Eric L. Miller

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Research Interests

Signal and image processing with an emphasis on physics-based tomographic image formation and object characterization, inverse problems in general and inverse scattering in particular, regularization, statistical signal and imaging processing, and computational physical modeling. Applications explored include medical imaging, nondestructive evaluation, environmental monitoring and remediation, landmine and unexploded ordnance remediation, and automatic target detection and classification.

Education

Massachusetts Institute of Technology **Cambridge, MA**
PH.D IN ELECTRICAL ENGINEERING, AUGUST 1994

- Thesis with Professor Alan Willsky, "The Application of Multiscale and Stochastic Techniques to the Solution of Inverse Problems", addressed the use of multiresolution, stochastic modeling and estimation techniques for the solution of inverse problems. Issues explored include regularization, sensor fusion, scale-recursive estimation algorithms and models, and computationally efficient implementations.

S.M. in Electrical Engineering, February 1994

- Thesis with Professor Alan Willsky, Thesis with Professor Alan Willsky carried out under auspices of MIT VI-A Cooperative Program with Loral Infrared and Imaging Systems, "Statistical Estimation of Atmospheric Transmission Parameters." Developed phenomenological model of atmospheric radiation propagation. Designed and analyzed algorithms based on model for estimation of parameters governing radiation absorption and scattering.

S.B. in Electrical Engineering, February 1990

Professional experience

Northeastern University **Boston, MA**

July 2000 - present, Associate Professor of Electrical and Computer Engineering

Sept. 1994-June 2000, Assistant Professor of Electrical and Computer Engineering

Concentrating in signal and image processing with emphasis on electromagnetic wavefield processing applications. Taught courses include discrete time signals and systems, digital signal processing, multirate filter banks theory, theory and application of linear inverse problems, wavelet signal processing, and C programming.

Massachusetts Institute of Technology **Cambridge, MA**

Fall 1991, Fall 1992 – Summer 1994, Research Assistant in the Laboratory for Information and Decision Systems.

Performed Ph.D. thesis research in area of multiscale, statistical signal processing.

Spring 1992, Teaching assistant, Recursive Estimation course.

Developed and taught bi-monthly recitations.

Spring 1990 and Spring 1991, Probabilistic Systems Analysis course.

Taught weekly recitation and tutorial sections.

Academic Year 1991. Academic advisor to three members of MIT freshman class.

Counseled in choice of course schedules and aided in determination of academic major.

Schlumberger-Doll Research **Ridgefield CT**

Summer 1991 and Summer 1992, Summer Intern

Developed statistical estimation algorithms based on multiscale modeling techniques for the solution of inverse conductivity problem.

Loral Infrared and Imaging Systems **Lexington MA**

Summers 1988 – 1990, Fall 1990, Co-op student

Master's Thesis research on the problem of statistical estimation of atmospheric transmission parameters in the ultraviolet. Developed single-scatter model of atmospheric radiation propagation. Utilized model and statistical methods for estimation of absorption and scattering parameters.

Refereed Journal Publications

"*" Represents joint work with students

1. Baussard, Alexandre, Miller, Eric L., and Lesselier, Dominique, "*Adaptive Multiscale Reconsstruction of Buried Targets,"* to appear **Inverse Problems: SPECIAL ISSUE: Electromagnetic characterization of buried obstacles,** Vol. 20, No. 6, December 2004, S1-S15

2. El Shenawee, Magda and Miller, Eric L., "Multiple-Incidence and Multi-Frequency for Profile Reconstruction of Random Rough Surfaces Using the 3-D Electromagnetic Fast Multipole Model," IEEE Trans. Geoscience and Remote Sensing, Vol. 42, No. 11, November 2004, pp. 2499-2510

3. * Coric, Srdjan, Leeser, Miriam, Miller, Eric, and Trepanier, Marc, "*Parallel-Beam Backprojection: an FPGA Implementation Optimized for Medical Imaging*," **The Journal of VLSI Signal Processing-Systems for Signal, Image, and Video Technology,** Volume 39, Number 3 (2005).

4. * Szabo, Thomas L., Karbeyaz, Basak Ulker, Cleveland, Robin O., and Miller, Eric L. "*Determining the pulse-echo electromechanical characteristic of a transducer using flat-plates and point targets*" **The Journal of the Acoustical Society of America,** Vol. 116, No 1, pp. 90-96.

5. * Tarokh, A. B., E. L. Miller, I. J. Won, and H. Huang (2004), *"Statistical classification of buried objects from spatially sampled time or frequency domain electromagnetic induction data*," **Radio Sci**., Vol 39, Np. 4, July/August, 2004, p RS4S05-1-RS4S05-11.

6. * Xu, Xiaoyin, Miller, Eric L., Chen Dongbin, and Sarhadi, Mansoor, "*Adaptive Two-pass Median Filter to Remove Impulse Noise in Highly Corrupted Images*," **IEEE Transactions on Image Processing**, Vol. 13, No. 2, February, 2004, p 238-247.

7. * Baussard, Alexandre, Miller, Eric L., and Prémel, Denis, "*Adaptive B-spline scheme for solving an inverse scattering problem*," **Inverse Problems** , Vol. 20, No. 2, April 2004, pp. 347-365.

8. * Li, Ang, Zhang, Q., Culver, J. P., Miller, E. L., and Boas, D.A., "*Reconstructing Chromophore Concentration Images Directly by Continuous-Wave Diffuse Optical*

Tomography," **Optics Letters**, Vol. 29, No. 3, pp. 256-258.

9. Li, Ang, Miller, Eric L., Kilmer, Misha E., Brukilacchio1, Thomas J., Chaves, Tina, Stott, Jonathan, Zhang, Quan, Moore, Richard H. Kopans, Daiel B., and Boas, David A. "*Tomographic Optical Breast Imaging Guided by 3-D Mammography*," **Applied Optics**, Vol. 42, No. 25, Sept 1, 2003, pp.5181-5191.

10. * Miller, Eric L., Cheney, Margaret, Kilmer Misha K., Boverman, Gregory, Li, Ang, Boas, David, "*Feature-Enhancing Methods for Limited View Tomographic Imaging Problems*," **Subsurface Sensing Technologies and Applications,** Vol. 4, No. 4, October 2003, pp. 327-353.

11. * Xu, Xiaoyin, Miller Eric L., and Rappaport, Carey M., "*Minimum entropy regularization in frequency-wavenumber migration to localize subsurface objects*," **IEEE Transactions on Geoscience and Remote Sensing**, Vol. 41, No. 8, August 2003, pp. 1804-1812.

12. Kilmer, Misha, Miller Eric L., Barbaro, Alethea, Boas David A., "*3D Shape-Based Imaging for Diffuse Optical Tomography*," **Applied Optics Special Issue on Topics in Biomedical Optics**, Vol. 42, No. 16, June 1, 2003**,** pp. 3129-3144**.**

13. * Boverman, Gregory, Miled, Mohamed Khames, Miller, Eric L., "*Recent Work in Shape-Based Methods for Diffusive Inverse Problems*," **Review of Scientific Instruments**, Vol. 74, No. 4, April 203, pp. 2580-2582.

14. * Dufour, Roger, Miller, Eric L., Galatsanos, Nikolas, "*Template Matching Based Object Recognition with Unknown Geometric Parameters*", **IEEE Trans. Image Processing**, Vol. 11, No. 12, December 2002, pp. 1385-1396.

15. * Hoge, W. Scott, Miller, Eric L., Lev-Ari, Hanoch, Brooks, Dana H., and Panych, Lawrence P., "*A Doubly Adaptive Approach to Dynamic MRI Sequence Estimation*," **IEEE Trans. on Image Processing**, Vol. 11, No. 10, October 2002, pp. 1168 - 1178

16. * Belge, Murat, Kilmer Misha, Miller, Eric L., "*Efficient Determination of Multiple Regularization Parameters in a Generalized L-Curve Framework*," **Inverse Problems**, Vol. 18, August 2002, pp. 1161-1183

17. * Xu, Xiaoyin, Miller, Eric L., Rappaport, Carey, and Sower, Gary, "*Statistical Method to Detect Subsurface Objects Using Array Ground Penetrating Radar Data*," **IEEE Trans. Geoscience and Remote Sensing**, Vol. 40, No. 4, April 2002 pp. 963 -976**.**

18. Kilmer, Misha, Miller, Eric L., Rappaport, Carey, "*QMR-Based Projection Techniques for the Solution of Non-Hermitian Systems with Multiple Right-Hand Sides*," **SIAM Journal on Scientific Computing**, Vol. 23 No. 3, 2001, pp. 761-780.

19. Boas, D.A., Brooks, D.H., Miller, E.L., DiMarzio, C.A., Kilmer, M., Gaudette, R.J., Quan, Zhang, "*Imaging the body with diffuse optical tomography,*" **IEEE Signal Processing Magazine**, Vol. 18, No. 6, November 2001, pp. 57—75

20. El-Shenawee, M., Rappaport, C., Miller, E. L., Silevitch, M.B. "*Three-dimensional subsurface analysis of electromagnetic scattering from penetrable/PEC objects buried under rough surfaces: use of the steepest descent fast multipole method,*" **IEEE Trans. Geoscience and Remote Sensing**, Vol. 39, No. 6, June 2001, pp. 1174--1182

21. * Hoge, Wm. Scott, Miller, Eric L., Lev-Ari, Hanoch, Brooks, Dana H., Karl, W. Clem, and Panych, Lawrence P., "*An efficient region of interest acquisition method for*

magnetic resonance imaging," **IEEE Trans. on Image Processing**, Vol., 10, No. 7 July 2001, pp., 1118 -1128.

