

CURRICULUM VITA

Leslie Marie Collins
Professor of Electrical and Computer Engineering,
Professor of Biomedical Engineering, and
Assistant Research Professor, Otolaryngology-Head and Neck Surgery, Department of Surgery
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EDUCATION

B.S.E.E. May, 1985
Electrical Engineering, summa cum laude
The University of Kentucky
Lexington, Kentucky

M.S.E.E. August, 1986
Electrical Engineering and Computer Science
Major: Control Theory, Minor: Bioengineering
The University of Michigan
Ann Arbor, Michigan

Ph.D. December, 1995
Electrical Engineering and Computer Science
Major: Signal Processing, Minor: Bioengineering
The University of Michigan
Ann Arbor, Michigan

EMPLOYMENT

July, 2007 – present
Chair, Department of Electrical and Computer Engineering

June, 2007 – present
Professor, Department of Electrical and Computer Engineering (primary),
Professor, Department of Biomedical Engineering, Assistant Research Professor,
Otolaryngology-Head and Neck Surgery, Department of Surgery, Duke
University Medical Center, Duke University, Durham, NC.

November, 2002 – June, 2007
Associate Professor, Department of Electrical and Computer Engineering
(primary), Associate Professor, Department of Biomedical Engineering, Assistant
Research Professor, Otolaryngology-Head and Neck Surgery, Department of
Surgery, Duke University Medical Center, Duke University, Durham, NC.

January, 1996 – October, 2002

Assistant Professor, Department of Electrical and Computer Engineering (primary), Assistant Professor, Department of Biomedical Engineering (since April 1, 1996), Assistant Research Professor, Otolaryngology-Head and Neck Surgery, Department of Surgery, Duke University Medical Center (since January, 1998), Duke University, Durham, NC.

August, 2004 – present

Consultant, Signal Innovations Group

August, 2003 – April, 2004

Consultant, SAIC.

August, 2002 – April, 2003

Consultant, AETC Inc.

October, 1998 - present

Consultant, Army Night Vision and Electronic Sensors Directorate, HSTAMIDS Red Team, Fort Belvoir, VA.

September, 1999 - present

Consultant, Army Night Vision and Electronic Sensors Directorate, GSTAMIDS Development Team, Fort Belvoir, VA.

January, 1997 – January, 2000

Consultant, Digital System Resources, Inc., Fairfax, VA.

May, 1997 – May, 1998

Consultant, Geophex, Ltd., Raleigh, NC.

November, 1995 - December, 1995

Assistant Research Professor, Department of Electrical and Computer Engineering, Duke University, Durham, NC.

August, 1991 - October, 1995

Graduate student research assistant, Department of Electrical Engineering and Computer Science and the Kresge Hearing Research Institute, The University of Michigan, Ann Arbor, MI.

April, 1993 - December, 1994

Research Engineer, Signal and Image Processing Laboratory, Advanced Concepts Division, Environmental Research Institute of Michigan, Ann Arbor, MI.

June, 1991 - February, 1993

Industrial technical consultant to the Scientific Research Laboratories, Ford Motor Company, Dearborn, MI.

August, 1986 - August, 1990

Senior Engineer, Electronic and Software Systems Department, Research and Development Center, Westinghouse Electric Corporation, Pittsburgh, PA.

RESEARCH INTERESTS

Auditory systems modeling and analysis, signal detection theory, subsurface object detection and classification, statistical signal processing, sensory prosthetics, speech processing.

GRANTS AND CONTRACTS

Principal Investigator, "Psychophysical Measures in Cochlear Implants," NIH (Deafness and other Communication Disorders Institute), 5-R03-DC03136-02, \$99,201. August 1, 1996 - July 31, 1999.

Principal Investigator, subproject of Multi-disciplinary University Research Initiative (MURI), "Multi-disciplinary Research for Demining," Army Research Office Electronics Division, DAAH04-96-1-0448 SUB #1, \$444,717. November 1, 1996 - October 31, 2002, Served as PI of the subproject. (Lawrence Carin, PI. Included researchers from Duke University, Stanford University, California Institute of Technology, Ohio State University, and Georgia Institute of Technology).

Principal Investigator, "Preliminary Research to Investigate the Feasibility of a Novel Signal Processing Scheme for Hearing Aids," Lord Foundation, \$10,000, May 1, 1998 - June 30, 1999.

Principal Investigator, "Statistical Signal Processing for Demining: Experimental Verification," Joint UXO Coordination Office/Army Research Office, DAAG55-98-1-0340, \$29,999, May 18, 1998 - May 31, 1999.

Principal Investigator, "Improved Landmine Detection and Identification: Combining Statistical Decision Making and Auditory-Based Optimization of Human-Detector Performance," Army Research Office Biological Sciences Division, DAAG55-98-1-0416, \$310,075, July 1, 1998 - December 31, 2001.

Principal Investigator, subproject of "Signal Processing for Nuclear Quadrupole Resonance Identification of Buried Explosives", Quantum Magnetics, Inc., \$62,500, August 15, 1998 - August 31, 1999 (Lawrence Carin, PI). Co-Principal Investigator of the total \$125,000 project.

Principal Investigator, "Improved Signal Processing for Auditory Prosthetic Devices," Whitaker Foundation, #RG98-0161, \$205,870, September 1, 1998 - February 28, 2002.

Principal Investigator, "Optimizing the Auditory Output of the HSTAMIDS Systems," Night Vision Electronic Systems Directorate, DAAB15-99-P-1034, \$73,707, April 1, 1999 - May 30, 2000.

Principal Investigator, "Statistical Signal Processing with Physics-Based Models: UXO Detection and Identification," Strategic Environmental Research and Development Program, DACA72-99-C-0012, \$860,505, April 1, 1999 - March 31, 2002.

Principal Investigator, "Statistical Signal Processing for Demining: Modeling and Experimental Verification," Joint UXO Coordination Office/Army Research Office, DAAD19-99-1-0201, \$335,195, May 1, 1999 - December 30, 2000.

Principal Investigator, “Statistical Signal Processing for Demining: Continuation and Field Demonstration” Joint UXO Coordination Office/Army Research Office, DAAD19-00-1-0386, \$2,118,893, June 19, 2000 – June 18, 2007.

Principal Investigator, “Software Analysis and Algorithm Development for HSTAMIDS/GSTAMIDS Mine Detection System”, Night Vision and Electronic Sensors Directorate, U. S. Army CECOM, DAAB15-00-D-1006 (DOs 0001 through 0005), \$433,059.27, July 19, 2000 – December 22, 2003.

Principal Investigator, “Optimizing Noise-based Enhancement of Speech Recognition by Cochlear Implant Patients”, National Science Foundation, NSF-BES-00-85370, \$283,428, November 1, 2000 – October 31, 2003.

Co-Principal Investigator, “Duke University Signal Processing and Communications Laboratory,” Lord Foundation of North Carolina, \$17,400, 6/3/2002 – 5/31/2003 (Lisa Huettel, PI).

Principal Investigator, “Signal Processing And Modeling For UXO Detection And Discrimination In Highly Contaminated Sites,” Strategic Environmental Research and Development Program, DACA72-02-C-0015, \$1,110,000, 6/17/2002 – 11/30/2006.

Principal Investigator, subproject of “Multi-Sensor Physics-Based Classification of Unexploded Ordnance”, Army Research Office, DAAD19-02-1-0268, \$131,008, 7/1/2002 – 6/30/2005 (Lawrence Carin, PI). Co-Principal Investigator of the total \$262,016 project.

