# CURRICULUM VITA

# STUART GEMAN

**Professor, Division of Applied Mathematics**
**Brown University**
**Providence, Rhode Island 02912**

## Education

University of Michigan, 1967-1971, B.S., Highest Honors in Physics
Dartmouth Medical School, 1971-1972, National Boards I
Dartmouth College, 1972-1973, Masters, Physiology
Massachusetts Institute of Technology, 1973-1977, Ph.D., Applied Mathematics
(Differential equations with random coefficients, Herman Chernoff, advisor)

## Professional Appointments

Division of Applied Mathematics, Brown University, Assistant Professor, 1977–1981 Associate Professor, 1981–1985; Professor, 1985 to 1997; James Manning Professor, 1997-present

## Honors

Presidential Young Investigator Award 1984–1989.

Fellow, Institute of Mathematical Statistics 1984.

Elected to International Statistical Institute, 1991.

James Manning Professor, 1997–

Philip J. Bray Award for Excellence in Teaching in the Physical Sciences, Brown University, 2001.

ISI Highly Cited Researcher

### *Named Lectures*

1997 Rietz Lecture, Institute of Mathematical Statistics.

2001 Hotelling Memorial Lectures, University of North Carolina

2006 Jim Press Endowed Research Lecture, University of California, Riverside

2008 Bahadur Memorial Lecture, University of Chicago

## Research

### *Published Papers*

S. Geman and M. Miller. Computer simulation of brainstem respiratory activity. J. Appl. Physiology, 41, 1976, 931-938.

S. Geman. Some averaging and stability results for random differential equations. SIAM J. Appl. Math., 36, 1979, 86-105.

S. Geman. Application of stochastic averaging to learning systems. Brain Theory Newsletter, 3, 1979, 69-71.

S. Geman. A method of averaging for random differential equations with applications to stability and stochastic approximations. In: Approximate Solutions of Random Equations. Ed. A.T. Bharucha-Reid, Elsevier/North-Holland, 1979.

S. Geman. A limit theorem for the norm of random matrices. Ann. Prob., 8, 1980, 252-261.

S. Geman. An application of the method of sieves: functional estimator for the drift of a diffusion. In: Colloquia Mathematica Societatis Janos Bolyai 32. Nonparametric Statistical Inference. North-Holland, Budapest, 1980.

S. Geman. Notes on a self-organizing machine. In: Parallel Models for Associative Memory. Ed. by J. Anderson and G. Hinton, Lawrence Erlbaum Associates, Hillsdale, N.J., 1981.

S. Geman. The law of large numbers in neural modeling. In: Mathematical Psychology and Psychophysiology. Ed. by S. Grossberg, SIAM AMS Proceedings, Vol. 13, 1981.

S. Geman and C.-R. Hwang. Nonparametric maximum likelihood estimation by the method of sieves. Ann. Stat., 10, 1982, 401-414.

S. Geman and C.-R. Hwang. A chaos hypothesis for some large systems of random equations. Z. Wahrschein. verw. Gebiete, 60, 1982, 291-314.

S. Geman. Almost sure stable oscillations in a large system of randomly coupled equations. SIAM J. Appl. Math., 42, 1982, 695-703.

S. Geman and D.E. McClure. Characterization of a maximum-likelihood nonparametric density estimator of kernel type. In: Proceedings of the NASA Workshop on Density Estimation and Function Smoothing. Ed. by L.F. Guseman, Jr., Texas A&M University, 1982.

S. Geman. Cross-validation for densities and regressions. Proceedings of the NASA Workshop on Density Estimation and Function Smoothing. Ed. by L.F. Guseman, Jr., Texas A&M University, 1982.

Y.-S. Chow, S. Geman, and L.-D. Wu. Consistent cross-validated density estimation. Ann. Stat., 11, 1983, 25-38.

S. Geman and D. Geman. Stochastic relaxation, Gibbs distributions, and the Bayesian restoration of images. IEEE-PAMI, 6, 1984, 721-741.

S. Geman. The Method of Sieves. Encyclopedia of Statistical Sciences, Volume 5. Ed. S. Kotz and N.L. Johnson, John Wiley & Sons, 1985.

S. Geman and D.E. McClure. Bayesian image analysis: An application to single photon emission tomography. 1985 Proceedings of the American Statistical Association. Statistical Computing Section, 1985, 12-18.

S. Geman. The spectral radius of large random matrices. Ann. Prob., 14, 1986, 1318-1328.

S. Geman and C.-R. Hwang. Diffusions for global optimization. SIAM J. Control and Optimization, 24, 1986, 1031-1043.

D. Geman and S. Geman. Bayesian image analysis. Disordered Systems and Biological Organization. Ed. E. Bienenstock, F. Fogelman, G. Weisbuch. NATO ASI Series, Vol. F20, Springer-Verlag, Berlin, 1986.

D. Geman, S. Geman, and C. Graffigne. Locating texture and object boundaries. Pattern Recognition Theory and Application. Ed. P. Devijver. NATO ASI Series, Springer-Verlag, Heidelberg, 1986.

D. Geman and S. Geman. Discussion of: “On the statistical analysis of dirty pictures” by Julian Besag, J. R. Statist. Soc. B, 48, 1986, 259-302.

S. Geman and C. Graffigne. Markov random field image models and their applications to computer vision. Proceedings of the International Congress of Mathematicians 1986. Ed. A.M. Gleason, American Mathematical Society, Providence, 1987.

S. Geman and D.E. McClure. Statistical methods for tomographic image reconstruction. Proceedings of the 46th Session of the International Statistical Institute, Bulletin of the ISI, 52, 1987.

S. Geman. Experiments in Bayesian Image Analysis. Bayesian Statistics 3. Ed. J.M. Bernardo, M.H. DeGroot, D.V. Lindley and A.F.M. Smith, Oxford University Press, 1988.

S. Geman. Stochastic relaxation methods for image restoration and expert systems. Maximum Entropy and Bayesian Methods in Science and Engineering (Vol. 2). Ed. G.J. Erickson and C.R. Smith, Kluwer Academic Publishers, 1988.

D. Geman, S. Geman, C. Graffigne, and P. Dong. Boundary detection by constrained optimization. IEEE-PAMI, 12, 1990, 609-628.

S. Geman, E. Bienenstock, and R. Doursat. Neural networks and the bias/variance dilemma. Neural Computation, 4, 1991, 1-58.

