

Matthew J. Hirn

Michigan State University
428 South Shaw Lane
East Lansing, Michigan 48824
United States

phone: +1 (517) 432-0611

email: mhirn@msu.edu

URL: matthewhirn.com

RESEARCH INTERESTS

Pure, applied, and computational harmonic analysis; data science; machine learning

- Mathematical foundations of deep learning (scattering transforms, convolutional neural networks, generative models)
- Machine learning and multiscale physics (quantum chemistry, materials science, turbulence)
- Geometric and graphical models for high dimensional data analysis (manifold learning, graph learning, geometric deep learning, biomedical data)
- Smooth extension, interpolation, and regression of data, with efficient algorithms (Whitney extensions, statistical learning theory)

POSITIONS HELD

- *Assistant Professor*, Michigan State University
Department of Computational Mathematics, Science & Engineering
Department of Mathematics
2015 – Present
- *Postdoctoral Researcher*, École normale supérieure
Department of Computer Science
Mentor: Stéphane Mallat
2013 – 2015
- *Postdoctoral Associate*, Yale University
Department of Mathematics, Program in Applied Mathematics
Mentor: Ronald R. Coifman
2009 – 2013

EDUCATION

- *PhD in mathematics*, University of Maryland, College Park
Advisors: John J. Benedetto, Kasso Okoudjou
2004 – 2009
- *BA in mathematics*, Cornell University
Advisor: Robert Strichartz
2000 – 2004

AWARDS & HONORS

N.B. Some of these awards come with financial support; these monetary details are listed in the following section on Grants & Funding.

- [NSF CAREER](#) (2019) [15% awarded across all of mathematics]
- [DARPA Director's Fellowship](#) (2018) [7 awarded from the 27 Young Faculty Awards]
- [Kavli Fellow](#) (2017) [awarded by the National Academy of Sciences]
- [Alfred P. Sloan Fellowship in Mathematics](#) (2016) [20 awarded in mathematics]
- [DARPA Young Faculty Award](#) (2016) [27 awarded across applied science and engineering]
- [Ann G. Wylie Dissertation Fellowship](#) (2009) [awarded by the University of Maryland]

GRANTS & FUNDING

- [NSF #1845856](#) (CAREER)
\$400,000 (2019 – 2024) [single PI]
- [DARPA #D16AP00117](#) (Young Faculty Award + Director's Fellowship)
\$744,297 (2016 – 2019) [single PI]
- [Sloan Foundation #FG-2016-6607](#) (Alfred P. Sloan Fellowship)
\$55,000 (2016 – 2020) [single PI]
- [NSF #1620216](#)
\$191,775 (2016 – 2019) [single PI]
- [AMS-Simons Travel Grant](#)
\$4,000 (2012 – 2015) [single PI]

ADVISING

I am the scientific leader of the [Complex Data Analysis Research \(CEDAR\) team](#) at MSU, which currently has 8 members (the 3 postdocs and 5 graduate students listed below).

POSTDOCTORAL ADVISING

- Anna Little (CMSE, 2017–Present) [co-mentored with Yuying Xie]
- Michael Perlmutter (CMSE/Mathematics, 2017–Present) [co-mentored with Mark Iwen]
- Paul Sinz (CMSE, 2017–Present)

GRADUATE ADVISING

- Nathan Brugnone (3rd year Community Sustainability/CMSE) [co-advised with Robert Richardson]
- Xavier Brumwell (3rd year CMSE) [advisor]
- Feng Gao (5th year Plant, Soil & Microbial Sciences/CMSE) [mentor and Ph.D. committee member, but not officially (co)-advisor; advisor: Stephen Boyd]
- Jieqian He (3rd year CMSE/Statistics) [advisor]
- Ryan LaRose (2nd year CMSE/Physics) [advisor]

UNDERGRADUATE ADVISING

2018 REU project co-leader on “Machine Learning from Quantum Computing,” which was part of the [MSU ACRES REU](#). I co-mentored two students with Yue Qi:

- Muawiz Chaudhary (undergraduate at WWU)
- Nikhil Shankar (undergraduate at UM, Ann Arbor)

2013 REU project leader on “High Dimensional Data Analysis,” which was part of the Cornell University Mathematics Department REU. I mentored six students:

