
CURRICULUM VITAE

Reza Abdolvand

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RESEARCH INTEREST

Micro/Nano-Electro-Mechanical Systems (*MEMS/NEMS*), Resonant devices for timing, signal processing and sensing, Nano-engineered infrared sensors, Micro-acoustics for biological sensing, Embedded wireless sensors

EDUCATION

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|------|-------|--|
| 2008 | Ph.D. | Electrical and Computer Eng., <i>Georgia Institute of Technology</i> , Atlanta, GA
Advisor: Professor Farrokh Ayazi
Thesis title: Thin-Film Piezoelectric-on-Substrate Resonators and Narrowband Filters |
| 2001 | M.S. | Electrical Engineering, <i>Sharif University of Technology</i> , Tehran, Iran |
| 1999 | B.S. | Electrical Engineering, <i>Sharif University of Technology</i> , Tehran, Iran |

ACADEMIC EXPERIENCE

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| Jan. 2014-present | <i>Associate Professor</i> , University of Central Florida, Orlando, FL
Department of Electrical Engineering and Computer Science |
| July 2013- Dec. 2013 | <i>Associate Professor</i> , Oklahoma State University, Stillwater, OK
School of Electrical and Computer Engineering |
| Aug. 2007-July 2013 | <i>Assistant Professor</i> , Oklahoma State University, Stillwater, OK
School of Electrical and Computer Engineering |
| Jan. 2002-Aug. 2007 | <i>Research Assistant</i> , Georgia Institute of Technology, Atlanta, GA
School of Electrical and Computer Engineering |

AWARDS AND HONORS

- Member of National Academy of Inventors, Nominated by Oklahoma State University, 2013
- NASA Patent Application Award, 2009
- Distinguished reviewer award, Journal of Sensors and Actuators, 2009
- Listed in *Marquis Who's Who America*, 2009 Edition
- Best graduate research poster award, school of electrical and computer engineering, Georgia Tech 2007

GRANTS AND GIFTS

- Reza Abdolvand (Co-PI), “Acquisition of an Energy Dispersive X-ray Microanalysis system for a Hitachi S-4800 Cold Field Emission Scanning Electron Microscope,” Vice President for Research & Technology Transfer (VPR), **\$83,910.00**, 12/2012-12/2013
- Reza Abdolvand (PI), “GOALI: Lateral-Mode MEMS Filter Arrays on Ultrananocrystalline Diamond for Multi-Band Communication,” National Science Foundation, **\$254,855**, 05/2012-05/2015
- Reza Abdolvand, “Evaluation of Micro-Resonators in Analyzing Acoustic Properties of Whole Blood,” OSU Tulsa Interdisciplinary Biomedical Research Initiative, **\$4000**, 01/2012-04/2012
- Reza Abdolvand, “Micromachined Lateral-Extensional Piezoelectric Transformers,” OSU Technology Business Assessment Group, **\$29,985**, 05/2010-04/2011.
- Reza Abdolvand (PI), “Nanoengineered Thermoelectric IR sensors,” Originally sponsored by the Oklahoma Economic Development Generating Excellence Program and recently by DARPA through a subcontract from Amethyst Research Lab, **\$602,000 matched by the Office of Vice President of Research for the amount of \$250,000**, 2010-2013.
- Reza Abdolvand, “Thin-Film Piezoelectric-on-Silicon Resonators for Commercial Oscillator Application (Phase III),” Integrated Device Technologies Inc., **\$100,000**, 05/2011-04/2012
- Reza Abdolvand, “Thin-Film Piezoelectric-on-Silicon Resonators for Commercial Oscillator Application (Phase II),” Integrated Device Technologies Inc., **\$100,000**, 05/2010-04/2011.
- Reza Abdolvand (Co-PI), “STTR Phase I: Piezoelectric/diamond RF MEMS Filters for Mobile Wireless Applications,” National Science Foundation, **\$58,007**(Co-PI’s share), 07/2009-06/2010.
- Reza Abdolvand, “Gift to explore new applications for thin-film piezoelectric resonators,” Integrated Device Technology, Inc. , **\$35,000**, 09/12
- Reza Abdolvand, “Thin-Film Piezoelectric-on-Silicon Resonators for Commercial Oscillator Application (Phase I),” **\$200,000**, 05/2008-04/2010.
- Reza Abdolvand (PI), “Acquisition of a Multi-Target Sputtering System for Thin-Film Deposition of Advanced Composite Material in Cleanroom Environment,” OSU Office of Vice President for Research and Technology Transfer, **\$137,600 matched by the Office of President at OSU-Tulsa (total of \$275,200)**, 11/2008-11/2009

