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RESEARCH INTERESTS

Signal Processing: Machine learning, statistical signal processing, nonlinear and sparse signal processing, sensor network, digital image and video signal processing. **Human Computer Interaction:** Access methods for individuals with disabilities, tactile, haptic, sonification and multimodal systems.

PROFESSIONAL EXPERIENCE

Charles B. Evans Professor & Chair	Department of Electrical and Computer Engineering, University of Delaware 2017–Present (Joint faculty appointment with Biomedical Engineering)
Professor & Chair	Department of Electrical and Computer Engineering, University of Delaware 2009–2017 (Joint faculty appointment with Biomedical Engineering)
Professor	Department of Electrical and Computer Engineering, University of Delaware 2005–2009
Associate Professor	Department of Electrical and Computer Engineering, University of Delaware 2000–2005
Assistant Professor	Department of Electrical and Computer Engineering, University of Delaware 1998–2000
Adjunct Assistant Professor	Department of Electrical and Computer Engineering, University of Delaware 1993–1998
Scientist	Center for Applied Science and Engineering, University of Delaware 1994–1998
Research Engineer	Department of Applied Science and Engineering, du Pont Hospital for Children 1993–1998
Visiting Lecturer	Department of Electrical Engineering, University of Delaware 1992

EDUCATION

Doctor of Philosophy Electrical Engineering	University of Delaware, May 1992 Dissertation: <i>Permutation Filters: A Group Theoretic Class of Non-Linear Filters</i> Honors: The <i>Allan P. Colburn Prize in Mathematical Sciences and Engineering</i> for the most outstanding dissertation in the engineering and mathematical disciplines
Master of Electrical Engineering	University of Delaware, December 1989 Thesis: <i>Optimal Detection Schemes for the Restoration of Images with Signal Dependent Noise</i>
Bachelor of Science Electrical Engineering	Lehigh University, May 1987 Honors: Degree received <i>Magna Cum Laude</i>

AWARDS AND PROFESSIONAL RECOGNITION

- Fellow of the IEEE, *for contributions in nonlinear signal processing* (2016)
- First place in the Group-level Emotion Recognition sub-challenge, in the 6th Emotion Recognition in the Wild (EmotiW 2018) Challenge, ACM International Conference on Multimodal Interaction (2018)
- Ninth place in the *IEEE Geoscience and Remote Sensing Society (GRSS) International Data Fusion Contest*; Only US team to finish in the top 10 (2013)
- Best Student Paper Award Finalist, IEEE International Conference on Acoustics and Signal Processing (ICASSP), for the paper *Robust Meridian Filtering*, Tuncer Can Aysal, student co-author, (2007)
- Best Student Paper Award, ACM SIGACCESS, ASSETS Conference, for the paper *Automatic Production of Tactile Graphics from Scalable Vector Graphics*, Stephen Krufka, student co-author, (2005)
- Senior Member, IEEE (2000)
- Who's Who in Engineering Education (2000)
- NSF CAREER award (1999)
- Best Scientific Paper Award, Whitaker Foundation and Rehabilitation Engineering Society of North America (RESNA), Juan Gonzalez, student co-author, (1997)
- Allan P. Colburn Prize in Mathematical Sciences and Engineering for the most outstanding dissertation in the engineering and mathematical disciplines (1992)
- Du Pont Teaching Fellowship (1991)
- IEEE Communications Society ComSoc Scholarship (1989)
- Electrical Engineering Departmental Fellowship (1989–91)
- Alfred I. duPont Research Fellowship (1988)
- Certificate of Commendation from the Army for outstanding technical support to PIVADS (1987)
- Member Tau Beta Pi and Eta Kappa Nu (1986)

PROFESSIONAL ACTIVITIES

- Associate Editor, *IEEE Signal Processing Letters* (2009-2012)
- Associate Editor, *EURASIP Journal of Applied Signal Processing* (2003–2011)
- Founding Editor-in-Chief, *Advances in Human-Computer Interaction* (2007–2010)
- Associate Editor, *IEEE Transactions on Signal Processing* (2002–2006)
- Associate Editor, *IEEE Signal Processing Magazine* (2003–2005)
- Associate Editor, *IEEE Transactions on Neural Systems and Rehabilitation Engineering* (2002–2005)
- Associate Editor, *IEEE Transactions on Rehabilitation Engineering* (1999–2002)
- Guest Editor, *EURASIP Journal of Applied Signal Processing*, Special Issue on the Empirical Mode Decomposition and the Hilbert-Huang Transform (2008)

- Guest Editor, *EURASIP Journal of Applied Signal Processing*, Special Issue on Super-Resolution Enhancement of Digital Video (2007)
- Guest Editor, *EURASIP Journal of Applied Signal Processing*, Special Issues on Nonlinear Signal and Image Processing (December 2001 and January 2002)
- Invited Speaker, *2011 AAAS Annual Meeting, Career Workshop Panelist*
- Committee member, *IEEE Signal Processing Theory and Methods (SPTM) Technical Committee* (2003–2009)
- Charter committee member, *IEEE Bio-Imaging and Signal Processing (BISP) Technical Committee* (2004-2010)
- Co-Vice Chair (Technical Program Co-Chair), *2005 IEEE International Conference on Acoustics and Signal Processing (ICASSP)*
- Co-Chair, *2001 IEEE Workshop on Nonlinear Signal and Image Processing (NSIP)*
- Board Member, *Nonlinear Signal and Image Processing (NSIP) Board* (2001–Present)
- Editorial Board Member, *ReviewCentral* (2006–Present)
- International Fellow, *Collaborative International Research Centre for Universal Access (CIRCUA)* (2007–Present)
- Member, *American Society for Engineering Education (ASEE)* (2002–Present)
- Member, *Communications Multirate Digital Signal Processing and Bioengineering Research Group* Dpt. Teora de la Seal y Comunicaciones Universidad de Alcal Alcal de Henares, Madrid Spain (2006–Present)
- Technical Program Committee member, *2014 IEEE International Conference on Image Processing (ICIP 2014)*
- International Program Committee member, *2012 IEEE International Conference on Bioinformatics and Biomedicine (BIBM 12)*
- International Program Committee member, *2012 IASTED International Conference on Signal Processing, Pattern Recognition and Applications (SPPRA 2012)*
- International Program Committee member, *2011 International Conference on Signal and Image Processing (SIP 2011)*
- International Program Committee member, *2011 IEEE International Conference on Bioinformatics and Biomedicine (BIBM 11)*
- International Program Committee member, *2011 Imaging and Signal Processing in Health care and Technology (ISPHT 2011) Conference*
- Technical Program Committee member, *2010 IEEE International Conference on Signal Processing (ICSP 2010)*
- International Program Committee member, *2010 International Conference on Signal and Image Processing (SIP 2010)*
- International Program Committee member, *2010 IEEE International Conference on Bioinformatics and Biomedicine (BIBM 10)*
- Technical Program Committee member, *2009 IEEE Statistical Signal Processing (SSP) Workshop*

- Technical Program Committee member, *2009 IEEE Digital Signal Processing & Signal Processing Education Workshop*
- International Program Committee member, *2009 IEEE International Conference on Bioinformatics and Biomedicine (BIBM 09)*
- International Program Committee member, *2009 International Conference on Computer Vision Theory and Applications (VISAPP 2009)*
- International Program Committee member, *2009 IASTED International Conference on Signal Processing, Pattern Recognition and Applications (SPPRA 2009)*
- Technical Program Committee member, *2009 EURASIP–IEEE Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS 2009)*
- Technical Program Committee member, *2009 International Conference on Imaging Theory and Applications (IMAGAPP 2009)*
- Technical Program Committee member, *2009 International Conference on Signal Processing, Image Processing and Pattern Recognition (SIP 2009)*
- Technical Program Committee member, *The Eleventh International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS 2009)*
- Technical Program Committee member, *2009 IASTED International Conference on Telehealth and Assistive Technology (TAT 2009)*
- Technical Program Committee member, *2008 IEEE International Conference on Signal Processing (ICSP2008)*
- Technical Program Committee member, *2008 EURASIP–IEEE Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS)*
- International Program Committee member, *2008 IASTED International Conference on Telehealth and Assistive Technologies (Telehealth/AT 2008)*
- Technical Program Committee member, *2008 International Conference on Signal Processing, Image Processing and Pattern Recognition (SIP 2008)*
- Technical Program Committee member, *2008 EURASIP–IEEE Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS 200)*
- Technical Program Committee member, *2007 IEEE Statistical Signal Processor (SSP) Workshop*
- Technical Program Committee member, *2007 IEEE Workshop on Genomic Signal Processing and Statistics (GENSIPS'07)*
- Technical Program Committee member, *2007 EURASIP–IEEE Symposium on Advanced Concepts for Intelligent Vision Systems (ACIVS)*
- Panel member, *Interagency Committee on Disability Research Interagency Subcommittee on Technology; Technologies and Strategies for Physical Transfer of Individuals with Motor Impairments 2007 State of the Art Conference*
- Technical Program Committee member, *2007 IEEE–EURASIP Workshop on Nonlinear Signal and Image Processing (NSIP)*
- Technical Program Committee member, *2003 IEEE–EURASIP Workshop on Nonlinear Signal and Image Processing (NSIP)*

- Technical Program Committee member, *2003 IEEE International Conference on Multimedia & Expo (ICME)*
- Committee member, *Governor's Committee on Delaware Assistive Technology Policy (2002–2003)*
- Committee member, *NSF Committee on Equal Opportunities in Science and Engineering (CEOSE) (1999–2003)*
- Committee member, *CEOSE liaison to NSF Directorate for Computer and Information Science and Engineering Advisory Committee (CISE AC) (2000-2003)*
- Committee member, *NSF CAREER Program Committee of Visitors (COV) (2001)*
- Session Chair, "Image Coding," *1998 Conference on Information Sciences and Systems*, Princeton University
- Co-Chair, special session on "Nonlinear Techniques in Digital Video Signal Processing," *1995 IEEE Workshop on Nonlinear Signal and Image Processing*, Halkidiki, Greece
- Technical reviewer (1992–Present):
 - *IEEE Transactions on Image Processing*
 - *IEEE Transactions on Signal Processing*
 - *IEEE Transactions on Circuits and Systems*
 - *IEEE Transactions on Rehabilitation Engineering*
 - *IEEE Transactions on Neural Systems & Rehabilitation Engineering*
 - *IEEE Transactions on Systems, Man and Cybernetics*
 - *IEEE Transactions on Wireless Communications*
 - *IEEE Transactions on Fuzzy Systems*
 - *IEEE Signal Processing Letters*
 - *Optical Engineering, The International Society for Optical Engineering*
 - *Journal of Electronic Imaging, The International Society for Optical Engineering*
 - *Applied Optics Journal, Optical Society of America*
 - *Signal Processing Journal, Elsevier Science*
 - *Ultrasonics, Elsevier Science*
 - *Chemical Engineering Science, Elsevier Science*
 - *Springer Neural Computing and Applications*
 - *Image Processing Journal, Institution of Engineering and Technology (IET)*
 - *Biomedical Signal Processing and Control Journal, Elsevier Science*
 - *Haptics-e, The Electronic Journal of Haptics Research (www.haptics-e.org)*
 - *European Conference on Signal Processing (EUSIPCO)*
 - *EURASIP Journal of Applied Signal Processing*
 - *Computational and Mathematical Methods in Medicine, Hindawi Publishing*
 - *IEEE International Conference on Image Processing (ICIP)*
 - *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*
 - *IEEE–EURASIP Workshop on Nonlinear Signal and Image Processing (NSIP)*
 - *IEEE Statistical Signal Processor (SSP) Workshop*

- *IEEE International Conference on Multimedia & Expo (ICME)*
- *IEEE International Symposium on Biomedical Imaging (ISBI)*
- *IEEE International Symposium on Communications, Control and Signal Processing (ISCCSP)*
- *IEEE Digital Signal Processing (DSP) Workshop*
- *IEEE Workshop on Genomic Signal Processing and Statistics (GENSIPS)*
- *IEEE Virtual Reality Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*
- *IEEE Biomedical Circuit & Systems Conference (BIOCAS)*
- *EURASIP–IEEE Symposium on Advanced Concepts for Intelligent Vision Systems” (ACIVS)*
- *International Conference on Computer Graphics and Interactive Techniques (SIGGRAPH)*
- *IASTED International Conference on Assistive Technologies*
- Panel reviewer, the *National Science Foundation* (1996, 1998, 2000, 2001, 2004, 2007)
- Panel reviewer, the *National Institute on Disability and Rehabilitation Research* (2007)
- Textbook reviewer, *McGraw Hill* (1999)
- Committee member, *President’s Advisory Committee on Program and Facility Accessibility for Persons with Disabilities* (1996)

UNIVERSITY, COLLEGE, AND DEPARTMENT SERVICE

- Chair, *Department of Electrical and Computer Engineering* (2009–Present)
- Chair, *Mechanical Engineering Department Chair Search Committee* (2016–2017)
- Chair, *Computer and Information Sciences Department Chair Search Committee* (2014–2015)
- Chair, *University of Delaware Chairs Caucus* (2013–2014)
- Member, *University of Delaware Responsibility Based Budget (RBB) Review Committee* (2013–2015)
- Member, *University of Delaware Managing Faculty Data Task Force* (2013–2014)
- Member, *Director of Cybersecurity Initiative Search Committee* (2013–2014)
- Member, *Biomedical Engineering Executive Committee* (2011–Present)
- Member, *Steering Committee, American Association of University Professors (AAUP)*, (2007–2009)
- Chair, *Department of Electrical and Computer Engineering Graduate Committee* (2000–2008)
- Chair, *Department of Electrical and Computer Engineering Promotion and Tenure Committee* (2007–2008)
- Member, *Department of Electrical and Computer Engineering Faculty Search Committee* (2002–2003)
- Member, *College of Engineering ABET Committee*, (2007–2010)
- Faculty Member, *Center for Biomedical Engineering (CBER)*, (2005–Present)
- Panel member, *University of Delaware Graduate Program Improvement and Innovation Awards Program*, (2008)

- Member, *College of Engineering eCALC Classroom Development Committee*, (2003)
 - Chair, *Department of Electrical and Computer Engineering Faculty Search Committee* (2001–2002)
 - Member, *College of Engineering Educational Activities Committee*, (2000–2002)
 - Co-founder and coordinator, *University of Delaware, Esslingen University, Graduate Student Exchange Program* (1999–Present)
 - Member, *Department of Electrical and Computer Engineering Chair Search Committee* (1999–2000)
 - Member, *Department of Electrical and Computer Engineering Undergraduate Curriculum Revision Committee* (1999–2001)
 - Lecturer, *Engineering Outreach* program on “Engineering Concepts to Enhance High School Math & Science Curriculum” (1995, 1999)
 - Technical presenter, *Delaware Decision Days, Delaware Days, Discovery Days, and University of Delaware Legacy Day* (1996–Present)
 - Technical presenter, *Governor’s School for Excellence* (2005)
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COURSES TAUGHT

- [1] ELEG–167: Introduction to electrical and computer engineering, 1998F. (Team taught.).