- Ariel Herbert-Voss (went on to graduate school at Harvard for computer science)
- Nicholas Marshall (went on to graduate school at Yale for applied mathematics)
- Frederick McCollum (went on to be an NSF graduate fellow at NYU for financial math)
- Christian Smith: (went on to graduate school at UW, Madison for sociology)
- Keyi Wu: (went on to be a software engineer at Bloomberg LP)
- Wendy Zeng: (went on to graduate school at UCSD for economics)

SHORT TERM VISITS

- *Senior Fellow*, Institute for Pure and Applied Mathematics (IPAM)
For the program on “Understanding Many-Particle Systems with Machine Learning”
2016 (fall semester)
- *Visiting Assistant Professor*, Cornell University
Department of Mathematics
Directed NSF REU on “High Dimensional Data Analysis”
2013 (summer)
- *Scientific Researcher*, Fields Institute
For the “Focus Program on Whitney Problems”
2012 (two weeks)
- *Visiting Researcher*, Institute of Research of Mathematics of Rennes
For research collaboration
2011 (three weeks)

PAPERS

Authors are listed in alphabetical order and are equal contributors (per the convention in Mathematics), unless otherwise noted as: John Smith (first author); Jane Doe[†] (principal investigator).*

PEER REVIEWED JOURNAL AND CONFERENCE PAPERS

All papers in this list are rigorously peer reviewed.

13. Feng Gao*, Guy Wolf and Matthew Hirn[†].
Geometric Scattering for Graph Data Analysis.
Proceedings of the 36th International Conference on Machine Learning, PMLR, volume 97, pages 2122–2131, 2019.

12. Nicholas F. Marshall* and Matthew J. Hirn[†].
Time-coupled diffusion maps.
Applied and Computational Harmonic Analysis, volume 45, number 3, pages 709–728, 2018.
11. Michael Eickenberg, Georgios Exarchakis, Matthew Hirn, Stéphane Mallat and Louis Thiry.
Solid Harmonic Wavelet Scattering for Predictions of Molecule Properties.
The Journal of Chemical Physics, volume 148, pages 241732-1–241732-9, 2018.
 Editor’s pick.
10. Michael Eickenberg, Georgios Exarchakis, Matthew Hirn and Stéphane Mallat.
Solid Harmonic Wavelet Scattering: Predicting Quantum Molecular Energy from Invariant Descriptors of 3D Electronic Densities.
Advances in Neural Information Processing Systems 30, pages 6540–6549, 2017.
9. Matthew J. Hirn, Stéphane Mallat, and Nicolas Poilvert.
Wavelet scattering regression of quantum chemical energies.
Multiscale Modeling and Simulation, volume 15, number 2, pages 827–863, 2017.
8. Ariel Herbert-Voss, Matthew J. Hirn, and Frederick McCollum.
Computing minimal interpolants in $C^{1,1}(\mathbb{R}^d)$.
Revista Matemática Iberoamericana, volume 33, number 1, pages 29–66, 2017.
7. Matthew J. Hirn and Erwan Le Gruyer.
A general theorem of existence of quasi absolutely minimal Lipschitz extensions.
Mathematische Annalen, volume 359, number 3-4, pages 595–628, 2014.
6. Ronald R. Coifman and Matthew J. Hirn.
Diffusion maps for changing data.
Applied and Computational Harmonic Analysis, volume 36, number 1, pages 79–107, 2014.
5. Ronald R. Coifman and Matthew J. Hirn.
Bi-stochastic kernels via asymmetric affinity functions.
Applied and Computational Harmonic Analysis, volume 35, number 1, pages 177–180, 2013.
4. Martin Ehler and Matthew J. Hirn.
Sparse endmember extraction and demixing.
 In *Proceedings of the IEEE 2012 International Geoscience and Remote Sensing Symposium*, pages 1385–1388, Munich, Germany, July 22–27, 2012.
3. Matthew J. Hirn.
The number of harmonic frames of prime order.
Linear Algebra and Its Applications, volume 432, number 5, pages 1105–1125, 2010.
2. John J. Benedetto, Wojciech Czaja, Justin C. Flake and Matthew J. Hirn.
Frame based kernel methods for automatic classification in hyperspectral data.
 In *Proceedings of the IEEE 2009 International Geoscience and Remote Sensing Symposium*, volume 4, pages 697–700, Cape Town, South Africa, July 12–17, 2009.
1. Matthew J. Hirn.
The refinability of step functions.
Proceedings of the American Mathematical Society, volume 136, number 3, pages 899–908, 2008.