PUBLICATIONS

Journal Articles (Accepted and Published)

- [1] H. Fatemi, **Reza Abdolvand**, “Low-Loss Lateral-Extensional Piezoelectric Filters on Ultra-Nano-Crystalline Diamond,” *IEEE Transaction on Ultrasonics, Ferroelectrics, and Frequency Control*, vol. 60, no. 9, pp. 1978-1988, Sep. 2013.
- [2] H. Fatemi, H. Zeng, J. Carlisle, **Reza Abdolvand**, “High Frequency Thin-Film AlN-on-Diamond Lateral-Extensional Resonators,” *IEEE Journal of Microelectromechanical Systems*, vol. 22, no.3, pp.678-686, June 2013.
- [3] M. Shahmohammadi, B.P. Harrington, **R. Abdolvand**, “Turnover Temperature Point in Extensional-Mode Highly Doped Silicon Micro-Resonators,” *IEEE Journal of Electron Devices*, vol. 60, no. 3, pp. 1213-1220, Feb. 2013.
- [4] H. M. Lavasani, W. Pan; B.P. Harrington, **R. Abdolvand**, F. Ayazi, “Electronic Temperature Compensation of Lateral Bulk Acoustic Resonator Reference Oscillators Using Enhanced Series Tuning Technique,” *IEEE Journal of Solid-State Circuits*, , vol.47, no.6, pp.1381-1393, June 2012.

