

## RICHARD J. KOZICK

**ADDRESS**

Electrical Engineering Department	Phone: (570) 577-1129 (Office)
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**PERSONAL DATA**      Born June 1, 1964      Married, four children  
                                  Citizen of the U.S.A.

## EDUCATION

**University of Pennsylvania**, Philadelphia, Pennsylvania, 1989-1992

Ph.D. in Electrical Engineering, July 1992

Dissertation title: “Signal Processing for High-Resolution Array Imaging and Adaptive Beamforming”

Advisor: Dr. Saleem A. Kassam

**Stanford University**, Stanford, California, 1987-88

M.S. in Electrical Engineering, June 1988

**Bucknell University**, Lewisburg, Pennsylvania, 1982-86

B.S. *summa cum laude* in Electrical Engineering, June 1986; Minor in Physics

## PROFESSIONAL EXPERIENCE

**Professor of Electrical Engineering**, Bucknell University, Lewisburg, PA (1993-Present)

T. Jefferson Miers Chair in Electrical Engineering (2006–2011)

Acting Chair of Electrical Engineering Department (2006–2007)

Teaching interests include signal processing, probability, control systems, communication systems, and introductory courses.

Research interests include statistical signal and array processing, signal processing for communication, sensor networking, and digital signal processing.

**Member of Technical Staff**, AT&T Bell Laboratories, Holmdel, NJ (1992-93)

Research and development in signal processing and communications. Responsibilities included developing and characterizing new algorithms for digital speech processing and coding, and establishing a laboratory for Telecommunication Management Networks (TMN).

**Consultant**, AT&T Bell Laboratories, Whippany, NJ (1989-90)

Technical support related to automatic fault detection system.

**Member of Technical Staff, AT&T Bell Laboratories, Whippany, NJ (1986-89)**

Lead role in development of automatic fault detection system for high-speed data communication network. Responsibilities: system design, software development and maintenance, system integration and test, coordination of product delivery to customer.

## RESEARCH AND CONSULTING EXPERIENCE

**Research Contractor**, Army Research Laboratory, Adelphi, MD (1997–present)  
and U.S. Army at Fort Monmouth, NJ (2002–2008)

Current projects include signal processing for source localization, VHF antenna systems.

**Consultant**, Science Applications International Corp. (SAIC), Arlington, VA (2010–2013)  
Radar signal processing.

**Consultant**, Macaulay-Brown, Inc. (MacB), Dayton, OH (2012–2016)  
Image compression, radar signal processing, electromagnetic analysis.

**Consultant**, York International Corporation, York, PA (Summer 1997)  
Developed a self-tuning, fuzzy logic control system for temperature control in buildings.

**Visiting Research Scientist**, Lehigh University, Bethlehem, PA (Summer 1996 and 2016)  
Research on antenna diversity for wireless communication in impulsive noise, GPS spoofing.

**Consultant**, Geisinger Medical Center, Danville, PA (1994–96) and New England Medical Center, Boston, MA (1996–2001)  
Developed and implemented algorithms to detect and track artery walls in ultrasound images.  
Investigated models for arterial pressure waveforms.

**Summer Faculty Fellow**, U.S. Army CECOM, Fort Monmouth, NJ (1994 & 1995)  
Research on antenna arrays composed of elements with steerable radiation patterns.

## HONORS AND AWARDS

2006 Best Paper Award from IEEE Signal Processing Society (Awarded April 17, 2007)

T. Jefferson Miers Chair in Electrical Engineering, Bucknell University (2006–2011)  
(Awarded for excellence in scholarship, teaching, and leadership in electrical engineering)

The Presidential Award for Teaching Excellence, Bucknell University (1999)  
(Awarded at Bucknell University Commencement, May 16, 1999)

Outstanding Faculty Award, Electrical Engineering Department, Bucknell University (1998)  
(Chosen by undergraduate students for teaching excellence)

Best Counselor Award, IEEE Lehigh Valley Section (1995)  
(Recognition for service as advisor to student chapter of IEEE)

Air Force Laboratory Graduate Fellowship (1989-92) – One of 27 awards out of 1550 applicants  
(Support for Ph.D. degree at University of Pennsylvania)

AT&T Bell Laboratories “One Year On Campus” Fellowship (1987-88)  
(Support for M.S.E.E. degree at Stanford University)

## PUBLICATIONS

### Papers in Refereed Journals

- J-1. R.J. Kozick and S.A. Kassam, "Linear Imaging with Sensor Arrays on Convex Polygonal Boundaries," *IEEE Trans. on Systems, Man, and Cybernetics* (Special Issue on Distributed Sensor Networks), vol. 21, no. 5, pp. 1155-1166, Sept. 1991.
- J-2. R.J. Kozick and S.A. Kassam, "Coarray Synthesis with Circular and Elliptical Boundary Arrays," *IEEE Trans. on Image Processing*, vol. 1, no. 3, pp. 391-405, July 1992.
- J-3. R.J. Kozick and S.A. Kassam, "Synthetic Aperture Pulse-Echo Imaging with Rectangular Boundary Arrays," *IEEE Trans. on Image Processing*, vol. 2, no. 1, pp. 68-79, Jan. 1993.
- J-4. R.J. Kozick and S.A. Kassam, "A Unified Approach to Coherent Source Decorrelation by Autocorrelation Matrix Smoothing," *Signal Processing*, vol. 45, pp. 115-130, 1995.
- J-5. M.F. Aburdene, J. Zheng, and R.J. Kozick, "Computation of Discrete Cosine Transform Using Clenshaw's Recurrence Formula," *IEEE Sig. Proc. Lett.*, vol. 2, pp. 155-156, Aug. 1995.
- J-6. R.J. Kozick and C.C. Crane, "An Integrated Environment for Modeling, Simulation, Digital Signal Processing, and Control," *IEEE Trans. on Education*, vol. 39, pp. 114-119, May 1996.
- J-7. G.R. Robertson, M.F. Aburdene, and R.J. Kozick, "Differential Block Coding of Bi-Level Images," *IEEE Trans. on Image Processing*, vol. 5, pp. 1368-1370, Sept. 1996.
- J-8. R.S. Blum, R.J. Kozick, and B.M. Sadler, "An Adaptive Spatial Diversity Receiver for Non-Gaussian Interference and Noise," *IEEE Trans. on Signal Processing*, vol. 47, no. 8, pp. 2100-2111, Aug. 1999.
- J-9. R.J. Kozick and M.F. Aburdene, "Methods for Designing Efficient Parallel-Recursive Filter Structures for Computing Discrete Transforms," *International Journal of Telecommunication Systems*, vol. 13, no. 1, pp. 69-80, Jan. 2000.
- J-10. R.J. Kozick and B.M. Sadler, "Maximum-Likelihood Array Processing in Non-Gaussian Noise with Gaussian Mixtures," *IEEE Trans. on Signal Processing*, vol. 48, no. 12, pp. 3520-3535, Dec. 2000.
- J-11. M.F. Aburdene, R.J. Kozick, and J. Baweja, "Interactive Signals and Systems Laboratories Using Notebooks," *Computers in Education Journal*, vol. XI, no. 1, Jan.-March 2001.
- J-12. B.M. Sadler, R.J. Kozick, and T. Moore, "Bounds on Bearing and Symbol Estimation with Side Information," *IEEE Trans. on Signal Processing*, vol. 49, no. 4, pp. 822-834, April 2001.
- J-13. R.J. Kozick, "Pattern Diversity for Narrowband Direction Finding with Sensor Arrays," *Journal of The Franklin Institute*, vol. 338, pp. 549-570, Aug. 2001.

