

EDUCATION

- Ph.D. Electrical Engineering, Penn State, University Park, PA 1995
- M.Eng. Engineering Science, Penn State, Great Valley, PA 1989
- B.S. Electrical Engineering, Penn State, University Park, PA 1979

EXPERIENCE

- **Associate Professor** of Electrical and Computer Eng., *University of North Carolina at Charlotte* Charlotte, NC, 2002 – present.
 - Research on radio frequency integrated circuits, mixed-signal integrated circuits, CMOS, SOI, linearization methods, signal processing, virtual reality, and image processing, ground penetrating radar, Gabor filtering, and multivariate classifiers.
 - Experience with Agilent ADS, Cadence, Mentor Graphics, and C++.
- **Assistant Professor** of Electrical and Computer Eng., *University of North Carolina at Charlotte* Charlotte, NC, 1995 – 2002.
- **President and Founder**, *MixSig Labs, Inc.*, Charlotte, NC, 2002-present
 - NSF Phase I SBIR for patented linearization methods for RF integrated circuits.
- **Research Fellow** (summer), phased array radar design, *Naval Research Laboratory*, Washington, DC, 1999.
 - Research on advanced phased array radar systems.
- **Consultant**, wireless radio systems design, *InterDigital Communications Corp.*, King of Prussia, PA, 1995 – 1998.
 - Research and development on the design of third-generation wireless radio systems
- **Ph.D. candidate**, signal and image processing, *Penn State*, University Park, PA, 1990 - 1995
 - Research on multi-resolution image/signal processing systems, filters, classifiers
- **Senior Engineer**, Microwave radio and signal processing, *American Electronic Laboratories (now BAE Systems)*, Lansdale, PA, 1984 – 1990.
 - Microwave communications and signal processing systems.
- **Project Engineer**, RF and digital design, *Alpha Industries (now Skyworks)*, Colmar, PA, 1982 – 1984.
 - Design and development of radio frequency and digital circuits
- **Development Engineer**, portable radio systems, *Motorola*, Plantation, FL, 1979 - 1982
 - Design of portions of Motorola's first frequency-synthesized portable radios

PROFESSIONAL LICENSES

- North Carolina P.E. Reg. No. 023548

SUMMARY OF RECENT PROJECTS

- Research on patented "super-linear transistors" for wireless RF integrated circuits (RFIC) consisting of a PMOS FET in parallel with an NMOS FET, using new patented methods and patent-pending methods. See also patents below and IEEE RFIC 2005 paper on "super-linear transistors."
- NSF funded research on patented linearization methods for wireless RF integrated circuits (RFIC) that can enable reductions in cost, size, and power consumption of cellular phones. See also US Patents 6,794,938, 6,853,247, 6,853,248, and MixSig Labs, Inc. for commercialization.
- Multiresolution design of Gabor Filter Banks for image segmentation with simultaneous design of both: 1) a set of tuned Gabor filters, and 2) an accompanying Bayesian classifier. See also Optical Engineering 1999.
- Ground penetrating radar (GPR) for detection of land mines, including propagation models, target models, and image formation (in conjunction with Mathematics department). See also IEEE ICASSP 2001 paper.
- DARPA funded research on patented Built-In Self-Test (BIST) methods for digital circuits including SRAM, using analog voltages and controlled-width power supply pulses (controlled-Iddt). See also US Patent 6,833,724 for BIST.
- DARPA funded research on a mixed-signal integrated circuit fault simulator for mixed-signal Built-In Self-Test (BIST), managed by Sensors Directorate of the Air Force Research Laboratory, USAF Wright-Patterson AFB.
- Medical Image processing, in conjunction with colleagues at Penn State and University of Iowa, including cardiac image segmentation, and lung airway extraction. See also Computer Vision and Image Understanding 2000 paper.
- RF / Wireless Engineering Laboratory for radio frequency and microwave systems and devices. Capabilities include: Agilent ADS software, Cascade Microtech RF-1 40 GHz probe station, 6 GHz network analyzer, 6 GHz oscilloscope, 26 GHz spectrum analyzer, 6 GHz generator.
- The development of Mixed-signal Integrated Circuits and design tools, installation of Mentor Graphics & Cadence for MOSIS, and MIT Lincoln Labs SOI tools. Processes include AMI 1.5 & 0.5 micron, and TSMC 0.18 micron.
- New video game systems research targeted at emerging applications in education, visualization, and emergency preparedness training including modeling, texturing, level design, scripting, animation, and artificial intelligence. Exploratory research area in early stages.