D. Geman and S. Geman. Discussion of: "Bayesian image restoration, with two applications in spatial statistics" by J.E. Besag and A. Mollié, Annals of the Institute of Statistical Mathematics, 43, 1991.

S. Geman, D.E. McClure, and D. Geman. A nonlinear filter for film restoration and other problems in image processing. CVGIP: Graphical and Image Processing, 54, 1992, 281-289.

S. Geman, K. Manbeck, and D.E. McClure. A comprehensive statistical model for single photon emission tomography. In: Markov Random Fields: Theory and Applications. Eds. R. Chellappa and A. Jain. Academic Press, Boston, 1993, 93-130.

E. Bienenstock and S. Geman. Discussion of: "Neural networks and statistical perspectives" by B. Cheng and D.M. Titterington, Statistical Science, 9, 1994, 36-38.

E. Bienenstock and S. Geman. Comment on: "The Hebbian paradigm reintegrated: Local reverberations as internal representations," by D.J. Amit, Behavioral and Brain Sciences, 18, 1995, 627-628.

E. Bienenstock and S. Geman. Compositionality in neural systems. The Handbook of Brain Theory and Neural Networks. Ed. M.A. Arbib. MIT Press, Cambridge, 1995.

H. Künsch, S. Geman, and A. Kehagias. Hidden Markov random fields. Annals of Applied Probability, 5, 1995, 577-602.

C. Raphael and S. Geman. A grammatical approach to mine detection. Proceedings of SPIE, 3079, 1997, 316-332.

Z. Chi and S. Geman. Estimation of probabilistic context-free grammars, Computational Linguistics, 24, 1997, 299-305.

E. Bienenstock, S. Geman, and D. Potter. Compositionality, MDL Priors, and Object Recognition. In: Advances in Neural Information Processing Systems 9. M.C. Mozer, M.I. Jordan, and T. Petsche, eds., MIT Press, 1998.

Z. Chi and S. Geman. On the consistency of minimum complexity nonparametric estimation. IEEE Trans. Inf. Theory, 44, 1998, 1968-1973.

M. Johnson, S. Geman, S. Canon, Z. Chi, and S. Riezler. Estimators for stochastic "unification-based" grammars. Proceedings of the Association for Computational Linguistics, 1999.

S. Geman. Compositionality. Brown University Faculty Bulletin, Spring, 1999.

S. Geman. Hierarchy in machine and natural vision. Proceedings of the 11th Scandinavian Conference on Image Analysis, 1999.

S. Geman and K. Kochanek. Dynamic programming and the graphical representation of error-correcting codes. IEEE Trans. Inf. Theory, 47, 2001, 549-568.

S. Geman, D.F. Potter, and Z. Chi. Composition systems. Quarterly of Applied Mathematics, LX, 2002, 707-736.

S. Geman and M. Johnson. Probabilistic grammars and their applications. In: International Encyclopedia of the Social & Behavioral Sciences. N.J. Smelser and P.B. Baltes, eds., Pergamon, Oxford, 2002, 12075-12082.

S. Geman and M. Johnson. Dynamic programming for parsing and estimation of stochastic unification-based grammars. Proceedings of the 40th Annual Meeting of the Association for Computational Linguistics, 2002.

N. Hatsopoulos, S. Geman, A. Amarasingham, and E. Bienenstock. At what time scale does the nervous system operate? Neurocomputing, Volumes 52-54, June 2003, 25-29.

S. Geman and M. Johnson. Probability and statistics in computational linguistics, a brief review. In: Mathematical foundations of speech and language processing. Johnson, M.; Khudanpur, S.P.; Ostendorf, M.; Rosenfeld, R. (Eds.), 2004, X, ISBN: 0-387-20326-5, Pages 1-26.

A. Amarasingham, T.-L. Chen, S. Geman, M. Harrison, and D. Sheinberg. Spike count reliability and the Poisson Hypothesis. Journal of Neuroscience, 26(3), 2006, 801-809.

Y. Jin and S. Geman. Context and hierarchy in a probabilistic image model. CVPR (2), 2006, 2145-2152.

S. Geman. Invariance and selectivity in the ventral visual pathway. Journal of Physiology – Paris, 100 (2006), 212-224.

***Submitted***

T.-L. Chen and S. Geman. On the minimum entropy of a mixture of unimodal and symmetric distributions.

***Abstracts/Posters***

A. Date, E. Bienenstock, and S. Geman. A Statistical Technique for the Detection of Fine Temporal Structure in Multi-Neuronal Spike Trains, Soc. Neurosci. Abstr., 25: 568.5 (1999).

A. Date, E. Bienenstock, and S. Geman. A Statistical Tool for Testing Hypothesis about the Temporal Resolution of Neural Activity, Soc. Neurosci. Abstr., 26: 828.6 (2000).

N.G. Hatsopoulos, A. Amarasingham, E. Bienenstock, S. Geman and J.P. Donoghue. Assessing Precise Temporal Patterns of Spikes among Cortical Neurons, Soc. Neurosci. Abstr., 27: 63.1 (2001).

A. Amarasingham, T.-L. Chen, S. Geman, M. Harrison and D. Sheinberg. (2003) "Spike count variability and the Poisson hypothesis." *Annual Computational Neuroscience Meeting (CNS).* Alicante, Spain.

A. Amarasingham, M. Harrison and S. Geman. (2005) "Statistical techniques for analyzing non-repeating spike trains." *Annual Society for Neuroscience Meeting (SFN).* Washington, DC.

A. Amarasingham, M. Harrison and S. Geman. (2006) "Statistical analysis of neuronal firing patterns with non-repeatable trials." *Third Workshop on Statistical Analysis of Neuronal Data (SAND3).* Pittsburgh, PA.

A. Amarasingham, M. Harrison and S. Geman. (2007) "Jitter methods for investigating spike train dependencies." *COSYNE 2007.* Salt Lake City, UT.

***Patents***

K. Manbeck, C. Yang, D. Geman, and S. Geman. Cadence Editing. US 6,542,199, 2003.

K. Manbeck, C. Yang, D. Geman, and S. Geman. Video Field Labeling. US 6,624,844, 2003.

C. Yang, K. Manbeck, S. Geman, D. Geman. Format Conversion. US 7,064,792, 2006.

K. Manbeck, J. Cassidy, S. Geman, D. Geman, and D. McClure. High Resolution Color Conforming. US 7,113,223, 2006.

K. Manbeck, D. Geman, S. Geman, and M. Orton. Automated Color Control in Film-to-Digital Transfer. US 7,068,838, 2006.

***Technical Reports***

S. Geman. On a common sense estimator for the drift of a diffusion. Reports On Pattern Analysis No. 79, Division of Applied Mathematics, Brown University, 1979.