22. * Sahin, Adnan and Miller, Eric L., "*Model-Based Multiple Object Detection Using High-Resolution Near Field Array Processing*", **IEEE Transactions on Geoscience and Remote Sensing**, Vol. 39 No. 1, January 2001, pp. 136 -141.

23. Miller, Eric L., "*Introduction to Focus Issue on Diffuse Optical Tomography*," **Optics Express**, Vol. 7, No. 13., Dec. 18, 2000, p. 461.

24. Kilmer, Misha, Miller Eric L., Boas, David, and Brooks, Dana, "*A shape-based reconstruction technique for DPDW data*," **Optics Express**, Vol. 7, No. 13, Dec. 18, 2000, pp. 481-491.

25. (Invited paper) Dorn, Oliver, Miller, Eric L. and Rappaport, Carey M, "*A shape reconstruction method for electromagnetic tomography using adjoint fields and level sets*," **Inverse Problems: Special issue on Electromagnetic Imaging and Inversion of the Earth Subsurface**, Vol. 16 October 2000, pp. 1119-1156.

26. (Invited paper) Miller, Eric L., Kilmer, Misha, and Rappaport Carey, "*A New Shape-Based Method for Object Localization and Characterization from Scattered Field Data*," **IEEE Trans. Geoscience and Remote Sensing: Special issue on Computational Wave Issues in Remote Sensing, Imaging and Target Identification, Propagation, and Inverse Scattering**, Vol. 38, No. 4, July 2000, pp. 1682-1696.

27. (Invited paper) Eric L. Miller, Ibrahim Yavuz, Lena Nicolaides, and Andreas Mandelis, "*An adaptive, multiscale inverse scattering approach to photothermal depth profilometry*," **Circuits, Systems, and Signal Processing: Special issue on Advanced Signal/Image Restoration**, Vol. 19, No. 4, 2000, pp. 339-363.

28. Gaudette, Richard J., Brooks, Dana H., DiMarzio, Charles A., Kilmer, Misha E., Miller, Eric L., Gaudette, Tom, and Boas, David A., "*A Comparison Study of Linear Reconstruction Techniques for Diffuse Optical Tomographic Imaging of Absorption Coefficient*," **Physics in Medicine and Biology**, Vol. 45, No. 4, April 2000, pp. 1051--1070.

29. * Belge, Murat and Miller, Eric L., "*A Sliding Window RLS-like Adaptive Filtering Algorithm for Filtering α–stable Noise*," **IEEE Signal Processing Letters**, Vol. 7, No. 4, April 2000, pp. 86--89.

30. * Belge, M., Kilmer, M. and Miller, Eric L., "*Wavelet Domain Image Restoration with Adaptive Edge-Preserving Regularization*", **IEEE Trans. on Image Processing**, Vol. 9, No. 4, April 2000, pp. 597--608.

31. Rappaport, Carey M., Kilmer, Misha and Miller, Eric L. "*Accuracy Considerations in Using the PML ABC with FDFD Helmholtz Equation Computation*," in press **International Journal of Numerical Modeling, special issue on the PML**, Vol. 13, 2000, pp. 471-482.

32. * Dufour, Roger and Miller, Eric L, "*Statistical Signal Restoration with Wavelet Domain Prior Models*," **Signal Processing**, Vol. 78, pp. 289-307, 1999.

33. * Sahin, Adnan and Miller, Eric L., "*Electromagnetic Scattering-Based Array Processing Methods for Near-Field Object Characterization*," **Journal of Electromagnetic Waves and Applications**, Vol. 13, pp. 1209--1236, 1999.

34. Marengo, Edwin A., Rappaport, Carey M., Miller, Eric L., "*Optimum PML ABC Conductivity Profile in FDFD*," **IEEE Trans. on Magnetics**, Vol. 35, No. 3, May 1999, pp. 1506--1509.

35. Miller, Eric L., "*Efficient Computational Methods for Multiscale Linear Gaussian Signal Restoration Problems*," **IEEE Trans. on Signal Processing**, Vol. 47, No. 4, April 1999, pp. 1184--1188.

36. Miller, Eric L., "*Statistically Based Methods for Anomaly Characterization in Images from Observations of Scattered Radiation*," **IEEE Trans. on Image Processing**, Vol. 8, No. 1, Jan. 1999, pp. 92-101.

37. Miller, Eric L., Nicolaides, Lena, and Mandelis, Andreas, "*Nonlinear Inverse Scattering Methods for Thermal Wave Slice Tomography: A Wavelet Domain Approach*," **Journal of the Optical Society of America (A)**, Vol. 15, No. 6, June 1999, pp. 1545-1556.

38. * Sahin, Adnan and Miller, Eric L., "*Recursive T-Matrix Methods for Scattering from Multiple Dielectric and Metallic Objects*." **IEEE Trans. on Antennas and Propagation**, Vol. 46, No. 5, May 1998, pp. 672--678.

39. * Sahin, Adnan and Miller, Eric L., "*Recursive T-Matrix Methods for Metallic Scattering Problem*," **Microwave and Optical Technology Letters**, Vol. 15, No. 6, August 1997, pp. 360--363.

40. Miller, Eric L. and Willsky, Alan S., "*Multiscale, Statistical Anomaly Detection Analysis and Algorithms for Linearized Inverse Scattering Problems*," **Multidimensional Systems and Signal Processing special issue on wavelets and multiresolution analysis**, Vol. 8, No. 1, January, 1997, pp. 151--184.

41. Miller, Eric L. and Willsky, Alan S., "*A Multiscale, Statistically-Based Inversion Scheme for the Linearized, Inverse Scattering Problem*," **IEEE Trans. on Geoscience and Remote Sensing**, Vol. 34, No. 2, March 1996, pp. 346--357.

42. Miller, Eric L. and Willsky, Alan S., "*Wavelet-based Methods for the Nonlinear Inverse Scattering Problem Using the Extended Born Approximation*," **Radio Science**, Vol. 31, No. 1, January-February 1996, pp. 51--65.

43. Miller, Eric L. and Willsky, Alan S., "*A Multiscale Approach to Sensor Fusion and the Solution of Linear Inverse Problems*," **Applied and Computational Harmonic Analysis**, Vol. 2, 1995, pp. 127--147.

Refereed Conference Publications

1. G. Boverman, E. L. Miller, J. J. Stott, and D. A. Boas, "*Linearized optical tomography using the diffusion approximation in regions with curved boundaries*," in **Proceeding of the OSA Biomedical Topical Meeting on Advances in Optical Imaging and Photon Migration**, 2004
2. El-Shenawee, Magda, "*Modeling the Resonance Phenomenon of Electromagnetic Waves Scattered from Malignant Breast Cancer Tumors*," **Proc. of the IEEE AP-S International Symposium and URSI Radio Science Meeting**, p. 224 (URSI), Monterey, CA, June 20-25, 2004.
3. El-Shenawee, Magda and Miller, Eric L.,, "*Inverse Scattering Computational Algorithm for the Reconstruction of Random Rough Profiles*," **Proc. of the IEEE AP-S International Symposium and URSI Radio Science Meeting**, vol. 1 (AP), pp. 205-

208, Monterey, CA, June 20-25, 2004.

4. * Karbeyaz, Basak Ulker, Miller, Eric, Cleveland, Robin O., and Roy, Ronald A., "*Adaptive linearized modeling and inversion for 3D tissue characterization*," **146th Meeting of the Acoustical Society of America**, Austin TX, November 2003.

5. * Karbeyaz, Basak Ulker, Miller, Eric, Cleveland, Robin O., and Roy, Ronald A., "*Quantitative object localization and characterization from broadband ultrasonic backscatter*," **146th Meeting of the Acoustical Society of America**, Austin TX, November 2003.

6. Baussard, Alexandre, Miller, Eric L., Premel, D., "Detection and Characterization of Buried Objects Using an Adaptive B-Spline Scheme," to appear at 2003 International Geoscience and Remote Sensing Symposium, Toulouse FRANCE, July 21-25, 2003.

7. Baussard, Alexandre, Miller, Eric L., Li, Xin, Premel, D., "Adaptive B-Spline Approach for Inverse Scattering Problems," **2003 IEEE AP-S International Symposium and URSI National Radio Science Meeting**, Columbus, Ohio, June 22-27, 2003

8. EL-Shenawee, Magda, Miller, Eric L., Rapaport, Carey, "Polarimetric Scattering from Dielectric Targets Buried Beneath 2-D Randomly Rough Surface," **2003 IEEE AP-S International Symposium and URSI National Radio Science Meeting**, Columbus, Ohio, June 22-27, 2003.

9. * Jaganathan, Anupama, Miller, Eric L., "On the Determination of Inconsistent Edges in Graph-Based Segmentation Algorithms," **36th Asilomar Conference on Signals, Systems and Computers**, October 2002.

10. * Xu, Xiaoyin and Miller, Eric L., "*Adaptive Difference of Gaussians to Improve Subsurface Imagery*", **IEEE International Conference on Image Processing**, Rochester NY, October 2002.

11. * Xu, Xiaoyin and Miller, Eric L., "*Adaptive Two-Pass Median Filtering to Remove Impulsive Noise*", **IEEE International Conference on Image Processing**, Rochester NY, October 2002.

12. * Jagannathan, Anupama and Miller, Eric L., "*A Graph-Theoretic Approach to Multiscale Texture Segmentation*", **IEEE International Conference on Image Processing**, Rochester NY, October 2002.

