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### EDUCATION

- Ph.D. with *Prof. Vijay Modi* , Mechanical Engineering, Columbia University, New York, NY, 2002.
- M.Phil. with *Prof. Vijay Modi* , Mechanical Engineering, Columbia University, New York, NY, 2000.
- M.S. with *Prof. Y. Q. Tian* , Thermal Engineering, Beijing University of Technology, Beijing, China, 1996.
- B. S., Aeronautical Engineering, Northwest Polytechnic University, Xi’an, China, 1993.

### PROFESSIONAL EXPERIENCE

- Joint Professor, Department of Biomedical Engineering, The University of Akron, Akron, OH (2012 – present).
- Professor, Department of Mechanical Engineering, The University of Akron, Akron, OH (2012 – present).
- Joint Associate Professor, Department of Biomedical Engineering, The University of Akron, Akron, OH (2008 – 2012).
- Associate Professor, with early tenure, Department of Mechanical Engineering, The University of Akron, Akron, OH (2008 – 2012).
- Assistant Professor, Department of Mechanical Engineering, The University of Akron, Akron, OH (2003 – 2008).
- MEMS Development Engineer, Advanced MicroSensors, Inc. Shrewsbury, MA (2002 – 2003)
- MEMS Engineer, MEMS R&D Center, Fitel Technologies, Inc. Marlboro, MA (2001 – 2002)
- Research/Teaching Assistant, Department of Mechanical Engineering., Columbia University, New York, NY (1997 – 2001)
- R&D Engineer, Beijing Construction Engineering Research Institute, Beijing, China (1996 - 1997)

### PUBLICATIONS

#### **Book Chapter**

1. Xiaoliang Zhu, Chong Zhong and Jiang Zhe<sup>†</sup>, Chapter Four: A Multi-Functional Sensor for Online Lubricating Oil Condition Monitoring, **Condition Monitoring and Dynamic**

**Referred Journal Publications** († represents correspondence author, ^ indicates Zhe's student)

1. D. Jiao, L. Ni, X. Zhu, J. Zhe, Z. Zhao, Y. Lyu and **J. Zhe**<sup>†</sup>, Measuring Gaps Using Planar Inductive Sensors Based on Calculating Mutual Inductance, *Sensors and Actuators A*, 295, 59-69, 2019. Doi: 10.1016/j.sna.2019.05.025.
2. L. Ni, P. KC, E. Mulvany, G. Zhang<sup>†</sup>, **J. Zhe**<sup>†</sup>, A microfluidic device for noninvasive cell electrical stimulation and extracellular field potential analysis, *Biomedical Microdevices*, (2019) 21(1):20. Doi: 10.1007/s10544-019-0364-2.
3. Liang-Liang Fan, Xiaoliang Zhu, Qing Yan, Jiang Zhe, Laing Zhao<sup>†</sup>, A passive microfluidic device for continuous microparticle enrichment, *Electrophoresis* 2018; 14(2):67-81. DOI 10.1002/elps.201800454.
4. F. Liu, P. KC, L. Ni, G. Zhang<sup>†</sup>, **J. Zhe**<sup>†</sup>, A Microfluidic Competitive Immuno-aggregation Assay for High Sensitivity Cell Secretome Detection, *Organogenesis*, 2018; 14(2):67-81. doi: 10.1080/15476278.2018.1461306 2018.
5. Liang-Liang Fan, Qing Yan, Jing Guo, Hong Zhao, **Jiang Zhe**<sup>†</sup>, Liang Zhao<sup>†</sup>, Single particle train ordering in microchannel based on inertial and vortex effects, **J. Micromech. Microeng.** 28(6), 065011, 2018.
6. F. Liu, L. Ni, **J. Zhe**<sup>†</sup>, Lab-On-A-Chip Electrical Multiplexing Techniques for Cellular and Molecular Biomarkers, *Biomicrofluidics* v12, issue 2, 021501 (2018), 2018. DOI: 10.1063/1.5022168.
7. Han, Y.; Zhong, C.; Zhu, X.L.; **Zhe, J.**<sup>†</sup> "Online monitoring of dynamic tip clearance of turbine blades in high temperature environments", *Measurement Science and Technology*, v29, n4, 045102, 2018. <https://doi.org/10.1088/1361-6501/aa912e>.
8. P. KC, F. Liu, **J. Zhe**<sup>†</sup>, G. Zhang<sup>†</sup>, Development and Comparison of Two Immuno-disaggregation Based Bioassays for Cell Secretome Analysis, **Theranostics** 2018; 8(2):328-340. doi:10.7150/thno.21917.
9. Liang-Liang Fan, Qing Yan, Jing Guo, Hong Zhao, Liang Zhao and Jiang Zhe<sup>†</sup>, Inertial particle focusing in microchannels with gradually changing geometrical structures, **J. Micromech. Microeng.** 27(1), 015027, 2017.
10. X. Zhu, C. Zhong and J. Zhe<sup>†</sup>, A high sensitivity wear debris sensor using ferrite cores for online oil condition monitoring, **Meas. Sci. Technol.** v28, n7 (2017) 075102 (7pp).
11. F. Liu, P. Kc, G. Zhang, and J. Zhe<sup>†</sup>, "In situ single cell detection via microfluidic magnetic bead assay," *PLoS One*, 12(2): e0172697, 2017.
12. Zhu, X<sup>^</sup>., Zhong, C.<sup>^</sup> and **Zhe, J.**<sup>†</sup>, Lubricating Oil Conditioning Sensors for Online Machine Health Monitoring – A Review, **Tribology International**, 2017, v109, 473-484. DOI: 10.1016/j.triboint.2017.01.015.
13. Zhu, X<sup>^</sup>., Du, Li<sup>^</sup> and **Zhe, J.**<sup>†</sup>, A 3×3 wear debris sensor array for real time lubricant oil conditioning monitoring using synchronized sampling, *Mechanical Systems and Signal Processing*, 2017, v83, 296–304. DOI: 10.1016/j.ymsp.2016.06.014.
14. Wang H.F.; Wu, H.Y.; Lee, J.C.; Lei, Zhe, J.; X.; Xu; F.J.; Cheng, F, and Cheng, G. <sup>†</sup>, pH-sensitive Poly(histidine methacrylamide), **2016, Langmuir**, 2016, 32 (25), pp 6544–6550, DOI: 10.1021/acs.langmuir.6b01465.

15. Han, Y. ^, Liu, F. ^, Zhao, L. and **Zhe, J.** †, An Automatic and Portable Prosthetic Cooling Device with High Cooling Capacity Based on Phase Change, *Applied Thermal Engineering*, v104, 243-248, 2016.
16. Zhu, X^., Du, Li^, Liu, B. and **Zhe, J.** †, A Microsensor Array for Quantification of Lubricant Contaminants Using A Back Propagation Artificial Neural Network, *J. Micromechanics and Microengineering*, 26 (6), 060005 (2016).
17. Han Y.^, Wu, H., Liu F. ^, Cheng G. † and **Zhe, J.** †, A Multiplexed Immunoaggregation Biomarker Assay Using a Two-stage Micro Resistive Pulse Sensor, *Biomicrofluidics* 10 (2), 024109 (2016). DOI: 10.1063/1.4944456.
18. Han Y.^, Wu, H., Cheng G. † and **Zhe, J.** †, A Two-stage Micro Resistive Pulse Immunosensor for Pathogen Detection, *Lab on a Chip*, 2016, 16, 773-779. DOI: 10.1039/C5LC01207D.
19. Liu F^, KC P, Zhang G†, Zhe J†, Microfluidic Magnetic Bead Assay for Cell Detection, *Analytical Chemistry*, 2016, 88(1), pp711–717, DOI: 10.1021/acs.analchem.5b02716.
20. Liu, F.^, Han, Y., Du, L., Huang, P.F., and **Zhe, J.** † Airborne Mineral Dust Measurement Using an Integrated Microfluidic Device, *Microfluidics and Nanofluidics*, 20(1), 1-7, 2016. DOI: 10.1007/s10404-015-1672-3.
21. Lee, J. C.; Wu, H.Y.; Tang, Q.; Cao, B.; Wang, H. F.; Cong, H. B.; **Zhe, J.**; Xu, F. J.; Cheng, G. †, The structure-function relationships of a tertiary amine-based polycarboxybetaine, *Langmuir* 2015, 31 (36), pp 9965–9972. DOI: 10.1021/acs.langmuir.5b02096.
22. Han, Y. ^, Liu, F. ^, Dowd, G. and **Zhe, J.** †, A Thermal Management Device for a Lower-limb Prosthesis, *Applied Thermal Engineering*, v82, 246-252, 2015.
23. Fan, L-L., He, X-K., Han, Y. ^, **Zhe, J.** † and Zhao, L. †, Continuous Three-dimensional Particle Focusing in a Microchannel with Curved and Symmetric Sharp Corner Structures, *J. Micromechanics and Microengineering*, 25 (3), 35020-35029, 2015.
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26. Zhu, X^., Du, Li^ and **Zhe, J.** †, An integrated lubricant oil conditioning sensor using signal multiplexing, *Journal of Micromechanics and Microengineering*, v25, n1, 015006 (12 pages). 2015.
27. Han Y.^, Wu, H., Liu F. ^, Cheng G. † and **Zhe, J.** †, Label-free Biomarker Assay in a Micro Resistive Pulse Sensor via Immunoaggregation, 86(19): 9717-22, *Analytical Chemistry*, DOI: 10.1021/ac502270n, 2014.
28. Du, L.^, Zhu, X.L.^, and **Zhe, J.** †, High Sensitivity Inductive Sensor for Blade Tip Clearance Measurement, *Smart Materials and Structures*, 23, 065018 (9pages), 2014. doi:10.1088/0964-1726/23/6/065018.
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34. Du, L.^ and **Zhe, J.**<sup>†</sup>, An Integrated Ultrasonic – Inductive Pulse Sensor For Wear Debris Detection, *Smart Materials and Structures*, 22, 025003(9 pages), 2012.
35. Appleby, M., Choy, F., Du, L.^, and **Zhe, J.**, Oil Debris and Viscosity Monitoring using Ultrasonic and Capacitance/Inductance Measurements, *Lubrication Science*, 25, 8, 507-524, 2012. DOI: 10.1002/lis.1221.
36. Zhu, X.L.^, Li, D.S, Liu, B.D. and **Zhe, J.**, Optimal Design and Simulation of a Cross-Plane Micro-Thermoelectric Generator, *Key Engineering Materials*, v503, 240-243, 2012.
37. Du, L.^ and **Zhe, J.**<sup>†</sup>, Parallel Sensing of Metallic Wear Debris in Lubricants Using Undersampling Data Processing, *Tribology International*, v53, 28–34, 2012.
38. Guldiken, R., Jo, M. C.^, Gallant, N., Demirci, U. and **Zhe, J.**<sup>†</sup>, Sheathless Size-Based Acoustic Particle Separation, *Sensors*, 12(1), 905-922, 2012.
39. Amin, A.^, Jagtiani, A.^, Vasudev, A.^, Hu, J., and **Zhe, J.** <sup>†</sup>, Soft Microgripping Using Ionic Liquid Droplet for High Temperature and Vacuum Applications, *Journal of Micromechanics and Microengineering*, 21, 125025 (8 pages), 2011.
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41. Jagtiani, A.^, Carletta, J. and **Zhe, J.**<sup>†</sup>, An impedimetric approach for accurate particle sizing using a micro Coulter counter, *Journal of Micromechanics and Microengineering*, 21 045036 (10 pages), 2011.
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43. Wang, Z.^ and **Zhe, J.**<sup>†</sup>, Recent advances in particle and droplet manipulation for lab-on-a-chip devices based on surface acoustic wave, *Lab on A Chip*, 11 (7), 1280 – 1285, 2011.
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45. Du, L.^ and **Zhe, J.**<sup>†</sup>, A High Throughput Inductive Pulse Sensor for Online Oil Debris Monitoring, *Tribology International*, v44, n2, 175-179, 2011.

