Jeffrey Schenker — Curriculum Vitae

Contact Department of Mathematics
Wells Hall
619 Red Cedar Road
East Lansing, MI 48824

tel: (517)-432-3590
fax: (517) 432-1562
jeffrey@math.msu.edu
http://math.msu.edu/~jeffrey

Current Position

Professor and Director of the MSU-Institute for Mathematical and Theoretical Physics at Michigan State University

Employment

Professor, Michigan State University, East Lansing, 2016-present
Associate Professor, Michigan State University, East Lansing, 2010-2016
Assistant Professor, Michigan State University, East Lansing, 2007-2010
NSF postdoctoral fellow and Member, Institute for Advanced Study, Princeton, 2005-2007
Postdoctoral fellow, ETH Zürich, Switzerland, 2003-2005
NSF postdoctoral fellow, University of California Irvine, 2002-2003

Education

Princeton University: Ph.D. (2002) and M. A. (1999) in Mathematics
University of Wyoming: M.S. in Applied Mathematics (1998), B.S. with honors in Mathematics (1996), B.S. in Physics and B.A. with honors in Chemistry (1995)

Visiting Positions

Visiting Fellow, Isaac Newton Institute, Cambridge, England, May 2015
Member, Institute for Advanced Study, Princeton NJ, September, 2013 - August 2014
Visiting Professor, Bernoulli Institute, Lausanne, Switzerland, May - July 2010
Visiting Professor, U. Paris-Nord 13, France, May - June 2009 and July 2010
Visiting Fellow, Isaac Newton Institute, Cambridge, England, August 2008

External Funding

NSA Award “The Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)”, May 2016-May 2017, $85,000 (Co-PI)
NSF Award DMS-1500386 “Quantum Diffusion in Fluctuating Media”, August 2015-July 2018, $120000
NSF Award DMS-1411411 “Interpreting Data from Trapping of Stochastic Movers”, August 2014-July 2017, $180000
NSF FRG Award DMS-0968360 “Collaborative Research: Modeling, Computation, and Analysis of Optical Responses of Nano-Structures”, May 2010-January 2015, $225000 (Co-PI)
NSF CAREER Award DMS-08446325 “CAREER: Analysis of disordered systems”, July

2009-September 2015, $479082

Awards, Fellowships and Honors

NSF CAREER Award DMS-08446325, 2009-2014
J. Sutherland Frame Excellence in Teaching Award, 2009
MSU Intramural Research Grant 07-IRGP-1192, 2008-2009
NSF postdoctoral fellowship, 2002-2006
NSF graduate fellowship, 1997-2000
Phi Beta Kappa, 1995
National Merit Scholar, 1991-1995

Students and Postdocs Advised

Rajinder Mavi, Postdoc, MSU 2015-
Zak Tilocco, Ph.D. student, MSU 2015-
Priyanga Ganesan, S.N.S. Bose Scholar, MSU 2015
Jeremy Clark, postdoc, MSU 2012-2104
Bernard Clark Musselman, Ph. D. student, MSU 2009-2012
David Wegscheid, professorial assistant, MSU 2012-2013
Eric Bates, professorial assistant, MSU 2010-2012
Trevor Steil, professorial assistant, MSU 2010- 2012
Matthew Meyer, professorial assistant, MSU 2009-2012
Yang Kang, postdoc, MSU 2007-2010
Eman Hamza, postdoc, MSU 2008-2009
Samuele Chiesa, diploma student, ETH 2004-2005

Service

Director of the MSU-Institute for Mathematical and Theoretical Physics
Associate Editor for Scientific Reports, published by Nature, 2014-
Regular referee for numerous journals in mathematics and mathematical physics, including Annales Henri Poincairé, Communications in Mathematical Physics, Journal of Functional Analysis, Journal of Statistical Physics, Letters in Mathematical Physics, Journal of Physics A, GAFA, Probability Theory and Random Fields, Electronic Journal of Probability, Journal of Spectral Theory

