

*Brian Lawrence Evans*

Dept. of Electrical and Computer Engineering  
1 University Station C0803  
The University of Texas  
Austin, TX 78712

E-mail: bevens@ece.utexas.edu  
Web: <http://www.ece.utexas.edu/~bevans>

Work: +1-512-232-1457

## Research Objectives

In the context of improving data rates and image quality for next-generation consumer electronic products and next-generation defense systems,

- Derive upper bounds on signal quality, e.g. bit rate and image quality
- Develop optimal algorithms to achieve the above bounds
- Quantify tradeoffs in signal quality vs. implementation complexity
- Develop near-optimal, low-complexity algorithms with implementation constraints in mind
- Map near-optimal, low-complexity algorithms onto programmable digital signal processors and field programmable gate arrays (bottom-up design)
- Automate simulation and synthesis of signal processing systems (top-down design)

## Applications

- Wireless Communication Systems (esp. WiMax systems)
  - Channel modeling and estimation for use in equalization and resource allocation
  - Resource allocation in the base station for optimizing connection speeds for multiple users
  - Radio frequency interference modeling and mitigation in receivers in mobile computing platforms
- Wired Communication Systems (esp. DSL systems)
  - Equalizer design for optimizing point-to-point connection speeds
  - Multi-input multi-output (MIMO) transmit/receive methods for improving connection speeds
- Image Processing Systems
  - Acquisition for automating ways in digital still cameras to improve the photographic composition of pictures taken by individuals
  - Hashing for fast indexing into image databases and for authenticating content in images
  - Halftoning for high-speed high-quality display and printing of images
- Electronic Design Automation Tools
  - Models of computation for scalable systems that can achieve high-performance through concurrent and distributed processing
  - Low power design by automating transformations of digital signal processing implementations from floating-point to fixed-point arithmetic and data types

## Education

- *Georgia Institute of Technology*, Atlanta, GA.  
Doctor of Philosophy in Electrical Engineering, Sep. 1993.  
Dissertation title: *A Knowledge-Based Environment for the Design and Analysis of Multidimensional Multirate Signal Processing Algorithms*.
- *Georgia Institute of Technology*, Atlanta, GA.  
Master of Science in Electrical Engineering, Dec. 1988.
- *Rose-Hulman Institute of Technology*, Terre Haute, IN.  
Double Major in Electrical Engineering and Computer Science, May 1987.

## Academic Positions

- *Professor, Dept. of ECE, The University of Texas, Austin, TX, 9/05–present*

Developed research and education program in embedded real-time signal processing systems. Applications spaces are communication systems and image processing systems. In communication systems, researched

- optimal linear complexity resource allocation algorithms for orthogonal frequency division multiple access (OFMDA) basetations applicable to WiMax and next-generation cellular standards
- impulse noise modeling and mitigation in embedded wireless receivers for emerging cognitive mobile computing platforms
- real-time testbeds for multichannel multicarrier wired communications (MIMO ADSL)
- multichannel underwater acoustic communication systems.

In image processing systems, researched

- image display for emerging reflective displays for cell phones.
- high-resolution three-dimensional sonar beamforming algorithms and their mapping onto high-performance computer architectures

Graduated three Ph.D. students and two MS students in rank, for a total of 16 Ph.D. and 8 MS students in career.

Researched resource allocation for multiuser multicarrier wireless systems as used in IEEE 802.16 systems (and its WiMax subset) and third-generation partnership project long-term evolution systems. Discovered linear complexity algorithms for optimal resource allocation to achieve the maximum instantaneous/ergodic, continuous/discrete, weighted-sum rate for perfect/predicted channels. Derived first adaptive doubly-selective channel prediction algorithms for multicarrier systems with linear complexity.

Teach four courses regularly to support a research and education program in embedded signal and image processing systems: *Multidimensional Digital Signal Processing* (graduate course), *Embedded Software Systems* (graduate course), *Real-Time Digital Signal Processing Laboratory* (junior/senior elective), and *Linear Systems and Signals* (sophomore required course).

Directed the Embedded Signal Processing Laboratory, which is part of the Wireless Networking and Communications Group and the Center for Perceptual Systems.

- *Associate Professor, Dept. of ECE, The University of Texas, Austin, TX, 9/00–8/05*

Developed research and education program in embedded signal and image processing systems, esp. in multicarrier wireless and wireline communication systems, and image acquisition and rendering systems. Also conducted research in perceptual image hashing and network tomography. Graduated ten Ph.D. students and one MS student in rank. Chaired first major undergraduate ECE curriculum reform to take place in more than two decades.

Researched the design and real-time implementation of ADSL transceivers. Developed off-line algorithms to design equalizers to reach the upper bound on achievable bit rate for single path, dual path, and filter bank equalizers. Developed real-time on-line algorithms for single path and dual path equalizers to achieve 95% of the matched filter bound. Released several versions of a freely distributable ADSL transceiver design toolbox for Matlab.

Conducted research in the design and real-time implementation of desktop printer pipelines. Made major contributions in improving the visual quality of halftoning by error diffusion in printer pipelines for both grayscale and color images. Developed still image quality measures useful for evaluating and optimizing halftoning methods. Integrated visual quality measures into the halftoning algorithms themselves. Released several versions of a image halftoning design toolbox for Matlab.

Taught four courses regularly to support a research and education program in embedded signal and image processing systems: *Multidimensional Digital Signal Processing* (graduate course), *Embedded Software Systems* (graduate course), *Real-Time Digital Signal Processing Laboratory* (junior/senior elective), and *Linear Systems and Signals* (sophomore required course).

Directed the Embedded Signal Processing Laboratory, which is part of the Wireless Networking and Communications Group and the Center for Perceptual Systems.

Offered and accepted Visiting Associate Professor positions at the American University of Beirut in summer 2005 and Cornell University in fall 2002.

- *Assistant Professor, Dept. of ECE, The University of Texas, Austin, TX, 9/96–8/00*

Developed a research and education program in embedded signal and image processing systems. Graduated three Ph.D. students and five MS students. Introduced three new courses.

In research, developed theory, fast algorithms, embedded software, and design automation tools for signal processing, image processing, and communication systems. For communication systems, developed multicarrier equalizers and smart antennas. For signal processing systems, developed acoustic echo cancellers, dual-tone multi-frequency (touchtone) detectors, phase locked loops, and sonar beamformers. For image processing, developed image halftoning and quality assessment methods.

In the curriculum, introduced three new courses:

- *Multidimensional Digital Signal Processing* (graduate course) presents theory, algorithms, and design tradeoffs in image, video, seismic, and tomographic processing;
- *Embedded Software Systems* (graduate course) introduces system-level design: dataflow, synchronous/reactive, and discrete-event models; cosimulation; software synthesis; and CAD tools.
- *Real-Time Digital Signal Processing Laboratory* (junior/senior elective) describes the design tradeoffs in mapping signal processing and communication algorithms onto programmable digital signal processor architectures. In the lab component, students design, implement, and test a voiceband transceiver using digital signal processor boards and development tools.

Taught *Linear Systems and Signals* (sophomore required course), which gives students a mathematical foundation for analyzing linear signal processing, communication, and control systems. Also, supervised senior design project students.

Founded and directed the Embedded Signal Processing Laboratory, which was part of the Center for Telecommunications and Signal Processing Research and the Center for Vision and Image Sciences.

- *Post-Doctoral Researcher, University of California, Berkeley, CA, 10/93–8/96*

Researched electronic design automation for signal processing and communication systems in Prof. Edward A. Lee's Ptolemy Project. Prototyped research ideas in the Ptolemy Classic software environment, an electronic design automation tool for system specification, simulation, and synthesis, and in the Signal Processing Packages for Mathematica. Developed methods for designing two-dimensional rational decimators, rearranging operators in algorithms to optimize implementation, and optimizing pole-zero locations of analog filters. Developed seamless Ptolemy Classic interfaces to MATLAB for system simulation and numeric parameter calculations, and to Mathematica for system optimization and symbolic parameter calculations. Helped develop a sophomore course *Introduction to Real-Time Digital Systems*. Wrote proposals, developed software, and directed student research.

- *Instructional Faculty, Dept. of EECS, University of California, Berkeley, CA, 1/95–5/95*

Taught *Noise Analysis of Communication Systems*, a senior class. Topics included signals, systems, transforms, analog modulation, probability, random processes, AM/FM noise analysis, sampling, quantization, pulse modulation, digital modulation, and digital noise analysis.

- *Teaching Assistant, School of EE, Georgia Institute of Technology, Atlanta, GA, 9/91–6/93*

Integrated symbolic algebra into signals and systems courses, and developed laboratories for *Algorithms in C*. Assisted in classes and laboratories on algorithms, C, MATLAB and signal processing. Won an Outstanding Teaching Assistant award.

- *Research Assistant, Georgia Institute of Technology, Atlanta, GA, 1/90–9/93*

Conducted doctoral research in formalizing simplification and rearrangement rules for multidimensional multirate systems and encoding the rules by computer.

- *Research Assistant, Georgia Tech Research Institute, Atlanta, GA, 6/89–12/89*

Wrote Fortran programs to automate testing for lead and asbestos content in samples. Helped port an expert system to NExpert that diagnosed coronary disease.

- *Research Assistant, Georgia Institute of Technology, Atlanta, GA, 1/89–6/89*

Coded a symbolic signal processing system in Lisp. Began a similar implementation in Mathematica.

- *Research Assistant, Georgia Tech Research Institute, Atlanta, GA, 9/87–12/88*

Applied pattern recognition and image processing to part identification using C and an image processing board. Developed an expert system for diagnosing problems in a computer network.

## Other Professional Experience

- *C Programmer, Applied Computing Devices, Terre Haute, IN, 6/87–9/87*

Helped write and debug utility programs for managing telecommunications switching operations.

## Honors and Awards

- 2009 IEEE Fellow award "for contributions to multicarrier communications and image display"
- 2008 Gordon Lepley IV Memorial Teaching Award, Department of Electrical and Computer Engineering, The University of Texas at Austin
- 2007 National Instruments Week Virtual Instrumentation Applications Paper Finalist, Prototyping and Testing Category (Second Place)
- 2004–present Robert and Jane Mitchell Faculty Fellowship, College of Engineering, The University of Texas at Austin
- 2003 Nomination by graduate students for the Graduate Engineering Council Faculty Appreciation Award at The University of Texas at Austin
- 2002–2003 Faculty Research Assignment, The University of Texas at Austin. Spent the assignment (equivalent to a sabbatical) at Cornell University visiting Prof. C. Rick Johnson during the Fall 2002 semester.
- 2000–2004 Mrs. Pearlie Dashiell Henderson Centennial Faculty Fellowship, College of Engineering, The University of Texas at Austin
- 2000 IEEE Student Chapter Award for "Most Animated Class"
- 1999 Halliburton, Brown and Root Young Faculty Award, College of Engineering, The University of Texas at Austin
- 1997 Institute of Electrical and Electronics Engineers Senior Membership
- 1997 National Science Foundation CAREER Award on "Scalable Software and Hardware for Image and Video Processing Systems"
- 1997 Gold CD Award, Wolfram Research Inc., Champaign, IL, to recognize the sale of more than 1000 copies of the *Signals and Systems Pack*, which had been on the market since 1995.
- 1992 Outstanding Graduate Teaching Assistant Award, School of Electrical Engineering, Georgia Institute of Technology
- 1987 Honors Key, Rose-Hulman Institute of Technology, for cumulative extra-curricular undergraduate activities

## Memberships in Professional and Honorary Societies

- Fellow, Institute of Electrical and Electronics Engineers (IEEE)
- Active member in two IEEE Societies: Communications and Signal Processing