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47. Du L.<sup>^</sup>, **Zhe, J.**<sup>†</sup>, Carletta J E, Veillette R J and Choy F, Real-Time Monitoring of Wear Debris in Lubrication Oil Using a Microfluidic Inductive Coulter Counting Device, *Microfluidics and Nanofluidics*, v9, n6, 1241-1245, 2010.
48. Ouyang, H.<sup>^</sup>, Xia, Z. H. and **Zhe, J.**<sup>†</sup>, Voltage-controlled flow regulating in nanofluidic channels with charged polymer brushes, *Microfluidics and Nanofluidics*, v9, n4-5, pp.915-922, 2010.
49. Du L.<sup>^</sup>, **Zhe, J.**<sup>†</sup>, Carletta J E, and Veillette R J, Inductive Coulter Counting: Detection and Differentiation of Metal Wear Particles in Lubricant, *Smart Materials and Structures*, 19, 057001 (7pp), 2010.
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52. Vasudev, A.<sup>^</sup> Jagtiani, A. <sup>^</sup>, Du, L. <sup>^</sup> and **Zhe, J.**<sup>†</sup>, A low-voltage droplet microgripper for micro-object manipulation, *Journal of Micromechanics and Microengineering*, 19 (2009), 075005 (8pp).
53. Ouyang, H.<sup>^</sup>, Xia, Z. H. and **Zhe, J.**<sup>†</sup>, Static and Dynamic Responsive Behavior of Polyelectrolyte Brushes under External Electrical Field, *Nanotechnology*, 20 (2009) 195703 (7pp).
54. Murali, S.<sup>^</sup>, Xia, G. <sup>^</sup>, Jagtiani, A. <sup>^</sup>, J. Carletta and **Zhe, J.**<sup>†</sup>, Capacitive coulter counting: detection of metal wear particles in lubricant using a microfluidic device, *Smart Materials and Structures*, 18 (2009) 03700 (6pp).
55. Murali, S.<sup>^</sup>, Jagtiani, A. <sup>^</sup>, Xia, G. <sup>^</sup>, Carletta, J. and **Zhe, J.**<sup>†</sup>, A Microfluidic Coulter Counting Device for Metal Wear Detection in Lubrication Oil, *Review of Scientific Instruments*, 80 (2009) 016105 (3pp).
56. Vasudev, A.<sup>^</sup> and **Zhe, J.**<sup>†</sup>, A Capillary Microgripper based on electrowetting, *Applied Physics Letters*, v93, n10 (2008) 103503 (3pp), doi:10.1063/1.2978402.
57. Jagtiani, A.<sup>^</sup>, Sawant, P. <sup>^</sup>, Carletta, J., and **Zhe, J.**<sup>†</sup>, Wavelet transform-based methods for denoising of Coulter counter, *Measurement Science and Technology*, v19, n6 (2008), 065102 (15pp), doi:10.1088/0957-0233, 2008.
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60. **Zhe, J.**<sup>†</sup>, Jagtiani, A.<sup>^</sup>, Dutta, P., Hu, J., and Carletta, J., A micromachined high throughput Coulter counter for bioparticle detection and counting, *Journal of Micromechanics and Microengineering*, v17, 304-313, 2007.

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66. **Zhe, J.**, Farmer, K. R. and Modi, V., A Microfabricated Wall Shear-Stress Sensor with Capacitive Sensing, *Journal of Microelectromechanical Systems*, v14, n1, 164-175, 2005.
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**Referred Conference Proceedings († represents correspondence author, ^ indicates Zhe's student)**

1. Fan, L. L., Yan, Q., Zhao, L.& Zhe, J., (2018) Continuous concentration of Cells in Microchannel with Contraction-Expansion Structures. *The Second International Conference of Microfluidics, Nanofluidics and Lab-on-a-Chip*. June 8~10, 2018, Beijing, China.
2. Fan, L. L., Yan, Q., Zhao, L.& Zhe, J., (2017) Influence of Secondary Flow and Geometrical Structure on Mixing in Microchannel. *ASME 2017 International Conference on Nanochannels, Microchannels, and Minichannels*. August 27– August 31, 2017, Cambridge, USA.

3. Liu, F, KC, P., Zhang, G., and **Zhe, J.**<sup>†</sup>, A microfluidic sensor for single cell detection in a continuous flow, *Transducer 2017*, Kaohsiung, Taiwan 2017, 194-197. DOI: 10.1109/TRANSDUCERS.2017.7994021.
4. N. Sutton, J. Zhe, X. Zhu, S. Li and H. Cong, Multiplexed Sensor Array for Accurate Time-of-Wetness (TOW) Measurement, National Corrosion Conference, December, 2017.
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11. Y. Han<sup>^</sup>, H. Y. Wu, F. Liu<sup>^</sup>, G. Cheng and **J. Zhe**<sup>†</sup>, Novel Quantitative Macro Biomolecule Analysis Based On A Micro Coulter Counter, *μTAS 2014*, October 26-30, San Antonio, TX.
12. Fan, L-L., He, X-K., Han, Y. <sup>^</sup>, Zhao, L., Wei, Q. and **Zhe, J.**<sup>†</sup>, Passive Continuous Particle Focusing In A Microchannel With Symmetric Sharp Corner Structures, *μTAS 2014*, October 26-30, San Antonio, TX.
13. Fan, L-L., He, X-K., Han, Y. <sup>^</sup>, Zhao, L. and **Zhe, J.**<sup>†</sup>, A New Microfluidic Device For Complete, Continuous Separation Of Microparticles, *μTAS 2014*, October 26-30, San Antonio, TX.
14. Fan, L-L., He, X-K., Han, Y. <sup>^</sup>, Zhao, L. and **Zhe, J.**<sup>†</sup>, A Microchannel With Repeated Sharp Corners for Single Stream Particle Focusing, *Int. Conf. on Nanochannels, Microchannels and Minichannels*, August 3-7, 2014, Chicago, USA.
15. J.P. Davis, J.E. Carletta, R.J. Veillette, L. Du<sup>^</sup>, and J. Zhe, Instrumentation Circuitry for an Inductive Wear Debris Sensor, *NEWCAS 2012*, Montreal, Canada, June 2012.
16. Jagtiani, A.<sup>^</sup> and **Zhe, J.**<sup>†</sup>, A Multiplexed Microfluidic Impedance Sensor for High Throughput Analysis of Microparticles, *IEEE Transducer 2011 Proceedings*, June 5-9, 2011. Beijing, China, v1, 294-297.
17. Du, L. <sup>^</sup> and **Zhe, J.** <sup>†</sup>, A Microfluidic Inductive Pulse Sensor for Real Time Detection Of Machine Wear, *IEEE MEMS 2011 Proceedings*, January 23-27, 2011. Cancun, Mexico.
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19. Jagtiani, A. <sup>^</sup> and **Zhe, J.**<sup>†</sup>, AC Measurements and Multiplexed Detection Of Microparticles Using Parallel Channel Coulter Counter, *Proceedings of 18th Biennial IEEE UGIM (University Government Industry Micro/nano) Symposium*, June 28-July 1, 2010, West Lafayette, IN.

