

Lori Mann Bruce, Ph.D.

CONTACT INFORMATION

Lori Mann Bruce
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Starkville, Mississippi 39759

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SIGNIFICANT ACCOMPLISHMENTS

Research

- Developed and maintained an active research program, involving PhD, MS, and BS students, in the areas of Digital Signal/Image Processing with emphases in Hyperspectral Remote Sensing and Diagnostic Medical Imaging
- Formed and led various multidisciplinary research teams in remote sensing and medical imaging, including proposal writing teams, the initiation of a cancer research institute, various, etc.
- Authored and co-authored proposals totaling more than \$8million in extramural research
- Served as PI or Co-PI on over \$4.5million in funded research grants and contracts
 - Funding agencies include NSF, DOE, NASA, USGS
- Over 100 professional papers published and/or presented at conferences and symposia
 - 19 refereed journal publications
 - over 60 refereed conference proceedings publications

Teaching

- Taught 36 sections of 14 different courses at the undergraduate, split, and graduate levels, resulting in over 2200 student credit hours (excluding dissertation and thesis hours)
- Maintained a high level of dedication to teaching, resulting in instructor evaluation scores averaging to 4.5/5.0, where the Bageley College of Engineering and the Electrical and Computer Engineering Department averages are 4.0 and 3.9, respectively
- Developed several new courses in the areas of Digital Image Processing, Automated Target Recognition, Biomedical Signals and Systems, and Medical Imaging, as well as conducted overhauls of various existing courses
- Received various teaching awards and faculty appreciation awards from university alumni associations and student chapters of Tau Beta Pi and National Society of Black Engineers

Service

- Maintained a service record dedicated to increasing under-represented groups in engineering, including activities such as currently serving as Director for the College of Engineering's Women in Engineering Programs, serving as faculty advisor to the student chapter of Society of Women Engineers, performed numerous K-12 outreach activities to female and minority students, IMAGE (Increasing Minority Access to Graduate Education) program, etc.
- Served as chair, co-chair, and member of various international advisory boards and technical committees, such as chairing the IEEE Geoscience and Remote Sensing Society- Data Fusion Technical Committee (one of only five technical committees representing the 2000 member society) and the International Steering Committee for research projects funded by The Federal Office for Scientific, Technical, and Cultural Affairs of Belgium
- Served on organizing and technical committees for various research conferences and symposia, including the IEEE International Geoscience and Remote Sensing Symposium (IGARSS), ASEE regional conferences, Multi-Temp Workshops, etc.
- Served as an associate editor and technical reviewer for various refereed journals, as well as various proposal review panels for agencies such as NSF, NASA, etc.

EDUCATION

The University of Alabama in Huntsville
Huntsville, Alabama
Ph.D., Electrical & Computer Engineering
1996
Course Emphases: Digital Signal Processing, Optics, Communications, Mathematics
Research: Multi-Resolution-Based Image Analysis & Pattern Recognition

Georgia Institute of Technology
Atlanta, Georgia
M.S., Electrical Engineering
1992
Course Emphases: Digital Signal Processing, Communications, Optics
Received Biomedical Engineering Certificate (Joint Program - Georgia Tech/Emory Medical School)
Research: Digital Processing of and Automated Target Detection in Medical Ultrasonic Images

The University of Alabama in Huntsville
Huntsville, Alabama
B.S.E., Electrical & Computer Engineering
1991

EMPLOYMENT HISTORY

Associate Professor
Mississippi State University
7/03 – present

Assistant Professor
Mississippi State University
8/00 – 7/03

Assistant Professor
University of Nevada Las Vegas
8/96 – 8/00

Graduate Researcher and University Instructor
The University of Alabama in Huntsville
7/95 – 7/96

NSF Graduate Research Fellow
The University of Alabama in Huntsville
12/94 – 6/95

NSF Graduate Research Fellow
Georgia Institute of Technology
7/92 – 11/94

Teaching Assistant
Georgia Institute of Technology
8/91 – 12/92

Technical Staff
U.S. Army Strategic Defense Command
4/87 – 12/90

AFFILIATIONS

American Society of Photogrammetry and Remote Sensing
IEEE – Senior Member
IEEE Engineering in Medicine and Biology Society
IEEE Geoscience and Remote Sensing Society
Mississippi State University – Remote Sensing Technology Center
Mississippi State University – Engineering Research Center

Society of Women Engineers
Eta Kappa Nu
Phi Kappa Phi
Tau Beta Pi

ACADEMIC HONORS & AWARDS

National Science Foundation - Graduate Research Fellowship (1992-1995)

UNLV Faculty Award for Academic Excellence and Student Focus (1998)

Outstanding Faculty Award from UNLV Alumni Association (2000)

Outstanding Faculty Award from Tau Beta Pi - Nevada Beta Chapter (2000)

MSU Nominee for the National Eta Kappa Nu Outstanding Junior Faculty Award (2003)

Faculty Appreciation Award from MSU National Society of Black Engineers Chapter (2003, 2005)

Departmental Nominee for MSU Alumni Award for Outstanding Graduate Educator (2005)

Inducted into Engineering Alumni Academy at University of Alabama in Huntsville (2005)

PROFESSIONAL HONORS & SERVICE

Chair, IEEE Geoscience and Remote Sensing Society's International Technical Committee on Data Fusion (2003 – 2005)

International Steering Committee Member, *HyperWave* Research Project Funded by The Federal Office for Scientific, Technical, and Cultural Affairs of Belgium (2004-present)

Director, Women in Engineering Programs, Bagley College of Engineering, Mississippi State University (2006-present)

NASA Remote Sensing Course Creation Fellow, GeoWorkforce Development Center, University of Mississippi (2002-2004)