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- [5] B. P. Harrington and **R. Abdolvand**, "In-plane acoustic reflectors for reducing effective anchor loss in lateral-extensional MEMS resonators" *Journal of Micromechanics and Micro engineering*, vol. 21, Number 8, Aug. 2011. **(Chosen as an IOPSelect paper)**
 - [6] H. M. Lavasani, W. Pan, B Harrington, **R. Abdolvand**, and F Ayazi, "A 76dB Ω 1.7GHz 0.18 μ m CMOS tunable TIA Using Broadband Pre-Amplifier for High Frequency Lateral MEMS oscillators," *IEEE Journal of Solid-State Circuits*, vol. 46, no. 1, pp. 224-235, Jan. 2011.
 - [7] **Reza Abdolvand** and Farrokh Ayazi, "High-frequency monolithic thin-film piezoelectric-on-substrate filters," *International Journal of Microwave and Wireless Technologies*, vol. 1, Issue 01, pp. 29-35, Feb 2009.
 - [8] **R. Abdolvand**, H.M. Lavasani, F. Ayazi, "Thin-film piezoelectric-on-silicon resonators for high frequency reference oscillator applications," *IEEE Transaction on Ultrasonics, Ferroelectric, and Frequency Control*, vol. 55, no.12, pp. 2596-2606, Dec. 2008.
 - [9] **R. Abdolvand**, F. Ayazi, "An advanced reactive ion etching process for very-high aspect-ratio sub-micron wide trenches in silicon," *Journal of Sensors and Actuators*, vol. 144, Issue 1, pp. 109-116, May 2008.
 - [10] **R. Abdolvand**, B. Vakili Amini, F. Ayazi, "Sub-micro-gravity in-plane accelerometers with reduced capacitive gaps and extra seismic mass," *Journal of Microelectromechanical Systems*, vol.16, no.5, pp.1036-1043, Oct. 2007.
 - [11] **R. Abdolvand** and F. Ayazi, "A gap reduction and manufacturing technique for thick oxide mask layers with multiple-size sub- μ m openings," *Journal of Microelectromechanical Systems*, vol. 15, no. 5, pp. 1139-1144, Oct. 2006.
 - [12] **R. Abdolvand**, H. Johari, G. K. Ho, A. Erbil, F. Ayazi, "Quality factor in trench-refilled polysilicon beam resonators," *Journal of Microelectromechanical Systems*, vol. 15, no. 3, pp. 471-478, June 2006.
 - [13] G. K. Ho, **R. Abdolvand**, A. Sivapurapu, S. Humad, and F. Ayazi, "Piezoelectric-on-silicon lateral bulk acoustic wave micromechanical resonators," *Journal of Microelectromechanical Systems*, vol.17, no.2, pp.512-520, April 2008.
 - [14] B. Vakili Amini, **R. Abdolvand**, F. Ayazi, "A 4.5-mW closed-loop $\Delta\Sigma$ micro-gravity CMOS SOI accelerometer," *IEEE Journal of Solid-State Circuits*, vol. 41, no. 12, pp. 2983-2991, Dec. 2006.
 - [15] G. Piazza, **R. Abdolvand**, G. K. Ho, and F. Ayazi, "Piezoelectrically-transduced, capacitively-tuned, high-Q single-crystal silicon micromechanical resonators on SOI wafers," *Sensors and Actuators A*, vol. 111, pp. 71-78, March 2004.
 - [16] S. Pourkamali, A. Hashimura, **R. Abdolvand**, G. K. Ho, A. Erbil, F. Ayazi, "High-Q single crystal silicon HARPSS capacitive beam resonators with self-aligned sub-100-nm transduction gaps," *Journal of Microelectromechanical Systems*, vol. 12, no. 4, pp. 487- 496, Aug. 2003.

Refereed Conference Papers

- [1] M. J. Modarres-Zadeh, **R. Abdolvand**, "A low-noise silicon-based 20 μ m*20 μ m uncooled thermoelectric infrared detector," *Proc. SPIE 8704, Infrared Technology and Applications XXXIX*, June 11, 2013.
- [2] H. Fatemi and **R. Abdolvand**, "Fracture Limit in Thin-Film Piezoelectric-on-Substrate Resonators: Silicon vs. Diamond," *Proc. of IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Taipei, Taiwan, 20-24 Jan. 2013, pp.461,464.
- [3] M. Shahmohammadi, H. Fatemi and **R. Abdolvand**, "Nonlinearity reduction in silicon resonators by doping and re-orientation," *Proc. of IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Taipei, 20-24 Jan. 2013, pp.793-796.

