

## Dr. Tanja Karp

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### Professional Experience

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<i>Associate Professor</i>	Fall 2006 - present
Texas Tech University, Department of Electrical and Computer Engineering	
<i>Fulbright Program Adviser</i>	2011 - 2013
Texas Tech University	
<i>Faculty Development Leave (Sabbatical)</i>	2007/2008
Ecole Supérieure d'Electricité (SUPELEC), Laboratoire des Signaux et Systèmes, Gif-sur-Yvette, France	
<i>Assistant Professor</i>	Fall 2000 - Summer 2006
Texas Tech University, Department of Electrical and Computer Engineering	
<i>Visiting Professor</i>	Summers 2001- 2007
Institute for Computer Engineering, University of Mannheim, Germany	
<i>Visiting Senior Researcher</i>	Summer 2001
School of Electrical, Computer, and Telecommunications Engineering, University of Wollongong, Australia	
<i>Post-Doctoral Research and Teaching Associate</i>	1997 - 2000
Institute for Computer Engineering, University of Mannheim, Germany	
<i>Guest Lecturer</i>	1998 - 2000
University of Freiburg, Germany	
<i>Research Scientist</i>	1993 - 1996
Hamburg University of Technology, Germany	

### Education

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Ph.D. in Electrical Engineering, Hamburg University of Technology, Germany	1997
M.S. in Electrical Engineering, Hamburg University of Technology, Germany	1993

### External Honors and Awards

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INSIGHT Into Diversity - Inspiring Women in STEM Award	2015
Scholarship recipient of Informal Science Education Association (ISEA) of Texas	2013
Hewlett-Packard /Harriett B. Rigas Award, IEEE Education Society	2012
Emerging Community Engagement Scholar	2012

### Texas Tech Honors and Awards

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Texas Tech Teaching Academy Member	since 2011
Service Learning Mentor	since 2010
Service Learning Fellow	since 2009
Chancellor's Council Distinguished Educator Award	2015
President's Excellence in Teaching Award	2015
TTU Integrated Scholar	2014
Butler Distinguished Educator Fellow, Whitacre College of Engineering	2012-2014
Honored Participant, 26th Annual Faculty Academic Contributions Exhibit, Seeds of Knowledge	2010
The Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award	2009
Spencer A. Wells Creativity in Teaching Award, Texas Tech Parent Association	2006
George T. & Gladys Abell Hanger Faculty Teaching Award	2006

The Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award	2003
Texas Tech Student Branch of the IEEE Outstanding Faculty Award	2002

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### Societies

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Institute of Electrical and Electronic Engineers (IEEE), Senior Member (Signal Processing Society, Communications Society, Information Theory Society, Education Society)  
 Society of Women Engineers (SWE), Member and Faculty Advisor of TTU Student Section of SWE  
 American Society for Engineering Education (ASEE), Informal Science Education Association of Texas (2013), and Science Teacher Association of Texas (2014)

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### Publications

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#### *DISSERTATION (PUBLISHED AS A BOOK)*

**T. Karp**, *Modifizierte DFT Filterbänke*, VDI Fortschritt-Berichte, Reihe 10, Nr. 484, VDI Verlag, Düsseldorf, ISBN 3-18-348410-2.

#### *REFEREED JOURNAL PUBLICATIONS*

1. **T. Karp**, R. Gale, M. Tan, and G. Burnham. Hosting a Pipeline of K-12 Robotics Competitions at a College of Engineering – A Review of Benefits and Challenges. *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship, Special Issue: University Engineering Programs That Impact Communities: Critical Analyses and Reflections*, pp. 406–423, Fall 2014.
2. P. Maloney, L. Dent, and **T. Karp**. A New Method of Assessing the Effects of a Service-Learning Class on Engineering Undergraduate Students. *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship, Special Issue: Opportunities and Barriers to Integrating Service Learning into Engineering Education*, pp. 29–47, Fall 2013.
3. **T. Karp** and P. Maloney. Exciting Young Students in Grades K-8 About STEM Through an Afterschool Robotics Challenge. *American Journal of Engineering Education – Spring 2013 Special Edition*, vol. 4, issue 1, pp. 39-54, 2013.
4. D. Nair, R. Gale, and **T. Karp**. Total Ionizing Dose Effects on Data Retention Capabilities of Battery-Backed CMOS SRAM. *IEEE Transactions on Nuclear Science*, issue 99, pp. 1-6, May 2013.
5. S. Lee, S. Ghanta, and **T. Karp**. Comparative Study of Retrospective Methods to Reduce Non-uniform Illumination Effects to Bridge coating. *Automation in Construction*, Elsevier, vol. 22, pp. 537-544, March 2012.
6. **T. Karp**, R. Gale, L. Lowe, V. Medina, E. Beutlich. Generation NXT: Building Young Engineers with LEGO's, *IEEE Transactions on Education, Special Issue on Outreach to Prospective Electrical, Electronic, and Computer Engineering Students*, vol. 53, issue 1, pp. 80-87, February 2010.
7. **T. Karp**, M. Kieffer, and P. Duhamel. Parity-Check Matrix Calculation for Paraunitary Oversampled DFT Filter Banks, *IEEE Trans. on Signal Processing*, vol. 56, issue 10, pp. 5277-5283, October 2008.
8. **T. Karp**. Fixed Wordsize Implementation of Lifting Schemes, *EURASIP Journal on Applied Signal Processing, Special Issue on Multirate Systems and Applications*, Article ID 13754, 5 pages, 2007.
9. J. Guo, S. Mitra, B. Nutter and **T. Karp**. Backward Coding of Wavelet Trees with Fine-grained Bitrate Control, *Academy Publisher Journal on Computers*, vol. 1, issue 4, 7 pages, July 2006.
10. Y. Sriraja and **T. Karp**. A Packetized SPIHT Algorithm with Overcomplete Wavelet Coefficients for Increased Robustness, *EURASIP Journal on Applied Signal Processing, Special Issue on Frames and Overcomplete Representations in Signal Processing, Communications, and Information Theory*, vol. 2006, article ID 19156, 8 pages, 2006.

11. R. B. Casey and **T. Karp**. Performance Analysis and Prototype Filter Design for Perfect-Reconstruction Cosine-Modulated Filter Banks with Fixed-Point Implementation, *IEEE Trans. on Circuits and Systems II*, vol. 52, issue 8, pp. 452-456, August 2005.
12. **T. Karp**, S. Trautmann, and N. J. Fliege. Zero-Forcing Frequency-Domain Equalization for Generalized DMT Transceivers with Insufficient Guard Interval, *EURASIP Journal on Applied Signal Processing, Special Issue on Multicarrier Communications and Signal Processing*, vol. 2004, issue 10, pp. 1446-1459, 2004.
13. A. Mertins and **T. Karp**. Modulated Perfect Reconstruction Filterbanks with Integer Coefficients, *IEEE Trans. on Signal Processing*, vol. 50, issue 6, pp. 1398-1408, June 2002.
14. **T. Karp**, A. Mertins, and G. Schuller. Efficient Biorthogonal Cosine-Modulated Filter Banks, *Signal Processing*, vol. 81, issue 5, pp. 997-1016, May 2001.
15. J. Kliewer, **T. Karp**, and A. Mertins. Processing Arbitrary-Length Signals with Linear-Phase Cosine-Modulated Filter Banks, *Signal Processing*, vol. 80, issue 8, pp. 1515-1533, August 2000.
16. G. Schuller and **T. Karp**. Modulated Filter Banks with Arbitrary System Delay: Efficient Implementations and the Time-Varying Case, *IEEE Trans. on Signal Processing*, vol. 48, issue 3, pp. 737-748, March 2000.
17. **T. Karp** and N. J. Fliege. Modified DFT Filter Banks with Perfect Reconstruction, *IEEE Trans. on Circuits and Systems II*, vol. 46, issue 11, pp. 1404-1414, November 1999.
18. P. N. Heller, **T. Karp**, and T. Q. Nguyen. A General Formulation of Modulated Filter Banks, *IEEE Trans. on Signal Processing*, vol. 47, issue 4, pp. 986-1002, April 1999.
19. K. Gosse, **T. Karp**, F. Moreau de Saint-Martin, P. Duhamel, and A. Mertins. MMSE Design of Modulated and Tree-Structured Filter Banks for Efficient Tradeoffs between Rate, Distortion and Decoder Complexity, *IEEE Trans. on Circuits and Systems II, Special Issue on Filter Banks and Wavelets*, vol. 45, issue 8, pp. 1044-1056, August 1998.

