

Patrick A. Kelly

Department of Electrical and Computer Engineering
University of Massachusetts, Amherst, MA 01003

- Present Position:** Associate Professor
Department of Electrical and Computer Engineering
University of Massachusetts, Amherst
- Education:** Princeton University, Department of Electrical Engineering and
Computer Science: B.S.E., 1978
- The University of Michigan, Department of Electrical and
Computer Engineering: M.S.E., 1979
- The University of Michigan, Computer, Information and Control
Engineering Program: Ph.D., 1985
- Experience:** The University of Michigan, Ultrasonic Imaging Laboratory:
Research Assistant, 1980-1983
- The University of Michigan, Department of Aerospace
Engineering: Research Assistant, 1983-1985
- The University of Massachusetts, Amherst, Department of
Electrical and Computer Engineering: Assistant Professor,
1985-1991
- The University of Massachusetts, Amherst, Department of
Electrical and Computer Engineering: Associate Professor,
1991-present
- Technical Interests:** Signal and Image Processing
Biomedical Sensing and Signal Processing
Communication Systems
Signal Detection and Estimation
Optimization Theory
- Publications:**
- Journal Papers:**
1. P. A. Kelly and W. L. Root, "Stability in Linear Detection," *IEEE Transactions on Information Theory*, vol. 33, pp. 36-46, January 1987.

2. P. A. Kelly, H. Derin and K. D. Hartt, "Adaptive Segmentation of Speckled Images Using a Hierarchical Random Field Model," *IEEE Transactions on Acoustics, Speech and Signal Processing*, vol. 36, pp. 1628-1641, October 1988.
3. H. Derin and P. A. Kelly, "Discrete-Index Markov-Type Random Processes," *Proceedings of the IEEE*, vol. 77, pp. 1485-1510, October 1989.
4. H. Derin, P. A. Kelly, G. Vezina and S. G. Labitt, "Modelling and Segmentation of Speckled Images Using Complex Data," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 28, pp. 76-87, January 1990.
5. P. A. Kelly and W. L. Root, "Stability in Linear Estimation," *IEEE Transactions on Information Theory*, vol. 38, pp. 39-49, January 1992.
6. W. Zhai, P. A. Kelly and W. B. Gong, "Genetic Algorithms with Noisy Fitness," *Mathematical and Computer Modelling*, vol. 23, pp. 131-142, June 1996.
7. J. Hokland and P. A. Kelly, "Markov Models of Specular and Diffuse Scattering in Restoration of Medical Ultrasound Images," *IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control*, vol. 43, pp. 660-669, July 1996.
8. G. Yin, P. A. Kelly and M. H. Dowell, "Approximating an Analog Diffusion Network with Applications to Image Estimation," *Journal of Optimization Theory and Applications*, vol. 107, pp. 391-414, November 2000.
9. G. Yin and P. A. Kelly, "Convergence Rates of Digital Diffusion Network Algorithms for Global Optimization with Applications to Image Estimation," *Journal of Global Optimization*, vol. 23, pp. 329-358, August 2002.
10. S. Wei, D. Goeckel and P. A. Kelly, "Convergence of the Complex Envelope of Bandlimited OFDM Signals," *IEEE Transactions on Information Theory*, vol. 56, pp. 4893-4904, October 2010.
11. B. St. Peter, S. Yngvesson, P. Siqueira, P. A. Kelly, A. Khan, S. Glick and A. Karellas, "Development and Testing of a Single Frequency Terahertz Imaging System for Breast Cancer Detection," *IEEE Trans. THz Science & Tech.*, vol. 3, no. 4, July 2013, pp. 374-386. (Also published in *IEEE Journal of Biomedical & Health Informatics*, vol. 17, no. 4, July 2013, pp. 785-797.)
12. P. A. Kelly and S. Kibria, "Complex Exponential Pseudomodes of LTI Operators Over Finite Intervals," *IEEE Signal Processing Letters*, vol. 23, no. 1, January 2016, pp. 135-138.