DESCRIPTION: This course presents an overview of the main sub-fields within electrical and computer engineering. The course featured lectures and demonstrations covering the three major areas of concentration within the ECE Department: (1) Computer Engineering, (2) Signals and Systems Engineering, and (3) Devices and Materials Engineering.

- [2] ELEG–202: Introduction to digital systems, 1992F, 1993F, 1994F.

DESCRIPTION: Analysis and design of logic circuits. Topics include: Boolean algebra and its application to switching circuits, simplification of switching functions, design of logic circuits at the gate level and with MSI and LSI components. Analysis and design of synchronous and asynchronous sequential state machines.

- [3] ELEG–212: Signals and communications, 2003S, 2004F, 2005F, 2006F.

DESCRIPTION: Introduction to signals, systems and communications. Covers discrete and continuous time systems, sampling, and conversion between analog and digital signals. Example systems studied may include voice coding, telephony, television and digital audio.

- [4] ELEG–305: Signal processing I, 2008F.

DESCRIPTION: Discrete time signal processing theory and methods. The course covers several transform methods, including Z-transforms, Fourier transforms, and Fast Fourier Transforms (FFTs). Filter design, including Butterworth, Chebyshev, and Elliptic filters, and multi-rate signal processing methods are also covered.

- [5] ELEG–306: Signal processing II, 1995S, 1998S, 1999S, 2000S, 2002S, 2012F.

DESCRIPTION: Discrete time signal processing theory and methods. The course covers several transform methods, including Z-transforms, Fourier transforms, and Fast Fourier Transforms (FFTs). Filter design, including Butterworth, Chebyshev, and Elliptic filters, and multi-rate signal processing methods are also covered.

- [6] ELEG-403: Communications systems engineering, 1998F, 1999F, 2000F, 2001F, 2002F.

DESCRIPTION: Review of signal theory, Fourier transforms, linear and time-invariant systems; review of probability and random signals; information theory, source entropy, channel capacity; basedband data transmission, modulation, noise in analog systems and digital carrier modulation.

- [7] ELEG-467-016: VIP Drone FLIE – Flying Labs employing Intelligent Engineering, 2018F, 2019S, 2019F, 2020S, 2020F.

DESCRIPTION: Autonomous control of a single drone as well as cooperative control of a drone swarm; methods for collecting multispectral images as well as other appropriate remote environment sensors; fusion of sensor collected data and intelligent data processing, volume reconstruction, feature detection, and object tracking; visualization, defect detection, and security applications.

- [8] CISC-485 (cross-listed in ECE): Mechatronics, 1997S. (Team taught.).

DESCRIPTION: Mechatronics is the intersection set of computers, electronics and mechanical engineering. This course covers practical and theoretical aspects of mechatronic design, including human/machine interfacing, haptic systems, procedures in mechatronic design, reverse engineering, machine behaviors, and mechatronic control systems.

- [9] ELEG-636: Statistical signal processing, 1999S, 200S, 2001S, 2003S, 2008S, 2009S, 2012S.

DESCRIPTION: Introduction to random vectors and random processes and second-order moment and spectral characterizations. Linear transformations of stationary processes. Parameter estimation. Orthogonality principle and optimal linear filtering. Levinson recursion and lattice prediction filters. AR and ARMA models and their Yule-Walker characterizations. Classical and modern spectrum estimation.

- [10] ELEG-675: Image processing with biomedical applications, 2005S.

DESCRIPTION: Fundamentals of digital image processing, including image formation, acquisition, transforms, enhancement, restoration, coding, and reconstruction from projections. Attention will be given to biomedical imaging modalities, including X-ray, computed tomography (CT), magnetic resonance (MR) imaging, and ultrasound.

- [11] ELEG-833: Nonlinear signal processing, 2006S, 2009S.

DESCRIPTION: Fundamental theory and applications of nonlinear signal processing. Topics include stable random processes, order statistics, fractional lower order statistics, maximum likelihood estimation and the filtering problem, weighted order-statistic filters, medianization of linear FIR filters, myriad filters and adaptive optimization of nonlinear filters. Applications of nonlinear signal processing include digital imaging and video, digital communications and time-frequency analysis.

- [12] ELEG-867: Advanced topics in signal processing, 2011F. (Co-Taught with G. R. Arce.).

DESCRIPTION: Course covers contemporary problems in signal processing (SP). Specific topics vary, but may include parametric signal modeling, spectral estimation, multirate SP, nonlinear SP, compressive sensing, adaptive SP and image/video/multidimensional SP.

- [13] ELEG-867: Modern machine learning, 2017SII, 2018SII, 2019SII, 2020SII. (Online Course).

DESCRIPTION: Modern machine learning methodologies are covered and concepts are reinforced through implementations focusing on array of contemporary classification problems. Fundamental methods covered may include linear and logistic regression, neural networks, support vector machines, clustering, dimensionality reduction, and deep learning.

CONTRACTS AND GRANTS (TOTAL: \$9.4M; \$7.4M AS PI)

- [1] K. E. Barner, G. Arce, and M. Badiey, "Graph signal processing and underwater acoustic modeling techniques to assist automation of through the sensor (tts) for statistical inference module (SIM).," *Office of Naval Research*, 2018–2021. \$383,007.
- [2] K. E. Barner, "Cybersecurity," *Unidel Foundation*, 2014. \$475,000.
- [3] K. E. Barner and J. Yu., "HCC: Small: Head activated technology for off-the-shelf mobile devices," *National Science Foundation*, 2013–2016. \$496,020.
- [4] K. E. Barner, C. Cotton, E. L. Lloyd, C.-C. Shen, and S. K. Bohacek, "Collaborative Project: A regional cybersecurity education initiative," *National Science Foundation*, 2012–2015. \$416,102.
- [5] D. M. Swany, R. S. Sacher, B. D. Saunders, K. E. Barner, and K. V. Steiner, "CITADel – CyberInfrastructure Technology Advancement for Delaware," *National Science Foundation*, 2010–2011. \$1,354,827.
- [6] K. E. Barner and K. Steiner, "Three dimensional projection environment for molecular design and surgical simulation," *U.S. Army Telemedicine & Advanced Technology Research Center (TATRC)*, 2009–2011. \$93,205 (Subcontract from Thomas Jefferson University, Eric Wickstrom, PI, total budget: \$849,000).
- [7] K. E. Barner and T. Buma, "REU SITE: Nature InSpired Engineering Research Experiences for Undergraduates — NISE–REU," *National Science Foundation*, 2009–2012. \$380,092 (with matching).
- [8] K. E. Barner, F. Kaimilev, and K. Manal, "HCC-Small: High-resolution RFID tracking with applications in gesture recognition and human-computer interaction," *National Science Foundation*, 2008–2011. \$449,983.
- [9] K. E. Barner, M. S. Carberry, S. Elzer, K. F. McCoy, and B. M. Mollica, "Multimodal access to information graphics," *The National Institute on Disability and Rehabilitation Research, Department of Education*, 2008–2011. \$599,385.
- [10] K. E. Barner and T. C. Aysal, "Generalized Cauchy distribution theory for statistical signal processing, communications and networking applications," *National Science Foundation*, 2007-2008. \$112,388.
- [11] K. E. Barner, "Nature inspired engineering research experiences for teachers," *National Science Foundation*, 2008-2011. \$499,938.
- [12] K. E. Barner and M. Ianetta, "English and technical writing instruction for the college of engineering graduate students," *University of Delaware, Graduate Program Improvement and Innovation Grant program*, 2008-2010. \$151,328.
- [13] K. E. Barner and G. Elias, "Multi–touch 2–D tactile human computer interface design and optimization for individuals with physical disabilities," *National Science Foundation*, 2003–2006. \$658,000.
- [14] K. E. Barner, "Automatic generation of optimal tactile graphics," *The National Institute on Disability and Rehabilitation Research, Department of Education*, 2002–2005. \$450,000.

- [15] K. E. Barner and G. R. Arce, "New methods for improved noise reduction, contrast enhancement, and volume rendering of directray images," *Direct Radiography Corp.*, 2000–2001. \$46,000.
- [16] K. E. Barner and G. R. Arce, "New methods for improved noise reduction, contrast enhancement, and volume rendering of directray images," *Delaware Research Partnership*, 2000–2001. \$46,000.
- [17] K. E. Barner, "CAREER – rendering algorithms for tactile and haptic display of multidimensional data," *National Science Foundation*, 1999–2003. \$300,000.
- [18] K. E. Barner, "Research experiences for undergraduates," *National Science Foundation*, 1999–2003. \$10,000.
- [19] K. E. Barner and R. A. Foulds, "Information access – education, opportunities, and technology," *National Science Foundation*, 1998–2001. \$893,967.
- [20] K. E. Barner, "Optimal filtering of bioelectronic signals," *University of Delaware Research Foundation*, 1999–2000. \$30,000.
- [21] K. E. Barner, "Investigation of nonlinear filters in direct radiography," *Direct Radiography Corp.*, 1999. \$5,000.
- [22] K. E. Barner, "Interference cancellation for non–invasive extraction of transabdominal fetal electroencephalography," *University of Delaware Research Foundation*, 1998–1999. \$29,000.
- [23] K. E. Barner, "Interference cancellation for non–invasive extraction of transabdominal fetal electroencephalography," *Nemours Foundation*, 1998–1999. \$16,000.
- [24] J. Kolodzey, P. Berger, K. E. Barner, N. Gallagher, and D. van der Weide, "An on–line laboratory for solid state instruction," *Unidel Foundation*, 1998. \$225,000.
- [25] K. E. Barner and R. A. Foulds, "Experimental projects for persons with disabilities," *National Science Foundation*, 1994–1997. \$1,409,641 and \$20,000 in UD matching funds.
- [26] K. E. Barner and R. A. Foulds, "Research experiences for undergraduates," *National Science Foundation*, 1997. \$8,500.
- [27] K. E. Barner, "Educational computer equipment," *Hewlett–Packard*, 1995. \$24,000.
- [28] G. R. Arce, N. Gallagher, K. E. Barner, and C. G. Boncelet, "Multimedia equipment for instruction and research," *Silicon Graphics Corporation*, 1995–1996. \$420,000.

PH.D. DISSERTATIONS SUPERVISED

- [1] X. Guo, *Deep Learning Algorithms for Image Understanding Based on Multiple Cues*. PhD thesis, University of Delaware, Newark, Delaware 19716, May 2020. (Currently with JPMC.).
- [2] S. M. Romero, *Conformal Prediction Based Active Learning*. PhD thesis, University of Delaware, Newark, Delaware 19716, May 2019. (Currently with MathWorks.).
- [3] S. M. Mathews, *Dictionary and Deep Learning Algorithms with Applications to Remote Health Monitoring Systems*. PhD thesis, University of Delaware, Newark, Delaware 19716, Jan. 2017. (Currently with Intel.).
- [4] L. F. P. Cabrera, *Exploiting Prior Knowledge in Compressed Sensing Wireless ECG Systems*. PhD thesis, University of Delaware, Newark, Delaware 19716, 2015. (Currently with Depaul University).