#### REFEREED ARTICLES IN CONFERENCE PROCEEDINGS

1. T. Dallas, **T. Karp**, B. S. Nutter, Y.-C. Lie, R. O. Gale, R. Cox, and S. B. Bayne. University-Industry Partnerships in Semiconductor Engineering. *121<sup>st</sup> ASEE Annual Conference & Exposition*, paper ID #9363, 13 pages, Indianapolis, IN, June 2014.
2. **T. Karp**. Work in Progress: Serving Rural Communities - A K-8 LEGO Robotics Case Study. *IEEE/ASEE Frontiers in Education Conference*, pp. 1-2, Seattle, WA, October 2012.
3. R. Gale, **T. Karp**, and H. Gesch. Work in Progress: International Experience in Semiconductor Product Engineering. *IEEE/ASEE Frontiers in Education Conference*, pp. 1-2, Seattle, WA, October 2012.
4. D. Nair, R. Gale, and **T. Karp**. Total Ionizing Dose Effects on Data Retention Capabilities of CMOS SRAMs. Proc. *IEEE RADIATION Effects on Components and Systems Conference*, Biarritz, France, September 2012.
5. E. Briggs, **T. Karp**, B. Nutter, and D. McLane. A System Architecture for Real-Time Multi-Path MIMO Fading Channel Emulation. *SDR Wireless Innovation Communications Conference 2012 Europe*, Brussels, June 2012.
6. **T. Karp** and A. Schneider. Evaluation of a K-8 LEGO Robotics Program. *IEEE/ASEE Frontiers in Education Conference*, pp. T1D 1-6, Rapid City, SD, USA, October 2011.
7. **T. Karp**. Teaching a Service Learning Introductory Engineering Course - Lessons Learned and Improvements Made. *IEEE/ASEE Frontiers in Education Conference*, pp. F1E 1-5, Rapid City, SD, USA, October 2011.
8. E. Levy, M. Tan, R. Gale, **T. Karp**, and A. Barhorst. Affordable K-12 Robotics Programs. *IEEE/ASEE Frontiers in Education Conference*, pp. S1D 1-5, Rapid City, SD, USA, October 2011.

9. S. Ghanta, **T. Karp**, and S. Lee. Wavelet Domain Detection of Rust in Steel Bridge Images. *IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 1033-1036, Prague, Czech Republic, May 2011.
10. Y. Yang, **T. Karp**, D. Nair, and R. Gale. Expanding the Capability of a Memory Tester, *International Conference on Test and Measurement*, Phuket, Thailand, December 2010.
11. **T. Karp** and R. Gale. Sustainability of K-12 Engineering Outreach Activities beyond the Grant Period, *IEEE/ASEE Frontiers in Education Conference*, 5 pages, San Antonio, TX, USA, October 2009.
12. S. Mitra, M. O'Boyle, F. Afrin, B. Nutter, M. Baker, R. Pal, B. Ghosh, **T. Karp**. Generating Structure-function Correlation ICA- based Mapping of Activation Patterns on Coregistered fMRI and FA-DTI, *42nd Asilomar Conference on Signals, Systems and Computers*, 4 pages, Pacific Grove, CA, USA, October 2008.
13. **T. Karp**, M. Kieffer, and P. Duhamel. Oversampled DFT Filter Banks for Error Correction Coding, *EURASIP European Signal Processing Conference*, 5 pages, Lausanne, Switzerland, August 2008.
14. E. Corona, B. Nutter, S. Mitra, J. Guo, and **T. Karp**. Efficient Random Access High Resolution Region-of-Interest (ROI) Image Retrieval Using Backward Coding of Wavelet Trees (BCWT), *SPIE Medical Imaging / Image Processing Conference*, vol. 6914 (3), pp. 69142M.1-69142M.10, San Diego, California, USA, March 2008.
15. R. Gale, **T. Karp**, L. Lowe, and V. Medina. Generation NXT, *IEEE Meeting the Growing Demand for Engineers and Their Educators 2010-2020 International Summit*, 13 pages, Munich, Germany, November 2007.
16. E. Corona, J. Guo, S. Mitra, B. Nutter, and **T. Karp**. Random Access Region of Interest in Backward Coding of Wavelet Trees, *IEEE Information Theory Workshop*, pp. 5-15, Lake Tahoe, CA, USA, September 2007.
17. M. C. Baker, M. Saed, **T. Karp**, and B. Nutter. The Development of a Project-Oriented Freshman Course in Electrical and Computer Engineering, *ASEE Gulf Southwest Section Meeting*, South Padre Island, TX, USA, March 2007.
18. J. Guo, S. Mitra, **T. Karp**, and B. Nutter. A Resolution- and Rate- Scalable Image Subband Coding Scheme with Backward Coding of Wavelet Trees, *IEEE Asia Pacific Conference on Circuits and Systems*, pp. 443-446, Singapore, December 2006.
19. L. Ye, J. Guo, **T. Karp**, S. Mitra, and B. Nutter. Three-Dimensional Subband Coding of Video with 3-D BCWT, *40th Annual Asilomar Conference on Signals, Systems, and Computers*, pp. 401-405, Pacific Grove, CA, USA, November 2006.
20. M. C. Baker and **T. Karp**. Work In Progress - WE CAN: Introducing High School Girls to Electrical Engineering, *36th Annual Frontiers in Education Conference*, pp. MIC 1-2, San Diego, CA, USA, October 2006.
21. R. B. Casey and **T. Karp**. Blind Equalization of 8-PSK Signals Aired in the High-Frequency Band, *IEEE 12th Digital Signal Processing Workshop*, pp. 88-93, Grand Teton National Lodge, WY, USA, September 2006.
22. **T. Karp** and M. C. Baker. Women in Engineering: Curriculum, Applications and Networking (WE CAN), *IEEE 4th Signal Processing Education Workshop*, pp. 117-122, Grand Teton National Lodge, WY, USA, September 2006.
23. J. Guo, S. Mitra, B. Nutter, and **T. Karp**. An Efficient Image Codec Based on Backward Coding of Wavelet Trees, *Southwest Symposium on Image Analysis and Interpretation*, pp. 233-237, Denver, CO, USA, March 2006.
24. B. Nutter, and **T. Karp**. Developing a Course on Digital Signal Processing Applications, *ASEE Gulf-Southwest Annual Conference*, paper #75, pp. 1-8, Baton Rouge, LA, USA, March 2006.