OTHER CONFERENCE AND WORKSHOP PAPERS

All papers in this list are peer reviewed, but mostly for fit to the conference or workshop.

4. Xavier Brumwell*, Paul Sinz*, Kwang Jin Kim, Yue Qi and Matthew Hirn[†].
Steerable Wavelet Scattering for 3D Atomic Systems with Application to Li-Si Energy Prediction.
In *NeurIPS Workshop on Machine Learning for Molecules and Materials*, 10 pages, 2018.
Contributed spotlight talk (9 out of 49 papers).
3. Michael Perlmutter*, Guy Wolf and Matthew Hirn[†].
Geometric Scattering on Manifolds.
Extended abstract in *NeurIPS Workshop on Integration of Deep Learning Theories*, 5 pages, 2018.
Contributed spotlight talk (3 out of 40 papers).
Longer version available on [arXiv](#).
2. Tobias Welp*, Guy Wolf, Matthew Hirn and Smita Krishnaswamy[†].
A Diffusion-based Condensation Process for Multiscale Analysis of Single Cell Data.
In *ICML Workshop on Computational Biology*, 5 pages, New York, June 24, 2016.
1. John J. Benedetto, Wojciech Czaja, Martin Ehler, Justin C. Flake and Matthew J. Hirn.
Wavelet packets for multi and hyperspectral imagery.
In *Proceedings of IS&T/SPIE Electronic Imaging 2010, Wavelet Applications in Industrial Processing VII*, San Jose, California, January 2010.

EXPOSITORY PAPERS

These are invited expository articles in magazine style publications.

1. Matthew J. Hirn.
Distinguished lecture series: Assaf Naor on the Lipschitz extension problem.
Fields Notes, volume 12, number 3, page 14, Winter 2013.

PREPRINTS

All preprint papers are submitted to journals or conferences.

6. Nathan Brugnone*, Alex Gonopolskiy*, Mark Moyle, Manik Kuchroo, David van Dijk, Kevin R. Moon, Daniel Colon-Ramos, Guy Wolf[†], Matthew Hirn[†] and Smita Krishnaswamy[†].
Coarse Graining of Data via Inhomogeneous Diffusion Condensation.
Submitted, 2019.
5. Michael Perlmutter*, Feng Gao, Guy Wolf[†] and Matthew Hirn[†].
Geometric scattering networks on compact Riemannian manifolds.
Submitted, 2019.
Available on [arXiv](#).
4. Michael Perlmutter*, Jieqian He and Matthew Hirn[†].
Scattering Statistics of Generalized Spatial Poisson Point Processes.
Submitted, 2019.
Available on [arXiv](#).
3. Mathieu Andreux, Tomás Angles, Georgios Exarchakis, Roberto Leonarduzzi, Gasper Rochette, Louis Thiry, John Zarka, Stéphane Mallat, Joakim Andén, Eugene Belilovsky, Joan Bruna, Vincent Lostanlen, Matthew J. Hirn, Edouard Oyallon, Sixhin Zhang, Carmine Cella and Michael Eickenberg.
Kymatio: Scattering Transforms in Python.

Submitted, 2019.
Available on [arXiv](#).

2. Adam Gustafson, Matthew Hirn, Kitty Mohammed, Hariharan Narayanan and Jason Xu.
Structural Risk Minimization for $C^{1,1}(\mathbb{R}^d)$ Regression.
Submitted, 2018.
Available on [arXiv](#).
1. Kevin R. Moon*, David van Dijk*, Zheng Wang*, Scott Gigante, Daniel Burkhardt, William Chen, Antonia van den Elzen, Matthew J Hirn, Ronald R Coifman, Natalia B Ivanova, Guy Wolf† and Smita Krishnaswamy†.
Visualizing Transitions and Structure for Biological Data Exploration.
Submitted, 2018.
Available on [bioRxiv](#).