Board Member, National Advisory Board for NSF-CRCD-CV Program (Combined Research and Curriculum Development in Computer Vision) (2001-2003)

Research Conference/Symposia Organizing and Technical Committees

ASEE Pacific Southwest Regional Conference, Las Vegas, Nevada (1997-1998)

Nevada/DOE Research Symposium, Las Vegas, Nevada (1999)

IEEE International Geoscience and Remote Sensing Symposium (IGARSS), Anchorage, Alaska (2004)

IEEE IGARSS, Seoul, Korea (2005)

Third International Workshop on Analysis of Multi-temporal Remote Sensing Images (MultiTemp), Biloxi, Mississippi (2005)

Research Conference Technical Session Organizer and Chair

Data Fusion Applications I, Data Fusion Applications II, and Data Fusion Poster Session, IGARSS, Anchorage, Alaska (2004)

Data Fusion Applications, Data Fusion Poster Session, IGARSS, Seoul, Korea (2005)

Proposal Review Panel, NSF Graduate Research Fellowship Program (2003-2004)

NASA Course Creation Program (2003-2004)

NASA Decision-CAN Program, (2005)

STEREO Research Program, Belgian Federal Science Policy Office (2003)

Associate Editor, *IEEE Geoscience and Remote Sensing Letters* (2004-present)

IEEE Transactions on Geoscience and Remote Sensing (2000-present)

Remote Sensing of Environment Journal (2002-present)

International Journal of Remote Sensing (2002-2004)

Medical Physics (1998-1999)

IEEE Trans. Circuits & Systems II (1998-1999)

IEEE Potentials (1997-2000)

Imaging and Vision Computing Journal (1998)

Professional Educational Workshops, Sole Organizer and Instructor

DOE "Introduction to Wavelets with Applications in Remote Sensing", 4-day Instructional Workshop held at DOE Remote Sensing Laboratory, Nellis Airforce Base, Nevada (2000).

RECENT EXTRAMURAL SUPPORT

- Co-PI, USGS, "Integrated Management Systems Of Invasive Aquatic Plants and Terrestrial Grasses" \$1,813,000 (2004-2007)
- PI, NASA, "Rapid Prototyping of Hyperspectral Image Analysis Algorithms for Improved Invasive Species Decision Support Tools," \$135,325, (2006-2007)
- PI, NASA/MSCI, "Near-Real Time Processing of Digital Multispectral Data Acquired Using Unmanned Aerial Vehicles" \$99,964 (2004-2005)
- PI, NASA, "Enabling Federal Noxious Weeds Detection for the National Invasive Species Decision Support Systems" \$400,000 (2004-2005)
- Co-PI, NASA, "Enabling Technologies for Exploiting EOS Data for Decision Support" \$550,000 (2004-2005)
- Co-PI, NASA SBIR Phase I, "Data Reduction and Rapid Analysis of Hyperspectral Datasets," \$70,000 (2004)
- Co-PI, Western Michigan University, "High Speed Wavelet-Based Compression and Transmission of Mammograms over Internet2," \$30,000 (2003-2004)
- Co-PI, NASA-RSTC - "Computational Modeling Support to the Remote Sensing Technology Center," \$1,170,012 (2001-2003)
- Co-PI, Mississippi Department of Transportation – "Digital Acoustic Signal Processing for Automated Detection of Accidents in Intersections," \$95,386 (2001-2003)
- PI, General Dynamics, Electronic Systems - " Multiresolution Feature Decomposition and Noise Filtering of Hyperspectral Image Data," \$25,000 (2001)
- PI, DOE/Bechtel Nevada - "Classification of Hyperspectral Signatures using Wavelet-Based Feature Extraction," \$100,000 (1999-2000)
- PI, DOE/Bechtel Nevada/ARI, "Wavelet-based Radiance Fingerprints for Computationally Efficient Analysis of Hyperspectral Data," \$105,000 (1998-1999)
- PI, NSF, "Wavelet-Based Shape Features for Mammographic Analysis," \$65,383 (1998-1999)

TEACHING EXPERIENCE – Average Teaching Evaluations of 4.5/5.0

Graduate Lecture Courses:

- Analog and Digital Communications
- Automated Target Recognition (*Developed for MSU*)
- Digital Image Processing (*Developed for MSU*)
- Digital Signal Processing (*Taught as a Distance Education Course in 2000-2002*)
- Medical Imaging Survey (*Developed for MSU*)
- Codes and Cryptography (*Developed for MSU*)
- Random Processes in Engineering Systems

Undergraduate Lecture Courses

- Biomedical Signals and Systems (*Developed for UNLV*)
- Computer Architecture and Assembly Language
- Digital Logic Design
- Electrical Engineering Systems
- Signals and Systems

Laboratories:

- Analog Electronics Laboratory
- Bioelectronics Laboratory
- Digital Logic Design Laboratory
- Digital Signal Processing Laboratory (*Developed for UNLV*)

GRADUATE STUDENTS (Chaired)

Post-Docs:

Yan Huang, "Texture Analysis of Multispectral Imagery for Automated Detection of Vegetative Species," 2000-2001.

Ph.D. students:

Jiang Li, "Linear Unmixing of Hyperspectral Signals via Wavelet Feature Extraction," 2002.

Abhinav Mathur, "Hyperspectral Hypertemporal Feature Extraction Methods with Applications to Aquatic Invasives Target Detection," 2006.

John Ball, "Level-Set Segmentation of Hyperspectral Imagery," present.

Masters students (Thesis Option):

Ravikiran Kalluri, "Effects of Wavelet Compression on Mammographic Mass Recognition," 1998.

