

BABAK ZIAIE, Ph.D.

Birck Nanotechnology Center
Purdue University
12095 W. State St.
West Lafayette, IN 47907

RESEARCH INTERESTS

Biomedical micro/nano systems (BioMEMS, BioNEMS), solid-state microsensors/microactuators, MEMS packaging technology for implantable microsystems, drug delivery microsystems, analog circuit design for transducer applications, biomedical microtelemetry, and advanced microinstrumentation techniques for high precision biological measurements.

EDUCATION

May/1992-April/1994

Ph.D., Electrical Engineering (Solid-State Electronics), University of Michigan.

- Dissertation: A Single-Channel Microstimulator for Functional Neuromuscular Stimulation Applications. Thesis advisor: Professor Khalil Najafi

Jan./1989-May/1992

M.S., Electrical Engineering (Solid-State Electronics), University of Michigan.

- Directed study research “Optical Force Transducers using Elasto-Optic Effect in Silicon, a Feasibility Study”.

Sep./1981-June/1986

B.S., Electrical Engineering, University of Tehran.

- Undergraduate senior design project “Design, Fabrication, and Test of a Microwave Patch Antenna Applicator for Biomedical Applications”.

EMPLOYMENT

Jan/05--present

Associate Professor, School of Electrical and Computer Engineering, Purdue University.

Oct./99-Dec/04

Assistant Professor, Department of Electrical and Computer Engineering, University of Minnesota.

Feb./96-Sep./99

Assistant Research Scientist, Center for Integrated Microsystems, University of Michigan.

March/95-Feb./96

Research Fellow, Center for Integrated Microsystems, University of Michigan.

May/94-March/95

Postdoctoral Research Fellow, Cardiac Rhythm Management Laboratory, University of Alabama at Birmingham.

Jan./1989 –April/1994

Graduate Student Research Assistant, University of Michigan.

1986-1987

Maintenance Engineer at the Iran Poplin textile Industrial Complex, Iran.

1980-1982

Electronic Technical Assistant at the Saadat Abad Medical Center, Iran.

HONORS AND AWARDS

- McKnight Endowment Fund for Neuroscience Technological Innovations Awards in Neuroscience (2002).
- National Science Foundation CAREER Award in Biomedical Engineering (2001).
- Winner of the third prize in the 1991 VLSI Design Contest.

EDITORIAL ACTIVITIES

- Associate editor, IEEE Sensors.
- Editorial Board, Sensor Letters.
- Reviewer for:
Journal of Microelectromechanical Systems, Sensors and Actuators, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Circuits and Systems, Journal of Biomedical Microdevices, Journal of Micromechanics and Microengineering, IEEE Journal of Solid-State Circuits, Langmuir, Advanced Materials.

REVIEW PANELS

- National Science Foundation ECS Sensors Program Review Panel (2005).
- National Science Foundation Biomedical Engineering CAREER Awards (2003).
- National Institute of Health (2002).
- National Science Foundation Biomedical Engineering CAREER Awards (2001).
- The Wellcome Trust Foundation, United Kingdom (2000).

PROFESSIONAL COMMITTEES AND ADVISORY PANELS

- Member of the program technical committee IEEE MEMS 07.
- Member of the program technical committee IEEE MEMS 06.
- Panel on Basic Sciences Issues in MEMS, DARPA, Santa Barbara, May 2005.
- Panel on The Control and System Integration of Micro- and Nano-Scale Systems, National Science Foundation, Arlington, Va., March, 2004.
- Member of the program technical committee IEEE MEMS 04.
- Member of the Drug Delivery Center, University of Minnesota (2000-2005).
- Secretary, Twin Cities IEEE-EMBS (Engineering in Medicine and Biology Society), 1999-2004.

PROFESSIONAL SOCIETIES

- Member of the IEEE.

