Yi (Grace) Wang

CONTACT INFORMATION

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RESEARCH INTERESTS

Computational Harmonic Analysis, Statistical Learning, Modeling High-Dimensional Data Clouds by Low-Dimensional Structures, Signal and Image Processing, Real Data Applications.

EDUCATION

University of Minnesota, Minneapolis, Minnesota USA

Ph.D., Mathematics, Aug. 2012

- Thesis Topic: "Robust Hybrid Linear Modeling and its Applications" advised by Gilad Lerman

M.S., Statistics, Aug. 2012
M.S., Mathematics, June 2010

ACADEMIC EXPERIENCE

Syracuse University, Syracuse, New York USA
Assistant Professor **August, 2015 - present**

Duke University, Durham, North Carolina USA
Visiting Assistant Professor (Mentor: Ingrid Daubechies) **August, 2012 - July, 2015**

Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham, North Carolina USA
Postdoctoral Researcher **August, 2012 - July, 2014**

University of Minnesota, Minneapolis, Minnesota USA
Teaching and Research Assistant **August, 2006 - August, 2012**

MCM Advisor **October, 2010**
Helped with the training session, evaluation of the final papers and advising in the Mathematical Contest in Modeling (MCM), Institute of Mathematics and Its Applications (IMA).

REU Mentor **June 14-July 16, 2010**
Co-presented the problem, led students into simulations and answered questions in the special program, Interdisciplinary Research Experience for Undergraduates (REU), IMA.

AWARDS AND GRANTS

NIH Award (1R01EB025018-01): *QuBBD: Geometric Time-Frequency Methods for Multi-Modal Physiological Monitoring.* $762,256, 01/2018 to 06/2020.
Principal Investigator, with Yuejie Chi, Kun Huang and Simon Lin.
SIAM Early Career Travel Award, 2014
SIAM Travel Award, 2012
Graduate Fellowship, HUST, 2005
Excellent Undergraduate Student, HUST, 2005
Kwang-Hua Scholarship, HUST, 2001

PUBLICATIONS

Preprints (available upon request)

1. Lei, J., Liu, K., Shen, L., and Wang, Y., *Machine Learning from Ventricular Geometric Characteristics Improves the Prediction of Cardiac Resynchronization Therapy Response: Signaling Crosstalk between Electrocardiography and Echocardiography*, submitted.
2. Abry, P., Daubechies, I., Jaffard S., Wang, Y. and Wendt, H., *A Review of Forgery Detection in Paintings with new Discoveries*, in preparation.
3. Wang, Y. and Zhang, L. *Robust Nonnegative Low-Rank Matrix Recovery*, in preparation.
4. Guo, W., Raskutti, G., Sun, J., Wang, Y. and Yang, D., *Compressive Support Detection based on Multiple Hypothesis Testing and Tube Method*, in preparation.

Journal Papers

5. O'Neal W.T., Wang, Y., Wu, H.-T., Zhang, ZM., Li, Y., Tereshchenko, LG., Estes, EH., Daubechies, I. and Soliman, EZ. *Electrocardiographic J-Wave and Cardiovascular Outcomes in the General Population (from the Atherosclerosis Risk in Communities Study)*, The American Journal of Cardiology, `http://dx.doi.org/10.1016/j.amjcard.2016.06.047`, 2016.
6. Wang, Y., Chen, G., and Maggioni M., *High Dimensional Data Modeling Techniques for Detection of Chemical Plumes and Anomalies in Hyperspectral Images and Movies*, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, DOI: 10.1109/JSTARS.2016.2539968, 2016.
7. Wang, Y., *Consistency and Convergence Rate for Nearest Subspace Classifier*, Information and Inference: A Journal of the IMA, DOI: 10.1093/imaiai/iaw006, 2016.
8. Daubechies, I., Wang, Y., and Wu, H., *ConceFT: Concentration of Frequency and Time via a multitapered synchrosqueezed transform*, Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 374(2065): 20150193, 2016.
9. Mahabal, A., Faraway, J., Zhang, L., Wang, Y., Wang, X. and Sun, J., *Modeling Light Curves for Improved Classification*, Statistical Analysis and Data Mining, DOI: 10.1002/sam.11305, 2016.
10. Wang, T., Chen, Y., Wang, Y., Wang, B., Wang, G., Li, X., Zheng, H. and Zhao, B., *The Power of Comments: Fostering Social Interactions in Microblog Networks*, Springer Frontiers of Computer Science, DOI: 10.1007/s11704-016-5198-y, 2015.
11. Wang, Y., Wu, H., Daubechies, I., Li, Y., Estes, H., and Soliman, E. *Automated J Wave Detection from Digital 12-lead Electrocardiogram*, Journal of Electrocardiology, Vol. 48, No. 1, pp. 21-28, 2015.
12. Wang, Y., Szlam, A. and Lerman, G., *Robust Locally Linear Analysis with Applications to Image Denoising and Blind Inpainting*, SIAM Journal on Imaging Sciences (SIIMS), Vol. 6, No. 1, pp. 526-562, 2013.
13. Zhang, T., Szlam, A., Wang, Y. and Lerman, G., *Hybrid Linear Modeling via Local Best Flats*, International Journal of Computer Vision, Volume 100, Issue 3, pp. 217-240, 2012.

Refereed Conference Papers

14. Wang, Y. and Szlam, A., *K-Mappings and Regression Trees*, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2014.
15. Wang, Y. and Porikli, F., *Multiple Dictionary Learning for Blocking Artifacts Reduction*, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Paper: IVMSP-P4.8, March 2012.