## Journal Papers (continued)

- J-14. B.M. Sadler, R.J. Kozick, T. Moore, and A. Swami, “Bounds On SIMO and MIMO Channel Estimation and Equalization with Side Information,” *Journal of VLSI Signal Processing* (Special Issue on Signal Processing for Wireless Communications: Algorithms, Performance, and Architecture), vol. 30, issue 1–3, pp. 107–126, 2002.
- J-15. T. Moore, B.M. Sadler, and R.J. Kozick, “Regularity and Strict Identifiability in MIMO Systems”, *IEEE Trans. on Signal Processing*, vol. 50, no. 8, pp. 1831–1842, Aug. 2002.
- J-16. M.F. Aburdene, J. Xie, and R.J. Kozick, “Efficient Computation of Discrete Polynomial Transforms,” *IEEE Signal Processing Letters*, vol. 10, no. 10, pp. 285–288, Oct. 2003.
- J-17. R.J. Kozick and B.M. Sadler, “Source Localization with Distributed Sensor Arrays and Partial Spatial Coherence,” *IEEE Trans. on Signal Processing*, vol. 52, no. 3, pp. 601–616, March 2004.
- J-18. T. Moore, R.J. Kozick, and B.M. Sadler, “The Constrained Cramer-Rao Bound from the Perspective of Fitting a Model,” *IEEE Signal Processing Letters*, vol. 14, no. 8, pp. 564–567, August 2007.
- J-19. T. J. Moore, B. M. Sadler, R. J. Kozick, “Maximum-likelihood estimation, the Cramer-Rao bound, and the method of scoring with parameter constraints,” *IEEE Transactions on Signal Processing*, vol. 56, no. 3, pp. 895–908, March 2008.
- J-20. C. Coviello, R.J. Kozick, A. Hurrell, P. Probert Smith, C. Coussios, “Thin-Film, Sparse Boundary Array Design for Passive Acoustic Mapping During Ultrasound Therapy,” *IEEE Trans. on Ultrasonics, Ferroelectrics, and Freq. Control*, vol. 59, no. 10, pp. 2322–2330, Oct. 2012.
- J-21. R.P. Ramachandran, K.D. Dahm, R. Nickel, R.J. Kozick, S.S. Shetty, L. Hong, S.H. Chin, R. Polikar and Y. Tang, “Vertical Integration of Biometrics Across the Curriculum: Case Study of Speaker, Face and Iris Recognition,” *IEEE Circuits and Systems Magazine*, vol. 14, issue 3, pp. 55–69, 2015.
- J-22. C. Coviello, R.J. Kozick, J. Choi, M. Gyongy, C. Jensen, P.P. Smith, C. Coussios, “Passive acoustic mapping utilizing optimal beamforming in ultrasound therapy monitoring,” *The Journal of the Acoustical Society of America*, vol. 137, no. 5, pp. 2573–2585, May 2015.
- J-23. E. Lyka, C. Coviello, R.J. Kozick, C. Coussios, “Sum-of-harmonics method for improved narrowband and broadband signal quantification during passive monitoring of ultrasound therapies,” *The Journal of the Acoustical Society of America*, vol. 140, no. 1, pp. 741–754, July 2016.

## Contributed Book Chapters

- BC-1. B.M. Sadler, R.J. Kozick, T. Moore, and A. Swami, “Bounds On SIMO and MIMO Channel Estimation and Equalization with Side Information,” in *Signal Processing for Wireless Communications Systems*, H. V. Poor and L. Tong (Eds.), Kluwer Academic Publishers, 2002. (This chapter is identical to journal paper J-14.)
- BC-2. R.J. Kozick, B.M. Sadler, and D.K. Wilson, “Signal Processing and Propagation for Aeroacoustic Sensor Networking,” *Distributed Sensor Networks*, pp. 225-270, S.S. Iyengar and R.R. Brooks (Eds.), Chapman & Hall/CRC Press, Boca Raton, Florida, 2005. Also reprinted as Chapter 12 in Second Edition, pp. 245–290, Sep. 2012.
- BC-3. R.J. Kozick and B.M. Sadler, “Frequency Hopping Waveform Diversity for Time Delay Estimation,” Chap. 72 in *Applications and Methods of Waveform Diversity*, V. Amuso, S. Blunt, E. Mokole, R. Schneible, M. Wicks (Eds.), SciTech Publishing, Inc., 2010.