Jiang Li, "Fast Wavelet-based Algorithms for Analysis of Hyperspectral Images," 1999.

Nithya Shanmugam, "Automated Mammographic Mass Shape Classification using Wavelets and Neural Networks," 2000.

Cliff Morgan, "Detection of Weak Anomalies in Hyperspectral Signatures using Wavelet Coefficient Energy Features," 2000.

Abhinav Mathur, "Dimensionality Reduction of Hyperspectral Signatures for Optimized Detection of Invasive Species," 2002.

Anil Cheriyyadat, "Limitations of Principal Component Analysis for Dimensionality Reduction of Hyperspectral Data," 2003.

Huang-de Lin, "Projection Pursuits for Dimensionality Reduction of Hyperspectral Signals in Target Recognition Applications," 2003.

Navaneethakrishnan Balraj, "Automated Accident Detection in Intersections Via Digital Audio Signal Processing," 2003.

Anuradha Agatheeswaran, "Analysis of JPEG2000 Compression Effects on Automated Shape and Texture Feature Extraction from Digital Mammograms", 2004.

Shilpa Venkataraman, "Hyperspectral Dimensionality Reduction via Localized Discriminant Bases," 2005.

Darrell Wesley Johnson, "Assessing Resolution Tradeoffs of Remote Sensing Data via Classification Accuracy Cubes for Sensor Selection and Design," 2006.

Terrance R. West, "Detecting Invasive Species via Hyperspectral Imagery using Sequential Projection Pursuits," present.

Adnan Orduyilmaz, "Co-registration of Spectral Bands in Multispectral Imagery Collected via an Unmanned Aerial Vehicle," present.

Masters students (Non-Thesis Option):

Jignesh Panchal, 2004.

Vijaykumar Rajaram, 2005.

GRADUATE STUDENTS (Committee)

Served on approximately 50 graduate student committees, with approximately 20 students graduated, including Phd and MS students in the Electrical and Computer Engineering Department, Plant and Soil Sciences Department, Forestry Department.

UNDERGRADUATE RESEARCH ASSISTANTS

- Sara Larsen, "Wavelet Denoising of Cl⁻ Patch Clamp Signals", "Wavelet Analysis of Hyperspectral Data," 1997-2000.
- Cliff Morgan, "Applying Steerable Filters to Hyperspectral Images," 1999.
- Mathew Burns, "Designing Adaptive Wavelet Filter Banks," 1999.
- Ricco Novero, "Wavelet Algorithm Development for the Texas Instruments DSP Microprocessors," 1998-1999.
- Andres Mendoza, "Wavelet Analysis of Mammographic Tumor Shapes", "Recognition of Vegetation Textures via Wavelet Packets," 1998-2000.
- Jay Stenmark, "Fourier and Wavelet Transform Methods for Texture Analysis in Remotely Sensed Imagery," 2002.
- Darryll Wesley Johnson, "Spectral Resolution Effects on Automated Detection of Cogongrass in Hyperspectral Imagery," 2004.
- Terrance West, "Investigating the use of Unsupervised Classifiers for Automated Detection of Invasive Species in Remotely Sensed Images," 2004.
- Lennon Brown, "Automated Invasive Species in Multispectral Imagery via Supervised Statistical Classification," 2004.

PUBLICATIONS (1998-2006)

(J# designates Journal Articles and C# designates Conference Proceedings)

TOPIC - REMOTE SENSING:

- J1. **L.M. Bruce**, A. Mathur, J.D. Byrd, "Denoising and Wavelet-Based Feature Extraction of MODIS Multi-Temporal Vegetation Signatures," *GIScience & Remote Sensing*, vol. 43, pp. 170-180, 2006.
- J2. J. Li and **L.M. Bruce**, "Wavelet-Based Feature Extraction for Improved Endmember Abundance Estimation in Linear Unmixing of Hyperspectral Signals," *IEEE Trans. Geoscience and Remote Sensing*, vol. 42, no. 3, pp. 644-649, March 2004. (See Correction to "Wavelet-Based Feature Extraction for Improved Endmember Abundance Estimation in Linear Unmixing of Hyperspectral Signals", *IEEE Trans. Geoscience and Remote Sensing*, vol. 42, no. 5, pp. 1122, May 2004.)
- J3. W.B. Henry, D. Shaw, **L.M. Bruce**, "Spectral reflectance curves to distinguish soybean from common cocklebur (*Xanthium stumarium*) and sicklepod (*Cassia obtusifolia*) grown with varying soil moisture," *Weed Science*, vol. 52, no. 5, pp.78-796, 2004.
- J4. W. B. Henry, D. Shaw, **L.M. Bruce**, "Remote Sensing to Distinguish Soybean (*Glycine max*) from Weeds Following Herbicide Application," *Weed Technology*, vol. 18, no. 3, pp. 594-604, 2004.
- J5. W.B. Henry, D.R. Shaw, K.R. Reddy, **L.M. Bruce**, H.D. Tamhankar, "Remote Sensing to Detect Herbicide Drift on Crops," *Weed Technology*, vol. 18, pp. 358-368, 2004.
- J6. C.H. Koger, **L.M. Bruce**, D.R. Shaw, K.N. Reddy, "Wavelet Analysis of Hyperspectral Reflectance Data for Detecting Pitted Morningglory (*Ipomoea lacunosa*) in Soybean (*Glycine max*)," *Remote Sensing of Environment*, vol. 86, no. 1, pp. 108-119, June 2003.
- J7. C. H. Koger, D. R. Shaw, K. N. Reddy, **L.M. Bruce**, "Detection of pitted morningglory with hyperspectral remote sensing. I. Effects of tillage and cover crop residue," *Weed Science*, vol. 52, no. 2, pp. 222–229, 2003.
- J8. C. H. Koger, D. R. Shaw, K. N. Reddy, **L.M. Bruce**, "Detection of pitted morningglory with hyperspectral remote sensing. II. Effects of vegetation ground cover and reflectance properties," *Weed Science*. vol. 52, no. 2, pp. 230–235, 2003.