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- [5] Y. Zhou, *Sparse Signal Processing for Machine Learning and Computer Vision*. PhD thesis, University of Delaware, Newark, Delaware 19716, 2015. (Currently with Apple.).
- [6] R. Hu, *Toward a Realistic Virtual Surgical Simulation Environment: Real-Time Deformation, Haptic Feedback and Visualization Algorithms*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2012. (Currently with Qualcomm; Co-advised with K. Steiner).
- [7] J. Gao, *Information Graphic Classification, Decomposition and Alternative Representation*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2012. (Currently with Amazon.).
- [8] R. Carrillo, *Robust Methods for Sensing and Reconstructing Sparse Signals*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2011. (Currently with the Swiss Center for Electronics and Microtechnology.).
- [9] Y. Yuan, *Image-Based Gesture Recognition with Support Vector Machines*. PhD thesis, University of Delaware, Newark, Delaware 19716, May 2008. (Currently with Research in Motion).
- [10] T. Aysal, *Filtering and Estimation Theory: First-Order, Polynomial and Decentralized Signal Processing*. PhD thesis, University of Delaware, Newark, Delaware 19716, Feb. 2007. (Currently with Cornell University.).
- [11] B. Weng, *Topics on Selected Nonlinear Problems in Signal and Image Processing*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2006. (Currently with Philips Medical Systems).
- [12] P. Chen, *Volumetric Reconstruction and Real-Time Deformation Modeling of Biomedical Images*. PhD thesis, University of Delaware, Newark, Delaware 19716, Aug. 2006. (Co-advised with K. Steiner. Currently with Radiology Imaging Associates).
- [13] I. R. Kim, *Wavelet Domain Partition-Based Processing with Applications to Image Denoising and Compression*. PhD thesis, University of Delaware, Newark, Delaware 19716, May 2006. (Currently with the South Korean Armed Forces).
- [14] Y. Niu, *Parallelization and Performance Optimization of Bioinformatics and Biomedical Applications Targeted to Advance Computer Architectures*. PhD thesis, University of Delaware, Newark, Delaware 19716, Aug. 2005. (Co-advised with G. Gao. Currently with Bloomberg, LP.).
- [15] Y. Nie, *Fuzzy Transformation Theory and its Application in Image Processing*. PhD thesis, University of Delaware, Newark, Delaware 19716, Jan. 2005. (Currently with FUJIFILM Medical System USA, Inc.).
- [16] B. Wang, *Fast Unconstrained Tomosynthesis Reconstruction Methods and Applications*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2004. (Currently with GE Medical Systems Information Technologies).
- [17] L. Ma, *Signal Processing Analysis and Algorithms for Internet Congestion Control*. PhD thesis, University of Delaware, Newark, Delaware 19716, Dec. 2004. (Co-advised with G. Arce. Currently with San Diego Research Center, Inc.).
- [18] Y. Shen, *Nonlinear Multivariate Signal Processing Methods and Applications*. PhD thesis, University of Delaware, Newark, Delaware 19716, Aug. 2004. (Currently with the Old Dominion University.).
- [19] M. Shao, *Partition-Based Weighted Sum Filtering Theory with Applications to Image Processing and Biomedical Engineering*. PhD thesis, University of Delaware, Newark, Delaware 19716, Aug. 2004. (Currently with the ZOLL Medical Corporation.).
- [20] R. P. Schumeyer, *A Video Coder Based on Scene Content and Visual Perception*. PhD thesis, University of Delaware, Newark, Delaware 19716, May 1998. (Currently with Mississippi State University and the Army Research Laboratory.).
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MASTER THESES SUPERVISED

- [1] A. Alblwi, "Improving the adaptive moment estimation optimization methods for modern machine learning," Master's thesis, University of Delaware, Newark, Delaware 19711, May 2020.
- [2] S. Bayram, "CNN-based single image super-resolution network and biomedical image applications," Master's thesis, University of Delaware, Newark, Delaware 19716, May 2018.
- [3] S. M. Mathews, "Leveraging discriminative dictionary learning algorithms for single lead ECG classification," Master's thesis, University of Delaware, Newark, Delaware 19716, May 2015.
- [4] Z. Liu, "Distributed estimation in heavy-tailed environments," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2009.
- [5] S. Wang, "A volumetric mesh-free deformation method for surgical simulations in virtual environments," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2009. (Co-advised with K. Steiner).
- [6] L. Su, "DCT coefficient based text detection," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2008.
- [7] Q. Liu, "Image mosaic algorithms and optimization," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2007.
- [8] S. Krufka, "Visual to tactile conversion theory," Master's thesis, University of Delaware, Newark, Delaware 19716, May 2006.
- [9] C. Haag, "Temporal and spatial wind field distribution in the Delaware Bay," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 2005. (Co-advised with M. Badiey.).
- [10] Y. Liu, "Motion estimation, extraction and recognition for people with disabilities based on multi-touch surface," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2005.
- [11] E. Fret, "Accuracy and frequency analysis of multitouch surfaces for individuals with parkinsonian and essential tremor," Master's thesis, University of Delaware, Newark, Delaware 19716, May 2005.
- [12] S. Ellwanger, "Tactile image conversion and printing," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2003.
- [13] Y. Shen, "Wireless sensing of composite manufacturing process parameters," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2003. (Co-advised with D. Heider.).
- [14] A. Nayak, "Halftoning methods in generation of tactile textures for binary image representation," Master's thesis, University of Delaware, Newark, Delaware 19716, May 2002.
- [15] M. D. Aguirre, "Multiresolution permutation filters based on acyclic connected graphs," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 2000.
- [16] W. An, "Fuzzy extensions to RCRS filters," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2000.
- [17] S. E. Hernandez, "Watershed-based image segmentation for gray-scale and color images," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 2000.
- [18] M. W. Asghar, "Nonlinear multiresolution techniques with applications to scientific visualization in a haptic environment," Master's thesis, University of Delaware, Newark, Delaware 19716, May 1999.
- [19] A. Flaig, "Affine order-statistic filters: "medianization" of linear FIR filters," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 1998. (Co-advised with G. Arce.).

-
- [20] J. I. Siddique, "Nonlinear image decomposition for multiresolution edge detection using gray-level edge maps," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 1998.
 - [21] S. Pledgie, "Tremor suppression through force feedback," Master's thesis, University of Delaware, Newark, Delaware 19716, May 1998. (Co-advised with S. Agrawal.).
 - [22] J. P. Fritz, "Haptic rendering techniques for scientific visualization," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 1996.
 - [23] T. P. Way, "Automatic generation of tactile graphics," Master's thesis, University of Delaware, Newark, Delaware 19716, Aug. 1996.
 - [24] J. G. Gonzalez, "A new approach to suppressing abnormal tremor through signal equalization," Master's thesis, University of Delaware, Newark, Delaware 19716, Dec. 1995. (Co-advised with G. Arce.).
-

DEGREE WITH DISTINCTION THESES SUPERVISED

- [1] I. Mirza, "Tactile image processing," Degree with distinction Bachelor's thesis, University of Delaware, Newark, Delaware 19716, May 2003.
 - [2] R. Sheth, "Region of interest detection in collimated x-ray images using the radon transform," Degree with distinction Bachelor's thesis, University of Delaware, Newark, Delaware 19716, May 2002.
 - [3] V. Emanuele, "L optimal combinatoric region merging for image segmentation," Degree with distinction Bachelor's thesis, University of Delaware, Newark, Delaware 19716, May 2002.
 - [4] D. Ramanan, "Spatial-rank order methods and their application in image interpolation," Degree with distinction Bachelor's thesis, University of Delaware, Newark, Delaware 19716, May 2000.
-

BOOKS

- [1] K. E. Barner and G. R. Arce, eds., *Nonlinear Signal and Image Processing: Theory, Methods, and Applications*. Boca Raton, FL: CRC Press, 2004.
-

BOOK CHAPTERS

- [1] K. E. Barner, T. C. Aysal, and G. R. Arce, "Nonlinear filtering using statistical signal models," in *The Circuits and Filters Handbook* (W.-K. Chen, ed.), Boca Raton, FL: CRC Press, 2009. (in Digital Filters Section, R. Ansari and A. E. Cetin section eds.).
- [2] K. E. Barner, "Fuzzy methods in nonlinear signal processing: Part I – theory," in *Nonlinear Signal and Image Processing: Theory, Methods, and Applications* (K. E. Barner and G. R. Arce, eds.), Boca Raton, FL: CRC Press, 2004.
- [3] K. E. Barner, Y. Nie, and Y. Shen, "Fuzzy methods in nonlinear signal processing: Part II – applications," in *Nonlinear Signal and Image Processing: Theory, Methods, and Applications* (K. E. Barner and G. R. Arce, eds.), Boca Raton, FL: CRC Press, 2004.

-
- [4] K. E. Barner, "Fuzzy theory, methods, and applications in nonlinear signal processing," in *Intelligent Systems: Techniques and Applications* (C. Leondes, ed.), vol. 3, pp. 49–101, Boca Raton, FL: CRC Press, 2003.
 - [5] K. E. Barner and R. C. Hardie, "Spatial–rank order selection filters," in *Nonlinear Image Processing* (S. K. Mitra and G. Sicuranza, eds.), San Diego, CA: Academic Press, 2001.
 - [6] G. R. Arce and K. E. Barner, "Nonlinear signals and systems," in *Encyclopedia of Electrical and Electronics Engineering* (J. G. Webster, ed.), pp. 612–630, N.Y.: John Wiley & Sons, 1998.
 - [7] R. C. Hardie and K. E. Barner, "Nonlinear filters," in *Encyclopedia of Electrical and Electronics Engineering* (J. G. Webster, ed.), pp. 570–585, New York, NY: John Wiley & Sons, 1998.
 - [8] G. R. Arce, Y. T. Kim, and K. E. Barner, "Order–statistic filtering and smoothing of time series: Part 1," in *Order Statistics and their Applications* (C. R. Rao and N. Balakrishnan, eds.), vol. 16 of *Handbook of Statistics*, pp. 525–554, Amsterdam, The Netherlands: Elsevier Science, 1998.
 - [9] K. E. Barner and G. R. Arce, "Order–statistic filtering and smoothing of time series: Part 2," in *Order Statistics and their Applications* (C. R. Rao and N. Balakrishnan, eds.), vol. 16 of *Handbook of Statistics*, pp. 555–602, Amsterdam, The Netherlands: Elsevier Science, 1998.
-

PATENTS

- [1] J. Yu, L. D. Lopez, X. Guo, K. V. Steiner, K. E. Barner, and T. L. Bauer, "Portable 3D reconstruction system using Microsoft Kinect sensors/3D space-time navigator to interactively display data generated on portable 3d acquisition system," *U. S. Patent*, Oct. 2013. (Pending).
 - [2] T. C. Aysal and K. E. Barner, "Speckle suppression in ultrasound imaging," *U. S. Patent*, Jan. 2007.
-

EDITORIAL PUBLICATIONS

- [1] N. O. Attoh-Okine, K. E. Barner, D. E. Bentil, and R. R. Zhang, "The empirical mode decomposition and the Hilbert–Huang transform," *EURASIP Journal on Advances in Signal Processing*, vol. 2008, p. 3 pages, 2008.
 - [2] R. C. Hardie, R. R. Schultz, and K. E. Barner, "Super-resolution enhancement of digital video," *EURASIP Journal on Advances in Signal Processing*, vol. 2007, p. 3 pages, Mar. 2007.
 - [3] K. E. Barner, G. R. Arce, G. L. Sicuranza, and I. Shmulevich, "Editorial, special issue on nonlinear signal and image processing – part II," *EURASIP Journal on Applied Signal Processing*, vol. 2002, pp. 1–3, Jan. 2002.
 - [4] K. E. Barner, G. R. Arce, G. L. Sicuranza, and I. Shmulevich, "Editorial, special issue on nonlinear signal and image processing – part I," *EURASIP Journal on Applied Signal Processing*, vol. 2001, pp. 189–191, Dec. 2001.
 - [5] R. Salcido and K. E. Barner, "The patient.com," *Advances in Skin & Wound Care*, vol. 14, pp. 108–110, May–June 2001.
 - [6] R. Salcido and K. E. Barner, "The patient.com, part 2," *Advances in Skin & Wound Care*, vol. 14, pp. 164–166, July–Aug. 2001.
-