S. Geman. Sieves for nonparametric estimation of densities and regressions. Reports on Pattern Analysis No. 99, Division of Applied Mathematics, Brown University, 1981.

S. Geman and W.B. Levy. Limit behavior of experimentally derived synaptic modification rules. Reports on Pattern Analysis No. 121, Division of Applied Mathematics, Brown University, 1982.

B. Davis and S. Geman. The application of neurobiological and statistical concepts to machine intelligence. Reports on Pattern Analysis No. 129, Division of Applied Mathematics, Brown University, 1983.

D. Geman and S. Geman. Relaxation and annealing with constraints. Complex Systems Technical Report No. 35, Division of Applied Mathematics, Brown University, December, 1987.

S. Geman, K. Manbeck, and D.E. McClure. Statistical methods for reconstruction in emission computed tomography. Technical Report, Division of Applied Mathematics, Brown University, 1993.

S. Geman, A. Kehagias, and H. Künsch. Consistent estimation of stationary processes and stationary random fields. Technical Report, Division of Applied Mathematics, Brown University, 1993.

S. Geman and K. Manbeck. Experiments in syntactic recognition. Reports on Pattern Analysis No. 158, Division of Applied Mathematics, Brown University, 1993.

S. Geman, K. Manbeck, and D.E. McClure. Coarse-to-fine search and rank-sum statistics in object recognition. Technical Report, Division of Applied Mathematics, Brown University, 1995.

A. Date, E. Bienenstock, and S. Geman. On the temporal resolution of neural activity. Technical Report, Division of Applied Mathematics, Brown University, 1998.

A. Amarasingham, T.-L. Chen, S. Geman and M. Harrison. (2003) “Notes on a spike count variability test.” *APPTS Report #03-8*.

M. Harrison, S. Geman and E. Bienenstock. (2004) “Using statistics of natural images to facilitate automatic receptive field analysis.” *APPTS Report #04-2*.

M. Harrison and S. Geman. (2004) “An exact jitter method using dynamic programming.” *APPTS Report #04-3*.

S. Geman. On the formulation of a composition machine. Technical report, Division of Applied Mathematics, Brown University, 2007.

***In Preparation***

S. Geman, A. Amarasingham, M. Harrison, N.G. Hatsopoulos. The statistical analysis of temporal resolution in the nervous system.

S. Geman, T.-L. Chen., and Z. Chi. Scaling in images, and scale-invariant image analysis.

M. Harrison and S. Geman. A pattern-preserving resampling algorithm for neural spike trains.

W. Zhang and S. Geman. Maximum-Likelihood Templates.

***Invited Lectures***

Mathematical Model of Brainstem Respiratory Centers. Annual meeting of American Physiological Society, Rochester, N.Y., May, 1973.

The Law of Large Numbers and the Central Limit Theorem in Neural Modeling. Meeting of the American Mathematical Society, Providence, R.I., August, 1978.

University of Massachusetts, Department of Mathematics and Statistics (May, 1979).

Relating Models of Memory and Models of the Environment. Sloan Foundation Conference on Parallel and Associative Memories, University of California, San Diego, June, 1979.

The Behavior of Learning Systems in Stochastic Environments. Annual Meeting of the Society for Mathematical Psychology, Providence, R.I., August, 1979.

Yale University, Department of Statistics (November, 1979).

Massachusetts Institute of Technology, Department of Mathematics, (February, 1980).

Toward a System that Learns, Guesses, and Discovers. Meeting of the American Mathematical Society, Philadelphia, Penn., April, 1980.

A Consistent Nonparametric Functional Estimator for the Drift of a Diffusion. Janos Bolyai Mathematical Society, Colloquium on Nonparametric Statistical Inference, Budapest, Hungary, June, 1980.

University of California, Davis, Division of Statistics (October, 1980).

University of Washington, Department of Statistics (October, 1980).

University of Washington, Department of Biostatistics (October, 1980).

University of British Columbia, Department of Mathematics (October, 1980).

University of Rhode Island, Department of Mathematics (December, 1980).

Cross-Validation and Maximum Likelihood for Nonparametric Density Estimation. Meeting of the Institute of Mathematical Statistics, Victoria, B.C., June, 1981.

Academia Sinica, Taipei, Taiwan (July, 1981).

Harvard University, Department of Statistics (October, 1981).

Cross-Validation for Densities and Regressions. NASA-sponsored workshop on Density Estimation and Function Smoothing. College Station, Texas, March, 1982.

Cross-Validation for Densities and Regressions. Meeting of the Institute of Mathematical Statistics, San Antonio, Texas, March, 1982.

Ford Motor Company, Research Division (May, 1982).

University of Michigan, Physics Department, May, 1982.

Why AI Researchers Should be Literate in the Neurosciences. Artificial Intelligence Society of New England 1982 meeting, Storrs, Conn., October, 1982.

University of California, Berkeley, Department of Statistics (January, 1983).

Image segmentation under a Markov random field model. Army Research Office sponsored workshop on Unsupervised Image Classification. Brown University, Providence, RI, April, 1983.

Yale University, Department of Statistics (April, 1983).

University of Massachusetts, Computer and Information Sciences Department (May, 1983).

Picture segmentation by nonparametric regression. Meeting of the Institute of Mathematical Statistics, Arcata, California, June, 1983.

University of California, Berkeley, Department of Statistics (June, 1983).

Mathematical Sciences Research Institute (June, 1983).

A parallel realization for maximum entropy distributions with applications to problems in inference and optimization. Third workshop on maximum entropy and Bayesian methods in applied statistics, University of Wyoming, Laramie, Wyoming, August, 1983.

Universite de Paris-Sud, Mathematique (3 lectures, October, 1983).

Universite Scientifique et Medicale de Grenoble, Laboratoire d'Informatique et de Mathematiques Appliquees de Grenoble (October, 1983).

Ecole Polytechnique (Paris), Laboratoire de Dynamique des Reseaux (November, 1983).

Universite de Paris-VI, Statistique (November, 1983).

The Weizmann Institute of Science, Department of Applied Mathematics (December, 1983).