## Short-Course Tutorials Presented at Conferences

- Tutorial 1. B.M. Sadler and R.J. Kozick, "Sensor Networks, Aeroacoustics, and Signal Processing," *ICASSP 2004*, Montreal, Canada, May 17, 2004.
- Tutorial 2. B.M. Sadler and R.J. Kozick, "Energy-Constrained Sensor Networks, Aeroacoustics, and Distributed Signal Processing," *SPIE 2005 Defense & Security Symp.*, Orlando, Florida, March 31, 2005.
- Tutorial 3. R.J. Kozick and B.M. Sadler, "Signal Processing for Sensing & Fusion," Half-day plenary/tutorial at 2010 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors, Laurel, MD, Aug. 2010.

## Conference Papers

- C-1. R.J. Kozick and S.A. Kassam, "Beampattern Synthesis for Linear Imaging with Ring Arrays," *Proc. of the Twenty-Fifth Conference on Information Sciences and Systems*, The Johns-Hopkins University, pp. 212-217, March 1991.
- C-2. R.J. Kozick and S.A. Kassam, "The Singular Value Decomposition Applied to Linear Imaging with Rectangular Arrays," *Proc. of the IEEE Pacific Rim Conference on Communications, Computers, and Signal Processing*, Victoria, B.C., Canada, pp. 231-234, May 1991.
- C-3. R.J. Kozick and S.A. Kassam, "Application of the Singular Value Decomposition to Aperture Synthesis with Boundary Arrays," *Proc. of the 1991 IEEE Antennas and Propagation Society Symposium*, London, Ontario, Canada, pp. 526-529, June 1991.
- C-4. R.J. Kozick and S.A. Kassam, "Passive Imaging with Elliptical Boundary Arrays and Coarray Synthesis," *Proc. of the 1991 North American Radio Science Meeting*, London, Ontario, Canada, p. 632, June 1991.
- C-5. S.A. Kassam and R.J. Kozick, "Near-Field Acoustical Imaging with Boundary Arrays," *Proc. of the 1992 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, San Francisco, pp. 113-116, March 1992.
- C-6. R.J. Kozick and S.A. Kassam, "Coherent Source De-Correlation: Beam-space Interpretation and New Techniques," *Proc. of the Twenty-Sixth Conference on Information Sciences and Systems*, Princeton University, pp. 405-410, March 1992.
- C-7. R.J. Kozick and S.A. Kassam, "Improved Coherent Source Decorrelation by Autocorrelation Matrix Smoothing," *Proc. Twenty-Seventh Asilomar Conference on Signals, Systems, and Computers*, Monterey, CA, pp. 1641-1645, Nov. 1993.
- C-8. R.J. Kozick and S.A. Kassam, "Coherent Source Location Using Autocorrelation Matrix Smoothing with Transmit/Receive Arrays," *Proc. 26th IEEE Southeastern Symposium on System Theory*, Athens, OH, pp. 427-431, March 1994.

## Conference Papers (continued)

- C-9. R.J. Kozick and S.A. Kassam, "A Unified Approach to Coherent Source Decorrelation by Autocorrelation Matrix Smoothing," *Twenty-Eighth Conference on Information Sciences and Systems*, Princeton University, pp. 184-189, March 1994.
- C-10. Z. Ji, R.J. Kozick, and M.F. Aburdene, "Implementation of a Discrete Legendre Adaptive IIR Filter Using the DSP56001," *37th Midwest Symposium on Circuits and Systems*, Lafayette, Louisiana, pp. 1075-1078, Aug. 1994.
- C-11. R.J. Kozick, "Electrical Engineering Laboratory for First-Year and Non-Engineering Students," *ASEE/IEEE Frontiers in Education Conf.*, San Jose, CA, pp. 63-67, Nov. 1994.
- C-12. G.R. Robertson, M.F. Aburdene, and R.J. Kozick, "A New Block Coding Method for Bi-Level Images," *IS&T/SPIE Electronic Imaging Symp.*, San Jose, CA, pp. 241-250, Feb. 1995.
- C-13. R.J. Kozick, F. Elmer, and V. Nalbandian, "Phased Arrays Composed of Antennas with Steerable Patterns," *IEEE Int. RADAR Conf.*, Washington, D.C., pp. 737-741, May, 1995.
- C-14. M.F. Aburdene, J. Zheng, and R.J. Kozick, "New recursive VLSI architectures for forward and inverse discrete cosine transform," *IS&T/SPIE Electronic Imaging Symp.*, San Jose, CA, vol. 2669, pp. 59-65, Feb. 1996.
- C-15. R.J. Kozick, "Detecting Interfaces on Ultrasound Images of the Carotid Artery by Dynamic Programming," *IS&T/SPIE Electronic Imaging Symp.*, San Jose, CA, vol. 2666, pp. 233-241, Feb. 1996.
- C-16. R.J. Kozick, "On Pattern Diversity for Direction Finding," *Proc. of the 30th Conference on Information Sciences and Systems*, Princeton University, pp. 7-12, March 20-22, 1996.
- C-17. C.C. Crane and R.J. Kozick, "An Integrated Environment for Modeling, Simulation, Digital Signal Processing, and Control," *Proc. of the 1996 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Atlanta, GA, pp. 1121-1124, May 7-10, 1996.
- C-18. M.F. Aburdene, J. Zheng, R.J. Kozick, "Parallel Recursive Algorithms for Inverse Discrete Legendre Transform and Inverse Discrete Laguerre Transform," *Proc. of the 1996 IEEE Int. Symp. on Circuits and Systems (ISCAS)*, Atlanta, GA, vol. 2, pp. 548-551, May 12-15, 1996.
- C-19. R.J. Kozick and M.F. Aburdene, "A Dynamic Parameter Estimation Experiment That Is Remotely Accessible Via Internet," *Proc. of the 1996 ASEE Annual Conference*, Washington, D.C., June 23-26, 1996. [Published on CD ROM only.]
- C-20. R.J. Kozick, "Undergraduate Design Projects in a Laboratory for Real-Time Signal Processing and Control," *Proc. of the 1996 ASEE Annual Conference*, Washington, D.C., June 23-26, 1996. [Published on CD ROM only.]