Principal Investigator, subproject of “Adaptive Multi-Modality Inverse Scattering for Targets Embedded in General Stochastic Environments”, Office of Naval Research (MURI), DAAD19-02-1-0252 SUB #4, \$532,125, 7/1/2002 – 6/30/2007 (Lawrence Carin, PI. Includes researchers from Duke University, Georgia Institute of Technology, University of Michigan and Stanford University). Co-Principal Investigator of the total \$4,747,000 project.

Principal Investigator, “Software Analysis/Algorithm Development for RFI Mitigation to Support QR Sensor,” U.S. Army CECOM, DAAB15-00-D-1006/DO 0006, \$66,000, 9/13/2002 – 9/12/2003.

Principal Investigator, subproject of “Physics-Based Modeling and Signal Processing for Synthetic Aperture Radar Detection of Former Bombing Ranges and Burial Grounds,” Strategic Environmental Research and Development Program, DACA72-02-C-0036 SUB #1, \$306,752, 9/20/2002 – 8/31/2006 (Lawrence Carin, PI). Co-Principal Investigator of the total \$613,504 project.

Principal Investigator, “Feature-Based UXO Detection and Discrimination,” Environmental Security and Technology Certification Program, AETC Inc., P.O. #SD-969, \$450,000, 10/1/2002 – 7/31/2005.

Principal Investigator, “IN-KIND Proposal to Develop Signal Processing and Communications Undergraduate Laboratory”, Microsoft Research, \$625,000, 11/15/2002 – 11/14/2004.

Principal Investigator, “Data Collection/Signal Processing Support, Jefferson Proving Grounds, IN,” Environmental Security and Technology Certification Program, AETC Inc., P.O. #SD-1030/ACCT #4047-040/3, \$4,700, 4/1/2003 – 7/31/2003.

Principal Investigator, "EMI Sensor Optimized for UXO Detection and Discrimination," Environmental Security and Technology Certification Program, AETC Inc., P.O. #SD-1057, \$175,000, 4/1/2003 - 3/31/2006.

Principal Investigator, "Software Analysis/Algorithm Development for Countermine Detection Systems," U.S. Army CECOM, DAAB15-03-D-0004/DO 0001, \$135,000, 5/29/2003 - 6/30/2005.

Principal Investigator, "Data Collection/Signal Processing Support, Jefferson Proving Grounds, IN (Supplement)," Environmental Security and Technology Certification Program, AETC Inc., P.O. #SD-1070/ACCT #4044030-31091, \$5,222, 7/20/2003 - 8/31/2003.

Principal Investigator, "Theme-based Redesign of the Duke ECE Curriculum," National Science Foundation, EEC-0343168, \$99,348, 9/1/03 - 8/31/05.

Principal Investigator, "Modeling and Signal Processing for EMI Sensing of Landmines, in Support of AMD System (Supplement)," Office of Naval Research, N00014-04-1-0210 SUB #2, \$75,000, 1/5/2004 - 4/14/2006.

Co-Principal Investigator, "An Innovative, Hands-on Teaching Laboratory for Electrical and Computer Engineering," Agilent Technologies, \$138,743, 3/1/2004 - 2/28/2005 (Lisa Huettel, PI).

Principal Investigator, "Software Algorithm Improvements for Humanitarian Demining Handheld Stand-Off Mine Detection System," U.S. Army CECOM, DAAB15-03-D-0004/DO 0002, \$100,000, 4/1/2004 - 3/31/2005.

Principal Investigator, "Analysis Algorithms for the Spectral Analysis and Decision-Making Process of SAIC's PELAN System," SAIC Inc., Subcontract #4400089113, \$100,000, 4/7/2004 - 2/10/2005.

Co-Principal Investigator, "Signal Processing for Handheld UXO Sensor Improvements," AETC Inc., P.O. #2094-SD, \$300,000, 7/1/2004 - 3/11/2007 (Stacy Tantum, PI).

Co-Principal Investigator, "A Vertically-Integrated Application-Driven Undergraduate Signal Processing Laboratory," National Science Foundation, DUE-0410596, \$199,358, 7/1/2004 - 6/30/2007 (Lisa Huettel, PI).

Principal Investigator, "Signal Processing for the Autonomous Mine Detection System," EOIR Technologies Inc., P.O. #G6003600, \$47,000, 7/9/2004 - 3/1/2005.

Principal Investigator, "Theme-based Redesign of the Duke ECE Curriculum," National Science Foundation, EEC-0431812, \$997,805, 9/1/04 - 8/31/07.

Principal Investigator, "Ultrasonic Data Classification," SAIC Inc. Subcontract #4400098319, \$100,168 (FBI prime), 9/21/2004 - 3/11/2005.

Principal Investigator, "US Army Autonomous Mine Detection Sensor (AMDS) STO Program Algorithm Development Support," U.S. Army CECOM, DAAB15-03-D-0004/DO 0003, \$118,642, 3/23/2005 - 12/31/2005.

Co-Principal Investigator, "Bridging the Gap: Using Mobile Technology to Integrate Classroom and Laboratory Experiences to Teach Fundamentals," Hewlett Packard, \$15,500 in funds plus \$58,000 in equipment, total value \$73,500, 6/1/2005 – 5/31/2008 (Lisa Huettel, PI).

Principal Investigator, "Statistical and Adaptive Signal Processing for UXO Discrimination for Next-Generation Sensor Data," Strategic Environmental Research and Development Program, W912HQ-05-C-0030, \$1,470,000, 6/8/2005 – 6/7/2008.

Co-Principal Investigator, "Analysis Algorithms for the Spectral Analysis and Decision-Making Process of SAIC's PELAN System," SAIC Inc., Subcontract #4400113434, \$80,000, 9/6/2005 – 1/31/2007 (Stacy Tantum, PI).

Principal Investigator, "Ultrasonic Data Classification," sponsored by SAIC, Inc. (FBI prime), Contract #4400117943, \$46,412, 9/6/2005 – 2/28/2006.

Principal Investigator, "Software Algorithm Improvements for Humanitarian Demining Handheld Stand-Off Mine Detection System," U.S. Army CECOM, DAAB15-03-D-0004/DO 0004, \$50,000, 12/5/2005 – 12/4/2006.

Principal Investigator, "Speech Processor Optimization for Cochlear Implant Subjects," NIH, 1R01-DC-007994-01, \$1,155,000, 1/1/2006 – 12/31/2011.

Principal Investigator, "Theme-based Redesign of the Duke ECE Curriculum," National Science Foundation, EEC-0431812 Sub #1, \$5,000, 5/12/2006 - 8/31/07.

Principal Investigator, "Alternative Techniques for Classifying "Widgets" from Ultrasonic Data," SAIC Inc., \$85,033 (FBI prime), 6/1/2006 – 1/31/2007.

Principal Investigator, "Statistical Signal Processing for Landmine and Ordnance Discrimination" Army Research Office, approved, \$1,950,000, 8/14/2006 – 8/13/2009.

Principal Investigator, "Locating Sound Sensor Networks (LSSN)," Scientific Applications & Research Associates, Inc., \$30,000, 8/31/2006 – 4/30/2007.

Co-Principal Investigator, "Model-Based Statistical Techniques for Classifying 'Widgets' from Ultrasonic Data," SignalScape (FBI prime), \$135,000, 2/1/2007 – 12/31/2007 (Sandy Throckmorton, PI).

Pending

Principal Investigator, "Statistical Signal Processing For Landmine and Ordnance Detection and Discrimination -- Addendum," Joint UXO Coordination Office/Army Research Office, \$150,000, 1/1/2007 -- 12/31/2007.

NATIONAL PROFESSIONAL SERVICE

Associate Editor and Member of the Editorial Board, IEEE Signal Processing Magazine, 6/96 – 6/99.