JOURNAL PUBLICATIONS

- [1] S. Matiz and K. E. Barner, "Conformal prediction based active learning by linear regression optimization," *Neurocomputing*, vol. 388, pp. 157 – 169, 2020. doi.org/10.1016/j.neucom.2020.01.018.
- [2] S. Matiz and K. E. Barner, "Inductive conformal predictor for convolutional neural networks: Applications to active learning for image classification," *Pattern Recognition*, vol. 90, pp. 172 – 182, 2019. doi.org/10.1016/j.patcog.2019.01.035.
- [3] S. M. Mathews, C. Kambhmettu, and K. E. Barner, "A novel application of deep learning for single-lead ecg classification," *Computers in Biology and Medicine*, vol. 99, pp. 53 – 62, 2018. doi.org/10.1016/j.compbimed.2018.05.013.
- [4] L. F. Polania and K. E. Barner, "Exploiting restricted Boltzmann machines and deep belief networks in compressed sensing," *IEEE Transactions on Signal Processing*, vol. 2017, May 2017. doi.org/10.1109/TSP.2017.2712128.
- [5] R. E. Carrillo, A. B. Ramirez, G. R. Arce, K. E. Barner, and B. M. Sadler, "Robust compressive sensing of sparse signals: a review," *EURASIP Journal on Advances in Signal Processing*, vol. 2016, p. 108, Oct. 2016. doi:10.1186/s13634-016-0404-5.
- [6] C. Duarte, K. E. Barner, and K. Goossen, "Design of IIR multi-notch filters based on polynomially-represented squared frequency response," *IEEE Transactions on Signal Processing*, vol. 64, pp. 2613–2623, May 2016. doi:10.1109/TSP.2016.2529578.
- [7] H. Chang, Y. Zhou, A. Borowsky, K. E. Barner, P. Spellman, and B. Parvin, "Stacked predictive sparse decomposition for classification of histology sections," *International Journal of Computer Vision*, vol. 113, pp. 3–18, May 2015. doi:10.1007/s11263-014-0790-9.
- [8] L. F. Polania, R. E. Carrillo, M. Blanco-Velasco, and K. E. Barner, "Exploiting prior knowledge in compressed sensing wireless ECG systems," *IEEE Journal of Biomedical and Health Informatics*, vol. 19, pp. 508–519, Mar. 2015. doi:10.1109/JBHI.2014.2325017.
- [9] K. Liu, S. Wang, D. L. Lau, K. E. Barner, and F. Kiamilev, "Nonlinearity calibrating algorithm for structured light illumination," *Optical Engineering*, vol. 53, p. 050501, May 2014. doi:10.1117/1.OE.53.5.050501.
- [10] R. Carrillo and K. Barner, "Lorentzian iterative hard thresholding: Robust compressed sensing with prior information," *IEEE Transactions on Signal Processing*, vol. 61, pp. 4822–4833, Oct 2013. doi:10.1109/TSP.2013.2274275.
- [11] Y. Zhou and K. Barner, "Locality constrained dictionary learning for nonlinear dimensionality reduction," *IEEE Signal Processing Letters*, vol. 20, pp. 335–338, April 2013. doi:10.1109/TSP.2013.2274275.
- [12] Y. Zhou, K. Liu, R. E. Carrillo, K. E. Barner, and F. Kiamilev, "Kernel-based sparse representation for gesture recognition," *Pattern Recognition*, vol. 46, pp. 3208–3222, Dec. 2013. doi:10.1016/j.patcog.2013.06.007.
- [13] R. C. Carrillo, K. E. Barner, and T. C. Aysal, "A Generalized Cauchy distribution framework for problems requiring robust behavior," *EURASIP Journal on Advances in Signal Processing – Special Issue on Robust Processing of Nonstationary Signals*, vol. 2010, p. 19 pages, Apr. 2010. doi:10.1155/2010/312989.
- [14] M. Blanco-Velasco, F. Cruz-Roldán, J. I. Godino-Llorente, and K. E. Barner, "Non-linear trend estimation of the ventricular repolarization segment for T-wave alternans detection," *IEEE Transactions on Biomedical Engineering*, vol. 57, pp. 2402–2412, Oct. 2010.

- [15] T. C. Aysal and K. E. Barner, "Convergence of consensus models with stochastic disturbances," *IEEE Transactions on Information Theory*, vol. 56, pp. 4101–4113, Aug. 2010. doi:10.1109/TIT.2010.2050940.
- [16] R. C. Carrillo, K. E. Barner, and T. C. Aysal, "Robust sampling and reconstruction methods for sparse signals in the presence of impulsive noise," *IEEE Journal of Selected Topics in Signal Processing*, vol. 4, pp. 392–408, Apr. 2010. doi:10.1109/JSTSP.2009.2039177.
- [17] S. M. A. Bhuiyan, R. R. Adhami, N. O. Attoh-Okine, A. Y. Ayenu-Prah, and K. E. Barner, "Bidimensional empirical mode decomposition using various interpolation techniques," *Advances in Adaptive Data Analysis*, vol. 1, pp. 1–30, Jan. 2009.
- [18] T. C. Aysal and K. E. Barner, "Sensor data cryptography in wireless sensor networks," *IEEE Transactions on Information Forensics and Security*, vol. 3, pp. 273–289, June 2008.
- [19] B. Weng and K. E. Barner, "Optimal signal reconstruction using the empirical mode decomposition," *EURASIP Journal on Advances in Signal Processing – Special Issue on The Empirical Mode Decomposition and the Hilbert–Huang Transform*, vol. 2008, 2008. Article ID 845294, 12 pages, 2008. doi:10.1155/2008/845294.
- [20] J. F. Khan, K. E. Barner, and R. R. Adhami, "Feature point detection utilizing the empirical mode decomposition," *EURASIP Journal on Advances in Signal Processing – Special Issue on The Empirical Mode Decomposition and the Hilbert–Huang Transform*, vol. 2008, 2008. Article ID 287061, 13 pages, 2008. doi:10.1155/2008/287061.
- [21] M. Blanco-Velasco, F. Cruz-Roldán, E. Moreno-Martinez, J. I. Godino-Llorente, and K. E. Barner, "Embedded filter bank-based algorithm for ECG compression," *Elsevier Science, Signal Processing*, vol. 88, pp. 1402–1412, June 2008.
- [22] T. C. Aysal and K. E. Barner, "Blind decentralized estimation for bandwidth constrained wireless sensor networks," *IEEE Transactions on Wireless Communications*, vol. 7, pp. 1466–1471, May 2008.
- [23] T. C. Aysal and K. E. Barner, "Constrained decentralized estimation over noisy channels for sensor networks," *IEEE Transactions on Signal Processing*, vol. 56, pp. 1398–1410, Apr. 2008.
- [24] M. Blanco-Velasco, B. Weng, and K. E. Barner, "ECG signal denoising and baseline wander removal based on the empirical mode decomposition," *Elsevier Science, Computers in Biology and Medicine*, vol. 38, pp. 1–13, Jan. 2008.
- [25] B. Weng, T. C. Aysal, and K. E. Barner, "Polynomial weighted median image sequence prediction," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 17, pp. 1764–1770, Dec. 2007.
- [26] B. Weng and K. E. Barner, "A linear phase condition for Volterra filters," *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 54, pp. 1097–1101, Dec. 2007.
- [27] T. C. Aysal and K. E. Barner, "Meridian filtering for robust signal processing," *IEEE Transactions on Signal Processing*, vol. 55, pp. 3949–3962, Aug. 2007.
- [28] S. E. Krufka, K. E. Barner, and T. C. Aysal, "Visual to tactile conversion of vector graphics," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 15, pp. 310–321, June 2007.
- [29] T. C. Aysal and K. E. Barner, "Rayleigh–maximum–likelihood filtering for speckle reduction in ultrasound images," *IEEE Transactions on Medical Imaging*, vol. 26, pp. 712–727, May 2007.
- [30] B. Narayanan, R. C. Hardie, K. E. Barner, and M. Shao, "A computationally efficient super-resolution algorithm for video processing using partition filters," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 17, pp. 621–634, May 2007.

- [31] M. Blanco–Velasco, F. Cruz–Roldán, J. I. Godino–Llorente, and K. E. Barner, “Wavelet packets feasibility study for the design of an ECG compressor,” *IEEE Transactions on Biomedical Engineering*, vol. 54, pp. 766–769, Apr. 2007.
- [32] T. C. Aysal and K. E. Barner, “Generalized mean–median filtering for robust frequency–selective applications,” *IEEE Transactions on Signal Processing*, vol. 55, pp. 937–948, Mar. 2007.
- [33] G. Xuan, S. Ghosh, S. Kim, P.-C. Lv, T. Buma, B. Weng, K. E. Barner, and J. Kolodzey, “Terahertz sensing of materials,” *International Journal of High Speed Electronics and Systems*, vol. 17, pp. 121–126, Mar. 2007.
- [34] T. C. Aysal and K. E. Barner, “Myriad–type polynomial filtering,” *IEEE Transactions on Signal Processing*, vol. 55, pp. 747–753, Feb. 2007.
- [35] Y. Nie and K. E. Barner, “Fuzzy rank LUM filters,” *IEEE Transactions on Image Processing*, vol. 15, pp. 3636–3654, Dec. 2006.
- [36] T. C. Aysal and K. E. Barner, “Hybrid polynomial filters for Gaussian and non–Gaussian noise environments,” *IEEE Transactions on Signal Processing*, vol. 54, pp. 4644–4661, Dec. 2006.
- [37] T. C. Aysal and K. E. Barner, “Quadratic weighted median filters for edge enhancement of noisy images,” *IEEE Transactions on Image Processing*, vol. 15, pp. 3294–3310, Nov. 2006.
- [38] S. E. Krufka and K. E. Barner, “A user study on tactile graphic generation methods,” *Behavior and Information Technology*, vol. 25, pp. 297–311, July–Aug. 2006. (Special invitation).
- [39] T. C. Aysal and K. E. Barner, “Second-order heavy-tailed distributions and tail analysis,” *IEEE Transactions on Signal Processing*, vol. 54, pp. 2827–2831, July 2006.
- [40] M. Shao and K. E. Barner, “Optimization of partition–based weighted sum filters and their application in image denoising,” *IEEE Transactions on Image Processing*, vol. 15, pp. 1900–1915, July 2006.
- [41] B. Weng and K. E. Barner, “TR–MUSIC – a robust frequency estimation method in impulsive noise,” *Signal Processing*, vol. 87, pp. 1477–1487, July 2006.
- [42] Y. Shen and K. E. Barner, “Fast adaptive optimization of weighted vector median filters,” *IEEE Transactions on Signal Processing*, vol. 54, pp. 2497–2510, July 2006.
- [43] L. Ma, K. E. Barner, and G. R. Arce, “Statistical analysis of TCP’s retransmission timeout algorithm,” *IEEE/ACM Transactions on Networking*, vol. 14, pp. 383–396, Apr. 2006.
- [44] Y. Lin, R. C. Hardie, Q. Sheng, M. Shao, and K. E. Barner, “Improved optimization of soft partition weighted sum filters and their application to image restoration,” *Applied Optics*, vol. 45, pp. 2697–2706, Apr. 2006.
- [45] Y. Nie and K. E. Barner, “The fuzzy transformation and its application in image processing,” *IEEE Transactions on Signal Processing*, vol. 15, pp. 910–927, Apr. 2006.
- [46] K. E. Barner and T. C. Aysal, “Polynomial weighted median filtering,” *IEEE Transactions on Signal Processing*, vol. 54, pp. 636–650, Feb. 2006.
- [47] M. Shao, K. E. Barner, and R. C. Hardie, “Partition-based interpolation for image demosaicking and super-resolution reconstruction,” *Optical Engineering*, vol. 44, pp. 107003–1–107003–14, Oct. 2005.
- [48] M. Shao, K. E. Barner, J. Liebman, R. G. M. H. Goodman, J. Lindauer, E. Helfenbein, and S. Zhou, “A multi–step algorithm for non-invasive fetal electrocardiographic extraction,” *Journal of Electrocardiology*, vol. 38, p. 38, Oct. 2005. (Also in the Proceedings of 30th Annual ISCE Conference).

- [49] Y. Lin, R. C. Hardie, and K. E. Barner, "Subspace partition weighted sum filters for image deconvolution and image denoising," *IEEE Signal Processing Letters*, vol. 12, pp. 613–616, Sept. 2005.
- [50] R. Sheth, K. E. Barner, R. Schumeyer, and G. R. Arce, "Region of interest identification in collimated X-ray images utilizing nonlinear preprocessing and the radon transform," *Journal of Electronic Imaging*, vol. 14, pp. 33011–1–33011–13, Jul–Sep 2005.
- [51] B. Weng and K. E. Barner, "Nonlinear system identification under impulsive environments," *IEEE Transactions on Signal Processing*, vol. 53, pp. 2588–2594, July 2005.
- [52] S. Hernandez, K. E. Barner, and Y. Yuan, "Region merging using homogeneity and edge integrity for watershed-based image segmentation," *Optical Engineering*, vol. 44, pp. 17004–1–17004–14, Jan. 2005.
- [53] M. Blanco-Velasco, F. Cruz-Roldan, J. I. Godino-Llorente, and K. E. Barner, "ECG compression with retrieved quality guaranteed," *IEE Electronic Letters*, vol. 40, pp. 1466–1467, Nov. 2004.
- [54] L. Ma, G. R. Arce, and K. E. Barner, "TCP retransmission timeout algorithm using weighted medians," *IEEE Signal Processing Letters*, vol. 11, pp. 569–572, June 2004.
- [55] A. Nayak and K. E. Barner, "Optimal halftoning for tactile imaging," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 12, pp. 216–227, June 2004.
- [56] Y. Shen and K. E. Barner, "Fuzzy vector median based surface smoothing," *IEEE Transactions on Visualization and Computer Graphics*, vol. 10, pp. 252–265, May–June 2004.
- [57] M. Shao, K. E. Barner, and M. Goodman, "An interference cancellation algorithm for non-invasive extraction of TaFEEG," *IEEE Transactions on Biomedical Engineering*, vol. 51, pp. 471–483, Mar. 2004.
- [58] G. R. Arce, K. E. Barner, and L. Ma, "RED gateway congestion control using median queue size estimates," *IEEE Transactions on Signal Processing – Special Issue on Signal Processing in Networking*, vol. 51, pp. 2149–2164, Aug. 2003.
- [59] M. D. Aguirre and K. E. Barner, "Multiresolution permutation filters based on acyclic connected graphs," *IEEE Transactions on Image Processing*, vol. 12, pp. 140–152, Apr. 2003.
- [60] J. Siddique and K. E. Barner, "Nonlinear image decomposition for multiresolution edge detection using gray-level edge maps," *Optical Engineering*, vol. 41, pp. 2749–2763, Nov. 2002.
- [61] K. E. Barner, Y. Nie, and W. An, "Fuzzy ordering theory and its use in filter generalizations," *EURASIP Journal on Applied Signal Processing – Special Issue on Nonlinear Signal and Image Processing*, pp. 206–218, Dec. 2001.
- [62] M. Asghar and K. E. Barner, "Nonlinear multiresolution techniques with applications to scientific visualization in a haptic environment," *IEEE Transactions on Visualization and Computer Graphics*, vol. 7, pp. 76–93, Mar. 2001.
- [63] E. A. Thomson, K. E. Barner, and R. C. Hardie, "Hybrid order statistic filters and their application to image restoration," *Applied Optics: Information Processing*, vol. 40, pp. 656–661, Feb. 2001.
- [64] K. E. Barner, "Colored l - l filters and their application in speech pitch detection," *IEEE Transactions on Signal Processing*, vol. 9, pp. 2601–2606, Sept. 2000.
- [65] A. Flaig, K. E. Barner, and G. R. Arce, "Fuzzy ranking: Theory and applications," *Signal Processing – Special Issue on Fuzzy Processing*, vol. 80, pp. 1017–1036, June 2000.
- [66] J. G. Gonzales, E. A. Heredia, T. Rahman, K. E. Barner, and G. R. Arce, "Optimal digital filtering for tremor suppression," *IEEE Transactions on Biomedical Engineering*, vol. 47, pp. 664–673, May 2000.