25. J. Guo, S. Mitra, B. Nutter, and **T. Karp**. A Fast and Low Complexity Image Codec Based on Backward Coding of Wavelet Trees, *Data Compression Conference*, pp. 292-301, Snowbird, UT, USA, March 2006.
26. Y. Sriraja and **T. Karp**. Error Protection of Packetized SPIHT Bit Streams for Image Transmission Over Noisy Channels, *39th Asilomar Conference on Signals, Systems and Computers*, pp. 864 - 868, Pacific Grove, CA, USA, November 2005.
27. Y. Sriraja, S. Krishnamurthy, and **T. Karp**. Multiple Description Wavelet Image Coding for Reliable Delivery and QoS Maintenance, *First International Conference on Multimedia Services Access Networks*, pp. 54-58, Orlando, FL, USA, June 2005.
28. **T. Karp**, C. Bauer, and N. J. Fliege. Optimal One-Tap Equalization for DMT Transceivers with Insufficient Guard Interval, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 3, pp. 881-884, Philadelphia, PA, USA, March 2005.
29. K. Krogsgaard and **T. Karp**. Fast Identification of Primitive Polynomials Over Galois Fields: Results from a Course Project, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 5, pp. 553-556, Philadelphia, PA, USA, March 2005.
30. Y. Sriraja, **T. Karp**, and S. Mitra. Error-Resilient Wavelet Coding for Wireless Image Transmission, *Wireless Networking Symposium*, Austin, TX, USA, October 2004.
31. R. B. Casey and **T. Karp**. Fixed-Point Prototype-Design for Biorthogonal Modulated Filter Banks, *IEEE 11th Digital Signal Processing Workshop*, pp. 39-43, Taos Ski Valley, NM, USA, August 2004.
32. **T. Karp**, C. Bauer, and N. J. Fliege. Initialization and Bitloading of Discrete Multi-Tone Transceivers for Channels with Unknown Impulse Response Length, *IEEE 11th Digital Signal Processing Workshop*, pp. 196-200, Taos Ski Valley, NM, USA, August 2004.
33. B. S. Nutter, **T. Karp**, and S. Mitra. Use of the Texas Instruments DSP Starter Kit (DSK) in Electrical Engineering Education, *ASEE Gulf-Southwest Annual Conference*, paper #51, pp. 1-7, Lubbock, TX, USA, March 2004.
34. M. J. Wolf, C. Bauer, and **T. Karp**. A New Phenomenon Observed in Connection with Determining the FEQ of DMT Transceivers with Insufficient Guard Interval, *First International Symposium on Control, Communications and Signal Processing*, pp. 389-392, Hammamet, Tunisia, March 2004.
35. J. Kliewer and **T. Karp**. Clipping Error Resilience for Peak Power-constrained DMT Transmission via Implicit Frequency Domain Redundancy, *IEEE International Symposium on Signal Processing and Its Applications*, vol. 2, pp. 379-382, Paris, France, July 2003.
36. **T. Karp**, M. J. Wolf, S. Trautmann, and N. J. Fliege. Zero-Forcing Frequency Domain Equalization for DMT Systems with Insufficient Guard Interval, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 4, pp. 221-224, Hong Kong, China, April 2003.
37. R. Kumar, S. Mitra, **T. Karp**, and B. S. Nutter. Adaptive Wavelet Filter Design for Optimized Image Source Encoding. *IEEE International Conference on Information Technology: Coding and Computing*, pp. 478-482, Las Vegas, NV, USA, April 2003.
38. **T. Karp**, S. Trautmann, and N. J. Fliege. Frequency Domain Equalization of DMT/OFDM Systems with Insufficient Guard Interval, *IEEE International Conference on Communications*, vol. 3, pp. 1646-1650, New York City, NY, USA, April 2002.
39. **T. Karp** and A. Mertins. Perfect-Reconstruction Biorthogonal Cosine-Modulated Filter Banks with Fixed-Point Arithmetic, *International TICSP Workshop on Spectral Methods and Multirate Signal Processing*, pp. 165-170, Pula, Croatia, June 2001.
40. A. Mertins and **T. Karp**. Perfect Reconstruction Integer-Modulated Filter Banks, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 6, pp. 3605-3608, Salt Lake City, UT, USA, May 2001.

41. **T. Karp** and G. Schuller. Joint Transmitter / Receiver Design for Multicarrier Data Transmission with Low Latency Time, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 4, pp. 2401-2404, Salt Lake City, UT, USA, May 2001.
42. **T. Karp** and A. Mertins. Implementation of Biorthogonal Cosine-Modulated Filter Banks with Fixed-Point Arithmetic, *IEEE International Symposium on Circuits and Systems*, pp. 469-472, Sydney, Australia, May 2001.
43. V. Kustov, S. Mitra, R. Casey, **T. Karp**, and S. Shishkin. High-Fidelity Adaptive Medical Image Reconstruction using Realtime Wavelet Filter Design for Fast Internet Transmission and Display, *SPIE Symposium on Medical Imaging*, vol. 4322, pp. 1191-1198, San Diego, CA, USA, February 2001.
44. A. Mertins, **T. Karp**, and J. Kliewer. Integer-Modulated Filter Banks Providing Perfect Reconstruction, *EURASIP European Conference on Signal Processing*, pp. 1763-1766, Tampere, Finland, September 2000.
45. C. Siclet, P. Siohan, and **T. Karp**. Biorthogonal Filter Banks with Nearly Optimal Time-Frequency Localization, *EURASIP European Conference on Signal Processing*, pp. 1017-1020, Tampere, Finland, September 2000.
46. S. Trautmann, **T. Karp**, and N. J. Fliege. Comparing TEQ and MMSE Receivers for Short-Latency DMT Transmission, *First International OFDM-Workshop*, Hamburg, Germany, September 1999.
47. A. Mertins, **T. Karp**, and J. Kliewer. Design of Perfect Reconstruction Integer-Modulated Filter Banks, *IEEE International Symposium on Signal Processing and its Applications*, pp. 591-594, Brisbane, Australia, August 1999.
48. S. Trautmann, **T. Karp**, and N. J. Fliege. Using Modulated Filter Banks for ISI/ICI-Corrupted Multicarrier Transmission, *SPIE International Symposium on Optical Science, Engineering, and Instrumentation; Session: Wavelet Applications in Signal and Image Processing*, vol. 3813, pp. 307-321, Denver, CO, USA, July 1999.
49. S. Govardhanagiri, **T. Karp**, P. Heller, and T. Q. Nguyen. Performance Analysis of Multicarrier Modulation Systems using Cosine Modulated Filter Banks, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 3, pp. 1405-1408, Phoenix, AZ, USA, March 1999.
50. G. Schuller and **T. Karp**. Causal FIR Filter Banks with Arbitrary System Delay, *IEEE 8th DSP Workshop*, Bryce Canyon, UT, USA, August 1998.
51. **T. Karp** and A. Mertins. Linear-Phase Cosine-Modulated Filter Banks without DC Leakage, *IEEE 8th DSP Workshop*, Bryce Canyon, UT, USA, August 1998.
52. **T. Karp** and A. Mertins. Biorthogonal Cosine-Modulated Filter Banks without DC Leakage, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 3, pp. 443-446, Seattle, WA, USA, May 1998.
53. **T. Karp** and A. Mertins. Efficient Prototype Filter Realizations for Cosine-Modulated Filter Banks, *16th GRETSI Symposium on Signal and Image Processing*, pp. 551-554, Grenoble, France, September 1997.
54. **T. Karp** and A. Mertins. Lifting Schemes for Biorthogonal Modulated Filter Banks, *International Conference on Digital Signal Processing*, pp. 443-446, Santorini, Greece, June 1997.
55. T. Karp, A. Mertins, and T. Q. Nguyen. Efficiently VLSI-Realizable Prototype Filters for Modulated Filter Banks, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 2445-2448, Munich, Germany, April 1997.
56. K. Gosse, **T. Karp**, P. Duhamel, and A. Mertins. Modulated Filter Banks with Minimum Output Distortion in Presence of Subband Quantization, *30th ASILOMAR Conference on Signals, Systems, and Computers*, pp. 1305-1309, Pacific Grove, CA, USA, November 1996.

57. **T. Karp** and N. J. Fliege. Computationally Efficient Realization of MDFT Filter Banks, *EURASIP European Conference on Signal Processing*, Trieste, Italy, September 1996.
58. **T. Karp**, K. Gosse, A. Mertins, and P. Duhamel. MMSE Filter Banks with Reduced Complexity, *EURASIP European Conference on Signal Processing*, Trieste, Italy, September 1996.
59. **T. Karp**, J. Kliever, A. Mertins, and N. Fliege. Processing Arbitrary-Length Signals with MDFT Filter Banks, *IEEE International Conference on Acoustics, Speech, and Signal Processing*, vol. 3, pp. 1479-1482, Atlanta, GA, USA, May 1996.
60. **T. Karp**, A. Mertins, and N. J. Fliege. Processing Finite-Length Signals with MDFT Filter Banks, *15th GRETSI Symposium on Signal and Image Processing*, Juan-les-Pins, France, September 1995.
61. **T. Karp** and N. J. Fliege. MDFT Filter Banks with Perfect Reconstruction, *IEEE International Symposium on Circuits and Systems*, vol. 1, pp. 744-747, Seattle, WA, USA, May 1995.