- Member of the American Association for the Advancement of Science.
- Member of the American Physical Society.
- Member of the American Chemical Society

MEETING ORGANIZATION

- Session Chair MEMS 07, Kobe, Japan.
- Session Chair MEMS 06, Istanbul, Turkey.
- Session Chair MEMS 05, Miami, Florida.
- Session Chair MEMS 04, Maastricht, Netherlands.
- Session chair Transducers 2003 Boston.
- Session chair Transducers 2001 Munich Germany.
- Chairman and organizer, IEEE Solid-State Circuits and Technology Committee (SSCTC) Workshop on Biomedical Electronics, October 12-13 2000, Arlington VA.
- Animator and session organizer for the first European Medical and Biological Engineering Conference, 1999 Vienna Austria (the Micro and Nano technology in Medicine session).

PUBLICATIONS

Conference Publications

1. T. Akin, **B. Ziaie**, and K. Najafi, "RF Telemetry Powering and Control of Hermetically-Sealed Integrated Sensors and Actuators," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 145-148, Hilton Head, SC, June 1990.
2. **B. Ziaie**, Y. Gianchandani, and K. Najafi, "A High-Current IrOx Thin-Film Neuromuscular Microstimulator," *Proceedings, 6th Int. Conf. on Solid State Sensors and Actuators*, pp. 124-127, San Francisco, June 1991.
3. **B. Ziaie**, M. Nardin, J. Von Arx, and K. Najafi, "A Single Channel Implantable Microstimulator for Functional Neuromuscular Stimulation," *Proceedings, 7th Int. Conf. on Solid State Sensors and Actuators*, pp. 266-269, Yokohama, Japan, June 1993.
4. **B. Ziaie**, M. Nardin, J. Von Arx, and K. Najafi, "A Hermetic Packaging Technology with Multiple Feedthroughs for Integrated Sensors and Actuators," *Proceedings, 7th Int. Conf. on Solid State Sensors and Actuators*, pp. 450-453, Yokohama, Japan, June 1993.
5. M. Nardin, **B. Ziaie**, J. Von Arx, A. R. Coghlan, M. Dokmeci, and K. Najafi, "An Inductively Powered Microstimulator for Functional Neuromuscular Stimulation," *Proceedings 13th International Symposium on Biotelemetry*, pp. 99-104, Williamsburg, Virginia, USA, March 1995.
6. J. Von Arx, **B. Ziaie**, M. Dokmeci, and K. Najafi, "Hermeticity Testing of Glass Silicon Packages with High-Density On-Chip Feedthroughs," *Proceedings, 8th Int. Conf. on Solid-State Sensors and Actuators*, 244-247, Stockholm, Sweden, June 1995.
7. T. Akin, **B. Ziaie**, and K. Najafi, "A Modular Micromachined High-Density Connector for Implantable Biomedical Systems," *Proceedings 9th. Int. IEEE Workshop on Microelectromechanical Systems*, pp. 497-502, Feb. 1996, San Diego, CA.