UNPUBLISHED PAPERS AND TECHNICAL REPORTS

4. A. Tkatchenko*, M. Afzal, C. Anderson, T. Baker, R. Banisch, S. Chiama, C. Draxl, M. Haghhighatlari, F. Heidar-Zadeh, M. Hirn, J. Hoja, O. Isayev, R. Kondor, L. Li, Y. Li, G. Martyna, M. Meila, K.S. Ruiz, M. Rupp, H. Saucedo, A. Shapeev, M. Stöhr, K. R. Müller†, S. Shankar†.
IPAM Program on Machine Learning & Many-Particle Systems - Recent Progress and Open Problems.
[Report for the Institute for Pure and Applied Mathematics \(IPAM\)](#), 2017.
3. Matthew J. Hirn, Nicolas Poilvert, and Stéphane Mallat.
Quantum Energy Regression using Scattering Transforms.
[arXiv:1502.02077](#), 2015.
2. Matthew J. Hirn.
Algorithms for computing the optimal Lipschitz constant of interpolants with Lipschitz derivative.
[arXiv:1307.3292](#), 2013.
1. Matthew J. Hirn and David Widemann.
Frames for subspaces of \mathbb{C}^n .
[arXiv:1410.5206](#), 2007.

TALKS

All listed talks are invited.

CONFERENCE AND WORKSHOP

33. [SPIE Wavelets and Sparsity XVIII.](#)
Session on Applications of Frames and Transforms in Neural Networks.
Geometric wavelet scattering transforms on graphs and manifolds.
August 14, 2019
32. [Fitting Smooth Functions to Data.](#)
University of Texas at Austin.
Title and date TBA.

31. [International Congress on Industrial and Applied Mathematics.](#)
Mini-symposium on Molecular simulation: dynamics, statistics, learning, and high performance computing.
Universitat de València.
Statistically Robust Multi-Reference Alignment with Wavelet Invariants.
July 16, 2019
30. [International Congress on Industrial and Applied Mathematics.](#)
Mini-symposium on Machine Learning for Materials.
Universitat de València.
Learning Material Properties with Multiscale Wavelet Scattering Transforms.
July 15, 2019
29. [Third International Conference on Mathematics of Data Science.](#)
City University of Hong Kong.
Learning on graphs and manifolds with geometric wavelet scattering transforms.
June 22, 2019
28. [Understanding Many-Particle Systems with Machine Learning 2nd Reunion.](#)
Institute for Pure and Applied Mathematics, UCLA.
Learning with Wavelet Scattering Transforms: Recent Results and Future Directions.
June 12, 2019
27. [Scientific Computing Across Scales: Quantum Systems in Cold-matter Physics and Chemistry.](#)
Fields Institute, University of Toronto.
Multiscale Machine Learning for Quantum Many Particle Physics with Wavelet Scattering Transforms.
April 23, 2019
26. [AMS Sectional Meeting.](#)
Special Session on Extensions-Interpolation-Shape Matching in \mathbb{R}^d , Symmetry-Invariance, Algorithms and Related Topics.
University of Michigan.
Fitting Smooth Functions to High Dimensional Data.
October 21, 2018
25. [Understanding Many-Particle Systems with Machine Learning 1st Reunion.](#)
Institute for Pure and Applied Mathematics, UCLA.
Solid Harmonic Wavelet Scattering for Prediction of Molecular Properties.
June 14, 2018
24. [Understanding Many-Particle Systems with Machine Learning 1st Reunion.](#)
Institute for Pure and Applied Mathematics, UCLA.
Introduction to Understanding Many-Particle Systems with Machine Learning (evening lecture).
June 11, 2018
23. [7th International Conference on Computational Harmonic Analysis.](#)
Vanderbilt University.
Multiscale machine learning for many particle physics with wavelet scattering transforms.
May 15, 2018
22. [The Mathematics of Deep Learning.](#)
Institute for Advanced Study, Hong Kong University of Science and Technology.