Active Reviewer: IEEE Transactions on Signal Processing, IEEE Transactions on Biomedical Engineering, Journal of the Acoustical Society of America, IEEE Transactions on Geoscience and Remote Sensing, IEEE Antennas and Propagation, IEEE Transactions on Aerospace and Electronic Systems, Neural Computation, Hearing Research, Ear and Hearing, Journal of the Association for Research in Otolaryngology.

Member, IEEE Signal Processing Theory and Methods Committee, January, 2002 – December, 2007.

Review Panelist, National Science Foundation Biomedical Engineering Division, March 1-2, 2000.

Review Panelist, National Institutes of Health, Biomedical Research Partnership Grants, July 5-6, 2000.

Review Panelist, Strategic Environmental Research and Development Program, UXO Technology Review Meeting, February 13, 2001.

Review Panelist, National Institutes of Health, Center for Scientific Review Special Emphasis Panel, March 9, 2001.

Member, Standardized UXO Test Sites Committee, Army Engineering Center, Aberdeen, MD.

Review Panelist, National Institutes of Health, Center for Scientific Review Special Emphasis Panel, June 25-26, 2001.

Review Panelist, National Institutes of Health, Biomedical Research Partnership Grants, July 9, 2001.

Committee of Visitors, National Science Foundation, Directorate for Biological Sciences, March 4-6, 2002.

Technical Program Committee, Detection and Remediation Technologies for Mines and Minelike Targets VII, SPIE, April, 2002.

Technical Program Committee, Detection and Remediation Technologies for Mines and Minelike Targets VIII, SPIE, April, 2003.

Review Panelist, National Science Foundation Biomedical Engineering Division, January 16-17, 2003.

Technical Program Committee, Detection and Remediation Technologies for Mines and Minelike Targets IX, SPIE, April, 2004.

Review Panelist, National Science Foundation Biomedical Engineering Division, January 15-16, 2004.

Review Panelist, National Science Foundation Engineering Education Division, September 8-9, 2004.

Review Panelist, National Institutes of Health, Biomedical Research Partnership Grants, February 28, 2005.

Technical Program Committee, IEEE International Geoscience and Remote Sensing Symposium, July, 2005.

Technical Program Committee, Detection and Remediation Technologies for Mines and Minelike Targets X, SPIE, April, 2005.

Review Panelist, Nation Science Foundation Engineering Education Division, June 7-8, 2005.

Technical Program Committee, Detection and Remediation Technologies for Mines and Minelike Targets XI, SPIE, April, 2006.

Technical Program Committee, IEEE International Geoscience and Remote Sensing Symposium, July, 2006.

Technical Program Committee, 14th European Signal Processing Conference, September, 2006.

Plenary Speaker, Women in Engineering Career Day, University of Kentucky College of Engineering, February, 2007.

Reviewer, U.S. Department of Homeland Security (DHS) Center of Excellence for Explosives Detection, Mitigation, and Response, March 2007.

Associate Editor, IEEE Transactions on Signal Processing, 9/1/04 – 8/31/07.

UNIVERSITY PROFESSIONAL SERVICE

Invited speaker at the EPA's "Take your daughter to work day" luncheon, Durham, NC, April 26, 2001.

Undergraduate Studies Committee, Electrical and Computer Engineering Department (member, 2000 – present; chair, 2001 - 2006).

Academic Council Member, April, 2000 – April, 2002, April, 2006 – April, 2008.

Faculty Advisor: Society of Women Engineers (1997 - 2003).

Member of Faculty Committee Advising IEEE Student Section (2001 – 2005).

Panelist, Women in Science and Engineering (WISE) Symposium "*The Advanced Degree and Science and Engineering Education: Mentoring University Students*", April 7, 2000.

Pratt School of Engineering Faculty Affairs Committee, (1999 – 2000).

Pratt School of Engineering Investment Task Force (1997 - 1998).

Search Committee, Electrical and Computer Engineering Department (member, 1996 – 2001; chair, 2002-2003).

Oral Qualification Examiner, Electrical and Computer Engineering Department (1996 - 1997).

Pratt School of Engineering Curriculum Committee (2002 – 2005).

Co-Chair, Pratt School of Engineering Curriculum Strategic Planning Committee (2005-2006).

Duke University Admissions and Financial Aid Committee (September, 2003 – August, 2006).

Duke University Science and Engineering Library Services Planning Committee (September, 2004 – May, 2005).

Duke University Task Force on Undergraduate Education (September, 2005 – January, 2006).

Panelist, “Managing a Lab: Practical Tips for Faculty, Postdocs, and Graduate Students,” Duke University Medical School, July 25, 2006.

Member, Graduate Student Compensation Committee, ECE Department, Pratt School of Engineering, Fall, 2006.

Search Committee, Dean of Undergraduate Education, Duke University, March, 2007 – May, 2007.

OTHER PROFESSIONAL ACTIVITIES

Professional Societies

Acoustical Society of America

American Society for Engineering Education

Association for Research in Otolaryngology

Institute of Electrical and Electronics Engineers (Senior Member, 2001)

HONORS AND AWARDS

Project of the Year (co-PI), “Wide Area Assessment for UXO Remediation”, Strategic Environmental Research and Development Program, November, 2005.

Capers and Marion McDonald Award for Excellence in Teaching and Research, April, 2005.

Position Paper, “Signal Processing for Landmine Detection”, White House/RAND Technology Summary, May, 2002.

Senior Member, IEEE, 2001.

John-Kelly C. Warren Faculty Scholar, January, 2001.

Project of the Year (PI), “Statistical Signal Processing with Physics-Based Models: Multi-Sensor UXO Detection and Identification”, Strategic Environmental Research and Development Program, November, 2000.

Full Membership, USNC/URSI Commission A (Electromagnetic Metrology), January, 2000.

1998 Outstanding Engineer, “Innovative Technical Contributions to the Benefit of Human Welfare”, IEEE Eastern North Carolina Section.

Member, Eta Kappa Nu

Member, Sigma Xi

Member, Tau Beta Pi

G. E. E. Fellowship (1994-1995)
Marian Sarah Parker Award for Outstanding Graduate Women in Engineering (1992)
Shell Graduate School Fellowship (1990-1991)