## University Committee Assignments

Assignments Active in 2008–2009

- Member, Dept. of ECE, Faculty Search Committee, Feb. 2009–Apr. 2009, *Evaluate candidates for tenure-track faculty position recommended by faculty search subcommittees, and recommend leading candidates to the ECE Budget Council for formal offers.*
- Member, Dept. of ECE, Faculty Search Subcommittee, Computer Architecture. Jan. 2009–Apr. 2009, *Evaluate candidates for tenure-track faculty positions in computer architecture and recommend leading candidates to Faculty Strategic Hiring Committee.*
- Member, Dept. of ECE, Curriculum Focus Group, Jan. 2009–Apr. 2009, *Refine the year-long undergraduate ECE curriculum reform discussions for the 2010–2012 catalog into a concrete proposal.*
- Member, Graduate Assembly, Sep. 2008–Aug. 2011.  
*Elected to represent engineering concerning all matters concerning graduate studies and graduate students.*
- Member, Administrative Committee, Graduate Assembly, Sep. 2008–Aug. 2011.  
*Evaluate and propose changes to funding and rules/regulations for TAs and AIs.*
- Member, General Faculty Council, Sep. 2008–Aug. 2010.  
*Elected to represent engineering concerning all university policy matters for faculty and students.*
- Member, General Faculty Council Committee of Counsel on Academic Freedom and Responsibility, Sep. 2008–Aug. 2010.  
*Evaluate, propose changes to, and advise the President on the processes for faculty grievances, esp. as relating to tenure, promotion and post-tenure evaluation.*
- Chair, Dept. of ECE, Teaching Assistant Recruiting Committee, Sep. 2007–present.  
*Determined allocations of TA positions to admission committees, matched 40+ newly enrolling graduate students on TA offers into fall 2008 courses, and ran TA orientation session.*
- Co-Chair, Dept. of ECE, Graduate ECE Admissions, Computer Engineering Curriculum Track Committee, Jan. 2007–present, co-chaired with Prof. Derek Chiou.  
*Evaluate 500+ applications for graduate ECE studies each year, coordinate financial support offers, and host recruiting site visit.*
- Member, Dept. of ECE, Budget Council, Sep. 2005–present, chaired by Prof. Anthony P. Ambler.  
*Allocate new faculty positions from Dean's Office to research topics, and evaluate faculty members for tenure and promotion.*
- Member, Provost's Office, Digital Arts & Media Bridging Disciplines Program Committee, Jan. 2005–present, chaired by Prof. Bruce Pennycook.  
*Evaluate applications for admission to this interdisciplinary certificate program (equivalent to a minor) and promote this program within the College of Engineering.*
- Member, Dept. of ECE, Privy Council, Sep. 2004–present.  
*Advise the Department Chair on all faculty and curriculum matters.*
- Member, Dept. of ECE, Allocation of Teaching Assistantships and Grader Positions Committee, Aug. 2004–present.  
*Advise the Department Chair in implementing department priorities in allocating TA and grader positions based on nature and enrollment in courses.*

- Member, Dept. of ECE, Senior Design Projects Committee, Jan. 2004–present, chaired by Prof. Anthony P. Ambler.  
*Develop content and scope for the six variations of the required capstone design project.*
- Member, Dept. of ECE, Faculty Incentives Committee, Jan. 2004–present, chaired by Prof. Ari Arapostathis.  
*Evaluate ECE faculty applications submitted to Dept. Chair.*
- Chair, Dept. of ECE, Course Scheduling Committee, Jan. 2002–present.  
*Schedule 100+ ECE lecture sections each fall/spring semester, evaluate adjunct faculty performance in ECE courses for renewal, and advise Dept. Chair on adjunct faculty budget allocations.*
- Member, Dept. of ECE, Mixed-Signal Chair Faculty Search Committee, Jan. 2002–present, chaired by Prof. Earl E. Swartzlander, Jr.  
*Evaluate dossiers and host potential faculty candidates.*
- Member, Dept. of ECE, Computer Engineering Curriculum Committee, Nov. 2001–present, chaired by Prof. Jonathan W. Valvano.  
*Evaluate and update undergraduate and graduate curriculums in computer engineering.*
- Member, Dept. of ECE, Communications, Networks, and Systems (CommNetS) Curriculum Committee, Nov. 2001–present, chaired by Prof. Ross Baldick.  
*Evaluate and update undergraduate and graduate curriculums in communications, networks and systems.*
- Member, Dept. of ECE, Graduate ECE Admissions, Communications, Networks, and Systems (CommNetS) Curriculum Track Committee, Sep. 1998–present (Chair, Sep. 1999–Jan. 2007).  
*Evaluate 700+ applications for graduate ECE studies each year, coordinate financial support offers, and host recruiting site visit(s).*
- Member, College of Engineering, Outreach Education / Instructional Technology Committee, Aug. 1997–present, chaired by Prof. Philip Schmidt.  
*Evaluate instructional technology initiatives, short courses, and Option III MS programs.*
- Member, Dept. of ECE, Communications, Networks, and Systems (CommNetS) Faculty Committee, Sep. 1996–present, chaired by Prof. Ari Arapostathis.  
*Evaluate and update PhD qualifying exam procedures, and propose future growth plans in faculty lines to the Budget Council.*
- Member, Dept. of ECE, Computer Engineering Faculty Committee, Sep. 1996–present, chaired by Prof. Earl E. Swartzlander, Jr.  
*Evaluate and update PhD qualifying exam procedures, and propose future growth plans in faculty lines to the Budget Council.*
- Member, Dept. of ECE, Graduate Studies Committee, Sep. 1996–present, chaired by Prof. Jack Lee (and formerly chaired by Prof. Dean P. Neikirk)

#### Past Assignments

- Member, Dept. of ECE, Electromagnetics & Acoustics Faculty Search Committee, Nov. 2007–May 2008, chaired by Prof. Hao Ling.  
*Evaluated faculty applications and hosted faculty candidates. As a result, Andrea Alu and Neal Hall were hired into 2008–2009 faculty positions.*

- Chair, University Responsibilities, Rights, and Welfare of Graduate Student Academic Employees Committee, Sep. 2007–Aug. 2008.  
*Advise President on matters concerning TA, AI, and RA employment. To increase graduate student recruiting and retention, submitted proposal to close gap in income for TAs who do not break even in income vs. expenses without reducing the number of TA positions.*
- Member, Dept. of ECE, Curriculum and Catalog Review Committee, Jan. 2007–May 2007, chaired by Prof. John A. Pearce
- Chair, Dept. of ECE, Embedded Systems Faculty Search Committee, Oct. 2006–May 2008.  
*Evaluated faculty applications and hosted faculty candidates. As a result, Andreas Gerstlauer was hired into a 2008–2009 faculty position.*
- Member, Dept. of ECE, Communications, Networks, and Systems Faculty Search Committee, Oct. 2006–May 2007, chaired by Prof. Gustavo de Veciana
- Member, University Responsibilities, Rights, and Welfare of Graduate Student Academic Employees Committee, Sep. 2006–Aug. 2007
- Member, Provost's Office, Signature Vision Committee, May 2006–Aug. 2006, chaired by Prof. Lucia Gilbert
- Member, Dept. of ECE, Post-tenure Review Committee, Jan. 2006–May 2007, chaired by Prof. Anthony P. Ambler
- Member, Dept. of ECE, Telecommunications Faculty Search Committee, Sep. 2001–Aug. 2002, chaired by Prof. Edward J. Powers
- Member, Dept. of ECE, Ad-hoc Committee for the Texas Telecommunications Engineering Consortium (TxTEC), Oct. 1996–May 2005, chaired by Prof. Edward J. Powers
- Member, Dept. of ECE, Subcommittee for TxTEC Undergraduate Scholarship and Graduate Fellowship Awards, Sep. 1998–May 2005,
- Branch Counselor, Dept. of ECE, IEEE Student Chapter, Aug. 2001–Dec. 2004,
- Member, Dept. of ECE, Department Chair Search Committee, Spring 2001, chaired by Prof. Edward J. Powers
- Chair, Dept. of ECE, Reform of BSEE Curriculum Committee, Nov. 1999–Mar. 2001
- Member, Dept. of ECE, Graduate ECE Admissions, Computer Engineering Curriculum Track Committee, Jan. 1997–Dec. 2006, chaired by Prof. Margarida Jacome
- Chair, Dept. of ECE, Undergraduate Communications Curriculum Committee, Sep. 1998–Aug. 2001 (Member, Sep. 1996–Aug. 1998)
- Member, Dept. of ECE, Undergraduate Controls Curriculum Committee, Sep. 1996–Aug. 2001, chaired by Prof. Robert Flake
- Member, Dept. of ECE, Undergraduate Digital Systems Curriculum Committee, Sep. 1996–Aug. 2001, chaired by Prof. G. Jack Lipovski

- Member, Dept. of ECE, Undergraduate Software Engineering Curriculum Committee, Sep. 1996–Aug. 2001, chaired by Prof. Craig M. Chase

## Professional Activities

### *Outside Committee Assignments*

- Associate Editor, *IEEE Transactions on Image Processing* (2007–present and 1998–2002).  
*Coordinated reviews for 83 submitted journal papers.*
- Associate Editor, *Journal of Signal Processing Systems*, (2007–present)
- Associate Editor, *IEEE Transactions on Signal Processing* (March 2005–March 2008).  
*Coordinated reviews for 57 submitted journal papers.*
- Design and Implementation of Signal Processing Systems Technical Committee, IEEE Signal Processing Society (1999–present)
- Technical Program Committee, 2009 *IEEE Int. Conf. on Distributed Smart Cameras*
- Technical Program Committee, 2008 IEEE International Symposium on System-on-Chip
- Technical Program Committee, 2008 IEEE Global Communications Conference
- Technical Program Committee, 2008 IEEE International Conference on Image Processing
- Technical Program Committee, 2008 IEEE International Conference on Communications
- Technical Program Committee, 2007 IEEE International Conference on Signal Processing and Communication
- Technical Program Committee, 2007 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Technical Program Committee, 2006 IEEE International Conference on Image Processing
- Technical Program Committee, 2006 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Technical Program Committee, 2005 IEEE Global Communications Conference, Signal Processing for Communications Symposium
- Technical Program Committee, 2005 IEEE International Conference on Image Processing
- Technical Program Committee, 2005 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Technical Advisory Board, 2005 Texas Instruments Developer's Conference
- Technical Program Co-Chair, 2004 IEEE Workshop on Signal Processing Systems
- Technical Program Co-Chair, 2004 IEEE Digital Signal Processing Workshop
- Technical Program Co-Chair, 2004 IEEE Signal Processing Education Workshop

- Technical Program Committee, 2004 IEEE Global Communications Conference, Signal Processing for Communications Symposium
- Technical Program Committee, 2004 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Technical Advisory Board, 2004 Texas Instruments Developer's Conference
- Technical Program Committee, 2003 IEEE International Conference on Image Processing
- Technical Program Committee, 2003 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Technical Program Committee, 2002 International Workshop on Digital and Computational Video
- Technical Program Committee, 2002 IEEE International Conference on Image Processing
- Technical Program Committee, 2002 International Conference on Compilers, Architecture, and Synthesis for Embedded Systems
- Technical Program Committee, 2002 IEEE Signal Processing Systems Workshop
- Technical Program Committee, 2002 IEEE International Conference on Acoustics, Speech, and Signal Processing
- General Chair, 2002 IEEE Southwest Symposium on Image Analysis and Interpretation
- Technical Program Committee, 2002 IEEE Southwest Symposium on Image Analysis and Interpretation
- Chair, Telecommunications Track, Texas Systems Day 2000
- Co-Chair, Curriculum Issues I Track, 2000 IEEE Signal Processing Education Workshop
- Technical Program Committee, 2000 IEEE International Conference on Acoustics, Speech, and Signal Processing
- Exhibits Co-Chair, 2000 IEEE International Conference on Image Processing
- Local Arrangements Chair, 2000 IEEE Southwest Symposium on Image Analysis and Interpretation
- Technical Program Committee, 1999 IEEE-EURASIP Workshop on Nonlinear Signal and Image Processing
- Technical Program Committee, 1997 IEEE International Conference on Image Processing

