

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

Charlotte, NC

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Synopsis: Dr. Weldon has over 30 years of diverse leadership experience in the successful design, management, and completion of complex technological projects in both academia and industry, with numerous patents and publications in international conferences and journals.

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 CMOS radio frequency integrated circuits, medical imaging, signal processing, RF systems, SOI, linearization methods, virtual reality, ground penetrating radar, multiresolution filtering, multivariate classifiers and image processing.
 - Patents issued in linearization methods for wireless RF integrated circuits and Built-In Self-Test (BIST) methods.
 - Experience with Agilent ADS, Cadence integrated circuit design, Mentor Graphics, Java, NetBeans, Mathcad, Mathematica, 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, 2002-2007
 - High-tech start-up venture
 - Awarded 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 including wideband CDMA radio system analysis and design.

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EXPERIENCE, continued

- **Ph.D. candidate**, signal and image processing, *Penn State*, University Park, PA, 1990 - 1995
 - Research on multi-resolution systems and image/signal processing systems including Gabor filters, medical image processing software, texture segmentation software, Bayesian classifiers, and multiresolution filter banks for multidimensional signals.
- **Senior Engineer**, Microwave radio and signal processing, *American Electronic Laboratories (now BAE Systems)*, Lansdale, PA, 1984 – 1990.
 - Project-level responsibilities for the design of radio frequency and microwave communications equipment and signal processing systems, including millimeter wave mixers, radio receivers, radio transmitters, repeaters, and digital signal processing systems.
- **Project Engineer**, RF and digital design, *Alpha Industries (now Skyworks)*, Colmar, PA, 1982 – 1984.
 - Responsible for the design and development of radio frequency and digital circuits including hybrids, quadrature mixers, amplifiers, baluns, and digital subsystems.
- **Development Engineer**, portable radio systems, *Motorola*, Plantation, FL, 1979 - 1982
 - Responsible for the design of portions of Motorola's first frequency-synthesized portable radios including voltage controlled oscillators, phase noise, and phase lock loops.

BIOGRAPHICAL SKETCH:

Dr. Weldon has over 30 years of experience in academia and industry. From 1979-82 he helped design Motorola's first frequency synthesized radio, the precursor of modern cellular phones. From 1982-84, he designed custom radio frequency and digital circuits for Alpha Industries (now Skyworks). From 1984-90, he designed signal processing systems, microwave systems, and electronic warfare systems while at American Electronic Laboratories (now BAE Systems). In 1995, Dr. Weldon joined the Department of Electrical and Computer Engineering at The University of North Carolina at Charlotte. His present research areas are in patent-pending linearization methods, mixed-signal integrated circuits, video game systems, and radio frequency integrated circuits. He also does research in the field of signal processing, including ground penetrating radar (GPR), image processing, and segmentation of textured images

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PUBLICATIONS AND PATENTS

- S. Chitchian, T. P. Weldon, and N. M. Fried, "OCT image segmentation for differentiation of the cavernous nerves from the prostate gland," Proceedings of SPIE, Vol. 7443, August 2009.
- S. Chitchian, T. P. Weldon, and N. M. Fried, "Segmentation of Optical Coherence Tomography Images for Differentiation of the Cavernous Nerves from the Prostate Gland," to appear Journal of Biomedical Optics.
- T. P. Weldon, "Rayleigh and Mie Enhancement of Blackbody Radiation in Nanoscale Devices," IEEE SoutheastCon 2009 Proceedings, Atlanta, GA, pp. 216-220, March 2009.
- P. Shoghi, C.J. Barnwell, T. P. Weldon, "Experimental Results for a Successive Detection Log Video Amplifier in a Single-Chip Frequency Synthesized Radio Frequency Spectrum Analyzer," IEEE SoutheastCon 2009 Proceedings, Atlanta, GA, pp. 379-382, March 2009.
- T. P. Weldon, Geng Ye, Raghu K. Mulagada "Linearization Conditions for Two and Four Stage Circuit Topologies Including Third Order Nonlinearities," IEEE SoutheastCon 2009 Proceedings, Atlanta, GA, pp. 362-366, March 2009.
- P. Shoghi, C.J. Barnwell, T. P. Weldon, "Experimental Results for an Inductively Matched Microwave Amplifier in a Standard 0.5 Micron CMOS Process Using Four Identical Spiral Inductors," IEEE SoutheastCon 2008 Proceeding, Huntsville, AL, April 2008.
- 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 22-25, 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 22-25, 2007.
- T. P. Weldon, "Removal of Image Segmentation Boundary Errors Using an N-ary Morphological Operator," IEEE Southeastcon 2007, Richmond, VA, March 22-25, 2007.
- T. P. Weldon, "Improved Image Segmentation with a Modified Bayesian Classifier," 2006 IEEE International Conference on Acoustics, Speech, and Signal Processing (IEEE ICASSP 2006), 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.