- J9. L.M. Bruce, N. Balraj, Y. Zhang, Q. Yu, "Automated Accident Detection in Intersections via Digital Audio Signal Processing," *Transportation Research Record, Journal of the Transportation Research Board*, vol. 1840, pp. 186-192, 2003.
- J10. C.T. Leon, D.R. Shaw, L.M. Bruce, C. Watson, "Effect of purple (*Cyperus rotundus*) and yellow nutsedge (*C. esculentus*) on growth and reflectance characteristics of cotton and soybean," *Weed Science*, vol. 51, no. 4, pp. 557-564, 2003.
- J11. L.M. Bruce, C.H. Koger, J. Li, "Dimensionality Reduction of Hyperspectral Data Using Discrete Wavelet Transform Feature Extraction," *IEEE Trans. Geoscience and Remote Sensing*, vol. 40, no. 10, pp. 2331-2338, 2002.
- J12. L.M. Bruce, J. Li, Y. Huang, "Automated Detection of Subpixel Hyperspectral Targets with Adaptive Multichannel Discrete Wavelet Transform," *IEEE Trans. Geoscience and Remote Sensing*, vol. 40, no. 4, pp. 977-979, 2002.
- J13. L.M. Bruce, C. Morgan, S. Larsen, "Automated detection of subpixel targets with continuous and discrete wavelet transforms," *IEEE Trans. Geoscience and Remote Sensing*, vol. 39, no. 10, pp. 2217-2226, 2001.
- J14. L.M. Bruce, J. Li, "Wavelets for computationally efficient hyperspectral derivative analysis," *IEEE Trans. Geoscience and Remote Sensing*, vol. 39, no. 7, pp. 1540-1546, 2001.
- C1. A. Mathur, L.M. Bruce, D.W. Johnson, W. Robles, J. Madsen, "Exploiting Hyperspectral Hypertemporal Imagery with Feature Clustering for Invasive Species Detection," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Denver, CO, August 2006.
- C2. J. Ball, L.M. Bruce, "Level Set Hyperspectral Segmentation: Near-Optimal Speed Functions using Best Band Analysis and Scaled Spectral Angle Mapper," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Denver, CO, August 2006.
- C3. A. Mathur, L.M. Bruce, D.W. Johnson, W. Robles, J. Madsen, "Automated Stepwise Selection of Hyperspectral Hypertemporal Features for Target Detection," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Denver, CO, August 2006.
- C4. T.R. West, L.M. Bruce, "Detecting Invasive Species via Hyperspectral Imagery using Sequential Projection Pursuits," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Denver, CO, August 2006.
- C5. A. Mathur, L.M. Bruce, "Identification of Pertinent Regions in Spectro-Temporal Maps for Vegetative Target Detection," *Proceedings of the American Society of Photogrammetry and Remote Sensing 2006 Annual Conference (ASPRS 2006)*, Reno, NV, May 2006.
- C6. J. Ball, L.M. Bruce, "Accuracy Analysis of Hyperspectral Imagery Classification using Level Sets," *Proceedings of the American Society of Photogrammetry and Remote Sensing 2006 Annual Conference (ASPRS 2006)*, Reno, NV, May 2006.
- C7. D.W. Johnson, L.M. Bruce, "Spatial and Spectral Resolution Effects on the Use of Remotely Sensed Data for Detection of Invasive Species," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Seoul, Korea, July 25-29, 2005.
- C8. S. Venkataraman, L.M. Bruce, "Hyperspectral Dimensionality Reduction via Localized Discriminant Bases," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Seoul, Korea, July 25-29, 2005.
- C9. J. Ball, L.M. Bruce, N.H. Younan, "Linear Pixel Unmixing with Adaptive Endmember Selection," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Seoul, Korea, July 25-29, 2005.
- C10. J. Ball, L.M. Bruce, "Segmentation of Hyperspectral Remotely Sensed Images using Level Sets," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Seoul, Korea, July 25-29, 2005.
- C11. L.M. Bruce, A. Mathur, "Denoising Multi-Temporal Vegetation Signatures Generated from MODIS Imagery," *Proc. Third Intl. Workshop on Analysis of Multi-temporal Remote Sensing Images*, May 16-18, 2005.