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### Presentations and Workshops

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#### CONFERENCE PRESENTATIONS (REVIEW OF SUBMISSION, NO PROCEEDINGS)

1. **T. Karp** and R. Gale. How Far? How Fast? Learning STEM Concepts through LEGO Robotics, *8th Annual Texas STEM Conference*, Austin, TX, January 2015.
2. **T. Karp** and K. Whatley. A How-to Guide to Starting a LEGO Robotics Course / Club (2<sup>nd</sup>-8<sup>th</sup> grade), *8th Annual Texas STEM Conference*, Austin, TX, January 2015.
3. **T. Karp**. How to Prepare High School Students for Success in an Engineering Major, *8th Annual Texas STEM Conference*, Austin, TX, January 2015.
4. R. Gale, **T. Karp**, and G. Burnham. Choosing a Robotics Competition that Best Fits Your Students' Needs, *8th Annual Texas STEM Conference*, Austin, TX, January 2015.
5. R. Gale, **T. Karp**, and G. Burnham. How and Why is College so Different from High School? *8th Annual Texas STEM Conference*, Austin, TX, January 2015.
6. **T. Karp**, C. Pinnell, R. Gale, K. Burnham, G. Burnham. K-12 Robotics - Opportunities for Collaboration with Engineering Colleges, *7th Annual Texas STEM Conference*, Dallas, TX, March 2014.
7. **T. Karp** and R. Gale. Learning STEM Concepts through LEGO Robotics, Pre-Conference Workshop at *7th Annual Texas STEM Conference*, Dallas, TX, March 2014.
8. **T. Karp**. ISEA Presents: Estimating and Measuring Distance and Velocity Using LEGO NXT Robots. Accepted for presentation at *Conference for the Advancement of Science Teaching (CAST)*, Houston, TX, November 2013.
9. **T. Karp**. ISEA Presents: Motors and Sensors - How Does a LEGO Robot Experience its Environment. Accepted for presentation at *Conference for the Advancement of Science Teaching (CAST)*, Houston, TX, November 2013.
10. **T. Karp**, R. Gale, T. Klameth, and G. Burnham. From K-12 Engineering Outreach to Community Engagement - A Roadmap. Accepted for presentation at *2013 Engagement Scholarship Conference*, Lubbock, TX, October 2013.
11. **T. Karp**. Hands-on Applications of STEM Concepts through LEGO Robotics, Workshop. *Informal Science Education Association (ISEA) Conference*, Port Aransas, TX, March 2013.
12. H. Gesch, **T. Karp**, R. Gale, and N. Suryana Herman. A Multinational Master's Degree Program in Electronic System Engineering. *ASEE Inaugural International Forum 2012*, San Antonio, TX, June 2012.
13. C. Saygin, R. Bauer, **T. Karp**, and C. Pinnell. How to Start a LEGO MINDSTORMS Robotics Program for Elementary and Middle School Students. *2012 Annual ASEE Workshop on K-12 Engineering Education "Employing Engineering for STEM Learning"*, San Antonio, TX, June 2012.

14. E. Beutlich, **T. Karp**, and R. Gale. Building Engineers with LEGO, *On Being An Engineer: Cognitive Underpinnings of Engineering Education Conference*, Lubbock, TX, USA, February 2008.
15. L. Lowe, V. Medina, R. Gale, and **T. Karp**. Engineering Can be Fun: Changing Kids' Attitudes with Robotics, *On Being An Engineer: Cognitive Underpinnings of Engineering Education Conference*, Lubbock, TX, USA, February 2008.
16. L. Lowe, V. Medina, R. Gale, and **T. Karp**. BEST Way to the NXT Step, *Texas Engineering Technology Consortium (TETC) Best Practices Conference*, Dallas, TX, USA, February 2008.
17. J. Guo, S. Mitra, B. Nutter, and **T. Karp**. A Fast and Resolution-Progressive Image Codec Based on Backward Coding of Wavelet Trees (BCWT), *Biomedical Engineering Society (BMES), Annual Fall Meeting*, Baltimore, MD, USA, September 2005.
18. Y. Sriraja, S. Krishnamurthy, and **T. Karp**. Inter-Channel Correlation Measurements for Estimation of Lost Wavelet Coefficients, *American Mathematical Society Central Section Meeting, Special Session on Statistical Image Processing and Analysis and Applications*, Lubbock, TX, USA, April 2005.
19. B. Nutter, S. Yang, S. Mitra, and **T. Karp**. High-Resolution Image Restoration with Self-Extracted Filtering, *TI Developer Conference*, Houston, TX, USA, February 2005.
20. R. Kumar, A. Kaan, B. Nutter, **T. Karp**, and S. Mitra. Wavelet Domain Video Analysis, *Texas Systems Day*, Southern Methodist University, Dallas, TX, USA, November 2003.
21. A. Patterson and **T. Karp**. Application of Blind Source Separation to Speech Signals, *Texas Systems Day*, Southern Methodist University, Dallas, TX, USA, November 2003.
22. R. B. Casey, **T. Karp**, and B. S. Nutter. Fixed Point Realization of Biorthogonal Cosine Modulated Filter Banks, *TxTEC Annual Conference*, University of Texas at Arlington, Arlington, TX, USA, January 2003.
23. **T. Karp**. Frequency-Domain Equalization for Discrete Multi-Tone Modulation, *Texas Systems Day*, University of Texas at Arlington, Arlington, TX, USA, November 2002.
24. V. C. Singleton, L. D. Clark, and **T. Karp**. Performance Evaluation of Peak-to-Average Reduction Algorithms for Discrete Multi-Tone (DMT) Modulation, *TxTEC Annual Conference*, Texas A&M University, College Station, TX, USA, January 2002.
25. C. Tucker and **T. Karp**. Minimum Mean Squared Error (MMSE) Equalization for Discrete Multi-Tone (DMT) Modulation, *TxTEC Annual Conference*, Texas A&M University, College Station, TX, USA, January 2002.
26. R. B. Casey and **T. Karp**. Efficient Fixed-Point Implementation of Low-Delay Modulated Filter Banks, *TxTEC Annual Conference*, Texas A&M University, College Station, TX, USA, January 2002.
27. M. Wolf, S. Trautmann, **T. Karp**, and N. J. Fliege. Frequency Domain Equalizer for Discrete Multi-Tone (DMT) Modulation with Insufficient Guard Interval, *TxTEC Annual Conference*, Texas A&M University, College Station, TX, USA, January 2002.
28. V. C. Singleton, L. D. Clark, and **T. Karp**. Performance Evaluation of Peak-to-Average Reduction Algorithms for DMT, *Texas Systems Day*, Texas Tech University, Lubbock, TX, USA, October 2001.
29. R. B. Casey, S. Yang, **T. Karp**, and S. Mitra. Implementation of a Color Multiplexing Algorithm for Image Compression on TI DSP C6201 EVM, *IEEE International Conference on Acoustics, Speech, and Signal Processing, Student Forum*, Salt Lake City, UT, USA, May 2001.
30. V. C. Singleton and **T. Karp**. Adaptive Loading Algorithms for DMT, *TxTEC Annual Conference*, University of Texas, Austin, TX, USA, January 2001.
31. S. Mitra and **T. Karp**. Filter Banks for Communications, *Texas Systems Day*, Austin, TX, USA, November 2000.



32. **T. Karp.** Redundanzbehaftete, blockbasierte Datenübertragung, *Seminar zur digitalen Signal- und Bildverarbeitung und Computergrafik*, Grindelwald, Switzerland, February 2000.
33. **T. Karp.** Digitale Signalverarbeitung in der Nachrichtentechnik: Darstellung unterschiedlicher Übertragungsverfahren mit Hilfe der Multiratentechnik, *Seminar zur digitalen Signal- und Bildverarbeitung und Computergrafik*, Grindelwald, Switzerland, March 1999.
34. **T. Karp.** Modifizierte DFT Filterbänke, *Seminar zur digitalen Signal- und Bildverarbeitung*, Meran, Italy, September 1996.
35. **T. Karp**, R. Adloff, and N. J. Fliege. Application of MDFT Filter Banks to Audio Coding, *European Workshop on Multirate DSP and Applications*, Hamburg, Germany, April 1996.
36. **T. Karp** and N. J. Fliege. Neuere Ergebnisse auf dem Gebiet der Modulierten Filterbänke, ITG Fachtagung für Multiratensysteme, Filterbänke, Wavelets und Zeit-Frequenz-Methoden, Hamburg, Germany, February 1994.