- [67] S. Pledgie, K. E. Barner, S. Agrawal, and T. Rahman, "Tremor-suppression through impedance control," *IEEE Transactions on Rehabilitation Engineering*, vol. 8, pp. 53–59, Mar. 2000.
- [68] J. P. Fritz and K. E. Barner, "Design of a haptic data visualization system for people with visual impairments," *IEEE Transactions on Rehabilitation Engineering*, vol. 7, pp. 372–384, Sept. 1999.
- [69] D. B. Loyd, A. Phalangas, and K. E. Barner, "An audio- and speech-based interface for computer-controlled scientific instruments," *IEEE Transactions on Rehabilitation Engineering*, vol. 7, pp. 245–253, June 1999.
- [70] K. E. Barner, A. M. Sarham, and R. C. Hardie, "Partition-based weighted sum filters for image restoration," *IEEE Transactions on Image Processing*, vol. 8, pp. 740–745, May 1999.
- [71] K. E. Barner, A. Flaig, and G. R. Arce, "Fuzzy time-rank relations and order statistics," *IEEE Signal Processing Letters*, vol. 5, pp. 252–255, Oct. 1998.
- [72] A. Flaig, G. R. Arce, and K. E. Barner, "Affine order-statistic filters: "medianization" of linear FIR filters," *IEEE Transactions on Signal Processing*, vol. 46, pp. 2101–2112, Aug. 1998.
- [73] K. E. Barner and G. R. Arce, "Design of permutation order statistic filters through group colorings," *IEEE Transactions on Circuits and Systems*, vol. 44, pp. 531–547, July 1997.
- [74] T. P. Way and K. E. Barner, "Automatic visual to tactile translation, part I: Human factors, access methods and image manipulation," *IEEE Transactions on Rehabilitation Engineering*, vol. 5, pp. 81–94, Mar. 1997.
- [75] T. P. Way and K. E. Barner, "Automatic visual to tactile translation, part II: Evaluation of the tactile image creation system," *IEEE Transactions on Rehabilitation Engineering*, vol. 5, pp. 95–105, Mar. 1997.
- [76] R. C. Hardie and K. E. Barner, "Extended permutation filters and their application to edge enhancement," *IEEE Transactions on Image Processing – Special Issue on Nonlinear Signal Processing*, vol. 5, pp. 855–867, June 1996.
- [77] G. R. Arce, T. A. Hall, and K. E. Barner, "Permutation weighted order statistic filter lattices," *IEEE Transactions on Image Processing*, vol. 4, pp. 1070–1083, Aug. 1995.
- [78] K. E. Barner and G. R. Arce, "Permutation filters: A class of non-linear filters based on set permutations," *IEEE Transactions on Signal Processing*, vol. 42, pp. 782–798, Apr. 1994.
- [79] R. C. Hardie and K. E. Barner, "Rank conditioned rank selection filters for signal restoration," *IEEE Transactions on Image Processing*, vol. 3, pp. 192–206, Mar. 1994.
- [80] K. E. Barner, G. R. Arce, and J.-H. Lin, "On the performance of stack filters and vector detection in image restoration," *Circuits, Systems, and Signal Processing*, vol. 11, pp. 153–169, Jan. 1992.

CONFERENCE PROCEEDING PUBLICATIONS

- [1] X. Guo, L. F. Polania, B. Zhu, C. Boncelet, and K. E. Barner, "Graph neural networks for image understanding based on multiple cues: Group emotion recognition and event recognition as use cases," in *The IEEE Winter Conference on Applications of Computer Vision (WACV)*, (Snowmass Village, Colorado, USA), IEEE, March 2020.
- [2] X. Lan and K. Barner, "Regularization learning for image recognition," in *2019 18th IEEE International Conference On Machine Learning And Applications (ICMLA)*, (Boca Raton, FL, USA), pp. 1–7, IEEE, May 2019. DOI:10.1109/ICMLA.2019.00010.

- [3] B. Zhu, X. Guo, K. Barner, and C. Boncelet, "Automatic group cohesiveness detection with multi-modal features," in *2019 International Conference on Multimodal Interaction, ICMI '19*, (New York, NY, USA), pp. 577–581, ACM, 2019.
- [4] X. Guo, L. F. Polana, J. Garcia-Frias, and K. E. Barner, "Social relationship recognition based on a hybrid deep neural network," in *2019 14th IEEE International Conference on Automatic Face Gesture Recognition (FG 2019)*, pp. 1–5, May 2019.
- [5] S. Matiz and K. E. Barner, "Inductive conformal predictor for sparse coding classifiers: Applications to image classification," in *ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 3307–3311, May 2019.
- [6] X. Guo, B. Zhu, L. F. Polanía, C. Boncelet, and K. E. Barner, "Group-level emotion recognition using hybrid deep models based on faces, scenes, skeletons and visual attentions," in *Proceedings of the 20th ACM International Conference on Multimodal Interaction, ICMI '18*, (New York, NY, USA), pp. 635–639, ACM, 2018.
- [7] X. Guo, L. Polania, and K. Barner, "Smile detection in the wild based on transfer learning," in *2018 13th IEEE International Conference on Automatic Face Gesture Recognition (FG 2018)*, pp. 679–686, May 2018.
- [8] X. Lan and K. Barner, "From MRFS to CNNs: A novel image restoration method," in *2018 52nd Annual Conference on Information Sciences and Systems (CISS)*, pp. 1–5, March 2018.
- [9] X. Lan and K. Barner, "Field of experts: Optimal structured bayesian compressed sensing," in *2017 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*, pp. 1130–1134, Nov 2017.
- [10] X. Guo, L. F. Polanía, and K. E. Barner, "Group-level emotion recognition using deep models on image scene, faces, and skeletons," in *Proceedings of the 19th ACM International Conference on Multimodal Interaction, ICMI '17*, (New York, NY, USA), pp. 603–608, ACM, 2017.
- [11] S. M. Mathews, C. Kambhamettu, and K. E. Barner, "Centralized class specific dictionary learning for wearable sensors based physical activity recognition," in *Information Sciences and Systems (CISS), 2017 51st Annual Conference on*, pp. 1–6, IEEE, 2017.
- [12] S. Matiz and K. E. Barner, "Label consistent recursive least squares dictionary learning for image classification," in *Image Processing (ICIP), 2016 IEEE International Conference on*, pp. 1888–1892, IEEE, 2016.
- [13] S. M. Mathews, C. Kambhamettu, and K. E. Barner, "Maximum correntropy based dictionary learning framework for physical activity recognition using wearable sensors," in *International Symposium on Visual Computing*, pp. 123–132, Springer International Publishing, 2016.
- [14] A. Ramirez, R. Carrillo, G. Arce, K. Barner, and B. Sadler, "An overview of robust compressive sensing of sparse signals in impulsive noise," in *European Signal Processing Conference (EUSIPCO)*, (Nice, France), IEEE, Sept. 2015.
- [15] S. M. Mathews, L. F. Polania, and K. E. Barner, "Leveraging a discriminative dictionary learning algorithm for single-lead ECG classification," in *Biomedical Engineering Conference (NEBEC), 2015 41st Annual Northeast*, (Troy, NY), pp. 1–2, IEEE, Apr. 2015. doi:10.1109/NEBEC.2015.7117118.
- [16] Y. Zhou, H. Chang, K. E. Barner, and B. Parvin, "Nuclei segmentation via sparsity constrained convolutional regression," in *Biomedical Imaging (ISBI), 2015 IEEE 12th International Symposium on*, pp. 1284–1287, IEEE, Apr. 2015. doi:10.1109/ISBI.2015.7164109.

- [17] S. M. Mathews, C. Kambhamettu, and K. E. Barner, "Am I your sibling? Inferring kinship cues from facial image pairs," in *Information Sciences and Systems (CISS), 2015 49th Annual Conference on*, (Johns Hopkins University, Baltimore, MD), pp. 1–5, IEEE, Mar. 2015.
- [18] C. Duarte, P. Delmar, K. Barner, and K. Goossen, "A signal acquisition system for non-intrusive load monitoring of residential electrical loads based on switching transient voltages," in *Power Systems Conference (PSC), 2015 Clemson University*, pp. 1–6, IEEE, Mar. 2015. doi:10.1109/PSC.2015.7101707.
- [19] Y. Zhou, H. Chang, K. E. Barner, P. Spellman, and B. Parvin, "Classification of histology sections using multispectral convolution sparse coding," in *Computer Vision and Pattern Recognition (CVPR), 2014 IEEE International Conference on*, (Columbus, OH), June 2014.
- [20] Y. Fu, Z. He, C. Ren, and K. E. Barner, "A novel algorithm for long pseudo-code acquisition in spread spectrum communication system," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), May 2014.
- [21] Y. Fu, L. Feng, C. Ren, and K. E. Barner, "A joint algorithm of hopping period estimation for frequency-hopping signals," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), May 2014.
- [22] C. Ren, J. Cao, Y. Fu, and K. E. Barner, "Improved method for pulse sorting based on PRI transform," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), May 2014.
- [23] L. F. Polania and K. E. Barner, "A weighted L1 minimization algorithm for compressed sensing ECG," in *Proceedings of the 2014 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2014)*, (Florence, Italy), May 2014.
- [24] X. Guo, L. D. Lopez, Z. Yu, K. V. Steiner, K. E. Barner, T. L. Bauer, and J. Yu, "An immersive surgery training system with live streaming capability," in *Proceedings Medicine Meets Virtual Reality (MMVR) 21*, (Manhattan Beach, CA), pp. 479 – 485, Feb. 2014.
- [25] H. Chang, Y. Zhou, P. Spellman, and B. Parvin, "Stacked predictive sparse coding for classification of distinct regions in tumor histopathology," in *Computer Vision (ICCV), 2013 IEEE International Conference on*, (Sydney, Australia), pp. 169–176, Dec. 2013.
- [26] Y. Zhou, K. Liu, and K. Barner, "Non-rigid 3d shape recognition via dictionary learning," in *Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on*, (Vancouver, Canada), pp. 3502–3506, May 2013.
- [27] Y. Zhou, J. Gao, and K. Barner, "Locality preserving ksvd for nonlinear manifold learning," in *Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on*, pp. 3372–3376, May 2013.
- [28] Y. Zhou, K. Liu, J. Gao, K. E. Barner, and F. Kiamilev, "High-speed structured light scanning system and 3d gestural point cloud recognition," in *Information Sciences and Systems (CISS), 2013 47th Annual Conference on*, (Johns Hopkins University, Baltimore, MD), pp. 1–6, Mar. 2013.
- [29] X. Guo, L. D. Lopez, Z. Yu, K. V. Steiner, K. E. Barner, T. L. Bauer, and J. Yu, "A portable immersive surgery training system using GB-D sensors," in *Proceedings Medicine Meets Virtual Reality (MMVR) 20*, (San Diego, CA), pp. 161 – 167, Feb. 2013.
- [30] C. Duarte, P. Delmar, K. W. Goossen, K. E. Barner, and E. Gomez-Luna, "Non-intrusive load monitoring based on switching voltage transients and wavelet transforms," in *Future of Instrumentation International Workshop (FIIW), 2012*, (Gatlinburg, TN), pp. 1–4, Oct. 2012.