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- [4] E. Mehdizadeh, J. Chapin, J. Gonzales, A. Rahafrouz, **R. Abdolvand**, B. Purse, S. Pourkamali, "Direct Detection of Biomolecules in Liquid Media Using Piezoelectric Rotational Mode Disk Resonators," *IEEE Sensors*, Taipei, Taiwan, Oct. 2012.
- [5] H. Fatemi and **R. Abdolvand**, "High-frequency thin-film piezoelectric transformers," *IEEE International Frequency Control Symposium (IFCS)*, Baltimore, MD, May 2012.
- [6] M. Shahmohammadi, B.P. Harrington, and **R. Abdolvand**, "Zero Temperature Coefficient of Frequency in Extensional-Mode Highly Doped Silicon Micro-Resonators," *IEEE International Frequency Control Symposium (IFCS)*, Baltimore, MD, May 2012. **(student paper competition finalist)**
- [7] M. Shahmohammadi, B.P. Harrington, J. Gonzales, and **R. Abdolvand**, "Temperature-Compensated Extensional-Mode MEMS Resonators on Highly N-Type Doped Silicon Substrates," *Hilton Head Workshop*, Hilton Head, SC, June. 2012, pp. 371-374.
- [8] M.J. Modarres-Zadeh, Z.S. Carpenter, **R. Abdolvand**, "Parylene Supported Uncooled Thermoelectric Infrared Detector with Umbrella Like Absorber," *Hilton Head Workshop*, Hilton Head, SC, June 2012, pp. 332-335.
- [9] E. Mehdizadeh, J. Gonzales, A. Rahafrouz, **R. Abdolvand**, and S. Pourkamali, "Piezoelectric Rotational Mode Disk Resonators for Liquid Viscosity Monitoring," *Hilton Head Workshop*, Hilton Head, SC, June. 2012, pp. 359-362.
- [10] A. Hajjam, A. Rahafrouz, J. Gonzales, **R. Abdolvand**, and S. Pourkamali, "Localized Thermal Oxidation for Frequency Trimming and Temperature Compensation of Micromechanical Resonators," *IEEE MEMS 2012*, Paris, France, Jan. 2012.
- [11] M.J. Modarres-Zadeh, Z.S. Carpenter, M.G. Rockley, **R. Abdolvand**, "Parylene Supported 20um x 20um Uncooled Thermoelectric Infrared Detector with High Fill Factor," *Proc. SPIE Infrared Technology and Applications XXXVIII*, May 2012.
- [12] J.M. Gonzales, M. Shahmohammadi, **R. Abdolvand**, "Sensing Acoustic Properties of Materials Using Piezoelectric Lateral-Mode Resonators," *IEEE International Ultrasonics Symposium (IUS)*, pp.200-203, Oct. 2011.
- [13] M. Shahmohammadi, D. Dikbas, B. Harrington, and **R. Abdolvand**, "Passive Tuning in Lateral-Mode Thin-Film Piezoelectric Oscillators," *Joint Conference of the IEEE International Frequency Control Symposium (IFCS) and European Frequency and Time Forum (EFTF)*, San Francisco, CA, May 2011. **(student paper competition finalist)**
- [14] H. Fatemi, H. Zeng, J. Carlisle, and **R. Abdolvand**, "Very Low-Loss High Frequency Lateral-Mode Resonators on Polished Ultrananocrystalline Diamond," *Joint Conference of the IEEE International Frequency Control Symposium (IFCS) and European Frequency and Time Forum (EFTF)*, San Francisco, CA, May. 2011.
- [15] H. Fatemi, B. Harrington, H. Zeng, J. Carlisle, and **R. Abdolvand**, "50Ω-Terminated 900MHz Monolithic Lateral-Extensional Piezoelectric Filters on Ultrananocrystalline Diamond," *Proc. IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Cancun, Mexico, 23-27 January 2011.
- [16] M. Shahmohammadi, M.J. Modarres-Zadeh, and **R. Abdolvand**, "Low jitter thin-film piezoelectric-on-substrate oscillators," *Proc. IEEE International Frequency Control Symposium (IFCS)*, Newport Beach, CA, 1-4 June 2010, pp.613-617. **(student paper competition finalist)**
- [17] B. P. Harrington, A. Hajjam, J. C. Wilson, S. Pourkamali, and **R. Abdolvand**, "Thin-Film Piezoelectric-on-Silicon Particle Mass Sensors," *Proc. IEEE International Frequency Control Symposium (IFCS)*, Newport Beach, CA, 1-4 June 2010, pp.238-241.
- [18] M. Shahmohammadi, B.P. Harrington, and **R. Abdolvand**, "Concurrent enhancement of Q and power handling in multi-tether high-order extensional resonators," *Proc. IEEE MTT-S International Microwave Symposium*, Anaheim, CA, 23-28 May 2010, pp.1452-1. **(student paper competition finalist)**