16. Hunt, F. Y., Marbukh, V. and Wang, Y., *A Mathematical Model of Joint Congestion Control and Routing in Multisource Networks*, Proceedings of the IEEE International Conference on Control Applications, CCA 2011.
17. Zhang, T., Szlam, A., Wang, Y. and Lerman, G., *Randomized Hybrid Linear Modeling by Local Best-fit Flats*, IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2010.

Presentations

Data Analysis - from Oscillatory Patterns to Geometric Structures,

Colloquium, Rensselaer Polytechnic Institute, Troy, NY **December, 2016**

Consistency and Convergence Rate for Nearest Subspace Classifier,

UP-STAT 2016 Conference, Buffalo, NY **April, 2016**

ConceFT: Concentration of Frequency and Time via a multitapered synchrosqueezed transform,

EECS Colloquium, Syracuse University, Syracuse, NY **Novmember, 2017**
Machine Learning Seminar, Ohio State University, Columbus, OH **October, 2017**
AMS sectional meeting, New York, NY **May, 2017**
Applied Math Seminar, General Electric Global Research Center, NY **July, 2016**
SIAM Conference on Imaging Science, Albuquerque, NM **May, 2016**
Math Colloquium, Colgate University, NY **March, 2016**
Machine Learning Seminar, Binghamton University (SUNY), NY **March, 2016**

Data Analysis with Low-dimensional Structures,

Applied Math Seminar, University of Alabama at Tuscaloosa, AL **February, 2015**
Applied Math Seminar, Louisiana State University, LA **February, 2015**
Statistics Seminar, University of Wisconsin at Madison, WI **February, 2015**
Applied Math Seminar, Syracuse University, NY **February, 2015**
Applied Math Seminar, Michigan State University, MI **January, 2015**
Applied Math Seminar, College of Staten Island, NY **March, 2014**
Applied Math Seminar, University of Alabama at Birmingham, AL **September, 2014**
Digital Technology Center Seminar, University of Minnesota, MN **October, 2014**

Compressive Inference based on Multiple Hypothesis Testing and Tube Method,

SIAM Conference on Imaging Science, Hong Kong, China **May, 2014**

K-Mappings and Regression Trees,

Applied Math Seminar, Claremont McKenna College, Claremont, CA **Nov, 2013**
IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Florence, Italy **May, 2014**

Forgery Detection in Paintings,

Joint Statistical Meetings, Montreal, Canada **August, 2013**
SIAM Annual Meeting, San Diego, CA, USA **July, 2013**

Robust Locally Linear Analysis with Applications to Image Denoising and Blind Inpainting,

Shape Analysis Seminar, UNC, Chapel Hill, NC, USA **Nov, 2012**
SIAM Annual Meeting, Minneapolis, MN, USA **July, 2012**
SIAM Conference on Imaging Science, Philadelphia, PA, USA **May, 2012**

Professional Services

Reviewer for Artificial Intelligence and Statistics Conference, **2016**
Reviewer for SIAM Journal on Imaging Sciences (SIIMS), **2016**
Review editor for Frontiers in Applied Mathematics and Statistics, **2016**
Reviewer for Conference on Neural Information Processing Systems (NIPS), **2016**
Reviewer for Applied and Computational Harmonic Analysis, **2016**
Reviewer for IEEE Transactions on Signal Processing, **2014**
Reviewer for IEEE Transactions on Neural Networks and Learning Systems, **2014**
Panelist for National Science Foundation (NSF), **2013, 2014**
Reviewer for IEEE Signal Processing Letters, **2013**

Teaching Experience

Syracuse University, Syracuse, New York USA

Lecturer **August, 2015 - present**

- Topics in Data Science, MAT 880 **Fall 2017**
- Math Methods for Data Science, MAT 500 **Fall 2016**
- Calculus III, MAT 397 **Fall 2015, Spring 2016**
- Numerical Methods with Programming, MAT 581 **Spring 2016, Spring 2017**

Duke University, Durham, North Carolina USA

Lecturer **August, 2013 - July, 2015**

- Multivariable Calculus, MATH 212 **Fall 2013**
- Multivariable Calculus, MATH 212 **Fall 2014**
- Introductory ODE and PDE, MATH 353 **Spring 2015**

University of Minnesota, Minneapolis, Minnesota USA

Teaching Assistant **September, 2006 - December, 2009**

Taught discussion classes, held office hours and graded exams and homework.

- Calculus I, MATH 1271 **Fall 2008, Fall 2009**
- Calculus II, MATH 1272 **Fall 2006, Spring 2007**
- Pre-calculus, MATH 1151, MATH 1155 **Fall 2007, Spring 2008**

Grade homework.

- Probability and Statistics, MATH 5651 **Spring 2009**

Internships

Mitsubishi Electric Research Laboratories, Cambridge, Massachusetts USA

Research Assistant **June - August, 2011**

Developed efficient sparse reconstruction methods for structured noise. Worked on blocking artifacts reduction and local variance noise removal.

Vision-Ease Lenses, Ramsey, Minnesota USA

Research Assistant **June - August, 2008**

Executed sustainability project, collected and analyzed data, and wrote and presented the final report.

Patent

Method for reducing blocking artifacts in images.
Patent number: 8942467. Inventors: Fatih Porikli and Yi Wang.