## Conference Papers (continued)

- C-21. R.S. Blum, R.J. Kozick, and B.M. Sadler, "An adaptive spatial diversity receiver for non-Gaussian interference and noise," *Proceedings of 1st Annual Conference of the Advanced Telecommunications/Information Distribution Research Program (ATIRP)*, pp. 355-358, College Park, MD, January 1997.
- C-22. R.J. Kozick, R.S. Blum, and B.M. Sadler, "EM-Based Approaches to Adaptive Signal Detection on Fading Channels with Impulsive Noise," *Proc. of the 31st Conference on Information Sciences and Systems*, Johns Hopkins University, pp. 112-117, March 19-21, 1997.
- C-23. R.S. Blum, R.J. Kozick, and B.M. Sadler, "An Adaptive Spatial Diversity Receiver for Non-Gaussian Interference and Noise," *First IEEE Workshop on Signal Processing Advances in Wireless Communication (SPAWC)*, Paris, France, pp. 385-388, April 16-18, 1997.
- C-24. R.J. Kozick and M.F. Aburdene, "Parallel-Recursive Filter Structures for the Computation of Discrete Transforms," *Proc. of the 1997 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Munich, Germany, pp. 1993-1996, April 21-24, 1997.
- C-25. M.F. Aburdene and R.J. Kozick, "A Project-Oriented Course in Probability and Statistics for Undergraduate Electrical Engineering Students," *ASEE/IEEE Frontiers in Education Conf.*, Pittsburgh, PA, Nov. 1997.
- C-26. R.J. Kozick, R.S. Blum, and B.M. Sadler, "Signal Processing in Non-Gaussian Noise Using Mixture Distributions and the EM Algorithm," *31st Asilomar Conf. on Signals, Systems, and Computers*, Pacific Grove, CA, pp. 438-442, Nov. 2-5, 1997.
- C-27. R.J. Kozick and M.F. Aburdene, "Methods for Designing Efficient Parallel-Recursive Filter Structures for Computing Discrete Transforms," *6th International Conference on Telecommunication Systems*, Nashville, TN, pp. 630-631, March 5-8, 1998.
- C-28. R.J. Kozick, B.M. Sadler, and R.S. Blum, "Array Processing in Impulsive Noise: A Non-Linear Beamformer Based on the EM Algorithm," *Proc. of the 1998 Conference on Information Sciences and Systems*, Princeton University, pp. 995-1000, March 18-20, 1998.
- C-29. R.J. Kozick, B.M. Sadler, and R.S. Blum, "Array Processing in Non-Gaussian Noise with the EM Algorithm," *Proc. of the 1998 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Seattle, WA, pp. 1997-2000, May 12-15, 1998.
- C-30. B.M. Sadler, R.J. Kozick, and T. Moore, "Performance Analysis for Direction Finding in Non-Gaussian Noise," *1999 International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Phoenix, AZ, pp. 2857-2860, March 15-19, 1999.
- C-31. R.J. Kozick and B.M. Sadler, "Maximum likelihood array processing: the semi-blind case," *Second IEEE Workshop on Signal Processing Advances in Wireless Communication (SPAWC)*, Annapolis, MD, pp. 70-73, May 9-12, 1999.

## Conference Papers (continued)

- C-32. R.S. Blum, Y. Zhang, B.M. Sadler, R.J. Kozick, "On the approximation of correlation non-Gaussian noise pdfs using Gaussian mixture models," *Conf. on the Applications of Heavy Tailed Distributions in Economics, Engineering, and Statistics*, American University, Washington, D.C., June 1999.
- C-33. R.J. Kozick and B.M. Sadler, "Distributed Sensor Array Processing of Wideband Acoustic Signals," *1999 Meeting of the IRIS Specialty Group on Battlefield Acoustics and Seismics*, pp. 79–93, Laurel, MD, September 13-15, 1999.
- C-34. B.M. Sadler, R.J. Kozick, T. Moore, "Bounds on Constant Modulus and Semi-blind Array Processing," *Proc. of the 2000 Conference on Information Sciences and Systems*, Princeton University, pp. WP3(19 – 24), March 15-17, 2000.
- C-35. R.J. Kozick and B.M. Sadler, "Source Localization with Distributed Sensor Arrays and Partial Spatial Coherence," *SPIE 2000 AeroSense Symp.*, Orlando, FL, pp. 142-153, April 24-28, 2000.
- C-36. B.M. Sadler and R.J. Kozick, "Robust Subspace Estimation in Non-Gaussian Noise," *ICASSP 2000*, vol. 6, pp. 3818-3821, June 5-9, 2000, Istanbul, Turkey.
- C-37. B.M. Sadler, R.J. Kozick, and T. Moore, "Performance Bounds on Bearing and Symbol Estimation for Communication Signals with Side Information," *ICASSP 2000*, vol. 5, pp. 2529-2532, June 5-9, 2000, Istanbul, Turkey.
- C-38. M.F. Aburdene, R.J. Kozick, J.S. Baweja, "Interactive Signals and Systems Laboratories Using Notebooks," *Proc. of the 2000 ASEE Annual Conference*, St. Louis, MO, June 18-21, 2000.
- C-39. B.M. Sadler and R.J. Kozick, "Semi-Blind Array Processing with Constant Modulus Signals," *Proc. 4th World Multiconference on Systemics, Cybernetics and Informatics (SCI 2000)*, Orlando, FL, July 23-26, 2000.
- C-40. R.J.Kozick and B.M. Sadler, "Distributed Source Localization with Multiple Sensor Arrays and Frequency-Selective Spatial Coherence," *Proc. 10th IEEE Workshop on Statistical Signal and Array Processing (SSAP 2000)*, Pocono Manor, PA, pp. 419-423, Aug. 14-16, 2000.
- C-41. B.M. Sadler and R.J. Kozick, "Bounds on Uncalibrated Array Signal Processing," *Proc. 10th IEEE Workshop on Statistical Signal and Array Processing (SSAP 2000)*, Pocono Manor, PA, pp. 73-77, Aug. 14-16, 2000.
- C-42. R.J. Kozick and B.M. Sadler, "Maximum Likelihood Multi-User Detection for Fast Frequency Hopping / Multiple Frequency Shift Keying Systems," *Proc. IEEE Wireless Communications and Networking Conference (WCNC 2000)*, Chicago, IL, pp. 67–72, Sept. 23-28, 2000.
- C-43. R.J. Kozick and B.M. Sadler, "Limits on Classifying Pulsed Signals," *Proc. IEEE Military Communications Conference (MILCOM 2000)*, Los Angeles, CA, pp. 962–966, October 22-25, 2000.