13. * Miled, Mohamed Khames and Miller, Eric L., "*Extension Of Level-Set Curve Evolution Methods For Low-Sensitivity Imaging Problems*", **IEEE International Conference on Image Processing**, Rochester NY, October 2002.

14. * Boverman, Gregory and Miller, Eric L., "*Adjoint Field Methods For Non-Linear Tomographic Medical Imaging Problems*", **IEEE International Conference on Image Processing**, Rochester NY, October 2002.

15. * Boverman, Greg, Miller, Eric L., Boas, David, "*Three Dimensional Nonlinear Inversion for Diffuse Optical Tomography*," **First International Symposium on Biomedical Imaging**, Washington D.C., July 2002.

16. * Xu, Xiaoyin and Miller, Eric L, "*Entropy Constrained Contrast Stretch to Enhance Remotely Sensed Imagery,"* **International Conference on Pattern Recognition**, Quebec Canada, August 2002,

17. * Xu, Xiaoyin and Miller, Eric L., "*Total Variation Regularization in Velocity Estimation in Target Localization by GPR Array*," **Second IEEE Sensor Array and Multichannel (SAM) Signal Processing Workshop**, Washington, D.C., August 2002.

18. Miller, Eric L., "*Towards a Unified Framework for Diffuse Wave Imaging*," **2002 Canadian Association of Physicists Congress**, Laval Univ., Quebec Canada, June 2002.

19. * Xu, Xiaoyin and Miller, Eric L., "*Adaptive Difference of Gaussians to Improve Subsurface Imagery*", **IEEE International Geoscience and Remote Sensing Symposium**, Toronto, CANADA, June 2002.

20. * Xu, Xiaoyin and Miller, Eric L., "*Optimization of Migration Methods to Locate Buried Objects in a Lossy Medium*", **IEEE International Geoscience and Remote Sensing Symposium**, Toronto, CANADA, June 2002.

21. * Xu, Xiaoyin and Miller, Eric L., "*On the use of histogram equalization and adaptive filtering to enhance ground penetrating radar imagery*", **IEEE International Geoscience and Remote Sensing Symposium**, Toronto, CANADA, June 2002.

22. * Cheng, Jie and Miller, Eric L., "*Model-based Principal Component Techniques for Detection of Buried Landmines in Multiframe Synthetic Aperture Radar Images*", **IEEE International Geoscience and Remote Sensing Symposium**, Toronto, CANADA, June 2002.

23. * Boverman, Gregory, Miled, Mohamed Khames, Miller, Eric L., "*Recent Work in Shape-Based Methods for Diffusive Inverse Problems*," **2002 IEEE AP-S International Symposium and USNC/URSI National Radio Science Meeting**, June 2003, San Antonio TX.

24. * Boverman, Gregory, Miled, Mohamed Khames, Miller, Eric L., "*Geometric Methods for Diffuse Wave Inverse Problems*," **XII International Conference on Photoacoustic and Photothermal Phenomena**, Toronto, CANADA, June 2002.

25. * Coric, Srdjan, Lesser Miriam, Miller, Eric L., Trepanier, Marc, "*Parallel Beam Back Projection: An FPGA Implementation Optimized for Medical Imaging*," **Tenth ACM International Symposium on Field-Programmable Gate Arrays**, Monterey, CA, Feb. 2002

26. * Miller, Eric L. and Tarokh, Beeta , "*A Model-Based Statistical Approach to the Localization, Classification and Characterization of UXO and UXO-like Items from Time an Frequency-Domain Induction Data*", **2001 Partners in Environmental Technology Technical Symposium and Workshop**, November 27-29, 2001, Washington, DC

27. * Boverman, Gregory, Miled, Mohamed Khames, Miller, Eric L., "*Recent Work in Shape-Based Methods for Diffusive Inverse Problems*," **2002 IEEE AP-S/USI Symposium**, San Antonio Texas, June 2002.

28. Zhan, H., Rappaport, C. R., Miller, Eric L., "*Mine Detection under Rough Ground Surfaces using 2-D FDTD Modeling and Hypothesis Testing*," **2001 IEEE Antennas and Propagation International Symposium**, Boston MA, July 2001.

29. Miller, Eric L., "*A Unified Statistically-Based Approach to the Modeling and Processing of EMI Time and Frequency Domain Sensor Data*," **2001 URSI Meeting**, Boulder Colorado, January 2001.

30. * Hoge, Wm. Scott, Miller, Eric L., Lev-Ari, Hanoch, Brooks, Dana H., Panych, Lawrence P., Karl, W. Clem, "*An Adaptive Image Estimation Framework for Low Order Dynamic Magnetic Resonance Imaging*," **IEEE 9th Annual DSP Workshop**, October 15 - 18, 2000, Hunt, TX

31. Brooks, D. H., Gaudette, R. J., Miller, E. L., DiMarzio, C. A., Boas, D., "*An Admissible Solution Approach for Diffuse Optical Tomography*," **34th Asilomar Conference on Signals, Systems, and Computers**, October 29 - November 1, 2000.

32. Dufour, Roger, Miller Eric L., and Galatsanos, Nikolas, "*Impulse Restoration Template Matching under Geometric Uncertainties*," **IEEE International Conference on Image Processing**, September, 2000.

33. El-Shenawee, M., Miller, Eric L., and Rappaport, C. M., "*Near Field Computations of Electromagnetic Wave Scattered from Objects Buried under 2-D Random Rough Surfaces*," **2000 IEEE AP-S International Symposium and URSI Radio Science Meeting**, Salt Lake City, UT, 16-21 July 2000.

34. Xu, Xiaoyin, Miller, Eric L., Sower, Gary, and Broach, J. Thomas, "*Detection of Buried Mines from GPR Array Measurement: A Statistical Approach*," **IEEE International Geoscience and Remote Sensing Symposium**, July 2000.

35. * Xu, Xiaoyin and Miller, Eric L., "*A Statistical Approach to Multichannel Blind Signal Detection for Ground Penetrating Radar Arrays*," **IEEE Sensor Array and Multichannel (SAM) Signal Processing Workshop**, March 16-17, 2000, Cambridge, Massachusetts

36. * Hoge, W. S., Brooks, D., Lev-Ari, H., Karl, W. C., Panych, L. P., and Miller, E. L., "*Efficient Region of Interest Approximation for MR Image Acquisition*" **Proc. Int. Soc. of Magn. Reson. Med**., 1644, 1999

37. (Invited talk) Miller, Eric L. and Kilmer, Misha, "*Statistical Methods for Shape-Based Inverse Scattering*," **Proceedings of the 1999 IEEE Information Theory Workshop on Detection, Estimation, Classification, and Imaging**, Santa Fe NM, February 24-26, 1999, p. 17.

38. * Belge, Murat, Kilmer, Misha E. and Miller, Eric L., "*Efficient Selection of Multiple Regularization Parameters in a Generalized L-curve Framework*," **Linear Algebra: Theory, Application, and Computation, a Conference in Honor of Robert J. Plemmons On the Occasion of His 60th Birthday**, Wake Forest University, January 8-9, 1999. Abstract only.

39. Miller, Eric L. and Karl, W. C. "*Detection and Localization of Buried Objects from Near-Field Sensor Array Data: Physical Models and Statistical Processing*," **Proceedings of the IEEE International Conference on Image Processing**, Chicago Il., October 1998, Paper WA09_06.

40. * Dufour, Roger and Miller, Eric L. "*Image Restoration with 1/f-type Fractal Models and Statistical Estimation of the Model Parameters*," **Proceedings of the IEEE International Conference on Image Processing**, Chicago Il., October 1998, Paper TA03_04.

41. * Belge, Murat and Miller, Eric L. "*Wavelet Domain Image Restoration Using Edge Preserving Prior Models*," **Proceedings of the IEEE International Conference on Image Processing**, Chicago Il., October 1998, Paper TA03_07.

42. (Invited talk) Miller, Eric L., Nicolaides, Lena, and Mandelis, Andreas, "*Nonlinear Inverse Scattering Methods for Thermal Wave Slice Tomography*," **Proceedings of the Third International Workshop Advances in Signal Processing for Non Destructive Evaluation of Materials**, Quebec, CA, August, 1997, pp. 49--56.

43. Miller, Eric L., "*Efficient Methods for the Solution and Analysis of Statistical Linear Inverse Problems in the Wavelet Transform Domain*," **Proceedings of the Conference on Information Sciences and Systems**, Baltimore, Maryland, March 1997, pp. 574--575.

44. * Dufour, Roger M. Jr. and Miller, Eric L., "*Statistical Estimation with 1/f-Type Prior Models: Robustness to Mismatch and Efficient Model Determination*," Proceedings of the **IEEE International Conference on Acoustic, Speech, and Signal Processing**, Atlanta, GA, May 1996, Vol. 5, pp. 2491--2494.

45. Miller, Eric L., "*A Scale-Recursive, Statistically-Based Method for Anomaly Characterization in Images Based upon Observations of Scattered Radiation*," **Proceedings of the IEEE International Conference on Image Processing**, Washington D.C., November 1995, Vol. 1, pp. 490--493.

46. Miller, Eric L. and Willsky, Alan S., "*A Multiscale, Decision-Theoretic Algorithm for Anomaly Detection in Images Based upon Scattered Radiation*," **Proceedings of the IEEE International Conference on Image Processing**, Austin, Texas, November 1994, Vol. 1, pp. 845--849.