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- [19] B. P. Harrington, M. Shahmohammadi, and **R. Abdolvand**, "Ultimate performance in GHz MEMS resonators: low impedance and high Q," *23rd IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Hong Kong, SAR, 2010, pp. 707-710.
- [20] B. Harrington, **R. Abdolvand**, "Q-Enhancement Through Minimization of Acoustic Energy Radiation in Micromachined Lateral Mode Resonators," *Proc. of International Conference on Solid-State Sensors, Actuators and Microsystem (TRANSDUCERS)*, Denver, CO, USA, June 21-25, 2009, pp. 700-703.
- [21] **R. Abdolvand**, F. Ayazi, "High frequency ZnO-on-Diamond Monolithic Filters," *Technical Digest Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head, SC, June 2008, pp. 384-385.
- [22] **R. Abdolvand**, H. Mirilavasani, F. Ayazi, "Single-resonator dual-frequency thin-film piezoelectric-on-substrate oscillator," *Proc. of International IEEE Electron Devices Meeting (IEDM 2007)*, Dec. 2007, pp.419-422.
- [23] **R. Abdolvand**, F. Ayazi, "Enhanced power handling and quality factor in thin-film piezoelectric-on-substrate resonators," *Proc. of IEEE Ultrasonics Symposium*, Oct. 2007, pp.608-611.
- [24] **R. Abdolvand**, F. Ayazi, "Monolithic thin-film piezoelectric-on-substrate filters" *Proc. IEEE MTT-S International Microwave Symposium (IMS 2007)*, June 2007, pp. 509-512.
- [25] **R. Abdolvand**, H. Mirilavasani, F. Ayazi, "A low-voltage temperature-stable micromechanical piezoelectric oscillator," *Technical Digest of the 14th International Conference on Solid State Sensors, Actuators and Microsystems (Transducers'07)*, June 2007, pp. 53-56.
- [26] **R. Abdolvand**, G. K. Ho, J. Butler, F. Ayazi, "ZnO-on-nanocrystalline-diamond lateral bulk acoustic resonators," *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Jan. 2007, pp. 795-798.
- [27] **R. Abdolvand**, Z. Hao, F. Ayazi, "A temperature-compensated ZnO-on-diamond resonant mass sensor," *Proc. of 5th IEEE Conference on Sensors*, Korea, Oct. 2006, pp.1297-1300.
- [28] **R. Abdolvand**, F. Ayazi, "Single-Mask reduced-gap capacitive micromachined devices," *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Miami, FL, Jan. 2005, pp. 151-154.
- [29] **R. Abdolvand**, G. K. Ho, F. Ayazi, "Poly-wire-coupled single crystal silicon HARPSS micromechanical filters using oxide islands," *Technical Digest Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head, SC, June 2004, pp. 242-245.
- [30] **R. Abdolvand**, G. K. Ho, A. Erbil, F. Ayazi, "Thermoelastic damping in trench-refilled polysilicon resonators," *Proc. of International Conference on Solid-State Sensors, Actuators and Microsystem*, June 2003, vol. 1, pp. 324-327.
- [31] W. Pan, **R. Abdolvand**, F. Ayazi, "A low-loss 1.8GHz monolithic thin-film piezoelectric-on-substrate filter," *Proc. of IEEE Conference on Micro-Electro-Mechanical-Systems (MEMS 2008)*, Jan. 2008, pp.176-179.
- [32] H. Mirilavasani, **R. Abdolvand**, F. Ayazi, "Low phase-noise UHF thin-film piezoelectric-on-substrate LBAR oscillators," *Proc. of IEEE conference on Micro-Electro-Mechanical-Systems (MEMS 2008)*, Jan. 2008, pp.1012-1015.
- [33] W. Pan, **R. Abdolvand**, F. Ayazi, "Effect of nonuniform loading layer on monolithic thickness-mode piezoelectric filters," *Proc. of IEEE Ultrasonics Symposium*, Oct. 2007, pp.1645-1648.
- [34] H. Mirilavasani, **R. Abdolvand**, F. Ayazi, "A 500MHz low phase-noise AlN-on-silicon reference oscillator," *Proc. of IEEE Custom Integrated Circuits Conference (CICC '07)*, Sept. 2007, pp.599-602.
- [35] G. K. Ho, **R. Abdolvand**, F. Ayazi, "High-order composite bulk acoustic resonators," *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Japan, Jan. 2007, pp. 791-794.
- [36] B. Vakili Amini, **R. Abdolvand**, F. Ayazi, "A 4.5mW closed-loop $\Delta\Sigma$ micro-gravity CMOS-SOI accelerometer," *Digest of Technical Papers IEEE International Conference of Solid-State Circuits*, Feb. 2006, pp. 1101-1110.