- C12.A. Mathur, **L.M. Bruce**, "Feature Extraction via Spectro-Temporal Analysis of Hyperspectral Data for Vegetative Target Detection," *Proc. Third Intl. Workshop on Analysis of Multi-temporal Remote Sensing Images*, May 16-18, 2005.
- C13.A. Mathur, N. Younan, **L.M. Bruce**, "Automated Texture Recognition Based on 2-D Minimum Variance Spectral Estimation," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Anchorage, Alaska, September, 2004.
- C14.H. Tamhankar, A. Mathur, **L.M. Bruce**, "Effects of Watermarking on Feature Efficacy in Remotely Sensed Data," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Anchorage, Alaska, September, 2004.
- C15.H.D. Lin, **L.M. Bruce**, "Projection Pursuits for Dimensionality Reduction of Hyperspectral Signals in Target Recognition Applications," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Anchorage, Alaska, September, 2004.
- C16.A. Cheriyyadat, **L. M. Bruce**, "Decision Level Fusion with Best- Bases for Hyperspectral Classification", *Proc. IEEE GRSS Workshop on Advances in Techniques for Analysis of Remotely Sensed Data*, October 2003.
- C17.J. Li, **L. M. Bruce**, "Improving the Accuracy of Linear Pixel Unmixing via Appropriate Endmember Dimensionality Reduction", *Proc. IEEE GRSS Workshop on Advances in Techniques for Analysis of Remotely Sensed Data*, October 2003.
- C18.S.B. Ziegeler, H. Tamhankar, H., J.E. Fowler, J.E., **L.M. Bruce**, "Wavelet-based watermarking of remotely sensed imagery tailored to classification performance," *Proc. IEEE GRSS Workshop on Advances in Techniques for Analysis of Remotely Sensed Data*, October 2003.
- C19.**L. M. Bruce**, N. H. Younan, R. L. King, A. Cheriyyadat, "Spectral Reduction Image Processing Techniques", *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toulouse, France, July 2003. (invited paper)
- C20.A. Cheriyyadat, **L. M. Bruce**, "Why Principal Component Analysis is not an Appropriate Feature Extraction Method for Hyperspectral Data", *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toulouse, France, July 2003.
- C21.A. Mathur, **L. M. Bruce**, Anil Meerasa Cheriyyadat, Huang-de Hennessy Lin "Hyperspec - Analysis Of Handheld Spectroradiometer Data", *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toulouse, France, July 2003.
- C22.H. Tamhankar, **L. M. Bruce**, N. H. Younan, "Adaptive Watermarking of Hyperspectral Signatures", *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toulouse, France, July 2003.
- C23.K.D. Burnell, J. D. Byrd, Jr., D. B. Mask, J. W. Barnett, C. M. Cofer, **L. M. Bruce**, "Differentiation of cogongrass (*Imperata cylindrica*) and other grassy weeds using hyperspectral reflectance data," *Weed Sci. Soc. Am. Abst.*, vol 40, 2003. (poster presented Jan 10-12, 2003 Jacksonville, FL).
- C24.J. Taylor, J., J. Byrd, K. Burnell, B. Mask, J. Barnett, **L. Bruce**, Y. Haung, M. Carruth, "Using remote sensing data to differentiate cogongrass [*Imperata cylindrica* (L.) Beauv.] and other grassy weeds," *Proc. 7th International Conference on the Ecology and Management of Alien Plant Invasions*, 2003. (poster presented Nov 3-7, 2003 Ft. Lauderdale, FL)
- C25.S. Wright, J. Byrd, **L. Bruce**, K. Burnell, "Using Global Positioning Systems to Detect Cogongrass [*Imperata cylindrica* (L.)] in Conjunction with Mississippi's Eradication Program," *Proc. South. Weed Sci. Soc*, vol 56, pp. 310, 2003. (poster presented Jan 27-29, 2003, Houston, TX)
- C26.K. Burnell, J. Byrd, **L. Bruce**, "Differentiation of Kudzu (*Pueraria montana*) and Forest Vegetation Using Hyperspectral Reflectance Data," *Proc. South. Weed Sci. Soc.*, vol. 56, pp. 340, 2003. (poster presented Jan 27-29, 2003, Houston, TX)

- C27. **L. M. Bruce**, H. Tamhankar, "Multiresolutional texture analysis of multispectral imagery for automated ground cover classification," *Proc. IEEE Geoscience and Remote Sensing Symposium*, Toronto, Canada, June 2002. (invited paper)
- C28. J. Li, **L.M. Bruce**, A. Mathur, "Wavelet Transform for Dimensionality Reduction in Hyperspectral Linear Unmixing," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toronto, Canada, June 2002.
- C29. Mathur, **L.M. Bruce**, J. Byrd, "Discrimination of Subtly Different Vegetative Species via Hyperspectral Data," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toronto, Canada, June 2002.
- C30. H. Tamhankar, **L.M. Bruce**, B. Henry, D. Shaw, "Automated detection of herbicide drift effects on crops," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toronto, Canada, June 2002.
- C31. H. Tamhankar, **L.M. Bruce**, B. Henry, D. Shaw, "Detection of moisture stress effects on plants using hyperspectral reflectance," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, Toronto, Canada, June 2002.
- C32. R.L. King, C. Ruffin, **L.M. Bruce**, J. Vickery, N. Younan "A Hyperspectral Toolkit For The Analysis Of Multitemporal Handheld Spectroradiometer Data," *Proceedings of First International Workshop On The Analysis of Multi-Temporal Remote Sensing Images (Multitemp-2001)*, Trento (Italy), September 13-14, 2001.
- C33. W.B. Henry, D. R. Shaw, K. R. Reddy, **L. M. Bruce**, M. C. Smith, "Detection of moisture stress using hyperspectral reflectance data from common cocklebur, sicklepod, and soybean," *Weed Sci. Soc. Am. Abst.*, vol. 41, pp. 316, 2001.
- C34. T.H. Koger, D.R. Shaw, **L.M. Bruce**, W.B. Henry, "Influence of weed patch size on remotely sensed detection of pitted morningglory (*Ipomoea lacunosa*) in soybean," *Weed Sci. Soc. Am. Abst.*, vol 41, pp.95, 2001.
- C35. Y. Huang, **L.M. Bruce**, T.H. Koger, D. Shaw, "Analysis of the effects of cover crop residue on hyperspectral reflectance discrimination of soybean and weeds via Haar transform," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 1276–1278, Sydney, Australia, July 2001.
- C36. J. Li, **L.M. Bruce**, J. Byrd, J. Barnett, "Automated detection of *Pueraria montana* (kudzu) through Haar analysis of hyperspectral reflectance data," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2247–2249, Sydney, Australia, July 2001.
- C37. **L.M. Bruce**, C. Morgan, S. Larsen, "Continuous and Discrete Wavelet Transforms for Automated Subpixel Target Detection," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2352–2354, Sydney, Australia, July 2001.
- C38. Y. Huang, **L.M. Bruce**, J. Byrd, B. Mask, "Using wavelet transforms of hyperspectral reflectance curves for automated monitoring of *Imperata cylindrica* (cogongrass)," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2244–2246, Sydney, Australia, July 2001.
- C39. Y. Huang, **L.M. Bruce**, J. Li, C. Loen, D. Shaw, "Brushlet transforms for hyperspectral feature extraction in automated detection of nutsedge presence in soybean," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 527-529, Sydney, Australia, July 2001.
- C40. J. Li, **L.M. Bruce**, Y. Huang, "Adaptive Multichannel Discrete Wavelet Transforms for Automated Subpixel Target Detection," *Proc. IEEE Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 369-371, Sydney, Australia, July 2001.
- C41. D.B. Mask, J.D. Byrd, Jr., J.W. Barnett, Jr., **L.M. Bruce**, Y. Huang, "Automated classification of cogongrass (*Imperata cylindrica*) using hyperspectral reflectance data," *Proc. South. Weed Sci. Soc.*, 2001.
- C42. J.W. Barnett, Jr., J.D. Byrd, Jr., **L.M. Bruce**, A.W. Ezell, J. Li, D.B. Mask, B.F. Montgomery, "Automated classification of Kudzu (*Pueraria montana*) using hyperspectral reflectance data," *Proc. South. Weed Sci. Soc.*, 2001.