#### *Other Activities*

- Reviewer for the following journals (in alphabetical order):
  - *EURASIP Journal on Applied Signal Processing* (2004–present)
  - *IEE Electronics Letters* (2004)
  - *IEEE Communication Letters* (2009)
  - *IEEE Signal Processing Letters* (1997–present)

- *IEEE Transactions on Circuits and Systems* (1993–present)
  - *IEEE Transactions on Circuits and Systems for Video Technology* (1997–present)
  - *IEEE Transactions on Education* (1999)
  - *IEEE Transactions on Signal Processing* (1991–present)
  - *IEEE Transactions on Vehicular Technology* (2006–present)
  - *Proceedings of the IEEE* (2007)
- Reviewer for the following conferences (in alphabetical order):
    - *European Conf. on Parallel Processing*: 1997
    - *IEEE Int. Global Communications Conf.*: 2009, 2008, 2007, 2006, 2005, 2004
    - *IEEE Int. Conf. on Acoustics, Speech, and Signal Proc.*: 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, and 2000
    - *IEEE Int. Conf. on Communications*: 2010, 2009, 2008, 2007, 2006
    - *IEEE Int. Conf. on Distributed Smart Cameras*: 2009
    - *IEEE Int. Conf. on Image Processing*: 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, and 1997
    - *IEEE Int. Sym. on Circuits and Systems*: 2008, 2004, 2003
    - *IEEE Int. Sym. on Information Theory*: 2007
    - *IEEE/ACM Int. Sym. on Microarchitecture*: 2000
    - *IEEE Int. Sym. on Personal Indoor and Mobile Radio Communications*: 2005
    - *IEEE Int. Sym. on System-on a Chip*: 2009, 2008, 2007, 2006
    - *IEEE Int. Workshop on Signal Processing Systems*: 2009, 2008, 2007, 2005, 2004
  - Chaired the following conference sessions:
    - “Array Processing and Source Localization”, *2008 IEEE Asilomar Conf. on Signals, Systems, and Computers*
    - “Integrated Algorithm and Architecture Implementation”, *2007 IEEE Asilomar Conf. on Signals, Systems, and Computers*
    - “Hardware and Software Implementations of DSP Systems”, *2007 IEEE Int. Conf. on Acoustics, Speech, and Signal Proc.*
    - “Signal Processing for MIMO Systems,” *2005 IEEE Global Communications Conference*
    - “VLSI Communication Systems,” *2005 IEEE Asilomar Conf. on Signals, Systems, and Computers*
    - “Signal Processing Algorithms,” *2004 IEEE Global Communications Conference*
    - “Prototyping and Design,” *2004 UT Austin Wireless Networking Symposium*
    - “Multicarrier Equalization for Wireline Communications,” *2002 IEEE Asilomar Conf. on Signals, Systems, and Computers*
    - “Face Detection and Recognition,” *2001 IEEE Int. Conf. on Image Processing*
    - “Filter Implementation,” *2001 IEEE Int. Conf. on Acoustics, Speech, and Signal Proc.*
    - “Image Modeling,” *2000 IEEE Int. Conf. on Image Processing*

- “Image/Video Enhancement,” *1999 IEEE Int. Conf. on Image Processing*
- “System-Level Design Methods, Tools, and Case Studies”, *1998 IEEE Asilomar Conf. on Signals, Systems, and Computers*
- “Mapping Models of Computation to Architectures”, *1997 IEEE Int. Conf. on Application Specific Systems, Architectures, and Processors*
- “Rapid Prototyping of Digital Signal Processing Systems”, *1996 IEEE Asilomar Conf. on Signals, Systems, and Computers*
- “DSP Education”, *1996 IEEE Int. Conf. on Acoustics, Speech, and Signal Proc.*
- “CAD for Design and Implementation of Signal Processing Systems”, *1994 IEEE Asilomar Conf. on Signals, Systems, and Computers*

## Publications

### *Refereed Journal Articles*

1. L. J. Karam, I. AlKamal, A. Gatherer, G. A. Frantz, D. V. Anderson and B. L. Evans, “Trends in Multicore DSP Platforms”, *IEEE Signal Processing Magazine*, Special Issue on Signal Processing on Platforms with Multiple Cores, vol. 26, no. 6, Nov. 2009, to appear.
2. M. Nassar, K. Gulati, M. R. DeYoung, B. L. Evans and K. R. Tinsley, “Mitigating Near-Field Interference in Laptop Embedded Wireless Transceivers”, *Journal of Signal Processing Systems*, Mar. 2009, invited paper.
3. I. C. Wong and B. L. Evans, “Optimal Resource Allocation in the OFDMA Downlink with Imperfect Channel Knowledge”, *IEEE Transactions on Communications*, vol. 57, no. 1, Jan. 2009, pp. 232-241.
4. I. C. Wong and B. L. Evans, “Sinusoidal Modeling and Adaptive Channel Prediction in Mobile OFDM Systems”, *IEEE Transactions on Signal Processing*, vol. 56, no. 4, Apr. 2008, pp. 1601–1615.
5. I. C. Wong and B. L. Evans, “Optimal Downlink OFDMA Resource Allocation with Linear Complexity to Maximize Ergodic Rates”, *IEEE Transactions on Wireless Communications*, vol. 7, no. 3, Mar. 2008, pp. 962–971.
6. S. Banerjee and B. L. Evans, “In-Camera Automation of Photographic Composition Rules”, *IEEE Transactions on Image Processing*, vol. 16, no. 7, Jul. 2007, pp. 1807–1820.
7. Z. Shen, R. Chen, J. G. Andrews, R. W. Heath, Jr., and B. L. Evans, “Sum Capacity of Multiuser MIMO Broadcast Channels with Block Diagonalization”, *IEEE Transactions on Wireless Communications*, vol. 6, no. 6, Jun. 2007, pp. 2040–2045. *29 citations*
8. R. Samanta, R. W. Heath, Jr., and B. L. Evans, “Joint Interference Cancellation and Channel Shortening in Multi-User MIMO Systems”, *IEEE Transactions on Vehicular Technology*, vol. 56, no. 2, Mar. 2007, pp. 652–660.
9. D. Arifler, G. de Veciana, and B. L. Evans, “A Factor Analytic Approach to Inferring Congestion Sharing Based on Flow Level Measurements”, *IEEE/ACM Transactions on Networking*, vol. 15, no. 1, Feb. 2007, pp. 67–79.
10. V. Monga, N. Damera-Venkata, and B. L. Evans, “Design of Tone Dependent Color Error Diffusion Halftoning Systems”, *IEEE Transactions on Image Processing*, vol. 16, no. 1, Jan. 2007, pp. 198–211.

11. V. Monga and B. L. Evans, "Perceptual Image Hashing Via Feature Points: Performance Evaluation and Trade-Offs", *IEEE Transactions on Image Processing*, vol. 15, no. 11, pp. 3452-3465, Nov. 2006. *30 citations*
12. Z. Shen, R. Chen, J. G. Andrews, R. W. Heath, Jr., and B. L. Evans, "Low Complexity User Selection Algorithms for Multiuser MIMO Systems with Block Diagonalization", *IEEE Transactions on Signal Processing*, vol. 54, no. 9, pp. 3658-3663, Sep. 2006. **82 citations**
13. R. K. Martin, K. Vanbleu, M. Ding, G. Ysebaert, M. Milosevic, B. L. Evans, M. Moonen, and C. R. Johnson, Jr., "Implementation Complexity and Communication Performance Tradeoffs in Discrete Multitone Modulation Equalizers", *IEEE Transactions on Signal Processing*, vol. 54, no. 8, pp. 3216-3230, Aug. 2006. *13 citations*
14. Z. Shen, J. G. Andrews, and B. L. Evans, "Sum Capacity of MIMO Gaussian Broadcast Channels with Channel Frobenius Norm Constraints", *IEEE Communication Letters*, vol. 10, no. 6, pp. 471-473, June 2006.
15. Z. Shen, R. W. Heath, Jr., J. G. Andrews, and B. L. Evans, "Space-Time Water-filling for Composite MIMO Fading Channels", *EURASIP Journal on Wireless Communications and Networking*, special issue on Radio Resource Management in 3G+ Systems, vol. 2006, special issue no. 6, 8 pages, Article Id 16281, May 2006.
16. G. Arslan, B. Lu, L. D. Clark, and B. L. Evans, "Iterative Refinement Methods for Time Domain Equalizer Design", *EURASIP Journal on Applied Signal Processing*, special issue on Advanced Signal Processing for Digital Subscriber Lines, vol. 2006, special issue no. 7, 12 pages, Article Id 43154, Apr. 2006.
17. K. Han and B. L. Evans, "Optimum Wordlength Search Using Sensitivity Information", *EURASIP Journal on Applied Signal Processing*, special issue on Design Methods for DSP Systems, vol. 2006, special issue no. 5, 14 pages, Article Id 92849, Mar. 2006. *11 citations*
18. V. Monga, A. Banerjee, and B. L. Evans, "A Clustering Based Approach to Perceptual Image Hashing", *IEEE Transactions on Information Forensics and Security*, vol. 1, no. 1, pp. 68-79, Mar. 2006. *19 citations*
19. K. Sato, B. L. Evans, and J. K. Aggarwal, "Designing an Embedded Video Processing Camera using a 16-bit Microprocessor for a Surveillance System", *Journal of VLSI Signal Processing*, vol. 42, no. 1, pp. 57-68, Jan. 2006.
20. W. Schwartzkopf, A. C. Bovik, and B. L. Evans, "Maximum Likelihood Techniques for Joint Segmentation-Classification of Multi-spectral Chromosome Images", *IEEE Transactions on Medical Imaging*, vol. 24, no. 12, pp. 1593-1610, Dec. 2005. *22 citations*
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#### *Other Major Publications*

1. A. G. Olson, I. C. Wong, B. L. Evans, A. Chopra, and Y. Mortazavi, "2×2 MIMO Discrete Multitone Transceiver Testbed," National Instruments Week, August 7–9, 2007, Austin, Texas USA. 1 page. 2007 National Instruments Week Virtual Instrumentation Applications Paper Finalist, Prototyping and Testing Category (second place).
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#### *Books and Book Chapters*

1. K. Han and B. L. Evans, *Transforming Floating-Point Algorithms to Fixed-Point Implementations*, VDM Verlag Publishing, Jun. 2009, ISBN 978-3-639-16090-1.
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#### *Technical Reports*