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23. Vasudev, A. ^ and **Zhe, J.** †, A Droplet Based Microgripper For Microassembly, *ASME IMECE 2008 Proceedings*, November 2-6, 2008. Boston, Massachusetts, v13, pp.755-759.
24. Murali, S ^, Gao, X., J. Carletta and **Zhe, J.** †, A Microfluidic Device For Wear Detection In Lubricants, *ASME IMECE 2008 Proceedings*, November 2-6, 2008. Boston, Massachusetts, v13, pp.859-863.
25. Murali, S. ^, Choy, F., Gao, X., Carletta J. and **Zhe, J.**, Oil Debris Detection Using Static and Dynamic Capacitance Measurements, *Proceedings of the STLE/ASME International Joint Tribology Conference, IJTC2008*, October 20-22, 2008, Miami, Florida.
26. Jagtiani, A. ^, Carletta, J., Hu, J. and **Zhe, J.** †, “A High Throughput Multiplexed Micro Coulter Counter Using Amplitude Modulation”, (2008). *Proceedings of 17th Biennial IEEE UGIM (University Government Industry Micro/nano) Symposium*, July 13-16, 2008, Louisville. KY, pp.173-176.
27. Vasudev, A. ^ and **Zhe, J.** †, "A Capillary Microgripper Using Electrowetting", (2008). *Proceedings of 17th Biennial IEEE UGIM (University Government Industry Micro/nano) Symposium*, July 13-16, Louisville, KY. pp. 6-10.
28. Jagtiani, A. ^, Carletta, J., Hu, J. and **Zhe, J.** †, "Amplitude Modulated Micro Coulter Counter for High Speed Counting of Microparticles", (2008). *Proceedings of 51st IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2008)*, August 10-13, 2008, in Knoxville, TN, pp.57-60.
29. Vasudev, A. ^ and **Zhe, J.** †, "An Electrowetting Based Microgripper", (2008). *Proceedings of 51st IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2008)*, August 10-13, 2008, in Knoxville, TN, pp.49-52.
30. Wang, Y. ^, **Zhe, J.** †, Dutta, P. and Chung, B. T., Numerical Analysis of Rapid Micromixers Utilizing Magnetic Particles, *ASME IMECE 2007 Proceedings*, November 11-15, 2007. Seattle, Washington, v11, pp.705-712.
31. **Zhe, J.** †, Jagtiani, A. ^, Dutta, P., Hu. J. and Carletta, J., A micromachined high throughput bioparticle sensor, *IEEE 14<sup>th</sup> International Conference on Solid State Sensors, Actuators and Microsystems*, Jun. 9-14, 2007, Lyon, France, pp. 1825 - 1828.
32. **Zhe, J.**, Choy, F., Murali, S. V. ^, Sarangi, M. A. and Wilfong, R., Oil Debris Detection Using Capacitance and Ultrasonic Measurements, *Proceedings of the STLE/ASME, International Joint Tribology Conference ( IJTC2007)*, October 22-24, 2007, San Diego, California, pp.113-115.
33. **Zhe, J.** †, Zhao, J., Lam, P., Doverspike, D. and Menzemer, C., Descriptions of STEM Workshops for Middle School Students with Specific Learning Disabilities, *1<sup>st</sup> International Technology-based Learning with Disability Conference*, July 19-20, 2007, Dayton, Ohio.
34. Lam, P., Zhao, J., Doverspike, D., **Zhe, J.** and Menzemer, C., An Initial Assessment of the Effectiveness of the Enhancing Access and Fostering Science, Technology, Engineering and

- Math (STEM) NSF Summer Workshop Program, *ASEE South East Conference*, March 30-April 3, Louisville, Kentucky, 2007.
35. **Zhe, J.**<sup>†</sup>, Zhao, J., Lam, P., Doverspike, D. and Menzemer, C., Fostering Science, Technology, Engineering and Math Using Intelligent Balloon for Special Learning Disabilities Middle School Students, *ASEE North Central Conference*, March 30 - 31, Charleston, West Virginia, 2007.
  36. Menzemer, C., Lam, P., Zhao, J., **Zhe, J.** and Doverspike, D., Enhancing Access and Fostering Science, Technology, Engineering and Math (STEM) Using Civil Engineering Materials Applications for Special Learning Disabilities Middle School Students, *37th ASEE/IEEE Frontiers in Education Conference*, October 10 – 13, 2007, Milwaukee, Wisconsin, v1-4, pp.183-187.
  37. Mallela, V., **Zhe, J.** and Quinn, D., In-Plane Stretching in MEMS Actuated Deformable Mirrors, *ASME IMECE 2006*, Chicago, November 5-11, Illinois, 2006, pp.69-73.
  38. **Zhe, J.**<sup>†</sup>, Jagtiani, A. ^, Mamun, N. H. A., Dutta, P., Hu. J., and Carletta, J., A Microfluidic Based High Throughput Resistive-Pulse Sensor, *ASME IMECE 2006*, Chicago, Nov. 5-11, Illinois, 2006, pp.195-200.
  39. Jagtiani, A. ^, **Zhe, J.**<sup>†</sup> and Newby B. Z., Simultaneous Detection of Multiple Bioparticles with A Resistive-Pulse Sensor, *ASME IMECE 2006*, Chicago, Nov. 5-11, Illinois, 2006, pp.551-555.
  40. Wang, Y.^, **Zhe, J.**<sup>†</sup>, Dutta, P., and Cheng, G., A Hybrid Rapid Microfluidic Mixer Utilizing Electrokinetic Relay and Asymmetric Flow Geometries for Lab-on-a-chip Applications, *ASME IMECE 2005*, Orlando, Florida, v7, pp.233-239, 2005.
  41. Ozlu, E. ^, **Zhe, J.**<sup>†</sup>, Cheng, J. and Wu, X.T., Feasibility Study on A Novel Electromagnetic MEMS Actuator With Planar Coils, 9th International Conference on New Actuators, Bremen, Germany, B.1-4, pp.14-17, June, 2004.
  42. Sidman, A, Neal, M., Borski, J. Tamura, H., Mugino, H., **Zhe, J** and Kousge, M., A large-displacement Electromagnetic MEMS Actuator, 7th Int. Symposium of magnetic materials, processes and Devices, Salt Lake City, Utah, Oct. 24-26, pp.157-170, issue 27, 2002.
  43. **Zhe, J.**<sup>†</sup>, Wu, X.T., Cheng, J., Wang, J., Farmer, K. R., Frechette, L. and Modi, V., "Analytical Pull-in Study on Non-Deformable Electrostatic Micro Actuators", Technical Proceedings of the 2002 International Conference on Modeling and Simulation of Microsystems, ISBN: 0-9708275-7-1, pp.287-290, 2002.
  44. Cheng J., **Zhe J.**, Wu, X. T., Farmer, K. R., Modi, V. and Frechette, L. Analytical and FEM Simulation Pull-in Study on Deformable Electrostatic Micro Actuators, Technical Proceedings of the 2002 International Conference on Modeling and Simulation of Microsystems, ISBN: 0-9708275-7-1, pp.298-301, 2002.
  45. Wu, X. T., Xiao, Z. X., **Zhe, J.** and Farmer K. R., Two Passive Methods to Obtain Large Travel Range for Electrostatic Micro Actuators, Technical Proceedings of the 2001 International Conference on Modeling and Simulation of Microsystems, Hilton Head Island, USA, pp.382-385, 2002.
  46. **Zhe, J.**, Farmer, K. R. and Modi, V., "A MEMS Device for Measurement of Skin Friction with Capacitive Sensing", Proceedings of 2001 Microelectromechanical Systems Conference, 24-26 August 2001, IEEE Circuits and Systems Society, Berkeley, California, USA, pp.4-7, 2002.

## PATENTS

1. Tamura, H., Neal, M. J., Sidman, A. L. and **Zhe, J**, MEMS Devices and Methods for Inhibiting Errant Motion of MEMS Components, U.S. Patent, 6,900,510, issued 5/2005.
2. Hu, J. and **Zhe, J.**, Coulter Counter Having A Plurality of Channels, U.S. Patent, 7,397,232, , issued 7/2008.
3. Hu, J. and **Zhe, J.**, Dynamic modulation for multiplexation of microfluidic and nanofluidic based biosensors, U.S. Patent, 7,777,476, issued 8/2010.
4. **Zhe, J.**, Du, L. et al, Metal Wear Detection Apparatus and Method Employing Microfluidic Electronic Device, US Patent, 8,522,604, issued 9/3/2013.
5. **Zhe, J.** and Vasudev A., Apparatus and Method for Manipulating Micro Component, US patent 8,628,648, issued 1/14/2014.
6. **Zhe, J.** and Du, L., Integrated ultrasonic-inductive pulse sensor for wear debris detection, US Patent No. 9,797,851, issued 10/24/2017.
7. Guldiken, R., Jo, M. C., and **Zhe, J.**, Two-Stage Microfluidic Device for Acoustic Particle Manipulation and Methods of Separation, US Patent 9,821,310, 11/21/2017.
8. **Zhe, J.** and Han, Y., Low-Power Method and Device for Cooling Prosthetic Limb Socket Based on Phase Change, US Patent 9,814,607. 11/14/2017.
9. **Zhe, J.** and Du, L., Wearable inductive-force sensor, US Patent App. 14/627,494, 2/10/2015.
10. **Zhe, J.** and Du, L. High Sensitivity Inductive Sensor for Measuring Blade Tip Clearance, US Patent App. 14/710119, 5/12/2015.
11. Gang Cheng, **Jiang Zhe**, Yu Han, Haiyan Wu, Biomarker assay using microparticle aggregation, UA Patent App. US20160334396A1, Pub. Date 11/17/2016. Priority date 5/12/2015, Filing date 9/16/2015.