- C43.T.H. Koger, D.R. Shaw, **L.M. Bruce**, and C.S. Bray, "Reflectance dynamics of cover crop residue, tillage, and soybean row spacing," *Proc. South. Weed Sci. Soc.*, 2001.
- C44.C.T. Leon, D.R. Shaw, C.E. Watson, **L.M. Bruce**, and T.H. Koger, "Spectral response of crops due to interference from purple and yellow nutsedge," *Proc. South. Weed Sci. Soc.*, 2001.
- C45.E.L. Sanders, **L.M. Bruce**, D.B. Reynolds, "Species differentiation with spectral images," *Proc. South. Weed Sci. Soc.*, 2001.
- C46.K.M. Bloodworth, **L.M. Bruce**, C.D. Rowland, D.B. Reynolds, "Detection, classification, and quantification of herbicide drift utilizing spectral signatures," *Proc. South. Weed Sci. Soc.*, 2001.
- C47.J.C. Sanders, **L.M. Bruce**, D.B. Reynolds, "Utilization of spectral images and COTMAN to optimize cotton defoliation timing," *Proc. South. Weed Sci. Soc.*, 2001.
- C48.**L.M. Bruce**, J. Li, "Enhancing hyperspectral data throughput utilizing wavelet-based fingerprints," *Proc. SPIE*, vol. 3871, pp. 218-227, 1999.
- C49.**L.M. Bruce**, J. Li, "Fast Wavelet-Based Algorithms for Multiresolutional Decomposition and Feature Extraction of Hyperspectral Signatures," *Proc. SPIE*, vol. 3717, pp. 72-81, 1999.

TOPIC - WAVELET THEORY:

- J15. **L.M. Bruce**, A. Cheriyyadat, M. Burns, "Wavelets: Getting Perspective," *IEEE Potentials*, vol. 22, no. 2, pp. 24-27, 2003.
- J16. **L.M. Bruce**, "Isolation Criteria for the Wavelet Transform Mod-Max Method", *IEEE Trans Circuits and Systems II: Analog and Digital Signal Processing*, vol. 45, no. 8, pp. 1084-1087, 1998.
- J17. **L.M. Bruce**, R.R. Adhami, "Wavelet-based Algorithm for the Numerical Solution of Differential Equations," *International Journal of Smart Engineering System Design*, vol. 1, no. 4, pp. 235-240, 1998.
- C50.**L.M. Bruce**, "Centroid Sensitivity of Wavelet-based Shape Features," *Proc. SPIE*, vol. 3391, pp. 358-366, 1998.
- C51.R.R. Adhami and **L.M. Bruce**, "Applications of Wavelet Transform in Aerospace Engineering," *Proc. IEEE Aerospace Conf.*, February 1997.
- C52.S.M. Hamidi, R.R. Adhami, **L.M. Bruce**, "Orthogonal compactly supported wavelet construction using beta functions," *Proceedings of IEEE Signal Processing International Symposium*, pp. 401-404, October 25-28, 1994.

TOPIC - MEDICAL IMAGING:

- J18. **L.M. Bruce**, R.R. Adhami, "Classifying Mammographic Mass Shapes Using the Wavelet Transform Modulus-Maxima Method," *IEEE Trans. Medical Imaging*, vol. 18, no. 12, pp. 1-8, December 1999.
- J19. **L.M. Bruce**, "Bioelectric Potentials: Regulating Reactions from the Heart," *IEEE Potentials*, pp. 5-9, Dec 1998.
- C53.V. Shah, **L.M. Bruce**, N. Younan, "Applying Modular Classifiers To Mammographic Mass Classification," *Proc. 26th Annual International Conference IEEE Engineering in Medicine and Biology Society*, pp. 1585-1588 San Francisco, California, September 1-5, 2004.
- C54.J.E. Ball, T.W. Butler, **L.M. Bruce**, "Towards Automated Segmentation and Classification of Masses in Digital Mammograms," *Proc. 26th Annual International Conference IEEE Engineering in Medicine and Biology Society*, pp. 1814-1817, San Francisco, California, September 1-5, 2004.
- C55.**L.M. Bruce**, N. Shanmugam, "Using neural networks with wavelet transforms for an automated mammographic mass classifier," *Proc. 22nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, vol. 2, pp. 985-987, July 23-28, 2000.