8. **B. Ziaie**, J. A. Von Arx, and K. Najafi, "A Micro-Fabricated Planar High-Current IrOx Stimulating Microelectrode," *Proc. 18th Ann. Conf., IEEE-EMBS*, pp. 270-271, Amsterdam, 1996.
9. **B. Ziaie**, N. K. Kocaman, and K. Najafi, "A Generic Micromachined Silicon Platform for Low-Loss Low-Power Transceivers," *Proceedings, 9th Int. Conf. on Solid-State Sensors and Actuators*, pp. 257-260, Chicago, USA, June 1997.
10. **B. Ziaie**, K. Najafi, and David J. Anderson, "A Low-Power Miniature Transmitter Using a Low-Loss Silicon Platform for Biotelemetry," *Proc. 19th Ann. Conf., IEEE-EMBS*, pp. 2221-2224, Chicago, 1997.
11. **B. Ziaie**, T. W. Wu, N. Kocaman, K. Najafi, and D. J. Anderson, "An Implantable Pressure Sensor Cuff for Tonometric Blood Pressure Measurement," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 216-219, Hilton Head, SC, June 1998.
12. P. Mohseni, K. Nagarajan, **B. Ziaie**, and S. B. Crary, "Robotics at the Interface of Microsystems Technology and Biology: Biobotics," *Proceeding of the Russian-Academy-Workshop on Robotics and Automation*, pp. 78-82, Moscow, Nov. 1999.
13. **B. Ziaie**, and K. Najafi, "Implantable Wireless Microsystems for Space Applications," *NASA Bioastronautics Workshop*, January 2001, Houston Texas.
14. S. Sengupta, **B. Ziaie**, and V. H. Brocas, "A Separator-Analyzer Flow-meter for Complex Fluid Flow in Micro-channels," *Proceedings of the American Institute of Chemical Engineers Annual Meeting*, November 2001, Reno, NV.
15. R. A. Siegel, **B. Ziaie**, Y. Gu, and A. Baldi, "Integrated Sensing and Delivery of Insulin without the Requirement of Power Supply," *Diabetes Technology Meeting*, Page A-53, Nov. 2001, San Francisco, CA.
16. E. Cavusgil, Y. Gu, P. Loftness, **B. Ziaie**, and R. Siegel, "Synthesis and Confinement of a Hydrogel Within a Micromachined Cavity," *28th International Symposium on Controlled release of Bioactive Materials*, June 2001, San Diego.
17. A. Bayrashev and **B. Ziaie**, "Silicon Wafer Bonding with an Insulator Interlayer Using RF Dielectric Heating," *Proceedings 15th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 105-108, Jan. 2002, Las Vegas, NV.
18. A. Baldi, Y. Gu, P. E. Loftness, R. A. Siegel, and **B. Ziaie**, "A Hydrogel-Actuated Smart Microvalve with a Porous Diffusion Barrier Back-Plate for Active Flow Control," *Proceedings 15th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 419-422, Jan. 2002, Las Vegas, NV.
19. S. Sengupta, V. H. Barocas, and **B. Ziaie**, "A Separator-Analyzer Flow-Meter for Complex Fluids in Micro-Fluidic Systems," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 321, 324, Hilton Head, SC, June 2002.

20. Y. Gu, A. Baldi, R. A. Siegel, and **B. Ziaie**, "A Micromachined, Hydrogel-Gated Smart Flow Controller," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 130-133, Hilton Head, SC, June 2002.
21. A. Baldi, J. N. Fass, M. N. De Silva, D. Odde, and **B. Ziaie**, "A Microtool for In-Vitro Cell Array Manipulation," *Proceedings 2nd Annual Int. IEEE-EMBS Special Topic Conf. on Microtechnology in Medicine and Biology*, pp. 180-183, Madison, WS, May 2002.
22. Y. Gu, A. Baldi, **B. Ziaie**, and R. Siegel, "Modulation of Drug Delivery Rate by Hydrogel-Incorporating MEMS Devices," *Proceedings 2nd Annual Int. IEEE-EMBS Special Topic Conf. on Microtechnology in Medicine and Biology*, pp. 406-409, Madison, WS, May 2002.
23. S. Sengupta, **B. Ziaie**, and V. H. Barocas, "A Separator-Analyzer Flowmeter for Complex Liquids in Microfluidic Systems," *Proceedings 2nd Annual Int. IEEE-EMBS Special Topic Conf. on Microtechnology in Medicine and Biology*, pp. 518-522, Madison, WS, May 2002.
24. A. Baldi, W. Choi, and **B. Ziaie**, "A Micromachined Self-Resonant Frequency-Modulated Passive Pressure Transensor," *Proceedings IEEE Sensors*, pp. 960-963, Orlando, FL, Jun2 2002.
25. M. N. De Silva, A. Baldi, J. N. Fass, **B. Ziaie**, and D. J. Odde, "Simultaneous Neurite Elicitation and Elongation from Neurons Using a Microfabricated Post Array," *Proceedings of the IEEE-EMBS*, pp. 1706-1707, Houston, TX, October 2002.
26. W. Choi, T. Pan, A. Baldi, and **B. Ziaie**, "Tissue Temperature Measurement and Heat Transfer Mechanisms for Inductively Powered Implantable Microsystems," *Proceedings of the IEEE-EMBS*, pp. 1838-1839, Houston, TX, October 2002.
27. T. Pan, D. J. Brown, and **B. Ziaie**, "A Microfluidic Testbed with Nanopore Membranes for In-Vitro Simulations of Flow Characteristics of Glaucoma drainage Devices," *Proceedings of the IEEE-EMBS*, pp. 1830-1831, Houston, TX, October 2002.
28. A. Baldi, M. Lei, Y. Gu, R. A. Siegel, and **B. Ziaie**, "An Environmentally Responsive Microflow Controller with Double Side Tethered Structure for the Entrapment of Hydrogel," *Proceedings 16th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 84-87, Jan. 2003, Kyoto, Japan.
29. T. Pan, W. Zheng, M. Lei, and **B. Ziaie**, "A Remotely Adjustable Check-Valve Array with an Electrochemical Release Mechanism for Implantable Biomedical Applications," *Proceedings, 12th Int. Conf. on Solid-State Sensors and Actuators*, pp. 115-118, Boston, USA, June 2003.
30. A. Bayrashev and **B. Ziaie**, "Remote Low Frequency Powering of Microsystems using Piezoelectric-Magnetostrictive Laminate Composites," *Proceedings, 12th Int. Conf. on Solid-State Sensors and Actuators*, pp. 1707-1710, Boston, USA, June 2003.
31. M. Lei, A. Baldi, T. Pan, Y. Gu, R. A. Siegel, and **B. Ziaie**, "Batch Integration of Stimuli-Sensitive Hydrogels in MEMS Microstructures with Environmental Exposure," *Proceedings of the Micro TAS*, pp. 351-354, Squaw Valley, CA, October 2003.