## **RESEARCH GRANTS**

### **External Grants**

1. A high throughput platform for rapid single cell surface mapping, (PI), **National Science Foundation**, \$373,373, 6/1/2019 to 5/30/2022.
2. MRI: Development of an Instrument for Single Cell Electrical Stimulation and Analysis, (PI), **National Science Foundation**, \$374,185, (\$260,930 from NSF, plus \$113,255 cost match from UA), 9/1/2016 to 8/30/2020.
3. IDBR: TYPE A: An Integrated Microfluidic Platform for Parallel Analysis of Cell Secretome and Cell Responses in Real Time, (PI), **National Science Foundation**, \$546,636, 6/1/2014 to 5/30/2018.
4. Rapid, Selective, Onsite Detection of Bacterial Pathogens Using A Bioinspired Microfluidic Sensor, (PI), **National Science Foundation**, \$360,000, 8/15/2012 to 8/14/2016.
5. IDBR: A Novel Multiplexed Multichannel Biosensor Chip for High-Throughput Detection of Macromolecular Biomarkers, (PI), **National Science Foundation**, \$561,448, 9/1/2011 to 8/31/2015.
6. A High Throughput Microfluidic Sensor for Real Time Health Monitoring of Rotating Machinery, (PI), **National Science Foundation**, \$270,000, 7/1/2010 – 6/31/2014.
7. SBIR Phase I: Development of Integrated Oil Debris Sensors for Machinery Fault Detection and Conditioning Monitoring, (PI), **National Science Foundation/Akron Air Materials**, \$49,682, 7/1/2011 to 12/31/2011.

8. Diagnostic Engineering Technologies for Evaluating Connective Tissue, (PI), **Austen BioInnovation Institute/Ohio Department of Development**, \$391,394, 9/1/2010 to 8/30/2013.
9. Develop Micro Sensing Systems for Real Time Health Monitoring of Rotating Machinery, subaward of **Ohio Wright Center for Sensor Systems Engineering**, (PI), \$160,520, 9/1/2010 to 8/30/2013.
10. Develop an Integrated Sensor and Control System to Blend Oxygen and Gasoline as a Flex Fuel, subaward of **Ohio Wright Center for Sensor Systems Engineering**, (Co-PI), \$211,821, 9/1/2010 to 8/30/2013.
11. MRI: Acquisition of an AFM/Raman Integrated System for Bio/Nano Functional Materials and Devices Research and Education, (Co-PI), **National Science Foundation**, \$372,166, (\$252,166 from NSF, \$120,000 from OBR), 9/1/2009 – 8/31/2010.
12. Self Powered Nano Fiber Surface Acoustic Sensor for Aerospace Structure Health Monitoring, (PI), **NASA-OSGC**, \$30,000, 8/1/2009 – 7/31/2010.
13. STTR Phase I: Innovative Concepts for Non-Thermal Based Anti-Icing/De-Icing of Rotor Blade Leading Edges, (Co-PI), **DOD-NAVY/Akron Air Materials**, \$41,850, 7/15/2008 to 2/15/2009.
14. NASA/OSGC/ArcelorMittal Industrial Collaboration High School Summer Bridge Internship Program, (Co-PI), **NASA/OSGC/ArcelorMittal**, \$24,500 (plus \$26,500 UA matching funds), 6/30/2008 to 5/30/2009.
15. **Ohio Board Regents** Research Challenge Initiative Grant, \$20,000, 9/2007 to 8/2010.
16. IDBR: Development of a Multiplexed Microfluidic Coulter Counting Instrument, (PI), **National Science Foundation**, \$574,106, 9/1/2007 to 8/30/2011.
17. NER: Nanofabrication of Field-Effect Fluidic Channels for Dynamic Modulation and Multiplexation of High Speed Microfluidic Biosensors, (PI), **National Science Foundation**, \$128,848, 6/1/07 to 5/30/09.
18. Development of Multichannel Coulter Counter for Real Time Anthrax Detection in Mailroom, (PI), **NASA-OAI/OSGC**, \$20,000, 9/1/2007 to 8/30/2008.
19. Development of a High Altitude Intelligent Balloon for Environmental Monitoring, (PI), **NASA-OSGC**, \$13,750, 2/1/07 to 2/1/08.
20. **Ohio Board Regents** Research Challenge Initiative Grant, Enhancing Access and Fostering STEM Based Education for Middle School Students With Specific Learning Disabilities, (Co-PI), \$20,000, 10/2006 to 9/2009.
21. Enhancing Access and Fostering Technology Based Education for Students with Specific Learning Disabilities, (Co-PI), **National Science Foundation**, \$282,969, 6/2006 to 6/2009.
22. Development of An Intelligent Balloon, (PI), \$10,000, **NASA-OSGC**, 2/2006 to 1/2007.

### Internal Grants

1. Achieving Distinction Initiative Funding: Center of a Proof-of-Concept Framework, (Co-PI, with 9 professors at UA), \$2,500,000, 9/1/2012 to 8/30/2017.
2. A Microfluidic Sensor for Online Fluid-Laden Particles/Debris Detection, (PI), \$8,000, Univ. of Akron Faculty Summer Research Fellowship, 6/1/2007 to 8/31/2007.
3. Hybrid GPCR-microcantilever system for high throughput prostate cancer drug screening and biomarker sensing, (Co-PI), \$8,000, Univ. of Akron Integrated Biosciences Initiative, 9/1/2007 to 8/31/2008.

4. A BioMEMS Approach for Detection of Nanoscale Particles, (PI), \$8,000, Univ. of Akron Faculty Summer Research Fellowship, 6/1/2006 to 8/31/2006.
5. A Hybrid Electrokinetic-Magnetic Rapid Micromixer for Lab-on-a-chip Applications, (PI), \$4,000, Univ. of Akron Faculty Research Grant, 3/31/05 – 1/31/06.
6. Innovation and Development of a Hybrid Electrokinetic-Magnetic Rapid Micromixer for Micro Total Analysis Systems, PI, \$6,500, Univ. of Akron Firestone Research Fellowship, 1/1/05 – 12/31/05.
7. Development of a MEMS Tunable Fabry-Perot Filter for Optical Communication, (PI), \$4,000, Univ. of Akron Faculty Research Grant, 11/15/03 to 1/31/05.

### **Pending Proposals**

1. IIBR Instrumentation: Collaborative Research: Development of a Single-Biomolecule Detection Instrument via Digital Counting of Nanoparticles, submitted to NSF, \$394,885, 8/1/2019 to 7/30/2022. PI.

### **HONORS AND AWARDS**

- **Fellow**, American Society of Mechanical Engineers, 2015.
- **Outstanding Researcher Award**, College of Engineering of University of Akron, 2011.
- **China Oversea Outstanding Young Resercher Award**, National Natural Science Foundation of China, 2011.
- **Member of National Academy of Inventors**, 2011.
- **Lewis F. Moody Award**, American Society of Mechanical Engineers, 2009.
- **Best Paper Award**, American Society of Mechanical Engineers IMECE-Microfluidics 2008.
- My graduate student Ashish Jagtiani was awarded “Outstanding Student Reseaccher Award” and “Best Oral Presentation Award” in Univ. of Akron Student Research Conference 2007.
- Akron Morning News “UA research to help hay fever sufferers” reported my research work titled “A label-free high throughput resistive-pulse sensor for simultaneous differentiation and measurement of multiple particle-laden analytes”, WAKR 1590, 8/1/06, Host: Mr. Ray Horner.
- Extraordinary Teaching Assistant Award, Columbia University, (2000, 2001).

### **INVITED PRESENTATIONS**

1. Single cell detection and its applications in clinics, College of Food Engineering, Xi’an Jiaotong University, Xi’an, 6/2018.
2. Inertia Particle Separation in Microfluidic, Invited talk at Northwestern Polytechnic University, Xi’an, China, Dec. 15, 2017.
3. Plantar Foot Force Detection Using Microsensors, Invited talk at Northwestern Polytechnic University, Xi’an, China, Dec. 17, 2017.
4. Dynamic Tip clearance measurement in High temperature measurement, Invited talk at Northwestern Polytechnic University, Xi’an, China, June, 2017.