Three dimensional deep learning and many body physics.
January 8, 2018

21. [Geometry and Topology of Data.](#)
Institute for Computational and Experimental Research in Mathematics, Brown University.
Transferring diffusion based manifold learning to trajectories and time varying data.
December 11, 2017
20. [Big Data driven Materials Science.](#)
Centre Européen de Calcul Atomique et Moléculaire, EPFL.
Solid Harmonic Wavelet Scattering.
September 11, 2017
19. [The 9th Applied Inverse Problems Conference.](#)
Session on Inverse Problems and Low Complexity Models.
Zhejiang University.
Deep Wavelet Scattering: Towards Mathematical Understanding of Convolutional Networks through Physics, Probability and Manifolds.
June 1, 2017
18. [First International Conference on Mathematics of Data Science.](#)
Hong Kong Baptist University.
Learning Many Body Physics with Multiscale, Multilayer Machine Learning Architectures.
March 20, 2017
17. [Understanding Many-Particle Systems with Machine Learning Culminating Workshop.](#)
Institute for Pure and Applied Mathematics, UCLA.
Scattering Transform Kernels.
December 13, 2016
16. [Understanding Many-Particle Systems with Machine Learning Tutorials.](#)
Institute for Pure and Applied Mathematics, UCLA.
Wavelet Tutorial, Part II.
September 14, 2016
15. [Understanding Many-Particle Systems with Machine Learning Tutorials.](#)
Institute for Pure and Applied Mathematics, UCLA.
Wavelet Tutorial, Part I.
September 13, 2016
14. [Understanding Many-Particle Systems with Machine Learning Opening Day.](#)
Institute for Pure and Applied Mathematics, UCLA.
Multiscale Machine Learning.
September 12, 2016
13. [The 11th American Institute of Mathematical Sciences \(AIMS\) Conference on Dynamical Systems, Differential Equations and Applications.](#)
Special Session on Harmonic Analysis and Partial Differential Equations.
Orlando, Florida.
Deep Wavelet Scattering for Quantum Energy Regression.
July 1, 2016
12. [American Physical Society March Meeting 2016.](#)
Session on Predicting and Classifying Materials via High-Throughput Databases and Machine Learning.

- Baltimore, Maryland.
Deep Wavelet Scattering for Quantum Energy Regression (invited talk for the session).
 March 15, 2016
11. [8th Whitney Problems Workshop](#).
 CIRM, Luminy, France.
Computing Minimal Interpolants in $C^{1,1}(\mathbb{R}^d)$ (with A. Herbert-Voss and F. McCollum).
 October 22, 2015
 10. [PASC15 Conference](#).
 Minisymposium on Big Data Analytics for Novel Materials Discovery.
 ETH Zürich.
Quantum Energy Regression by Scattering Transforms.
 June 1, 2015
 9. [Foundations of Computational Mathematics Conference 2014](#).
 Workshop A2: Computational Harmonic Analysis, Image and Signal Processing.
 Universidad de la República.
High dimensional learning rather than computing in quantum chemistry.
 December 12, 2014
 8. [5th International Conference on Computational Harmonic Analysis](#).
 Vanderbilt University.
Minimal $C^{1,1}$ extensions.
 May 23, 2014
 7. [Statistics, Mathematics, and Applications Conference](#).
 Fréjus, France.
Diffusion maps for changing data.
 September 3, 2013
 6. [Workshop on Whitney type extension and trace problems](#).
 Fields Institute, University of Toronto.
A general theorem of existence of quasi absolutely minimal Lipschitz extensions.
 August 28, 2012
 5. [Operator Algebras, Frames, and Undergraduate Research: A Conference in Honor of the 70th Birthday of David R. Larson](#).
 Texas A&M University.
Diffusion maps for changing data.
 July 21, 2012
 4. [Fourth Whitney Problems Workshop](#).
 College of William and Mary.
Wells' construction of interpolants in $C^{1,1}(\mathbb{R}^n)$.
 August 4, 2011
 3. [Mini-Conference in Harmonic Analysis on the Occasion of John Benedetto's 70th Birthday](#).
 University of Maryland, College Park.
Harmonic frames of prime order.
 August 21, 2009
 2. [Recent Advances in Harmonic Analysis and Elliptic Partial Differential Equations](#).
 University of Virginia.