REFEREED JOURNAL PUBLICATIONS

- (1) Remus, J. J. and Collins, L. M., "Comparison of adaptive psychometric procedures motivated by the Theory of Optimal Experiments: simulated and experimental results," in press, J. Acoustical Society of America, September, 2007.
- (2) Torrione, P. A. and Collins, L. M., "Texture Feature Coding Method Features for Anti-Tank Landmine Detection in GPR Data," IEEE Trans. Geosc. Remote Sens., vol. 45, Issue 7, July, 2007, 2364-2382.
- (3) Tantum, S. L., Yu, Y., and Collins, L. M., "Bayesian Mitigation of Sensor Position Errors to Improve Unexploded Ordnance Detection," in press, IEEE Trans. Geosc. Remote Sens. Letters, July, 2007.
- (4) Throckmorton, C. S., Kucukoglu, M. S., Remus, J. J., and Collins, L. M., "The Effect of Frequency Estimation on Speech Recognition Using an Acoustic Model of a Cochlear Implant," in press, Hearing Research, March 2007.
- (5) Remus, J. J., Throckmorton, C. S., and Collins, L. M., "Expediting the identification of impaired channels in cochlear implants via analysis of speech-based confusion matrices," in press, IEEE Trans. Biomedical Engineering, March, 2007.
- (6) Xu, Y. and Collins, L. M. "Predictions of Psychophysical Measurements for Sinusoidal Amplitude Modulated (SAM) Pulse-train Stimuli from a Stochastic Model," in press, IEEE Trans. Biomedical Engin., November, 2006.
- (7) Huettel, L., Coonley, K., Gustafson, M., Kim, J., Ybarra, G., Brown, A., Collins, L., "Fundamentals of ECE: A Rigorous, Integrated Introduction to Electrical and Computer Engineering," in press, IEEE Trans. Education, November, 2006.
- (8) Kolba, M. P. and Collins, L. M., "Information-Based Sensor Management In The Presence Of Uncertainty," IEEE Trans. Signal Processing, Vol 55, Iss 6, Part 1, June 2007, 2731-2735.
- (9) Remus, J. J., and Collins L. M., "A Comparison of Adaptive Psychometric Procedures Based on the Theory of Optimal Experiments and Bayesian Techniques: Implications for Cochlear Implants," in press, Perception and Psychophysics, June, 2006.
- (10) Throckmorton, C. S., Tantum, S. L., Tan, Y., and Collins, L. M., "Blind Source Separation for UXO Detection in Highly Cluttered Environments," Journal of Applied Geophysics, 61, 2007, 304-317.
- (11) Throckmorton, C. S., Kucukoglu, M. S., Remus, J. J., and Collins, L. M., "Encoding fine frequency structure for improved speech recognition in cochlear implant subjects: a multiple carrier frequency algorithm," Hearing Research, 218, August, 2006, 30-42.
- (12) Song, J., Liu, Q., Torrione, P., and Collins, L. M., "2D and 3D NUFFT Migration Method for Landmine Detection Using Ground-Penetrating Radar," IEEE Trans. Antennas and Propagation, 44 (6), June, 2006, 1462 - 1469.
- (13) Torrione, P. and Throckmorton, C., and Collins, L., "Performance of an Adaptive Feature-Based Processor for a Wideband Ground Penetrating Radar System", IEEE Trans. Aerospace and Electronic Systems, 42 (2), April, 2006, 644 - 658.
- (14) Y. Liao, L. W. Nolte, and L. M. Collins, "Decision Fusion of Ground Penetrating Radar and Metal Detector Algorithms – a Robust Approach," IEEE Trans. Geoscience and Remote Sensing, Vol 45, Iss. 2, Feb 2007, pp. 398-409.

- (15) Xu, Y. and Collins, L. M., "Predicting Dynamic Range and Intensity Discrimination for Electrical Pulse-train Stimuli Using a Stochastic Auditory Nerve Model: the Effects of Stimulus Noise," *IEEE Trans. Biomed. Engin.*, 52(6), June, 2005, 1040-1049.
- (16) Tan, Y., Tantum, S. L., and Collins, L. M., "Kalman Filtering for Enhanced Landmine Detection using Quadrupole Resonance," *IEEE Trans. Geoscience and Remote Sensing*, 43(7), July 2005, 1507-1516.
- (17) Remus, J. J. and Collins, L. M., "The Effects of Noise on Speech Recognition in Cochlear Implant Subjects: Predictions and Analysis Using Acoustic Models," *EURASIP Journal on Applied Signal Processing, Special Issue on DSP in Hearing Aids and Cochlear Implants, Volume 2005, #18*, pp. 2979-2990, November, 2005.
- (18) Torrione, P. and Collins, L., "The Performance of Matched Subspace Detectors and Support Vector Machines for Induction-Based Landmine Detection", *Subsurface Sensing Technologies and Applications, Vol. 5, No. 3*, pp. 121-150, July 2004.
- (19) Zhu, Q. and Collins, L. M., "Application of Feature Extraction Methods for Landmine Detection Using the Wichmann/Niitek Ground Penetrating Radar", *IEEE Geoscience and Remote Sensing Letters*, 43(1), Jan. 2005, 81-85.
- (20) Hu, W., Tantum, S. L., and Collins, L. M., "Classification of Multiple Closely-Spaced Subsurface Objects: Application of Independent Component Analysis," *IEEE Trans. Geosc. Remote Sensing*, 42(11), November, 2004, 2544-2554.
- (21) Hu, W. and Collins, L., "Classification of Closely-Spaced Subsurface Objects Using Electromagnetic Induction Data and Blind Source Separation Algorithms", *Radio Science*, June, 2004.
- (22) Chilaka, S., Collins, L., Lowe, L., Weaver, R., and Riggs, L., "Discrimination Experiments with the U. S. Army's Standard Metal Detector the AN/PSS-12", *Radio Science*, June 2004.
- (23) Tan, Y., Tantum, S. L., and Collins, L. M., "Cramer-Rao Lower Bound for Estimating Quadrupole Resonance Signals in Non-Gaussian Noise," *IEEE Signal Processing Letters*, Vol. 11, No. 5, 490-493, May, 2004.
- (24) Huettel, L. G., and Collins, L. M., "A theoretical analysis of normal- and impaired-hearing intensity discrimination", *IEEE Transactions on Speech and Audio Processing*, 12(3), pp. 323-333, May, 2004.
- (25) Xu, Y. and Collins, L. M., "Predicting the Threshold of Pulse-train Electrical Stimuli Using a Stochastic Auditory Nerve Model: the Effects of Noise," *IEEE Trans. Biomedical Engin.*, 51(4), April, 2004, 590-603.
- (26) Ho, K. C., Collins, L. M., Huettel, L. G., and Gader, P. D., "Discrimination Mode Processing for EMI and GPR Sensors for Hand-Held Landmine Detection," *IEEE Trans. Geoscience and Remote Sensing*, 42(1), Jan. 2004, 249-263.
- (27) Huettel, L. G., and Collins, L. M., "The theoretical effects of neural and stimulus uncertainty on tone-in-noise detection", *IEEE Trans. Biomedical Engineering*, Vol 51, No. 2, February, 2004, 282-293.
- (28) Tantum, S. L. and Collins, L. M., "Performance Bounds and a Parameter Transformation for Decay Rate Estimation," *IEEE Trans. Geoscience and Remote Sensing*, 41(10), 2224-2231, October, 2003.
- (29) Tan, Y., Huettel, L., Tantum, S., and Collins, L. "Enhanced Signal and Auditory Processing for Landmine Detection using Electromagnetic Induction Sensors", *Subsurface Sensing Technologies and Applications*, 4(3), July, 2003, 263-284.
- (30) Ferguson, W. D., Collins, L. M., and Smith, D. W., "Psychophysical Threshold Variability in Cochlear Implant Subjects," *Hearing Research*, 180, June, 2003, 101-113.
- (31) Zhang, Y., Collins, L. M., Yu, H., Baum, C., and Carin, L., "Sensing of Unexploded Ordnance with Magnetometer and Induction Data: Theory and Signal Processing", *IEEE Trans. Geosc. Remote Sensing*, Vol. 41 (5), pp. 1005-1015, May, 2003.