PUBLICATIONS AND PATENTS

- T. P. Weldon, "Removal of Image Segmentation Boundary Errors Using an N-ary Morphological Operator," IEEE Southeastcon 2007, Richmond, VA, March 12-15, 2007.
- D. T. Lieu and T. P. Weldon, "Reduced Current Class AB Radio Receiver Stage Using Novel Superlinear Transistors with Parallel NMOS and PMOS Transistors at One GHz," IEEE Southeastcon 2007, Richmond, VA, March 12-15, 2007.
- C. Mack, V. Mogallapu, A. Willis, and T. Weldon, "Exploiting Typical Clinical Imaging Constraints for 3D Outer Bone Surface Segmentation," IEEE Southeastcon 2007, Richmond, VA, March, 2007.
- T. P. Weldon, "Improved Image Segmentation with a Modified Bayesian Classifier," 2006 IEEE Int. Conf. on Acoustics, Speech, and Signal Processing, Toulouse, FR, May 2006.
- D. Binkley, R. Makki, T. Weldon, A. Chehab, US patent 7,148,717, "Methods and apparatus for testing electronic circuits," Dec. 12, 2006.
- T. P. Weldon, D. T. Lieu, and M. J. Davis, "Experimental Results at One GHz on Linearizing an NMOS Transistor with a Parallel PMOS Transistor," 2005 IEEE Radio Frequency IC Symposium (RFIC 2005) , Long Beach, CA, June 2005.
- T. P. Weldon, US patent 6,943,628, " Methods and apparatus for substantially reducing nonlinear distortion," Sept.13, 2005.
- T. P. Weldon, US patent 6,906,585, "Method and Apparatus for cancellation of third order intermodulation distortion and other nonlinearities," June 14, 2005.
- T. P. Weldon, US patent 6,853,247, "Methods and apparatus for using Taylor series expansion concepts to substantially reduce nonlinear distortion," Feb. 8, 2005.
- T. P. Weldon, US patent 6,853,248, "Methods and apparatus for substantially reducing nonlinear distortion using multiple nonlinear devices," Feb. 8, 2005.
- T. P. Weldon, US patent 6,794,938, "Method and Apparatus for cancellation of third order intermodulation distortion and other nonlinearities," Sept. 21, 2004.
- D. Binkley, R. Makki, T. Weldon, A. Chehab, US patent 6,833,724, "Methods and apparatus for testing electronic circuits," Dec. 21, 2004.
- Thomas P. Weldon and Konrad Miehle, "Using Amplifiers with Poor Linearity to Linearize Amplifiers with Good Linearity," 2003 IEEE MTT-S Int. Microwave Symposium, June 2003.
- T. P. Weldon, "Novel Inverse Methods in Land Mine Imaging," 2001 IEEE Int. Conf. on Acoustics Speech and Signal Processing (ICASSP 2001) , Salt Lake City, UT, 7-11 May, 2001.
- J. M. Reinhardt, A. J. Wang, T. P. Weldon, and W. E. Higgins, "Cue-Based Segmentation of 4D Cardiac Image Sequences," Computer Vision and Image Understanding, pp. 251-262 , Feb. 2000.
- T. P. Weldon, Y. A. Gryazin, and M. V. Klibanov, "Comparison of 2D and 1D Approaches to Forward Problem in Mine Detection," SPIE Proceedings, Vol. 4038, pp. 1140-1148 , April 2000.
- T. P. Weldon and W. E. Higgins, "Designing Multiple Gabor Filters for Multi-Texture Image Segmentation," Optical Engineering, Vol. 38 No. 9, pp. 1478-1489, Sept. 1999.
- T. P. Weldon, US patent 5,999,141, "Enclosed dipole antenna and feeder system," Dec. 7, 1999.
- T. P. Weldon and W. E. Higgins, "An Algorithm for Designing Multiple Gabor Filters for Segmenting Multi-Textured Images," 1998 IEEE Int. Conf. on Image Processing, 4-7 Oct. 1998.
- D. F. Dunn, T. P. Weldon, and W. E. Higgins, "Extracting Halftones from Printed Documents Using Texture Analysis," Optical Engineering, Vol. 36 No. 4, pp. 1044-1052, April 1997.
- T. P. Weldon, W. E. Higgins, and D. F. Dunn, "Efficient Gabor Filter Design for Texture Segmentation," Pattern Recognition , Vol. 29, No. 12, pp. 2005-2015, Dec. 1996.