Articles in Books:

1. P. A. Kelly and X. Duan, "Robust Multiple Hypothesis Tests," in *Advances in Communications and Signal Processing, (Lecture Notes in Control and Information Sciences, no. 129)*, W. A. Porter and S. C. Kak, eds., pp. 91-102, Springer-Verlag, 1989.
2. P. A. Kelly and W. L. Root, "Stability in Signal Detection," in *Advances in Statistical Signal Processing, vol. 2*, H. V. Poor and J. B. Thomas, eds., pp. 101-136, JAI Press, 1993.
3. G. Yin, P. A. Kelly and M. H. Dowell, "A Recursive Algorithm for Digital Diffusion Networks and Applications to Image Processing," in *MODA 6 - Model Oriented Design and Analysis*, A. C. Atkinson, W. G. Muller and P. Hackl, eds., pp. 267-275, Springer-Verlag, 2001.

Conference Papers:

1. P. A. Kelly, "Robust Estimation and Detection of Signals with Arbitrary Parameters," *Proceedings of the Twenty-First Annual Allerton Conference on Communication, Control and Computing*, October 1983.
2. P. A. Kelly and W. L. Root, "Stable Linear Detectors with Optimality Constraints," *Proceedings of the Twenty-Second Annual Allerton Conference on Communication, Control and Computing*, October 1984.
3. P. A. Kelly and W. L. Root, "Stability of Detection of Signals in Noise," *Proceedings of the 1984 IEEE Conference on Decision and Control*, December 1984.
4. P. A. Kelly, "Asymptotically Robust Parameter Estimation for Signals in Correlated Noise," presented at the *1986 IEEE International Symposium on Information Theory*, October 1986.
5. H. Derin, P. A. Kelly and W. Zhang, "A Study of Relationships Between Markov-Type Random Process Models," presented at the *1986 IEEE International Symposium on Information Theory*, October 1986.
6. P. A. Kelly and W. L. Root, "Stability in Linear Estimation," *Proceedings of the Twenty-Fourth Annual Allerton Conference on Communication, Control and Computing*, October 1986.
7. P. A. Kelly, H. Derin and K. D. Hartt, "The Modelling and Segmentation of Speckled Images," *Proceedings of the 1987 IEEE International Conference on Acoustics, Speech and Signal Processing*, April 1987.
8. H. Derin, P. A. Kelly and K. D. Hartt, "Unsupervised Segmentation of Speckled Images," *Proceedings of the 1987 IEEE International Geoscience and Remote Sensing Symposium*, May 1987.
9. P. A. Kelly and X. Duan, "Least-Favorable Densities for Some Robust MAP Tests," *Proceedings of the 1988 Conference on Information Sciences and Systems*, Princeton University, March 1988.
10. P. A. Kelly, H. Derin and G. Vezina, "Adaptive Segmentation of Complex Speckled Images," *Proceedings of the 1988 Conference on Information Sciences and Systems*, Princeton University, March 1988.
11. H. Derin, P. A. Kelly and S. G. Labitt, "Segmentation of Multi-Look Speckled Images," *Proceedings of the 1988 IEEE International Conference on Acoustics, Speech and Signal Processing*, April 1988.
12. P. A. Kelly and X. Duan, "Robust Multiple Hypothesis Tests," *Proceedings of the 1988 International Conference on Advances in Communication and Control Systems*, October 1988.
13. H. Derin and P. A. Kelly, "Algorithms for the Segmentation of Speckled Images," *Proceedings of the 1988 Asilomar Conference on Signals, Systems and Computers*, October 1988.
14. P. A. Kelly and F. Chen, "Some Results on Robust MAP Estimation for Discrete-Valued Random Sequences," *Proceedings of the 1989 Conference on Information Sciences and Systems*, Johns Hopkins University, March 1989.
15. P. A. Kelly and F. Chen, "Robust Methods for Image Segmentation," *Proceedings of the 1990 Conference on Information Sciences and Systems*, Princeton University, March 1990.