- (32) Collins, L. M., Tantum, S. L., Gao, P., Makowsky, L., Moulton, J., Reidy, D., and Weaver, R., "A subspace-based algorithm for detection of low-metallic content landmines using electromagnetic induction sensor data," in press, Signal Processing.
- (33) Xu, Y., and Collins, L., "Predicting the threshold of electrical stimuli using a stochastic auditory nerve model: the effects of noise", IEEE Trans. Biomedical Engin., Vol 50(7), pp. 825-835, July, 2003.
- (34) Zhang, Y., Collins, L., and Carin, L., "Unexploded Ordnance Detection Using Bayesian Physics-Based Data Fusion", Integrated Computer-Aided Engineering, Vol 10, pp. 231-237, July, 2003.
- (35) Throckmorton, C. and Collins, L., "The effect of channel interactions on speech recognition in cochlear implant subjects: predictions from an acoustic model", J. Acoust. Soc. Am, 112(1), July, 2002, 285-296
- (36) Collins, L., Gao, P., Schofield, D., Moulton, J., Makowsky, L., Reidy, D., and Weaver, R., "A Statistical Approach to Landmine Detection Using Broadband Electromagnetic Induction Data", IEEE Trans. Geoscience and Remote Sensing, Vol. 40, No. 4, April, 2002, pp. 950-962.
- (37) Huettel, L. G. and Collins, L. M. "A theoretical comparison of information transmission in the peripheral auditory system: Normal and impaired frequency discrimination", Speech Communication, special issue on Speech Processing for Hearing Aids, 39, pp. 5-21, January, 2003.
- (38) Throckmorton, C. S. and Collins, L. M., "A comparison of two loudness balancing tasks in cochlear implant subjects", Ear and Hearing, Vol 22, No. 5, October, 2001, pp. 439-448.
- (39) Tantum, S. and Collins, L. "A comparison of algorithms for subsurface object detection and identification using time domain electromagnetic induction data", **invited paper** for special issue "New advances in subsurface sensing: Systems, modeling, and signal processing", IEEE Transactions of Geoscience and Remote Sensing, Vol 39, No. 6., June 2001, pp. 1299-1306.
- (40) Collins, L. M., Zhang, Y., Li, J., Wang, H., Carin, L., Hart, S., Rose-Pehrsson, S., Nelson, H., and McDonald, J., "A Comparison of the Performance of Statistical and Fuzzy Algorithms for Unexploded Ordnance Detection", special issue on Recognition Technology, IEEE Trans. Fuzzy Systems, vol 9, No. 1., (2001), pp. 17-30.
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 - (95) Gresham, L. C. and Collins, L. M., "Signal detection theory analysis of two computational auditory models", NATO International Advanced Study Institute for Computational Hearing, Il Ciocco, Italy, July, 1998.
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INVITED TALKS

- (1) Collins, L., "Who Me.. an Engineer?," Plenary Lecture, University of Kentucky Women in Engineering Career Day, February 23, 2007.
- (2) Collins, L., "ECE Curriculum Reform at Duke University," NSF Workshop on Engineering Department Level Reform," May 17, 2006.
- (3) Collins, L., "Speech Synthesizer Technologies for High Bandwidth BCIs," NIDCD/NIH Workshop on Brain Computer Interfaces for Speech Synthesis, May 25, 2006.
- (4) Collins, L., "The Current State of Signal Processing and Sensor Fusion for Shallow Geophysical Remote Sensing," Workshop on Shallow Tunnel Detection, University of Mississippi, February, 2006.
- (5) Collins, L., "Engineering a Secure Future: Detection of Hidden or Camouflaged Objects," CIEMAS Dedication, Duke University, November, 2004.
- (6) Collins, L., "Detection of hidden or camouflaged objects: Lessons learned from landmine and unexploded ordnance detection", Technologies of Counter-Terrorism, Panelist, Duke University Community Forum, October 26, 2001.
- (7) Collins, L., "A study of pulsatile stimulation with additive noise for enhanced neural response in cochlear implant subjects," University of Iowa Otolaryngology Seminar Series, July, 2001.
- (8) Collins, L., "EMI, GPR, and MAG Signal Processing and Fusion", Joint Workshop on Research on Demining Technologies, Ispra, Italy, July, 2000.
- (9) Collins, L., "Human Cognition in EMI Detection", Joint Workshop on Research on Demining Technologies, Ispra, Italy, July, 2000.
- (10) Collins, L., "Improving the Detection of Landmines and Unexploded Ordnance via Physics-Based Statistical Signal Processing, VISSTA/CACC Seminar Series, Department of Electrical and Computer Engineering, North Carolina State University, February, 2000.
- (11) Collins, L., "Predictors of Speech Recognition in Cochlear Implants", Hearing & Chemical Senses Program Seminar Series, Kresge Hearing Research Institute, University of Michigan, Ann Arbor, MI, October 13, 1999.
- (12) D. Reidy, L. Collins, P. Gao, D. Weaver, "Low Metal Mine Discrimination Using EM Spectroscopy", APL Signature Data Workshop, Joint Research Centre European Commission, Ispra, Italy, June 14 – 15, 1999.

- (13) Collins, L. and Tantum, S., "ATR Algorithm Performance for the BRTRC Wichmann Ground Penetrating Radar System", Joint UXO Coordination Office Ground Penetrating Radar Workshop, Institute for Defense Analyses, Alexandria, VA, May 8 - 10, 1999.
- (14) Collins, L., "Signal Processing for the GEM-3: New Developments", Active Electromagnetics Workshop, Joint UXO Coordination Office, Ft. Belvoir, VA, January 21-22, 1999.
- (15) Collins, L., "Signal Processing and System Optimization for Individuals with Cochlear Implants and Hearing Aids", Department of Psychology-Experimental, Duke University, October 17, 1997.
- (16) Collins, L. and Gao, P., "EMI Detection Algorithms", DARPA Clutter Workshop, Washington, DC, October 29-30, 1997.

CONFERENCE SESSION MODERATOR

- (1) "Student Papers", Detection and Remediation Technologies for Mines and Minelike Targets VI Conference, 2003 International Symposium on Aerospace/Defense Sensing and Controls, Orlando, Florida, April, 2003.
- (2) "Signal Processing and Data Fusion II", Detection and Remediation Technologies for Mines and Minelike Targets VI Conference, 2003 International Symposium on Aerospace/Defense Sensing and Controls, Orlando, Florida, April, 2003.
- (3) "Cochlear Implants", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2003.
- (4) "Detection, Including Discrimination", UXO/Countermines Forum, Orlando, Florida, September, 2002.
- (5) "UWB Subsurface Discrimination from Magnetostatics to GPR", 2002 IEEE International Geoscience and Remote Sensing Symposium, Toronto, Canada, June, 2002.
- (6) "Radar IV", Detection and Remediation Technologies for Mines and Minelike Targets V Conference, 2002 International Symposium on Aerospace/Defense Sensing and Controls, Orlando, Florida, April, 2002.
- (7) "Technologies: Detection", UXO/Countermines Forum, New Orleans, LA, April, 2001.
- (8) "Detection of Buried Objects", National Radio Science Meeting, Boulder, Colorado, January, 2001.
- (9) "Sensor Fusion", Joint Workshop on Research on Demining Technologies, Ispra, Italy, July, 2000.
- (10) "UXO: Identification, Signals, Discrimination", EUROEM 2000, Edinburgh, Scotland, June, 2000.
- (11) "Technologies: Detection", UXO/Countermines Forum, Anaheim, CA, May, 2000.
- (12) "Electromagnetics/Magnetics I", Detection and Remediation Technologies for Mines and Minelike Targets V Conference, 2000 International Symposium on Aerospace/Defense Sensing and Controls, Orlando, Florida, April, 2000.
- (13) "Electromagnetics/Magnetics III", Detection and Remediation Technologies for Mines and Minelike Targets V Conference, 2000 International Symposium on Aerospace/Defense Sensing and Controls, Orlando, Florida, April, 2000.
- (14) "A New Technology Applications Conference On The Science And Technology Of Unexploded Ordnance (UXO) Removal And Site Remediation", Workshop sponsored by the Naval Facilities Engineering Command, Pacific, Naval Postgraduate School and the Kaho'olawe Island Reserve Commission, Maui, Hawaii, November, 1999.
- (15) "Psychoacoustic and Auditory Models", Audio Engineering Society 17th Convention, New York, NY, September, 1999.

- (16) "Plenary Summary: Data Collection", Active Electromagnetics Workshop, Joint UXO Coordination Office, Ft. Belvoir, VA, January 21-22, 1999.
- (17) "Assessment of New Technology", Issues in Advanced Hearing Aid Research, Lake Arrowhead, California, May, 1998.
- (18) "Representations in Psychophysical Space", Conference on Implantable Auditory Prostheses, Monterey, California, August, 1997.