How are objects represented in neural networks? The Neurosciences Institute, New York, New York, December, 1983.

The Weizmann Institute of Science, Department of Theoretical Mathematics (December, 1983).

A Bayesian approach to image restoration and invariant object recognition. ARO workshop on Assessment of Analytical Methods for Target Acquisition and Tracking. Night Vision and Electro-Optics Laboratory, Ft. Belvoir, Virginia, February, 1984.

Nonparametric Statistics: General Approaches and Methods for Problems with Unknown Functional Parameters. Short course delivered jointly with D.E. McClure. Fort Monmouth, NJ, and Aberdeen Proving Ground, MD, March, 1984.

Image analysis by simulated annealing. Workshop on Statistical Physics in Engineering and Biology. IBM Thomas J. Watson Research Center, April, 1984.

University of Rochester, Department of Computer Science (April, 1984).

Princeton University, Department of Statistics (May, 1984).

Massachusetts Institute of Technology, Laboratory for Information and Decision Systems (May, 1984).

Workshop on stochastic parallel computation. M.I.T. Endicott House, May, 1984.

General Motors Research Laboratories, Mathematics Department (June, 1984).

AT&T Bell Laboratories (August, 1984).

University of Rhode Island, Department of Mathematics (December, 1984).

University of Maryland, Department of Mathematics (December, 1984).

Carnegie-Mellon University, Department of Statistics (January, 1985).

Bayesian image analysis. Disordered Systems and Biological Organization. NATO Advanced Research Workshop. Les Houches, France, March, 1985.

Bayesian image restoration. Mathematical Stochastics. Oberwolfach, Germany, March, 1985.

Bayesian image restoration. Seventeenth Symposium on the Interface of Computer Science and Statistics. University of Kentucky, March, 1985.

Bayesian image analysis. Central Regional Meeting of the Institute of Mathematical Statistics. University of Texas at Austin, March, 1985.

Yale University, Department of Statistics (April, 1985).

National Bureau of Standards, Statistical Engineering Division (April, 1985).

Harvard University, Department of Psychology and Social Relations (April, 1985).

Assessment of Analytical Methods for Target Acquisition and Tracking. Army Research Office/Night Vision and Electro Optics Laboratory sponsored workshop. University of Maryland, April, 1985.

Nonparametric Statistics: General Approaches and Methods for Problems with Unknown Functional Parameters. Short course delivered jointly with D.E. McClure. White Sands Missile Range, NM, May, 1985.

Stochastic relaxation methods for image restoration and expert systems. Cognitiva 85. Paris, France, June, 1985.

Bayesian image analysis: An application to single photon emission tomography. Statistical Computing Invited Paper Session, 1985 ASA Meetings. Las Vegas, August, 1985.

University of Chicago, Department of Statistics (October, 1985).

Harvard University, Department of Statistics (December, 1985).

Brigham and Women's Hospital, Department of Radiology (January, 1986).

A Bayesian framework for machine vision. The 2nd Fyssen Foundation Conference, Models of Visual Perception: From Natural to Artificial. Versailles, France, March, 1986.

Gibbs distributions for a Bayesian approach to expert systems. Congress of the German Society for Cybernetics. Gottingen, West Germany, March, 1986.

Florida State University, Department of Statistics (April, 1986).

Florida State University, Supercomputer Computations Research Institute (April, 1986).

General Motors Technical Center, Mathematics Department (June, 1986).

Applications of Markov random field image models. Special Invited Paper. Institute of Mathematical Statistics, Western Regional Meeting. Seattle, Washington, July, 1986.

Markov random field image models, and their applications to computer vision. International Congress of Mathematicians 1986. Berkeley, California, August, 1986.

Image processing: the state of the art. National Research Council briefing on Opportunities for the Mathematical Sciences in the IST/SDI program. Washington, D.C., October, 1986.

Some applications of Bayesian image analysis. Thirty-second Conference on the Design of Experiments in Army Research, Development and Testing. Monterey, California, October, 1986.

Boston University, Department of Mathematics (February, 1987).

Massachusetts Institute of Technology, Center for Intelligent Control Systems (March, 1987).

Bolling Air Force Base, Mathematics Division (March, 1987).

Harvard University, Department of Statistics (April, 1987).

Massachusetts Institute of Technology, Artificial Intelligence Laboratory (May, 1987).

Nonparametric Statistics: General Approaches and Methods for Problems with Unknown Functional Parameters. Short course delivered jointly with D.E. McClure. Army Engineer Waterways Experiment Station, MS, May, 1987.

Experiments in Bayesian image analysis. Third Valencia International Meeting on Bayesian Statistics. Altea, Spain, June, 1987.

Parallel and stochastic methods for computer vision. Whitney Symposium on Science and Technology VIII "Emerging Technologies." General Electric, Schenectady, New York, June, 1987.

Automatic target recognition technology: causes for skepticism. Meeting of ATR Development Group, of the Harry Diamond Laboratories and the Center for Night Vision and Electro-Optics. Aberdeen, Maryland, June, 1987.

(plenary) Image processing. 17th European Meeting of Statisticians. Aristotle University of Thessaloniki, Thessaloniki, Greece, August, 1987.

IBM Thomas J. Watson Research Center (August, 1987).

Bolt, Beranek, and Newman (August, 1987).

Ohio State University, Department of Statistics (September, 1987).

U.S. Army Human Engineering Laboratory (November, 1987).

Character recognition. Workshop on Computer Vision, Center for Intelligent Control Systems. Harvard University, November, 1987.

Participant, U.S. Army ATR Workshop. Johns Hopkins University, November, 1987.

University of Arizona, Program in Applied Mathematics (February, 1988).

Machine Vision. U.S. Army Research Office, Mathematical Sciences Division Program Review, North Carolina, April, 1988.

The Role of Statistics in Automated Inspection and Classification for Process Control. Conference on Uncertainty in Engineering Design, National Bureau of Standards, Maryland, May, 1988. Boeing Electronics Company (May, 1988).

Monte Carlo Methods for Image Processing. American Association for the Advancement of Science, Annual Meeting, January, 1989.

Harvard University, Department of Statistics (March, 1989).

Neural Networks and Nonparametric Statistical Inference - Tutorial. Conference on Neural Networks for Computing, Snowbird, Utah, April, 1989.

An Application of Markov Random Fields to Medical Imaging. Workshop on Theory and Applications of Markov Random Fields for Image Processing, Analysis and Computer Vision, San Diego, California, June, 1989.