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## Oral Presentations

1. Oct 7, 2009, "Radio Frequency Interference Sensing and Mitigation in Wireless Receivers", VLSI Seminar Series, The University of Texas at Austin, Austin, Texas.
2. June 23, 2009, "Radio Frequency Interference Sensing and Mitigation in Wireless Receivers", Department of Electrical and Computer Engineering, American University of Beirut, Beirut, Lebanon.
3. March 16, 2009, "Radio Frequency Interference Sensing and Mitigation in Wireless Receivers", Intel Labs, Hillsboro, Oregon.
4. October 29, 2008, "Adaptive Downlink OFDMA Resource Allocation", IEEE Asilomar Conference on Signals, Systems and Computers, Pacific Grove, California.
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6. October 21, 2008, "Dataflow Modeling of Signal Processing and Communication Systems", Guest Lecture for EE 382V Embedded System Design and Modeling, The University of Texas at Austin, Austin, Texas.
7. October 16, 2008, "Improving Wireless Data Transmission Speed and Reliability to Mobile Computing Platforms", Texas Wireless Summit, Austin, Texas.
8. October 9, 2008, "Mitigating Computer Platform Radio Frequency Interference in Embedded Wireless Receivers", Electrical and Computer Engineering Seminar, Carnegie Mellon University, Pittsburgh, Pennsylvania.
9. August 26, 2008, "Embedded Signal Processing Systems", The University of Texas at Austin, Austin, Texas.
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13. November 6, 2007, "Resource Allocation in Downlink Multiuser Multicarrier Wireless Systems", Intel, Santa Clara, California.
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15. August 8, 2007, Moderated panel discussion on "Bridging the Academic and Industry DSP Gaps". C. Sidney Burrus (Rice University), Chris H. Dick (Xilinx), Gene Frantz (TI), James H. McClellan (Georgia Institute of Technology), Ronald W. Schafer (HP Labs) and Mark A. Yoder (Rose-Hulman Institute of Technology), National Instruments Week, Austin, Texas.
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22. August 16, 2005, "NI at ECE at UT Austin", Signal Processing Workshop, NI Week 2005, Austin, Texas.
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24. June 30, 2005, "Modem Design, Implementation, and Testing Using NI's LabVIEW", NI Academic Day, Beirut, Lebanon.
25. March 22, 2005, "Deadlock Detection for Distributed Process Networks", *IEEE Int. Conf. on Acoustics, Speech, and Signal Proc.*, Philadelphia, PA USA.
26. June 16, 2004, "Equalization for ADSL Transceivers", Dept. of Electrical and Computer Engineering, American University of Beirut, Beirut, Lebanon.
27. May 18, 2004, "Network Tomography Based on Flow Level Measurements", Proc. IEEE Int. Conf. on Acoustics, Speech, and Signal Processing, Montreal, Canada.
28. May 11, 2004, "High-Speed Wireline Communication Systems", The University of Texas, Austin, TX.
29. February 19, 2004, "Modem Design, Implementation, and Testing Using NI's LabVIEW", *Texas Instruments Developer's Conference*, Houston, TX.
30. November 21, 2003, "Embedded Signal Processing", National Instruments, Austin, TX.
31. August 20, 2003, "Error Diffusion Halftoning Methods for Printing and Display", Xerox Research Labs, Webster, NY.
32. April 2, 2003, "The Future of DSP Engineering Panel," International Signal Processing Conference, Dallas, TX.
33. March 29, 2003, "How ADSL Modems Work", Sophomore Engineering Honors Program, The University of Texas at Austin, Austin, TX.
34. February 21, 2003, "Equalizer Design to Maximize Bit Rate in ADSL Transceivers", Dept. of ECE, The University of Texas at Austin, Austin, TX.

35. January 24, 2003, "Variations on Error Diffusion: Retrospectives and Future Trends", SPIE/IS&T Symposium on Electronic Imaging, Santa Clara, CA.
36. January 9, 2003, "Embedded Signal Processing Laboratory at UT Austin", National Instruments, Austin, TX.
37. November 8, 2002, "Equalization for ADSL Transceivers", Dept. of ECE, University of California, Davis, CA.
38. November 7, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images", California Research Center, Ricoh Innovations, Inc., Menlo Park, CA.
39. November 6, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images", Apple, Inc., Cupertino, CA.
40. November 1, 2002, "Equalization for ADSL Transceivers", Dept. of EE, Stanford University, Stanford, CA.
41. October 31, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images", HP Laboratories, Palo Alto, CA.
42. October 8, 2002, "Equalization for ADSL Transceivers", Dept. of ECE, Cornell University, Ithaca, NY.
43. October 2, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images: Part II Color Halftoning", Dept. of ECE, Cornell University, Ithaca, NY.
44. September 18, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images: Part I Grayscale Halftoning", Dept. of ECE, Cornell University, Ithaca, NY.
45. September 13, 2002, "Equalization for ADSL Transceivers", Dept. of ECECS, University of Cincinnati, Cincinnati, OH.
46. September 12, 2002, "Equalization for ADSL Transceivers", Dept. of ECE, Purdue University, West Lafayette, IN.
47. September 11, 2002, "Error Diffusion Halftoning Methods for High-Quality Printed and Displayed Images", Dept. of ECE, Purdue University, West Lafayette, IN.
48. June 5, 2002, "BSEE and BS Comp. Eng. Curriculum for the 2002–2004 Catalog", The University of Texas at Austin, Austin, TX.
49. January 24, 2002, "Time-Domain Equalization for ADSL Transceivers", Telecommunications and Signal Processing Seminar, Dept. of ECE, The University of Texas, Austin, TX.
50. October 27, 2001, "Time-Domain Equalization for ADSL Transceivers", Texas Systems Day 2001, Dept. of ECE, Texas Tech University, Lubbock, TX.
51. October 26, 2001, "How to Make Printed and Displayed Images Have High Visual Quality", UT Center for Perceptual Systems Seminar Series, The University of Texas at Austin, Austin, TX.
52. September 25, 2001, "BSEE and BS Comp. Eng. Curriculum for the 2002–2004 Catalog", The University of Texas at Austin, Austin, TX.

53. September 7, 2001, "Time-Domain Equalization for ADSL Transceivers", Telecommunications and Signal Processing Seminar, Dept. of ECE, The University of Texas at Austin, Austin, TX.
54. August 3, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of ECE, University of British Columbia, Vancouver, BC Canada.
55. July 9, 2001, "Time-Domain Equalization for ADSL Transceivers", Rhodes Hall, Dept. of ECE, Cornell University, Ithaca, NY.
56. May 21, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of EE, Southern Methodist University, Dallas, TX.
57. April 10, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of EE, Texas A&M University, College Station, TX.
58. April 6, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of EE, The University of Texas at Arlington, Arlington, TX.
59. March 29, 2001, "Time-Domain Equalization for ADSL Transceivers", 487 Goldwater Research Center, Arizona State University, Tempe, AZ. (Slides)
60. March 27, 2001, "BSEE and BS Comp. Eng. Curriculum for the 2002–2004 Catalog", The University of Texas at Austin, Austin, TX.
61. March 26, 2001, "BSEE and BS Comp. Eng. Curriculum for the 2002–2004 Catalog", The University of Texas at Austin, Austin, TX.
62. February 16, 2001, "Time-Domain Equalization for ADSL Transceivers", Center for Signal and Image Processing, Georgia Institute of Technology, Atlanta, GA.
63. February 8, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of ECE, The University of Texas at Dallas, Richardson, TX.
64. February 2, 2001, "Time-Domain Equalization for ADSL Transceivers", Dept. of ECE, The University of Texas at Austin, Austin, TX.
65. November 10, 2000, "Software Development in the Unix Environment", Dept. of ECE, The University of Texas at Austin, Austin, TX.
66. October 24, 2000, "Summary of Faculty and Student Discussions for the BSEE Curriculum for the 2002–2004 Catalog", The University of Texas at Austin, Austin, TX.
67. October 17, 2000, "A Signal Processing System Design Course", IEEE Signal Processing Education Workshop, Hunt, Texas.
68. October 17, 2000, "Fast Time-Domain Equalization for Discrete Multitone Modulation Systems", IEEE Digital Signal Processing Workshop, Hunt, Texas.
69. September 5, 2000, "BSEE and BS Comp. Eng. Degrees: Ideas for the 2002-2004 Catalog", The University of Texas at Austin, Austin, TX. (PowerPoint)
70. August 25, 2000, "Telecommunications and Signal Processing at UT Austin", Motorola, Austin, TX. (PowerPoint)

71. May 30, 2000, "Telecommunications and Signal Processing at UT Austin", Texas Instruments, Dallas, TX. (PowerPoint)
72. May 26, 2000, "Telecommunications and Signal Processing at UT Austin", Motorola, Austin, TX. (PowerPoint)
73. February 2, 2000, "Introduction to Digital Signal Processors", Guest Lecture for EE382M Application-Specific Processing, The University of Texas at Austin, Austin, TX
74. January 24, 2000, "Experiences using WebCT: Empower the Students and Burden your TA", College of Engineering Brown Bag Seminar, The University of Texas at Austin, Austin, TX
75. October 27, 1999, "Quality Assessment of Compression Techniques for Synthetic Aperture Radar Images," *IEEE Int. Conf. on Image Processing*
76. October 27, 1999, "Low Delay Foveated Visual Communications Over Wireless Channels," *IEEE Int. Conf. on Image Processing*
77. October 27, 1999, "Fast Rehalftoning and Interpolated Halftoning Algorithms with Flat Low-Frequency Response," *IEEE Int. Conf. on Image Processing*
78. October 26, 1999, "Motion Estimation and Compensation for Foveated Video," *IEEE Int. Conf. on Image Processing*
79. October 25, 1999, "Lossy Compression of Stochastic Halftones with JBIG2," *IEEE Int. Conf. on Image Processing*
80. August 6, 1999, "Efficient Implementation of Foveation Filtering", Texas Instruments Digital Signal Processing Systems Conference, Houston TX.
81. August 5, 1999, "A Framework for Real-time High-Throughput Signal and Image Processing on Workstations", Bellaire Technology Center, Shell Company, Houston, TX.
82. April 29, 1999, "Introduction to System-Level Design", Guest Lecture for EE382C-8 Methodology for Hardware/Software Codesign, Dept. of ECE, The University of Texas at Austin, Austin, TX.
83. March 31, 1999, "Introduction to System-Level Design", Guest Lecture for EE382M Application-Specific Processing, Dept. of ECE, The University of Texas at Austin, Austin, TX.
84. March 26, 1999, "Software Development in the Unix Environment", Dept. of ECE, The University of Texas at Austin, Austin, TX.
85. March 6, 1999, "Embedded Signal Processing Laboratory", Prospective Graduate Student Site Visit, Dept. of ECE, The University of Texas at Austin, Austin, TX.
86. February 24, 1999, "Introduction to Digital Signal Processors", Guest Lecture for EE382M Application-Specific Processing, Dept. of ECE, The University of Texas at Austin, Austin, TX.
87. February 22, 1999, "Introduction to Digital Signal Processors", HP Laboratories, Palo Alto, CA.
88. February 19, 1999, "Real-Time Process Network Sonar Beamformer", Ptolemy Miniconference, University of California, Berkeley, CA.
89. January 11, 1999, "Scalable Software and Hardware for Image and Video Processing Systems", National Science Foundation CAREER Principal Investigator Conference, Washington, D.C.