## Conference Papers (continued)

- C-44. R.J. Kozick and B.M. Sadler, "Algorithms for Localization and Tracking of Acoustic Sources with Widely Separated Sensors," *Proc. 2000 Meeting of the MSS Specialty Group on Battlefield Acoustics and Seismics*, pp. 205–223, Laurel, MD, October 18–20, 2000.
- C-45. B.M. Sadler and R.J. Kozick, "Constrained CRBs for Channel and Signal Estimation of MIMO Systems," *Proc. of the Thirty-Fifth Conference on Information Sciences and Systems*, Johns Hopkins University, vol. 2, pp. 834–839, March 21–23, 2001.
- C-46. R.J. Kozick and B.M. Sadler, "Near-Field Localization of Acoustic Sources with Imperfect Spatial Coherence, Distributed Processing, and Low Communication Bandwidth," *SPIE 2001 AeroSense Symp.*, Vol. 4393, pp. 52–63, Orlando, FL, April, 2001.
- C-47. B.M. Sadler, R.J. Kozick, T. Moore, "Bounds on MIMO Channel Estimation and Equalization with Side Information," *ICASSP 2001*, Salt Lake City, UT, pp. 2145–2148, May 7–11, 2001.
- C-48. M.F. Aburdene, R.J. Kozick, R.S. Magargle, J.D. Maloney-Hahn, C.M. Coviello, "Discrete Polynomial Transform Representation Using Binary Matrices and Flow Diagrams," *ICASSP 2001*, Salt Lake City, UT, pp. 1141–1144, May 7–11, 2001.
- C-49. B.M. Sadler and R.J. Kozick, "Constrained Cramer-Rao Bounds on Source Separation," *Proc. 2001 IEEE Symp. Information Theory*, Washington, D.C., p. 208, June 24–29, 2001.
- C-50. R.J. Kozick and B.M. Sadler, "Issues and Algorithms for Tracking Multiple Sources with a Network of Sensors," *Proc. 2001 Meeting of the MSS Specialty Group on Battlefield Acoustics and Seismics*, Laurel, MD, October 23–26, 2001.
- C-51. R.J. Kozick and B.M. Sadler, "Bounds on Time Delay and Doppler Estimation with Partially Coherent Signals," *Conference on Information Sciences and Systems*, Princeton University, March 20–22, 2002.
- C-52. M.F. Aburdene, J. Xie, and R.J. Kozick, "Efficient Computation of Discrete Polynomial Transforms", *Conference on Information Sciences and Systems*, Princeton University, March 20–22, 2002.
- C-53. R.J. Kozick and B.M. Sadler, "Tracking Moving Acoustic Sources with a Network of Sensors," *SPIE 2002 AeroSense Symp.*, Orlando, FL, pp. 20–31, April 1–5, 2002.
- C-54. B.M. Sadler, T.J. Moore, and R.J. Kozick, "On the Performance of Source Separation With Constant Modulus Signals," *ICASSP 2002*, Orlando, FL, pp. III-2373–2376, May 13–17, 2002.
- C-55. M.F. Aburdene, J. Zheng, R.J. Kozick, J. Xie, S. Wang, "On Recursive Algorithms for the Discrete Cosine Transform," *Proc. of Workshop on Signal Proc., Comms., Chaos, and Systems (A Tribute to R.N. Madan)*, Newport, Rhode Island, pp. 44–52, June 20, 2002.
- C-56. T.J. Moore, B.M. Sadler, and R.J. Kozick, "Regularity and Identifiability in MIMO Systems," *Second IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM 2002)*, Rosslyn, VA, pp. 298–302, Aug. 4–6, 2002.

## Conference Papers (continued)

- C-57. R.J. Kozick and B.M. Sadler, "Information Sharing Between Localization, Tracking, and Identification Algorithms," *Proc. 2002 Meeting of the MSS Specialty Group on Battlefield Acoustics and Seismics*, Laurel, MD, Sept. 24–27, 2002.
- C-58. R.J. Kozick and B.M. Sadler, "Acoustical Signal Processing for Classifying and Tracking Ground Vehicles," *Proc. 23rd Army Science Conference*, Orlando, FL, Dec. 2–5, 2002.
- C-59. R.J. Kozick, B.M. Sadler, and T.J. Moore, "Bounds on MIMO Estimation With CM and Semi-Blind Signaling," *Proc. 37th Annual Conf. on Information Sciences and Systems (CISS)*, Baltimore, MD, March 12–14, 2003.
- C-60. R.J. Kozick, B.M. Sadler, and T.J. Moore, "Performance of MIMO: CM and Semi-Blind Cases," *Proc. IV IEEE Workshop on Signal Processing in Wireless Communications (SPAWC)*, Rome, Italy, June 15–18, 2003.
- C-61. M.A.S. Vigeant, S.B. Velegol, J.W. Baish, R.J. Kozick, R. Zacccone, and R.D. Ziemian, "Exploring Engineering at Bucknell University: A Seminar Approach to the First-Year Engineering Experience," *Proc. ASEE 2003 Annual Conf.*, Nashville, TN, June 22–25, 2003.
- C-62. R.J. Kozick and B.M. Sadler, "Acoustic Source Estimation with Doppler Processing," *2003 Meeting of the MSS Specialty Group on Battlefield Acoustics and Seismics*, Laurel, MD, Oct. 7–10, 2003.
- C-63. R.J. Kozick, "Information Theoretic Approach to Emitter Differentiation: Illustration of Fundamental Concepts," *SEI Technologies Conference*, San Diego, CA, March 2, 2004. (Presentation only)
- C-64. B.M. Sadler, R.J. Kozick, and S.L. Collier, "Algorithms and performance of small baseline acoustic sensor arrays," *Proc. SPIE 2004 Defense & Security Symp.*, Orlando, FL, April 12–16, 2004.
- C-65. R.J. Kozick and B.M. Sadler, "Performance of Doppler Estimation for Acoustic Sources with Atmospheric Scattering," *ICASSP 2004*, Montreal, Canada, May 17–21, 2004.
- C-66. M.A.S. Vigeant, R.D. Ziemian, J.W. Baish, D.P. Cavanagh, R.J. Kozick, S.A.T. Petrescu, R.J. Zacccone, "Introducing first-year students to engineering, economics, and social responsibility: ADA compliance as a first project," *2004 ASEE Annual Conference*, Salt Lake City, UT, June 20–24, 2004.
- C-67. R.J. Kozick, B.M. Sadler, and S.L. Collier, "Acoustic Sensor Arrays with Small Baseline," *2004 Meeting of the MSS Specialty Group on Battlefield Acoustic and Seismic Sensing*, Laurel, MD, Aug. 23–26, 2004.
- C-68. R.J. Kozick, "Information Analysis of Measured Radar Signals," *SEI Technologies Conference*, San Diego, CA, Feb. 8, 2005. (Presentation only)
- C-69. B.M. Sadler, R.J. Kozick, L. Tong, "Multi-Modal Sensor Localization Using a Mobile Access Point," *Proc. ICASSP 2005*, Philadelphia, PA, March 2005.