5. Microfluidics Applications in Bioengineering, Invited talk at Xi'an Jiaotong University, Xi'an, 6/2017.
6. Single cell detection and its applications in clinics, Beijing University of Technology, Beijing, 6/2017.
7. Macromoleclar Detection Based on Micro Coulter Counters, Invited talk at Northwestern Polytechnic University, Xi'an, China, June, 2016.
8. Integrated Microfluidic Devices for Cell and Biomarker Detection and Analysis, Beijing University of Technology, Beijing, 6/2016.
9. On Chip Micro and Nano Scale Bio-object Separation, Manipulation and Detection, Xi'an Jiaotong University, Xi'an, 6/2016.
10. Integrated oil condition sensing system for online machine health monitoring, Beijing University of Technology, Beijing, 6/2015.
11. Integrated oil condition sensing system for online machine health monitoring, Northwestern Polytechnic University, Xi'an, 6/2015.
12. Biomarker detection using multiplexed microfluidic Coulter counters, Beijing University of Technology, 6/2014.
13. Multiplexed Biomarker detection, International Conference on BioElectronics, BioSensors, BioMedical Devices, BioMEMS/NEMS and Applications, Shanghai, Nov.17-19, 2013.
14. Multiplexed Resistive Pulse Sensors for Biomedical Research and Health Care, Shanghai University, 7/2013.
15. Multiplexed Resistive Pulse Sensors for Biomedical Research and Health Care, Xi'an Jiaotong University, 6/2013.
16. Integrated Inductive and Acoustic Sensors for Online Health Monitoring, Xi'an Jiaotong University, 6/2013.
17. High-Throughput Detection of Microscale and Nanoscale Bio-objects Using Microfluidic Sensors", Jilin University, 6/2012.
18. "High Through Oil Debris Sensors for Online Health Monitoring of Rotating Machinery", Xi'an Jiaotong University, 5/2012.
19. BioMEMS Approach for Detection Bio-objects in Suspension", Texas Tech University, 5/2012.
20. Microfluidic Sensors for Detection of Micro and Nano scale Particles in Suspension, University of North Texas, 3/2012.
21. "Particle Separation using Standing Surface Acoustic Waves", Xi'an Jiaotong University, 5/2012.
22. "Lab-on-a-chip Biosensors for High-throughput Detection of Microscale and Nanoscale Objects", Xi'an Jiaotong University, 6/2011.
23. "Capillary Microgrippers using Electrowetting", Xi'an Jiaotong University, 6/2011.
24. "Lab-on-a-chip Biosensors for High-Throughput Detection of Microscale and Nanoscale Bio-objects", Department of Biomedical Engineering, The University of Akron, OH, 4/2011.
25. "Smart Microfluidic Sensors for Biomedical Research", International Symoposium on Micro/Nano Mechanical Machining and Manufacturing, Guilin, China, Aug.18-20,2010.
26. "Machine Health Monitoring Using Inductive Coulter counting Technologies", Intelligent Sensors and Actuators at Earth and Space 2010 Conference, Hawaii, USA, Mar.14-17, 2010.
27. "Electric Pulse Sensors and Application for Biomedical Research and Rotating Machinery Health Monitoring", Tianjin University, China, 7/2010.

28. “Resistive Pulse sensors and Applications for Biomedical Research”, Beijing University of Technology, China, 7/2010.
29. “Electric Pulse sensors and Application for Biomedical Research and Rotating Machinery Health Monitoring”, Xi’an JiaoTong University, China. 7/2010.
30. “Coulter Counting Methods to Assay Bioparticles”, Department of Biomedical Engineering, The University of Akron, OH (10/2009).
31. “A High Altitude Balloon-Sat for Environmental Monitoring”, NASA-OAI/OSGC Executive Committee, Columbus, OH (08/2007).
32. “Microactuators and Nanoactuators for Optical and BioMEMS applications”, School of Electrical-Mechanical Engineering, Beijing University of Technology, Beijing, China (05/2007).
33. “MEMS Approach to Aeronautical/Aerospace Applications”, School of Electrical-Mechanical Engineering, Northwestern Polytechnic University, Xi’an, China (05/2007).
34. “A High Throughput Device for Pollen Detection”, School of Mechanical Engineering, Xi’an Jiaotong University, Xi’an, China (05/2007).
35. “BioMEMS Approach to Micro and Nano Scale Bioparticle Detection”, Department of Polymer Engineering, The University of Akron, OH (09/2006).
36. “Development of A Tethered, Low-Payload Smart Balloon”, NASA-OAI/OSGC Executive Committee, Columbus, OH (08/2006).
37. “High Throughput Resistive Pulse Sensors for Bioparticle Sensing”, Department of Mechanical Engineering, University of Louisville, KY (04/2006).
38. “Health Monitoring Sensor System for Metallic and Ceramic Bearings Using Surface Acoustic Waves”, Ohio Aerospace Institute, OH (07/2005).
39. “A Large Displacement Electromagnetic MEMS Actuation System and Micromembrane Actuator Arrays for Optical Applications”, NASA Glennan Microsystem Initiative, Independence, OH (05/2005).
40. “Large Displacement MEMS Magnetic and Electrostatic Actuators”, Department of Electrical and Computer Engineering, University of Cincinnati, OH (05/2004).
41. “MEMS actuators sensors and actuators for aeronautical applications”, General Electric Gas Turbine Division, Cincinnati, OH (10/2003).

## **CONFERENCE PRESENTATIONS**

1. Continuous concentration of Cells in Microchannel with Contraction-Expansion Structures. *The Second International Conference of Microfluidics, Nanofluidics and Lab-on-a-Chip*. June 8~10, 2018, Beijing, China.
2. Influence of Secondary Flow and Geometrical Structure on Mixing in Microchannel. *ASME 2017 International Conference on Nanochannels, Microchannels, and Minichannels*. August 27– August 31, 2017, Cambridge, USA.
3. Liu, F, KC, P., Zhang, G., and **Zhe, J.**<sup>†</sup>, A microfluidic sensor for single cell detection in a continuous flow, *Transducer 2017*, Kaohsiung, Taiwan, June 18 to June 22, 2017.
4. Liu, F, KC, P., Zhang, G., and **Zhe, J.**<sup>†</sup>, A Label-free microfluidic sensor for high sensitivity biomarker sensing, *ASME FEDSM 2017*, Hawaii, July 30 to August 4, 2017.
5. Liu, F, KC, P., Zhang, G., and **Zhe, J.**<sup>†</sup>, Target Cell Detection via Microfluidic Magnetic Beads Assay, *ASME IMECE 2016 Proceedings*, November 11-17, 2016. Phoenix, Arizona.

6. Han, Y., Wu, H., Liu, F., Cheng, G. and Zhe, J., A Multiplexed Biomarker Assay Using a Two-stage Micro Resistive Pulse Sensor, *ASME IMECE 2016 Proceedings*, November 11-17, 2016. Phoenix, Arizona.
7. F. Liu, P. KC, G. Zhang, and J. Zhe, "An Integrated Microfluidics Device for Magnetic Activated Cell Analysis," in 14th International Conference on Nanochannels, Minichannels, and Microchannels, Washington, DC, July. 10th, 2016.
8. Liu, F, KC, P., Zhang, G., and **Zhe, J.**<sup>†</sup>, An Integrated Device for Magnetic Activated Cell Detection and Analysis, Int. Conf. of Microfluidics, Nanofluidics and Lab-on-a-Chip, June 10~12, 2016, Dalian, China.
9. Han, Y., Wu, H., Liu, F., Cheng, G. and Zhe, J., A Label-Free Microparticle Based Immunoaggregation Assay for Biomarker Detection, Int. Conf. of Microfluidics, Nanofluidics and Lab-on-a-Chip, June 10~12, 2016, Dalian, China.
10. Fan L.L., Zhe, J., He, X.-K., Dong, H., Zhao, L. <sup>†</sup>, and Feng, J., Particle Focusing Behavior in Microchannel with Different Arrangements of Sharp Corners, Joint Conference of 5th UK-China and 13th UK Particle Technology Forum, Leeds, 12-15 July 2015.
11. "Immunoaggregation Based, Label-Free Biomarker Sensor", *Int. Conf. on Nanochannels, Microchannels and Minichannels*, August 3-7, 2014, Chicago, USA.
12. "A Microchannel With Repeated Sharp Corners for Single Stream Particle Focusing", *Int. Conf. on Nanochannels, Microchannels and Minichannels*, August 3-7, 2014, Chicago, USA.
13. "An Integrated Lubricant Oil Condition Monitoring Sensor", *Int. Conf. on Nanochannels, Microchannels and Minichannels*, August 3-7, 2014, Chicago, USA.
14. "A Microfluidic Biomarker Sensor Based on Immunoaggregation", *ASME IMECE 2012*, November 11-15, 2012. Houston, Colorado.
15. "A Multichannel Inductive Coulter Counter for High Throughput Wear Debris Detection", *ASME IMECE 2011*, November 13-17, 2011. Denver, Colorado.
16. "High Throughput Multichannel Coulter Counter Using Isolation Electrodes", *ASME IMECE 2011*, November 13-17, 2011. Denver, Colorado.
17. "A Multiplexed Microfluidic Impedance Sensor for High Throughput Analysis of Microparticles", *IEEE Transducer 2011*, June 5-9, 2011. Beijing, China.
18. "A Microfluidic Inductive Pulse Sensor for Real Time Detection of Machine Wear", *IEEE MEMS 2011*, January 23-27, 2011. Cancun, Mexico.
19. "Division Multiplexing of a Multi-channel Resistive Pulse Sensor", *ASME IMECE 2010*, November 12-18, 2010. Vancouver, British Columbia, Canada.
20. "Electro-mechanical Behavior of Polymer Brushes for Smart Nanovalves: Molecular Dynamics Simulation", *ASME IMECE 2010*, November 12-18, 2010. Vancouver, British Columbia, Canada.
21. "AC Measurements and Multiplexed Detection Of Microparticles Using Parallel Channel Coulter Counter", 18th Biennial IEEE UGIM (University Government Industry Micro/nano) Symposium, June 28-July 1, 2010, West Lafayette, IN.
22. "Electrowetting of room temperature ionic liquids (RTILs) for capillary force manipulation", *ASME IMECE 2009*, November 13-18, 2009. Lake Buena Vista, Florida.
23. "A magnetic coulter counting device for wear debris detection in lubrication", *ASME IMECE 2009*, November 13-18, 2009. Lake Buena Vista, Florida.
24. "A low voltage capillary microgripper based on electrowetting", IEEE 15th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers'09), June 21-25, Denver, Colorado.