90. November 4, 1998, "Interpolated Halftoning, Rehalftoning, and Compression of Halftones", HP Laboratories, Palo Alto, CA.
91. November 3, 1998, "Improved Matrix Pencil Methods", IEEE Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA.
92. October 28, 1998, "Image Halftoning", Signal and Image Processing Seminar, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX.
93. October 15, 1998, "Signal Processing for Wireless Basestations", Wireless Communications Laboratory Seminar, Texas A&M University, College Station, TX.
94. August 27, 1998, "Design and Quality Assessment of Forward and Inverse Error Diffusion Image Halftoning Algorithms", Center for Signal and Image Processing Seminar, Georgia Institute of Technology, Atlanta, GA.
95. August 7, 1998, "Embedded Halftoning and Inverse Halftoning for JBIG2 Coding", Texas Instruments Digital Signal Processing Systems Fest, Houston, TX.
96. August 3, 1998, "Embedded Signal Processing Laboratory", Digital Signal Processing R&D Center, Texas Instruments, Dallas, TX.
97. June 9, 1998, "Embedded Signal Processing Laboratory", HP EEsof, Westlake Village, CA.
98. June 8, 1998, "Embedded Signal Processing Laboratory", Rockwell Science Center, Thousand Oaks, CA.
99. June 2, 1998, "Joint Optimization of Multiple Behavioral and Implementation Properties of Analog Filter Designs", IEEE Int. Sym. on Circuits and Systems, Monterey, CA.
100. April 13, 1998, "Overview of Research in the Embedded Signal Processing Laboratory", Motorola, Austin, TX
  - Overview
  - Analog IIR Filter Optimization
  - HDSL2 Modem Design
101. March 10, 1998, "Heterogeneous Modeling and Design: UT Austin Subcontract", slides by Prof. Brian L. Evans but presented by Prof. Edward A. Lee, DARPA Informal Review, University of California at Berkeley, Berkeley, CA.
102. February 11, 1998, "Advanced Digital Signal Processing for Communications Systems", IEEE Communication Society Seminar, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX.
103. January 23, 1998, "Software Development in the Unix Environment", Electrical and Computer Engineering Departmental Seminar, The University of Texas at Austin, Austin, TX.
104. January 5, 1998, "Advanced Filter Design for Communications and Signal Processing Systems", Center for Signal and Image Processing Seminar, Georgia Institute of Technology, Atlanta, GA.
105. December 5, 1997, "Summary of Abstracts Submitted to the Texas Instruments University DSP R&D Fund", DSP R&D Center, Texas Instruments, Dallas, TX.

- “Web-Enabled Simulation of Texas Instruments DSP Processors and Boards”
  - “Design Tools to Help Map Applications into Minimum Power Implementations on TMS320C54x and TMS320C6x Processors”
  - “High-Speed Digital Subscriber Line Generation 2 (HDSL2) Modem on a Single TMS320C6x Processor”
  - “Towards a DSP Solution for Real-Time MPEG-2 Encoding ”
  - “Standards-Compliant High-Quality Low-Bitrate Wireless Video Communications Using TMS320C6x and TMS320C54x Processors”
106. November 21, 1997, “Advanced Filter Design for Communications and Signal Processing Systems”, Digital Signal Processing Seminar, The University of Texas at Austin, Austin, TX.
  107. November 10, 1997, “The Wonders of Digital Signal Processing”, IEEE Brown Bag Lunch, The University of Texas at Austin, Austin, TX.
  108. November 4, 1997, “Generalized Coiflets”, IEEE Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA.
  109. November 4, 1997, “Advanced Filter Design”, IEEE Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA.
  110. November 3, 1997, “Blind Channel Estimation in CDMA Systems with Aperiodic Spreading Sequences”, IEEE Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA.
  111. November 3, 1997, “A Fingerprint Classification Technique Using Directional Images”, IEEE Asilomar Conf. on Signals, Systems, and Computers, Pacific Grove, CA.
  112. October 28, 1997, “Biorthogonal Quincunx Coifman Wavelets”, IEEE Int. Conf. on Image Processing, Santa Barbara, CA.
  113. October 27, 1997, “Digital Image Halftoning As 2-D Delta-Sigma Modulation”, IEEE Int. Conf. on Image Processing, Santa Barbara, CA.
  114. September 29, 1997, “Digital Image Halftoning as 2-D Delta-Sigma Modulation”, Rose-Hulman Institute of Technology, Terre Haute, IN.
  115. July 16, 1997, “Trends in Computer-Aided Design for Signal Processing Systems”, Laboratory for Video and Image Engineering, The University of Texas at Austin, Austin, TX.
  116. June 12, 1997, “Delta-Sigma Analysis of Image Halftoning by Error Diffusion”, Lucent Bell Laboratories, Holmdel, NJ.
  117. June 10, 1997, “Signal Modeling”, Guest Lecture for EE381K-9 Advanced Signal Processing, The University of Texas at Austin, Austin, TX.
  118. June 5, 1997, “An Introduction to Advanced Signal Processing”, Guest Lecture for EE381K-9 Advanced Signal Processing, The University of Texas at Austin, Austin, TX.
  119. May 9, 1997, “Delta-Sigma Analysis of Image Halftoning by Error Diffusion”, Georgia Institute of Technology, Atlanta, GA.

120. April 22, 1997, "Signal Processing System Design", Guest Lecture for EE382C Methodology for Hardware/Software Codesign, The University of Texas at Austin, Austin, TX.
121. March 17, 1997, "Error Diffusion as Delta-Sigma Modulation for Digital Image Halftoning", HP Research Laboratories, Palo Alto, CA.
122. March 14, 1997, "Web-Based Simulators for Embedded Software for Digital Signal Processors", Ptolemy Miniconference, University of California at Berkeley, Berkeley, CA.
123. February 28, 1997, "Software Development in the Unix Environment", Electrical and Computer Engineering Departmental Seminar, The University of Texas at Austin, Austin, TX.
124. February 20, 1997, "The Role of Symbolic Computation in Signal Processing System Design", Crystal Semiconductor, Austin, TX.
125. November 19, 1996, "An Algebraic Approach to Multi-Frame Blind Deconvolution", Smart Sensors for Space & Airborne Applications Workshop, Kirkland Air Force Base, NM.
126. November 19, 1996, "AM-FM Image Analysis", Smart Sensors for Space & Airborne Applications Workshop, Kirkland Air Force Base, NM.
127. November 6, 1996, "Optimization of Signal Processing Algorithms", Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA.
128. October 18, 1996, "Software Development in the Unix Environment", Electrical and Computer Engineering Department Seminar, The University of Texas at Austin, Austin, TX.
129. June 25, 1996, "Highlights of the Workshop on a Common Operating Environment for Signal Processing", Ptolemy Project Group Meeting, University of California at Berkeley, Berkeley, CA.
130. June 12, 1996, "Overview of the Ptolemy Project", Joint Services Workshop for a Common Signal Processing Operating Environment, Georgia Institute of Technology, Atlanta, GA.
131. June 10, 1996, "Overview of the Ptolemy Project", Industrial Liaison Program Conference, University of California at Berkeley, Berkeley, CA.
132. May 8, 1996, "Real-Time DSP for Sophomores", IEEE Int. Conf. on Acoustics, Speech, and Signal Proc., Atlanta, GA.
133. April 30, 1996, "The Role of Symbolic Computation in Signal Processing System Design", MicroUnity, Mountain View, CA.
134. April 21, 1996, "The Role of Symbolic Computation in Signal Processing System Design", University of British Columbia, Vancouver, CA.
135. April 17, 1996, "The Role of Symbolic Computation in Signal Processing System Design", Catholic University of America, Washington, D.C.
136. April 15, 1996, "The Role of Symbolic Computation in Signal Processing System Design", Pennsylvania State University, University Park, PA.
137. April 12, 1996, "The Role of Symbolic Computation in Signal Processing System Design", University of Maryland, College Park, MD.

138. April 11, 1996, “The Role of Symbolic Computation in Signal Processing System Design”, Virginia Polytechnic Institute and State University, Blacksburg, VA.
139. April 9, 1996, “The Role of Symbolic Computation in Signal Processing System Design”, Dartmouth College, Hanover, NH.
140. April 8, 1996, “Theory and Implementation of Multirate Digital Signal Processing Systems”, Dartmouth College, Hanover, NH.
141. April 4, 1996, “The Role of Symbolic Computation in Signal Processing System Design”, UCLA, Los Angeles, CA.
142. March 29, 1996, “The Role of Symbolic Computation in Signal Processing System Design”, University of Rochester, Rochester, NY.
143. March 25, 1996, “The Role of Symbolic Computation in Signal Processing System Design”, The University of Texas, Austin, TX.
144. January 26, 1996, “Mathematica and the Ptolemy/Mathematica Interface”, DSP Design Group Meeting, University of California at Berkeley, Berkeley, CA.
145. November 16, 1995, “Filter Design in MATLAB and Mathematica”, DSP Design Group Meeting, University of California at Berkeley, Berkeley, CA.
146. November 9, 1995, “MATLAB and the Ptolemy/MATLAB Interface”, DSP Design Group Meeting, University of California at Berkeley, Berkeley, CA.
147. May 1995, “Integrating Analysis, Simulation, and Implementation Tools in Electronic Courseware for Teaching Signal Processing”, IEEE Int. Conf. on Acoustics, Speech, and Signal Proc., Detroit, MI.

## Patents

- Matthew D. Felder, James C. Mason, and Brian L. Evans, *Efficient Digital ITU-Compliant, Zero-Buffering, DTMF Detection Using the Non-Uniform Discrete Fourier Transform*, US Patent 6608896, issued Aug. 19, 2003, application number 10/021,397. Non-Confidential Specification Sheet. Patent sold to Mosaid Technologies Inc. in April 2007.
- Matthew D. Felder, James C. Mason, and Brian L. Evans, *Efficient Digital ITU-Compliant, Zero-Buffering, DTMF Detection Algorithm Using the Non-Uniform Discrete Fourier Transform*, US Patent 6370244, issued Apr. 9, 2002, application number 09/054,872. Non-Confidential Specification Sheet. Patent sold to Mosaid Technologies Inc. in April 2007.

## Copyrighted Software

- Kapil Gulati, Marcel Nassar, Navid Aghasadeghi, Arvind Sujeeth, and Brian L. Evans, *Radio Frequency Interference Modeling and Mitigation Toolbox in MATLAB*, copyright © 2006–2009 by The University of Texas. This toolbox provides a simulation environment for generating radio frequency interference (RFI) and quantifying the performance of algorithms for parameter estimation and interference mitigation. Consists of 82 files containing 2,000 lines and 380 kB of Matlab source code. Version 1.3 (August 26, 2009) is available at <http://www.ece.utexas.edu/~bevans/projects/rfi/software>.