## Conference Papers (continued)

- C-70. R.J. Kozick and B.M. Sadler, "Sensor Localization Using Acoustic Doppler Shift with a Mobile Access Point," *Proc. 2005 IEEE Workshop on Statistical Signal Processing (SSP '05)*, Bordeaux, France, July 17–20, 2005.
- C-71. R.J. Kozick and B.M. Sadler, "Sensor Localization Using Acoustic Doppler Shift with a Mobile Access Point," *2005 Meeting of the MSS Specialty Group on Battlefield Acoustic and Seismic Sensing*, Laurel, MD, Aug. 22–25, 2005.
- C-72. R.J. Kozick and B.M. Sadler, "Frequency Hopping Waveform Diversity for Time Delay Estimation," *Proc. 2006 IEEE International Waveform Diversity & Design Conference*, Kauai, Hawaii, Jan. 22–27, 2006.
- C-73. R.J. Kozick and J.A. Kosinski, "Systematic Approach to SEI," *SEI Technical Working Group Meeting*, Denver, CO, March 14–16, 2006.
- C-74. B.M. Sadler and R.J. Kozick, "A Survey of Time Delay Estimation Performance Bounds," *Proc. Fourth IEEE Workshop on Sensor Array and Multi-Channel Processing (SAM 2006)*, Waltham, MA, July 12–14, 2006.
- C-75. R.J. Kozick and B.M. Sadler, "Fusion of Acoustic and Magnetic Sensor Data," *2006 Meeting of the MSS Specialty Group on Battlespace Acoustic and Magnetic Sensors Symposium*, Laurel, MD, Aug. 22–24, 2006.
- C-76. R.J. Kozick, B.M. Sadler, C.-C. Lee, and L. Tong, "Sensor Localization Using Radio and Acoustic Transmissions from a Mobile Access Point," *25th Army Science Conference*, Orlando, FL, Nov. 27–30, 2006.
- C-77. R.J. Kozick and B.M. Sadler, "Joint Processing of Vector-Magnetic and Acoustic Sensor Data," *SPIE 2007 Defense & Security Symp.*, Orlando, Florida, April 9–13, 2007.
- C-78. R.J. Kozick and B.M. Sadler, "Classification Via Information-Theoretic Fusion of Vector-Magnetic and Acoustic Sensor Data," *ICASSP 2007*, Honolulu, Hawaii, April 15–20, 2007.
- C-79. R.J. Kozick and B.M. Sadler, "Magnetic Signal Processing and Tracking," *2007 Meeting of the MSS Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors*, Laurel, MD, Aug. 21–23, 2007.
- C-80. R.J. Kozick and B.M. Sadler, "Bounds and Algorithms for Time Delay Estimation on Parallel, Flat Fading Channels," *ICASSP 2008*, Las Vegas, March 30–April 4, 2008.
- C-81. R.J. Kozick and B.M. Sadler, "Algorithms for Tracking with an Array of Magnetic Sensors," *Proc. Fifth IEEE Sensor Array and Multi-Channel Processing Workshop (SAM 2008)*, Darmstadt, Germany, July 21–23, 2008.
- C-82. R.J. Kozick, T.J. Moore, and B.M. Sadler, "Localization and Tracking with Networked Sensors: Bounds, Algorithms, and Distributed Processing," *Proc. 2008 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors*, Laurel, MD, Aug. 19–21, 2008.

## Conference Papers (continued)

- C-83. B.M. Sadler, N. Liu, Z. Xu, R.J. Kozick, "Range-Based Geolocation in Fading Environments," *Forty-Sixth Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, Sept. 23–26, 2008.
- C-84. R.J. Kozick and B.M. Sadler, "Feature Extraction for Light Vehicles via Information-Theoretic Fusion of Multimodal Sensor Data," Human, Light Vehicle and Tunnel Detection Workshop, Beltsville, MD, June 16-17, 2009.
- C-85. R.J. Kozick, G.T. Whipps, and B.M. Sadler, "Sniper Localization Systems with Acoustic Sensors," *Proc. 2009 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors*, Laurel, MD, Aug. 2009.
- C-86. R.J. Kozick and B.M. Sadler, "Accuracy of Source Localization Based on Squared-Range Least Squares (SR-LS) Criterion," *Proc. Third Int. Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP '09)*, Aruba, Dec. 13–16, 2009.
- C-87. R.J. Kozick and B.M. Sadler, "Source Localization with Squared-Range Least Squares Criterion," *Proc. 2010 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors*, Laurel, MD, Aug. 2010.
- C-88. J.N. Ash, G.T. Whipps, and R.J. Kozick, "Performance of shockwave-based shooter localization under model misspecification," *Proc. IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP 2010)*, pp. 2694-2697, March 14-19, 2010.
- C-89. R.J. Kozick, G.T. Whipps, and J.N. Ash, "Supersonic projectile models for asynchronous shooter localization," *Proc. SPIE 8046 (Defense & Security Symposium)*, Orlando, FL, April 25-29, 2011.
- C-90. J. George, L. Kaplan, R.J. Kozick, S. Deligeorges, "Multi-Sensor Data Fusion Using Soldier-Worn Gunfire Detection Systems," *2011 MSS Battlespace Acoustic and Seismic Sensing, Magnetic & Electric Field Sensors (BAMS)*, October 2011.
- C-91. R.J. Kozick, J. George, L. Kaplan, S. Deligeorges, "Centralized Fusion of Acoustic Sensor Data for Gunfire Localization," *2011 MSS Battlespace Acoustic and Seismic Sensing, Magnetic & Electric Field Sensors (BAMS)*, October 2011.
- C-92. R.P. Ramachandran, R. Polikar, K.D. Dahm, Y. Tang, S. Shetty, R.J. Kozick, R.N. Nickel, S.H. Chin, "Project-based Design of a Biometric Face Recognition System," *Proc. of the 2012 ASEE Annual Conference*, San Antonio, TX, June 2012.
- C-93. C.M. Coviello, R.J. Kozick, A. Hurrell, P. Probert-Smith and C.-C. Coussios, "The Design of a Thin-Film, Sparse Boundary Array for Ultrasound Therapy Monitoring," *Proc. 2012 IEEE International Ultrasonics Symposium*, Dresden, Germany, Oct. 2012. (Poster only)