47. Miller, Eric L. and Willsky, Alan S., "*A Multiscale Approach to the Solution of One Dimensional Linear Inverse Problems,"* **Proceedings of the IEEE-SP Symposium on Time-Frequency and Time-Scale Analysis**, Victoria, BC, Canada, October, 1992, pp.129--132.

Professional Conference Publications

1. M. E. Kilmer, E. L. Miller, M. Enriquez, and D. Boas, "Cortical Constraint Method for Diffuse Optical Brain Imaging," SPIE Proceedings of the Annual Meeting, Vol. 5559, pp. 381-391

2. El-Shenawee, Magda and Miller, Eric L., "Joint Retrieval of Target and Background Electrical Parameters of Buried Objects," Proc. of the Progress in Electromagnetics Research Symposium (PIERS 2004), March 28-31, in Pisa, Italy, 2004.

3. El-Shenawee, Magda and Miller, Eric L., "Reconstruction of Two-Dimensional Rough Surface Profile using Optimization Techniques," Proc. of the Progress in Electromagnetics Research Symposium (PIERS 2004), March 28-31, in Pisa, Italy, 2004.

4. * Boverman, Gregory, Miller, Eric L., and Boas, David, "*Linear and nonlinear reconstruction for diffuse optical tomography in an inhomogeneous background*," **Proc. SPIE** Vol. 5299, p. 10-21, Computational Imaging II; Charles A. Bouman, Eric L. Miller; Eds., May 2004

5. * Tarokh, Ashley B, Miller, Eric L., and Boas, David, "*A new flexible parameterization for the estimation of 3D shape structure from scattered field data*," **Proc. SPIE** Vol. 5299, p. 304-314, Computational Imaging II; Charles A. Bouman, Eric L. Miller; Eds., May 2004

6. * Miled. Mohamed Khamed ben Hadj Miled and Miller, Eric L., "*Subspace-based analysis of the ERT inverse problem*," **Proc. SPIE** Vol. 5299, p. 315-326, Computational Imaging II; Charles A. Bouman, Eric L. Miller; Eds., May 2004

7. El Shenawee, Magda and Miller, Eric L., *"Computational algorithm for reconstructing the profile of 2D rough surfaces*," **Proc. SPIE** Vol. 5299, p. 43-50, Computational Imaging II; Charles A. Bouman, Eric L. Miller; Eds., May 2004

8. Miller, Eric L., and Mandelis Andreas, *"On imaging multiple physical parameters in an inverse problems contex*t," **Proc. SPIE** Vol. 5299, p. 51-62, Computational Imaging II; Charles A. Bouman, Eric L. Miller; Eds., May 2004

9. El-Shenawee, Magda, and Miller, Eric L., "*Covariance matrix for radar imaging of targets buried beneath two-dimensional rough surfaces*," **Proc. SPIE Vol. 5089**, p. 265-273, Detection and Remediation Technologies for Mines and Minelike Targets VIII; Russell S. Harmon, John H. Holloway, Jr., J. T. Broach; Eds.

10. El-Shenawee, Magda, and Miller, Eric L., "*Scattering from dielectric targets buried beneath 2D randomly rough surfaces*," **Proc. SPIE Vol. 5089**, p. 258-264, Detection and Remediation Technologies for Mines and Minelike Targets VIII; Russell S. Harmon, John H. Holloway, Jr., J. T. Broach; Eds.

11. * Miled, Mohamed Khames, and Miller, Eric L., "Use of secondary equivalent sources for solving electrical resistance inverse problems" **Proceedings of SPIE: Computational Imaging** Vol., 5016, January 2003, pp. 103-114.

12. * Xu, Xiaoyin and Miller, Eric L., "*A Statistical Approach to Localize Buried Objects from Ground Penetrating Radar Arrays*," **Proceedings of the Progress in Electromagnetics Symposium**, Cambridge, MA, July 2002.

13. * Boverman Gregory and Miller, Eric L., "*Adjoint-Field Methods for Shape-Based and Image-Based Diffuse Wave Inverse Problems*" **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2002.

14. * Miled, Mohamed Khames and Miller, Eric L., "*Level Set Methods for Cross-Borehole ERT*" **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2002.

15. * Cheng, Jie and Miller, Eric L., "*Model-Based Principal Component Techniques for Detection of Buried Landmines in Multiframe Synthetic Aperture Radar Images*", **SPIE Proc.: Detection and Remediation Technologies for Mine and Minelike Targets VII AeroSense Symposium**, Orlando FL, April, 2002.

16. Miled, Mohamed Khames, B. H., Miller, Eric L., "*Geometric Inversion Methods for 3D Resistance Tomography*," **First SIAM Conference on Imaging Science**, Boston MA., March 2002.

17. Miller, Eric L., Brooks, Dana, Kilmer, Misha, Brooks, Dana, Boas, David, "*Shape-Based Image Reconstruction*," **First SIAM Conference on Imaging Science**, Boston MA., March 2002.

18. Dufour, R. M., Miller, E. L., Galatsanos, N. P., "*Target detection and classification using a deformable template library*,", **SPIE Proc. Automatic Target Recognition XI**, Vol. 4379, Orlando FL, April 2001.

19. Miller, Eric L., " *Options for Statistical Classification of Buried Objects from Spatially*

Sampled Time or Frequency Domain EMI Data," **SPIE Proc.: Detection and Remediation Technologies for Mine and Minelike Targets VI**, Vol. 4394, pp. 97--107, Orlando FL, April 2001.

20. Xu, Xiaoyin, Miller, Eric L., "*A Statistical Method to Localize Buried Landmines from GPR Array Measurements*," **SPIE Proc.: Detection and Remediation Technologies for Mine and Minelike Targets VI**, Vol. 4394, pp. 742--753, Orlando FL, April 2001.

21. * Ozdemir, Mustafa, Miller, Eric L., Witten, Alan, "*Electromagnetic Modeling and Physics-based Processing Methods for Subsurface Object Characterization from Broadband Electromagnetic Induction Data*" **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2000.

22. * Xu, Xiaoyin, and Miller, Eric L., "*A Statistical Approach to Object Detection from Ground Penetrating Radar Arrays*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2000.

23. Miller, Eric L., "*Multiscale, adaptive methods for reduced order inverse scattering*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2000.

24. Dorn, Oliver, Miller, Eric L., and Rappaport, Carey, "*A Nonlinear Shape Reconstruction Algorithm For Cross-Borehole Electromagnetic Tomography Using Adjoint Fields And Level Sets*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA , July 2000.

25. * Ozdemir, Mustafa, Miller, Eric L., and Witten, Alan "*Clutter modeling and estimation methods for low metal content mine characterization from broadband electromagnetic induction data*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets V**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Orlando Fl., April 2000.

26. * Xu, Xiaoyin, Miller, Eric L., and Sower, Gary, "*Combined High-dimensional analysis of variance(HANOVA) and Sequential Probability Ratio Test(SPRT) to Detect Buried Mines*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets V**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Orlando Fl., April 2000.

27. * Dufour, Roger, Miller, Eric L., and Galatsanos, Nikolas, "*Geometric parameter estimation with a multiscale template library*," **Proceedings SPIE AeroSense Symposium, Automatic Target Recognition X**, Firooz A. Sadjadi, editor, Orlando Fl., April 2000.

28. (Invited talk) Miller, Eric L. "*Frequency Recursive Layer Stripping Methods for Photothermal Depth Profilometry Problems*," **Gordon Conference on Photoacoustic and Photothermal Phenomena** Colby-Sawyer College, New London, NH June 27-July 2, 1999.

29. Rappaport, C. M., Wu, S., Kilmer, M. E., Miller, E. L.,, "*Distinguishing Shape Details of Buried Non-Metallic Minelike Objects with GPR*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets IV**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, 1419--1428.

30. * Shi, Pengyu and Miller, Eric L. "*Baseband Wiener Filter Processing for Mine Detection from Scanned Laser Induced Acoustic Data*," **Proceedings SPIE AeroSense**

Symposium, Detection Technologies for Mines and Minelike Targets IV, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, 1373--1384.

31. Raemer, H. R., Rappaport, C. M., Miller, E. L., "*Nearfield and Timing Effects in Simulation of Focused Array Radar Signals from a Mine in Subsurface Clutter*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets IV**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, 1289--1300.

32. Weisenseel, R. A., Karl, W. C., Castanon, D. A., Miller, E. L., Rappaport, C. M., and Dimarzio, C. A. "*Statistical Fusion of GPR and EMI Data*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets IV**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, 1179--1187.

33. * Xu, Xiaoyin, Miller, Eric L. and Rappaport, Carey, "*Statistically based Sequential Detection of Buried Mines from Array Ground Penetrating Radar Data*," **Proceedings SPIE Aero-Sense Symposium, Detection Technologies for Mines and Minelike Targets IV**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, pp. 1063--1074.

34. * Ozdemir, Mustafa, Miller, Eric L., Norton, Stephen J., "*Localization and Characterization of Buried Objects from Multi-Frequency, Array Inductive Data*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets IV**, Abinash C. Dubey, James F. Harvey, J. Thomas Broach, and Regina E. Dugan editors, Vol. 3710, Orlando Fl., April 1999, pp. 26--36.

35. Li, Wen, Dimarzio, Charles A., McKnight, Stephen W., Sauermann, Gerhard O., Miller, Eric L., "*Laser-Induced Acoustic Imaging of Underground Objects*" **Proc. SPIE Environmental Monitoring and Remediation Technologies**, Tuan Vo-Dinh; Robert L. Spellicy, Vol. 3534, Feb. 1999, pp. 328-336.