Two lectures: Single Photon Emission Computed Tomography and Object Recognition

in Computer Vision: Lessons from Speech Recognition Systems. London Mathematical Society Durham Symposium on Image Analysis, Durham, England, July, 1989.

Yale University, Department of Statistics (October, 1989).

Hidden Markov Models for Speech Recognition. Five Tutorials to Honor Ulf Grenander, Cape Cod, Massachusetts, November, 1989.

Hidden Markov Models for Image Analysis. Workshop on Encounter of Computer Vision and Mathematics, University of Pennsylvania, Philadelphia, Pennsylvania, May, 1990.

Mathematical Models for Regularities and Constraints in Image Analysis. Workshop on Mathematics of Image Analysis, Naval Research Laboratory, Washington, DC, May, 1990.

Two lectures: Handwritten Numeral Recognition and Fitting Stationary Processes With Hidden Markov Models. Stochastic Models, Statistical Methods and Algorithms in Image Analysis, Instituto per le Applicazioni del Calcolo, Rome, Italy, July, 1990.

One Dimensional Recognition Problems. Stochastic Image Models and Algorithms, Oberwolfach, Germany, July, 1990.

Neural Networks and the Bias-Variance Dilemma. ONR Seminar Series on Image Representation in Biological and Machine Vision, Office of Naval Research, Arlington, Virginia, October, 1990.

University of Connecticut, Department of Statistics (April, 1991).

Participant: Interdisciplinary Workshop on Compositionality in Cognition and Neural Models, Abbaye de Royaumont, France, May, 1991.

Fitting Stationary Processes with Hidden Markov Models; Single Photon Emission Computed Tomography; Handwritten Numeral Recognition; The Limitations of Learning in Neural Networks. Four lectures given at the workshop on Stochastic Image Models, Markov Random Fields and Related Topics, Academia Sinica, Taipei, Taiwan, June, 1991.

General Motors Technical Center, Mathematics Department (July, 1991).

Probabilistic Methods in Emission Tomography. International Conference on Industrial and Applied Mathematics, Washington, D.C., July, 1991.

Fitting Stationary Processes with Hidden Markov Models; A Meeting on Vision, California Institute of Technology, Pasadena, California, September, 1991.

Naval Research Laboratory (October, 1991).

University of North Carolina, Department of Statistics (November, 1991).

Duke University, Department of Statistics (November, 1991).

Remarks on Emission Tomography; Fitting Stationary Processes with Hidden Markov Models. Workshop on Statistical Methods in Imaging. Mathematical Sciences Research Institute, Berkeley, California, December, 1991.

Deformable Templates. DOD Tri-Service Workshop on Stochastic Methods in Image Analysis. U.S. Army Harry Diamond Laboratory, Adelphi, MD, May, 1992.

Participant: Interdisciplinary Workshop on Compositionality in Cognition and Neural Models, Abbaye de Royaumont, France, June, 1992.

(plenary) Theory and Applications of Hidden Markov Models. SPIE 1992 Conference on Neural and Stochastic Methods in Image and Signal Processing, San Diego, CA, July, 1992.

Neural Networks and Statistics. Institute of Mathematical Statistics, Annual Meeting, Boston, MA, August, 1992.

University of Chicago, Department of Statistics (November, 1992).

Dartmouth College, Department of Mathematics (November, 1992).

Interpretation-guided segmentation and recognition. Neural Information and Processing Systems—Natural and Synthetic, Denver, CO, December, 1992. Brown University, Department of Physics (March, 1993).

Dynamic programming and hierarchical models for speech and image analysis. The Seventh New England Statistics Symposium, Storrs, CT, April, 1993.

Discussion on recognition of multiple objects in complex scenes. Isaac Newton Institute for Mathematical Sciences, Cambridge, U.K., September, 1993.

Syntactic recognition of convex shapes. Navy MCM Image Analysis Workshop, Panama City, Florida, November, 1993.

Mathematical methods for object recognition. ONR Grantee Meeting in Vision and Optical Information Processing, Arlington, VA, April, 1994.

A general view of the HMM framework, with applications to vision. Image Models (and their Speech Model Cousins), Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN, May, 1994.

Johns Hopkins University, Center for Speech Processing (November, 1994).

Model-based vision. U.S. Army Research Office, Investment Strategy Meeting, Lake Buena Vista, Florida, December, 1994.

Maximum-likelihood decoding of 2-D bar codes, Statistics Department. Yale University, January, 1995.

Compositional vision. Cognitive Sciences Department, Brown University, April, 1995.

(plenary) Restoration of movies, industrial-strength character recognition, and some other high-tech applications of statistics. Spring Research Conference, Waterloo, Canada, June, 1995.

Compositional vision. Workshop on Mathematical Methods in Computer Vision, The Geometry Center, U. of Minnesota, Minneapolis, MN., September, 1995.

Compositional vision. Center for Intelligent Control Systems, Review, MIT, Boston, MA, October, 1995.

Compositional vision. Neural and Information Processing Systems, NIPS-95, Workshop on Object Features for Visual Shape Representation, Vail, CO, November, 1995.

Minimum description length priors for object recognition, Center for Statistical Sciences, Brown University, April, 1996.

Image Analysis. Army Research Office Program Review, Army Research Office, Research Triangle Park, NC, May, 1996.

Minimum description length priors for Bayesian image analysis. Second World Congress of Nonlinear Analysts, Athens, Greece, July, 1996.

On the statistical foundations of performance metrics. ATR Performance Estimation Workshop, DARPA, Arlington, VA, July, 1996.

Minimum description length priors for object recognition. Joint Annual Meeting of the Institute of Mathematical Statistics and the American Statistical Association, Chicago, IL, August, 1996.

Massachusetts Institute of Technology, Department of Mathematics (November, 1996).

Compositional models for targets and clutter. Vision Strategies and ATR Performance: A Mathematical/Statistical Formulation and Critique, ARO Workshop, Brown University, November, 1996.

Compositionality, MDL priors, and object recognition. Neural and Information Processing Systems—96, Denver, CO, December, 1996.

Division of Applied Mathematics, Brown University, March, 1997.

"David Mumford: Contributions to Machine Vision and the Neurosciences." Symposium in Honor of David Mumford, Harvard University, May, 1997.

Rietz Lecture: "Probabilistic grammars and their applications." Institute for Mathematical Statistics, Annual Meeting, Park City, Utah, July, 1997.

