

Jason W. Weigold

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Education

Ph.D., Electrical Engineering, *University of Michigan*, Ann Arbor, MI, 2000

Major: Solid State Electronics Minor: Optics

M.S., Electrical Engineering, *University of Michigan*, Ann Arbor, MI, 1997

Major: Solid State Electronics Minor: Optics

B.S., Electrical Engineering, *University of California*, Los Angeles, CA, 1995

Professional Experience

- ANALOG DEVICES INC.**, Cambridge, MA September 2004-October 2006
Staff Development Engineer in the Micromachined Products Division's Advanced Development Group. Created working MEMS microphones from concept to working prototypes in 6 months. Led team of 7 people in successful completion of project. Designed process, laid out reticles, fabricated and tested devices. Coordinated design of interface circuit, built demo, and took measurements to demonstrate microphone performance to potential customers. Microphones can be fabricated inexpensively and in high volume using current, production proven methods. Microphones are smaller, cheaper, more robust, and more reliable than existing microphone solutions. Microphones met or exceeded all competitor and customer specs. Also, created process to fabricate MEMS resonators for rf filter and oscillator applications. Designed, simulated mechanical characteristics using finite element methods, laid out, fabricated, and successfully tested and demonstrated MEMS resonators in the MHz range.
- ANALOG DEVICES INC.**, Limerick, Ireland October 2002-September 2004
Staff Development Engineer in the Micromachined Products Division's Advanced Development Group. Worked on an international team consisting of groups in Cambridge, MA, USA, Belfast, Northern Ireland, UK, and Limerick, Ireland to develop Analog Devices' next generation SOIMEMS inertial sensor process. The core team consisted of 5 people working on the process which will support more than \$100M in revenue over the next 5 years. Solved many problems in the integration of submicron CMOS circuitry with MEMS elements. Led 6 person team and came up with solution to gate oxide integrity problem. The solution was implemented with no cost penalty, no performance compromise, and no impact to schedule. Worked in submicron CMOS fab including Nikon reduction steppers and parametric testing.
- UNIVERSITY OF MICHIGAN**, Ann Arbor, MI September 1995- June 2000
Research Assistant to Prof. Stella Pang. Dissertation Title: "Dry Etching of High Aspect Ratio Si Microstructures in High Density Plasma Sources for Microelectromechanical Systems". Specializing in the field of microelectromechanical systems and semiconductor materials processing with emphasis on dry etching and the simple, inexpensive integration of sensor and circuit on the same die. Experienced in operation and maintenance of high density plasma sources (electron cyclotron resonance and inductively coupled plasma systems) and vacuum systems, design, fabrication and testing of resonant devices and acceleration sensors. Worked in clean room environment with process experience in electron microscopy, electron beam lithography, LPCVD, oxidation/diffusion furnaces, aligner, RTA, dry etching, wet processing, PVD. Worked on projects with Profs. Kensall Wise, Khalil Najafi, and Clark Nguyen developing dry etch technology for a compact microinstrumentation cluster for environmental monitoring, precision inertial sensors, and micromechanical signal processors respectively.
- UNIVERSITY OF CALIFORNIA**, Los Angeles, CA September 1993- June 1995
Researcher under Prof. Kristofer Pister in the field of microelectromechanical systems. Designed and tested micromachined acceleration sensors and relays fabricated using standard CMOS processes. Worked with integration of sensors with standard processes using foundry processed CMOS IC's on which the sensors were subsequently formed.
- ANALOG DEVICES INC.**, Wilmington, MA Summer 1992-Summer 1995
Worked extensively on surface micromachined accelerometers including marketing, testing, packaging, and aiding in process development. The work of the accelerometer team at Analog Devices ultimately resulted in the release of the ADXL50 which was the world's first micromachined acceleration sensor integrated with circuitry to be produced and sold in high volume. This product resulted in the creation of a \$100M+ per year business that has shipped over 200 million accelerometers to date. Worked in various capacities including development of software for test engineers, testing and characterization of integrated circuits for the automated test equipment (ATE) group, and programming, testing and characterization of digital signal processors (DSP's).
- UNITRODE INTEGRATED CIRCUITS CORP**, Merrimack, NH Summer 1990- Summer 1991
Worked with production engineers on fabrication of test fixtures for linear integrated circuits. Skills included soldering, fabricating circuits from schematics, testing and troubleshooting of handlers, and distribution of devices and die to customers.