CONFERENCE ABSTRACTS AND PRESENTATIONS

- (1) Torrione, P. A. and Collins, L. M., "Application of Markov Random Fields for Image Segmentation in GPR Data," UXO/Countermining Forum, Orlando, FL, August, 2007.
- (2) Tantom, S. L., Kolba, J. and Collins, L. M., "Statistical and Adaptive Signal Processing for Multi-Axis Time-Domain EMI Data," UXO/Countermining Forum, Orlando, FL, August, 2007.
- (3) Remus, J. J. and Collins, L. M., "Inversion Strategies for a UXO Dipole Model: The Effects of Prior Information," UXO/Countermining Forum, Orlando, FL, August, 2007.
- (4) Stohl, J. S., Throckmorton, C. S., and Collins, L. M., "Investigating The Impact Of Duration On Pitch Cues In Cochlear Implants," Conference on Implantable Auditory Prostheses, Lake Tahoe, CA, July, 2007.
- (5) Stohl, J. S., Throckmorton, C. S., and Collins, L. M., "Evaluating The Pitch Structure Due To Multiple Rates And Places For Cochlear Implant Users," Conference on Implantable Auditory Prostheses, Lake Tahoe, CA, July, 2007.
- (6) Stohl, J. S., Throckmorton, C. S., and Collins, L. M., "Mapping the Place and Rate Induced Pitches Across a Cochlear Implant Array," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2007.
- (7) Stohl, J. S., Throckmorton, C. S., and Collins, L. M., "Developing a SPEAR-3 Based Experimental Psychophysics Interface," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2007.
- (8) Stohl, J. S., Throckmorton, C. S., and Collins, L. M., "Implementing a Psychophysical Interface for the SPEAR3," 152nd Meeting of the Acoustical Society of America, Honolulu, Hawaii, November, 2006.
- (9) Morton, K. D. and Collins, L. M., "Predictions of Mandarin Chinese Tone Identification In Cochlear Implants Using Particle Filters," 152nd Meeting of the Acoustical Society of America, Honolulu, Hawaii, November, 2006.
- (10) Remus, J. J. and Collins, L. M., "Sensitivity Analysis to Evaluate the Benefits and Risks of Using Prior Information in Adaptive Psychometric Procedures," 152nd Meeting of the Acoustical Society of America, Honolulu, Hawaii, November, 2006.
- (11) Remus, J. J. and Collins, L. M., "A Multi-Stage Sensor Fusion Countermining Strategy Using Handheld GPR/EMI Sensors," UXO/Countermining Forum, Las Vegas, NV, July, 2006.
- (12) Tantom, S. L., Wang, Y., Yu, Y., and Collins, L. M., "Mitigating Measurement Position Uncertainty to Improve UXO Detection," UXO/Countermining Forum, Las Vegas, NV, July, 2006.
- (13) Torrione, P. A. and Collins, L. M., "Tracking and Feature Processing for GPR Based Detection of Anti-Tank Landmines," UXO/Countermining Forum, Las Vegas, NV, July, 2006.
- (14) Morton, K. D., and Collins, L. M., "Mandarin Chinese Tone Identification in Cochlear Implant Subjects: Predictions from Acoustic Models," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2006.
- (15) Remus, J. J. and Collins, L. M., "Comparison of Adaptive Psychometric Procedures Based on the Theory of Optimal Experiments and Bayesian Adaptive Techniques," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2006.

- (16) Stohl, J. S. and Collins, L. M., "Encoding Additional Information via Variable Simulation Rates in Cochlear Implants: Investigating Potential Benefits to Music Appreciation Using Acoustic Models," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2006.
- (17) Kucukoglu, M. S., and Collins, L. M., "Alternative Methods for Frequency Selection in a Frequency Encoding Algorithm for Cochlear Implant Speech Processors," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2006.
- (18) Throckmorton, C. S. and Collins, L. M., "Melody Identification And Channel Interactions: Acoustic Model Predictions," 2005 Conference on Implantable Auditory Prostheses, August, 2005.
- (19) Kucukoglu, M. S., Throckmorton, C. S., and Collins, L. M., "Encoding Additional Frequency Information via Variable Pulse Rate for Improved Speech Understanding in Cochlear Implant Subjects," 2005 Conference on Implantable Auditory Prostheses, August, 2005.
- (20) Remus, J. J. and Collins, L. M., "Identifying Poorly Performing Channels in Cochlear Implants through Confusion Matrix Analysis," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2005.
- (21) Kucukoglu, M. S., Davidian, D., and Collins, L. M., "Encoding Fine Structure for Improved Speech Understanding in Cochlear Implant Subjects," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2005.
- (22) Crosby, P. A., Throckmorton, C. S., and Collins, L. M., "The Impact of Limited Spectral Information and Pitch Anomalies on Melody Recognition in Cochlear Implants," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2005.
- (23) Throckmorton, C. S. and Collins, L. M., "The Effect of Poor Intensity Resolution in Individual Channels on Speech Recognition in Cochlear Implants," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2005.
- (24) Huettel, L. G., Brown, A., Gustafson, M. Massoud, H., Ybarra, G., and Collins, L. M., "Work In Progress: Theme-based Redesign of an Electrical and Computer Engineering Curriculum," Frontiers in Education Symposium, Savannah, GA, October, 2004.
- (25) Remus, J. J. and Collins, L. M., "Vowel and Consonant Confusion in Noise: Analysis and Comparison of Acoustic Models using Statistical Signal Processing Techniques," 2003 Conference on Implantable Auditory Prostheses, Asilomar, CA, September, 2003.
- (26) Xu, Y. and Collins, L. M., "Theoretical Prediction of Dynamic Range and Intensity Discrimination for Electrical Noise-modulated Pulse-train Stimuli," 2003 Conference on Implantable Auditory Prostheses, Asilomar, CA, September, 2003.
- (27) Remus, J. J., Throckmorton, C. S., and Collins, L. M., "Speech Recognition in Noise: Comparison of Two Acoustic Cochlear Implant Models using Normal Hearing Subjects", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2003.
- (28) Xu, Y., and Collins, L. M., "Threshold Prediction for Noise-Modulated Pulse Trains", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2003.
- (29) Collins, L. M., Carin, L., Frasier, S., and Clodfelter, F., "Wichmann/NIITEK GPR Processing Using Independent Components Analysis," UXO/Countermine Forum, Orlando, Florida, September, 2002.
- (30) Zhang, Y., Collins, L. M., and Carin, L., "Unexploded Ordnance Detection and Discrimination via Model-Based Statistical Sensor Fusion," UXO/Countermine Forum, Orlando, Florida, September, 2002.
- (31) Miller, J., Keiswetter, D., Collins, L., and Torriano, P., "UXO Variability: A Fundamental Limit On Discrimination Performance", UXO/Countermine Forum, Orlando, Florida, September, 2002.
- (32) Ferguson, W. D., Xu, Y., Miller, R. L., and Collins, L. M., "Analytical predictions of auditory nerve response to noise-modulated pulsatile electrical stimulation," 144th Acoust. Soc. Am., June, 2002.