"Three lectures in image understanding." Center for Imaging Science, Department of Electrical Engineering, Washington University, September, 1997.

Department of Mathematics, Boston University, September, 1997.

Army Research Laboratory Workshop, University of Maryland, October, 1997.

Two lectures on probabilistic grammars and their applications. 26'th Lunteren Meeting, Lunteren, The Netherlands, November, 1997.

Devising statistical tests for fine temporal structure. The Role of Timing in Neuronal Processing, Titisee, Germany, March, 1998.

Probability models for objects and images of objects. Workshop on Image Analysis, University of Montreal, April, 1998.

Probability models for objects and images of objects. 1998 Lukacs Symposium, Bowling Green State University, April, 1998.

(plenary) Probabilistic grammars and their applications. Conference on Automated Learning and Discovery, Carnegie Mellon University, June, 1998.

Invariance and hierarchy in statistical image models. Information, Statistique et Reconnaissance des Formes, Luminy, France, December, 1998.

Compositional vision. Methodology in Cognitive Science, Foundation des Treilles, Nice, France, December, 1998.

Hierarchical representation. Brown University Mind Brain Retreat, Attitash, New Hampshire, February, 1999.

Model-based performance bounds: Learning and computation in hierarchical models. Center for Imaging Science, Johns Hopkins University, March, 1999.

Compositionality in computer and natural vision. Five College Cognitive Science Colloquium Series, University of Massachusetts, April, 1999.

(plenary) Statistics in computer vision, and some industrial applications. The 11th Scandinavian Conference on Image Analysis, Kangerlussuaq, Greenland, June, 1999.

Codes, graphs, and computation, and a robust two-dimensional bar code. Computer Vision and Speech Recognition: Statistical Foundations and Applications, Anogia, Crete, July, 1999.

Hierarchical models of natural images and their applications to object recognition. International Workshop on Mathematical Aspects of Computational Intelligence, Peking University, August, 1999.

Algebraic coding theory and its applications to improved and generalized bar coding. International Workshop on Mathematical Aspects of computational Intelligence, Peking University, August, 1999.

Computer and natural vision. National Society of Black Engineers, Technical Research Forum, Brown University, October, 1999.

Learning mixtures and learning hierarchies. Brown University IGERT Retreat, Little Compton, RI, March, 2000.

Mathematical methods in speech analysis, introduction and overview. IMA Short Course on Speech and Image Analysis, Institute for Mathematics and its Applications, Minneapolis, Minnesota, September, 2000.

Mathematical methods in image analysis, introduction and overview. IMA Short Course on Speech and Image Analysis, Institute for Mathematics and its Applications, Minneapolis, Minnesota, September, 2000.

Variance and Invariance in Machine Vision. Sixth U.S. Army Conference on Applied Statistics, Rice University, October, 2000.

Coarse-to-fine parsing for context-free grammars. Mathematical Foundations of Natural Language Modeling, Institute for Mathematics and its Applications, Minneapolis, Minnesota, October, 2000.

Analysis of multi-unit microelectrode neuronal recordings. 2000/2001 Hotelling Lecture, Department of Statistics, University of North Carolina, March, 2001.

Exact computations on Markov dependency graphs and their applications. 2000/2001 Hotelling Lecture, Department of Statistics, University of North Carolina, March, 2001.

Invariance in natural image statistics and the invariant recognition of objects. 2000/2001

Hotelling Lecture, Department of Statistics, University of North Carolina, March, 2001.

Invariance in machine vision. Department of Electrical Engineering and Department of Statistics, Ohio State University, May, 2001.

Irrational optimism that a grand vision system can really be built. Third Occasional St. George Vision Quest, St. George, Maine, June, 2001.

Statistical methods for measuring the temporal resolution of neural activity. Workshop on Statistical Analysis of Neuronal Data, Carnegie Mellon University, May, 2002.

Why are pictures scale invariant? Department of Mathematics, University of Rhode Island, May, 2003.

Why are pictures scale invariant? Chernoff Symposium, Harvard University, June, 2003.

Three lectures on the hierarchical organization of images, of image analysis, and of neural representation. Etats de la recherche, Aspects probabilistes en Vision, Ecole Normale Suprieure de Cachan, June, 2003.

Functional connectivity and synchrony in the ventral visual pathway. Committee on Computational Biology, University of Chicago, April, 2004.

Ulf Grenander's second career (Pattern Theory, abstract inference, ...). Meeting in Celebration of Ulf Grenander's 80'th Birthday, Brown University, May, 2004.

Coarse to fine scene analysis. Department of the Army, MaCog/CISCog Meeting, Army Missile and Aviation R&D Command, Huntsville, Alabama, May, 2004.

Synchrony and real-time measures of significance. Workshop on Statistical Analysis of Neuronal Data, Carnegie Mellon University, May, 2004.

(plenary) Invariance and selectivity in biological vision. CVPR: IEEE annual Conference on Computer Vision and Pattern Recognition, Washington, DC, June, 2004.

Invariance and selectivity in the ventral visual pathway. Brown University Neuroscience Graduate Program Seminar Series, December, 2004.

Hierarchy and nonlinearity in biological vision. Mathematical Sciences Research Institute, Berkeley CA, February, 2005.

Representation and computation in natural vision. National Science Foundation, meeting of CRCNS principle investigators, April, 2005.

Four arguments in support of hierarchy in computer vision. Sabanci University, Istanbul, May, 2005.

Four arguments in support of hierarchy in computer vision. Methodes Mathematiques du Traitement d'Images, Universite Pierre et Marie Curie & C.N.R.S., Paris, May, 2005.

A composition machine. CMLA Colloquium, Ecole Normale Sup´erieure de Cachan, Paris, May, 2005.

On the implementation of hierarchy in the ventral visual pathway. The 2005 Summer School, "Math and the Brain," Mathematics Institute of Jussieu, University of Paris VI and VII, France, June, 2005.

Nonlinearities and the distinction between functional and anatomical connectivity. An Anniversary Conference Celebrating Steve Grossberg at 65 and CNS at 15, Boston University, September, 2005.

Hierarchical structure in vision and language. Frontiers of Statistical, Mathematical and Computational Sciences, George Washington University, September, 2005.

At what time scale does the nervous system operate? Department of Statistics, Yale University, January, 2006.

Context and hierarchy in a probabilistic image model. Google Research, New York, NY, May, 2006.

