CURRICULUM VITAE

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Education

1988 Ph.d. thesis - Department of Mathematics, Weizmann Institute of Science, Israel.
Subject: Approximations of non-linear diffusions and their ergodic properties.
Advisor: Marc Berger.

1984 M.Sc. - Department of Mathematics, Hebrew University, Jerusalem, Israel.
Subject: Optimal stopping and prophet inequalities.
Advisor: Arieh Dvoretzky.

1983 B.Sc. - Department of Mathematics, Hebrew University, Jerusalem, Israel.

Academic Positions

1988-1991 Visiting Assistant Professor, Division of Applied Mathematics, Brown University.

1991-1996 Assistant Professor, Department of Statistics, University of Chicago.

1996-2000 Associate Professor, Department of Statistics, University of Chicago.

2000- Professor, Departments of Statistics and Computer Science, and Senior Fellow of Computational Institute, University of Chicago.

Fellowships and Grants

1988-1990 Dr. Chaim Weizmann Post-Doctoral Fellowship For Scientific Research.

1992-1996 Army Research Office grant, Deformable templates for image analysis. DAAL03-92-G-0322.

1996-1999 Army Research Office grant, Hierarchies of spatial graphical models: a unified approach to image analysis. DAAH04-96-1-0061.

1996-2001 Department of Defence grant, Vision strategies and ATR performance: A Mathematical/Statistical formulation and critique. DAAH04-96-1-0445.

2002-2005 NSF ITR, Invariant detection and interpretation of specific objects in image data. 0219016

2004-2009 NSF ITR, Triage and the automated annotation of large image data sets. 0427223.

2007-2010 NSF, Synscenelab - A statistical analysis of feasibility and computability of scene interpretation in synthetic stochastic images. DMS-0706816.

Teaching.

Introduction to discrete Probability. Probability and Measure. Stochastic Processes. Gibbs Distributions and Large Deviations. Gaussian Processes. Introduction to Statistics. Matrix Computation. Probability and Statistics for Neuroscience. Computer Vision. Non-parametric Statistics and Pattern recognition. Statistics of Neural Recordings.

Graduate Students.

Walter Ambrosius Ph.D. December, 1995.

Title: Deformable Templates and Image Compression.

Steve Wang Ph. D. August, 1998.

Title: A Statistical Model for Computer Recognition of Sequences of Handwritten Digits, with Applications to Zipcodes.

Gilles Blanchard 1998-1999 (visiting student from Ecole Normale Superieur.)

Research topic: Multiple randomzied classifiers.

Elliot Bernstein 2001-2005

Research topic: Hierarchical part based models for object recognition.

Qingqing Xu 2001-

Research topic: Efficient boosting and coarse to fine methods for detection and classification.

Leandro Cortez 2003-

Research topic: Efficient detection and tracking of multiple events in cellular video sequences.

Post-Docs

Bruno Jedynak 1996-1997,

Research topic: Algorithms for face detection.

Keneth Wilder 1997-1999,

Research topic: Merging of detection and recognition algorithms, with applications to face detection and recognition.

Massimo Mascaro 1999-2001

Research Topic: Implementing object detection and recognition algorithms in the framework of Attractor Neural Nets.

Francois Fleuret 2000-2001

Research topic: Object detection and tracking in video sequences.

Editorial Activites

- Associate editor, Statistical Science, 2007-
- Associate editor Annals of Applied Statistics, 2006-
- Associate editor IEEE-PAMI, 2002-2006
- Associate editor Methodology and Computing in Applied Probability. 2002-2003
- Scientific Committee EMMCVPR (Energy minimization methods in computer vision and pattern recognition), 2002, 2003.
- Scientific Committee NIPS (Neural and Information Processing Systems), 2003.
- Scientific Committee NIPS (Neural and Information Processing Systems), 2004.

Manuscripts

Amit, Y. (2002), '2d Object Detection and Recognition: models, algorithms and networks', MIT Press.