Frame based kernel methods for hyperspectral imagery data.
May 9, 2009

1. [Graduation Conference 2009](#)
University of Maryland, College Park.
Frame based kernel methods for hyperspectral imagery data.
May 1, 2009

SEMINAR

24. [Michigan State University.](#)
NSCL/FRIB Nuclear Theory Seminar.
Machine Learning for Quantum Many-Particle Physics.
November 13, 2018
23. [Michigan State University.](#)
ACRES REU Seminar Series.
Computational Harmonic Analysis and Data Science.
June 6, 2018
22. [RWTH-Aachen University.](#)
Center for Computational Engineering Science Seminar.
Multiscale Machine Learning and Many Body Physics.
September 18, 2017
21. [Shanghai Jiao Tong University.](#)
Applied Math Seminar.
Multiscale Machine Learning and Many Body Physics.
June 6, 2017
20. [Johns Hopkins University.](#)
Data Analysis Seminar.
Learning Many Body Physics with Multiscale, Multilayer Machine Learning Architectures.
March 8, 2017
19. [Michigan State University.](#)
Physical Chemistry Seminar.
High Dimensional Learning Rather than Computing in Quantum Chemistry.
November 17, 2015
18. [Michigan State University.](#)
Computer Science and Engineering Lecture Series.
High Dimensional Learning Rather than Computing in Quantum Chemistry.
October 9, 2015
17. [Michigan State University.](#)
Applied Math Seminar.
Quantum Energy Regression by Scattering Transforms.
September 11, 2015
16. [University of Minnesota.](#)
Mathematics Colloquium.
Interpolation for Physical Big Data.
February 26, 2015

15. [City College of New York](#).
Mathematics Colloquium.
Interpolation for Physical Big Data.
February 18, 2015
14. [Yale University](#).
Applied Mathematics Seminar.
High Dimensional Learning rather than Computing in Quantum Chemistry.
February 4, 2015
13. [Michigan State University](#).
Mathematics Colloquium.
Interpolation for Physical Big Data.
January 16, 2015
12. [Institut Henri Poincaré](#).
Analyse non-linéaire et EDP seminar.
Minimal $C^{1,1}$ Extensions.
April 15, 2014
11. [École normale supérieure](#).
Sierra group meeting.
Diffusion based manifold learning (joint talk with Guy Wolf).
October 23, 2013
10. [Cornell University](#).
REU Smorgasbord Seminar.
Diffusion geometry for high dimensional data.
July 3, 2013
9. [Yale University](#).
Analysis Seminar.
Quasi absolutely minimal Lipschitz extensions.
February 21, 2013
8. [Cornell University](#).
Analysis Seminar.
New developments in the theory of absolutely minimal Lipschitz extensions.
December 3, 2012
7. [Kansas State University](#).
Mathematics Colloquium.
Diffusion maps for changing data.
November 29, 2012
6. [University of Houston](#).
Image Analysis Seminar.
Diffusion maps for changing data.
November 5, 2012
5. [Vanderbilt University](#).
Computational Analysis Seminar.
Diffusion maps for changing data.
October 17, 2012

4. [University of Maryland](#).
Norbert Wiener Center Seminar.
Diffusion maps for changing data.
October 2, 2012
3. [Bell Labs](#).
Mathematics Colloquium and Informal Seminar.
Diffusion maps for changing data.
July 26, 2012
2. [Duke University](#).
Applied Mathematics Seminar.
Diffusion maps for changing data.
January 23, 2012
1. [École Normale Supérieure de Cachan, Antenne de Bretagne, France](#).
Groupe de travail “applications des mathématiques,”
Minimal interpolants in $C^{1,1}(\mathbb{R}^n)$.
December 7, 2011

SOFTWARE

3. [ScatNet-QM-2D](#)
Matthew Hirn, Stéphane Mallat, and Nicolas Poilvert.
Primary developer and author.
2016.
2. [C-1-1-Interpolation](#)
Frederick McCollum and Matthew Hirn.
Supervisor and secondary author.
2014 – 2016.
1. [ScatNetLight](#)
Edouard Oyallon and Matthew Hirn.
Contributor.
2015 – 2016.