#### INVITED PRESENTATIONS

1. **T. Karp.** *Get Excited About Robotics (GEAR) Program at Texas Tech University.* University of Applied Sciences Mannheim, Germany, July 2014.
2. **T. Karp.** *Exciting Young Students about STEM through a Pipeline of Robotics Programs.* Harriett B. Rigas Award Lecture, IEEE/ASCE Frontiers in Education Conference, Seattle, WA, October 2012.
3. **T. Karp.** *GEARing Up: Halliburton Robotic Oil Exploration for K-16 Students and Teachers.* Halliburton Foundation Day 2012, Houston, TX, April 2012.
4. R. Gale and **T. Karp.** *K-12 Robotics Competitions: A Way to Integrate Engineering Outreach, Community Engagement, Undergraduate Education, and Research,* Whitacre College of Engineering Multidisciplinary Speaker Series, October 2011.
5. **T. Karp.** *Integrating Community Engagement, Teaching, and Research through K-12 LEGO Robotics,* invited panelist at Texas Tech University Diversity Summit, Session on Community Engagement, Lubbock, TX, USA, April 2011.
6. **T. Karp.** *Get Excited About Robotics 2011,* presented to TTU Whitacre College of Engineering Dean's Council, Lubbock, TX, USA, April 2011.
7. **T. Karp.** *LEGO Robotics Activities at TTU,* presented to employees of National Instruments and faculty of University of Texas in Austin, Austin, TX, USA, February 2011.
8. **T. Karp.** *Get Excited About Robotics,* presented to TTU Whitacre College of Engineering Dean's Council, Lubbock, TX, USA, November 2010.
9. **T. Karp.** *LEGO MINDSTORMS Activities,* presented to National Instruments employees visiting TTU, Lubbock, TX, March 2010.
10. **T. Karp** and R. Gale. *Robotics Programs at Texas Tech University,* presented to employees of Texas Instruments Freising and University of Applied Sciences Landshut, Freising, Germany, August 2010.
11. **T. Karp.** *Studying Electrical Engineering at TUHH and TTU,* presentation for IAESTE MayMersion Excursion, Mannheim, Germany, May 2009.
12. **T. Karp**, M. Kieffer, and P. Duhamel. *Oversampled DFT Filter Banks for Error Correction Coding,* ANR ESSOR Meeting, ENST Paris, France, February 2008.
13. J. Guo, S. Mitra, B. Nutter and **T. Karp.** *An Efficient Image Codec based on Backward Coding of Wavelet Trees (BCWT),* Seminar of Signal Processing Group, University of Oldenburg, Germany, June 2006.
14. **T. Karp.** *Error-Resilient Image Coding for Transmission over Noisy Channels,* Seminar Mobilkommunikation, Technical University Ilmenau, Germany, July 2005.

15. S. Mitra, B. Nutter, and **T. Karp**. *Signal / Image Processing Research at the Computer Vision and Image Analysis Laboratory (CVIAL) at TTU*, Texas Tech ECE Graduate Seminar, Texas Tech University, Lubbock, TX, USA, September 2004.
16. **T. Karp**. *Recent Trends in the Design of Multicarrier Transmission Systems*, TAIT Seminar, Dept. of Telecommunications and Applied Information Theory, University of Ulm, Germany, July 2002.
17. **T. Karp**. *Multicarrier Data Transmission and Redundant Filter Bank Precoders*, Texas Tech ECE Graduate Seminar, Texas Tech University, Lubbock, TX, USA, October 1999.
18. **T. Karp**. *Egalisation Aveugle*, Ecole Pré-Doctorale de Physique, Session VI, Traitement du Signal - Développements Récents, Les Houches, France, September 1993.

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### Funded Projects

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#### EXTERNALLY FUNDED PROJECTS (ACCORDING TO OFFICE OF RESEARCH SERVICES)

1. **T. Karp** (100%), Robotics Based Community Engagement - Combining and Evaluating Approaches from Two Institutions. *Fulbright Research and Teaching Scholar* for South Africa, 2015/16. Pending.
2. S. Mengel, T. Davis, J. Dwyer, **T. Karp** (15%), and G. Williams, Computational Thinking Assessment in STEM Variants of the MyCS Curriculum, *NSF EI: STEM+C Program*. Budget: \$1,105,729. Submitted April 2015. Pending.
3. T. Dallas, R. Gale, B. Nutter, D. Lie, C. Li, S. Bayne, R. Cox, and **T. Karp** (10%), Scholarships in Semiconductor Device Engineering, *NSF S-STEM Program*. Total budget: \$599,971, 2011-2015.
4. **T. Karp** (100%). Oversampled Filter Banks for Multicarrier Communications with Built-In Error Correction Capabilities, *Norman Hackerman Advanced Research Program, Texas Higher Education Coordinating Board*. Budget: \$116,675, July 2010 - August 2012.
5. **T. Karp** (34%), B. Nutter, M. Baker. Women's Summer Mathematics Academy, *Texas Workforce Commission Summer Merit Program*. Total budget: \$42,105. Summer 2009.
6. A. D. Fontenot, R. Gale, **T. Karp** (20%), J. Chandler, and D. Hamman. Engineering Camps for Shake Hands with Your Future Program, *Texas Workforce Development Engineering Recruitment Program Summer Camps*. Total budget: \$19,230. Summer 2008.
7. **T. Karp** (100%). WE CAN Summer Camp: MATLAB for High School Students, *The Mathworks*. Budget: \$3,000. Summer 2007.
8. R. Gale, **T. Karp** (34%), and L. Lowe. Integrated Outreach, Mentoring, and Placement of Texas Youth in Engineering Careers, *Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board*. Total budget: Phase I: \$94,742, Phase II: \$183,344. August 2006 - March 2008.
9. **T. Karp** (50%) and B. Nutter. Multicarrier CDMA, *General Dynamics C4 Systems*. Total budget: \$30,738. March 2006 - March 2007.
10. S. Mitra, B. Nutter, **T. Karp** (10%), and S. Yang. JPEG2000 Capabilities for Hybrid Vector Scalar Quantization (HVSQ) Compression for Multiple Image Classes, *National Library of Medicine at National Institute of Health*. Total budget: \$89,000. September 2005 - August 2006.
11. **T. Karp** (50%) and M. Baker. WE CAN: Women in Engineering: Curriculum, Applications, and Networking, Technology, *Texas Workforce Development Grant Program, Texas Higher Education Coordinating Board*. Total budget: \$82,075. August 2005 - August 2007.
12. **T. Karp** (100%). Multicarrier CDMA, *General Dynamics C4 Systems*. Budget: \$26,656. March - December 2005.
13. **T. Karp** (100%). Automatic Signal Recognition and Blind Equalization of HF Channels, *Southwest Research Institute, San Antonio, TX*. Budget: \$45,272. January - December 2005.

14. S. Mitra, B. Nutter, **T. Karp** (10%), and S. Yang. Hybrid Vector Scalar Quantization (HVSQ) Compression for Multiple Image Classes, *National Library of Medicine at National Institute of Health*. Total budget: \$99,900. September 2004 - August 2005.