Patents

Yoshida, H., Katsuragawa,S., Amit, Y., Doi, K. (2000), 'Method, apparatus, and storage medium for detection of nodules in biological tissue using wavelet snakes to characterize features in radiographic images', U.S. Patent 6,078,680.

Refereed Journal Publications

1. Amit Y. (1988) 'Approximations to diffusions and their ergodic properties', Ph.d. thesis, Department of Theoretical Mathematics, Weizmann Institute, Rehovoth, Israel.
2. Amit Y. (1989), 'Ergodic properties of Markov processes driven by a set of vector fields', Stochastics and Stochastic Reports, vol. 27, pp. 235-247.
3. Amit Y. (1991), 'A multiflow approximation to diffusions', Stochastic Processes and their Applications, vol. 37, no. 2, pp. 213-238.
4. Amit Y. and Grenander U. (1991), 'Comparing sweep strategies for stochastic relaxation', Journal of Multivariate Analysis, vol. 37, no, 2, pp 197-222.
5. Amit Y. and Piccioni M. (1991), 'A non-homogeneous Markov process for the estimation of Gaussian random fields with non-linear observations', Annals of Probability, vol. 19, no. 4, pp 1664-1679.
6. Amit Y., Grenander U., and Piccioni M. (1991), 'Structural image restoration through deformable templates', Journal of the American Statistical Association, vol. 86, no. 414, pp. 376-387.
7. Amit Y. (1991), 'On rates of convergence of stochastic relaxation for Gaussian and non-Gaussian distributions', Journal of Multivariate Analysis, vol. 38, no. 1, pp. 82-100.
8. Amit Y. and Miller M. (1992), 'Large deviations for the asymptotics of Ziv-Lempel codes for 2-d Gibbs fields', IEEE Transactions on Information Theory, Vol. 38, no. 4, pp. 1271-1276.
9. Amit Y. and Miller M. (1993), 'Large deviations for coding Markov chains and Gibbs random fields', IEEE Transactions on Information Theory, vol. 39, no. 1, pp. 109-119.
10. Amit Y. and Manbeck K. M. (1993) , 'Deformable template models for emission tomography', IEEE Transactions on Medical Imaging, Vol. 12, no. 2. pp. 260-269.

11. Miller M., Christensen G., Amit Y. and Grenander U. (1993), 'A mathematical textbook of deformable neuro-anatomies', Proc. of the National Academy of Science, Vol. R90, pp. 11944-11948.

12. Amit Y. (1994), ' A non-linear variational problem for image matching', SIAM Journal on Scientific Computing, Vol. 15, no. 1, pp. 207-224.

13. Amit Y. (1994), 'Discussion of *Representation of complex systems* by Ulf Grenander and Michael Miller', Journal of the Royal Statistical Society B., vol. 56, no. 3.

14. Amit Y. (1994), 'Large deviations and the rate distortion theorem for Gibbs distributions', Proceedings of the IT/STAT Joint IEEE/IMS workshop.

15. Amit Y. (1996), 'Convergence properties of the Gibbs sampler for perturbations of Gaussians', Annals of Statistics, vol. 24, no. 1., pp. 122-140.

16. Amit Y. and Kong A. (1996), 'Graphical templates for model registration', IEEE PAMI, vol. 18, pp. 225-236.

17. Amit Y. (1997), 'Graphical shape templates for automatic anatomy detection, application to MRI brain scans'. IEEE Trans. Medical Imaging, vol. 16, pp. 28-40.

18. Yoshida H., Katsuragawa S., Amit Y. and Doi K. (1997),' Wavelet snake for classification of nodules and false positives in digital chest radiographs', Proc IEEE Engineering in Medicine and Biology Society (IEEE-EMBS), pp. 509-512.

19. Yoshida H., Katsuragawa S., Amit Y., Doi K., (1997) 'Wavelet snake for classification of nodules and false positives in digital chest radiographs', Proc. SPIE 3169: Wavelet Applications in Signal and Image Processing V, pp. 328-337.

