.S. in Applied Mathematics (1997) B.S. with honor in Mathematics (1996) B.S. in Physics (1996) B.A. with honor in Chemistry (1995) |
| EMPLOYMENT | Michigan State University Institute for Advanced Study ETH Zürich University of California, Irvine | Chair of Mathematics, 2022-present Mathematics Director of Graduate Studies, 2017-2020 Professor, 2016-present Associate Professor, 2010-2016 Assistant Professor, 2007-2010 NSF Postdoctoral Fellow and Member, 2005-2007 Postdoctoral fellow, 2003-2005 NSF postdoctoral fellow, 2002-2003 |
| VISITING POSITIONS | Institut Mittag-Leffler, Stockholm, April 2019, Invited Visitor Isaac Newton Institute, Cambridge, May 2015, Visiting Fellow Institute for Advanced Study, Princeton, September 2013 - August 2014, Member Bernoulli Institute, Lausanne, May-July 2010, Visiting Professor U. Paris-Nord 13, Paris, May-June 2009 and July 2010, Visiting Professor Isaac Newton Institute, Cambridge, August 2008, Visiting Fellow | |
| AWARDS AND HONORS | Fellow of the American Mathematical Society, November 2019 J. Sutherland Frame Excellence in Teaching Award, 2009 NSF Postdoctoral Research Fellowship, 2002-2006 NSF Graduate Research Fellowship, 1997-2002 Phi Beta Kappa, 1995 | |
| RESEARCH FUNDING | NSF 2153946: "Ergodic Quantum Processes: localization, diffusion, and steady states," 2022-2025, \$451,130 NSF 1900015: "Localization and Diffusion in open and many body quantum systems," 2019-2022, \$250,000 NSF 1500386: "Quantum Diffusion in Fluctuating Media," 2015-2019, \$120,000 NSF 1411411: "Interpreting Data from Trapping of Stochastic Movers," 2014-2018, \$180,000 NSF 0968360: "FRG: Collaborative Research: Modeling, Computation, and Analysis of Optical Responses of Nano-Structures," 2010-2015, \$225,000 (Co-PI) NSF 08446325: "CAREER: Analysis of disordered systems," 2009-2015, \$479,082 | |

PUBLICATIONS

BOOKS

1. J. R. Miller, C.G. Adams, P.A. Weston, J. H. Schenker, *Trapping of small animals moving randomly: Principles and Applications to Pest Monitoring and Management*. [SpringerBriefs in Ecology 2015](#). 116 pages.