Seminars Organized

Mathematical Physics and Gauge Theory, twice weekly seminar series on topics in Mathematics and Physics, 2014-
Quantifying Uncertainty: Probability, Entropy and Disorder, Interdisciplinary seminar series, 2014-2015
Co-organizer for *Science at the Edge* seminar series, 2008-2010

Conferences Organized

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

Committees

Mathematics Personnel Committee 2016-2017
Mathematics Advisory Committee 2010-2012, 2014-2016
Mathematics Graduate Studies Committee 2014-2016
Mathematics hiring committee, 2012-2013
Mathematics undergraduate studies committee, 2012-2013
University committee on liberal learning, 2011-2012
Ad-hoc committee for mathematics undergraduate curriculum reform, 2009-2010
Mathematics colloquium committee, 2008-2010

Teaching (at Michigan State University, U=undergrad, G=graduate)

Fall 2016:	Intro to Advanced Analysis (U)
Spring 2016:	Statistical Mechanics (G)
Fall 2015:	Real Analysis (G)
Spring 2015:	Functional Analysis (G), Advanced Track Analysis II (U)
Fall 2014:	Intro to Advanced Analysis (U), Transitions to Higher Mathematics (U)
Summer 2013:	Transitions to Higher Mathematics (U)
Spring 2013:	Advanced Track Analysis II (U), Math of Quantum Mechanics (U)
Fall 2012:	Real Analysis II (G)
Summer 2012:	Percolation (G)
Spring 2012:	Advanced Track Analysis II (U)
Fall 2011:	Intro to Advanced Analysis (U), Real Analysis I (G)
Spring 2011:	Honors Analysis II (U), Complex Analysis I (G)
Fall 2010:	Honors Analysis I (U)
Spring 2010:	Complex Analysis II (G), Order from Disorder, the mathematics of statistical mechanics and phase transitions. (U)
Fall 2009:	Honors Calculus II (U)
Spring 2009:	Analysis II (U), Complex Analysis I (G)

Fall 2008: Functional Analysis II (G)
Spring 2008: Functional Analysis I (G)

Manuscripts in preparation and under review

R. Mavi, J. Schenker, "Localization in the Disordered Holstein model," in preparation.

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," submitted. Draft available on request.

R. Peled, J. Schenker, M. Shamis, S. Sodin "On the Wegner N-orbital model," arxiv.org:1608.02922, submitted.

M. Aizenman, R. Peled, J. Schenker, M. Shamis, S. Sodin "Matrix regularizing effects of Gaussian perturbations," arXiv:1509.01799, submitted.

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.

Papers

29. J. Clark, J. Schenker, "Spectral analysis of a family of symmetric, scale-invariant diffusions with singular coefficients and associated limit theorems," To appear in Lat. Am. J. Prob. Stat. 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," Comm. 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, Proceeding 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

Invited lectures, including seminars, colloquia and lectures at conferences

Mathematical Physics Seminar, Princeton Univeristy, 8 March 2016: “Localization in the disordered Holstein model”

Analysis and PDE Seminar, University of Kentucky, 10 November 2015: “Phonons, disorder, and transport”

At *Random and other ergodic problems*, Isaac Newton Institute, Cambridge, England, 22-26 June 2015: “Dissipative transport in the localization regime”

At *Quantum many-body systems, random matrices, and disorder*, Erwin Schrödinger Institut, Vienna, Austria, 8-12 June 2015: “Dissipative transport in the localized regime”

Isaac Newton Institute seminar, 20 May 2015: “Dissipative transport in the localization regime”

IAS Nonequilibrium Dynamics and Random Matrices Seminar, 26 November 2013: “Diffusion for the (Markov) Anderson model”

At *Mathematical Physics of Disordered Systems*, FernUniversität Hagen, Germany, 13-17 May 2013: “Diffusion of waves in fluctuating random media”

Applied Mathematics Seminar, University of Illinois at Chicago, 14 November 2012: “Diffusion of waves in fluctuating media”

At AMS Western Section Meeting, special session *Mathematical Physics: Spectral and Dynamical Properties of Quantum Systems*, Tucson, Arizona, 27-28 October 2012:

"Diffusion of waves in fluctuating media"

Mathématiques des systèmes quantiques désordonnés, Université Paris 13, 28-30 May 2012: "Diffusion of waves in a random environment: problems and results"

Mathematics and Statistics Department Faculty Seminar, Williams College, 3 May 2012: "The Problem of Quantum Diffusion"

Mathematical Physics seminar, Princeton University, 29 March 2012: "Diffusion of wave packets for the Markov Schroedinger equation"

At *The Arizona School of Analysis and Mathematical Physics*, University of Arizona, 12-16 March 2012: "Diffusion of waves in a random environment: problems and results"

At *Correlations and Interactions for Random Quantum Systems*, Oberwolfach, Germany, 23-29 October 2011: "Diffusion for Markov Random Schrödinger equations"

At *4th La Pietra week in Probability at Finaly*, Firenze, Italy, 13-17 June 2011: "Diffusion for Waves in Random Media: Problems and Results"

At AMS Central Sectional Meeting, special session *Spectral Theory*, Iowa City, Iowa, 18-20 March 2011: "Diffusion of wave packets in a fluctuating random potential"

At *Probability Theory, Statistical Physics and Applications*, NYU Abu Dhabi, Abu Dhabi, 16-20 January 2011: "Diffusion for Waves in Random Media: Problems and a Few Results"

Mathematical Physics seminar, University of Texas, 4 May 2011: "Diffusion of waves in a random environment: problems and results"

Stulken Geometry-Analysis seminar, Rice University, 3 May 2011: "Eigenvector localization for random band matrices with power law band width"

University of Colorado probability seminar, 3 February 2011: "Eigenvector localization for random band matrices with power law band width"

University of Alabama at Birmingham mathematics colloquium, 8 October 2010: "Diffusion of waves in a random environment: problems and results"

Bernoulli Center seminar, EPF Lausanne, Switzerland, 15 June 2010: "Eigenvector localization for random band matrices with power law band width"

At First joint meeting of the Sociedad de Matematica de Chile (SOMACHI) and the AMS, special session *Spectral Theory and Mathematical Physics*, Santiago, Chile, 15-18 December 2010: "Diffusion of waves in a random media: problems and results"

At *Electronic Transport in Disordered Media*, U. Cergy-Pontoise, 28 June 2010: "Eigenvector localization for random band matrices with power law band width"

At *Random Schrödinger Operators*, Centre Interfacultaire Bernoulli, 31 May - 4 June 2010: "Diffusion of waves in a random environment: problems and results"

Harvard University probability seminar, 8 April 2010: "Eigenvector localization for

random band matrices with power law bandwidth”

At *Western States Mathematical Physics Meeting*, Caltech, Pasadena CA, 15-16 Feb 2010: “Diffusion of waves in a random environment: problems and results”

University of Toronto probability seminar, 18 January 2010: “Eigenvector localization for random band matrices with power law band width”

University of Toronto PDE/applied math/analysis seminar, 15 January 2010: “Diffusion of waves in a random environment: problems and results”

University of Arizona mathematics colloquium, 1 October 2009: “Diffusion of waves in random media: results and problems”

At *Mathematics of Complex Quantum Systems*, Oberwolfach, Germany, 30 August - 5 September 2009: “Diffusion of wave packets in a Markov random potential”

At *Open Quantum Systems*, ETH Zürich, Switzerland, 8-12 June 2009: “Diffusion of wave packets in a Markov random potential”

Columbia University probability seminar, 1 April 2009: “Eigenvector localization for random band matrices with power law band width”

University of Wisconsin analysis seminar, 9 December 2008: “Diffusion of wave packets in a Markov random potential”

At *Anderson Localization and Related Phenomena*, Isaac Newton Institute, Cambridge, England, 18-22 August 2008: “Diffusion of wave packets in a Markov random potential”

Isaac Newton Institute seminar, 13 August 2008: “Localisation for random band matrices”