16. P. A. Kelly and B. Wu, "Restoration and Segmentation of Complex-Valued SAR Images," *Proceedings of the 1991 Conference on Information Sciences and Systems*, Johns Hopkins University, March 1991.
17. F. Chen and P. A. Kelly, "Algorithms for Generating and Segmenting Morphologically Smooth Binary Images," *Proceedings of the 1992 Conference on Information Sciences and Systems*, Princeton University, March 1992.
18. P. A. Kelly, S. D. Hoyt and D. P. Looze, "Real-Time Radius Estimation from Optical Images of GaAs Crystal Growth," *Proceedings of the 1993 Conference on Information Sciences and Systems*, Johns Hopkins University, March 1993.
19. F. Chen and P. A. Kelly, "Iterative Segmentation Algorithms Using Morphological Operations," *Proceedings of the 1993 IEEE International Conference on Acoustics, Speech and Signal Processing*, April 1993.
20. W. B. Gong, P. A. Kelly and W. Zhai, "Comparison Schemes for Discrete Optimization with Estimation Algorithms," *Proceedings of the 1993 IEEE Conference on Decision and Control*, December 1993.
21. F. Chen and P. A. Kelly, "Robust and Morphological Processing for Small Object Detection," *Proceedings of the 1994 Conference on Information Sciences and Systems*, Princeton University, March 1994.
22. J. Hokland and P. A. Kelly, "A New Model and Algorithm for Restoring Medical Ultrasound RF Images," *Proceedings of the SPIE Conference on Medical Imaging 1995: Image Processing*, March 1995.
23. X. Cai, P. A. Kelly, and W. B. Gong, "Digital Diffusion Network for Image Segmentation," *Proceedings of the 1995 IEEE International Conference on Image Processing*, October 1995.
24. P. A. Kelly and O. Kandamar, "Morphological Filtering for Detection of Moving Objects in Image Sequences," *Proceedings of the 1996 Conference on Information Sciences and Systems*, Princeton University, March 1996.
25. G. Yin, P. A. Kelly and W. B. Gong, "Convergence Analysis of a Digital Diffusion Network," *Proceedings of the 1996 IEEE International Conference on Decision and Control*, December 1996.
26. Y. Qu, P. A. Kelly, H. Derin and W. B. Gong, "Conditional Event Algebra Techniques for Iterated Image Estimation," *Proceedings of the 1997 IEEE International Conference on Image Processing*, October 1997.
27. T. Smith and P. A. Kelly, "Random Sets Technique for Information Fusion Applied to Estimation of Brain Functional Images," *Proceedings of the SPIE Conference on Medical Imaging 1999: Image Processing*, February 1999.
28. P. A. Kelly, H. Derin and W. B. Gong, "Some Applications of Conditional Events and Random Sets for Image Estimation and System Modeling," *Proceedings of the SPIE Conference on Signal Processing, Sensor Fusion and Target Recognition VIII*, April 1999.
29. P. A. Kelly, W. B. Gong and W. Zhai, "Convergence and Choice of Comparison Schemes for Discrete Optimization Using Statistical Tests," *Proceedings of the SPIE Conference on Enabling Technology for Simulation Science III*, April 1999.
30. P. A. Kelly, H. Derin and R. Zhao, "Target Detection and Recognition Using Markov Modeling with Probability Updating," *Proceedings of the SPIE Conference on Sensor Fusion: Architectures, Algorithms and Applications IV*, April 2000.