JOURNAL PUBLICATIONS

44. A. Bols, J. Schenker, J. Shapiro, "Fredholm Homotopies for Strongly-Disordered 2D Insulators," [Commun. Math. Phys. \(2022\)](#). [arXiv:2110.07068](#)
43. R. Movassagh, J. Schenker, "An ergodic theorem for homogeneously distributed quantum channels with applications to matrix product states," [Commun. Math. Phys. 395, 1174-1196 \(2022\)](#). [arXiv:1909.11769](#).
42. F. Klopp, J. Schenker, "On the spatial extent of localized eigenfunctions for random Schrödinger operators," [Commun. Math. Phys. 394, 679–710 \(2022\)](#). [arXiv:2105.13215](#),
41. R. Movassagh, J. Schenker, "Theory of Ergodic Quantum Processes," [Phys. Rev. X 11, 041001 \(2021\)](#). [arXiv:2004.14397](#).
40. R. Matos, J. Schenker, "Localization and IDS Regularity in the Disordered Hubbard Model within Hartree-Fock Theory," [Commun. Math. Phys. 382, 1725–1768 \(2021\)](#). [arXiv:1906.10800](#).
39. C. Adams, J. Schenker, P. Weston, L. Gut, J. Miller, "Path Meander of Male Codling Moths (*Cydia pomonella*) Foraging for Sex Pheromone Plumes: Field Validation of a Novel Method for Quantifying Path Meander of Random Movers Developed Using Computer Simulations," [Insects 11, 549 \(2020\)](#).
38. J. Schenker, F. Z. Tilocco, S. Zhang, "Diffusion in the mean for a periodic Schrödinger equation perturbed by a fluctuating potential," [Commun. Math. Phys. 377, 1697-1563 \(2020\)](#), [arxiv:1901.06598](#).
37. P. Hislop, K. Kirkpatrick, S. Olla, J. Schenker, "Transport of a quantum particle in a time-dependent white-noise potential," [J. Math. Phys. 60, 083303 \(2019\)](#). [arxiv:1807.08317](#).
36. R. Mavi, J. Schenker, "Resonant Tunneling In A System With Correlated Pure Point Spectrum," [J. Math. Phys. 60, 052103 \(2019\)](#). [arxiv:1705.03039](#).
35. R. Peled, J. Schenker, M. Shamis, S. Sodin "On the Wegner N-orbital model," [Int. Math. Res. Not. 2019 \(4\), 1030-1058 \(2019\)](#). [arxiv.org:1608.02922](#).
34. R. Mavi, J. Schenker, "Localization in the Disordered Holstein model," [Comm. Math. Phys 364, 719-764 \(2018\)](#). [arXiv:1709.06621](#).
33. J. Schenker, "Trapping planar Brownian motion in a non circular trap", [ALEA, Lat. Am. J. Probab. Math. Stat. 15, 213–231 \(2018\)](#). [arxiv:1610.09731](#).
32. C. G. Adams, J. Schenker, P.S. McGhee, L. J. Gut, J. R. Miller, "Line-Trapping of Codling Moth, *Cydia pomonella*, (Lepidoptera: Tortricidae): a Novel Approach to Improving the Precision of Capture Numbers in Traps Monitoring Pest Density," [J. Econ. Ent 110\(4\):1508-1511 \(2017\)](#).
31. M. Aizenman, R. Peled, J. Schenker, M. Shamis, S. Sodin "Matrix regularizing effects of Gaussian perturbations," [Comm. Cont. Math. \(2017\)](#). [arXiv:1509.01799](#).
30. C. G. Adams, J. Schenker, P.S. McGhee, L. J. Gut, J. Brunner, J. R. Miller, "Maximizing information yield from pheromone-baited monitoring traps: estimating plume reach, trapping radius, and absolute density of codling moth (*Cydia pomonella*) in Michigan apple." [J. Econ. Ent. \(2017\)](#).