Towards image parsing. Visual Learning and Recognition Workshop, Institute for Mathematics and its Applications, May, 2006.

Representation and computation in natural vision. Collaborative Research in Computational Neuroscience, Principle Investigator Meeting, National Science Foundation, Washington, DC, June, 2006.

Context and hierarchy in a probabilistic image model. IEEE Conference on Computer Vision and Pattern Recognition, June, 2006.

Bio-inspired scene understanding. Conference sponsored by the Office of Naval Research, Washington, DC, July 2006.

Hierarchy in the ventral visual pathway. Center for the Neural Basis of Cognition, Carnegie Mellon University, January, 2007.

Parsing images with context/content sensitive grammars. Workshop on Challenges and Opportunities in Image Understanding, University of Maryland, January, 2007.

Generative models for image understanding. Distinguished Professor S. James Press Endowed Lecture, U. of California, Riverside, April, 2007.

On building strong representations for image understanding, Google Research, Mountain View, CA, May, 2007.

Hierarchy and reusability in image analysis: the Brown school. Meeting to honor David Mumford's 70'th birthday, Newport, RI, June, 2007.

Probabilistic grammars for vision. The Mathematics of Mind, graduate summer school, Institute for Pure and Applied Mathematics, U. of California, Los Angeles, July, 2007.

Some mathematical issues in image analysis. Departamento de Matemática, Universidade de Fortaleza, Brazil, October, 2007.

Some mathematical issues in image analysis. International Workshop on Object Categorization, ICCV 2007, Rio de Janiero, Brazil, October, 2007.

Compositionality in vision. The Grammar of Vision: Probabilistic Grammar-Based Models for Visual Scene Understanding and Object Categorization, NIPS 2007, Whistler, Canada, December, 2007.

***Grants***

1980–83 U. S. Army Research Office Contract, "Nonparametric estimation by the method of sieves," Co-principal investigator.

1983 (Three year grant) U. S. Army Research Office Contract, "Nonparametric estimation by the method of sieves," Co-principal investigator.

1983 (Three year grant) National Science Foundation, "Techniques for Nonparametric Estimation," Principal investigator.

1983 Department of Defense University Research Instrumentation Program, proposal for large–scale scientific computing equipment, participant.

1984 Renewal of U. S. Army Research Contract, "Nonparametric estimation by the method of sieves," Co-principal investigator.

1985 Renewal of U. S. Army Research Contract, "Nonparametric estimation by the method of sieves," Co-principal investigator.

1985 Three-year ONR Grant, "Application of Stochastic Relaxation and Simulated Annealing to Problems of Inference and Optimization," Principal investigator.

1984 NSF five-year (Presidential Young Investigator) grant, "A Mathematics for Parallel Processing with Applications to Problems in Inference and Optimization," Principal investigator.

1984 Industrial support from Analog Devices (PYI-matching funds), Principal investigator.

1985 Industrial support from North American Philips Corporation (PYI-matching funds), Principal investigator.

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1986, 1987, 1988 Industrial support from General Motors Corp. (PYI-matching funds), Principal investigator.

1986–1991, University Research Initiative Program, Center for Intelligent Control Systems (Brown–Harvard–MIT), funded by the U.S. Army Research Office, (joint with Fleming, Grenander, Kushner, and McClure in the Division of Applied Mathematics).

1988 Department of Defense University Research Instrumentation Grant, "Image Acquisition and Processing Equipment for Machine Vision," participant.

1988–1990 Office of Naval Research Contract, "A Mathematical Framework for Image Analysis," Co-principal investigator together with U. Grenander and D.E. McClure.

1989 Industrial support from General Motors Corporation, Principal investigator.

1989–1992 National Science Foundation Grant, "A Mathematical Framework for Image Analysis," Co-principal investigator together with B. Gidas, U. Grenander, and D.E. Mc-Clure.

1990-1992 Office of Naval Research Grant, "Mathematical Methods for Object Recognition," Co-principal investigator with B. Gidas and U. Grenander, and D.E. McClure.

1991, one-year ONR Supplement, principal investigator.

1991 Army Research Office Grant for Computing Equipment.

1992, one-year ONR Supplement, principal investigator.

1992–1997, University Research Initiative Program, "Foundations of Intelligent Systems," Center for Intelligent Control Systems (Brown-Harvard-MIT), funded by the US Army Research Office, (joint with Fleming, Gidas, Grenander, Kushner, and McClure in the Division of Applied Mathematics).

1993-1996, National Science Foundation, "Mathematical and Computational Problems in Object Recognition," Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure.

1992-1995 Office of Naval Research, Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure, AASERT Grant for Graduate Student Support,

1992-1995 US Army Research Office, Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure, AASERT Grant for Graduate Student Support, Three-year grant of

1993-1996 Office of Naval Research Grant, “Model-Based Object Recognition,” Co-principal investigator with B. Gidas and U. Grenander, and D.E. McClure

1993-1996 US Army Research Office, Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure, AASERT Grant for Graduate Student Support.

1993-1998 Advanced Research Projects Agency (ARPA), “Foundations of Object Detection and Recognition,” Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure

1994–1995 Department of Defense University Research Instrumentation Program, “Computational Resources for Image Modeling and Object Recognition,” Co-principal investigator with S. Geman, B. Gidas, U. Grenander, and D.E. McClure

1995–2000 Department of Defense Focused Research Initiative, “Algorithms for Image Compression, Distributed Communication Networks and Distributed Resource Allocation,” Co-principal investigator with B. Gidas, U. Grenander, D.E. McClure, and S. Ghosh (Arizona State University)

1996–1997, Office of Naval Research, “Recognition Algorithms for Wide-Area Surveillance,” Co-principal investigator with B. Gidas, U. Grenander, D.E. McClure, and D. Geman (UMass)

1996–1998, Department of Defense University Research Instrumentation Program, “Network and Graphics Systems for Image Modeling,” Co-principal investigator with B. Gidas, U. Grenander, and D.E. McClure

1996-2001, U.S. Army Research Office, “Vision Strategies and ATR Performance,” Co-principal investigator with B. Gidas, U. Grenander, D.E. McClure, and D. Mumford,

1997-1999, Office of Naval Research, “Mathematical Foundations for Object Recognition and Image Analysis,” Co-principal investigator with B. Gidas, U. Grenander, D.E. McClure, and D. Geman (UMass)

1997-2000, National Science Foundation, “Structured Statistical Learning,” Co-principal investigator with faculty from Cognitive Sciences, Computer Science, Neuroscience, and David Mumford from Applied Mathematics.