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PUBLICATIONS AND PATENTS, continued

- 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 International Microwave Symposium, pp.1741-44, 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.

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PUBLICATIONS AND PATENTS, continued

- 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.
- 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), Lausanne, Switzerland, vol. III, 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.

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PROFESSIONAL LICENSES

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

FUNDING ACTIVITIES

- **Total Program Funding:** approx. \$1.2 Million
- **National Science Foundation (Subcontract)**, “InfoSense Subcontract: Dynamic Predictive Maintenance,” PI T. Weldon, 2009
- **National Science Foundation**, “SBIR Phase I: Novel Linearizer for Wireless Integrated Circuits,” PI T. Weldon, 2003
 - NSF SBIR program to commercialize patented linearization technology
 - Research project through start-up company, MixSig Labs, Inc.
- **DARPA NeoCAD**, “A Comprehensive Design and Test Methodology for Mixed-Signal Systems,” Co-PI with J. Emmert, D. Binkley, C. Stroud, and R. Makki, 2001 – 2004 ;
 - 2 year program to develop computer-aided design tools for mixed signal integrated circuits, and high-speed (GHz) analog circuits in support of integrated circuit self-test methods
 - Fabricate novel RFIC integrated circuits using MIT advanced 0.35 micron SOI process
 - Develop new CAD software tools for automated design of mixed-signal circuits in emerging deep-submicron integrated circuit technology
- **National Science Foundation**, “Test Solutions for Next-Generation Embedded Memory,” Co-PI with R. Makki, 2000 – 2004
 - 3 year program to develop advanced test methods for embedded memory in system-on-a-chip technology.
- **US Army** (through Dynetics, Inc.), “System Design and Development of a Portable Josephson Junction Intrinsic Standard,” Co-PI with J. Cuttino, 2001 – 2004.
 - Multi-year program to develop a new cryogenically Josephson voltage standard system, funded in annual increments
 - Develop 75 GHz feed network for voltage standard
- **Other**
 - Ground Penetrating Radar, US Army office of Research, 1998 – 2000, Collaboration with Mathematics Department, PI M. Klibanov.
 - RF Design Seminar Solectron Corporation , Charlotte, NC, 1999.
 - Biotelemetry Integrated Circuit, UNCC Faculty Research Grant.

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TEACHING

ECGR 4123, Analog and Dig. Communications	ECGR 6437, Mixed signal VLSI
ECGR 6264, Radio Frequency Design	ECGR 3111, System Analysis I
ECGR 4124, Digital Signal Processing	ECGR 3111, System Analysis I
ECGR 6118, Image Processing	ECGR 3090, Video Game Design
ECGR 6114, Digital Signal Processing II	

AWARDS

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

SERVICE ACTIVITIES

- IEEE Member, 1984-present
- Technical Program Chair, IEEE SoutheastCon 2010 conference
- Vice-Chair, IEEE North Carolina Council, 2009
- Chair, IEEE Charlotte Section, 2008 & 2009
- Vice-Chair, IEEE Charlotte Section, 2006 & 2007
- Member of Faculty Council, 2005-2006.
- Faculty Council Alternate, 2006-2007, 2009
- College representative, Univ. Faculty Academic Policy and Standards Committee, 2004-2006
- Chair, Departmental Review Committee, 2005-2006.
- Member Departmental Review Committee, 2002-2003, 2004-2009.
- Chair, ECE Faculty Recruiting Committee, 2002 – 2003, 2004 – 2005.
- Numerous presentations at IEEE, DARPA, and SPIE conferences
- Reviewer for National Science Foundation, IEEE Journals, IEEE Conferences, and SPIE
- Member of WCU distance education program advisory committee 2004-2005.
- Member of Communications FAIT team committee, 2003-present.
- Member of Computer Engineering FAIT team committee, 2005-2008.
- Chair, College of Eng. Computing Facilities Committee, 1997-2003.
- Member, Faculty Research Grants Committee, 2002-2003.
- Member, College of Eng. Computing Facilities Committee, 1996-1997.
- Chair, Laboratory Executive Committee, 1997-2001.
- Lecturer, Professional Engineer Examination Review, 1996-2000.