32. S. Sengupta, **B. Ziaie**, and V. Barocas, "Lag After Pulsed Separation (LAPS) Meter for Complex Liquids in Microfluidic Systems," *Proceedings of the Micro TAS*, pp. 583-586, Squaw Valley, CA, October 2003.
33. A. Salim, A. Baldi, and **B. Ziaie**, "Inductive Link Modeling and Design Guidelines for Optimum Power Transfer in Implantable Wireless Microsystems," *Proceedings of the IEEE-EMBS*, pp. 3368-3371, Cancun Mexico, September 2003.
34. W. Choi, and **B. Ziaie**, "Inductively Powered Implantable Microcoil Temperature Measurements: Safety Implications and Operational Guidelines," *Proceedings of the IEEE-EMBS*, pp. 3041-3044, Cancun, Mexico, September 2003.
35. T. Pan, Z. Li, J. D. Brown, and **B. Ziaie**, "Microfluidic Characterization of a Valved Glaucoma Drainage Device with Implications for Enhanced Therapeutic Efficacy," *Proceedings of the IEEE-EMBS*, pp. 3317-3320, Cancun, Mexico, September 2003.
36. M. Lei, A. Baldi, T. Pan, Y. Gu, R. A. Siegel, and **B. Ziaie**, "A Hydrogel-Based Wireless Chemical Sensor," *Proceedings 17th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 391-394, Maastricht, Netherlands, Jan. 2004.
37. W. Choi, and **B. Ziaie**, "A Foldable Multi-Chip Packaging Technique with a Polyimide Platform and Flexible PDMS Assembly Mold," *Proceedings 17th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 701-704, Maastricht, Netherlands, Jan. 2004.
38. T. Pan, A. Baldi, E. Davies-Venn, R. F. Drayton, and **B. Ziaie**, "Fabrication and Modeling of Silicon-Embedded High Q Inductors," *Proceedings 17th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 809-812, Maastricht, Netherlands, Jan. 2004.
39. E. Kai, T. Pan, and **B. Ziaie**, "A Robust Low-Cost PDMS Peristaltic Micropump with Magnetic Drive," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 270-273, Hilton Head, SC, June 2004.
40. T. Pan, and **B. Ziaie**, "A Remotely Adjustable Micromachined Check-Valve with a Variable Length Cantilever-Beam Structure for Implantable Biomedical Microsystems," *Digest, Solid-State Sensor and Actuator Workshop*, pp. 278, 281, Hilton Head, SC, June 2004.
41. J. Guimont, and **B. Ziaie**, "A Batch-Manufacturable Uniform Current Density Metallic-Shell Hemispherical Microelectrode," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.
42. T. Pan, E. Kai, M. Stay, V. Barocas, and **B. Ziaie**, "A Magnetically Driven PDMS Peristaltic Micropump," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.
43. T. Pan, A. Baldi, and **B. Ziaie**, "Remotely Adjustable Check-Valves with an Electrochemical Release Mechanism for Implantable Biomedical Microsystems," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.
44. S. McDonald, T. Pan, and **B. Ziaie**, "A Magnetically Driven PDMS Micropump with Micro-Ball Valves," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.