25. "A Droplet Based Microgripper For Microassembly", *ASME IMECE 2008*, November 2-6, 2008. Boston, Massachusetts.
26. "A Microfluidic Device for Wear Detection In Lubricants", *ASME IMECE 2008*, November 2-6, 2008. Boston, Massachusetts.
27. "A High Throughput Multiplexed Micro Coulter Counter Using Amplitude Modulation", (2008). 17th Biennial IEEE University Government Industry Micro/nano (UGIM) Symposium, July 13-16, 2008, Louisville. KY.
28. "A Capillary Microgripper Using Electrowetting", (2008). 17th Biennial IEEE UGIM (University Government Industry Micro/nano) Symposium, July 13-16, Louisville, KY.
29. "Amplitude Modulated Micro Coulter Counter for High Speed Counting of Microparticles", (2008). 51st IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2008), August 10-13, 2008, in Knoxville, TN.
30. "An Electrowetting Based Microgripper", (2008). 51st IEEE International Midwest Symposium on Circuits and Systems (MWSCAS 2008), August 10-13, 2008, in Knoxville, TN, pp.49-52.
31. "Numerical Analysis of Rapid Micromixers Utilizing Magnetic Particles", *ASME IMECE 2007*, November 11-15, 2007. Seattle, Washington.
32. "Initial Assessment of NSF STEM workshops for middle school students with disabilities", *NSF Division of Human Resource Development (HRD) 2007 Joint Annual Meeting*, Aug. 12 – 14, 2007, Washington DC.
33. "Design and integration of Bi-camera imaging system on a smart balloon", *Ohio Science and Engineering Alliance Research Forum 2007*, Aug. 9 – 10, 2007, Wright State University.
34. "Implementation of mechanical components for a high-altitude smart balloon", *Ohio Science and Engineering Alliance Research Forum 2007*, Aug. 9 – 10, 2007, Wright State University..
35. "A micromachined high throughput bioparticle sensor", *IEEE 14<sup>th</sup> International Conferences on Solid State Sensors, Actuators and Microsystems*, Jun. 9-14, 2007, Lyon, France.
36. "Descriptions of STEM Workshops for Middle School Students with Specific Learning Disabilities", *1<sup>st</sup> International Technology-Based Learning with Disability Conference*, July 19-20, 2007, Dayton, Ohio.
37. "Fostering Science, Technology, Engineering and Math Using Intelligent Balloon for Special Learning Disabilities Middle School Students", *ASEE North Central Conference*, Mar. 30-31, Charleston, West Virginia, 2007.
38. "A Microfluidic Based High Throughput Resistive-Pulse Sensor", *ASME IMECE 2006*, Chicago, Nov. 5-11, Illinois, 2006.
39. "Simultaneous Detection of Multiple Bioparticles Using A Microfluidic Based Resistive-Pulse Sensor", *ASME IMECE 2006*, Chicago, Nov. 5-11, Illinois, 2006.
40. "Implementation of a Tethered Smart Balloon", *Ohio Science and Engineering Alliance Research Forum 2006*, Columbus, Aug. 13-14, 2006.
41. "Development of Sensors and Acquisitions for A Tethered Smart balloon", *Ohio Science and Engineering Alliance Research Forum 2006*, Columbus, Aug. 13-14, 2006.
42. "Aerodynamic Design and Altitude Measurement for A Tethered Smart Balloon", *Ohio Science and Engineering Alliance Research Forum 2006*, Columbus, Aug. 13-14, 2006.
43. "A High throughput MEMS sensor for Bioparticle counting", *2006 Solid State Sensors, Actuators and Microsystems Workshop*, Hilton Head, South Carolina, June 4-8, 2006.

44. “A Hybrid Rapid Microfluidic Mixer Utilizing Electrokinetic Relay and Asymmetric Flow Geometries for Lab-on-a-chip Applications”, *ASME IMECE 2005*, Orlando, Florida, Nov. 5-11, 2005.

### **GRADUATE STUDENTS SUPERVISION**

| <b>Student Name</b>   | <b>Program</b> | <b>Title of Project</b>   |
|---|----------------|---|
| 1. Yiou Wang (2004 – 2007)( <b>finished</b> )                               | Ph.D.          | Rapid Micromixers for Lab-on-a-chip Applications  |
| 2. Ashish Jagtiani (2007 – 2011) ( <b>finished</b> )                        | Ph.D.          | Development Of A Novel Multichannel Resistive Pulse Sensor For Micro-Particle Detection And Differentiation                       |
| 3. Du Li (2008 to 2012) ( <b>finished</b> )                                 | PhD            | A Multichannel Oil Debris Sensor For Online Health Monitoring Of Rotating Machinery   |
| 4. Yu Han (2011-2015), ( <b>finished</b> )                                  | PhD            | Label Free And Multiplexed Immunosensor Chips For Detection Of Macromolecular And Cellular Biomarkers                             |
| 5. Xiaoliang Zhu (2012-2016, <b>finished</b> .)                             | PhD            | Detection of wear deris and lubricant properties using microfluidic devices   |
| 6. Fan Liu (2013 – 2017, <b>finished</b> .)                                 | PhD            | Multiplexed biochip for analysis of cell responses and cell secretomes  |
| 7. Liwei Li (2015-present)  | PhD            | Stdudy of electrical stimulations on cells based on a integrated chip   |
| 8. Dian Jiao (2017-present)   | PhD            | Online monitoring of dynamic tip clearance with simplified calibration  |
| 9. Zheng Zhang (2004 – 2006) ( <b>finished</b> )                            | M.S.           | Resistive Pulse Sensors For Pollen Detection  |
| 10. Ashish Jagtiani (2005 – 2007) ( <b>finished</b> )                       | M.S.           | Development of Novel Multichannel Resistive Pulse Sensors for Micro-Particle Detection and Differentiation                        |
| 11. Rupesh Sawant (2005 – 2007) ( <b>finished</b> )                         | M.S.           | Bio-Particle Counting and Sizing Using Micro-Machined Multichannel Coulter Counter with Wavelet Based De-Noiseing                 |
| 12. John Visner (2005 – 2008) ( <b>finished</b> ), co-advised with P. Lam   | M.S.           | Large Deflection of a Cantilever Beam Subjected to a Constant, Concentrated Force, with a Constant Angle, Applied to the Free End |
| 13. Jansen Smolk (2005 – 2008) ( <b>finished</b> ), co-advised with P. Lam  | M.S.           | The Design of a Low Profile Leaf Spring for Paper Handling Applications   |
| 14. John Laguadia (2005 – 2009) ( <b>finished</b> ), co-advised with P. Lam | M.S.           | Computer Aided Parametric Threaded Screws Design and Analysis   |
| 15. Srinidhi Murali (2006 – 2008) ( <b>finished</b> )                       | M.S.           | A Microfluidic Coulter Counting Device for Metal Wear Detection in Lubrication Oil  |
| 16. Sheela Bhandarkar   | M.S.           | Multiple Bio-Particle Separation Using a Two-Stage  |

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| (2006 – 2008) ( <b>finished</b> )  |      | Microfluidic Dielectrophoretic Sorter   |
| 17. Xingao Xia (2007 – 2009) ( <b>finished</b> ), co-advised with J. Carletta  | M.S. | Modeling A Microfluidic Capacitive Sensor for Metal Wear Debris Detection in Lubrication Oil                        |
| 18. Abhay Vasudev (2007 – 2009) ( <b>finished</b> )                            | M.S. | A Capillary Force Microgripper for Microassembly Using Electrowetting-on-Dielectric (EWOD)                          |
| 19. Zhenpeng Qin, (2007 – 2009) ( <b>finished</b> ), co-advised with G.X. Wang | M.S. | Modeling of Ion Transport For Micro/Nano Size Particles in Coulter Counter Application                              |
| 20. Hui Ouyang (2008-2010), ( <b>finished</b> )                                | MS   | Charged Polyelectrolyte Brushes For Voltage-Controlled Gating Of Nanofluidic Channel: Molecular Dynamics Simulation |
| 21. Abdullah Al Amin (2011 – 2014) ( <b>finished</b> )                         | MS.  | High Throughput Particle Separation On A Differential Fermat Spiral Microchannel                                    |
| 22. Zhuocheng Wang (2010 – 2012, <b>finished</b> )                             | MS   | Micro devices for Microparticle Separation using Surface acoustic waves   |
| 23. Mingxian Ma (2013 – 2015, <b>finished</b> )                                | MS   | A Feasibility Study Of Particle Sorter Using Impedance Detection And Surface Acoustic Wave Sorting                  |
| 24. Xueyang Yu (2018-present)  | MS   | Improving sensitivity and resolution of inductive sensors for gap measurements                                      |