- (33) Xu, Yifang and Collins, L., "Threshold Prediction for a Noise-Modulated Electrical Stimulus using a Stochastic Auditory Nerve Model: Implications for Cochlear Implants", Midwinter Research Meeting, Association for Research in Otolaryngology, January, 2002.
- (34) Collins, L. M., Miller, R. L., Ferguson, W. D., and Xu, Y., "Neural Responses Under Electrical Stimulation: Modeling the Effects of Noise," 2001 Conference on Implantable Auditory Prostheses, Asilomar, CA, September, 2001.
- (35) Collins, L., Zhang, Y, Tantum, S., and Li, J., "Statistical Signal Processing With Physics-Based Models: Multi-Sensor UXO Detection And Identification", UXO Forum, New Orleans, LA, April, 2001.
- (36) Collins, L. and Huettel, L., "Detection And Identification Of Landmines: A Comparison Of Statistical Signal Processing Algorithms", UXO Forum, New Orleans, LA, April, 2001.
- (37) Tantum, L. and Collins, L., "Physics-Based Signal Processing For Subsurface Object Detection And Identification Using Ground Penetrating Radar", UXO Forum, New Orleans, LA, April, 2001.
- (38) Throckmorton, C. and Collins, L., "Evaluating the Effect of Psychophysically-Measurable Perceptual Anomalies Using an Acoustic Model of a Cochlear Implant", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2001.
- (39) Collins, L., Ferguson, W., and Miller, R., "Neural Responses Under Electrical Stimulation: Modeling the Effects of Noise," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2001.
- (40) Huettel, L. and Collins, L., "Theoretical limits of frequency discrimination for normal and impaired peripheral auditory systems," Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2001.
- (41) Tantum, S., and Collins, L., "Robust Statistical Signal Processing for Subsurface Target Detection and Identification", National Radio Science Meeting, Boulder, Colorado, January, 2001.
- (42) Huettel, L. G. and Collins, L. M. "Using signal detection theory to evaluate differences between normal and impaired auditory performance on a frequency discrimination task", International Hearing Aid Research Conference, Lake Tahoe, NV, August, 2000.
- (43) Tantum, S., and Collins, L., "A Comparison of Statistical Signal Processing Algorithms for Detection and Identification of Low Metal Mines," UXO Forum, Anaheim, CA, May, 2000.
- (44) Collins, L., Tantum, S., Zhang, Y., Li, J., and Carin, L., "Physics-Based Signal Processing and Sensor Fusion for Improve UXO Detection," UXO Forum, Anaheim, CA, May, 2000.
- (45) Collins, L., and Gao, P., "Subsurface Target Detection and Identification Via Bayesian Statistical Signal Processing of EMI Data," UXO Forum, Anaheim, CA, May, 2000.
- (46) Huettel, L. and Collins, L., "The theoretical effects of neural uncertainty on acoustic signal detectability: Single vs. multiple ANFs", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 2000.
- (47) Tantum, S. and Collins, L. "Statistical signal processing for improved subsurface object detection and discrimination", National Radio Science Meeting, Boulder, Colorado, January, 2000.
- (48) Throckmorton, C. and Collins, L., "The effects of additive gaussian noise on speech recognition in cochlear implant subjects", 1999 Conference on Implantable Auditory Prostheses, Asilomar, CA, September, 1999.
- (49) Ferguson, W., D., Collins, L. M., Finley, C. C., and Smith, D. W., "Prediction of psychophysical data using a stochastic model of electrical stimulation", 1999 Conference on Implantable Auditory Prostheses, Asilomar, CA, September, 1999.
- (50) Collins, L., Gao, P., Geng, N., Carin, L., Keiswetter, D., and Won, I. J., "Discrimination of UXO-like metal targets using wideband electromagnetic induction", UXO Forum, Atlanta, Georgia, May, 1999.

- (51)L. Carin, P. Runkle, P. Bharadwaj, L. Collins, S. Tantum, "Wave-Based Hidden Markov Models for Fusion of Multi-Sensor UXO Data", UXO Forum, Atlanta, Georgia, May, 1999.
- (52)L. Collins, P. Gao, L. Riggs, J. Moulton, L. Makowsky, D. Reidy, and D. Weaver, "Detection of low-metal mines using time-domain and frequency-domain EMI", UXO Forum, Atlanta, Georgia, May, 1999.
- (53)S. Tantum, L. Collins, L. Carin, D. Reidy, and D. Weaver, "ATR algorithm performance for the wichmann brtrc ground penetrating radar system", UXO Forum, Atlanta, Georgia, May, 1999.
- (54)Gresham, L. C. and Collins, L. M., "A signal detection theory analysis of auditory processing: Phase and frequency uncertainty", Issues in Advanced Hearing Aid Research, May, 1998.
- (55)Collins, L. M. and Gresham, L. C., "A signal detection theoretic analysis of the Carney model of auditory processing", Joint meeting of the International Conference on Acoustics and the 135th meeting of the Acoustical Society of America, Seattle, Washington, June, 1998.
- (56)Gresham, L. C. and Collins, L. M., "Signal detection theoretic analysis of auditory processing: Phase uncertainty and multiple channel integration", Joint meeting of the International Conference on Acoustics and the 135th meeting of the Acoustical Society of America, Seattle, Washington, June, 1998.
- (57)Ferguson, W. D., Collins, L. M., Finley, C. C., Pflingst, B. E., and Smith, D. W., "Prediction of the variance in behavioral thresholds using a stochastic model of electrical stimulation", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1998.
- (58)Collins, L. M. and Throckmorton, C. S., "Investigation of the relationship between psychophysical measures of channel interaction and perceptual structure in subjects with cochlear implants", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1998.
- (59)Gresham, L. C. and Collins, L. M., "A physiologically-based signal detection theory approach to the analysis of human auditory processing", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1998.
- (60)Gelenbe, E., Kocak, T., and Collins, L., "Sensor fusion for mine detection with the RNN", International Conference on Artificial Neural Networks, Lausanne, Switzerland, October, 1997.
- (61)Throckmorton, C. S. and Collins, L. M., "Investigation of channel interactions through forward masking patterns and electrode discriminability", 1997 Conference on Implantable Auditory Prostheses, August, 1997.
- (62)Throckmorton, C. S. and Collins, L. M., "Perceptual features of electrode stimulation investigated through a multidimensional scaling paradigm", 1997 Conference on Implantable Auditory Prostheses, August, 1997.
- (63)Gresham, L. C. and Collins, L. M., "Analysis of the performance of a model-based optimal auditory processor on a simultaneous masking task", 133rd meeting of the Acoustical Society of America, June, 1997.
- (64)Throckmorton, C. S. and Collins, L. M., "Forward masking patterns measured in cochlear implant subjects", 133rd meeting of the Acoustical Society of America, June, 1997.
- (65)Throckmorton, C. S. and Collins, L. M., "Forward Masking Patterns Measured in Cochlear Implant Subjects", 27th Neural Prosthesis Workshop, National Institutes of Health, October, 1996.
- (66)Collins, L. M., Zwolan, T. A., and Wakefield, G. H., "An analysis of the relationships between different measures of electrode discrimination in cochlear implant subjects", 1996 Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1996.