45. M. Lei, Y. Gu, A. Baldi, R. A. Siegel, and **B. Ziaie**, "Soft Mold-Dry Etch: A Novel Hydrogel Patterning Technique for Biomedical Applications," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.
46. M. Lei, A. Salim, R. A. Siegel, and **B. Ziaie**, "A Hydrogel-Actuated Microvalve for Smart Flow Control," *Proceedings of the IEEE-EMBS*, San Francisco, September 2004.
47. A. Salim, X. Hunag, S. Humad, F. Ayazi, and **B. Ziaie**, "Adjustable-Force Soft-Landing Contact Lithography for Precision Patterning of Biomolecules," *Proceedings 18th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 770-774, Miami, Florida, Jan. 2005.
48. M. Lei, W. Choi, R. Siegel, and **B. Ziaie**, "An Ultrasensitive Chemical Microsensor Based on Self-Aligned Dry-Patterned Environmentally Sensitive Hydrogels," *Proceedings, 13th Int. Conf. on Solid-State Sensors and Actuators*, pp. 1824-1827, Seoul, Korea, June 2005.
49. C. Son, and **B. Ziaie**, "Electret Based Wireless Micro-ionizing Radiation Dosimeter," *Proceedings 19th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 610-613, Istanbul, Turkey, Jan. 2006.
50. W. B. Song, H. Kim, C. Son, and **B. Ziaie**, "Fabrication of Polymeric 3D Microstructures using Ferrofluid Mold," *Proceedings 19th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 334-337, Istanbul, Turkey, Jan. 2006.
51. Z. Ding, and **B. Ziaie**, "Frequency Controlled Bidirectional Ratcheting Biomimetic Motion," *Proceedings 19th. Int. IEEE Conference on Microelectromechanical Systems*, pp. 802-805, Istanbul, Turkey, Jan. 2006.
52. J. Parthasarathy, A. G. Erdman, A. D. Redish, and **B. Ziaie**, "An Integrated CMOS Bio-potential Amplifier with a Feed-Forward DC Cancellation topology," *Proceedings of the IEEE-EMBS*, New York, September 2006.
53. H. Kim, and **B. Ziaie**, "Fabrication Techniques for Improving the Performance of PVDF-on-Silicon Ultrasonic Transducer Array," *Proceedings of the IEEE-EMBS*, New York, September 2006.
54. T. Pan, J. D. Brown, and **B. Ziaie**, "An Artificial Nano-Drainage Implant (ANDI) for Glaucoma Treatment," *Proceedings of the IEEE-EMBS*, New York, September 2006.
56. J. Parthasarathy, J. Hogenson, A. G. Erdman, A. D. Redish, and B. Ziaie," Battery-operated High-bandwidth Multi-channel Wireless Neural Recording System using 802.11b," *Proceedings of the IEEE-EMBS*, New York, September 2006.
57. W. B. Song, Z. Ding, C. Son, and **B. Ziaie**, "Microdrop Manipulation and Mixing using Dynamic Ferrofluid Cage Array," *Proceedings of IMECE06 2006 ASME International Mechanical Engineering Congress and Exposition*, November 5-10, 2006, Chicago IL, USA
58. M. F. Wang, N. Raghunathan, and **B. Ziaie**, "A Nonlithographic Approach for Creating Unstable Hierarchical (Micro-Nano) Superhydrophobic Silicon Surfaces," *Proceedings of IMECE06 2006 ASME International Mechanical Engineering Congress and Exposition*, November 5-10, 2006, Chicago IL, USA