### **UNDERGRADUATE STUDENTS RESEARCH SUPERVISION**

| <b>Student Name</b>                                       | <b>Program</b>                                  | <b>Title of Project</b>  |
|---|---|--|
| 1. D. Moore (Minority student, Fall, 2004 & Spring, 2005) | Undergraduate Research                          | Design and testing of a rapid micromixer                           |
| 2. Adrien Fays (Summer, 2005)                             | Independent Study                               | Pollen detection using a resistive pulse sensor                    |
| 3. Chris Pfizzer (Spring, 2006)                           | Senior Design Project                           | Design and testing of a lubricant debris sensor (capacitance mode) |
| 4. Jeff Rayle (Spring, 2006)                              | Senior Design Project                           | Design and testing of a lubricant debris sensor (resistance mode)  |
| 5. Mike Arnett (Fall 2006 - Spring 2007)                  | Senior Design Project                           | Development of a low payload intelligent balloon                   |
| 6. Kassandra Oglesky (Minority student, Summer, 2006)     | NASA Glenn-Stokes summer undergraduate research | Sensor testing for a smart balloon                                 |
| 7. Shiraz Khan (Minority student, Summer, 2006)           | NASA Glenn-Stokes summer undergraduate research | Aerodynamic design and altitude measurement for a smart balloon    |
| 8. Rebekar Konet (Fall 2007-Spring 2008)                  | Senior Design Project                           | Design of of a thermal cutter for a smart balloon                  |
| 9. Jose Blanco (Minority student,                         | NASA Glenn-Stokes summer undergraduate          | Design and implementation of mechanical components for a high      |

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| Summer, 2006 and Summer 2007)                      | research   | altitude smart balloon   |
| 10. Osama Elbuluk (Minority student, Summer, 2007) | NASA Glenn-Stokes summer undergraduate research  | An time-controlled imaging device for a high altitude smart balloon                      |
| 11. Wai Moe (Summer, 2007)                         | Manair scholarship summer undergraduate research | System integration of a high altitude smart balloon                                      |
| 12. Tom Vo (Summer, 2007)                          | NASA-OSGC summer undergraduate research          | Design and implementation of a GPS and tracking system for a high altitude smart balloon |
| 13. Jamila Frank (Summer, 2008)                    | NASA-OSGC summer undergraduate research          | Capacitance Cytometer for detection of bio objects                                       |
| 14. Jose Blanco (Summer, 2008)                     | Independent Study                                | Design and implementation of a passive separator for micro particle sorting              |
| 15. Uchechukwu Anozie (Fall 2009 –Spring 2010)     | Senior Design Project                            | Fabrication of nanopore based biosensors   |
| 16. Francis Gradisher (Fall 2010-Spring 2011)      | Senior Design Project                            | Development of a nanostructured energy generator for biosensors                          |
| 17. Chris Indermuhle (Fall 2010-Spring 2011)       | Senior Design Project                            | Development of a nanofiber based explosive sensor  |
| 18. Garrett Dowd (Fall 2014 – Spring 2015)         | Honors Project                                   | Design of a coolign device for patients wearing prosthetic legs                          |

### **HIGH SCHOOL STUDENTS SUPERVISION**

| <b>Student Name</b>              | <b>Program</b>       | <b>Title of Project</b>  |
|----------------------------------|----------------------|--|
| Zhiyuan Li (Summer, 2014)        | Summer Research      | Testing of prosthetic leg cooling                                |
| Jeffery Wang (Spring, 2011)      | Independent Research | Testing of nano-structured thermoelectrical materials            |
| Courtney Gras (Summer, 2007)     | Summer research      | Time control circuit design & implementation for a smart balloon |
| Brigid Fleischman (Summer, 2007) | Summer research      | Cell detection using a resistive pulse sensor                    |
| Timothy Mille (Summer, 2007)     | Summer research      | Cell detection using a resistive pulse sensor                    |

### **UNDERGRADUATE COURSES TAUGHT**

| <b>Course</b>    | <b>Title</b>                   | <b>Year</b> | <b>Semester</b> | <b>Number<br/>of<br/>Students</b> | <b>Rating</b> |
|------------------|--------------------------------|-------------|-----------------|-----------------------------------|---------------|
| 4600:441         | Control System Design          | 2019        | Spring          | 13                                | 3.95/5        |
| 4600:484         | Mechanical Engineering Lab     | 2019        | Spring          | 78                                | N/A           |
| 4600:484         | Mechanical Engineering Lab     | 2018        | Fall            | 95                                | N/A           |
| 4600:441         | Control System Design          | 2018        | Fall            | 35                                | 3.9/5         |
| 4600:484         | Mechanical Engineering Lab     | 2018        | Spring          | 46                                | N/A           |
| 4600:441/<br>541 | Control System Design          | 2017        | Fall            | 39                                | 3.91/5        |
| 4600:671         | Fund. & Application of MEMS    | 2017        | Fall            | 12                                | 5.0/5.0       |
| 4600:441/<br>541 | Control System Design          | 2017        | Spring          | 33                                | 4.64/5        |
| 4600:484         | Mechanical Engineering Lab     | 2017        | Spring          | 24                                | N/A           |
| 4600:484         | Mechanical Engineering Lab     | 2016        | Fall            | 36                                | 3.33/5        |
| 4600:441/<br>541 | Control System Design          | 2016        | Fall            | 35                                | 3.83/5        |
| 4600:484         | Mechanical Engineering Lab     | 2016        | Spring          | 35                                | N/A           |
| 4600:484         | Mechanical Engineering Lab     | 2015        | Spring          | 36                                | N/A           |
| 4600:441/<br>541 | Control System Design          | 2014        | Fall            | 43                                | 3.94/5        |
| 4600:441         | Control System Design          | 2014        | Fall            | 45                                | 3.37/5        |
| 4600:441         | Control System Design          | 2013        | Fall            | 46                                | 4.04/5        |
| 4600:441         | Control System Design          | 2013        | Spring          | 42                                | 2.95/4        |
| 4600:484         | Mechanical Engineering Lab     | 2013        | Spring          | 65                                | N/A           |
| 4600:441         | Control System Design          | 2012        | Fall            | 41                                | 2.93/4        |
| 4600:441         | Control System Design          | 2012        | Spring          | 25                                | 2.81/4        |
| 4600:484         | Mechanical Engineering Lab     | 2012        | Fall            | 66                                | N/A           |
| 4600:484         | Mechanical Engineering Lab     | 2012        | Spring          | 28                                | N/A           |
| 4600:496         | Fund. & Application of MEMS    | 2011        | Fall            | 4                                 | 3.14/4        |
| 4600:441/<br>541 | Control System Design          | 2011        | Spring          | 20                                | 3.39/4        |
| 4600:441/<br>541 | Control System Design          | 2010        | Fall            | 38                                | 2.83/4        |
| 4600:441/<br>541 | Control System Design          | 2010        | Spring          | 8                                 | 3.18/4        |
| 4600:441         | Control System Design          | 2009        | Fall            | 35                                | 2.97/4        |
| 4600:441         | Control System Design          | 2008        | Fall            | 39                                | 2.26/4        |
| 4600:484         | Mechanical Engineering Lab     | 2008        | Spring          | 21                                | N/A           |
| 4600:441         | Control System Design          | 2007        | Fall            | 37                                | 3.26/4        |
| 4600:203         | Dynamics                       | 2007        | Spring          | 41                                | 3.57/4        |
| 4600:441         | Control System Design          | 2006        | Fall            | 39                                | 3.24/4        |
| 4600:203         | Dynamics                       | 2006        | Spring          | 39                                | 2.95/4        |
| 4600:441         | Control System Design          | 2005        | Fall            | 35                                | 2.72/4        |
| 4600:203         | Dynamics                       | 2005        | Spring          | 33                                | 2.85/4        |
| 4600:496         | Microelectromechanical Systems | 2004        | Fall            | 2                                 | 4.00/4        |

|          |                       |      |        |    |        |
|----------|-----------------------|------|--------|----|--------|
| 4600:441 | Control System Design | 2004 | Fall   | 35 | 2.78/4 |
| 4600:203 | Dynamics              | 2004 | Spring | 35 | 1.87/4 |