- Vishal Monga, Divyanshu Vats, and Brian L. Evans, *Matlab Image Hashing Toolbox*, copyright © 1999–2006 by The University of Texas. Toolbox contains several methods for computing a hash value (on the order of 100 bits) from images (on the order of 1 MB). The distance between hash values has a perceptual meaning of closeness in image features. Applications are in image authentication and image database indexing. Version 0.1 beta (June 18, 2006) is available at  
<http://www.ece.utexas.edu/~bevans/projects/hashing/toolbox/index.html>.
- Alex G. Olson, Daifeng Wang, Ian C. Wong, and Brian L. Evans, *ADSL2 Simulator*, copyright © 2005–2006 by The University of Texas. A discretized, physical layer, second-generation asymmetric digital subscriber line (ADSL) simulator for high-speed Internet access from the home and small business. Simulator is in LabVIEW, but also exists as a standalone program. ADSL is more commonly known as DSL. The structure and default parameters of the transmitter, channel model, and receiver follow the ADSL2 ITU-T G.992.3 standard. Version 1.1 (May 24, 2006) is available at  
<http://www.ece.utexas.edu/~bevans/projects/adsl/simulator/index.html>.
- Kyungtae Han and Brian L. Evans, *Floating-Point to Fixed-Point Transformation Toolbox*, copyright © 2005–2006 by The University of Texas. This freely distributable toolbox automates conversion of floating-point programs to fixed-point programs and quantifies the tradeoff in signal quality vs. implementation complexity in fixed-point wordlength choices. One application of this toolbox is to reduce the power consumed by existing algorithms in an embedded software or hardware implementation. Version 1.1 (May 22, 2006) is available at  
<http://www.ece.utexas.edu/~bevans/projects/wordlength/converter/index.html>.
- Vishal Monga, Niranjan Damera-Venkata, Hamood-ur Rehman, and Brian L. Evans, *Matlab Halftoning Toolbox*, copyright © 1999–2005 by The University of Texas. Collection of grayscale and color image halftoning methods for printing and displaying images, and figures of merit for evaluation of image halftoning methods. Used by more than 60 companies and universities. Version 1.2 (July 25, 2005) is available at  
<http://www.ece.utexas.edu/~bevans/projects/halftoning/toolbox/index.html>.
- Mayank Gupta and Brian L. Evans, *Rule-Of-Thirds Automation for Digital Still Cameras*, copyright © 2004 by The University of Texas. Automation of the rule-of-thirds photographic composition rule during image acquisition in C for desktop and digital signal processors. Version 0.1 beta (June 12, 2004) is available at  
[http://www.ece.utexas.edu/~bevans/projects/dsc/software/RuleOfThirds0\\_1beta.zip](http://www.ece.utexas.edu/~bevans/projects/dsc/software/RuleOfThirds0_1beta.zip).
- Serene Banerjee and Brian L. Evans, *Smart Image Acquisition for Digital Still Cameras*, Automation of photographic composition rules during image acquisition in Matlab. Version 1.0 Beta (February 15, 2004) is available at  
[http://www.ece.utexas.edu/~bevans/projects/dsc/software/SmartCamera1\\_0.zip](http://www.ece.utexas.edu/~bevans/projects/dsc/software/SmartCamera1_0.zip).
- Güner Arslan, Ming Ding, Biao Lu, Milos Milosevic, Zukang Shen, and Brian L. Evans, *Matlab Discrete Multitone Equalizer Toolbox*, copyright © 2000–2003 by The University of Texas. Graphical user interface and functions in Matlab to design four different multicarrier equalizer structures: conventional, dual-path, per tone, and filter bank. Dual-path and filter bank equalizers were proposed by Evans *et al.* Several training methods implemented: thirteen for conventional, two for dual-path, two for per tone, and one for filter bank equalizers. Default parameters are from the G.DMT ADSL standard for downstream transmission. Version 3.1 (May 10, 2003) is available at

<http://www.ece.utexas.edu/~bevans/projects/adsl/dmtteq/dmtteq.html>.

- Dogu Arifler, Chi Duong, Brian L. Evans, Srikanth Gummadi, Saleem K. Marwat, Chris M. Moy, and Anna Yuan, *Web-Enabled Simulation*, copyright © 1996–2001 by The University of Texas. An extensible and portable framework for Web-enabled interfaces to simulators and debuggers. The framework consists of a configurable graphical user interface (Java applets), a multithreaded TCP/IP Server written (Java application), TMS320C30 digital signal processor, MC68HC11 microcontroller, and MC58800 digital signal processor simulators (C/C++), and a debugger for a MC58800 digital signal processor board. Consists of 148 files containing 54,000 lines and 1.7 Mb of C, C++, and Java source code. Version 1.3.0 (May 18, 2001) is available at <http://signal.ece.utexas.edu/~arifler/wetics/index.html>.
- Niranjan Damera-Venkata and Brian L. Evans, *Image Quality Assessment*, copyright © 2001 by The University of Texas. Matlab files to compute linear and nonlinear quality measures when comparing an original to a processed image. Version 1.0 (April 28, 2001) is available at [http://signal.ece.utexas.edu/software/imageQuality/quality1.0/ImageQuality1\\_0.zip](http://signal.ece.utexas.edu/software/imageQuality/quality1.0/ImageQuality1_0.zip)
- Niranjan Damera-Venkata and Brian L. Evans, *Filter Optimization Packages for MATLAB and Mathematica*, copyright © 1993–1998 by the Regents of the University of California. Mathematica packages to generate MATLAB software to perform a joint optimization of several characteristics of analog infinite impulse response filters. Supported characteristics are magnitude response, phase response, step response, and quality factors. New characteristics can be easily added. Version 1.1 (June 23, 1998) is available at [http://www.ece.utexas.edu/~bevans/projects/filters/filter\\_design.html](http://www.ece.utexas.edu/~bevans/projects/filters/filter_design.html).
- Niranjan Damera-Venkata, Thomas D. Kite, and Brian L. Evans, *Fast Inverse Halftoning Algorithms*, copyright © 2001 by The University of Texas. Contains two fast inverse halftoning algorithms in C. Version 1.0 (June 21, 1998) is available at <http://www.ece.utexas.edu/~bevans/projects/inverseHalftoning.html>.
- Joseph T. Buck, Edward A. Lee, Brian L. Evans, Soonhoi Ha, David G. Messerschmitt, Thomas Parks, José L. Pino, and others. *Ptolemy Classic Software Environment*, a graphical block diagram environment for specifying, simulating, and synthesizing signal processing and communications systems, copyright © 1990–1998 by Regents of the University of California. Runs on 12 different Unix architectures. Version 0.7.1, the seventh major version, was released on June 12, 1998. Between August 3, 1998, and February 23, 1999, Ptolemy Classic 0.7.1 was downloaded 3135 times from 450 different Internet domains. Consists of 2700 files containing 440,000 lines and 11.4 Mb of C, C++, Tcl/Tk, and Java source code. Releases are available at <http://ptolemy.eecs.berkeley.edu/ptolemyclassic/pt0.7.1/>.
- Brian L. Evans and Steve X. Gu, *TMath*, a Tcl/C++ interface to Mathematica and MATLAB, copyright © by Regents of the University of California 1996. Runs on 10 different Unix architectures. Version 0.2 (released July 8, 1997) is available at <http://www.ece.utexas.edu/~bevans/projects/tmath.html>.
- Raza Ahmed and Brian L. Evans, *Heuristic Search Packages for Mathematica*, copyright © 1996 by Regents of the University of California. A general framework for applying transformation rules to minimize the cost of implementation of algebraic expressions. Available at

<http://www.mathsource.com/cgi-bin/MathSource/Applications/ComputerScience/0208-044>.

- Brian L. Evans and John M. Novak, *Signals and Systems Pack*, Wolfram Research Inc., October 15, 1995. Contains the Signal Processing Packages (see below) plus 200 pages of documentation. More than 10,000 copies sold.
- Brian L. Evans, Steve X. Gu, Edward A. Lee, and Philip Chen, *Mathematica Notebooks to Accompany Contemporary Linear Systems Using MATLAB*, PWS Publishing Company, ISBN 0-534-93509-5 (PC) and 0-534-93507-9 (Mac), June, 1995. Interactive solution sets containing the Signal Processing Packages (see below) plus introductory electronic notebooks and a “tutoring” and a “solutions” electronic notebook for each chapter of Robert D. Strum and Donald E. Kirk, *Contemporary Linear Systems Using MATLAB*, PWS Publishing Company, ISBN 0-534-94710-7, 1995.
- Brian L. Evans, James H. McClellan, Joseph M. Winograd, Lina J. Karam, Robert H. Bamberger, Wallace B. McClure, and Kevin B. West, *Signal Processing Packages and Notebooks for Mathematica*, copyright © by Georgia Tech Research Corporation, 1989–1998. Runs in Mathematica 2.x. Version 2.9.5 is available by FTP from ftp.eedsp.gatech.edu. Downloaded by over 1000 sites. Packages consist of 42 files containing 1 Mb of Mathematica source code. Notebooks serve as on-line tutorials.

## Projects Funded

- Since September 1, 1996, funded projects have totaled \$2,946,235, with \$2,764,017 from external and \$182,218 from internal sources. Project funding that has gone directly to my research group totals \$2,444,627.
- Individual Projects
  - \$110,000, 9/1/09 – 8/31/10, *Radio Frequency Interference Sensing and Mitigation in Wireless Transceivers*, Intel Research Council, Portland, OR.
  - \$150,000, 12/6/06 – 8/31/09, *In-Platform Radio Frequency Interference Mitigation for Wireless Communications*, a no-overhead unrestricted gift from the Intel Research Council, Portland, OR.
  - \$440,000, 10/3/06 – 8/31/10, *Communications Systems*, Sponsored Research Project, Schlumberger, Sugar Land, TX.
  - \$ 30,000, 9/1/07 – 8/31/08, *Signal Processing Research*, a no-overhead unrestricted gift from National Instruments, Austin, TX.
  - \$ 15,000, 1/16/08 – 5/31/08, *Image Processing Research*, a no-overhead unrestricted gift from Qualcomm MEMS Technologies, San Jose, CA.
  - \$ 20,000, 9/1/06 – 8/31/09, *Wireless Communications Research*, a no-overhead unrestricted gift from the Wireless Networking and Communications Group, The University of Texas at Austin, Austin, TX.
  - \$ 50,000, 1/1/05 – 12/31/05, *Embedded Real-Time Signal Processing*, a no-overhead unrestricted gift from an anonymous donor.
  - \$ 55,000, 1/1/05 – 12/31/06, *Communications Systems*, a no-overhead unrestricted gift from Schlumberger, Sugar Land, TX.
  - \$ 4,500, 9/1/04 – 8/31/05, Robert and Jane Mitchell Faculty Fellowship, College of Engineering, The University of Texas, Austin, TX 78712.

- \$ 16,000, 8/24/04 – 8/31/05, *Real-Time Imaging Projects*, a no-overhead unrestricted gift from Intel Academic Relations, Portland, OR.
- \$ 48,185, 3/1/04 – 12/31/04, *Real-Time Imaging Projects*, Intel Academic Relations Equipment Grant, Portland, OR.
- \$ 50,000, 1/1/04 – 12/31/04, *Embedded Real-Time Signal Processing*, a no-overhead unrestricted gift from an anonymous donor.
- \$ 60,000, 1/1/04 – 12/31/06, *Robust Perceptual Image Hashing*, a no-overhead unrestricted gift from Xerox Foundation, Webster, NY.
- \$ 2,179, 9/1/03 – 8/31/04, Mrs. Pearlie Dashiell Henderson Centennial Faculty Fellowship, College of Engineering, The University of Texas, Austin, TX 78712.
- \$ 50,000, 1/1/03 – 12/31/03, *Embedded Real-Time Signal Processing*, a no-overhead unrestricted gift from an anonymous donor.
- \$ 42,000, 9/1/02 – 1/15/03, *Optimizing Communication Speed of ADSL and VDSL Modems for High-Speed Internet Access*, Faculty Research Assignment Award, The University of Texas at Austin, Austin, TX 78712.
- \$ 4,000, 9/1/02 – 8/31/03, Mrs. Pearlie Dashiell Henderson Centennial Faculty Fellowship, College of Engineering, The University of Texas, Austin, TX 78712.
- \$178,485, *Equipment Grant to Upgrade the Real-Time Digital Signal Processing Laboratory and Senior Design Courses*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 35,000, 9/1/01, *ADSL/VDSL Transceiver Design*, a no-overhead unrestricted gift from Motorola, Inc., Austin, TX, 78704.
- \$ 3,000, 9/1/01, Mrs. Pearlie Dashiell Henderson Centennial Faculty Fellowship, College of Engineering, The University of Texas, Austin, TX 78712.
- \$ 9,960, 7/12/01, *Equipment Grant for a Real-Time Digital Signal Processing Laboratory and Senior Design Courses*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 35,000, 9/1/00, *ADSL/VDSL Transceiver Design*, a no-overhead unrestricted gift from Motorola, Inc., Austin, TX, 78704.
- \$ 5,139, 9/1/00, Mrs. Pearlie Dashiell Henderson Centennial Faculty Fellowship, College of Engineering, The University of Texas, Austin, TX 78712.
- \$ 13,950, 7/10/00, *Equipment Grant for a Real-Time Digital Signal Processing Laboratory and Senior Design Courses*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 16,600, 4/26/00, *Equipment Grant for Video Codec Development*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 9,000, 9/1/99, *Curriculum Development Grant*, Texas Telecommunications Engineering Consortium, College of Engineering, The University of Texas at Austin, Austin, TX 78712.
- \$ 9,000, 11/1/99, *Color Image Halftoning Research*, a no-overhead unrestricted gift from Hewlett Packard Laboratories, Palo Alto, CA 94304, through their Imaging Technology Department.
- \$ 10,000, 9/1/99, *Neural Networks Channel Equalizer Using Altera FPGAs*, University Program, Altera, San Jose, CA 95134.
- \$ 19,450, 6/24/99, *Equipment Grant for a Real-Time Digital Signal Processing Laboratory and Senior Design Courses*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 5,000, 6/1/99, *WebCT Instruction for Telecommunication Systems Courses*, Academic Development Grant, College of Engineering, The University of Texas at Austin, Austin, TX 78712.