Journal Publications

1. **B. Ziaie**, J. A. Von Arx, M. R. Dokmeci, and K. Najafi, "A Hermetic Glass-Silicon Micropackage with High-Density On-Chip Feedthroughs for Sensors and Actuators," *IEEE Journal of Microelectromechanical Systems*, Vol. 5, No. 3, pp. 166-179, September 1996.
2. **B. Ziaie**, M. Nardin, A. R. Coghlan, and K. Najafi, "A Single-Channel Implantable Microstimulator for Functional Neuromuscular Stimulation," *IEEE Transactions on Biomedical Engineering*, Vol. 44, No. 10, pp. 909-920, October 1997.
3. T. Akin, **B. Ziaie**, S. A. Nikles, and K. Najafi, "A Modular Micromachined High-Density Connector for Implantable Biomedical Systems," *IEEE Transactions on Biomedical Engineering*, Vol. 46, pp. 471-480, April 1999.
4. **B. Ziaie**, "Implantable Wireless Microsystems: New Opportunities in Medicine and Biology," *IEEE Circuits and Systems Society Newsletter*, Vol. 10, No. 2, June/July 1999.
5. **B. Ziaie**, and K. Najafi, "A Generic Micromachined Silicon Platform for High-Performance RF Passive Components," *Journal of Micromechanics and Microengineering*, 10, pp. 365-371, Sep. 2000.
6. **B. Ziaie**, and K. Najafi, "An Implantable Microsystem for Tonometric Blood Pressure Measurement," *Biomedical Microdevices*, Vol. 3, pp. 285-292, December 2001.
7. R. N. Rizq, W. Choi, D. Eilers, M. M. Wright, and **B. Ziaie**, "Intraocular Pressure Measurement at the Choroidal Surface: A Feasibility Study with Implications for Implantable Microsystems," *British Journal of Ophthalmology*, Vol. 85, pp. 868-871, 2001.
8. **B. Ziaie**, S. C. Rose, M. D. Nardin, and K. Najafi, "A Self-Oscillating, Detuning Insensitive, Class-E Transmitter for Implantable Microsystems," *IEEE Transactions on Biomedical Engineering*, Vol. 48, pp. 397-400, March 2001
9. P. Mohseni, K. Nagarajan, **B. Ziaie**, K. Najafi, and S. B. Crary, "An Ultra-Light Biotelemetry Backpack for Recording EMG Signals in Moths," *IEEE Transactions on Biomedical Engineering*, Vol. 48, pp. 734-737, June 2001.
10. A. Bayrashev, and **B. Ziaie**, "Silicon Wafer Bonding through RF Dielectric Heating," *Sensors and Actuators A*, Vol. 103, pp. 16-22, Jan 2003.
11. A. Baldi, Y. Gu, P. Loftness, R. A. Siegel, and **B. Ziaie**, "A Hydrogel-Actuated Environmentally-Sensitive Microvalve for Active Flow Control," *IEEE Journal of Microelectromechanical System*, Vol. 12, pp. 613-621, Oct 2003.
12. A. Baldi, W. Choi, and **B. Ziaie**, "A Self-Resonant-Frequency-Modulated Micromachined Passive Pressure Transducer," *IEEE Sensors*, Vol. 3, pp. 728-733, Dec 2003.