20. Amit Y. and Geman D. (1997), 'Shape quantization and recognition with randomized trees', Neural Computation, vol. 9, pp. 1545-1588, 1997.

21. Amit Y., Geman D., and Jedynak B. (1997), 'Efficient focusing and shape detection', *Face Recognition: From Theory to Applications*, eds. H. Wechsler et al, NATO ASI Series F, Springer Verlag, Berlin, 1997.

22. Amit Y., Geman D. and Wilder K. (1997), 'Joint induction of shape features and tree classifiers', IEEE PAMI,, vol. 19, pp. 1300-1306. 1997.

23. Amit Y. and Geman D. (1998), 'Discussion of 'Arcing Classifiers' by Leo Breiman', The Annals of Statistics, vol. 26.

24. Amit, Y. (1998), 'Deformable templates for object detection', Tutorial Notes for the IEEE International Conference on Image Processing.

25. Amit Y. and Geman D. (1999), 'A computational model for visual selection', Neural Computation, vol. 11, pp. 1691-1715.

26. Amit Y. (2000) 'A neural network architecture for visual selection', Neural Computation, vol. 12, pp. 1059-1082

27. Amit Y. and Mascaro M. (2001), 'Attractor networks for shape recognition', Neural Computation, vol. 13, pp. 1415-1442.

28. Amit Y. and Murua A. (2001), 'Speech recognition using randomized relational decision trees', IEEE Transactions on Speech and Audio Processing, vol. 9, pp. 333-342

29. Amit Y. and Mascaro, M. (2003), 'An integrated network for invariant visual detection and recognition'. Vision Research, vol. 43, pp. 2073-2088.

30. Amit Y., Geman, D. and Fan, X., (2004) 'A Coarse-to-Fine Strategy for Multi-Class Shape Detection', IEEE Trans. Pat. Anal. and Mach. Intel. vol. 26, pp. 1606-1621.

31. Bernstein, E. and Amit, Y, (2005), Part-based Models for Object Classification and Detection. CVPR 2005 (2). pp. 734-740.

32. Amit Y., Alexey Koloydenko, Partha Niyogi. (2005) 'Robust Acoustic Object Detection'. Journal of the American Acoustic Association. vol. 118, pp. 2634-2648.

33. Amit, Y. and Trouvé, A, (2007), Generative Models for Labeling Multi-Object Configurations in Images. In 'Toward Category-Level Object Recognition', Lecture Notes in Computer Science, Volume 4170, Springer.

34. S. Allassonnire, Y. Amit, and A. Trouv, (2007), Toward a Coherent Statistical Framework for Dense Deformable Template Estimation. JRSS (Series B). vol. 69, pg. 3-29.

35. Amit, Y. and Trouvé, A., (2007), POP: Patchwork of Parts Models for Object Recognition, *to appear* Intern. Jour. of Comp. Vis. *(appeared online).*

36. Hatsopoulos, N. G., Xu, Q. and Amit, Y. (2007), Encoding of movement fragments in the motor cortex, Journal of Neuroscience, vol. 27, pg. 5105-5114.

37. Cortés, L. and Amit, Y. (2008), Efficient Annotation of Vesicle Dynamics in Video Microscopy, to appear in IEEE PAMI special issue: Real World Image Annotation and Retrieval.

38. Romani, S., Amit D. and Amit, Y., (2008), Optimizing one-shot learning with binary synapses, to appear in Neural Computation.

Technical Reports

1. Krempp, S., Geman, D. and Amit, Y., (2002), Sequential Learning of Reusable Parts for Object Detection. Dept. of Statistics, University of Chicago.

2. Amit Y., Blanchard G. (2001), 'Multiple randomized classifiers: MRCL'. Dept. of Statistics, University of Chicago.

3. Yoshida, H. and Amit Y. (1998), 'Computer-aided diagnosis in chest radiographs: Reduction of false positives by removal of normal anatomical structures based on symmetry between left and right lung regions'.