- [31] J. Gao, Y. Zhou, and K. E. Barner, "View: Visual information extraction widget for improving chart images accessibility," in *Image Processing (ICIP), 2012 19th IEEE International Conference on*, (Orlando, FL), pp. 2865–2868, Sept. 2012.
- [32] L. Polania and K. Barner, "Multi-scale dictionary learning for compressive sensing ECG," in *IEEE Digital Signal Processing and Signal Processing Education Meeting (DSP/SPE)*, (Napa Valley, CA, USA), pp. 36–41, Aug. 2013.
- [33] Y. Zhou, J. Gao, and K. E. Barner, "An enhanced sparse representation strategy for signal classification," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), Apr. 2012.
- [34] L. F. Polania, R. E. Carrillo, M. Blanco-Velasco, and K. E. Barner, "Compressive sensing exploiting wavelet-domain dependencies for ECG compression," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), Apr. 2012.
- [35] L. F. Polania, R. E. Carrillo, M. Blanco-Velasco, and K. E. Barner, "On exploiting interbeat correlation in compressive sensing-based ECG compression," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), Apr. 2012.
- [36] J. Gao, Y. Zhou, and K. E. Barner, "Classifying chart images with sparse coding," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), Apr. 2012.
- [37] H. Rueda, L. F. Polania, and K. E. Barner, "Robust tracking and anomaly detection in video surveillance sequences," in *Proceedings of the SPIE Defense, Security, and Sensing Conference*, (Baltimore, MD, USA), Apr. 2012.
- [38] R. Hu, E. Barner, Kenneth, J. Yu, and V. Steiner, Karl, "On improving the deformation and display modules of surgery simulation systems," in *38th Annual IEEE Northeast Bioengineering Conference (NEBEC)*, (Philadelphia, PA), pp. 163–164, IEEE, Mar. 2012.
- [39] L. Polania, R. Carrillo, M. Blanco-Velasco, and K. Barner, "Compressive sensing for ECG signals in the presence of electromyographic noise," in *38th Annual IEEE Northeast Bioengineering Conference (NEBEC)*, (Philadelphia, PA, USA), pp. 295–296, Mar. 2012.
- [40] R. Hu, K. Barner, and K. Steiner, "An accelerated haptic feedback algorithm utilizing volume reconstruction," in *Proceedings Medicine Meets Virtual Reality (MMVR) 19*, (Newport Beach, CA), Feb. 2012.
- [41] R. Hu, K. Barner, J. Yu, and K. Steiner, "A non-photorealistic surgery simulation system," in *Proceedings Medicine Meets Virtual Reality (MMVR) 19*, (Newport Beach, CA), Feb. 2012.
- [42] J. Gao, Y. Zhou, and K. E. Barner., "Nonvisual access to information graphics," in *Proceedings of the 23rd International Conference on Assistive Technology and Persons with Disabilities*, (San Diego, CA, USA), Feb. 2012.
- [43] L. F. Polania, R. E. Carrillo, M. Blanco-Velasco, and K. E. Barner, "Matrix completion based ECG compression," in *Proceedings of the 33rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC '11)*, (Boston, MA, USA), pp. 1757–1760, Sept. 2011.
- [44] L. F. Polania, R. E. Carrillo, M. Blanco-Velasco, and K. E. Barner, "Compressed sensing based method for ECG compression," in *Proceedings of the 2011 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2011)*, (Prague, Czech Republic), May 2011.
- [45] R. E. Carrillo and K. E. Barner, "Lorentzian based iterative hard thresholding for compressed sensing," in *Proceedings of the 2011 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2011)*, (Prague, Czech Republic), May 2011.

- [46] R. E. Carrillo, L. F. Polania, and K. E. Barner, "Iterative hard thresholding for compressed sensing with partially known support," in *Proceedings of the 2011 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2011)*, (Prague, Czech Republic), May 2011.
- [47] R. Hu, K. Steiner, and K. Barner, "Towards a GPU-based accelerated surgery simulation system," in *International Symposia on Imaging and Signal Processing in Healthcare and Technology*, (Washington D. C., USA), pp. 108 – 115, May 2011.
- [48] R. Hu, K. Steiner, and K. Barner, "On accelerating a volume-based haptic feedback algorithm," in *IEEE Virtual Reality 2011*, (Singapore), pp. 213 – 214, March 2011.
- [49] J. Gao, R. E. Carrillo, and K. E. Barner, "Image categorization for improving accessibility to information graphics," in *Proceedings of the 12th international ACM SIGACCESS conference on Computers and accessibility, ASSETS '10*, (New York, NY, USA), pp. 265–266, ACM, Oct. 2010. doi: 10.1145/1878803.1878863.
- [50] R. Carrillo, L. Polania, and K. Barner, "Iterative algorithms for compressed sensing with partially known support," in *Proceedings of the 2010 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2010)*, (Dallas, TX), pp. 3654 –3657, Mar. 2010. Print ISBN: 978-1-4244-4295-9, 4 pages, doi: 10.1109/ICASSP.2010.5495901.
- [51] R. Carrillo, T. Aysal, and K. E. Barner, "Bayesian compressed sensing using generalized cauchy priors," in *Proceedings of the 2010 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2010)*, (Dallas, TX), Mar. 2010. Print ISBN: 978-1-4244-4295-9, 4 pages, doi: 10.1109/ICASSP.2010.5495747.
- [52] I. Esnaola, R. E. Carrillo, J. Garcia-Frias, and K. E. Barner, "Orthogonal matching pursuit based recovery for correlated sources with partially disjoint supports," in *Proceedings of 2010 Conference on Information Sciences and Systems (CISS 2009)*, (Princeton, NJ), Mar. 2010. Print ISBN: 978-1-4244-7416-5, 6 pages, doi:10.1109/CISS.2010.5464901.
- [53] J. Gao, R. E. Carrillo, and K. E. Barner, "Multimodal access to information graphics: Improving information graphics understanding for people with visual impairments," in *Proceedings of the 33rd Annual RESNA Conference*, (Las Vegas, NV), June 2010.
- [54] R. Rehrig, J. Marks, S. Janansky, L. Aiello, F. Kiamile, and K. E. Barner, "Repurposing commodity hardware for use as assistive technologies," in *Proceedings of the 33rd Annual RESNA Conference*, (Las Vegas, NV), June 2010.
- [55] R. Hu, K. Steiner, and K. Barner, "A generalized haptic feedback approach for arbitrary shaped object," in *Proceedings Medicine Meets Virtual Reality (MMVR) 18*, (Los Angeles, CA, USA), pp. 224 – 230, Feb. 2010.
- [56] M. Wampole, E. Wickstrom, C.-P. Chen, D. Devadhas, Y.-Y. Jin, J. M. Sanders, J. C. Kairys, M. L. Ankeny, R. Hu, K. E. Barner, K. V. Steiner, and M. L. Thakur, "Three dimensional projection environment for molecular design and surgical simulation," in *Proceedings Medicine Meets Virtual Reality (MMVR) 18*, (Los Angeles, CA, USA), Feb. 2010.
- [57] R. Carrillo, T. C. Aysal, and K. E. Barner, "A generalized Cauchy distribution theoretical framework for problems requiring robust behavior," in *Proceedings of the Third International Workshop on Computational Advances in Multi-Sensor Adaptive Processing 2009 (CAMSAP 09)*, (Aruba, Dutch Antilles), Dec. 2009. Invited paper.
- [58] E. Guillen, D. Padilla, A. Hernandez, and K. E. Barner, "Date recognition system: Bundle rectangle approach," in *World Academy of Sciences, Engineering and Technology, Volume 58*, (Venice, Italy), Oct. 2009.

- [59] T. C. Aysal, K. E. Barner, and M. E. Yildiz, "In-network cooperative spectrum sensing," in *Proceedings of the 2009 European Signal Processing Conference (EUSIPCO'09)*, (Glasgow, Scotland), Aug. 2009.
- [60] T. Aysal and K. E. Barner, "On the convergence of perturbed non-stationary consensus algorithms," in *Proceedings of the 28th IEEE Conference on Computer Communications (INFOCOM 2009)*, (Rio de Janeiro, Brazil), Apr. 2009.
- [61] R. Carrillo, K. E. Barner, and T. Aysal, "Robust sampling and reconstruction methods for compressed sensing," in *Proceedings of the 2009 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2009)*, (Taipei, Taiwan), Apr. 2009.
- [62] R. E. Carrillo and K. E. Barner, "Iteratively re-weighted least squares for sparse signal reconstruction from noisy measurements," in *Proceedings of 2009 Conference on Information Sciences and Systems (CISS 2009)*, (Baltimore, MD), Mar. 2009.
- [63] J. Gao, R. E. Carrillo, and K. E. Barner, " LL_p metric based robust clustering," in *Proceedings of 2009 Conference on Information Sciences and Systems (CISS 2009)*, (Baltimore, MD), Mar. 2009.
- [64] E. P. G. Pinto, D. E. P. Bez, A. M. H. Acosta, and K. E. Barner, "Sistema de autenticacin biomtrica por la forma de caminar humana con aplicacin a la seguridad aeroportuaria," in *Proceedings of the Congreso Latinoamericano en Aeronutica*, (Universidad Militar Nueva Granada, Bogota, Colombia), Nov. 2008.
- [65] R. Pedada, Y. Shen, J. Li, and K. E. Barner, "Binary-output weighted median filter for binary signals," in *Proceedings of the 2008 International Conference on Image Processing, Computer Vision, and Pattern Recognition (ICCV'08)*, (Las Vegas, NV), July 2008.
- [66] B. Blanton and K. E. Barner, "Infrared region classification using texture and model-based features," in *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, (Las Vegas, NV), Apr. 2008.
- [67] R. Carrillo, T. Aysal, and K. E. Barner, "Generalized Cauchy distribution based robust estimation," in *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, (Las Vegas, NV), Apr. 2008.
- [68] S. Lu and K. E. Barner, "Weighted DCT coefficient based text detection," in *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, (Las Vegas, NV), Apr. 2008.
- [69] Y. Yuan and K. E. Barner, "Hybrid feature selection for gesture recognition using support vector machines," in *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, (Las Vegas, NV), Apr. 2008.
- [70] J. Khan, R. Adhami, S. Bhuiyan, and K. E. Barner, "Empirical mode decomposition based interest point detector," in *Proceedings of the 2008 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, (Las Vegas, NV), Apr. 2008.
- [71] Y. Yuan and K. E. Barner, "A multi-touchpad based human computer gesture interface for people with disabilities," in *Proceedings of the IASTED International Conference on Assistive Technologies (AT 2008)*, (Baltimore, MD), Apr. 2008.
- [72] B. Blanton and K. E. Barner, "Texture-based infrared image segmentation by combined merging and partitioning," in *IEEE International Conference on Image Processing (ICIP)*, (San Antonio, TX), Sept. 2007.

- [73] T. Aysal and K. E. Barner, "Robust meridian filtering," in *Proceedings of the 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, (Honolulu, Hawaii), Apr. 2007.
- [74] T. Aysal and K. E. Barner, "Decentralized estimation over noisy channels for bandwidth-constrained sensor networks," in *Proceedings of the 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, (Honolulu, Hawaii), Apr. 2007.
- [75] T. Aysal and K. E. Barner, "Decentralized estimation for bandwidth constrained sensor networks in clustered environments," in *Proceedings of the 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, (Honolulu, Hawaii), Apr. 2007.
- [76] T. Aysal and K. E. Barner, "Decentralized estimation for bandwidth constrained sensor networks in clustered environments," in *Proceedings of the 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, (Honolulu, Hawaii), Apr. 2007.
- [77] B. Weng and K. E. Barner, "Optimal and bidirectional optimal empirical mode decomposition," in *Proceedings of the 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, (Honolulu, Hawaii), Apr. 2007.
- [78] T. C. Aysal and K. E. Barner, "Despeckling utilizing M-estimators," in *IEEE International Conference on Image Processing (ICIP)*, (Atlanta, GA), Oct. 2006.
- [79] Y. Yuan and K. E. Barner, "Color image segmentation using watersheds and joint homogeneity-edge integrity region merging criteria," in *IEEE International Conference on Image Processing (ICIP)*, (Atlanta, GA), Oct. 2006.
- [80] B. Weng, T. C. Aysal, and K. E. Barner, "Polynomial weighted median predictors for image sequences," in *IEEE International Conference on Image Processing (ICIP)*, (Atlanta, GA), Oct. 2006.
- [81] M. Blanco-Velasco, F. Cruz-Roldán, J. I. Godino-Llorente, and K. E. Barner, "Embedded wavelet packets-based algorithm for ECG compression," in *Proceedings of the 2006 European Signal Processing Conference (EUSIPCO'06)*, (Florence (Italy)), Sept. 2006.
- [82] M. Blanco-Velasco, B. Weng, and K. E. Barner, "A new ECG enhancement algorithm for stress ECG tests," in *Proceedings of Computers in Cardiology*, (Valencia, Spain), Sept. 2006.
- [83] G. Xuan, S. Ghosh, S. Kim, P.-C. Lv, T. Buma, B. Weng, K. E. Barner, and J. Kolodzey, "Terahertz sensing of materials," in *Advanced Semiconductor Devices: Proceedings of the 2006 Lester Eastman Conference*, (Cornell, Ithaca, New York), Aug. 2006.
- [84] B. Weng, M. Blanco-Velasco, and K. E. Barner, "ECG denoising based on the empirical mode decomposition," in *Proceedings of 2006 IEEE International Conference of the Engineering in Medicine and Biology Society (EMBC)*, (New York, NY), Aug. 2006.
- [85] P. Chen, K. V. Steiner, and K. E. Barner, "An adaptive, deformable mass-spring model for realistic soft tissue modeling in virtual surgery simulations," in *1st Biennial National IDeA Symposium of Biomedical Research Excellence (NISBRE)*, (Washington, DC), July 2006.
- [86] B. Weng, G. Xuan, J. Kolodzey, and K. E. Barner, "Empirical mode decomposition as a tool for DNA sequence analysis from terahertz spectroscopy measurements," in *Proceedings of the IEEE International Workshop on Genomic Signal Processing and Statistics (GENSIPS)*, (College Station, TX), pp. 63–64, May 2006.
- [87] B. Weng, G. Xuan, J. Kolodzey, and K. E. Barner, "Discriminating DNA sequences from terahertz spectroscopy - a wavelet domain analysis," in *Proceedings of the Annual Northeast Bioengineering Conference*, (Easton, PA), Apr. 2006.