31. P. A. Kelly, H. Derin and P. Vaidya, "Qualitative Optimization of Image Processing Systems Using Random Set Modeling," *Proceedings of the SPIE Conference on Signal Processing, Sensor Fusion and Target Recognition IX*, April 2000.
32. I.-S. Shin, P. A. Kelly, H. Derin, K. F. Lee and D. Tighe, "Template and Active Contour Matching for Automated Left Ventricle Boundary Detection," *Proceedings of the SPIE Conference on Medical Imaging: Ultrasonic Imaging and Image Processing*, February 2001.
33. R. Zhao, P. A. Kelly and H. Derin, "A Bayesian Network Using Edge Probabilities for Target Detection and Recognition," *Proceedings of the SPIE Conference on Signal Processing, Sensor Fusion and Target Recognition X*, April 2001.
34. S. Wei, D. Goeckel and P. A. Kelly, "The OFDM Signal Envelope Converges Weakly to a Gaussian Random Process: Proof and Application," *Proceedings of the 39th Annual Allerton Conference on Communication, Control and Computing*, October 2001.
35. I.-S. Shin, P. A. Kelly, H. Derin, K. F. Lee and D. Tighe, "Unsupervised Estimation of the Left Ventricular Boundary in Echocardiographic Image Sequences Using Edge Probabilities," *Proceedings of the SPIE Conference on Medical Imaging: Ultrasonic Imaging and Image Processing*, February 2002.
36. S. Wei, D. Goeckel, and P. Kelly, "A Modern Extreme Value Theory Approach to Calculating the Distribution of the Peak-to-Average Power Ratio in OFDM Systems," *Proceedings of the IEEE International Conference on Communications*, May 2002.
37. S. Wei, D. Goeckel, and P. Kelly, "On Calculating the Distribution of the Peak-to-Average Power Ratio in OFDM Systems," *Proceedings of the 2002 IEEE International Conference on Telecommunications*, June 2002.
38. I.-S. Shin, P. A. Kelly, K. F. Lee and D. A. Tighe, "Left Ventricular Volume Estimation from Three-Dimensional Echocardiography," *Proceedings of the SPIE Conference on Medical Imaging: Ultrasonic Imaging and Signal Processing*, Feb. 2004.
39. J. Hu, W. Gong and P. A. Kelly, "Search Space Reduction via Clustering for Haplotype Reconstruction," *Research in Computational Biology (RECOMB)*, March 2004.
40. I.-S. Shin, P. A. Kelly, D. A. Tighe, and M. Rosetti, "Probability Propagation Approach to Left Ventricular Volume Estimation from Three-Dimensional Echocardiography," *Proceedings 2007 IEEE International Symposium on Biomedical Imaging*, April 2007.
41. Y. Cai, T. Wolf, P. Kelly and W. Gong, "Stochastic Sampling for Internet Traffic Measurement," *Proceedings IEEE Global Internet Symposium*, May 2007.
42. J. Sun, D. Gupta, P. Kelly and W. Gong, "Analog Signal processing for Ultra High Speed Data Communication," *Proceedings Sixth IEEE International Conference on Information, Communications and Signal Processing*, December 2007.
43. D. Gupta, D. Gupta, Z. Lai and P. Kelly, "Interference Detection and Rejection in Ultra-Wideband RFID Systems," *Proceedings 2008 IEEE International Conference on Ultra Wideband*, September 2008.