*FUNDED PROJECTS AND DONATION (NOT TRACKED BY OFFICE OF RESEARCH SERVICES)*

1. **T. Karp**. *Broadening Participation in GEAR – A LEGO Robotics Competition for Students in Grades K-8*. Halliburton Foundation May 2014. Budget: \$25,748. November 2014 - August 2015.
2. **T. Karp**. *Get Excited About Robotics (GEAR) – A LEGO Robotics Competition for Students in Grades K-8*. Halliburton Foundation May 2013. Budget: \$17,000. November 2013 - August 2014.
3. A. Morse and **T. Karp**. *Pipelining Engineering: Integrated Recruitment and Retention of Women*. Halliburton Foundation. Budget: \$14,550. November 2012 - August 2013.
4. **T. Karp**, and A. Morse. *Rewarding Academic Excellence - Explore Engineering Field Trip for TX Panhandle High School Students*. Halliburton Foundation. Budget: \$12,500. November 2012 - August 2013.
5. **T. Karp**, and P. Patrick. *Building STEM Relationships*. Halliburton Foundation. Budget: \$28,550. November 2012 - August 2013.
6. **T. Karp**, A. Morse, and A. D. Fontenot. *GEARing Up: Halliburton Robotic Oil Exploration for K-16 Students and Teachers*. Halliburton Foundation. Budget: \$35,000. November 2011 - May 2012.
7. Support for Get Excited About Robotics Program (GEAR) 2010-2014.
  - Alphasteel Industries: \$30,000.
  - Whitacre College of Engineering Dean's Council: \$17,500
  - Mr. David Sharbutt: \$1,000.
  - Industrial Advisory Board, Department of Electrical and Computer Engineering, Texas Tech University: \$500.
  - National Instruments: 30 LEGO NXT kits. Commercial price: \$300 each.
  - Texas Tech University, Division of Institutional Diversity and Community Engagement: 12 LEGO NXT kits. Commercial price: \$ 3,027.
8. Joint Source-Channel Coding with Modulated Filter Banks, *Ecole Supérieure d'Electricité (SUPELEC), Laboratoire des Signaux et Systèmes, Gif-sur-Yvette, France*. Budget: EUR 13,500. September 2007 - May 2008.
9. Ten MATLAB Student Licenses, *The Mathworks*. Commercial price: approx. \$600. May 2007
10. Analog Devices and Xilinx: RF-RIO state-of-the-art communications design platform (software + hardware), *National Instruments*. November 2005.
11. Research and Travel Grant, *University of Mannheim, Institute for Computer Engineering*: (Collaborator on 2 research projects sponsored by the German Science Foundation (DFG)):
  - N. Fliege: Adaptive Verfahren zur Erhöhung der Selektivität von OFDM gegenüber schmalbandigen Störsignalen
  - N. Fliege: OFDM mit dynamisch-adaptiver Modulation zur Realisierung von unterschiedlichen QoS bei der Übertragung von Protokoll- und Anwenderdaten über langsam veränderlicher Kanäle.Summers 2001 - 2005.
12. Automatic Signal Recognition and Blind Equalization of HF Channels, *ECE Matching Funds*. Budget: \$1,250. January - December 2005.

13. S. Mitra, B. Nutter, **T. Karp** (10%), and S. Yang. Hybrid Vector Scalar Quantization (HVSQ) Compression for Multiple Image Classes, *TTU Matching Funds*. Total Budget: \$20,000. September 2004 - August 2005.
14. TMS320C6713 DSK board. *Texas Instruments*, Commercial price: \$395. March 2005.
15. B. Nutter and **T. Karp** (50%). Compression of Cartographic Images, *TTU ECE Research Incentive Award*. Total budget: 5,000. February - August 2005.
16. B. Nutter and **T. Karp** (50%). Compression of Cartographic Images, *TTU College of Engineering Research Incentive Award*. Total Budget: \$5,000. February - August 2005.
17. B. Nutter, **T. Karp** (25%), K. Mulligan, and L. Barbato. Image Resizing for Cartographic Display, *TTU ORS Multidisciplinary Seed Grant*. Total budget: \$10,900. January - August 2005.
18. **T. Karp** (50%) and B. Nutter. Digital Signal Processing Applications Graduate Course Development, *Texas Instruments, Advanced Electronics Systems Engineering Program at ECE*. Total budget: \$10,000 and 1 course teaching relief. Fall 2004.
19. Two MATLAB Licenses with 1 year free maintenance, *The Mathworks*. Academic price: \$ 860, commercial price: approx. \$5,000. September 2004.
20. Xilinx ML310 Virtex-II Pro FPGA board and Digilent D2SB-DIO4 FPGA board and various software packages. academic price: \$ 2,867, commercial price: \$8,369. August 2004.
21. M. Saed and J. Bredeson. Electrical Engineering Workforce Development at Texas Tech, *Texas Technology Workforce Development Grant Program, Texas Higher Education Coordinating Board*. (I am part of the key personnel). Budget: \$177,810. May 2002- August 2004.
22. Exploiting Internet Provided Material to Teach Digital Signal Processing Texas Tech Teaching, Learning, and Technology Center (TLTC). *Faculty Incentive Grant*. Budget: \$4,950. August 2001 - May 2002.
23. Two-year graduate student scholarships for 3 students, *Texas Telecommunications Engineering Consortium (TxTEC)*. Budget: \$90,000. August 2000 - May 2002.
24. Research Grant, *University of Wollongong, School of Electrical, Computer, and Telecommunications Engineering..* Budget:\$1,250. Summer 2001.

## Teaching

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### GRADUATE STUDENT SUPERVISION

#### ***Doctoral Students Graduated as Chair/Co-Chair:***

1. Dhanya Nair (together with Dr. Richard Gale). Radiation & Annealing Effects on CMOS SRAM. August 2013.
2. Elliot Briggs (together with Dr. Brian Nutter). OFDM Physical Layer Architecture and Real-Time Multi-Path Fading Channel Emulation for the 3GPP Long Term Evolution Downlink. December 2012.
3. Andrew J. Patterson. A Comparison of Convolutional Blind Source Separation Algorithms Applied to Speech Signals. May 2006.
4. Ryan B. Casey. Blind Equalization of an HF Channel for a Passive Listening System. May 2006.
5. Yagneswaran Sriraja. Error-Resilient Schemes for Efficient Transmission of Embedded Wavelet Coded Images. December 2005.

***Master's Students Graduated as Chair:***

1. Matthew Riley. A Performance Comparison between Oversampled Filter Banks and the 3GPP Long Term Evolution. May 2013
2. Davis Hoover (together with Dr. Jennifer Rice). Design, Testing, and Implementation of WiSeMote: A Wireless Sensor Network for Structural Health Monitoring. May 2012.
3. Arun Shamanna. Oversampled Filter Banks with Built-in Error Correction Capabilities. May 2012.
4. Spandana Kongara. Implementation of BCWT in GUI Wavelet Toolbox. December 2010.
5. Sandeep Mallela. Joint Source Channel Coding using Complex Number DFT Block Codes. December 2010.
6. Sindhu Ghanta. (together with Dr. Sanwook Lee) Highway Steel Bridge Coating Condition Assessment by Developing a Digital Image Processing System. May 2010.
7. Yihong Yang. Expanding the Capability of a Memory Tester. December 2009.
8. Lavanya Periasamy. Automated Multimedia Audio Quality Evaluation. December 2007.
9. Varun Pendharkar. Design Analysis and Performance of RAKE Receivers. August 2007.
10. N. Bharat Kotikanyadanam. Signal Compression Using Redundant 1-D Discrete Wavelet Transforms. December 2005.
11. Kruthika Ponnusamy. Implementation of an MC-CDMA System and Study on Wireless Channel Models. December 2005.
12. Nagesh Kashinath. An Unconstrained Non-linear Optimization of the Prototype Filter for Cosine Modulated Filter Banks. May 2005.
13. Sandip Krishnamurthy. Multiple Description Coding for Robust Transmission and Redundant Storage of Images. May 2005.
14. John Beshears. Utilization of BIST Memory Testing Techniques. Program for Semiconductor Product Engineering (PSPE). May 2004.
15. Jie Zhao. MATLAB GUI-Based Toolbox for the Design of Modulated Perfect Reconstruction Filter Banks. May 2004.
16. Anupama Ramalingam. Application of Frequency-Time Coding to Multicarrier Transmission Schemes. May 2004.
17. Ryan B. Casey. Efficient Realization of Biorthogonal Fixed Point Cosine-Modulated Filter Banks. December 2002.
18. Andrew J. Patterson. Blind Source Separation of Speech Signals using Filter Banks. August 2002.
19. Cary Tucker. Minimum Mean Squared Error Equalization for Discrete Multi-Tone Modulation. August 2002.
20. Carlos Cisnero. Improved Microprocessor Testing Algorithm. Program for Semiconductor Product Engineering (PSPE). May 2002.
21. V. Cody Singleton. Peak-To-Average Ratio Reduction Algorithms for Multicarrier Modulation Systems. May 2002.