4. Amit Y. and McCullagh P. (1993), 'Extremal convex sets and the three corner theorem', Technical report no. 372, Dept. of Statistics, University of Chicago.

5. Amit Y., Grenander U., Miller M. (1992), 'Ergodic properties of jump diffusion processes', Technical report no. 361, Dept. of Statistics, University of Chicago.

6. Amit Y. (1992), 'On the equivalence of functions on the unit square modulo composition', Technical report no. 338, Department of Statistics, University of Chicago.

7. Amit Y. (1992), 'Introduction to Gibbs distributions and large deviations of their empirical distributions', Preprint, Dept. of Statistics, University of Chicago.

Recent Invited Conference Lectures

- 'A computational model for visual attention', 3rd NECI workshop on vision, February, 1998.
- 'Deformable Templates for Object Detection', Tutorial given at the IEEE-International Conference on Image Processing, September, 1998.
- 'Deformable templates for object detection: From snakes to spiders and back', Tutorial at CIRM center Luminy, France, in workshop on Mathematical Models for Object Recognition. April, 1999.
- 'Star type graphical models for efficient object detection', DIMACS workshop on Graph Theoretic methods in Computer Vision, Rutgers, May 1999.
- 'Analysis of visual and acoustic data with sparse relational models of local features', Euro-conference in Mathematics, Computer Vision and Speech Recognition, Statistical Foundations and Applications. Anogia, Crete, July 1999.
- 'Efficient object detection in visual scenes', Joint IMS-Bernoulli, meeting in Mexico, May 2000.
- 'How far can we get with counting binary features?', MIA 2000, Ecole Polytechnique, Paris, May 2000.
- 'Common themes in object detection and recognition in visual and acoustic scenes.' NSF workshop on Pattern Recognition, University of Michigan, March 2002.
- 'Statistical methods and learning in computer vision', Minitutorial, SIAM 2002 Annual Meeting, Philadelphia, July 2002. (Joint with D. Geman and A. Trouve.)
- 'Computational and Biological models Object Detection and Recognition', June (2003). Lecture Series at 'Etat de la Recherche' conference at Ecole Normale Superieur-Cachan.
- International Workshop on Object Recognition. October (2004). Sicily, Italy.
- MSRI Workshop on Pattern Classification, Learning Theory, and Object/Scene Recognition. March (2005). Berkeley, California.
- IMA Workshop on Visual Learning and Recognition, May (2006). University of Minnesota, Minneapolis, Minnesota.
- International Center for Neural Computation, Jerusalem Israel, Feb. (2008), From Perception to Action and Back.

Recent Workshop organization

- 'Pattern Recognition', Organizer and chair of session in the Joint IMS-Bernoulli, meeting in Mexico, May 2000.
- 'Mathematics in Image Analysis', co-organizor of meeting in Ecole Polytechnique, Paris, September 2000.
- 'High-Level Vision' co-organizor of IMA workshop, November 2000.

Recent Colloquium lectures

- University of Paris 13, March 2001.
- Unversity of California Los-Angeles, February 2002.

- Courant Institute, New York University, January 2003.
- IAC Rome, June 2004.
- ENS Cachan, October 2004.
- University of Northern Illinois, November 2004.
- Université de Rennes I, June 2005.
- University of Montreal, October, 2006.
- University of Toronto, October, 2007.

Refereeing

Annals of Applied Probability, Annals of Statistics, Journal of the American Statistical Association, Canadian Journal of Statistics, Journal of the Royal Statistical Society, Stochastics, IEEE Trans. Medical Imaging, Radiology, IEEE Trans. on Information Theory, IEEE Trans. on Pattern Analysis and Machine Intelligence, Journal of Computational Geometry, IEEE Transactions on Image Processing, Neural Computation, International Journal of Computer Vision.