- C56. **L.M. Bruce**, S.E. Larsen "Wavelet denoising of patch clamp signals for improved histogram analysis," *Proc. 22nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, vol. 1, pp. 310-313, July 23-28, 2000.
- C57. **L.M. Bruce**, S.E. Larsen, S. Hillyard, "Improved analysis of Cl- patch clamp signals using discrete wavelet approximations," *Proc. 21st Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, vol. 2, pp. 946, October 13-16, 1999.
- C58. **L.M. Bruce**, M. Kallergi, A. Mendoza, "Wavelet Scalar-Energy Features for Recognition of Mammographic Mass Shapes," *Proc. SPIE*, vol. 3723, pp. 156-162, 1999.
- C59. **L.M. Bruce**, M. Kallergi, "Effects of Image Resolution and Segmentation Method on Automated Mammographic Mass Shape Classification", *Proc. SPIE*, vol. 3661, pp. 940-947, 1999.
- C60. **L.M. Bruce**, R. Kalluri, "An Analysis of the Effects of Discrete Wavelet Compression on Automated Mammographic Mass Shape Classification", *Proc. SPIE*, vol 3661, pp. 1190-1195, 1999.
- C61. **L.M. Bruce** and R.R. Adhami, "Wavelet Based Feature Extraction for Mammographic Lesion Recognition," *Proc. of SPIE*, vol. 3034, pp. 779-789, Feb. 1997.
- C62. **L.M. Bruce**, R. Kalluri, "An analysis of the contribution of scale in mammographic mass classification," *Proc. 19th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, vol. 4, pp. 1609-1612, October 30 – November 2, 1997.
- C63. **L.M. Bruce**, R.R. Adhami, J.W. Bruce, "Appropriate Scales when using Wavelets for Feature Extraction," *Intelligent Engineering Systems Through Artificial Neural Networks*, (Dagli et al, eds), pp. 507-512, Nov. 1996.
- C64. **L.M. Bruce**, R.R. Adhami, "Wavelets for Shape Recognition with Applications to Mammography," *Intelligent Engineering Systems Through Artificial Neural Networks*, (Dagli et al, eds), pp. 653-658, Nov. 1996.

TOPIC - ENGINEERING EDUCATION:

- C65. J.W. Bruce, **L.M. Bruce**, "This town ain't big enough for the both of us: Two Engineering Educator Careers, One Department," *Proc. 2005 ASEE Annual Conference & Exposition*, Portland, Oregon, June 12-15, 2005.
- C66. **L.M. Bruce**, J.W. Bruce, "Maximizing Your Productivity as a Junior Faculty Member: Balancing Research, Teaching, and Service," *Proc. 2004 ASEE Annual Conference & Exposition*, Salt Lake City, Utah, June 20-23, 2004.
- C67. J.W. Bruce, **L.M. Bruce**, "Maximizing Your Productivity as a Junior Faculty Member: Being Effective in the Classroom," *Proc. 2004 ASEE Annual Conference & Exposition*, Salt Lake City, Utah, June 20-23, 2004.
- C68. S. Norris and **L.M. Bruce**, "Co-op Faculty Advisors? Collaboration or Consternation," *Proc. 1999 ASEE CIEC Conf*, Palm Springs, California, February 1999.
- C69. **L.M. Bruce**, "Teaching Multidisciplinary Courses in an Electrical Engineering Curriculum: An Example Bioelectricity Course," *Proc. ASEE-PSW Annual Conf.*, Claremont, California, March 1998.

UNIVERSITY SERVICE

MSU (2000-present)

MSU Faculty Research Advisory Committee (2004-present)

MSU Commencement Usher and Attendee (2000-present)

Remote Sensing Seminar, Presented "Data Reduction and Rapid Analysis of Hyperspectral Datasets", seminar is video-conferenced between faculty and students at MSU, Purdue, University of Nebraska, and Indiana State (2003)

Sonya Kovalevsky High School Mathematics Day, presented workshop "Applying Mathematical Transforms to Satellite Imagery" for approximately 40 highschool students visiting MSU (2003)

UNLV (1996-2000)

Faculty Senate, Admissions Committee Member (1997-2000)

University Planning Council, Member - Attend Bi-weekly meetings, attend all-day planning retreat, review Planning Initiative Award Proposals, etc. (1998)

Expanding Your Horizons Day – Sponsored laboratory/workshop (1998)

Faculty/Scholar Mentoring Program, Multicultural Student Affairs Office (1996-1997)

COLLEGE SERVICE

MSU (2000-present)

Director, Women in Engineering Programs, Bagley College of Engineering, (2006-present).