***Doctoral Committees:***

1. Feng Zhangpeng: Light Transport Simulation in Reflective Displays. May 2012.
2. Sonal Bhattachria. Analyzing the Effects of Coarse-scale Modeling of Genetic Regulatory Networks, December 2011.
3. Yeshwanth Srinivasan. Identification and Segmentation of Pre-cancerous Cervix Lesions for Automated Diagnosis of Cervical Neoplasia. May 2007.

4. Linning, Ye. Fast and Low Memory Usage for Image and Video Based on Wavelet Transform. May 2007.
5. Jiangling Guo. A Hybrid Vector Scalar Quantization Based on Backward Coding of Wavelet Trees. December 2005.
6. Michael Pate. Enhanced Class D Amplifier Architecture. December 2005.
7. Molly Dickens. Volumetric Segmentation via Three-dimensional Active Shape Models. May 2002.
8. Shuyu Yang. Performance Analysis from Rate Distortion Theory of Wavelet Domain Vector Quantization Encoding. May 2002.
9. Zhanyu Ge. Automated Object Recognition Through Reinforcement Learning. May 2002.

***Master's Committees:***

1. Aric Wax. Digital Emulation of Classic Analog Subtractive Synthesis. December 2011.
2. Jens Skovgaard Olsen. SoC Design for an Audio System. Dual Master's Degree Program with Denmark Technical University. December 2006.
3. Cui Mao. Unsupervised Segmentation of Two-texture Images Using Gabor Filters with Optimized Coefficients. December 2006.
4. Adam Williamson. Investigation in Gate Oxide Integrity. December 2006.
5. Krishna Chaitanya Raju. Segmentation of Radiographs of Cervical Spine Using Level Sets. December 2006.
6. Prateek Shrivastava. Implementation and Analysis of Eidochromatic Transform for Color Image Compression. December 2006.
7. Chad Larsh. Automatic Silencing of Cellular Phones Using Bluetooth Communication. May 2006.
8. Archie Sharma. Automated Depth Analysis of Optic Nerve Head from Stereo Fundus Images. May 2006.
9. Michael Hastings. Temperature Sensitive Ring Oscillators for Use with a Digitally Controlled Oscillator. Dual Master's Degree Program with Denmark Technical University. May 2006.
10. Parag Khanapurkar. Design of an Automated Fingerprint Analysis System. December 2005.
11. Fei Gao. An Efficient Approach to Automated Segmentation in Medical Analysis. December 2005.
12. Mark Watts. Digitally Controlled Oscillator for All-digital Phase Locked Loop Application. Dual Master's Degree Program with Denmark Technical University. December 2005.
13. Pingli Billy Kao. Image Resizing Using Maximum Entropy Algorithm. December 2005.
14. Dana Hernes. Feature Extraction and Classification of Precancerous Cervix Lesions. August 2005.
15. Jeetendrasingh Dungar. Effects of Dementia on EEG Coherence. August 2005.
16. Jie Yin. Design of Predictive Vector Quantizer for Image Coding. May 2005.
17. Dheeraj Varambally. Implementation and Optimization of Vector Quantization in Hybrid Vector Scalar Quantization. May 2005.
18. Philip King. An Investigation into the Design of an Automated Glaucoma Diagnostic System. December 2004.
19. Robert Manion. Recognition of Alzheimer's Disease Using Quantitative Electroencephalography. August 2004.
20. Kedar Bhate. Implementation and Comparison of Cosine Modulated Filter Banks on a Fixed Point Digital Signal Processor. May 2004.
21. Kwaku Akrofi. An Algorithm for Voice Segregation. May 2004.

22. Yeshwanth Srinivasan. High Capacity Data Hiding System Using BPCS Steganography. December 2003.
23. Arunkumar Gururajan. Coarse Segmentation of Cervical and Lumbar Vertebrae Using a Customized Version of the General Hough Transform. December 2003.
24. Linning Ye. Codebook Ordering for Vector Quantization. December 2003.
25. Michael Pate. Switching Output Stages for Direct PCM-PWM Amplification with enhanced PSSR and THD Performance. Dual Master's Degree Program with Denmark Technical University. December 2003.
26. Roopesh Kumar. Adaptive Wavelet Filter Design for Optimized Image Source Encoding. December 2002.
27. Nilesh Kenkare. Temperature Control and Measurement in Spike Anneal. December 2002.
28. Martin Wolf (from University of Mannheim) Adaptive Bitaufteilung für verallgemeinerte DMT-Übertragung. June 2002.
29. Yagneswaran Sriraja. EEG Signal Analysis for Detection of Alzheimer's Disease with a Neural Network Approach. May 2002.
30. Ajay Pai. X-Ray Microtomographic Image Analysis for Identification of Cotton Contaminants. August 2002.
31. Nathan Wright. Central Processing Unit Built-In Self-Test for Random Access Memory Test and Repair. Program for Semiconductor Product Engineering (PSPE). May 2002.
32. Brad Grinstead. Content-based Compression of Mammograms. August 2001.
33. Ning Liu. Control Unit of Microprocessor. December 2000.

#### *GRADUATE COURSES TAUGHT*

- ECE 5331 Individual Study in Electrical Engineering
- ECE 5332 Digital Signal Processing Applications
- ECE 5361 Advanced Communication Systems
- ECE 5364 Digital Signal Processing
- ECE 6365 Topics in Advanced Communications
- ECE 6000 Master's Thesis
- ECE 8000 Doctor's Dissertation
- Digital Signal Processing I & II (University of Mannheim, Germany). 1999-2000
- Information Theory and Channel Coding (University of Mannheim, Germany). Summer 2001 - 2005

#### *UNDERGRADUATE PROJECTS SUPERVISED*

1. Isaac Chang. Automatic Altitude Control of a Quad-Rotor, Lab IV, 2014.
2. Justin Teaff. Room Mapping Algorithm for LEGO NXT Robot and Sensors, Lab V, 2013.
3. Christopher White. LabView Implementation of Room Acoustic Equalization, Lab V, 2012.
4. Matthew Riley. A MATLAB Toolbox for LTE, Lab V, 2011.
5. Eric Levy. Customer support and webpage design for Get Excited About Robotics, Lab V, 2011.
6. Bryan Bruce. Siren Detection Algorithms Lab IV, 2010.
7. Matthew Riley. Computer Aided Rhythmic Dictation Lab IV, 2010.
8. Davis Hoover. Remote DSP Structural Health Monitoring System Lab V, 2010.
9. Andrew Meyers. Exploring Capabilities of Rohde & Schwarz's CMU 2000 Tester Lab IV, 2010.

10. Michael Jencik. Reduction of Quantization Effects in Images by DWT Lab V, 2009.
11. Eric Beutlich. Multicarrier CDMA, Research Experience for Undergraduate Fellowship Program of the Honors College, 2005.
12. Vitaliy Sitvetskiy. Blind Source Separation of Speech Signal, 2005.
13. Vitaliy Sitvetskiy. Blind Equalization of HF Channels, 2005.
14. Jacob Borgensen. Active Noise Cancellation, 2005.
15. Mark Lira. Smart Antenna Arrays, 2003.
16. Pradeep Suthram. Peak-to-Average Power Reduction in DMT System, 2003.