13. A. Baldi, J. N. Fass, M. N. De Silva, D. J. Odde, and **B. Ziaie**, "A Microtool for Mechanical Manipulation of In Vitro Cell Arrays," *Journal of Biomedical Microdevices*, 5(4): pp. 291-295; Dec 2003.
14. A. Bayrashev, W. P. Robbins, and **B. Ziaie**, "Remote Low Frequency Powering of Microsystems using Piezoelectric-Magnetostrictive Laminate Composites," *Sensors and Actuators A*, Vol. 114, pp. 244-249, Sep 2004.
15. S. Sengupta, **B. Ziaie**, and V. Barocas, "Lag-After-Pulsed-Separation Flowmeter for Biomacromolecular Solutions," *Sensors and Actuators B*, Vol. 99, pp. 25-29, April 2004.
16. **B. Ziaie**, A. Baldi, M. Lei, Y. Gu, and R. Siegel, "Hard and Soft Micromachining for Biomems: Review of Techniques and Examples of Applications in Microfluidics and Drug Delivery," *Advanced Drug Delivery Reviews*, Vol. 56, pp. 145-172, Feb 2004.
17. M. Lei, Y. Gu, A. Baldi, R. A. Siegel, and **B. Ziaie**, "A High Resolution Technique for Fabricating Environmentally Sensitive Hydrogel Microstructure," *Langmuir*, Vol. 20, pp. 8947-8951, 2004.
18. R. A. Siegel, Y. Gu, A. Baldi, and **B. Ziaie**, "Novel Swelling/Shrinking Behaviors of Glucose-Binding Hydrogels and Their Potential Use in Insulin Delivery," *Macromolecular Symposia 207*, pp. 249-256, 2004.
19. T. Pan, J. D. Brown, and **B. Ziaie**, "Modeling and Characterization of a Valved Glaucoma Drainage Device with Implications for Enhanced Therapeutic Efficacy," *IEEE Transactions on Biomedical Engineering*, vol. 52, no. 5, pp. 948-951, May 2005.
20. T. Pan, A. Baldi, E. Davies-Venn, R. F. Drayton, and **B. Ziaie**, "Fabrication and Modeling of Silicon-Embedded High-*Q* Inductors," *Journal of Micromechanics and Microengineering*, Vol. 15, pp. 1-6, 2005.
21. T. Pan, S. J. McDonald, E. M. Kai, and **B. Ziaie**, "A Magnetically Driven PDMS Micropump with Ball Check-Valves," *Journal of Micromechanics and Microengineering*, Vol. 15, pp. 1021-1026, 2005.
22. S. Sengupta, G. Mahmud, D. J. Chiou, **B. Ziaie**, and V. H. Barocas, "Application of the Lag-After-Pulsed-Separation (LAPS) Flow Meter to Different Protein Solutions," *Analyst*, Vol. 130, pp. 171-178, 2005.
23. M. S. Stay, T. Pan, J. D. Brown, **B. Ziaie**, and V. H. Barocas, "Thin-Film Coupled Fluid-Solid Analysis of Flow through the AhmedTM Glaucoma Drainage Device," *J. Biomechanical Engineering*, vol. 127, pp. 776-781, October 2005.
24. R. Venkateswaran, C. Boldt, J. Parthasarathy, **B. Ziaie**, A. G. Erdman, and A.D. Redish, "A Motorized Microdrive for Recording of Neural Ensembles in Awake Behaving Rats," *J. Biomechanical Engineering*, vol. 127, pp. 1035-1049, November 2005.
25. T. Pan, A. Baldi, and **B. Ziaie**, "A Reworkable Adhesive-Free Interconnection Technology for Integrated Microfluidic Systems," *IEEE/ASME J. Microelectromech. Systems*, vol. 15, no. 1, pp.267-272, Feb. 2006.

26. A. Baldi, M. Ling, Y. Gu, R. A. Siegel, and **B. Ziaie**, "Microstructured Silicon Membrane with Entrapped Environmentally-Sensitive Hydrogel for Smart Flow control," *Sensors and Actuators B*, Vol.114, pp. 9-18, April 2006.
27. M. Lei, A. Baldi, E. Nuxoll, R. A. Siegel, and **B. Ziaie**, "A Hydrogel-Based Implantable Micromachined Transponder for Wireless Glucose Measurement," *Diabetes Technology and Therapeutics*, Vol. 8, pp. 112-122, 2006.
28. C. Son, **B. Ziaie**, "A Micromachined Electret-Based Transponder for *In Situ* Radiation Measurement," *IEEE Electron Device Letters*, vol. 27, pp.884-886, Nov 2006.
29. M. Lei, **B. Ziaie**, E. Nuxoll, K. Iván, Z. Noszticzius, and R. A. Siegel, "Integration of Hydrogels with Hard and Soft Microstructures," *Journal of Nanoscience and Nanotechnology*, Vol. 7, 1-10, 2007.
30. H. Kim, L. Hanwoo, and **B. Ziaie**, "A Wideband PVDF-on-silicon Ultrasonic Transducer Array with Microspheres Embedded Low Melting Temperature Alloy Backing," *Biomedical Microdevices*, In Press.