Thomas P. Weldon, Ph.D., P.E.

PUBLICATIONS AND PATENTS, continued

- T. P. Weldon, W. E. Higgins, and D. F. Dunn, "Gabor Filter Design for Multiple Texture Segmentation," Optical Engineering, Vol. 35 No. 10, pp. 2852-2863, October 1996.
- T. P. Weldon and W. E. Higgins, "Integrated Approach to Texture Segmentation Using Multiple Gabor Filters," 1996 IEEE Int. Conf. on Image Processing (ICIP96), pp. 955-958, 16-19 Sept. 1996.
- D. F. Dunn, T. P. Weldon, and W. E. Higgins, "Extracting Halftones from Printed Documents Using Texture Analysis," IEEE Int. Conf. on Image Processing, Lausanne, Switzerland, 16-19 Sept. 1996.
- T. P. Weldon and W. E. Higgins, "Design of Multiple Gabor Filters for Texture Segmentation," 1996 IEEE Int. Conf. Acous., Speech, Sig. Proc. (ICASSP96), Atlanta, GA, pp. 2245-2248, 7 May 1996.
- T. P. Weldon and W. E. Higgins, "Multiscale Rician Approach to Gabor Filter Design for Texture Segmentation," 1994 IEEE Int. Conf. on Image Processing Austin, TX, pp. 620-624, Nov. 1994.
- T. P. Weldon, W. E. Higgins, and D. F. Dunn, "Efficient Gabor Filter Design Using Rician Output Statistics," 1994 IEEE Int. Symp. Circuits, Systems, London, England, vol. 3, pp. 25-28, 1994.
- T. Weldon, "An Inductorless Double Scroll Chaotic Circuit," American Journal of Physics, Oct. 1990.
- T. Weldon, "High Sensitivity Wideband Millimeter Wave Receiver," U.S. Air Force Technical Report AFWAL-TR-87-1145, Wright Patterson AFB, Feb., 1988.

FUNDING ACTIVITIES

- **National Science Foundation**, "SBIR Phase I: Novel Linearizer for Wireless Integrated Circuits." PI T. Weldon, 2003
- **DARPA NeoCAD**, "A Comprehensive Design and Test Methodology for Mixed-Signal Systems," Co-PI with M. Emmert, D. Binkley, C. Stroud, and R. Makki, 2001 – 2004
- **National Science Foundation**, "Test Solutions for Next-Generation Embedded Memory," Co-PI with R. Makki, 2000 – 2004
- **US Army** (through Dynetics, Inc.), "System Design and Development of a Portable Josephson Junction Intrinsic Standard" (~\$100,000), Co-PI with J. Cuttino, 2001 – 2004
- **Other**
 - Ground Penetrating Radar, US Army office of Research, 1998 – 2000, collaboration with Math Department PI M. Klivanov.
 - RF Design Seminar Solectron Corporation, Charlotte, NC, 1999.

AWARDS

- 2000-2001 Maxheim Fellow Award
- 1995 – 1996 Tau Beta Pi Outstanding Professor

TEACHING

ECGR 4123, Analog and Dig. Communications
ECGR 6264, Radio Frequency Design
ECGR 4124, Digital Signal Processing
ECGR 6118, Image Processing
ECGR 6114, Digital Signal Processing II

ECGR 6437, Mixed signal VLSI
ECGR 3111, System Analysis I
ECGR 3111, System Analysis I
ECGR 3090, Video Game Design