Selected Accomplishments

- Travel:** North America, South America, Europe, Asia, Africa, Australia. July 2000-December 2001
- Training:** Technical Leadership Course, Team Members/Team Leaders Course, Management Essentials Course. IEEE short course "MEMS in RF and Microwave Electronics" May 2006, MEMC Silicon Workshop, October 2004, Evans Analytical Group "Surface Analytical Techniques", October 2004, Nikon Stepper Training, Feb 2003.
- Software:** Cadence, ANSYS, SPICE, Coventor Memulator, Spotfire, PROMIS, Mathcad, MATLAB, SUPREM.

Patents

- Issued: 1) **Jason W. Weigold** and Stella W. Pang, "Method of Making a Micromechanical Device from a Single Crystal Semiconductor Substrate and Monolithic Sensor Formed Thereby", Patent No: US 6,429,458 B1, Aug. 6, 2002.
- 2) **Jason W. Weigold** and Stella W. Pang, "Method of Making a Micromechanical Device from a Single Crystal Semiconductor Substrate and Monolithic Sensor Formed Thereby", Patent No: US 6,136,630, Oct. 24, 2000.
- In Application: 1) **Jason W. Weigold**, "MEMS Resonator", September 27, 2006.
- 2) **Jason W. Weigold** "Method of Forming an Integrated MEMS Resonator", September 27, 2006.
- 3) **Jason W. Weigold**, John R. Martin, Timothy J. Brosnihan, "Integrated Microphone", No. 11/115,804, September 27, 2006.
- 4) **Jason W. Weigold** and Kieran P. Harney, "Multi-Microphone System", August 23, 2006.
- 5) Kieran P. Harney, **Jason W. Weigold**, and Gary Elko, "Noise Mitigating Microphone System and Method", July 24, 2006.
- 6) **Jason W. Weigold**, "Microphone with Irregular Diaphragm" June 26, 2006.
- 7) **Jason W. Weigold**, Thomas D. Chen, Denis Mel O'Kane, David J. Collins, Andrew D. Bain, "Method and Apparatus for forming buried oxygen precipitate layers in multi-layer wafers", October 28, 2005.
- 8) John R. Martin, Timothy J. Brosnihan, Craig Core, Thomas Kieran Nunan, **Jason W. Weigold**, Xin Zhang, "Micromachined Microphone and Multisensor and Method for Producing Same", April 25, 2005.
- 9) **Jason W. Weigold**, Thomas D. Chen, Denis Mel O'Kane, Claire N. Leveugle, Stephen Alan Brown, William A. Nevin, "Integrated Circuit with Impurity Barrier", No. 11/044,612, January 27, 2005.
- Provisional: 1) **Jason W. Weigold**, "Process of Forming Microphone Using Support Member", No. 60/754,984, December 29, 2005.
- 2) **Jason W. Weigold**, Timothy J. Brosnihan, X. Zhang, Craig Core, "Support Mechanism for Microphone Diaphragm", 2005.