1998-2001, National Science Foundation, IGERT, “Learning and Action in the Face of Uncertainty: Cognitive, Computational and Statistical Approaches,” Co-principal

investigator with faculty from Cognitive Sciences, Computer Science, and David Mumford from Applied Mathematics.

1999-2003, Burroughs Wellcome Fund, "Brain Science Interfaces Program," Co-principal investigator with faculty from Cognitive Sciences, Computer Science, Neuroscience, Physics, and David Mumford from Applied Mathematics

2001-2004, National Science Foundation, "Mathematical Analysis of the Compositional Structure of Images," Co-principal investigator with U. Grenander, M. Johnson, D.E. Mc-Clure, D. Mumford

2002-2005, U.S. Army Research Office, "Coarse-to-Fine Computational Vision," Co-principal investigator with D. Geman

2004-2009, National Science Foundation, ITR, "Triage and the Automated Annotation of Large Image Data Sets," Co-principal investigator with D. Geman (Johns Hopkins), L. Younes (Johns Hopkins), and Y. Amit (U. Chicago).

2004-2007, National Science Foundation, CRCNS, "Representation and Computation in Natural Vision," Co-principal investigator with E. Bienenstock, M. Paradiso, and D. Sheinberg.

2006-2009, Office of Naval Research, "Multi-Modal Parsing and the Semantic Content of Images and Language," Principal investigator.

## Teaching

### *Courses (since 1980)*

Winter, 1980, Statistical Inference (AM 166)
Fall, 1980, Statistical Inference (AM 165)
Fall, 1980, Independent Study (AM 193)
Winter, 1981, Statistical Inference (AM 166)
Winter, 1981, Independent Study (AM 194)
Winter, 1981, Independent Study (AM 294)
Winter, 1981, GISP
Summer, 1980, through Winter, 1981, Honors Thesis (Joyce Anderson)
Fall, 1981, Real Analysis (AM 211)
Fall, 1981, Independent Study (AM 293)
Winter, 1982, Hilbert Spaces (AM 212)
Fall, 1982, Real Analysis (AM 211)
Winter, 1983, Hilbert Spaces (AM 212)
Winter, 1983, Honors Thesis (Irvin Lustig)
Winter, 1983, Honors Thesis (Jennifer Lynch)
Fall, 1984, Real Analysis (AM 211)

Winter, 1985, Hilbert Spaces (AM 212)
Fall, 1985, Real Analysis (AM 211)
Fall, 1986, Probability (AM 263)
Winter, 1987, Probability (AM 264)
Fall, 1987, Differential Equations (AM 33)
Fall, 1988, Probability (AM 263)
Winter, 1989, Probability (AM 264)
Fall, 1989, Real Analysis (AM 211)
Winter, 1990, Hilbert Spaces (AM 212)
Winter, 1992, Methods of Applied Mathematics (AM 33)
Winter, 1992, new course: Information and Coding Theory (AM 194)
Fall, 1992, Probability and Stochastic Processes (AM 263)
Fall, 1992, Two independent study (reading) courses.
Winter, 1993, Probability and Stochastic Processes (AM 264)
Fall, 1993, Real Analysis (AM 211)
Fall, 1994, Real Analysis (AM 211)
Fall, 1995, Statistical Inference (AM 165)
Fall, 1995, Independent Study (AM 193)
Fall, 1996 (AM193), Winter, 1997 (AM194), Independent Study—The Statistics of Black Jack
Fall, 1996, Computational Probability and Statistics (AM 169)
Winter, 1997, Information and Coding Theory (AM 194)
Fall, 1998, Computational Probability and Statistics (AM 193)
Winter, 1999, Independent Study (honors thesis)—Independent Components Analysis
Winter, 1999, Operations Research: Probabilistic Models (AM 120)
Fall, 1999, Differential Equations (AM 33)
Winter, 2000, Mathematical Statistics II (AM 268)
Winter, 2001, Mathematical Methods in the Brain Sciences (AM 40)
Fall, 2001, Mathematical Methods in the Brain Sciences (AM 40)
Winter, 2002 Independent Study—Computer Recognition of Speech (completed Fall, 2002)
Fall, 2002, Computational Probability and Statistics (AM 169)
Fall, 2002, Information Theory (AM 171)
Fall, 2003, Mathematical Methods in the Brain Sciences (AM 41)
Fall, 2003, Information Theory (AM 171)
Fall, 2004, Information Theory (AM 171)
Fall, 2005, Holdem Poker (AM 193)
Fall, 2005, Information Theory (AM 171)
Winter, 2006, Holdem Poker, Independent Study (AM 196)
Winter, 2006, Tetris Bot, Independent Study (AM 196)
Fall, 2006, Theory of Probability (AM 263)
Winter, 2006, Theory of Probability (AM264)
Fall, 2007, Recent Applications of Probability and Statistics (APMA2610)

***Ph.D. Students***

Barry Davis (June, 1982) A neurobiological approach to machine intelligence.

Aytul Erdal (January, 1983) Cross validation for ridge regression and principle component analysis.

Alan Lippman (June, 1986) Research on Bayesian methods for expert systems.

Christine Graffigne (June, 1987) Markov random fields for texture modeling and segmentation.

John Mertus (June, 1987) New reconstruction methods for single photon emission tomography.

Kevin Manbeck (May, 1990) Bayesian statistical methods applied to emission tomography with physical phantom and patient data.

Athanasios Kehagias (June, 1991) Approximation of stochastic processes by hidden Markov models.

Daniel Potter (December, 1998) Compositional vision models.

Zhiyi Chi (May, 1998) Probability models for complex systems.

Kevin Kochanek (May, 1998) Grammatical representation of algebraic codes.

Shih-Hsiu Huang (May, 2001) An image analysis system.

Brian Lucena (May 2002) Coarse-to-fine dynamic programming.

Asohan Amarasingham (October, 2003) The statistics of neuronal spike train recordings.

Ting-Li Chen (October, 2004) On the statistics of natural images.

Matthew Harrison (December, 2004) Discovering compositional structure.

Ya Jin (May, 2006) Computation and estimation in image analysis.

Yanchun Wu (in progress) Statistics in neurophysiology.

Wei Zhang (in progress) Computer vision.