At *Current Topics in Mathematical Physics*, Erwin Schrödinger Institut, Vienna, Austria, 21-31 July 2008, mini-course: “On random Schroedinger operators”

MSU Science at the Edge seminar, 18 January 2008: “The mathematics of currents occurring in the quantum Hall effect”

MSU Statistics colloquium, 8 January 2008: “Localization for random band matrices”

University of Chicago applied math and PDE seminar, 9 May 2007: “Estimating the real part of complex eigenvalues of non-self adjoint Schrödinger operators via complex dilations”

McGill University analysis Seminar, 3 May 2007: “Estimating the real part of complex eigenvalues of non self-adjoint Schroedinger operators via complex dilations”

At *Transport in Multi-Dimensional Random Schrödinger Operators*, Oberwolfach, Germany, 4-10 March 2007: “Spectral Statistics and Localization of Eigenfunctions in Random Band Matrices”

IAS Mathematical Physics Seminar, 10 November 2006: “Random Band Matrices”

At *International Congress of Mathematical Physics*, Rio de Janeiro, Brazil, 6-11 August 2006: “Equality of the edge and bulk Hall conductances in a mobility gap”

At *Stochastic Processes in Mathematical Physics*, Florence, Italy, 19-23 June 2006:

"Eigenfunction localization for random band matrices"

MIT PDE/analysis Seminar, 1 March 2006: "Edge and bulk currents in 2D disordered magnetic systems"

University of Minnesota probability seminar, 24 February 2006: "Limit theorems for moments of random matrices with correlated entries"

IAS Mathematical Physics seminar, 20 February 2006: "Edge and Bulk Currents in 2D Disordered Magnetic Systems"

University of Colorado Boulder Kempner colloquium, 18 January 2006: "Edge and bulk currents in 2D disordered magnetic systems"

University of Toronto PDE/applied math/analysis seminar, 7 November 2005: "Wave propagation in random media: dynamical localization for a many particle system with mean field interaction."

Princeton University mathematical physics seminar, 3 October 2005: "Dynamical localization for an ensemble of fermions with Hartree-Fock interactions at positive temperature"

At *Recent Advances in Schrodinger Operator Theory*, Banff International Research Station, Banff, Canada, 17-25 September 2005: "A first step toward localization for interacting electrons: weak Hartree-Fock interactions at large disorder and positive temperature"

Georgia Tech mathematical physics seminar, 2 March 2005: "Waves in random media: localization and a bound for the density of states inside a band"

At *Open Quantum Systems*, Erwin Schrödinger Institut, Vienna, Austria, 14-18 March 2005: "Equality of the edge and bulk Hall conductances in a mobility gap"

University of Erlangen mathematical physics seminar, 11 November 2004: "Equality of the edge and bulk Hall conductances in a mobility gap"

Spectral Theory of Schrödinger Operators, Centre de Research Mathématiques, Montréal, Canada, 26-30 July 2004: "Inequality of the (naive) edge and bulk Hall conductance in 2D"

At *Operator Theory and Applications in Mathematical Physics*, Bedlewo, Poland, 6-11 July 2004: "Spectral theory of time dispersive and dissipative systems"

At *Mathematics and Physics of Disordered Systems*, Oberwolfach, Germany, 2-8 May 2004: "Equality of the edge and bulk Hall conductance in 2D localized quantum systems"

TU Chemnitz mathematics colloquium, 5 February 2004: "Moment analysis for localization in random Schrödinger operators"

LMU Münich applied math Seminar, 12 December 2003: "Moment analysis for localization in random Schrödinger operators"

At *Transport in Quantum Systems*, Lille, France, 23-25 June 2003: "Adiabatic charge transport and the Kubo formula for 2D Hall conductance"

At *Western States Mathematical Physics Meeting*, Caltech, Pasadena CA, 17-18 Feb 2003: “Moment analysis of localization for random Schrödinger operators”

Caltech mathematical physics seminar, 6 February 2002: “A strong operator topology adiabatic theorem”

Caltech mathematical physics seminar, 4 December 2001: “Fractional-moment methods for localization in the continuum”