- \$ 20,000, 6/1/99, *Modern Digital Signal Processing Architectures for Halftoning*, a no-overhead unrestricted gift from Hewlett Packard Laboratories, Palo Alto, CA 94304, through their Imaging Technology Department.
- \$ 9,500, *Curriculum Development Grant*, Texas Telecommunications Engineering Consortium, College of Engineering, The University of Texas at Austin, Austin, TX 78712.
- \$ 4,000, *Faculty Incentive Grant*, Texas Telecommunications Engineering Consortium, College of Engineering, The University of Texas at Austin, Austin, TX 78712.
- \$ 15,000, 1/1/98, *Video Processing Research*, a no-overhead unrestricted gift from Accelerix, Inc., 11000 N. Mopac Expressway, Austin, TX 78759.
- \$210,000, 9/1/97 – 8/31/01, *Scalable Software and Hardware for Image and Video Processing Systems*, NSF CAREER Award, MIP-9702707, National Science Foundation, Arlington, Virginia 22230.
- \$ 84,172, 6/1/97 – 11/1/99, *Design of Distributed Adaptive Signal Processing Systems*, DARPA Composite CAD Program, Contract DAAB07-97-C-J007, Electronic Technology Office, Defense Advanced Projects Research Agency, Arlington, Virginia 22203-1714, subcontract from the Sponsored Projects Office, University of California, Berkeley, CA 94720.
- \$ 20,000, 6/1/97 – 8/31/00, *Equipment Grant for a Real-Time Digital Signal Processing Laboratory Course*, University Program, Texas Instruments, Houston, TX 77251.
- \$ 14,400, 6/1/97 – 7/31/97, *Scalable Software for Image and Video Processing Systems*, Summer Research Assignment Grant, The University of Texas at Austin, Austin, TX 78712.
- \$ 10,000, 9/1/96 – 8/31/97, *Signal Processing Research*, a no-overhead unrestricted gift from the Shell Oil Company Foundation, Bellaire Technology Center, Houston, TX 77025.
- \$ 4,500, 9/1/96 – 8/31/98, *A Real-Time Digital Signal Processing Laboratory*, Academic Development Grant, College of Engineering, The University of Texas at Austin, Austin, TX 78712.
- \$ 5,000, 9/1/96 – 8/31/97, *Design and Implementation of Signal Processing Systems*, Research Initiation Award In Engineering, Bureau of Engineering Research, The University of Texas at Austin, Austin, TX 78712.
- \$ 50,000, 9/1/96 – 8/31/98, *Embedded Systems Research*, Equipment Grant, College of Engineering, The University of Texas at Austin, Austin, TX 78712.

- Joint Projects

- \$127,500, 1/1/02 – 12/31/03, *DSL to 802.11 Bridge: Enabling High-Speed Wireless Internet Access at Home and Small Offices*, The State of Texas Advanced Technology Program, Division of Research, Planning and Finance, Texas Higher Education Coordinating Board, P. O. Box 12788, Austin, TX 78711-2788. Co-Principal Investigator is Robert W. Heath, Jr..
- \$ 10,000, 1/15/00 – 12/31/01, *Biomedical Image Analysis*, a no-overhead unrestricted gift from Perceptive Scientific Instruments, League City, TX 77573. Co-principal investigator is Prof. Alan C. Bovik.
- \$198,700, 1/15/00 – 12/31/01, *Foveated Wireless Video Communication*, The State of Texas Advanced Research Program, Division of Research, Planning and Finance, Texas Higher Education Coordinating Board, P. O. Box 12788, Austin, TX 78711-2788  
Principal investigator is Prof. Alan C. Bovik.

- \$198,712, 1/15/00 – 12/31/01, *Standards-Compliant High-Quality Low-Bitrate Wireless Video Communications Using TMS320C6x and TMS320C54x Processors*, Texas Instruments DSP R&D Fund, Houston, TX 77251. Principal investigator is Prof. Alan C. Bovik.
- \$ 63,303, 6/1/98 – 5/31/99, *Loop Filter Development Project*, Semiconductor Products Sector Sponsored Research Project, Motorola, Inc., Austin, TX, 78704. Co-principal investigator is Prof. Takis Konstantopoulos.
- \$ 25,000, 6/1/98 – 5/31/99, *Automatic Integration of Intellectual Property Cores*, a no-overhead unrestricted gift from the Rockwell Semiconductor Systems, Newport Beach, CA 92658. Co-principal investigator is Prof. Margarida Jacome.
- \$250,000, 9/1/97 – 8/31/00, *Digital Video Telecommunications Research and Teaching in the Laboratory for Image and Video Engineering*, co-principal investigator with Alan C. Bovik, which was part of a \$6,000,000 university equipment infrastructure grant entitled *High-Performance Computing at the University of Texas at Austin* funded by the Utilization of Advanced Intel Based Platforms in Computationally Demanding Tasks Program, Academic Relations, Intel Corporation, Hillsboro, OR 97124-6497.
- \$ 15,000, 9/1/97, *Image Halftoning Research*, a no-overhead unrestricted gift from Hewlett Packard Laboratories, Palo Alto, CA 94304, through their Imaging Technology Department. Co-principal investigator with Alan C. Bovik.
- \$115,000, 6/1/97 – 5/31/00, *AM-FM Analysis of Images and Video*, co-principal investigator with Alan C. Bovik, Augmentation Awards for Science and Engineering Research Training, Air Force Office of Scientific Research, Bolling Air Force Base, D.C. 20332-80801.

## Continuing Education

- Founder and organizer (1996–2003) of a Wireless Networking and Communications Seminar in the Dept. of ECE. This seminar series has been funded by the Texas Telecommunications Engineering Consortium (2000–2003) and Tivoli (2002-2003). Seminar announcements were posted on the Web and to an e-mail list that included more than 50 people from local industry (AMD, Analog Devices, Cicada, Cirrus, Crystal, ESS Technology, IBM, I/O Systems, Motorola, National Instruments, SBC, Schlumberger, Shell, The Silicon Group, and Tracor). More than 200 presentations were made in the seminar series.
- Presented the following training sessions in the Engineering Science Building at The University of Texas at Austin that were open to the public:
  - “Software Development in the Unix Environment”, November 10, 2000
  - “Software Development in the Unix Environment”, March 26, 1999
  - “Software Development in the Unix Environment”, January 23, 1998
  - “Software Development in the Unix Environment”, February 28, 1997
  - “Software Development in the Unix Environment”, October 18, 1996
- Instructor at the 1992, 1993, 1994, and 1995 *NSF Workshop on Revitalizing the Engineering, Mathematics, and Science Curricula Via Symbolic Algebra*, to teach professors how to develop new types of problems that students can work using the algebraic abilities of computer algebra systems

## Current Graduate Students

- Students admitted to candidacy

- Gregory E. Allen
- Post M.S. students
  - Lina Al-Kanj (exchange student)
  - Hugo A. Andrade
  - Aditya Chopra
  - Marcus R. DeYoung
  - Kapil Gulati
  - Yousof Mortazavi
  - Marcel Nassar
  - Hamood-ur Rehman
- M.S. in progress
  - Chao Jia
  - Jing Lin
  - Akshaya Srivatsa
  - Kyle Wesson

## Graduate Students Supervised

- Ph.D. Dissertations
  - Ian C. Wong, *A Unified Framework for Optimal Resource Allocation in Multiuser Multicarrier Wireless Systems*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2007. **Currently** he is working as a Senior RF/Communications Software Engineer at National Instruments at Austin, Texas USA.
  - Kyungtae Han, *Automating Transformations from Floating-point to Fixed-point for Implementing Digital Signal Processing Algorithms*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, August 2006. **Currently** he is working as a Senior Hardware Engineer at Intel Research Labs in Hillsborough, Oregon USA.
  - Zukang Shen, *Multiuser Resource Allocation in Multichannel Wireless Communication Systems*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2006. **Currently** Cellular Systems Engineer at Datang Mobile in Beijing, China.
  - Vishal Monga, *Perceptually Based Methods for Robust Image Hashing*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 2005. **Currently** he is a Member of Research Staff at Xerox Research Labs in Rochester, New York USA. He has accepted a position as an Assistant Professor in the Department of Electrical Engineering at the main campus of The Pennsylvania State University.
  - Serene Banerjee, *Composition-Guided Image Acquisition*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 2004. **Currently** she is a Research Scientist at HP Research Labs in Bangalore, India.
  - Ming Ding, *Channel Equalization to Achieve High Bit Rates In Discrete Multitone Systems*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 2004. **Currently** he is a Senior Staff Software Engineer at Broadcom in San Jose, California USA.

- Dogu Arifler, *Network Tomography Based on Flow Level Measurements*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2004. **Currently** he is an Associate Professor in the Dept. of Computer Engineering, at Eastern Mediterranean University in Famagusta, Cyprus.
  - Milos Milosevic, *Maximizing Data Rate of Discrete Multitone Systems using Time Domain Equalization Design*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2003. Technical Report WNCG-TR-2003-05-02. **Currently** he is working as a Principal Engineer in Wireline Acquisition, Power and Telemetry at Schlumberger, Sugar Land, Texas USA.
  - Wade C. Schwartzkopf, *Maximum Likelihood Techniques for Joint Segmentation-Classification of Multi-spectral Chromosome Images*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 2002. Technical report WNCG-TR-2002-12-06. **Currently** he is a Research Scientist at Integrity Applications Inc. in Chantilly, Virginia USA.
  - K. Clint Slatton, *Adaptive Multiscale Estimation for Fusing Image Data*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 2001. **Currently** he is an Associate Professor in the Department of Electrical and Computer Engineering at the University of Florida in Gainesville, Florida USA. Prof. Slatton won a 2007 Presidential Early Career Award in Science and Engineering (PECASE).
  - Güner Arslan, *Equalization for Discrete Multitone Transceivers*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 2000. **Currently** he is a Principal Design Engineer at ST-Ericsson in Austin, Texas USA.
  - Niranjan Damera-Venkata, *Analysis and Design of Vector Error Diffusion Systems for Image Halftoning*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 2000. **Currently** he is a Principal Scientist in the Multimedia Interaction and Understanding Laboratory at HP Research Labs in Palo Alto, California USA.
  - Biao Lu, *Wireline Channel Estimation and Equalization*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 2000. **Currently** she is a Senior Software Engineer at OpenSpirit Corp. in Sugar Land, Texas USA.
  - Murat Torlak, *Estimation and Capacity of Channels in Smart Antenna Wireless Communication Systems*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 1999. **Currently** he is a tenured Associate Professor in the Dept. of Electrical Engineering, at The University of Texas at Dallas, Richardson, Texas USA.
  - Thomas D. Kite, *Design and Quality Assessment of Forward and Inverse Error Diffusion Halftoning Algorithms*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 1998. **Currently** he is Vice President of Engineering at Audio Precision in Beaverton, Oregon USA.
  - Dong Wei, *Coiflet-Type Wavelets: Theory, Design, and Applications*, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 1998. **Currently** he is a Member of Technical Staff at at&t Research Labs in Austin, Texas USA.
- MS Reports & Theses
    - Thomas P. Higdon, *The Implementation of a Sonar Beamformer on the Cell Broadband Engine*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2008. **Currently** he works in software-defined radios for Vanu in Cambridge, Massachusetts USA.