- [88] B. Weng, M. Blanco-Velasco, and K. E. Barner, "Baseline wander correction in ECG by the empirical mode decomposition," in *Proceedings of Annual Northeast Bioengineering Conference*, (Easton, PA), Apr. 2006.
- [89] T. C. Aysal and K. E. Barner, "Robust frequency-selective filtering using weighted sum-median filters," in *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS2006)*, (Princeton, NJ), Mar. 2006.
- [90] T. C. Aysal and K. E. Barner, "Robust polynomial filters for impulsive environments," in *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS2006)*, (Princeton, NJ), Mar. 2006.
- [91] B. Weng and K. E. Barner, "Time-varying Volterra system identification using Kalman filtering," in *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS2006)*, (Princeton, NJ), Mar. 2006.
- [92] Y. Yuan, , and K. E. Barner, "Active shape model based tactile hand shape recognition with support vector machines," in *Proceedings of the 40th Annual Conference on Information Sciences and Systems (CISS2006)*, (Princeton, NJ), Mar. 2006.
- [93] T. C. Aysal and K. E. Barner, "Stochastic and deterministic models for haptic pseudo-textures," in *Proceedings of the 2006 IEEE-VR International Symposium on Haptic Interfaces for virtual environment and teleoperator systems*, (Virginia, USA), Mar. 2006.
- [94] P. Chen, K. E. Barner, and K. V. Steiner, "A displacement driven real-time deformable model for haptic surgery simulation," in *Proceedings of the 2006 IEEE-VR International Symposium on Haptic Interfaces for virtual environment and teleoperator systems*, (Virginia, USA), Mar. 2006.
- [95] Y. Niu, Z. Hu, K. Barner, and G. R. Gao, "Performance modelling and optimization of memory access on cellular computer architecture cyclops64," in *Network and Parallel Computing: IFIP International Conference*, (Beijing, China), Springer-Verlag GmbH, Nov. 2005.
- [96] S. E. Krufka and K. E. Barner, "Automatic production of tactile graphics from scalable vector graphics," in *ACM Conference on Assistive Technologies*, (Baltimore, MD), Oct. 2005. (Best Student Paper Award recipient).
- [97] E. J. Frett and K. E. Barner, "Accuracy and frequency analysis of multitouch interfaces for individuals with parkinsonian and essential," in *ACM Conference on Assistive Technologies*, (Baltimore, MD), Oct. 2005.
- [98] P. Chen, K. E. Barner, and K. V. Steiner, "A mass-spring deformable surface model for soft tissue simulation with haptic feedback," in *Proceedings Medicine Meets Virtual Reality (MMVR) 14*, (Long Beach, California), Jan. 2006.
- [99] T. C. Aysal and K. E. Barner, "Quadratic weighted median filters for noisy image sharpening," in *Proceedings of the 2005 European Signal Processing Conference (EUSIPCO'05)*, (Antalya, Turkey), Sept. 2005.
- [100] T. C. Aysal and K. E. Barner, "Maximum likelihood estimation of higher-order statistics of gaussian and tail analysis," in *Proceedings of the 2005 European Signal Processing Conference (EUSIPCO'05)*, (Antalya, Turkey), Sept. 2005.
- [101] M. Blanco-Velasco, F. Cruz-Roldan, J. I. Godino-Llorente, and K. E. Barner, "Efficient ECG compression based on M-channel maximally decimated filter banks," in *Proceedings of the 2005 European Signal Processing Conference (EUSIPCO'05)*, (Antalya, Turkey), Sept. 2005.

- [102] P. Chen, K. Barner, and K. Steiner, "A spring-net deformable model for surgery simulation with haptic feedback," in *Proceedings of ACM SIGGRAPH 2005*, (Los Angeles, CA), ACM Press / ACM SIGGRAPH, July-August 2005.
- [103] T. C. Aysal and K. E. Barner, "Polynomial hybrid filtering," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Sapporo, Japan), May 2005.
- [104] K. E. Barner and T. C. Aysal, "Analysis of polynomial weighted median filters," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Sapporo, Japan), May 2005.
- [105] T. C. Aysal and K. E. Barner, "Spectral design of polynomial weighted median filters," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Sapporo, Japan), May 2005.
- [106] M. Shao, K. E. Barner, J. Liebman, M. H. Goodman, R. Gregg, J. Lindauer, E. Helfenbein, and S. Zhou, "A multi-step algorithm for non-invasive fetal ECG extraction," in *the 30th Annual Conference of International Society of Computerized Electrocardiology (ISCE)*, (Lihue, Kauai, HI), Apr. 2005.
- [107] T. C. Aysal and K. E. Barner, "Analysis of polynomial hybrid filtering," in *Proceedings of 2005 Conference on Information Sciences and Systems (CISS 2005)*, (Baltimore, MD), Mar. 2005.
- [108] T. C. Aysal and K. E. Barner, "Higher-order statistics of heavy-tailed distribution and their tail heaviness order," in *Proceedings of 2005 Conference on Information Sciences and Systems (CISS 2005)*, (Baltimore, MD), Mar. 2005.
- [109] B. Weng and K. E. Barner, "Closed-form wiener system identification under non-gaussian inputs," in *Proceedings of 2005 Conference on Information Sciences and Systems (CISS 2005)*, (Baltimore, MD), Mar. 2005.
- [110] S. E. Krufka and K. E. Barner, "Producing multi-level tactile edge maps from vector graphics," in *Proceeding of the CSUN International Conference on Technology and Persons with Disabilities*, (Los Angeles, CA), Mar. 2005.
- [111] K. E. Barner and T. C. Aysal, "Polynomial weighed median filtering," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.
- [112] B. Weng and K. E. Barner, "Robust frequency estimation based on trimmed correlation in impulsive environments," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.
- [113] Y. Nie, H. song Kong, and K. E. Barner, "Adaptive fuzzy filtering for removing coding artifacts in interlaced video," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.
- [114] I. R. Kim and K. E. Barner, "Wavelet domain partition-based image denoising," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.
- [115] Y. Yuan, Y. Liu, and K. E. Barner, "Tactile gesture recognition for people with disabilities," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.
- [116] Y. Lin, R. Hardie, and K. E. Barner, "Subspace partition weighted sum filters for image deconvolution," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Philadelphia, PA), Mar. 2005.

- [117] B. Wang, K. E. Barner, Y. Niu, C. Liu, and D. Lee, "Parallelizable 3D statistical reconstruction for C-arm tomosynthesis system," in *Proceeding of the SPIE International Symposium on Medical Imaging*, (San Diego, CA), Feb. 2005.
- [118] B. Wang, B. Rodricks, C. Liu, K. E. Barner, and D. Lee, "A simple edge device method for determining the pre-sampling modulation transfer function of flat field digital detectors," in *Proceeding of the SPIE International Symposium on Medical Imaging*, (San Diego, CA), Feb. 2005.
- [119] P. Thiagarajan, P. Chen, G. Gao, K. E. Barner, and K. Steiner, "Segmenting deformable surface models using haptic feedback," in *Proceeding of the Medicine Meets Virtual Reality (MMVR) 12*, (Long Beach, California), Jan. 2005.
- [120] H.-S. Kong, Y. Nie, A. Vetro, H. Sun, and K. E. Barner, "Coding artifacts reduction using edge map guided adaptive and fuzzy filtering," in *Proceedings of the IEEE International Conference on Multimedia & Expo (ICME)*, (Taipei, Taiwan), June 2004.
- [121] Y. Shen and K. E. Barner, "Fast optimization of weighted vector median filters," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Montreal, Quebec, Canada), May 2004.
- [122] Y. Nie and K. E. Barner, "Fuzzy LUM filters," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Montreal, Quebec, Canada), May 2004.
- [123] G. R. Arce, K. E. Barner, and L. Ma, "Median RED gateways for congestion control," in *Proceeding of 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2004)*, (Montreal, Quebec, Canada), May 2004.
- [124] P. Chen and K. E. Barner, "Three-dimensional multi-resolution statistical reconstruction for tomosynthesis," in *Proceedings of the 2004 IEEE International Symposium on Biomedical Imaging*, (Arlington, VA), Apr. 2004.
- [125] B. Wang, K. E. Barner, and D. Lee, "Slice based unconstrained cone beam tomosynthesis," in *Proceedings of the 2004 IEEE International Symposium on Biomedical Imaging*, (Arlington, VA), Apr. 2004.
- [126] Y. Shen and K. E. Barner, "Optimization of fuzzy vector median filter for color image denoising," in *Proceedings of the 38th Annual Conference on Information Sciences and Systems (CISS2003)*, (Princeton, New Jersey), Mar. 2004.
- [127] I. Kim and K. E. Barner, "Wavelet image denoising with multiresolution edge detection," in *Proceedings of the 38th Annual Conference on Information Sciences and Systems (CISS2003)*, (Princeton, New Jersey), Mar. 2004.
- [128] L. Ma, K. E. Barner, and G. R. Arce, "Statistical analysis of TCP's retransmission timeout algorithm," in *Proceedings of the 38th Annual Conference on Information Sciences and Systems (CISS2003)*, (Princeton, New Jersey), Mar. 2004.
- [129] Y. Nie and K. E. Barner, "Microarray image segmentation using fuzzy transformation," in *Proceedings of the 38th Annual Conference on Information Sciences and Systems (CISS2003)*, (Princeton, New Jersey), Mar. 2004.
- [130] B. Wang, K. E. Barner, and D. Lee, "Fast reconstruction for unconstrained cone beam tomosynthesis," in *Proceedings of the SPIE International Symposium on Medical Imaging 2004*, (San Diego, CA), Feb. 2004.
- [131] B. Wang, K. E. Barner, and D. Lee, "An adapted tomosynthesis with algebraic reconstruction technique," in *Proceedings of the SPIE International Symposium on Medical Imaging 2004*, (San Diego, CA), Feb. 2004.

- [132] Y. Nie and K. E. Barner, "Fuzzy transformation and its applications," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Barcelona, Spain), Sept. 2003.
- [133] M. Shao and K. E. Barner, "Soft-partition-based weighted sum filters for image enhancement," in *Proceedings of the IEEE International Conference on Multimedia & Expo (ICME)*, (Baltimore, MD), July 2003.
- [134] Y. Shen and K. E. Barner, "Surface denoising with directional fuzzy vector median filtering," in *Proceedings of the IEEE International Conference on Multimedia & Expo (ICME)*, (Baltimore, MD), July 2003.
- [135] Y. Nie and K. E. Barner, "Optimized fuzzy transformation for image deblocking," in *Proceedings of the IEEE International Conference on Multimedia & Expo (ICME)*, (Baltimore, MD), July 2003.
- [136] P. Chen and K. Barner, "Maximum likelihood reconstruction for tomosynthesis," in *Proceedings of the 29th Northeast Bioengineering Conference*, (Newark, NJ), Mar. 2003.
- [137] B. Wang and K. E. Barner, "ART based high quality and fast tomosynthesis," in *Proceedings of the 29th Northeast Bioengineering Conference*, (Newark, NJ), Mar. 2003.
- [138] Y. Shen and K. E. Barner, "Fuzzy vector median based surface smoothing in a haptic environment," in *Proceedings of 11th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, (Los Angeles, CA), Mar. 2003.
- [139] P. Chen and K. Barner, "Maximum likelihood tomosynthesis," in *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS2003)*, (Baltimore, MD), Mar. 2003.
- [140] Y. Nie and K. E. Barner, "Noisy image sharpening using fuzzy weighted median filter," in *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS2003)*, (Baltimore, Maryland), Mar. 2003.
- [141] Y. Shen and K. E. Barner, "Marginal fuzzy median and fuzzy vector median filtering of color images," in *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS2003)*, (Baltimore, MD), Mar. 2003.
- [142] B. Wang and K. E. Barner, "Unconstrained cone beam tomosynthesis," in *Proceedings of the 37th Annual Conference on Information Sciences and Systems (CISS2003)*, (Baltimore, MD), Mar. 2003.
- [143] Y. Nie and K. E. Barner, "The output distribution of fuzzy weighted median filter," in *Proceedings of the 45th IEEE Midwest Symposium on Circuit and System (MWSCAS02)*, (Tulsa, Oklahoma), Aug. 2002.
- [144] Y. Nie and K. E. Barner, "Fuzzy weighted median filters," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (Orlando, Florida), May 2002.
- [145] Y. Nie, K. E. Barner, and J. Paredes, "A general colored ordering structure of samples for signal filtering," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [146] W. An and K. E. Barner, "A fuzzy extension to RCRS filters," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [147] S. Hernandez and K. E. Barner, "Color image segmentation using watersheds and joint region merging criteria," in *Proceedings of the IEEE-EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.