- (67) Wakefield, G. H., Collins, L. M., Zwolan, T. A., and Runkle, P. R., "Psychophysics, channels and speech coding", 1995 Conference on Implantable Auditory Prostheses, August, 1995.
- (68) Collins, L. M., Zwolan, T. A., and Wakefield, G. H., "Effects of stimulation rate and uniformity on electrode pair discriminability in cochlear implant subjects", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1995.
- (69) Zwolan, T. A., Collins, L. M., and Wakefield, G. H., "Electrode discrimination: applicability of results to mapping for improved speech recognition", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1995.
- (70) Wakefield, G. H., Collins, L. M., Zwolan, T. A., and Hafter, E., "On the extraction of periodic from aperiodic events under electrical stimulation of the auditory system", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1995.
- (71) Collins, L. M., Zwolan, T. A., and Wakefield, G. H., "Electrode discrimination measures: relationship with speech perception and clinical applicability of results", 127th Acoust. Soc. Am., June, 1994.
- (72) Collins, L. M., Zwolan, T. A., O'Neill, J. C., and Wakefield, G. H., "Analysis of electrode pair confusions and implications for speech recognition in cochlear implant subjects", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1994.
- (73) Collins, L. M. and Wakefield, G. H., "Evaluation and Modeling of Channel Independence and Uncertainty Processing in Cochlear Implant Subjects", 124th Acoust. Soc. Am., November, 1992.
- (74) Collins, L. M. and Wakefield, G. H., "Models of Temporal Pattern Discrimination Performance Under Electrical Stimulation: Evaluation of Channel Independence", Issues in Advanced Hearing Aid Research, May, 1992.
- (75) Collins, L. M. and Wakefield, G. H., "Temporal Pattern Discrimination and Speech Recognition Under Electrical Stimulation", Midwinter Research Meeting, Association for Research in Otolaryngology, February, 1992.

TEACHING EXPERIENCE

Undergraduate courses taught:

- "Introduction to Communications and Signal Processing", ECE 181, Junior/Senior level.
- "Signals and Systems", ECE64/ECE54, Freshman/Sophomore level.

Graduate courses taught:

- "Acoustics and Hearing", ECE 284 (cross listed as BME 235). New course.
- "Random Signals and Noise", ECE 281.
- "Digital Signal Processing", ECE 282.
- "Pattern Recognition", ECE 243.

POST-DOCTORAL FELLOWS PREVIOUSLY SUPERVISED

- (1) Stacy Tantum
- (2) Sandy Throckmorton
- (3) Lisa Huettel
- (4) Yuchuan Wei
- (5) Yan Zhang
- (6) Yingyi Tan
- (7) Lei Huang

POST-DOCTORAL FELLOWS CURRENTLY BEING SUPERVISED

- (1) Li Tang
- (2) Jeremiah Remus

PH.D. STUDENTS PREVIOUSLY SUPERVISED

- (1) Lisa Gresham, "A Signal Detection Theory Approach to Predicting Auditory Detection Performance", April, 1999.
- (2) Ping Gao, "Improved land mine detection approaches incorporating signal processing and statistical methods using EMI and GPR data", November, 2000.
- (3) Sandy Throckmorton, "The effect of perceptual anomalies on speech recognition in Cochlear implant subjects: predictions from an acoustic model", December, 2001.
- (4) Yingyi Tan, "Advanced Signal Processing in Landmine Detection with Quadrupole Resonance", April, 2004.
- (5) Yifang Xu, "Prediction of Psychophysical Measurements For Electrical Pulse-Train Stimuli Using a Stochastic Auditory Nerve Model: Implications for Cochlear Implants," April, 2004.
- (6) Jeremiah Remus, "Improving Speech Perception In Cochlear Implant Patients: Techniques To Expedite The Identification Of Psychophysics-Based Performance Limitations," March, 2007.

PH.D. STUDENTS CURRENTLY BEING SUPERVISED

- (1) Peter Torrione, "Advanced Signal Processing Techniques for Landmine Detection Using Ground Penetrating Radar," degree expected March 2008.
- (2) Mark Kolba, "A comparison of myopic and non-myopic approaches for sensor management," degree expected June 2008.
- (3) Josh Stohl, "Optimized sound processing strategies for providing improved music perception in cochlear implant subjects," degree expected May 2009.
- (4) Kenneth Morton, "Acoustic event detection, localization, and classification," degree expected December 2009.

M.S. STUDENTS PREVIOUSLY SUPERVISED (all thesis)

- (1) Ping Gao, "Improved approaches to land mine remediation using signal detection and estimation theory", December, 1997.
- (2) Sandy Throckmorton, "Investigation of the effects of forward masking on speech recognition skills in cochlear implant subjects", April, 1998.
- (3) David Ferguson, "The relationship between variance in cat psychophysical thresholds and predictions from a stochastic model of electrical stimulation of the cochlea", July, 1998.
- (4) Yingyi Tan, "Improving demining sensor operator interfaces through auditory displays", project presentation, April, 2001.
- (5) Yifang Xu, "Threshold Prediction for a Noise-Modulated Electrical Stimulus using a Stochastic Auditory Nerve Model: Implications for Cochlear Implants," December, 2001.
- (6) Peter Torrione, "A comparison of statistical algorithms for landmine detection", April, 2002.
- (7) Quan Zhu, "Landmine Detection with Ground Penetrating Radar," December, 2003.
- (8) Wei Hu, "Classification of Multiple Closely-Spaced Subsurface Objects: Application of Blind Source Separation", December, 2003.

- (9) Jeremiah Remus, "The Effects of Noise on Speech Recognition in Cochlear Implant Subjects: Predictions and Analysis Using Acoustic Models", March, 2004.
- (10) Yongli Yu, "Multi-modal Iterative Adaptive Processing (MIAP) for Landmine Detection," April, 2005.
- (11) Mark Kolba, "Information-Based Sensor Management for the Landmine Detection Problem", November, 2005.
- (12) Selin Kucukoglu, "MCFA: Multi-carrier frequency algorithm for improving speech recognition in cochlear implant subjects," March, 2006.
- (13) Joshua Stohl, "Using Variable Stimulation Rates to Encode More Information in Cochlear Implants," July, 2006.
- (14) Kenneth Morton, "Mandarin Chinese Tone Identification in Cochlear Implant Subjects: Predictions from Acoustic Models," November, 2006.

M.S. STUDENTS CURRENTLY BEING SUPERVISED

- (1) Eric Fails
- (2) Katie Hedlund
- (3) Christopher Ratto
- (4) Kyle Bradbury
- (5) Philip Brown

UNDERGRADUATE RESEARCH PROJECTS SUPERVISED

- (1) Bethany Broom, "Processing standard phonemes to explore masking effects in Cochlear Implant subjects", Spring, 1998.
- (2) Keatly Haldeman and John Howell, "Surround Sound, Its Perception by Humans and its Future", Fall, 1998.
- (3) Jared Dulmage, "A real-time programmable speech processor for the Nucleus/Cochlear Corporation 22 channel device", Spring 1999.
- (4) Pei-ju Chiang, "Physics-Based Signal Processing For Subsurface Object Detection And Identification Using Ground Penetrating Radar", Spring 2001.
- (5) Vivek Munshi, "Physics-Based Signal Processing For Subsurface Object Detection And Identification using the Wichmann Ground Penetrating Radar", Pratt Fellow, Spring 2002 – Spring 2003.
- (6) Bo Marr, "UXO Discrimination Using Bayesian Techniques", Pratt Fellow, Spring, 2003 – Spring 2004.
- (7) Blaine Nelson, "Low-metallic Content Landmine Detection and Discrimination," NSF REU Fellow, Summer, 2002.
- (8) Danielle Davidian, "Advanced Speech Processing Techniques for Noise Reduction for Cochlear Implant Subjects", Pratt Fellow, Spring 2004 – Spring 2005.
- (9) Patrick Crosby, "Enhancing Music Perception by Cochlear Implant Subjects", Pratt Fellow, Spring 2004 – Spring 2005.
- (10) Erik Schmidt, "Using the SWORM algorithm for Sensor Management for Improved Landmine Detection," Pratt Fellow, Spring 2005 – Spring 2006.
- (11) Ronal Abrahams, "Optimizing psychophysical techniques for cochlear implant psychophysics," Pratt Fellow, Spring 2006 – Spring 2007.
- (12) Leah Acker, "Musical Instrument Identification through Pattern Classification: Implications for Cochlear Implants", NSF REU Fellow, Summer, 2006.