29. J. Clark, J. Schenker, "Spectral analysis of a family of symmetric, scale-invariant diffusions with singular coefficients and associated limit theorems," [Lat. Am. J. Prob. Stat. 13 \(1\), 265-289 \(2016\)](#). [arXiv:1307.4814](#).
28. J. Fröhlich, J. Schenker, "Quantum Brownian motion for Lindblad dynamics in the presence of disorder," [J. Math. Phys. 57, 023305 \(2016\)](#). [arXiv:1506.01921](#)
27. J. Schenker, "Diffusion in the Mean for an Ergodic Schrödinger Equation Perturbed by a Fluctuating Potential," [Commun. Math. Phys. 339, 859-901 \(2015\)](#). [arXiv:1406.4932](#)
26. C. Musselman, J. Schenker, "Diffusive scaling for all moments of the Markov Anderson model," [Mark. Proc. Rel. Fields. 21 \(2015\)](#). [arXiv:1312.2603](#)
25. J. Schenker, "How large is large? Estimating the critical disorder for the Anderson model," [Lett. Math. Phys., 105 \(2015\), 1-9](#). [arXiv:1305.6987](#)
24. J. Schenker, "Estimating complex eigenvalues of non-self-adjoint Schrödinger operators via complex dilations," [Math. Res. Lett. 18 \(2011\), 755-765](#). [arXiv:1007.3552](#)
23. E. Hamza, Y. Kang, J. Schenker, "Diffusive propagation of wave packets in a fluctuating periodic potential," [Lett. Math. Phys. 95 \(2010\), 53-66](#). [arXiv:1002.0599](#)
22. J. Schenker, "Eigenvector localization for random band matrices with power law bandwidth," [Comm. Math. Phys. 290 \(2009\), 1065-1097](#). [arXiv:0809.4405](#)
21. Y. Kang, J. Schenker, "Diffusion of wave packets in a Markov random potential," [J. Stat. Phys. 134 \(2009\), 1005-1022](#). [arXiv:0808.2784](#)
20. F. Germinet, A. Klein, J. H. Schenker, "Quantization of the Hall conductance and delocalization in ergodic Landau Hamiltonians," [Rev. Math. Phys. 21 \(2009\), 1045-1080](#). [arXiv:0812.0392](#)
19. F. Germinet, A. Klein, J. H. Schenker, "Dynamical delocalization in random Landau Hamiltonians," [Ann. of Math., 166 \(2007\), 215-244](#). [arXiv:math-ph/0412070](#)
18. A. Figotin, J. H. Schenker, "Hamiltonian structure for dissipative and dispersive dynamical systems," [J. Stat. Phys., 128 \(2007\), 969-1056](#). [arXiv:math-ph/0608003](#)
17. H. Schulz-Baldes, J. H. Schenker, "Gaussian fluctuations for random matrices with correlated entries," [Inter. Math. Res. Not. 2007, Vol. 2007, article ID rmn047, 36 pages](#). [arXiv:math-ph/0607028](#)
16. A. Figotin, J. H. Schenker, "Hamiltonian extension and eigenfunctions for a time dispersive dissipative string," in Probability and Mathematical Physics, Proceedings of the conference celebrating 65th birthday of Stanislav Molchanov (Dawson, Jaksic, and Vainberg, eds.), CRM Proceedings and Lecture Notes, vol. 42, AMS, Providence. [arXiv:math-ph/0604001](#)
15. A. Figotin, J. H. Schenker, "Hamiltonian treatment of time dispersive and dissipative media within the linear response theory," [J. Comp. Appl. Math. 204 \(2007\), 199-208](#). [arXiv:physics/0410127](#)
14. M. Aizenman, A. Elgart, S. Naboko, J. H. Schenker, G. Stolz, "Moment analysis for localization in random Schrödinger operators," [Invent. Math. 163 \(2006\), 343-413](#). [arXiv:math-ph/0308023](#)
13. A. Elgart, G.-M. Graf, J. H. Schenker, "Equality of edge and bulk Hall conductances in a mobility gap," [Comm. Math. Phys. 259 \(2005\), 185-221](#). [arXiv:math-ph/0409017](#)
12. P. D. Hislop, F. Klopp, J. Schenker, "Continuity with respect to disorder of the integrated density of states," [Illinois. J. of Math. 49 \(2005\), 893-904](#). [arXiv:math-ph/0409007](#)
11. J.-M. Bouclet, F. Germinet, A. Klein, J. Schenker, "Linear response theory for magnetic Schrödinger operators in disordered media," [J. Func. Anal. 226 \(2005\), 301-372](#). [arXiv:math-ph/0408028](#)
10. H. Schulz-Baldes, J. H. Schenker, "Semicircle law and freeness for random matrices with symmetries or correlations," [Math. Res. Lett. 12 \(2005\), 531-542](#). [arXiv:math-ph/0505003](#)

9. A. Figotin, J. H. Schenker, "Spectral theory of time dispersive and dissipative systems," [J. Stat. Phys. 118 \(2005\), 199-263. arXiv:math-ph/0404070](#)
8. J. H. Schenker, "Hölder equicontinuity of the density of states at weak disorder," [Lett. Math. Phys. 70 \(2004\), 195-209. arXiv:math-ph/0403063](#)
7. M. Aizenman, A. Elgart, S. Naboko, J. H. Schenker, G. Stolz, "Fractional moment methods for Anderson localization in the continuum," Proceedings of the ICMP (Lisbon 2003), World Scientific. [arXiv:math-ph/0309018](#)
6. A. Elgart, J. H. Schenker, "A strong operator topology adiabatic theorem," [Rev. Math. Phys. 14 \(2002\), 569- 584. arXiv:math-ph/0110002](#)
5. M. Aizenman, R. M. Friedrich, D. Hundertmark, J. H. Schenker, "Finite-volume fractional moment criteria for Anderson localization," [Commun. Math. Phys. 224 \(2001\), 219-254. arXiv:math-ph/9910022](#)
4. B. Chen, J. H. Schenker, "Molecular dynamics simulations of gases using a split-Hamiltonian method," [Appl. Num. Math. 38 \(2001\), 21-48.](#)
3. M. Aizenman, J. H. Schenker, "The creation of spectral gaps by graph decoration," [Lett. Math. Phys. 53 \(2000\), 253-262. arXiv:math-ph/0008013](#)
2. M. Aizenman, R. M. Friedrich, D. Hundertmark, J. H. Schenker, "Constructive fractional-moment criteria for localization in random operators," [Phys. A 279 \(2000\), 369-377. arXiv:math-ph/0001035](#)
1. J. H. Schenker, J. W. Swift, "Observing the symmetry of attractors," [Phys. D 114 \(1998\), 315-337. arXiv:chao-dyn/9706009](#)