- [148] M. D. Aguirre and K. E. Barner, "Graph implementations of multiresolution permutation filters," in *Proceedings of the IEEE–EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [149] E. Thompson, R. C. Hardie, and K. E. Barner, "Hybrid order statistic filter (HOS) and its application to image restoration," in *Proceedings of the IEEE–EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [150] M. Shao and K. E. Barner, "Optimization of partition based weighted sum filters," in *Proceedings of the IEEE–EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [151] A. Nayak, K. E. Barner, and D. Lau, "Optimal halftoning for tactile imaging," in *Proceedings of the IEEE–EURASIP Nonlinear Signal and Image Processing (NSIP) Workshop*, (Baltimore, MD), June 2001.
- [152] D. Ramanan and K. E. Barner, "Nonlinear image interpolation through extended permutation rank selection filters," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Vancouver, Canada), Sept. 2000.
- [153] S. Hernandez and K. E. Barner, "Tactile imaging using watershed-based image segmentation," in *Proceedings of the The Fourth International ACM SIGCAPH Conference on Assistive Technologies ASSETS 2000*, (Washington, D.C.), Oct. 2000.
- [154] S. Hernandez and K. E. Barner, "Joint region merging criteria for watershed-based image segmentation," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Vancouver, Canada), Sept. 2000.
- [155] M. Aguirre and K. E. Barner, "Multiresolution permutation filters based on decision trees," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Vancouver, Canada), Sept. 2000.
- [156] M. Shao, K. E. Barner, and M. Goodman, "An interference cancellation algorithm for non-invasive extraction of TaFEEG," in *Proceedings of the 22nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, (Chicago, IL), July 2000.
- [157] M. Shao, K. E. Barner, and M. Goodman, "Partition-based weighted sum filter with joint optimization of vector space partitioning and filtering," in *Proceedings of the 2000 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 2000.
- [158] S. Hernandez and K. E. Barner, "Fast bivariate region merging for watershed-based image segmentation," in *Proceedings of the 2000 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 2000.
- [159] M. Aguirre and K. E. Barner, "LNE optimization of acyclic connected graph implementations of permutation filters," in *Proceedings of the 2000 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 2000.
- [160] D. Ramanan and K. E. Barner, "Rank-based interpolation of quinqux sub-sampled images," in *Proceedings of the 2000 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 2000.
- [161] N. Grabowski and K. E. Barner, "Structurally-derived sounds in a haptic rendering system," in *Proceedings of the PHANToM User's Group Workshop*, (Boston, MA), Oct. 1999.
- [162] R. P. Schumeyer and K. E. Barner, "Chain coding of picture quantization values," in *Invited paper, IEEE Sarnoff Symposium on Advances in Wired and Wireless Communications*, (The College of New Jersey, Newark, NJ), Mar. 1999.

- [163] M. W. Ashgar and K. E. Barner, "Multiresolution representation of data in a haptic environment," in *Proceedings of Photonics East '98 - the SPIE's International Symposium on Intelligent Systems and Advanced Manufacturing*, (Boston, MA), Nov. 1998.
- [164] N. Grabowski and K. E. Barner, "Visualization methods for the blind using force feedback and sonification," in *Proceedings of Photonics East '98 - the SPIE's International Symposium on Intelligent Systems and Advanced Manufacturing*, (Boston, MA), Nov. 1998.
- [165] N. Grabowski, M. W. Asghar, and K. E. Barner, "Joint haptic and aural methods for data visualization," in *Proceedings of the 21st Annual RESNA Conference*, (Minneapolis, MN), June 1998.
- [166] D. B. Loyd, S. Schragger, and K. E. Barner, "Scientific instrumentation access for students with disabilities," in *Proceedings of the 21st Annual RESNA Conference*, (Minneapolis, MI), June 1998.
- [167] R. P. Schumeyer and K. E. Barner, "Perception based selection of video coding parameters," in *Proceedings of the 1998 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 1998.
- [168] J. Siddique and K. E. Barner, "Wavelet-based multiresolution edge detection utilizing gray level edge maps," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Chicago, IL), Oct. 1998.
- [169] J. Siddique and K. E. Barner, "Nonlinear image decomposition for multiresolution edge detection," in *Proceedings of the 1998 Conference on Information Sciences and Systems (CISS)*, (Princeton, NJ), Mar. 1998.
- [170] R. P. Schumeyer and K. E. Barner, "Fast color-based content coding for sign language video," in *Proceedings of the Visual Communications and Image Processing (VCIP) Conference*, (San Jose, CA), Jan. 1998.
- [171] K. E. Barner, "Colored L - ℓ filters with applications to speech pitch detection," in *Proceedings of the 1997 IEEE EURASIP Workshop on Nonlinear Signal and Image Processing*, (Mackinac Island, Michigan), Sept. 1997.
- [172] R. A. Dosari, R. C. Hardie, A. Sarhan, and K. E. Barner, "Multichannel nonlinear filters for signal restoration," in *Proceedings of the National Aerospace and Electronics Conference*, (Dayton, OH), July 1997.
- [173] T. P. Way and K. E. Barner, "TACTICS: A tactile image creation system," in *Proceedings of the 20th Annual RESNA Conference*, (Pittsburgh, PA), June 1997.
- [174] A. Phalangus, K. E. Barner, and A. Joyce, "A preliminary investigation of a lipreading tool intended for a regular educational classroom setting," in *Proceedings of the 20th Annual RESNA Conference*, (Pittsburg, PA), June 1997.
- [175] T. Hammer and K. E. Barner, "A model science, engineering, and mathematics program for high school students with disabilities," in *Proceedings of the 20th Annual RESNA Conference*, (Pittsburg, PA), June 1997.
- [176] R. Schumeyer, E. A. Heredia, and K. E. Barner, "Region of interest priority coding for sign language videoconferencing," in *Proceedings of the First IEEE Workshop on Multimedia Signal Processing*, (Princeton, NJ), June 1997.
- [177] A. Flaig, G. R. Arce, and K. E. Barner, "Affine order statistic filters: A data-adaptive filtering framework for nonstationary signals," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (Munich, Germany), Apr. 1997.

- [178] J. P. Fritz and K. E. Barner, "Stochastic models for haptic textures," in *Proceedings of Photonics East '96 - the SPIE's International Symposium on Intelligent Systems and Advanced Manufacturing*, (Boston, MA), Nov. 1996.
- [179] K. E. Barner, "Nonlinear estimation of DEGG signals with applications to speech pitch detection," in *Proceedings of the Fourth International Conference on Spoken Language Processing (ICSLP)*, (Philadelphia, PA), Oct. 1996.
- [180] R. Schumeyer and K. E. Barner, "On audio and visual information in human speech recognition of normal and dysarthric speakers with applications to multimodal automatic speech recognition," in *Proceedings of the Fourth International Conference on Spoken Language Processing (ICSLP)*, (Philadelphia, PA), Oct. 1996.
- [181] J. P. Fritz and K. E. Barner, "Haptic scientific visualization," in *Proceedings of the PHANToM User's Group Workshop*, (Boston, MA), Sept. 1996.
- [182] T. P. Way and K. E. Barner, "Towards automatic generation of tactile graphics," in *Proceedings of the 19th RESNA Conference*, (Salt Lake City, Utah), June 1996.
- [183] J. P. Fritz and K. E. Barner, "Design of a haptic graphic system," in *Proceedings of the 19th RESNA Conference*, (Salt Lake City, Utah), June 1996.
- [184] K. E. Barner, R. Howell, and R. Mahoney, "Telementoring and collaborative learning for students with disabilities," in *Proceedings of the 19th RESNA Conference*, (Salt Lake City, UT), June 1996.
- [185] J. P. Fritz, T. P. Way, and K. E. Barner, "Haptic representation of scientific data for visually impaired or blind persons," in *Proceedings of the Eleventh Annual Technology and Persons with Disabilities (CSUN) Conference*, (California State University, Northridge, Los Angeles, CA), Apr. 1996.
- [186] Q. Xu, J. Sun, T. Rahman, and K. E. Barner, "Some control strategies for tremor suppression," in *Proceedings of the 2nd Annual Alfred I. duPont Institute Orthopedic Research Symposium*, (Wilmington, DE), 1996.
- [187] J. G. Gonzalez, E. A. Heredia, T. Rahman, K. E. Barner, S. K. Basu, and G. R. Arce, "A new approach to suppressing abnormal tremor through signal equalization," in *Proceedings of the 18th RESNA Conference*, (Vancouver, BC, Canada), 1995.
- [188] J. G. Gonzalez, E. A. Heredia, T. Rahman, K. E. Barner, S. K. Basu, and G. R. Arce, "Filtering involuntary motion of people with tremor disability using optimally designed equalizers," in *Invited paper in the Proceedings of the IEEE International Conference on Systems, Man and Cybernetics*, (Vancouver, BC, Canada), 1995.
- [189] J. G. Gonzalez, E. A. Heredia, T. Rahman, K. E. Barner, and G. R. Arce, "A customized filter design for eliminating operator's tremor," in *Proceedings of the Telem manipulator and Telepresence Technologies II Conference, SPIE's International Symposium on Intelligent Systems and Advanced Manufacturing*, (Philadelphia, PA), 1995.
- [190] K. E. Barner and R. C. Hardie, "Extended permutation filters and their application to image edge enhancement," in *Proceedings of the IEEE International Conference on Image Processing (ICIP)*, (Washington, D.C.), Oct. 1995.
- [191] R. C. Hardie and K. E. Barner, "Extended permutation filters and their application to edge enhancement," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (Detroit, MI), May 1995.
- [192] M. Sahran, R. C. Hardie, and K. E. Barner, "Partition based adaptive estimation of single response evoked potentials," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (Detroit, MI), May 1995.

- [193] K. E. Barner and J. A. Gallant, "Nonlinear estimation of EGG signals with applications to speech pitch detection," in *Proceedings of the 16th Annual IEEE-EMBS International Conference*, (Baltimore, Maryland), Nov. 1994.
- [194] H. T. Bunnall, D. Yarrington, and K. E. Barner, "Page control in diphone synthesis," in *Proceedings of the Second ESCA/IEEE Workshop on Speech Synthesis*, (New Paltz, NY), Sept. 1994.
- [195] R. C. Hardie, K. E. Barner, and A. Sarhan, "Selection filters for signal restoration," in *Proceedings of the National Aerospace and Electronics Conference*, (Dayton, OH), May 1994.
- [196] K. E. Barner, R. C. Hardie, and G. R. Arce, "On the permutation and quantization partitioning of \mathbf{R}^N and the filtering problem," in *Proceedings of the 1994 Conference on Information Sciences and Systems (CISS)*, (Princeton, New Jersey), Mar. 1994.
- [197] T. A. Hall, K. E. Barner, and G. R. Arce, "Permutation weighted order statistic filters," in *Proceedings of the 1993 Conference on Information Sciences and Systems (CISS)*, (John Hopkins University, Baltimore, MD), Mar. 1993.
- [198] R. C. Hardie and K. E. Barner, "Rank conditioned rank selection filters for signal restoration," in *Proceedings of the 1993 Conference on Information Sciences and Systems (CISS)*, (John Hopkins University, Baltimore, MD), Mar. 1993.
- [199] K. E. Barner and G. R. Arce, "Permutation filters: A class of nonlinear filters based on set permutations," in *Proceedings of the 1992 Conference on Information Sciences and Systems (CISS)*, (Princeton University, Princeton, NJ), Mar. 1992.
- [200] K. E. Barner, "C-stack filters," in *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, (Toronto, Canada), May 1991.
- [201] K. E. Barner and G. R. Arce, "Optimal detection methods for the restoration of images degraded by signal depended noise," in *Proceedings of the SPIE Symposium on Advances in Intelligent Robotic Systems*, (Philadelphia, PA), Oct. 1990.
- [202] K. E. Barner and G. R. Arce, "Optimal detection schemes for the restoration of images with signal depended noise," in *Proceedings of the Midwest Symposium on Circuits and Systems*, (Chicago, IL), Aug. 1990.
- [203] K. E. Barner, J. H. Lin, and G. R. Arce, "On the performance of stack filters and vector detection in image restoration," in *Proceedings of the SPIE Symposium on Electronic Imaging Science and Technology*, (Santa Clara, CA), Feb. 1990.
- [204] K. E. Barner and L. A. Pearlstein, "Two new methods for adaptive pre-equalization," in *Proceedings of the 1988 Conference on Information Sciences and Systems (CISS)*, (Johnson Hopkins University, Baltimore, MD), Mar. 1988.
- [205] H. E. Barner, H. Beisswenger, and K. E. Barner, "Chemical equilibrium relationships applicable in fluid bed combustion," in *Proceedings of the International Conference on Fluid Bed Combustion*, (Boston, MA), 1987.