## Conference Papers (continued)

- C-94. R.P. Ramachandran, R. Polikar, K.D. Dahm, Y. Tang, S. Shetty, R.J. Kozick, R.N. Nickel, S.H. Chin, "Configuration and Assessment of a Senior Level Course in Biometric Systems," *Proc. of the 2013 ASEE Annual Conference*, Atlanta, GA, June 2013.
- C-95. C. Coviello, R.J. Kozick, J.J. Choi, M. Gyongy, J. Collin, C. Jensen, P.P. Smith, C.-C. Coussios, "Passive acoustic mapping using optimal beamforming for real-time monitoring of ultrasound therapy," *Proc. of International Congress on Acoustics (ICA 2013) / 165th Meeting of the Acoustical Society of America*, Montreal, Canada, June 2-7, 2013.  
(Abstract published in the *Journal of the Acoustical Society of America*, vol. 133, iss. 5, p. 3263, 2013.)
- C-96. R.P. Ramachandran, K.D. Dahm, R.J. Kozick, R.M. Nickel, S. Shetty, R. Polikar, Y. Tang, S.H. Chin, "Active Analog Circuit Design: Laboratory Project and Assessment," *Proc. of the 2014 ASEE Annual Conference*, Indianapolis, Indiana, June 2014.
- C-97. E. Lyka, C. Coviello, R.J. Kozick, C. Coussios, "A sum-of-harmonics time-domain method to distinguish harmonic and broadband signals during passive acoustic mapping of ultrasound therapies," *169th Meeting of the Acoustical Society of America*, Pittsburgh, PA, May 2015.  
(Abstract published in the *Journal of the Acoustical Society of America*, vol. 137, iss. 4, p. 2399, April 2015.)
- C-98. R.P. Ramachandran, L. Hong, S.S. Shetty, K.D. Dahm, R.J. Kozick, R.M. Nickel, R. Polikar, Y. Tang, and S.H. Chin, "Design and Performance Evaluation of a Biometric Iris Verification System," *Proc. of the 2015 ASEE Annual Conference*, Seattle, WA, June 2015.
- C-98. F.T. Dagefu, G. Verma, R.J. Kozick, B.M. Sadler and K. Sarabandi, "Short range lower VHF channel study using full-wave simulations and measurements," *Radio Science Meeting (Joint with AP-S Symposium)*, 2015 USNC-URSI, Vancouver, BC, Canada, 2015, p. 257. (Abstract)
- C-99. R.P. Ramachandran, S.H. Chin, K.D. Dahm, L. Hong, S. Shetty, R.M. Nickel, R.J. Kozick, Y. Tang, R. Polikar, "Planning and Assessment of a Workshop on Undergraduate Education in Biometric Systems," *Proc. of the 2016 ASEE Annual Conference*, New Orleans, LA, June 2016.
- C-100. J.A. Kosinski and R.J. Kozick, "Composite EM Waves for Distributed EW," Two-hour tutorial presented at Association of Old Crows, Kittyhawk Week Conference, Dayton, Ohio, June 14, 2016.

## Invited Conference Plenary Presentations and Workshops

R.J. Kozick, “Time Delay Estimation on Parallel Fading Channels,” Plenary at *Fifth IEEE Sensor Array and Multi-Channel Processing Workshop (SAM 2008)*, Darmstadt, Germany, July 21–23, 2008.

R.J. Kozick, “Information Measures for System Performance Bounds, Feature Extraction, and Multimodal Sensor Fusion,” Workshop on “Challenges in Information Evaluation and Extraction in Distributed Sensing Systems,” sponsored by the Army Research Office, held at the Massachusetts Institute of Technology, Oct. 21-22, 2009.

R.J. Kozick and B.M. Sadler, “Signal Processing for Sensing & Fusion,” Half-day plenary/tutorial at *2010 Meeting of the Military Sensing Symposia (MSS) Specialty Group on Battlespace Acoustic & Seismic Sensing, Magnetic & Electric Field Sensors*, Laurel, MD, Aug. 2010.

## Patent Applications

J.A. Kosinski, R.V. Burns, E.J. Moser, R.J. Kozick, S.R. Lindle, and N.A. Pequignot, “Matched representation space method for numerically encoding data,” US Patent App. 14 / 051,095, April 2014.

C. Coviello, R.J. Kozick, C. Coussios, “Passive ultrasound imaging with sparse transducer arrays,” US Patent App. 14/427,667, August 2015.