#### *UNDERGRADUATE COURSES TAUGHT*

- ENGR 1315-S: Introduction to Engineering, Service Learning Course.
- ECE 1304: Introduction to Electrical and Computer Engineering.
- ECE 1305: Introduction to Engineering and Computer Programming.
- ECE 3303: Linear System Analysis.
- ECE 3304: Discrete Time Signals and Systems
- ECE 3323: Principles of Communication Systems.
- ECE 4333/4: Project Laboratory V/IV Advisor.
- ECE 4361: Advanced Communication Systems.
- ECE 4364: Digital Signal Processing.
- Signals and Systems (University of Freiburg, Germany). 1998 - 2000.
- Introduction to Channel Coding (University of Mannheim, Germany). 1998.

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### **Service**

#### *COMMITTEES*

##### ***Texas Tech University***

- Center for Active Learning and Undergraduate Engagement (CALUE) Advisory Committee. 2014 - present
- Fulbright Student Scholarship Committee. 2001 – 2010, 2013 - present
- Graduate School Scholarship Committee. 2013 – present
- Department Excellence in Teaching Awards Committee. 2012 - 2014
- Faculty Development Leave Committee. 2012 - 2014
- Fulbright Program Adviser. 2011 - 2013
- Goldwater Scholarship Selection Committee. 2005 - 2007.

##### ***Whitacre College of Engineering***

- Society of Women Engineers Faculty Advisor, 2011 - present
- Peer Teaching Evaluator, 2013 – present
- Committee for International Engineering Minor, 2009
- First Year Experience Committee, 2006 - 2008



- Electrical and Computer Engineering Department Chair Search Committee, 2006 - 2007
- Awards Committee. Fall 2003, Spring 2004, Fall 2006, Spring 2010
- Grade Appeal Committee. Spring 2004

### *ECE Department*

- Member of Program for Semiconductor Product Engineering Steering Committee, Fall 2008 - present
- Undergraduate Curriculum Committee, Fall 2006 - present
- Undergraduate Curriculum Sub-Committee for Communications and Controls, Member: Fall 2000 - Spring 2006, Chair: Fall 2006 - present
- Awards Committee, Chair, Fall 2006 - present
- ABET Accreditation Committee Member. Fall 2000 - present
- Faculty Search Committees, Fall 2002 - present
- Graduate Studies Committee, 2008 - 2012
- Computer Engineering Curriculum Committee, 2010 - 2011
- Undergraduate Advisor Fall 2010
- Freshmen Advisor, Fall 2006 - Summer 2007, Fall 2008
- Undergraduate Recruitment Committee Member, Fall 2004 - Summer 2007

### *CONFERENCES*

- Technical Program Committee Member of IEEE Asia Pacific Conference on Circuits and Systems 2009.
- Program Committee Member of European Signal Processing Conference (EUSIPCO) 2007.
- Organization and Chair of Texas Systems Day, Communications and Signal Processing Track, Texas Tech University, October 2001.

### *BOOK / JOURNAL / CONFERENCE REVIEWER*

- Review of Springer book proposal Excursions in Waves and Wavelets by Xiaoping Shen and Gilbert Walter.
- Review of book chapter Filter-Bank Modulation Techniques for Transmission over Frequency Selective Channels for publication in Handbook for Signal Processing in Communications.
- Review of 2 chapters of Digital Signal Processing: Fundamentals and Applications by Li Tan.
- Reviewer for several journals such as IEEE Trans. on Signal Processing, IEEE Trans. on Circuits and Systems I & II, IEEE Trans. on Communications, IEEE Trans. on Neural Networks, IEEE Signal Processing Letters, Signal Processing, EURASIP Journal on Applied Signal Processing.
- Reviewer for several Conferences such as IEEE International Symposium on Circuits and Systems (ISCAS), IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), EURASIP European Signal Processing Conference (EUSIPCO).

### *PROFESSIONAL DEVELOPMENT*

- Emerging Engagement Scholar Workshop, in conjunction with National Outreach Scholarship Conference, University of Alabama, Tuscaloosa, AL, October 2012.
- Teaching Learning and Professional Development Center, Texas Tech University, Building Community Partner and Faculty Relationships: Why should we work together?, September 2012.

- Teaching Learning and Professional Development Center, Texas Tech University, The Neurobiology of Learning, February 2012.
- Teaching Learning and Professional Development Center, Texas Tech University, Fall Ethics Series: Top 10 Ethical Issues Facing Today's Students, October 2011.
- Texas Instruments Workshop at ICASSP 2011 in Prague, Czech Republic, How 32-bit Embedded Processors Change the Focus in Teaching DSP Hardware, May 2011.
- Teaching Learning and Professional Development Center, Texas Tech University, Seeking Fulbright Opportunities: A Fulbright Faculty Workshop, January 2011.
- Teaching Learning and Professional Development Center, Texas Tech University, The Gulf Oil Spill: Some Questions to be Asked and Initial Lessons to be Learned, September 2010.
- Ethics Day 2006, Texas Tech University, Lubbock, TX, April 2006.
- National Instruments: Signal Processing Workshop, Austin, TX, August 2005.
- Texas Instruments Workshop: Digital Signal Processing System-Level Design Based on LabVIEW and TMS320C6000 DSPs, Philadelphia, PA, March 2005.
- Texas Instruments Workshop: Teaching with the TMS320C6713 DSK Starter Kit (DSK), Philadelphia, PA, March 2005.
- ABET Training Session, TTU College of Engineering, October 2004.
- Xilinx DSP Design Flow Workshop, Albuquerque, NM, August 2004.

#### *ENGINEERING OUTREACH / COMMUNITY ENGAGEMENT*

LEGO Robotics Programs for K-12 students:

- Organizer of annual Get Excited About Robotics (GEAR) competition for elementary and middle schools in Lubbock and the South Plains since 2007. In 2011 GEAR Lubbock has 500 participants from over 30 schools. GEAR robotics was featured on Lubbock ISD TV (4/2010 & 12/2010) and in local newspapers.
- Advisor of Engineering Freshmen students who mentor GEAR teams, 2007 - present.
- Organizer of LEGO Robotics field trips for K-12 students to Texas Tech University. So far 5 field trips with 20 - 60 participants each have been organized. Students spend a day on campus designing and programming LEGO robots. They also learn about other K-12 robotics programs through showcases. Spring 2010 - present.
- Organizer of LEGO robotics courses at Maxey Community Center, Lubbock, TX, and as part of Texas Tech Super Saturdays Program, January 2007 - present.
- Organizer of Engineering Lessons in STEM After School Club, set in place by the Institute for the Development and Enrichment of Advanced Learners (IDEAL) at Texas Tech University, 2010 - present.
- Nomination of awardees Eric Levy and Eric Beutlich for Texas Parent Association Award in 2011 and 2008 for Student Citizenship, awarded in partly for their engagement in LEGO robotics
- Presentations of LEGO robotics program to Whitacre College of Engineering Dean's Council, 2009-present.

Judging for K-12 Programs:

- Texas Computing Educator Association (TCEA) Regional Robotics Competition, 2013 - present
- Texas BEST (Boosting Engineering Science, and Technology) Competition, Denton, TX, 2009 - present.
- Roscoe Wilson Elementary School Science Fair, Lubbock, TX, March 2007.

- 5th Annual Graduate Student Poster Competition, Texas Tech University, Lubbock, TX, April 2006.

Other:

- Co-organizer of WE CAN Summer Camp for female high school juniors who were interested in Electrical Engineering, Summer 2006 and 2007.

#### *INTERNATIONAL EXCHANGE*

- Texas Tech University Fulbright Program Advisor. 2011 - 2013.
- Visits to University of Erlangen, Technical University Munich, University of Applied Sciences Landshut, Jade University of Applied Sciences, and Hamburg University of Technology to promote exchange programs. Summer 2012.
- Faculty advisor of IAESTE Local Committee, which was awarded the Best Newcomer Student Organization Award by the Student Government Association. 2006 - 2010.
- Organized a field trip to Lubbock and Texas Tech University for a group of 17 industrial engineering graduate students from University of Applied Sciences Wilhelmshaven, Germany. Visit resulted in a memorandum of agreement for an international exchange program. Since 2010 Texas Tech undergraduate students take summer classes in Wilhelmshaven together with German students and German engineering graduate students take graduate classes at Texas Tech University.