POSTDOCTORAL AND STUDENT ADVISEES

(current position shown where known for Postdocs and Graduate Students)

- POSTDOCS**
- [Matthew Cha](#), MSU 2017-2019, Quantum Computing Scientist at General Atomics, San Diego CA
 - [Shiwen Zhang](#), MSU 2017-2019, Assistant Professor, U. Massachusetts Lowell
 - [Rajinder Mavi](#), MSU 2015-2019
 - [Jeremy Clark](#), MSU 2012-2104, Associate Professor at U. Mississippi
 - [Eman Hamza](#), MSU 2008-2009, Lecturer at Cairo U., Egypt
 - [Yang \(Charles\) Kang](#), MSU 2007-2010, Lecturer at Kennesaw State U., Georgia
- GRADUATE STUDENTS**
- [Eloy Moreno-Nadales](#), MSU 2022-
 - [Owen Ekblad](#), MSU 2022-
 - [Lubashan Pathirana Karunarathna](#), MSU 2020-
 - [Jacob Gloe](#), MSU 2019-2023
 - [Rodrigo Matos](#), MSU 2016-2020, postdoc at Texas A&M
 - Zak Tilocco, MSU 2015-2020, Bank of America, Chicago
 - [Bernard Clark Musselman](#), MSU 2009-2012, Associate Teaching Professor at U. Washington Bothell

UNDERGRADUATE RESEARCHERS David Lingan, Spring 2022, MTH REU-Exchange
Samuel Sottile, Spring 2022, MTH REU-Exchange
Jenny Zhan, Spring 2022, MTH REU-Exchange
Xiangshou Kong, Spring 2022, MTH REU-Exchange
[Kelly Barnes](#), Summer 2019, SURIEM REU
[Nathan Gaby](#), Summer 2019, SURIEM REU
[Ben Zeman](#), Summer 2019, SURIEM REU
[Alejandro Becerra](#), Summer 2018, SURIEM REU
[Tait Weicht](#), Summer 2018, SURIEM REU
Jacob Stamm, Spring 2018, MTH REU-Exchange
[Aaron Bawol](#), Spring 2018, MTH REU-Exchange
Jingwan Liao, Spring 2018, MTH REU-Exchange
[Mark Landry](#), 2017-2019, Professorial Assistant
[Priyanga Ganesan](#), 2015, S.N.S. Bose Scholar
[David Wegscheid](#), 2012-2013, Professorial Assistant
[Eric Bates](#), 2010-2012, Professorial Assistant
[Trevor Steil](#), 2010- 2012, Professorial Assistant
[Matthew Meyer](#), 2009-2012, Professorial Assistant