36. Kilmer, Misha E., Miller, Eric L., et al, "*Direct Object Localization and Characterization from Diffuse Photon Density Wave Data*," **Proceedings SPIE, Optical Tomography and Spectroscopy of Tissue III**, Britton Chance, Roberto R. Alfano, and Bruce J. Tromberg editors, Vol. 3597, January 24--28, 1999, pp. 45--54.

37. Gaudette, R. J., Boas, D. A., Brooks, D. H. , DiMarzio, C. A., Kilmer, M. E., Miller, E. L., "*Comparison of Linear Reconstruction Techniques for 3D DPDW Imaging of Absorption Coefficient*," **Proceedings SPIE, Optical Tomography and Spectroscopy of Tissue III**, Britton Chance, Roberto R. Alfano, and Bruce J. Tromberg editors, Vol. 3597, January 24--28, 1999, pp. 55--66.

38. * Belge, Murat Kilmer, Misha, and Miller, Eric L., "*Simultaneous Multiple Regularization Parameter Selection By Means of the L-Hypersurface with Applications to Linear Inverse Problems Posed in the Wavelet Transform Domain*," **Proceedings SPIE International Symposium on Optical Science, Engineering, and Instrumentation: Bayesian Inference for Inverse Problems**, July. 1998, pp. 328--336.

39. Rappaport, Carey M., Marengo, Edwin, and Miller, Eric L. "*Conductivity Profile Optimization for the PML ABC in FDFD*," **Proceedings of the Progress in Electromagnetics Symposium**, Nantes, France, July 1998, Vol. 1, p. 307.

40. Johansen, Peter, Rappaport, C. M., Devaney, A. J. and Miller, Eric L. "*Electromagnetic*

Inversion for Multi-Bistatic Ground Penetrating Radar," **Proceedings of the Progress in Electromagnetics Symposium**, Nantes, France, July 1998, Vol. 2, p. 862.

41. (Invited talk) Miller, Eric L., Karl, W. C. "*On the Detection of Buried Objects from Inductive Arrays*," **1998 Proceedings of the Progress in Electromagnetics Symposium**, Nantes, France, July 1998, Vol. 2, p. 861.

42. * (Invited talk) Sahin, Adnan and Miller, Eric L. "*High Resolution Processing Algorithms for Near Field Object Detection: Performance Bounds and Sensitivity Analyses*," **1998 Proceedings of the Progress in Electromagnetics Symposium**, Nantes, France, July 1998, Vol. 1, p. 445.

43. Raemer, Harold, Rappaport, Carey, and Miller, Eric, "*Frequency Domain Simulation of Focused Array Radar Returns from Buried Mines in Clutter*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets III**, Abinash C. Dubey, James T. Harvey and J. Thomas Broach editors, Vol. 3392, Orlando Fl., April 13--17 1998, pp. 754--764.

44. Miller, Eric L., Karl, W. C. , and Norton, Stephen J., "*On the Detection of Buried Mines from Array Inductive Measurements*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets III**, Abinash C. Dubey, James T. Harvey and J. Thomas Broach editors, Vol. 3392, Orlando Fl., April 13--17 1998, pp. 2--13.

45. * Sahin, Adnan and Miller, Eric L., "*Performance Bounds for Matched Field Processing in Subsurface Object Detection Applications*," **Proceedings SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets III**, Abinash C. Dubey, James T. Harvey and J. Thomas Broach editors, Vol. 3392, Orlando Fl., April 13--17 1998, pp.794--807.

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47. Raemer, H., and Miller, Eric L., "*Signal Processing for Sub-Surface Object Detection*," **Proceedings of the 1997 North American Radio Science Meeting**, Montreal, CA, July 1997, p. 390.

48. * (Invited talk) Sahin, Adnan, and Miller, Eric L., "*Efficient T-Matrix Methods for GPR Forward Modeling*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA, July 1997, p. 338.

49. * (Invited talk) Sahin, Adnan, and Miller, Eric L., "*GPR Localization of Buried, Multiple Objects Using High Resolution Array Processing*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA, July 1997, p. 575.

50. (Invited talk) Miller, Eric L., Mandelis, Andreas, and Nicolaides, "*Reduced Complexity, Newton-Type Methods for Nonlinear Inverse Scattering Problems*," **Proceedings of the Progress in Electromagnetics Symposium**, Boston, MA, July 1997, p. 38.

51. * Sahin, Adnan, and Miller, Eric L., "*Object-Based Localization of Buried Objects Using High-Resolution Array Processing Techniques*," **SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets II**, Orlando Fl., April 1996,

pp.409--419.

52. (Invited Paper) Miller, Eric L. and Willsky, Alan S., "*Wavelet-Based, Stochastic Inverse Scattering Methods Using the Extended Born Approximation*," **Proceedings of the Progress in Electromagnetics Research Symposium**, Seattle, Washington, July, 1995, p. 322.

53. Miller, Eric L. and Willsky, Alan S., "*Wavelet Transforms and Multiscale Statistical Modeling Techniques for the Solution of Multisensor Inverse Problems*," **Proceedings SPIE International Symposium on OE/Aerospace Sensing, Wavelets Applications Conference**, Orlando, FL, 1994, pp. 28--39.

54. Miller, Eric et al., "*Multiresolution Signal Processing*" **The IMA Conference on Multiscale Stochastic Processes Analyzed using Multifractals and Wavelets**, Cambridge England, March, 1993, abstract only.

Books and Book Chapters

1. * Xu, Xiaoyin and Miller, Eric L., "*Image Enhancement in Ground Penetrating Radar to Detect Buried Landmines*," in **Frontiers of Remote Sensing Information Processing**, C. H. Chen, ed., World Scientific Publishing Co., September 2003.

Technical Reports

1. Miller, Eric L., "*Efficient Computational Methods for Wavelet Domain Signal Restoration Problems*," Northeastern University, Boston MA, CDSP Center Report TR-CDSP-97-41, February, 1997.
2. Miller, Eric L., "*Statistically Based Methods for Anomaly Characterization in Images from Observations of Scattered Radiation*," Northeastern University, Boston MA, CDSP Center Report TR-CDSP-96-35, January, 1996.
3. Miller, Eric L., "*The Application of Multiscale and Stochastic Techniques to the Solution of Inverse Problems*," Ph.D. Thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, August 1994.
4. Miller, Eric, "*Statistical Estimation of Atmospheric Transmission Parameters*" M.S. Thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, November, 1991.

Seminars and Workshops

1. Miller, Eric L., "*Level Set and Level Set-Like Methods for Inverse Problems*," CenSSIS Seminar at RPI, July 19, 2004.

2. Miller, Eric L., *"Geometric Methods for Multi-Parameter, Multi-Source Inverse Problems*," Institute for Mathematics and its Applications Hot Topics Workshop on Adaptive Sensing and Multimode Inversion, June 27-30, 2004.

3. Miller, Eric L., and Tarokh, Beeta, "*A Model-based Statistical Approach to the Localization, Classification and Characterization of UXO and UXO-like Items From Time and Frequency-domain Induction Data*," SERDP/ESTCP Electromagnetic Induction Workshop, Annapolis MD, February 4-5, 2004.

4. Miled Mohamed Khames Ben Hadj and Miller, Eric, "Geometric Inverse Methods for Geophysical Imaging," ," IEEE Geoscience and Remote Sensing Society Boston Chapter Meeting, January 2004.

5. Miled Mohamed Khames Ben Hadj and Miller, Eric, "On Level Sets Methods for Inverse Problems," Level Set Methods for Inverse and Optimal Design Problems, Institute for Pure and Applied Mathematics, November 22-24, 2003.

6. Miller, Eric L., "*A Rapid Tour of Variational Inverse Problems*," Massachusetts General Hospital Dept. of Radiation Oncology Seminar Series, December 17, 2002.

7. Miller, Eric L. "*Diffuse Wave Tomographic Imaging*," Harvard Division of Engineering and Applied Sciences, November 7, 2002.

8. Miller, Eric L., Khames, Mohamed, Boverman, Gregory, "*Geometric Methods for Diffuse Wave Inverse Problems*," IEEE Signal Processing Society Boston Chapter Meeting, March 2002.

9. Miller, Eric L., and Cheney Margaret, "*Advanced Methods for Subsurface Target Detection and Classification*," presented at the National Reconnaissance Office Technical Seminar Series, May 2002.

10. Miller, Eric, "*Progress in Multilook Detection and Classification Methods at Northeastern University*," **2001 Forward Looking Mine Detection Workshop**, Ft. Belvoir BA, July 2001

11. Miller, Eric, "*Limited View Tomographic Imaging*," Boston University Electrical and Computer Engineering Colloquium Lecture Series, October 2000

12. Miller, Eric, Dorn, Oliver, and Rappaport, Carey, "*Reduced Order and Object Based Methods for Limited View Tomographic Imaging Problems*," Presented at Idaho National Engineering and Environmental Laboratory Seminar Series, February 2000

13. Rappaport, Carey and Miller, Eric, "*NEU Humanitarian Demining MURI Efforts on Clutter Modeling and Inverse Scattering Methods for GPR*," JUXOCO Workshop on Ground Penetrating Radar, June 8--10, 1999.

14. Miller, Eric L. "*EM and Radar Signal Processing Methods for Buried Object Identification*," JUXOCO workshop on Active Electromagnetics Methods, January 21-22, 1999.