- Jeffrey B. Livingston, *Time-Scale Modification of Audio Signals Using the Dual-Tree Complex Wavelet Transform*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, December 2006. **Currently** he works as a Design Engineer for Cirrus Logic in Austin, Texas USA.
- Young H. Cho, *Implementation of a 3-D Sonar Beamformer Using the Computational Process Network Model on a Synergy Quad PowerPC G4 with Altivec Board*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 2001. **Currently** he is a post-doctoral researcher at UCLA in Los Angeles, California USA. He finished a PhDEE degree at UCLA, and is also the founder of Open Acceleration Systems Research in Chatsworth, California USA.
- Norman K. James, *PLL Modelling Using Software Tools*, MSEE Report, Option III Executive Software Engineering Program, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 1999. **Currently** he works as a Phase Locked Loop Designer for Microprocessors at IBM in Austin, Texas USA.
- Srikanth Gummadi, *Space-Time Processing for Wireless Base Stations*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Dec. 1998. **Currently** he works as a Member of the Technical Staff in Wireless LAN Design for Alantro Communications in Santa Rosa, California USA, which is part of Texas Instruments.
- Gregory E. Allen, *Real-Time Sonar Beamforming on a Symmetric Multiprocessing Unix Workstations Using Process Networks and POSIX Pthreads*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, Aug. 1998. **Currently** he works as a Research Engineer in the Advanced Technology Laboratory for the UT Applied Research Laboratories in Austin, Texas USA, and is also a part-time Ph.D.E.E. student at UT.
- Amey A. Deosthali, *Embedded Signal Processing on Microcontrollers*, MSEE Report, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 1998. **Currently** he works as a Senior Manager at the Texas Instruments Wireless Division in Dallas, Texas USA.
- Charles R. Powers, *A Review of Performance Analysis (Benchmarking) Approaches for Embedded Microprocessors and Microcontrollers*, MSSE Report, Option III Executive Software Engineering Program, Dept. of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX 78712, May 1998. **Currently** he works as Manager of Systems Engineering for Intelligent Transportation Systems for Motorola in Austin, Texas USA.

## Other Research Supervision

- Ph.D. Defense Committees (38): Taner Akkin, Dogu Arifler, Gregory E. Allen, Alberto Arredondo, Güner Arslan, Serene Banerjee, Gwangwoo “Johnny” Choe, Eun Ho Choi, Thayne R. Coffman, Niranjana Damera-Venkata, Ming Ding, Kurt A. Feiste, Kyungtae Han, Adnan Kavak, Ivy Kelly, Youngok Kim, Thomas D. Kite, Hoojin Lee, Sanghoon Lee, Shizhong Liu, Biao Lu, Anderson Mills, Milos Milosevic, Bishwarup Mondal, Vishal Monga, Hung-ta Pai, Jeffrey T. Russell, Koichi Sato, Wade C. Schwartzkopf, K. C. Slatton, Zukang Shen, Deependra Talla, Murat Torlak, Yuanxun Wang, Zhou Wang, Dong Wei, Ian C. Wong, and Shi Zhong.
- Ph.D. Qualifying Committees (41): Taner Akkin, Gregory E. Allen, Dogu Arifler, Güner Arslan, Alberto Arredondo, Serene Banerjee, Ramya Bhagavatula, Gwangwoo “Johnny” Choe, Thayne R. Coffman, Niranjana Damera-Venkata, Kurt A. Feiste, Kyungtae Han, Adnan Kavak, Thomas D. Kite,

Jaekwon Kim, Hoojin Lee, Sanghoon Lee, Jinyang Liang, Biao Lu, Anderson Mills, Milos Milosevic, Bishwarup Mondal, Vishal Monga, Hung-ta Pai, CheolHee Park, Sri Priya Ponnappalli, Jeffrey T. Russell, Koichi Sato, Wade C. Schwartzkopf, K. C. Slatton, Zukang Shen, Deependra Talla, Murat Torlak, Joel Tropp, Yuanxun Wang, Zhou Wang, Jeff Wehnes, Dong Weilan Wong, Johnathan York, Shi Zhong.

- M.S. Thesis Committees (3): Anjum Ali, Mike Kuei-che Cheng, and Hamid R. Sheikh.
- M.S. Report Committees (12): Gregory E. Allen, John R. W. Ammerman, Tai-Wu Chiang, Amey A. Deosthali, Srikanth Gummadi, Thomas P. Higdon, Norman James, Jeff Livingston, Benjamin Marrou, Charles R. Powers, Roopsha Samanta, and Mahalakshmi Venkataraman.
- Undergraduate thesis students (2): Marynia Demkowicz and Christopher Jackson.
- Undergraduate senior design students (119): Djordje Adnadjevic, Moiz Ahmad, Navid Aghasadeghi, Holly Ammerman, Dogu Arifler, Nabil Aounallah, Farris Bar, Wade Berglund, Gary Bernitz, Kevin M. Boyd, Colin Bozarth, Justin Burk, Jerel Canales, Daniel Chan, John Chang, Robert Chang, Andy Chao, Andrew Chen, Howard Chen, Yeeland Chen, Umar Chohan, Douglas Coleman, Brandon Copley, Si Crouch, Fullon Delco, Alden Doyle, Douglas Drinka, Chi Duong, Blake Dumas, Michael Elhofy, Brandon Elliott, Peter Erickson, Elmustafa Erwa, Amir Farahani, Robson Fricks, James Fung, Chinmoy Gavini, Ricardo Garcia, Morton Garay, Austin Grossman, Mayank “Mike” Gupta, Rezaul Hasan, Mark Hayenga, Eric Heinen, Marcelo Hinojosa, Joyce Huang, Daniel Huff, Ali Hussain, Altamash Janjua, Courtney Jones, Robert Jones, Robert Kang, Tim Kao, Jason Keller, Ehsan Khan, Eric Kirchenwitz, Joseph Koenig, Joel Koepke, Patrick Kreuzer, Ishan Kumar, Jorge Lara-Garduno, Stanley Tze Law, Peter Ka Lee, Alvin Leung, David Liu, Shan Liu, Shawn Liu, Jeff Livingston, David Love, Danny Lynch, Marjo Manalang, Ketan Mandke, Vivek Mani, Scott Margo, Saleem K. Marwat, Julia Montgomery, Chris M. Moy, Robert Mullenix, Kurt Nee, Ben Nguyen, Ha Nguyen, Han Nguyen, Huy Nguyen, Roy Patterson, Aaron Prasanna, Stephen Pun, Mazyar Razzaz, Hamood-ur Rehman, Esther Resendiz, Matthew Riley, Nicolas Rodriguez, Justin Romero, Andrew Rumelt, Mione Sadeghzadeh, Francisco Serna, Abdelaziz Skiredj, David Stachelski, Leonard Staller, Jonathan Starr, Junichi Sugiura, Arvind Sujeeth, Kong Susanto, Frank Sun, Michael Tarin, Matt Tech, Bill Terry, Arvind Thirunarayanan, George Tipple, Travis Tucker, Divyanshu Vats (**won 2006 University Co-op/George H. Mitchell Award for Academic Excellence**), Milton Villeda, Jennifer Vining, Michael Vu, Nick Wong, Jeff Wu, Jace Yarbrough, Jonathan York, Bo Yu, and Anna Yuan.
- Other undergraduate supervision (8): Babar Ahmed, Navid Aghasadeghi, Brian Fernandes (conference course), Ricardo R. Garcia, Mohamed Gzara (exchange student), Robert Mullenix, Nnaemeka Ben Okafor, Arvind Sujeeth, and Divyanshu Vats.

## Computer Skills

- Assembly languages: Texas Instruments TMS320C3000/C5000 DSP, Texas Instruments TMS320C6000 VLIW DSP, Motorola 56000 DSP, Motorola 68000, Vax, PDP 11
- Scripting languages: csh, ksh, Perl, sed, sh, Tcl/Tk
- High-level languages: C, C++, Java, Lisp, Pascal, Fortran, APL
- Algorithm development environments: Khoros, LabVIEW, Maple, Mathematica, Matlab
- Electronic design automation tools: LabVIEW, Ptolemy Classic, SIMULINK, Spice

- Knowledge-based environments: NExpert (expert system) and Integrated Process and Understanding of Signals (blackboard architecture)
- Software development tools: makefiles, source code control, Purify, debuggers, class browsers, gnats
- Developed large software systems portable to Unix and Windows NT operating systems

## Vita

Dr. Brian L. Evans is Professor of Electrical and Computer Engineering at The University of Texas at Austin, and holds the Robert and Jane Mitchell Faculty Fellowship in Engineering. Prof. Evans' research efforts are in embedded real-time digital signal processing systems. His research group derives application performance bounds and optimal algorithms to achieve those bounds, as well as near-optimal low-complexity algorithms and embedded prototypes. In signal processing, his group researches multicarrier communication systems for high-speed Internet access. In multicarrier communication systems, his group's contributions include the first linear complexity algorithm that allocates resources for optimal bit rates in multiuser OFDM basestations and is realizable in fixed-point hardware/software, as well as the first ADSL equalizer training method that maximizes a measure of the bit rate and is realizable in real-time fixed-point software. In image processing, his group researches high-quality halftoning for desktop printers and perceptual image hashing. for image databases and multimedia authentication. In imaging, his group's primary contribution is in the design, analysis, and quality assessment of halftoning by error diffusion for real-time processing by printer pipelines. Prof. Evans has published over 180 refereed conference and journal papers.

Dr. Evans is the primary architect of the *Signals and Systems Pack* for Mathematica, which was on the market from October 1995 to June 2008. He was a key contributor to UC Berkeley's Ptolemy Classic electronic design automation environment for embedded systems, which has been successfully commercialized by Agilent and Cadence. He developed and currently teaches two graduate courses, Multidimensional Digital Signal Processing. and Embedded Software Systems, and two undergraduate courses, Real-Time Digital Signal Processing Laboratory, and Linear Systems and Signals, in order to help train undergraduate and graduate students in the theory, algorithms, design, and implementation of signal and image processing systems.

His B.S.E.E.C.S. (1987) degree is from the Rose-Hulman Institute of Technology, and his M.S.E.E. (1988) and Ph.D.E.E. (1993) degrees are from the Georgia Institute of Technology. From 1993 to 1996, he was a post-doctoral researcher in the Ptolemy project at UC Berkeley. He is an Associate Editor for the *IEEE Transactions on Signal Processing*, a member of the Design and Implementation of Signal Processing Systems Technical Committee, of the IEEE Signal Processing Society, and a Senior Member of the IEEE. He joined the faculty at UT Austin in fall 1996. He is the recipient of a 1997 US National Science Foundation CAREER Award.