### **Master's Theses Advised**

- M-1. Ravinder P. Singh, "Distributed Power Control for Wireless Communication," 1995.
- M-2. Curtis C. Crane, "Integrated Environment for Modeling, Simulation, Digital Signal Processing, and Control," 1995.
- M-3. Nicole D. Dretar, "Antenna Diversity Techniques for Wireless Communications in Gaussian and Non-Gaussian Noise," 1996.
- M-4. Christopher Tassone, "TCP/IP Data Communication Characterization," 1998.  
(Co-advised with Prof. Ralph Droms.)
- M-5. Ligong Zheng, "Performance Study of Signal Processing in Impulsive Noise Using Gaussian Mixture Distributions and the EM Algorithm," 1998.
- M-6. Yue Sun, "Application of Fuzzy Logic Control for Temperature Systems," 1998.
- M-7. Andy Rejmer, "Analysis, Simulation, and Implementation of Adaptive Equalizers," 1999.
- M-8. Jin Xie, "Sphere Packing and Performance of Signal Classifiers," 2002.
- M-9. Sheng Wang, "Algorithms to Estimate the Harmonic Signature of Acoustic Sources," Dec. 2003.
- M-10. Matthew D. Sharp, "A Study of Wireless Channel Estimation and Equalization Algorithms Using Measured MIMO Data," May 2005.
- M-11. Robert D. Zorn, "Experimental Testbed for Specific Emitter Identification," May 2009.

### **Honor's Theses Advised**

- H-1. John J. Carey, "Performance of Multiple User Separation Algorithms for Frequency Hopped Communications," 1999.
- H-2. Christian M. Coviello, "Remote Acoustic Detection System: Dynamic Target Tracking," 2000.
- H-3. Barry D. Black, "Processing of Sampled Data for Localization of Acoustic Sources with Wide Bandwidth," 2001.

## **Presentations and Invited Seminars**

- P-1. “Active and Passive Imaging with Sparse Two-Dimensional Arrays,” presented at the IEEE NJ Coast Section, Circuits and Systems/Signal Processing Chapter Meeting, Middletown, NJ, Feb. 18, 1993.
- P-2. “Electrical Engineering Laboratory for First-Year and Non-Engineering Students,” IEEE Central Pennsylvania Section Meeting, Penn State University, Nov. 1994.
- P-3. “Parallel Recursive Algorithms for the Discrete Cosine Transform and Other Orthogonal Transforms,” IEEE Lehigh Valley Signal Processing Chapter Seminar, Lehigh University, Feb. 15, 1996.
- P-4. “New Algorithms for Parallel Recursive Computation of Discrete Cosine Transform and Polynomial Transforms,” Electrical Engineering Department Seminar, University of Pennsylvania, June 12, 1996.
- P-5. “Antenna Diversity Techniques to Combat Fading in Impulsive Noise Environments,” Electrical Engineering Seminar, Villanova University, October 4, 1996.
- P-6. “Iterative Techniques for Signal Processing in Non-Gaussian Noise Using the EM Algorithm,” IEEE Philadelphia Signal Processing Chapter Seminar, Philadelphia, PA, Oct. 9, 1997.
- P-7. Workshop on “Signal Processing for Communication over Non-Gaussian Channels,” University of Delaware, July 13, 1998.
- P-8. “Signal Separation and Channel Estimation in MIMO Systems with Side Information,” Electrical Engineering Department Seminar, Drexel University, March 30, 2001.
- P-9. “Near-Field Localization of Acoustic Sources with Multiple Sensor Arrays and Imperfect Spatial Coherence,” Army Research Laboratory Distinguished Lecture Series, Adelphi, Maryland, June 14, 2001.
- P-10. “Signal Separation and Channel Estimation in MIMO Systems with Side Information,” Electrical Engineering Department Seminar, Penn State University, Sept. 4, 2001.
- P-11. B.M. Sadler and R.J. Kozick, “Sensor Networks, Aeroacoustics, and Signal Processing,” Army Research Laboratory Seminar, Adelphi, Maryland, June 22, 2004.
- P-12. R.J. Kozick, “Sensors Networks and Signal Processing,” U.S. Army Picatinny Arsenal Seminar, Oct. 12, 2010.

## Seminars at Bucknell University

- B-1. “Teaching Image Processing with Matlab,” presented at the ASEE Mid-Atlantic Spring Meeting on Engineering Education, Bucknell University, April 30, 1994.
- B-2. “Application of Image Processing to Medical Ultrasound,” IEEE Student Branch Seminar, Bucknell University, March 11, 1996.
- B-3. “Fuzzy Logic for Adaptive Temperature Control,” Mechanical Engineering Department Seminar Series, Bucknell University, Nov. 20, 1997.
- B-4. “Current Research in Statistical Signal Processing,” Engineering Seminar, Feb. 28, 2001.
- B-5. “A Case Study in Statistical Signal Processing: Acoustic Source Estimation with Doppler Processing,” Guest Speaker in ELEC 471 Class & IEEE Student Branch Seminar, Nov. 2003.
- B-6. “Information Theoretic Approach to Emitter Differentiation: Illustration of Fundamental Concepts,” Guest Speaker in ELEC 471 Class & IEEE Student Branch Seminar, March, 2004.
- B-7. “An Overview of Energy-Constrained Sensor Networks and Aeroacoustics,” Bucknell Computer Science Colloquium, Feb. 24, 2005.
- B-8. “Classification of Radio Emitters,” Guest Speaker in ELEC 471 Class, Oct. 21, 2005.

## Professional Service Activities

- Serve on the Editorial Board of *Journal of the Franklin Institute* (1996-2014) and *EURASIP Journal of Wireless Communications and Networking* (March, 2004 – present)
- Served as Associate Editor for *IEEE Signal Processing Letters* (June, 2005 – 2010)
- Served as Registration Chair for the 2005 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), held March 18-23, 2005 in Philadelphia, PA
- Organized an invited session on Sensor Networks at the IEEE Workshop on Statistical Signal Processing in Bordeaux, France in July, 2005
- Served as Finance Chair for the 2nd IEEE Signal Processing Workshop on “Signal Processing Advances in Wireless Communications (SPAWC),” held May 9-12, 1999 in Annapolis, MD
- Active reviewer for several journals and conferences, with significant activity for *IEEE Trans. on Signal Processing*, *IEEE Signal Processing Letters*, *Journal of the Franklin Institute*, and *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*
- Served on NSF panels for graduate fellowship awards (1998, 1999, 2000, 2014, 2015) and NSF panel to evaluate research proposals in wireless communications (1999)
- Served on the Technical Committee for digital signal processing in the IEEE Circuits and Systems Society (1996-2000)