TEACHING

MICHIGAN STATE UNIVERSITY

- [CMSE 201: Introduction to Computational Modeling](#).
Flipped class. Spring 2016 was the first time the course ran.
Spring 2016, Fall 2018
- [MATH 994-003: Computational Harmonic Analysis and Data Science](#).
Topics level graduate course that I developed.
Spring 2018
- [CMSE 820: Mathematical Foundations of Data Science](#).
New qualifying exam course for the Department of Computational Mathematics, Science & Engineering (CMSE), which I developed. In addition to teaching the course, I wrote two

qualifying exams associated with it and organized weekly summer review sessions.
Spring 2017

- [MATH 414: Linear Algebra II.](#)
Fall 2015

YALE UNIVERSITY

- MATH/AMTH 244: Discrete Mathematics.
Fall 2010
- MATH/AMTH 244: Discrete Mathematics.
Fall 2009

UNIVERSITY OF MARYLAND

- Review Course for Analysis PhD Qualifying Exam.
Summer 2007
- Math 111: Introduction to Probability.
Spring 2006
- Math 111: Introduction to Probability.
Fall 2005

SERVICE

CONFERENCE AND SEMINAR ORGANIZATION

- Co-organizer of the summer school on [“Machine Learning Applied to Nuclear Physics”](#)
Held at the Facility for Rare Isotope Beams, Michigan State University
May 2019
- Organized mini-session on “Kernel Learning and Harmonic Analysis”
Held during the “Culminating Workshop of the IPAM long program on Understanding
Many-Particle Systems with Machine Learning”
December 2016
- Co-organizer of the [“8th Whitney Problems Workshop 2015”](#)
Held at the Centre International de Rencontres Mathématiques (CIRM)
October 2015
- Applied Mathematics Seminar co-organizer
Yale University
2012 – 2013
- Norbert Wiener Center Seminar co-organizer
University of Maryland
2007 – 2008

GRANT EVALUATION

- Reviewer for DOE grant proposals: 2017
- Joint NSF/NIH panel member: 2016

JOURNAL AND CONFERENCE REVIEWER

- Applied and Computational Harmonic Analysis: 2011 – 2018 (top 10% reviewer)
- European Journal of Operational Research: 2018 – 2019
- IEEE Signal Processing Letters: 2013 – 2014
- IEEE Transactions on Circuits and Systems for Video Technology: 2018
- IEEE Transactions on Information Theory: 2012
- International Conference on Machine Learning (ICML): 2019 (top 5% reviewer)
- International Journal of Quantum Chemistry: 2018
- Linear Algebra and Its Applications: 2009
- Neural Computation: 2013
- Neural Information Processing Systems (NeurIPS): 2019
- NPJ Computational Materials: 2017
- Proceedings of the American Mathematical Society: 2011
- SIAM Journal on Applied Dynamical Systems: 2013
- Signal Processing: 2014

UNIVERSITY COMMITTEES

- Chair of the CMSE Undergraduate Studies Committee
During this period the Departments of CMSE, Computer Science, and Statistics developed a new undergraduate degree in *Data Science*.
2017 – 2019 (two years)
- CMSE Long Term Steering Committee
2017 – 2018
- CMSE/CSE/ECE Hiring Committee
Connected and autonomous networked vehicles for active safety (CANVAS). Resulted in the hiring of Shaunak D. Bopardikar (ECE) and Bahare Kiumarsi (ECE).
2017 – 2018
- CMSE/CSE/BME/ECE Hiring Committee
Deep learning
2017 – 2020 (three year search)
- Mathematics/CMSE Hiring Committee
Fixed term to tenure stream conversion. Resulted in the conversion of Ekaterina A. Rappinchuk (Math/CMSE) from fixed term to tenure track.
2017 – 2018
- CMSE/ChEMS Hiring Committee
Computational materials science. Resulted in the hiring of Hui-Chia Yu (CMSE/ChEMS).
2016 – 2017

UNIVERSITY OUTREACH

- Panel member on “Getting Started at MSU”
University wide new faculty orientation at Michigan State University
August 23, 2018
- CMSE Department promotional talk
Shanghai Jiao Tong University
June 6, 2017
- CMSE Department promotional talk
Fudan University
June 5, 2017
- Panel member on “Getting Grants”
Michigan State University, College of Natural Science.
September 9, 2016
- Panel member on “How to look for an academic job”
Michigan State University, Department of Mathematics.
November 5, 2015
- Speaker at Putnam Exam review sessions
Yale University
Fall 2009