CONFERENCES CO-ORGANIZED

Special Session *Mathematical Challenges in Complex Quantum Systems*, AMS-SMF-EMS joint international meeting, Grenoble France, July 2022
Great Lakes Mathematical Physics meeting, East Lansing MI, June 2022
BIRS workshop Probability and Quantum Information Science, March 2022 (online)
Great Lakes Mathematical Physics meeting, East Lansing MI, June 2021 (online)
Seminar on Stochastic Processes 2020, East Lansing MI, March 2020
Special Session *Spectral and Transport Properties of Disordered Systems* at Joint Meetings of the AMS, Denver CO, 15-18 January 2020
Great Lakes Mathematical Physics Meeting, Oberlin OH, June 2019
Special session *Localization and Delocalization for Disordered Quantum Systems* at Joint Math Meetings of the AMS, Baltimore MD, 16-19 January 2019
Great Lakes Mathematical Physics meeting, East Lansing MI, June 2018
Special session *Spectral Theory, Disorder and Quantum Physics* at Joint Math Meetings of the AMS, San Diego CA, 11-13 January 2018
Great Lakes Mathematical Physics meeting, East Lansing MI, June 2017
Great Lakes Mathematical Physics meeting, East Lansing MI, June 2016
Midwest PDE Seminar, East Lansing MI, 21-22 November 2015
MSU-IMTP summer school Current topics in Mathematical and Theoretical Condensed Matter Physics, MSU, 17-21 August 2015
Special session *Spectral Theory, Disorder and Quantum Many Body Physics* at AMS regional meeting, East Lansing MI, 14-15 March 2015
Special session *Spectral and transport properties of Schrodinger operators* at AMS regional meeting, Lexington KY, 27-28 March 2010

RECENT INVITED LECTURES

- At Mathematical Challenges in Quantum Physics, Princeton Center for Theoretical Science, 20-23 March 2023: "Theory of Ergodic Quantum Processes"
- At AMS SE Sectional Meeting, Georgia Tech, 18-19 March 2023: "Fredholm Homotopies for Strongly-Disordered 2D Insulators"
- At QMATH 15, Davis CA, 12-16 September 2022: "Localization for Gaussian Random Band Matrices up to W "
- At New Directions in Disordered Systems, Cergy Paris University, 27 June - 1 July 2022: "Theory of Ergodic Quantum Processes"
- Princeton University Mathematical Physics Seminar, 5 October 2020: "Theory of Ergodic Quantum Processes"
- At Random Schrödinger operators, and related topics, Villa Finaly, Florence Italy, 17-21 February 2020: "An ergodic theorem for homogeneously distributed quantum channels with applications to matrix product states"
- Virginia Tech Mathematics Colloquium, 14 October 2019: "Quantum Diffusion and Dissipative Transport in disordered systems"
- Harvard University Random Matrix & Probability Seminar, 25 September 2019: "An ergodic theorem for homogeneously distributed quantum channels with applications to matrix product states"
- At Workshop: Many-body theory, random operators & matrices, Institut Mittag-Leffler, Sweden, 8-12 April 2019: "Localization (and resonant delocalization?) for a disordered polaron"
- At Random Physical Systems, Puerto Natales, Chile, 11-15 December 2018: "How big is a lattice point? (or random walks and applied chemical ecology)"
- At Workshop: Spectral Theory of Quasi-Periodic and Random Operators, CRM Montreal, 12-16 November 2018: "Quantum diffusion in fluctuating media"
- University of Notre Dame Applied Math Seminar, 8 November 2018: "Random Walk Models and Applied Chemical Ecology or How big is a lattice point?"
- At Workshop: Quantum Information and Quantum Statistical Mechanics, CRM Montreal, 15-19 October 2018: "Localization (and resonant delocalization?) for a disordered polaron"
- University of Colima Faculty of Sciences Colloquium, Colima Mexico, 27 September 2018: "Random Walk Models and Applied Chemical Ecology, or how big is a lattice point?"
- At 119th Statistical Mechanics Conference, Rutgers, 6-8 May 2018: "Localization (and resonant delocalization?) of a disordered polaron."
- University of Wyoming Mathematics Colloquium, 29 March 2018: "Wave Diffusion in Random Media."
- At Arizona School of Analysis and Mathematical Physics, Tucson, 5-9 March 2018: "Localization, and resonant delocalization, of a disordered polaron."
- At Mathematical Congress of the Americas, Montreal, 24-28 July 2017: "Localization in disordered polaron models"
- At Nuclear and Mesoscopic Physics V, MSU, 6-10 March 2017: "Dissipative transport in the localized regime"