15. Miller, Eric L. "*Jumpy wavelet priors: A fine tale guaranteed to keep you on the edge of your seat of coarse*," MIT Stochastic Systems Group, April 1998.

16. Miller, Eric L. "*High Resolution Array Processing Methods For Buried Object Detection*," Boston section of the IEEE Geoscience and Remote Sensing Society, October 1996.

17. Miller Eric L. "*A Multiscale and Stochastic Signal Processing Approach to Inverse Scattering Problems*," Center for Interdisciplinary Research in Complex Systems at Northeastern University, February 1996.

18. Miller, Eric L. "*A Multiscale and Stochastic Signal Processing Approach to Inverse Scattering Problems*," University of Rhode Island Electrical Engineering Seminar Series, January 1996

19. Miller, Eric L. "*A Multiscale and Stochastic Signal Processing Approach to Inverse Scattering Problems*," Boston section of the IEEE Signal Processing Society, December 1995.

External Grants and Contracts

1. "*Mapping Backprojection to the Heterogeneous HPC Cluster for SAR Image Formation*" funded by AFRL. Requested level of funding: $108,251Role of Prof. Miller:: Co-PI (Prof. Miriam Leeser is the PI). One year effort to implement

backprojection operation on high performance supercomputer for application to synthetic aperture radar imaging.

2. "*Advanced, Model-Based Statistical Processing and Sensor Optimization Methods for Discrimination and Classification of UXO from EMI Data*," funded by the Strategic Environmental Research and Development program (SERDP). Level of funding: approx. $1.0 M. Role of Prof. Miller: PI. Other participants: Dr. Stephen Norton (Geophex Inc., Raleigh NC), Drs. Eugene Lavely and Peter Weichman (ALPHATECH Inc, Burlington MA). This contract is for a three year effort to develop and validate a collection of processing methods and models for the discrimination of buried unexploded ordnance from undesired scrap based on observations of time and frequency domain electromagnetic induction sensor data.

3. "*Wavelet Methods for Infrared Image Segmentation and Personnel Detection and Discrimination in IR Imagery*" submitted by Prof. Eric Miller to Textron Systems Division in January 2002. Level of funding: $100,000 for one year (all to Miller). This contract is to support work on two projects: (1) exploration of wavelet-based techniques for segmentation of infrared imagery and (2) the development of tracking and classification methods for people in infrared and video sequences.

4. "*Inverse Scattering Models and Algorithms for Functional Brain Imaging with Diffuse Optical Wavefields*," submitted by Prof. Eric Miller (Northeastern) and Prof. Misha Kilmer (Tufts Mathematics) to National Science Foundation Directorate of Engineering, Program in Biomedical Engineering. Level of funding: $296,000 over three years ($163,000 to Prof. Miller). This grant is supporting the development of inverse scattering algorithms for the identification of functional area in the brain using diffuse optical tomographic sensing technology.

5. "*Towards a Unified Approach to Diffuse Wave Imaging,"* submitted by Prof. Eric Miller (Northeastern) and Prof. Misha Kilmer (Tufts Mathematics) to National Science Foundation CISE Directorate, Signal Processing Systems Program.. Level of funding: $375,000 over three years, $195,000 to Miller. This grant is supporting the development of shape-based image formation methods for diffuse wave inverse problems arising in biomedical imaging, nondestructive evaluation, and environmental remediation.

6. "*Enhanced Technology for Vehicular Demining Sensors and Systems*," submitted by Prof. Eric Miller in Nov. 2000 to the US Army. Level of funding: $50,000 for one year all for Prof. Miller. This grant is to support work related to signal processing for the Army's advanced demining sensing systems.

7. "*Implementation of Back Projection on Reconfigurable Hardware*," submitted to Mercury Computer in September 2000 by Prof. Miriam Leeser (PI) and Prof. Eric Miller (Co-PI). Level of funding: $53,000 for one year (approx. $8,000 to Miller). Renewed in 2001. This contract is to support the analysis and development of backprojection algorithms for implementation on FPGA hardware.

8. "*Advanced Processing Methods for Environmental Remediation*," submitted by Prof. Eric Miller to the Dept. of Energy Idaho National Engineering and Environmental Remediation in April 2000. Level of funding: $100,000 for one year (all to Miller). Renewed in 2001 and 2002 at the $100,000 level per year. This contract is to develop new inversion methods for crosswell electrical resistance tomography in support of environmental remediation applications.

9. "*ATR under Target Uncertainty and Wavelet Methods for Infrared Image Segmentation*," submitted by Prof. Eric Miller to Textron Systems Division in July

2000. Level of funding: $100,000 for one year (all to Miller). Renewed in 2001 at the $100,000 level. This contract is to support work on two projects: (1) advanced methods for object classification in an image using optimization methods and (2) exploration of wavelet-based techniques for segmentation of infrared imagery.

10. "*A Unified Approach to the Processing and Fusion of Time and Frequency Domain EMI Data for UXO Discrimination*," submitted by Prof. Eric Miller to the Strategic Environmental Research and Development Program in March 2000. Level of funding: $75,000 for one year (all to Miller). The work on this contract involves the development and application of estimation and classification methods to characterize detected metal objects using low frequency induction sensors.

11. "*Proposal for Funding of Patrick Rennich: Fall 1999*," submitted by Prof. Eric Miller (PI, NU-ECE) in Nov. 1999 to MIT Lincoln Laboratory. Level of funding: $13,528 for three months all for Prof. Miller. Full overhead. Status: funded, January 2000. This grant is to support the Master's Thesis research of a Lincoln Lab employee under Prof. Miller's supervision.

12. "*Advanced Image Processing Techniques*" submitted to Textron Systems Division, Wilmington MA by Profs. Eric Miller (NU-ECE) and Michael Silevitch (NU-ECE). Awarded: July 1999 for 1 year. Total level of funding: $14,997. Level of funding to Prof. Miller: $14,997. This grant is to support the research of one of Prof. Miller's Ph.D. students, Mr. Roger Dufour, who is performing work on advanced image processing methods for automatic target recognition.

13. "*Laser Line Scan System for Underwater Measurements*" submitted to Raytheon Corporation, Tewksbury, MA by Dr. Charles DiMarzio (NU-ECE) and Prof. Eric Miller (NU-ECE). Awarded: April 1999 for 1 year. Total level of funding: $100,000. Level of funding for Prof. Miller: $50,000. This grant is supporting the development of radiative transfer based physical models and associated image formation methods for an underwater sensing system developed by Raytheon.

14. "*Characterization Technology and Data Processing for Buried Wastes and Pollution Plumes*" submitted to the Department of Energy by Profs. Carey Rappaport (NU-ECE), Fernando Miralles-Wihelm (NU-CivE), and Eric Miller (NU-ECE). Awarded: March 1998 for 3 years. Level of funding: Approx. $267,000. Level of funding for Prof. Miller: Approx. $133,000. This grant is supporting Prof. Miller's RAs and post doc on projects related to subsurface imaging and object detection using electromagnetic probing methods.

15. "*Wavelet-Based Signal Processing Methods for Automatic Target Recognition*" submitted Textron Systems Division, Wilmington MA by Prof. Eric Miller (NU-ECE) and Dr. Charles DiMarzio (NU-ECE). Awarded: December 1997 for 1 year. Level of Funding: $80,000. Level of funding for Prof. Miller: $40,000. This funding represents a renewal of funding from the 1996 calendar year for work by Prof. Miller and his group in automatic target recognition and laser radar signal processing.

16. "*The Evaluation of Wavelet Transforms for Improved DAMOCLES Clutter Rejection*" submitted to Textron Systems Division, Wilmington, MA by Prof. Eric Miller (NU-ECE). Awarded: August 1997 for 1 year. Level of funding: $40,000 entirely to Prof. Miller. This funded proposal represents academic year support from Textron under their DAMOCLES program (US Army) for a student of Prof. Miller's, Roger Dufour, who had spent the summer at TSD working on ATR in the DAMOCLES infrared imagery.

17. "*Acquisition of a High Performance Computation/Visualization Laboratory for*

Scientific Research" submitted to the National Science Foundation MRI program in Feb. 1997. Level of funding: $2 million over three years for the purchase of computational infrastructure (workstation network and parallel machine) to be shared between the Department of Electrical and Computer Engineering and the Physics Department at Northeastern. Prof. Miller was responsible for coordinating the ECE contributions to the grant that was primarily assembled by Prof. Arun Bansil of the Physics Department. Additionally, Prof. Miller wrote a short section describing a research project related to the use of a higher performance network and parallel machine for solving large-scale problems arising in imaging from scattered radiation.

18. "*Wavelet-Based Signal Processing Methods for Automatic Target Recognition*" submitted to Textron Systems Division, Wilmington MA by Profs. Carey Rappaport, Eric Miller, and Dr. Charles DiMarzio all NU-ECE. Awarded: December 1996 for 1 year. Level of Funding: $75,000. Level of funding for Prof. Miller: $25,000. Textron was interested in three Center for Electromagnetics (CER) related projects including the use of multiscale signal processing methods for automatic target recognition problems. Prof. Miller wrote this third of the proposal; specifically, sections concerned with the development of wavelet-based methods for target recognition.