Advisor, MSU Student Chapter of Society of Women Engineers (SWE), attend monthly meetings, advise on service activities, program speakers, chapter finances, attend national conference, etc., (2001-present)

Graduate School Fellowship Application Workshop, created and presented workshop to undergrad and graduate students to assist them in preparation for graduate school admission and fellowship applications, approximately 60 students attend annually, personally assisted approximately 12 students with fellowship applications, essays, reference letters, etc. (2003-present)

Member, Search Committee for College of Engineering Dean, Elected College Representative (2004)

Mentor, Serve as a mentor to new faculty member in the College Mentoring Program (2004-present)

Member, College of Engineering Women's Faculty Group (2003-present)

College of Engineering New Faculty Seminar, Conducted "Teaching Tips" presentation (2004)

Member, Search Committee for College of Engineering Associate Dean for Research, Elected ERC Representative (2003)

Judge, College of Engineering E-Week Student Research Poster Contest (2003-2004)

Member, Search Committee for College of Engineering Outreach Staff (2001)

UNLV (1996-2000)

Mechanical Engineering Faculty Search Committee (1998)

Commencement Committee - acted as the Bearer for College of Engineering (1997-2000)

High School Distance Ed Course - Developed lectures, developed lab experiments, co-authored lab manual, ordered materials/supplies, taught two 2-hour lectures, and taught three 3-hour labs – Course was for approximately 10 high school students (1998)

Biomedical Engineering Program Committee – Organize curriculum, develop courses, etc. (1998-2000)

Biomedical Engineering Research Group – Meet with College of Science and UMC faculty, present research topics, attend seminars, etc. (1998-2000)

Washoe County College Fair - represented Electrical & Computer Engineering Dept. and Computer Science Dept. at 2-day college recruitment fair in Reno, NV (1997-1998)

Nevada Science & Technology Day – sponsored laboratories (1997-2000)

College of Engineering Scout Explorer's Post - Attend monthly scout meetings, conduct lab exercises with scouts (1997-1999)

Nevada Regional Science Bowl (Sponsored by DOE) - served as technical judge (1997-1999)

Lawrence Livermore National Laboratory Visit – Met with visiting scientists (1997-1998)

SGI Visit - Met with visiting scientists and gave tour of facilities(1998)

Sandia National Labs Visit – Met with visiting Scientists and gave tour of facilities (1998)

Wepan Workshop - Seattle, Washington, represented College of Engineering at 3-day workshop (1997)

DOE EPSCoR - Represented College of Engineering at meeting with Dr. Krebs (Director of Office of Energy Research) visit and tour of UNLV (1997)

DEPARTMENT SERVICE

MSU (2000-PRESENT)

Committee member, Graduate Studies Committee (2003-present)

Committee member, Tenure and Promotion Committee (2003-present)

Committee member, Space Committee (2003-present)

Committee member, Awards Committee (2004-present)

Committee member, Digital Signal Processing Committee (2000-present)

Committee member (elected), Department Head Search Committee (2002-2003)

Committee member, Undergraduate Curriculum Committee (2000-2003)

Committee member, Faculty Search Committee (2000-2002)

IEEE Southeastern Conference (SECON) Student Design Competition - Faculty Advisor for MSU Team for 2002 and 2004 competitions. For both the 2002 and 2004 teams, I met weekly with the design team for 1 calendar year to advise them on project development, hardware and software development and testing, documentation, and preparations for competition. In 2004, I drove the student team to Greensboro, North Carolina so they could participate in the competition – the MSU team placed 7th out of 33 teams. In 2002, I drove the student team to Clemson, South Carolina, so they come participate in the competition – the MSU team placed 5th out of 27 teams.

UNLV (1996-2000)

Student Advising - serve as student advisor - upkeep student folders, approve of student course schedules, student financial-aid forms, recommendation letters, etc. (1996-2000)

Faculty Search Committee – searched for 5 positions (1997-2000)

EE Curriculum Committee – introduce “tracks” to curriculum, renumber departmental courses, prepare ABET accreditation documents, etc. (1996-2000)

Ph.D. Qualifying Examination Committee - provided and graded exam questions for signal processing, computer engineering, and communications portions of exams (1997-2000)

Ph.D. Comprehensive Examination Committee - Provided and graded exam questions for communications and computer engineering portions of exam, monitored exam (1997-2000)

Tau Beta Pi Departmental Advisor - Assist in member selection and induction ceremonies (1997-2000)

Strategic Planning Committee – author departmental strategic planning document (1996-1998)

Orientation, represent department at Freshman Orientation (1998)

COMMUNITY SERVICE

Junior Auxiliary of Starkville, Mississippi, conduct service projects for the children of Oktibbeha County, Mississippi (2004-present)

Sunnybrook Home for Children, provide financial and personal assistance (2001-present)

Girl Scout Engineering Career Workshop, presented 2-hour workshops on Saturdays introducing girl scouts to electrical and computer engineering (2001-present)

Boy Scout Troop – Assisted local Boy Scout Troop members to obtain Bicycle Merit Badge by attending rides and loaning bicycles for use, including a tandem bicycle for use by a blind troop member (2003)

Las Vegas Valley Soroptimist Club – Sponsored two scholarships for women attending UNLV, collected used goods for donation to charities including GoodWill, sponsored two Christmas trees at Opportunity Village, sponsored and hosted Christmas party for Holly-Hock Adult Day-Care Center. For all activities, student organizations were recruited to participate (1997-2000)

Clark County 4-H Council - Attend monthly meetings, participate in 4-H youth activities, conduct fund raising activities (1997-1999)

Clark County 4-H Web Day – Hosted a “Build a 4H Web Page” event at UNLV College of Engineering, approximately 20 4H’ers attended daylong event (1997-1999)

Clark County 4-H Camp – Attended 4-H Camp, taught classes in “How to Build Web Pages” and “Safely Surfing the Net”, approximately 40 4H’ers attended the classes (1997-1999)

IEEE Student Chapter Meetings - attend meetings, invited speaker (1996-2000)

IEEE Las Vegas Professional Chapter - Executive Committee - Representative at Large - attend executive meetings, attend executive meetings, recruit members, organize student paper competition, represent chapter at Engineering Week displays (1998)

SWE Student & Professional Chapter, Las Vegas – Co-advisor, represent chapter at career advisement exhibits, invited speaker at Chapter meetings (1997-1998)

Future’s Expo - manned “Careers in Engineering” booth, High School Student Career Night (1997-1998)