44. G. Capraro, F. Blank, B. Nathanson, M. Reiser, S. Jasienowski, A. Ramakrishna and P. Kelly, "Can the Heat of Localized Soft Tissue Infections be Quantified Non-Invasively Using an Infrared Thermography Camera?" presented at the *American College of Emergency Physicians National Scientific Assembly*, November, 2008.
45. K. Andryc, R. Tessier and P. Kelly, "An Interactive Approach to Timing-Accurate PCI-X Simulation," *Proceedings IEEE/IFIP International Symposium on Rapid Systems Prototyping*, June 2009.
46. J. Sun, D. Gupta, Z. Lai, W. Gong and P. Kelly, "Indoor Transmission of Multi-Gigabit-Per-Second Data Using Millimeter Waves, presented at *2009 IEEE International Conference on Ultra Wideband*, September 2009.
47. D. Gupta, D. Gupta, Z. Lai, A. Mathew and P. Kelly, "A State Variable Based Tunable Notch Filter for Wideband Applications," presented at *2009 Software Defined Radio Conference (SDR '09)*, December 2009.
48. J. Xu, P. Kelly, P. Siqueira and M. Das, "A Hypothesis Testing Approach for Microwave Breast Imaging in Conjunction with CT," *Proceedings 2010 SPIE Symposium on Medical Imaging: Physics of Medical Imaging*, February 2010.
49. P. Kelly, T. Sobers, B. St. Peter, P. Siqueira and G. Capraro, "Temperature Anomaly Detection and Estimation Using Microwave Radiometry and Anatomical Information," *Proceedings 2011 SPIE Symposium on Medical Imaging: Physics of Medical Imaging*, February 2011.
50. S. Yngvesson, B. St. Peter, P. Siqueira, P. Kelly, S. Glick and A. Karellas, "A New Technology for Terahertz Imaging in Breast Cancer Margin Detection," *Proceedings 2011 SPIE Symposium on Medical Imaging: Physics of Medical Imaging*, February 2011.
51. S. Yngvesson, B. S. Peter, P. Siqueira, P. Kelly, S. Glick, A. Karellas, and A. Khan, "Feasibility Demonstration of Frequency Domain Terahertz Imaging in Breast Cancer Margin Determination," *Proceedings SPIE Photonics West: Optical Interactions with Tissue and Cells XXIII*, January 2012.
52. P. Kelly, T. Sobers, B. St. Peter, P. Siqueira and G. Capraro, "Microwave Radiometric Signatures of Temperature Anomalies in Tissue," *Proceedings 2012 SPIE Symposium on Medical Imaging: Physics of Medical Imaging*, February 2012.
53. S. Kibria, P. Kelly, T. Sobers, J. Gupta and L. Gupta, "Optimal Basis for Real-Time Compression of Ultrasound RF Signals," *Proceedings 2013 SPIE Symposium on Medical Imaging: Ultrasonic Imaging, Tomography and Therapy*, February 2013.
54. J. Kang, S. Lu, W. Gong, P. A. Kelly, "A Complex Network Based Feature Extraction for Image Retrieval," *Proceedings IEEE International Conference on Image Processing*, October 2014.
55. K. S. Yngvesson, A. Karellas, S. Glick, A. Khan, P. Siqueira, P. Kelly, B. St. Peter, "Breast Cancer Margin Detection with a Single Frequency Terahertz Imaging System," *Proceedings SPIE Conference on Optical Interactions with Tissue and Cells XXVII*, February 2016.
56. J. Kang, S. Lu, W. Gong, P. A. Kelly, "Image Feature Extraction Based On Spectral Graph Information," *Proceedings IEEE International Conference on Image Processing*, September 2016.

57. J. Xu and P. A. Kelly, "Estimating Internal Tissue Temperature Using Microwave Radiometry Data and Bioheat Models," *Proceedings 2017 SPIE Conference on Medical Imaging: Physics of Medical Imaging*, February 2017.

Research Grants Awarded:

1. "Robust Methods for Signal Parameter Estimation and Image Segmentation," National Science Foundation, Grant No. MIP-8710871, July 1987-December 1989, \$57,924.
2. "Segmentation of Noisy and Textured Images Modelled with Gibbs Distributions," (Co-PI with H. Derin), National Science Foundation, Grant No. ECS 8617995, August 1987-January 1990, \$141,436.
3. "Radius Estimation from Optical Images of GaAs Crystal Growth," (Co-PI with D. Looze), General Electric Co., April 1992-March 1993, \$34,670.
4. "Fusion of Stochastic and Linguistic Information Using a Conditional Event Algebra Approach," (PI; co-PI's: H. Derin and W.-B. Gong), Air Force Research Laboratory Contract F30602-98-C-0263, September 1998-June 2000, \$180,564.
5. "Edge Detection and Restoration for Low Signal-to-Noise Ratio Images," (co-PI; PI: H. Derin), Kollmorgen Corp., October 1998-September 1999, \$26,412.
6. "Estimation and Tracking of the Left Ventricle Boundary in Ultrasound Image Sequences," (co-PI with H. Derin, K. F. Lee of Baystate Medical Center), Baystate Medical Center, 2000 - 02, \$25,000.
7. "Automated Estimation of Left Ventricular Volume Using 3D Echocardiography," (co-PI with K. F. Lee of Baystate Medical Center) UMass-Baystate Collaborative Biomedical Research Program, 2002 – 03, \$22,000.
8. "Automated Estimation of Left Ventricular Volume Using 3D Echocardiography," (co-I with K. F. Lee of Baystate Medical Center; PI: D. A. Tighe of UMass-Worcester), Department of Medicine Grant, UMass Medical School, 2003– 04, \$35,000 (\$13,500 for support of a research assistant to work with P. Kelly).
9. "Infrared Thermography Detection of Soft Tissue Infections," (co-PI with G. Capraro of Baystate Medical Center), UMass-Baystate Collaborative Biomedical Research Program, Sept. 1, 2006 – Aug. 31, 2007, \$5,000.
10. "FPGA-Based Image Processing Research," (PI; co-PI: R. Tessier), Kollmorgen EO, Dec. 2006 – June 2010, \$70,896.
11. "Passive Microwave System Development for Emergency Diagnosis," (co-PI with P. Siqueira and G. Capraro of Baystate Medical Center), Baystate-UMass Collaborative Biomedical Research Program, Sept. 2009 – Aug. 2010, \$24,484.
12. "Biomedical Electronics and Imaging," (co-I with C. Salthouse; PI: C. Hollot), Newlans, Inc., Jan. 2012 – Dec. 2013 (\$16,000 to support research assistants working with P. Kelly).