19. "*An Integrated Approach to the Detection, Localization, and Classification of Mines*" submitted to the Army Research Office (ARO) under the Multidisciplinary University Research Initiative (MURI) by Prof. Eric Miller (NU-ECE) as a Co-PI with Prof. Carey Rappaport (PI, NU-ECE) and a dozen other faculty from 4 universities and four industrial partners. Awarded: February, 1997 for 5 years. Total level of funding: $5 million. Level of funding for Prof. Miller: Approx. $559,000. This grant is supporting Prof. Miller's work in the areas of fast computational models, inverse scattering, and statistical signal processing methods for the detection, localization, and characterization of buried landmines given data from electromagnetic and acoustic sensing systems.

20. "*An Integrated Approach to the Study of Inverse Methods in Electrical Engineering*" submitted to the NSF CAREER Program by Prof. Eric Miller (NU-ECE). Awarded: August 1996 for 4 years. Level of funding: $200,000 al to Prof. Miller. This proposal supports both research and course development work of Prof. Miller in the general area of inverse methods in electrical engineering.

21. "*Integrated Reduced Target Automatic Target Recognition*" submitted to Multidisciplinary University Research Initiate Program with Prof. Eric Miller (NU-ECE) as a Co-PI along with roughly a dozen other faculty from Boston University, Northeastern, MIT, University of Minnesota, NYU, and Stanford University. Awarded: July, 1995 for 5 years. Total level of funding: Approx. $5 million. Total level of funding for Prof. Miller approx. $324,000. Prof. Miller used this funding to provide summer support for himself as well as fulltime support for one graduate student. The work performed under this contract was primarily concerned with the exploration of methods to regularize linear inverse problems.

22. "Enhanced Research in Ground-Penetrating Radar and Multi-Sensor Fusion with Applications to the Detection and Visualization of Buried Waste" submitted by Prof. Miller (NU-ECE, Co-PI) and six other investigators from Northeastern University's Center for Electromagnetic Research. Awarded: April 1995 for 1 year. Total level of funding: $200,000. Level of funding for Prof. Miller: $25,000. This funding supported the development of computationally efficient physical models and advanced sensor array processing methods for the detection and localization of buried objects from ground penetrating radar type data.

Internal Grants and Contracts

1. "*Integration of Undergraduates into the Synthesis of Scientific Software Systems*," submitted to the Northeastern University Provost's Office Program in Undergraduate Research by Prof. Eric Miller. Level of funding: $9,000 to partially support the efforts of three ECE undergraduates to work with Prof. Miller's research group as co-op students during the Winter of 2002 on CenSSIS related software development projects.

2. "*Diffuse Optical Tomography: A Model Integrated Subsurface Sensing and Imaging Application*," submitted to the Center for Subsurface Sensing and Imaging Systems in April 2000 by Profs. Eric Miller (PI), Dana Brooks, Charles DiMaarzio, David Boas (Mass General Hospital/Harvard), and Misha Kilmer (Tufts) all Co-PIs. Level of funding: 9 months of release time and six RA's for one year (2 months to Miller and 3 RAs to Miller). This grant is to support work in the development of forward models and inverse processing methods for diffuse optical imaging methods as applied to breast and brain imaging problems.

3. "*Diffuse Optical Imaging*" submitted to The Northeastern University Center for Subsurface Sensing and Imaging by Prof. Dana Brooks (NU-ECE), Dr. Charles DiMarzio (NU-ECE), Dr. Misha Kilmer (NU-ECE), Prof. Eric Miller (NU-ECE), Prof. George Tsihrintzis (NU-ECE), Dr. David Boas (Mass General Hospital). Awarded: June 1998 for 1 year. Level of funding: $100,000. Level of funding to Prof. Miller: $34,000. This proposal provided support for Prof. Miller, his post doc, and graduate student to study object-based estimation methods for diffuse wave imaging.

4. "*Anomaly Detection and Localization in Three Dimensions*" submitted to the Northeastern College of Engineering for summer 1996 graduate student support through the Bellamy Philip Memorial Fund for Engineering. Level of funding: $5000 to support graduate student research during the summer of 1996. This proposal was written in response to an offer from Dean King who was making available funds to junior College of Engineering faculty to help support graduate students over the summer. Prof. Miller was the only investigator on this effort.

5. "*High Performance EM Wave Simulation and Imaging for Ground Penetrating Radar*," submitted to the Army Research Lab in July 1995 by Eric Miller (Co-PI) and five other investigators from Northeastern University's Center for Electromagnetic Research. Awarded: July 1995.

Teaching Activities

Courses taught:

1. ECE 1333: Linear Systems II (Fall 1994)
2. ECE 1733: Linear System II, honors section (Winter 1995)
3. ECE 1456, Undergraduate level Digital Signal Processing
4. (Spring 1995, Winter 1996, Spring 1996, Spring 2000, Winter 2003)
5. ECE 1234, Undergraduate level Digital Signal Processing Laboratory (Spring 1995, Winter 1996, Spring 1996)
6. ECE 3557, Special Topics in Signal Processing: Filter Banks and Wavelets (Fall 1995)
7. GE 1101, Engineering Problem Solving and Computation (Fall 1996, Fall 1997, Spring 1998, Spring 2001)
8. GE 1001, Introduction to Engineering (Fall 1996)
9. ECE 3557 (ECE G398), Special Topics in Signal Processing: Inverse Problems in Engineering and the Applied Sciences (Winter 1997, Fall 2002, Fall 2003)
10. ECE 3321: Graduate Level Digital Signal Processing (Spring 1997, Winter 1998, Winter 1999, Winter 2000, Spring 2000, Fall 2001)

11. ECE 3558: Digital Filter Banks and Wavelets (Spring 1998, Spring 1999, Winter 2001)
12. ECE G 410: Modern Signal Processing (Spring 2004)
13. ECE U464: Linear Systems (Fall 2004, Spring 2005)

Student Advising

Ph.D. Students

1. Wm. Scott Hoge. Thesis title: *Adaptive signal processing methods for Magnetic Resonance Imaging*. Graduation Date: June 2001.

2. Murat Belge. Thesis title: *Multiscale and Curvature Methods for the Regularization of Linear Inverse Problems*. Graduation date: August 1999.

3. Adnan Sahin. Thesis title: *Near Field Forward Scattering, and Object-Based Localization Algorithms for Subsurface Objects*. Graduation date: August 1998.

4. Roger Dufour. Thesis topic: Multiscale, decision-directed methods for image segmentation with applications to automatic target recognition in IR and SAR imagery. Expected Graduation Date: December 2002.

5. Xiaoyin Xu. Thesis topic: Detection, Localization, and Imaging of Buried Objects from Scattered Field Data. Expected Graduation Date: October 2002.

6. Ashley Beeta Tarokh. Thesis topic: Shape-based methods for linear inverse scattering problems. Expected graduation date: July 2005.

7. Anupama Jannathan Thesis topic: Graph-based Methods for Segmentation and Classification of Objects from of 3D Meshed Data. Expected graduation date: July 2005.

8. Basak Ulker Karbeyaz Thesis topic: Modeling and Geometric Inverse Methods for Wideband Ultrasonic Imaging. Expected graduation date: July 2005.

9. Reza Firoozabadi Thesis topic: Topcs in Multidimensional Inverse Scattering. Expected graduation date: December 2005.

10. Gregory Boverman Thesis topic: Shape and Pixel Based Methods for Diffuse Optical Tomographic Imaging with Applications to Breast Tumor Detection. Expected graduation date: December 2005.

11. Amireza Aliamiri Thesis topic: Statistical Methods for Physics-Based Paramater Estmation and Classification with Application to the UXO Problem. Expected graduation date: June 2007.

12. Damon Hyde. Thesis topic: Inverse Methods for Fluorescence Tomography. Expected graduation date: June 2007.

13. Alireza Aliamiri. Thesis Topic: Statistical Methods for Unexploded Ordnance Discrimination. Expected Graduation Date: June 2007.

MS Thesis Students

1. Roger Dufour. Thesis title: *Statistical Estimation with 1/f-Type Models*. Graduation date: May, 1997.

2. Tzipora Halevi. Thesis title: *Statistical Methods for Object Detection in a Three Dimensional Volume*. Graduation date: August, 1997.

3. Anupama Jagannathan. Thesis topic: Wavelet-based Graph Theoretic Methods for Image Segmentation. August 2002.

4. Beeta Tarokh. Thesis topic: A Model-Based Statistical Approach to the Characterization of Unexploded Ordinance from Time and Frequency-Domain Electromagnetic Induction Data. May 2003.

5. Greg Boverman. Thesis topic: Forward Modeling and Adjoint Field Inverse Methods for Diffuse Wave Inverse Problems. June 2003.

6. Damon Hyde. Thesis topic: Computationally Efficient Implementation of the Time Domain Born Approximation in Diffuse Optical Tomography. September 2004.

7. Amine Hamdi. Thesis topic: On the tracking of functional brain activity from diffuse optical wavefields. Expected graduation date: July 2005.

8. Andrey Krokhin. Thesis topic: Superresolution processing of infrared imagery. Expected graduate date: July 2005.

MS Project Students

1. Xin Li. Thesis title: "*Adaptive basis methods and edge preserving regularization for linearized inverse scattering problems*." June 2001.

2. Pengyu Shi. Project title: *Recursive processing methods for object detection and shape determination from laser-induced acoustic scattering data*. Expected graduation date: June, 1999.

3. Patrick Rennich. Project title: *Volumetric registration for fMRI*. Graduation date: June 2001.

4. Mustafa Ozdemir. Project title: *Estimation theoretic methods for object characterization from low frequency electromagnetic data*. Graduation date: June 2001.

