

Martin Raphan

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RESEARCH INTERESTS

Statistics, Image/Signal Processing, Wavelets, Machine Learning, and Computational Neuroscience

EDUCATION

New York University - Courant Institute of Mathematical Sciences

- Ph.D., Mathematics (GPA 4.0/4.0) May, 2007
M.S., Mathematics (GPA 4.0/4.0) January, 2003
- Courses Include: Statistics, Limit Theorems, Numerical Analysis, Derivative Securities, Capital Markets and Portfolio Theory, Partial Differential Equations.
 - Thesis: *Optimal Estimation: Prior-Free Methods with Physiological Application*
Advisors: Eero P. Simoncelli and Daniel Tranchina
 - Devised methods for Prior-Free Bayesian Estimation (Statistical Regression); applied them to image processing and neuroscience.

The Cooper Union for the Advancement of Science and Art

- M.E., Electrical Engineering (GPA 4.0/4.0) May, 2003
B.E., Electrical Engineering (GPA 4.0/4.0) May, 2001
- Various undergraduate/graduate course work and projects in deterministic/statistical signal processing, control systems, electronics.
 - Masters Thesis: *Discrete Wavelet Multitone (DWMT) and Discrete Multitone (DMT) Communications with Matrix Equalization*
Advisor: Fred L. Fontaine
 - Senior Project: *Discrete Wavelet Multitone (DWMT) and Discrete Multitone (DMT) Communications*
Advisor: Fred L. Fontaine

EXPERIENCE

Howard Hughes Medical Institute

- Postdoctoral Fellow June 2007 - Present
- Research in application of statistics to image processing and neuroscience.

New York University, Courant Institute

- Graduate Assistant September 2001 - May 2007
- Research in application of statistics to image processing and neuroscience funded by HHMI, NSF and MacCracken Fellowship (NYU).
 - Taught courses and recitations for various subjects in mathematics.

Mount Sinai School of Medicine

- Internship in Computational Neuroscience Summer 2002

Brooklyn College of the City University of New York

- College Assistant Summers 1999, 2000

TEACHING

New York University

Fall, 2005	Teaching Assistant, Mathematics in Medicine and Biology
Spring, 2005	Lecturer, Calculus I
Fall, 2004	Teaching Assistant, Advanced Calculus I
Spring, 2004	Teaching Assistant, Advanced Calculus II
Fall, 2003	Teaching Assistant, Advanced Calculus I
Spring, 2003	Teaching Assistant, Business Calculus
Fall, 2002	Teaching Assistant, Quantitative Reasoning
Spring, 2002	Teaching Assistant, Calculus I
Fall, 2001	Teaching Assistant, Intensive Calculus I

PUBLICATIONS

M. Raphan and E.P. Simoncelli, *Optimal Denoising in Redundant Representations*, IEEE Transactions on Image Processing, vol. 17(8), August 2008. To appear.

M. Raphan and E.P. Simoncelli, *Optimal Denoising in Redundant Bases*, Proc. IEEE Int'l Conference on Image Processing, 2007. (Winner of IBM Student Paper Award)

M. Raphan and E.P. Simoncelli, *Learning to be Bayesian Without Supervision*, in Adv. Neural Information Processing Systems (NIPS*06), B Scholkopf, J. Platt and T. Hoffman, Eds. May 2007, vol. 19, MIT Press.

M. Raphan and E.P. Simoncelli, *Empirical Bayes Least Squares Estimation Without an Explicit Prior*, Technical Report TR2007-900, Courant Institute of Mathematical Sciences, May 2007.

PRESENTATIONS

Unsupervised Regression for Image Denoising, Yale Applied Mathematics Seminar. (March 2008)

Unsupervised Regression for Image Processing, MIT Computer Vision Colloquium. (February 2008)

Unsupervised Regression for Image Processing, Harvard School of Engineering and Applied Sciences. (February 2008)

Unsupervised Regression for Image Processing, CUNY Graduate Center Computer Science Colloquium. (November 2007)

Unsupervised Regression for Image Processing, Harmonic Analysis and Signal Processing Seminar, Courant Institute. (October 2007)

Prior Free Methods for Image Denoising, Polytechnic University. (October 2007)

Unsupervised Regression with Application to Image Denoising, Google Labs, New York. (September 2007)

Modeling Contrast-Dependent Spatial Summation Area in Visual Cortex, Mount Sinai School of Medicine. (July 2007)

Contrast-Dependent Spatial Summation Area in Visual Cortex: Optimal Filtering and Modeling of Neural Mechanisms, Mostly Biomathematics Lunchtime Seminar, Courant Institute of Mathematical Sciences, New York University. (April 2007)

Empirical Bayes Least Squares Estimation Without and Explicit Prior, SIAM Conference on Imaging Science. (May 2006)

**PROFESSIONAL
ACTIVITIES**

Honor Societies

Eta Kappa Nu	2000
Tau Beta Pi	2000
Order of the Engineer	2000

Professional Societies:

Institute of Electrical and Electronics Engineers (IEEE)	2007 - present
American Mathematical Society (AMS)	2002 – present

Reviewer

European Signal Processing Conference (EUSIPCO)	2008
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HONORS

Sokol Postdoctoral Research Fellowship	2008
Kurt O. Friedrichs Prize for Outstanding Dissertation in Mathematics	2008
IBM Student Paper Award, International Conference on Image Processing	2007
MacCracken Fellowship (Courant Institute)	2001-2005
Jesse Sherman Award (E.E. Lab)	2001
Harry W. Reddick Award (Mathematics)	2001
National Dean's List	1999-2001
All-American Scholar	1999-2001
Full Scholarship- Cooper Union	1997-2001
National Merit Scholarship	1997

PROGRAMMING

Matlab, C, C++, Intel-based Assembler.