Dissertations and Theses Supervised:

Ph.D. Dissertations:

1. F. Chen, "Robust and Morphologically Constrained Image Segmentation," 1994.

2. R. Zhao, "Iterative Posterior Probability Estimation, Optimal Filtering and Object Detection," (co-advisor with D. Goeckel), 2003.
3. I.-S. Shin, "Left Ventricular Volume Estimation from Three-Dimensional Echocardiography," 2006.
4. T. Sobers, "Covert Wireless Communications in a Dynamic Environment," (co-advisor with D. Goeckel), 2017.

Masters Theses:

1. K. D. Hartt, "The Modelling and Segmentation of Speckled Images," 1987 (co-advisor with H. Derin).
2. P. Punyagupta, "Recursive Linear Smoothing of Images," 1988.
3. S. G. Labitt, "Segmentation of Multi-Look Speckled Images," 1988 (co-advisor with H. Derin).
4. G. Vezina, "Segmentation of Speckled Images Using Complex Data," 1988 (co-advisor with H. Derin).
5. S. D. Hoyt, "Radius Estimation from Optical Images of GaAs Crystal Growth," 1993.
6. L. R. Teng, "Optimum Trajectories for Projectile Flight in an Integrated Global Positioning System/Inertial Measurement Unit," 1994.
7. O. Kandamar, "Motion Detection in Image Sequences Using Mathematical Morphology," 1995.
8. X. Cai, "Digital Diffusion Network for Image Segmentation," 1996.
9. M. H. Dowell, "A Parallel Implementation of a Digital Diffusion Network for Image Segmentation," 1998.
10. I.-S. Shin, "Edge Detection and Image Restoration for Low Signal-to-Noise Ratio Images," (co-advisor with H. Derin), 1999.
11. P. Vaidya, "Qualitative Optimization of Image Processing Systems," (co-advisor with H. Derin), 2000.
12. M. Bagla, "Computer-Assisted System for Analysis of Excised Breast Specimen Radiographs," (co-advisor with E. Riseman), 2005.
13. D. Gupta, "Synthesis of Continuous Time Nyquist Pulses," 2006.
14. R. Arumalla, "Medical Infrared Image Analysis for Detecting Skin Temperature Disparities," 2008.
15. T. Sobers, "The Measurement of Internal Temperature Anomalies in the Body Using Microwave Radiometry and Anatomical Information: Inference Methods and Error Models," 2012.
16. S. Kibria, "Optimal Basis for Ultrasound RF Apertures: Applications to Real-Time Compression and Beamforming," 2014.