5. Ibrahim Yavuz. Project title: *Basis adaptive methods for linear inverse problems* Graduation date: December, 1999.

6. Xiaoyin Xu. Project title: *Modeling and detection methods for rapidly moving objects*. Graduation date: March, 1998.

BS Honors Project

1. Mr. Matthew Emerson. Project title: *Statistically-based Method for Anomaly Characterization in Images*. Graduation Date: June, 1996.

Engineering-Coop Advising

1. Mr. Yves Meyer: Project title: *Design and Implementation of Processing and Modeling Tools for Processing of Electromagnetic Induction Data.* July 2004-December 2004

2. Mr. Derek Uluski. Project title: *Distributed Computing Methods for Nonlinear Inverse Scattering Problems*. January 2002-August 2003.

3. Mr Kyle Guilbert. Project title: *An Object Oriented Toolbox for Diffuse Wave Modeling and Inversion*. January 2002-August 2003.

4. Mr. Benjamin Yuen. Project title: *A Graphical User Interface for Diffuse Wave Imaging Toolbox*. January 2002-August 2003.

5. Mr. Michael Fitgibbons. Project title: *Analysis and Optimization of Jammer Excision Methods for Next Generation GPS*. June 1999 - December 1999.

Member of Thesis Committee

1. Mr. Scott Winton (MS, 1999)
2. Mr. Kadagattur G. Srinidhi (Ph.D., 1999)
3. Mr. Edwin Marengo (Ph.D., 1997)
4. Mr. Alexis Tzannes (Ph.D., 1997)
5. Ms. Ilene Herranz (MS, 1997)
6. Mr. Ross Demming (Ph.D., 1996)
7. Mr. Santosh K. Chandwani (MS, 1996)
8. Mr. Scott M. Griebel (MS, 1996)
9. Ms. Maya El-Bar (MS, 1995)
10. Mr. Kevin Reilly (MS, 1995)
11. Mr. Costa Zervos (MS, 1995)
12. Mr. Haifeng Qiu (MS, 1995)
13. Mr. Hong Liu (Ph.D., 1995)
14. Mr. Charles A. DiMarzio (Ph.D., 1995)

Departmenal, College, & University Service

- Member, Northeastern University Wide Ad Hoc Committee on Information Systems, 2004-2005
- Member and Chair, External Search Committee for ECE Chair, 2004-2005
- Member, ECE Computer Committee, 2004-2005
- Member, ECE Hiring Committee, 2004-2005
- Member and Chair ECE Library Committee, 2004-2005
- Member, Ph.D. Qualifying Exam Committee in Signals and Systems, 2004
- Member, Northeastern University Wide Ad Hoc Committee on Information Systems, 2003-2004
- Member, Northeastern University-wide Committee to Evaluate the Dean of the Northeastern Libraries, 2003-2004
- Member and Chair, ECE Library Committee, 2003-2004
- Member, Ph.D. Qualifying Exam Committee in Signals and Systems, 2003
- Member, ECE Tenure and Promotions Committee, 2002-2004
- Organizer, Signals and Systems Faculty, 2000-2001
- Member, College of Engineering Faculty Council, 2000-2001.
- Member, ECE Educational Program Committee, 2000-2001.
- Member, ECE Graduate Affairs Committee, 1999-2000.
- Member and Chair, ECE Departmental Council, 1999--2000.
- Member, ECE Web Site Committee, 1999.
- Member and Chair, ECE Departmental Council, 1998--1999.
- Organizer of Seminar Series for Communications and Digital Signal Processing Laboratory: Winter/Spring 1998.
- Member of Graduate Affairs Committee: 1997--1998
- Member of ECE Chair Search Committee: 1997--1998.
- Director of Computing Facilities for Communications and Digital Signal Processing Lab. 1997

- Member of Graduate Affairs Committee: 1996--1997
- Member of Departmental Computer Advisory Committee: 1996--1997
- Member of the Ph.D. Qualifying Exam Committee: 1995--1996.
- Member of Graduate Affairs Committee: 1995--1996.
- Member of Circuits and Systems sub-committee for the revision of the undergraduate curriculum: 1995--1996.
- Member of the Ph.D. Qualifying exam committee: 1994--1995.

Professional Service

- Co-General Chair (with Prof. Joh Kerekes of RIT) for **the International Geoscience and Remote Sensing Symposium 2008** which will be held in Boston MA
- Member, Technical Organizing Committee, **IS&T & SPIE 17th Annual Symposium on Electronic Imaging Science and Technology** and organizer of **Computational Imaging III Conference** with Prof. Charles Bouman of Purdue University, San Jose, CA, January 2005
- Member, NSF Panel Review, June 2004.
- Member, Technical Organizing Committee, **IS&T & SPIE 16th Annual Symposium on Electronic Imaging Science and Technology** and organizer of **Computational Imaging II Session** with Prof. Charles Bouman of Purdue University, San Jose, CA, January 2004
- Organizer and Chair of Session "Statistical Signal Processing with Applications to Subsurface Sensing," **2003 IEEE AP-S International Symposium and URSI National Radio Science Meeting**, Columbus, Ohio, June 22-27, 2003
- Member, NSF Panel Review, March 2003.
- Reviewer for U.S. Civilian Research & Development Foundation (CRDF), May 2002.
- Member, NSF Panel Review, June 2001.
- Reviewer for U.S. Civilian Research & Development Foundation (CRDF), May 2001.
- Local events coordinator, **Progress in Electromagnetics Research Symposium**, Boston, MA, July 2000.
- Chairman of the "Progress in Inverse Methods I" session**, Progress in Electromagnetics Research Symposium**, Boston, MA, July 2000.
- Chairman of the "Remote Sensing and Geophysical Problems" session, **Progress in Electromagnetics Research Symposium**, Boston, MA, July 2000.
- Member, technical committee, **IEEE International Conference on Image Processing**, Vancouver BC, September 2000.
- Chairman of the "Image Restoration I" session at **IEEE International Conference on Image Processing**, Vancouver BC, September 2000.
- Reviewer for NSF Theoretical Physics Program, March 2000.
- Reviewer, DEPSCor white papers, August 1999.
- Reviewer for text "*Introduction to Wavelets and Wavelet Transforms: A Primer*," by C. Sidney Burrus, Ramesh A. Gopinath, and Haitao Guo, Prentice Hall, 1998.
- Member, Program Committee, "Subsurface Sensing Technologies and Applications," **SPIE International Symposium on Optical Science, Engineering, and Instrumentation**, San Diego, July, 2000.
- Co-developer and instructor (with Prof. Leslie Collins of Duke University) of short course "Statistical Signal and Image Processing for Landmine Detection," taught at **SPIE AeroSense Symposium**, Orlando FL., April, 1999 and April 2000.
- Co-Chairman of the "Radar II" session at **SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets**, Orlando, FL., April 1999.
- Member, NSF Panel Review, March 1999.
- Member, technical program committee, **IEEE International Conference on Image**

Processing, Chicago, IL October, 1998.

- Chairman of the "Wavelet-Based Image Restoration" session **at IEEE International Conference on Image Processing**, Chicago, IL. October, 1998.
- Co-Chairman of the "Electromagnetics Methods I" session at **SPIE AeroSense Symposium, Detection Technologies for Mines and Minelike Targets**, Orlando, FL., April 1998.
- Chairman of the "Imaging Holography and Tomography" session at **Progress in Electromagnetics Research Symposium**, Boston, MA, July 1997.
- Member of technical program committee**, Progress in Electromagnetics Research Symposium**, Boston, MA, July 1997.
- Treasurer, Boston Section of IEEE, 1996--1997.
- Technical reviewer for
    - IEEE Transactions on Signal Processing
    - IEEE Transactions on Image Processing
    - IEEE Transactions on Antennas and Propagation
    - IEEE Transactions on Microwave Theory and Techniques
    - IEEE Transactions on Geoscience and Remote Sensing
    - IEE Proceedings on Image, Vision and Signal Processing
    - Journal of the Optical Society of America
    - Journal of the Acoustic Society of America
    - Radio Science
    - Applied Optics
    - Electron Letters
    - Computer Journal
    - Inverse Problems
    - Optics Express
    - Subsurface Sensing Technologies and Applications
    - 1998 International Conference on Image Processing
    - 2000 International Conference on Image Processing
    - 2002 International Conference on Image Processing
    - 2004 International Conference on Image Processing

Academic and Professional Activities

- Senior Member, IEEE, 2004-present
- Member, IEEE, 1995-2004
- Student Member, IEEE, 1991-1994
- Member, SIAM 2002-present
- Member, Optical Society of America, 1998-present
- Member, American Society for Engineering Education, 1998-2000

Awards received

- Honoree at Principal Investigators Reception, Northeastern University, December 2003. The criterion for inclusion in this group is the successful raising of over $1 million in externaly supported research funds over the last five years.
- Associate Editor, **IEEE Transactions on Geoscience and Remote Sensing,** July 2003-present.
- Outstanding Research Award in the College of Engineering, Northeastern University, June 2002
- Guest Editor, **Optics Express** special issue on Diffuse Optical Tomography and Related Inverse Problems, December 2000.
- Associate Editor for Image Analysis, **IEEE Transactions on Image Processing,** October 1999-September 2003.
- Recipient, National Science Foundation Faculty Early Career Development (CAREER) Award, 1996--2000.

- Recipient, Air Force Office of Scientific Research Graduate Fellowship 1992-1995.
- Recipient, Schlumberger - Doll Research Fellowship 1991-1992.
- Member, MIT Chapters Tau Beta Pi, Phi Beta Kappa, Eta Kappa Nu Honor Societies