BOOK CHAPTERS

- Introduction to Micro/nanofabrication, Handbook of Nanotechnology, pp. 147-184, Springer-Verlag, New York, 2004.
- Implantable Wireless Microsystems, Handbook of BioMEMS and Biomedical Nanotechnology, Springer-Verlag, 2005.
- Biotelemetry, Encyclopedia of Medical Devices and Instrumentation, John Wiley, 2006.

INVITED PRESENTATIONS

- Invited speaker, 1995 Int. Semiconductor Device Research Symposium, Charlottesville Virginia, December 1995.
Title of the talk, "Biomedical Microdevices: A Micromachining Approach".
- Invited speaker, BME 5910: Special Topics Seminar, Biomedical Applications of MicroElectromechanical Systems (MEMS), University of Minnesota, November 1999.
Title of the talk, "Implantable wireless Microsystems; New Opportunities in Medicine and Biology".
- Invited speaker, 2001 MESA Computer Element Workshop, IEEE Computer Society, January 2001 Mesa Arizona.
Title of the talk, "Micromachined Transducers and Implantable Microsystems for Electronic Interface to the Nervous System".
- Invited speaker, IEEE Solid-State Circuits and Technology Workshop, Oct 2000, Arlington VA.
Title of the talk, "Micromachined Transducers for Biomedical Applications".

- Invited Speaker, Guidant Corporation, March 2001, St. Paul, Minnesota.
Title of the talk, "Micromachined Transducers and Microsystems for Biomedical Applications".
- Invited Speaker, University of Minnesota Medical Device Workshop, April 2001, Minneapolis, Minnesota.
Title of the talk, "Implantable Wireless Microsystems: New Opportunities in Medicine and Biology".
- Invited Speaker, ASME BioMEMS Workshop, June 2002, Boston, Massachusetts.
Title of the talk, "Biomedical Microsystems for Intraocular and Neurological Measurements".
- Invited Speaker, ASME BioMEMS Workshop, June 2002, Boston, Massachusetts.
Title of the talk, "Implantable Hydrogel-Bases Sensors and Actuators for Diabetes Management".
- Invited Speaker, Third Annual BioMEMS and Biomedical Nanotech World, Sep 2002, Columbus, Ohio.
Title of the talk, "Implantable Wireless Microsystems".
- Invited Speaker, Honeywell Technology Center, Dec 2002, Plymouth, MN.
Title of the talk, "Hydrogel-Based Microsystems for Physiological Sensing and Active Flow Control".
- Invited Speaker, University of Minnesota Medical Device Workshop, April 2003, Minneapolis, Minnesota.
Title of the talk, "Hydrogel-Based Microsystems for Physiological Sensing and Active Flow Control".
- Invited Speaker, Frontiers in Assessment Methods for the Environment Workshop, August 2003, Minneapolis, MN
Title of the talk, "Micromachined Sensors for Environmental Monitoring".
- Invited Speaker, Emerging Information Technology Conference, October 2004, Princeton, NJ.
Title of the talk, "Hydrogel-Based MEMS Platforms for Smart Sensing and Active Flow Control".
- Invited Speaker, ERC for Wireless Integrated Microsystems, April 2005, Ann Arbor MI.
Title of the talk, "Hydrogel-Based Micromachined Platforms for Physiological Sensing and Smart Flow Control".

PATENTS

- "Hydrogel Compositions, Devices, and Microscale Components", US Patent, Pending.
- "Bypass for Glaucoma Drainage Device", US Patent, Pending
- "DC Offset Cancellation Techniques" US Patent, Pending.
- "Apparatus and Method for Radiation Detection" Provisional US Patent.

Supervised PhDs

- 1) Dr. Woohyek Choi, PhD 2006 (Currently with Samsung Electronic, Korea)
- 2) Dr. Ming Lei PhD 2005 (Currently with Intel Corp., AZ)
- 3) Dr. Tingrui Pan PhD 2005 (Currently Assistant Professor BME Department UC Davis)
- 4) Dr. Jayant Parthasarathy PhD 2006 (Currently with Nonin Technologies St Paul, MN)