Publications

- J. W. Weigold**, "High Q, On-Chip MEMS Resonators for Oscillator and Filter Applications", Analog Devices General Technical Conference (Internal), May 2006.
- J. W. Weigold**, T. J. Brosnihan, J. Bergeron, X. Zhang, "A MEMS Condenser Microphone for Consumer Applications", in Proc. IEEE MEMS '06, Istanbul, Turkey, pp. 86-89, 2006.
- T.D. Chen, T.W. Kelly, D. Collins, D. Bain, B. Berthold, T.J. Brosnihan, T. Denison, J. Kuang, M. O'Kane, and **J.W. Weigold**, "The Next Generation Integrated MEMS and CMOS Process on SOI Wafers for Overdamped Accelerometers", in Digest 14th Int. Conference on Solid State Sensors and Actuators (Transducers'05), pp. 1122-1125, Seoul, Korea, June 2005.
- J. W. Weigold**, "A MEMS Microphone for Consumer Applications", Analog Devices General Technical Conference (Internal), May 3, 2005. Voted Best Paper 2005 out of more than 200 papers throughout the company.
- J. W. Weigold**, "Gate Oxide Integrity on an SOIMEMS Airbag Sensor", Analog Devices General Technical Conference (Internal), April 20, 2004.
- J. W. Weigold**, K. Najafi, and S. W. Pang, "Design and Fabrication of Submicrometer, Single Crystal Si Accelerometer", IEEE J. Microelectromech. 10, pp. 518-524 (2001).
- J. W. Weigold**, "Dry Etching of High Aspect Ratio Si Microstructures in High Density Plasma Sources for Microelectromechanical Systems", Ph.D. Dissertation, University of Michigan, Ann Arbor, MI, 2000.
- J. W. Weigold**, A.-C. Wong, C. T.-C. Nguyen, and S. W. Pang, "A Merged Process for Thick Single Crystal Si Resonators and BiCMOS Circuitry", IEEE J. Microelectromech. 8, pp. 221-228 (1999).
- J. W. Weigold**, W. H. Juan, S. W. Pang, and J. T. Borenstein, "Characterization of Bending in Single Crystal Si Beams and Resonators", J. Vac. Sci. Technol. B 17, pp. 1336-1340 (1999).
- J. W. Weigold**, A.-C. Wong, C. T.-C. Nguyen, and S. W. Pang, "Thick Single Crystal Si Lateral Resonant Devices Integrated with a Conventional Circuit Process", in Late News Digest IEEE Solid-State Sensor and Actuator Workshop, Hilton Head Island, SC, June 1998.
- J. W. Weigold** and S. W. Pang, "High Aspect Ratio Single Crystal Si Microelectromechanical Systems", Proc. SPIE Conference on Micromachining and Microfabrication Process Technology 3551, pp. 242-251 (1998).
- M. A. Spak, F. Mohr, R. Bradbury, R. R. Dammel, **J. W. Weigold**, and S. W. Pang, "Novel Approach to Surface Imaging", Proc. SPIE Conference on Advances in Resist Technology and Processing XV 3333, pp. 1017-1023 (1998).
- M. R. Rakhshandehroo, **J. W. Weigold**, W.-C. Tian, and S. W. Pang, "Dry Etching of Si Field Emitters and High Aspect Ratio Resonators Using an Inductively Coupled Plasma Source", J. Vac. Sci. Technol. B 16, pp. 2849-2854 (1998).
- J. W. Weigold** and S. W. Pang, "Fabrication of Thick Si Resonators with a Frontside-Release Etch-Diffusion Process", IEEE J. Microelectromech. 7, pp. 201-206 (1998).
- J. W. Weigold**, W. H. Juan, and S. W. Pang, "Dry Etching of Deep Si Trenches for Released Resonators in a Cl₂ Plasma", J. Electrochem. Soc. 145, pp. 1767-1771 (1998).
- J. W. Weigold** and S. W. Pang, "A New Frontside-Release Etch-Diffusion Process for the Fabrication of Thick Si Microstructures", in Digest 9th Int. Conference on Solid-State Sensors and Actuators (Transducers'97), pp. 1435-1438, Chicago, June 1997.
- J. W. Weigold**, W. H. Juan, S. W. Pang, and J. T. Borenstein, "Optical Interferometric Characterization of Membrane Curvature in Boron Doped Si Microstructures", Proc. SPIE Conference on Micromachining and Microfabrication Process Technology 3223, pp. 142-148 (1997).
- J. W. Weigold**, W. H. Juan, and S. W. Pang, "Etching and Boron Diffusion of High Aspect Ratio Si Trenches for Released Resonators", J. Vac. Sci. Technol. B 15, pp. 267-272 (1997).
- W. H. Juan, **J. W. Weigold**, and S. W. Pang, "Dry Etching and Boron Diffusion of Heavily Doped High Aspect Ratio Si Trenches", Proc. SPIE Conference on Micromachining and Microfabrication Process Technology 2879, pp. 45-55 (1996).
- E. Hoffman, B. Warneke, E. Kruglick, **J. Weigold**, and K. S. J. Pister, "3D Structures with Piezoresistive Sensors in Standard CMOS", in Proc. IEEE MEMS '95, Amsterdam, Netherlands, pp. 288-293, 1995.