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- [37] Z. Hao, **R. Abdolvand**, F. Ayazi, "A high-Q length-extensional bulk-mode mass sensor with annexed sensing platforms," *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Jan. 2006, pp. 598-601.
 - [38] P. M. Raj, I. R. Abothu, **R. Abdolvand**, F. Ayazi, R. Tummala, "Integrating solution-derived 3D PZT structures on Si MEMS platform for RF and biomedical applications," *Technical Digest IEEE International Symposium on Advanced Packaging Materials: Processes, Properties and Interface*, March 2006, pp. 122- 122.
 - [39] B. Vakili Amini, **R. Abdolvand**, F. Ayazi, "Sub-micro-gravity capacitive SOI microaccelerometers," *Digest of Technical Papers International Conference on Solid-State Sensors, Actuators and Microsystems*, vol. 1, June 2005, pp. 515-518.
 - [40] G. K. Ho, **R. Abdolvand**, F. Ayazi, "Through-support-coupled micromechanical filter array," in *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Jan. 2004, pp. 769-772.
 - [41] S. Pourkamali, **R. Abdolvand**, G. K. Ho, F. Ayazi, "Electrostatically coupled micromechanical beam filters," in *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Jan. 2004, pp. 584-587.
 - [42] S. Humad, **R. Abdolvand**, G. K. Ho, G. Piazza, F. Ayazi, "High frequency micromechanical piezo-on-silicon block resonators," *Technical Digest IEEE International Electron Devices Meeting*, Dec. 2003, pp. 39.3.1-39.3.4.
 - [43] G. Piazza, **R. Abdolvand**, F. Ayazi, "Voltage-tunable piezoelectrically-transduced single-crystal silicon resonators on SOI substrate," in *Proc. of IEEE Micro Electro Mechanical Systems Conference*, Jan. 2003, pp. 149-152.
 - [44] S. Pourkamali, **R. Abdolvand**, F. Ayazi, "A 600 kHz electrically-coupled MEMS bandpass filter," in *Proc. of IEEE Electro Mechanical Systems Conference*, Jan. 2003, pp. 702-705.
 - [45] G. Wang, **R. Abdolvand**, F. Ayazi, J. Papapolymerou, E. M. Tentzeris, "Finite ground coplanar lines on CMOS grade silicon with a thick embedded silicon oxide layer using micromachining techniques," in *Proc. of European Microwave Conference*, Oct. 2003, vol. 1, pp. 25- 27.
 - [46] H. Golnabi, N. Rahnavard, **R. Abdolvand**, "Design and construction of a simple controller for auto synchronized scanning systems," in *Proc. of Flexible Automation and Intelligent Manufacturing Conference (FAIM'98)*, Portland, OR, July 1998.