Teaching:

Undergraduate Courses Taught:

- ENGIN 112 – Introduction to ECE: 2008, '09, '15, '16, '17
- ENGIN 197 - Introduction to Engineering: 1995
- ECE 211 - Circuit Analysis I: 1989, '98, 2000, '01
- ECE 212 - Circuit Analysis II: 1997, '99
- ECE 303 – Junior Seminar: 2009
- ECE 313 - Signals and Systems: 2005, '09, '10, '11, '14, '16, '17

ECE 314 - Probability and Random Processes: 2002, '03, '04, '06, '07, '15, '16
ECE 561 - Digital Signal Processing I: 1990, '91
ECE 562 - Digital Signal Processing II: 1991, '92, '95, '96
ECE 563 - Communications and Signal Processing: 2002, '03, '04, '12, '13, '14
ECE 564 - Communication Systems: 2002, '15
ECE 565 - Digital Signal Processing: 2004, '05, '10, '11, '12, '14
ECE 566 - Communication Systems I: 1985, '88, '92, '96, '97
ECE 567 - Communication Systems II: 1986, '89, '93, '97, '98, 2000, '01

Graduate Courses Taught:

ECE 608 - Signal Theory: 1986, '87, '93, 2001, '02, '07, '08, '09
ECE 645 - Digital Communications: 1998, '99, 2000, '03, '04
ECE 697K – Signal Processing: 2007, '08, '10, '15
ECE 746 - Statistical Signal Processing: 1987, '88, '90, '94, '99, '05, '07, '10
ECE 786 - Advanced Digital Signal Processing: 1998, 2006

Other Teaching Activities:

Instructor for Senior Professional Seminar (1 credit) - 1987, '93.
Supervised twenty-two graduate-level independent study courses.
Supervised twenty-six Senior Design Projects.
Supervised three undergraduate Honors Theses.
Developed laboratory projects for Communication Systems and Digital Signal Processing courses.
Supervised Honors Colloquia for ECE 314 (Probability and Random Processes) in 2003, '04, '06, '07 and '17, and for ECE 313 (Signals and Systems) in 2009, '10, '11, '16, and '17.

Service:

Departmental Committees:

Academic Status Committee
Biomedical Sensing & Signal Processing Faculty Search Committee
Committee on Undergraduate Program Processes (Chair, 2006-present)
Communications Faculty Search Committee (Chair, 2005)
Equipment Committee (Chair, 2004-07)
Graduate Student Admissions Committee
Instructional Development Committee (Chair, 2002-07)
Personnel Committee
Ph.D. Exam Committee
Publications Committee
Seminars Committee
Systems Foundations Faculty Search Committee (Chair, 2011)
Undergraduate Curriculum Committee
Ad Hoc Committee on Ph.D. Exam Policy
Ad Hoc Committee on Preparation for ABET Review
Ad Hoc Committee on TA Policy
Ad Hoc Committee on Graduate Student Policy

College and University Committees:

College ABET Coordination Group
College Academic Affairs Committee
College Curriculum Strategic Planning Committee
College Committee on Community, Diversity and Social Justice
College Video Instructional Program Advisory Committee
Tau Beta Pi advisor
University Academic Honesty Board
University Academic Matters Council (Chair, Program Subcommittee, 2010-present)
University Joint Task Force on Resource Allocation

Service to Profession:

Reviewer for papers submitted to several journals and conferences, and for proposals submitted to National Science Foundation, Office of Naval Research, and UMass – Baystate Collaborative Biomedical Research Program.

Chaired sessions at 1986 IEEE International Symposium on Information Theory and at 1989, 1991 and 1996 Conferences on Information Sciences and Systems.

Associate Editor, IEEE Transactions on Image Processing, 1994-1997.

Invited speaker, Applied Mathematics Seminar Series, Dept. of Mathematics, Wayne State University, 2003.

Awards:

1987: Prize Paper Award (co-author), IEEE Geoscience and Remote Sensing Symposium.

1989 and 1993: Outstanding ECE Teacher Award, IEEE/HKN student branches, University of Massachusetts, Amherst.

1995: Honorable Mention Poster Award (co-author), SPIE Symposium on Medical Imaging: Image Processing.

2001, 2002, 2006 and 2011: Nominated for University Distinguished Teaching Award.

2002: Honorable Mention Poster Award (co-author), SPIE Symposium on Medical Imaging: Ultrasonic Imaging and Signal Processing.