PATENTS & RECORDS OF INVENTION

- [1] **R. Abdolvand**, Mohsen Shahmohammadi Ghahsareh, M.J. Modarres-Zadeh, "Microelectromechanical resonators with passive frequency tuning using variable impedance circuits," US Patent # 8,350,633. **(Licensed)**
- [2] F. Ayazi and **R. Abdolvand**, H.M. Lavasani, "Oscillator having micro-electromechanical resonators and driver circuits therein that support in-phase and out-of-phase signals," US Patent # 8,242,663. **(Licensed)**
- [3] **R. Abdolvand**, B. P. Harrington, "Q-Enhancement in micromachined lateral-extensional resonators," US Patent # 8,228,141. **(Licensed)**
- [4] F. Ayazi, G.K. Ho, **R. Abdolvand**, "Micromechanical bulk acoustic mode resonators having interdigitated electrodes and multiple pairs of anchor supports," UP Patent # 7,924,119. **(Licensed)**
- [5] F. Ayazi and **R. Abdolvand**, "Monolithic thin-film piezoelectric filters," US Patent # 7,847,656.
- [6] F. Ayazi, G. K. Ho, **R. Abdolvand**, "Lithographically-defined multi-standard multi-frequency high-Q tunable micromechanical resonators," US Patent # 7,843,284. **(Licensed)**
- [7] F. Ayazi, **R. Abdolvand**, "Piezo-on-diamond resonators and resonator systems," US Patent #7,812,692. **(Licensed)**
- [8] F. Ayazi, **R. Abdolvand**, "Single-resonator dual-frequency lateral-extensional mode piezoelectric oscillators and operating methods thereof," US Patent #7,800,282. **(Licensed)**

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- [9] F. Ayazi, B. Vakili Amini, **R. Abdolvand**, “Capacitive microaccelerometers and fabrication methods,” US Patent #7,337,671.
 - [10] F. Ayazi, **R. Abdolvand**, S. P. Anaraki, “Methods of forming oxide masks with submicron openings and microstructures formed thereby,” US Patent #7,056,757.
 - [11] F. Ayazi, G. Piazza, **R. Abdolvand**, G. K. Ho, S. Humad, “Piezoelectric on semiconductor-on-insulator microelectromechanical resonators,” USPTO #6,909,221. **(Licensed)**

INVITED TALKS AND PRESENTATIONS

- [1] R. Abdolvand, “Application of Nano-Engineering in Infrared Sensing,” Citywide Research Day, Tulsa OK, Nov. 2012.
- [2] R. Abdolvand, “Ultrasound-Based Micro-Systems for Biomedical Diagnostics,” Oklahoma State University Center for Health and Sciences (Seminar Series), Tulsa, Ok, April 2011.
- [3] R. Abdolvand, “Microsystems Program at Helmerich Research Center,” OSU College of Engineering, Agriculture and Technology Associates Meeting, Stillwater, OK, April 2010.
- [4] R. Abdolvand, “Thin-Film Piezoelectric Resonant Devices,” NSF-sponsored workshop, University of Arkansas, Fayetteville, AR, August 2008.
- [5] R. Abdolvand, “Thin-Film Piezoelectric-on-Substrate Devices for Sensors and RF applications,” School of Electrical and Computer Engineering, Wichita State University, April 2007.
- [6] R. Abdolvand, “Thin-Film Piezoelectric-on-Substrate Devices for Sensors and RF applications,” School of Electrical and Engineering, Oklahoma State University, March 2007.

PROFESSIONAL MEMBERSHIPS

- IEEE member since 2002
- IEEE UFFC and Electron Devices member

PROFESSIONAL SERVICES

- NSF Panel Reviewer
 - o SBIR Phase II, Sensor Panel (Oct. 2012)
 - o ECCS/CCSS, MEMS, NEM, and Bio Panel (May 2012)
 - o SBIR Phase II, Instrumentation Panel (Apr. 2012)
 - o SBIR Phase I, MEMS Applications (Mar. 2012)
 - o SBIR Phase I, Sensors Panel (Aug. 2011)
 - o SBIR Phase I, Robotics/Assistive Technologies Panel (March 2011)
 - o SBIR Phase I, Instrumentation Panel (February 2011)
- Journal Reviewer
 - o IEEE Journal of Microelectromechanical Systems (JMEMS),
 - o IEEE Transaction on Ultrasonics, Ferroelectrics, and Frequency Control
 - o IEEE Transaction on Electron Devices
 - o IEEE Sensors Journal
 - o Journal of Sensors and Actuator
 - o Journal of Applied Optics