### **GRADUATE COURSES TAUGHT**

| <b>Course</b> | <b>Title</b>                     | <b>Year</b> | <b>Semester</b> | <b>Number of Students</b> | <b>Rating</b> |
|---------------|----------------------------------|-------------|-----------------|---------------------------|---------------|
| 4600:672      | Design of Micro/Nano Systems     | 2018        | Spring          | 6                         | 4.62/5        |
| 4600:671      | Fund. & Application of MEMS      | 2017        | Fall            | 12                        | 5.0/5.0       |
| 4600:672      | Design of Micro/Nano Systems     | 2016        | Spring          | 6                         | 4.44/5        |
| 4600:671      | Fund. & Application of MEMS      | 2015        | Fall            | 6                         | 4.67/5        |
| 4600:672      | Design of Micro/Nano Systems     | 2014        | Fall            | 15                        | 4.58/5        |
| 4600:671      | Fund. & Application of MEMS      | 2013        | Fall            | 10                        | 4.25/4        |
| 4600:672      | Design of Micro and Nano Devices | 2012        | Spring          | 13                        | 3.67/4        |
| 4600:671      | Fund. & Application of MEMS      | 2011        | Fall            | 12                        | 3.59/4        |
| 4600:672      | Design of Micro and Nano Devices | 2011        | Spring          | 8                         | 3.86/4        |
| 4600:671      | Fund. & Application of MEMS      | 2010        | Fall            | 16                        | 3.62/4        |
| 4600:672      | Design of MEMS and Nano Devices  | 2010        | Spring          | 12                        | 3.73/4        |
| 4600:671      | Fund. & Application of MEMS      | 2009        | Fall            | 8                         | 3.34/4        |
| 4600:672      | Design of Micro and Nano Devices | 2009        | Spring          | 8                         | 3.83/4        |
| 4600:671      | Fund. & Application of MEMS      | 2008        | Fall            | 10                        | 3.40/4        |
| 4600:672      | Design of Micro and Nano Devices | 2008        | Spring          | 8                         | 3.00/4        |
| 4600:671      | Fund. & Application of MEMS      | 2007        | Fall            | 10                        | 3.63/4        |
| 4600:672      | Design of Micro and Nano Devices | 2007        | Spring          | 9                         | 4.00/4        |
| 4600:671      | Fund. & Application of MEMS      | 2006        | Fall            | 6                         | 3.67/4        |
| 4600:672      | Design of Micro and Nano Devices | 2006        | Spring          | 9                         | 4.00/4        |
| 4600:671      | Fund. & Application of MEMS      | 2005        | Fall            | 5                         | 3.67/4        |
| 4600:496      | Advanced MEMS                    | 2005        | Spring          | 7                         | 3.60/4        |
| 4600:696      | Microelectromechanical Systems   | 2004        | Fall            | 6                         | 3.17/4        |
| 4600:696      | Microelectromechanical Systems   | 2003        | Fall            | 14                        | 3.30/4        |

### **TEACHING TRAINING**

1. "TTL Teaching, Assessment, and Learning Workshop", The University of Akron, Apr. 12, 2004.

2. “**STEM Interactive Teaching Workshop**”, ASEE North Central Conference, Mar. 31-Apr. 1, 2007.
3. “**Technology-Based Learning With Disabilities Forum**”, 1<sup>st</sup> Int. Technology-Based Learning with Disability Conference, July 19 – 20, 2007.

### **CURRICULUM DEVELOPMENT**

- “**CNC Machining**” (4600:484) (A new undergraduate mechanical lab)
- “**Fundamentals of Microelectromechanical Systems**” (4600:671) (A new graduate/undergraduate) course developed including laboratory components)
- “**Design of Microsystems and Nano Devices**” (4600:672) (A new graduate course developed)
- “**Fabrication and Characterization of Microfluidic Channels**” (4600:484) (A new undergraduate mechanical lab)

### **COMPETITIVE STUDENT PROJECTS**

- “**Development of A Tethered Smart Balloon**”, Feb. 2006 to Jan. 2007.
- “**Design and Implementation of A High Altitude Balloon for Environmental Monitoring**”, Feb. 2007 to Jan. 2008.

### **TEACHER IN-SERVICE PROGRAM**

- Organizer and instructor for **NSF STEM Workshops for Middle School Students and Teachers** (Aug. 2006 to May 2009) (trained 52 middle school students and 12 middle school teachers)
- Organizer and instructor for **UA Summer High School Bridge Programs** (Aug. 2008) (trained 16 high school teachers and 52 middle school students)

### **THESIS COMMITTEE DUTIES**

- Graduate Thesis Committee chair for 17 M.S. candidates and 8 Ph.D. Candidates (already graduated 16 M.S. students and 6 Ph.D. students)
- Committee member for 18 master candidates’ and 15 doctoral candidates’ oral examining committees as examiner (2003 – 2011). Partial List since 2008:
  - i. Ahmed Elghriany, System engineerign on road traffic control, PhD 2015 (Advisor: Dr. Peng Yi)
  - ii. James Natale, System optimization for hospital appointment systems, PhD 2014 (Advisor: Dr. Shenyong Wang)
  - iii. Qing Liu, A novel charge-switched zwitterionic carboxybetaine based materials for biomedical applications, PhD 2015 (Advisor: Dr. Lingyun Liu)
  - iv. Chao Zhao, Nanopore-based Biosensor with High Sensitivity for Both Specific and Nonspecific Protein Detection, PhD 2013 (Advisor: Dr. Jie Zheng)

- v. Abdulwahab Aljuhani, A Fundamental Study On Water Droplets Coalescence On Electrowettable Surfaces In Air And Diesel Media, Ph.D 2013, Advisor: George Chase.
- vi. Hua Wang, Utilize xdlvo theory to interpret the initial bacterial attachment under slow flow, Chemical Engineering, Ph.D. 2013, Advisor: Bi-Min Newby.
- vii. Matt Appleby, Oil debris and property monitoring, M.S., 7/2010. Advisor: Fred Choy.
- viii. Mallela, Vineel in Mechanical Engineering, M.S., Performance Evaluation of Modal and Local Control Methods for Flexible Systems, 3/2010. (Advisor: Dr. Dane Quinn)
- ix. Aljarrah, Mohannad, Ph.D in Civil Engineering, Modeling and Experimental Validation of Radiative Heat Transfer in Porous Nanocomposites as Selective Emitters for Low Temperature Thermophotovoltaic Systems. 2010. (Advisor: Dr. Edward Evans)
- x. Pinzon-Gamez, Neissa M., Ph.D. in Chemical Engineering, Rhamnolipid Biosurfactant Production from Glycerol: New Methods of Analysis and Improved Denitrifying Fermentation, 2009 (Advisor: Dr. Luke Ju)
- xi. Sharo, Abdulla Sharo, Ph.D in Civil Engineering, Pressuremeter Applications in Laterally Loaded Drilled Shaft Socketed Into Transversely Isotropic Rock, 2009, (Advisor: Dr. R. Liang)
- xii. Varonis, Orestes J. Ph.D in Eectrical Engineering, Eddy Current Characterization of Stressed Steel and the Development of a Shaft Torque Eddy Current System, 2008, (Advisor: Dr. Nathan Ida)

### **ACADEMIC ADMINISTRATIVE DUTIES**

1. Committee Member (2013 to 2018), *University of Akron Faculty Research Committee*.
2. Senator (2010 – 2013), *University of Akron Faculty Senate*.
3. Committee Member (2007 – present), *Undergraduate Curriculum Committee* of Department of Mechanical Engineering.
4. Committee Member (2009 – 2010), *Graduate Admission Committee* of Department of Mechanical Engineering.
5. Committee Chair (2008-2009), *Tenure/Promotion to Associate Professor Committee* of Department of Mechanical Engineering.
6. Committee member (2006-2008), *Merit Increase Committee* of Department of Mechanical Engineering.
7. Committee Member (2006 – 2010), *Graduate Faculty Committee* of The University of Akron.
8. Graduate Advisor (2003 – present), graduated 13 students and am advising 4 graduate students.
9. Undergraduate Advisor (2007 – present), advised 17 undergraduate students.

### **PROFESSIONAL ACTIVITIES**

1. Manuscript Reveiwer for:
  - Applied Physics Letters

- Lab on a Chip
  - Nano Today
  - Analytical Chemistry
  - Nanotechnology
  - Journal of Micromechanics and Microengineering
  - Smart Materials and Structures
  - Sensor and Actuators A
  - Sensor and Actuators B
  - Materials and Manufacturing Processes
  - Journal of Physics D: Applied Physics
  - Microfluidics and Nanofluidics
  - Journal of Numerical Heat Transfer
  - Journal of Microelectromechanical Systems
  - Journal of Biomedical Microdevices
  - Journal of Optics A
  - Measurement Science and Technology
  - Recent Patents on Electrical Engineering
  - Recent Patents on Mechanical Engineering
  - Chemical Engineering Science
  - IEEE Transaction on Industrial Electronics
  - IEEE Transactions on Nanotechnology
  - Analytical Methods
  - American Control Conference 2003
  - ASME-IMECE conferences 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013
  - IEEE –CASE conference 2004
2. Editorial Advisory Board Member of *Recent Patents on Mechanical Engineering*
3. Panelist/Reviewer for Research Proposal Review Panels
- Panelist for NSF CMMI Career Proposals (October, 2012), reviewed 4 proposals.
  - Communication reviewer for Biological Infrastructure Division, National Science Foundation (September 2009), reviewed 1 proposal.
  - Panelist for Chemical, Bioengineering, Environmental and Transport Systems (May, 2009), reviewed 8 proposals.
  - Communication reviewer for NASA – Ohio Aerospace Institute, (April, 2009). Reviewed 1 proposal.
  - Communication reviewer for research proposals from Kentucky Science and Engineering Foundation (May, 2008), Reviewed 1 proposal.
  - Communication reviewer for research proposals from NASA South Carolina EPSCOR program, (August 2008). Reviewed 8 proposals.
  - Panelist for Chemical, Bioengineering, Environmental and Transport Systems (May, 2007), reviewed 8 proposals.
  - Panelist for Exposure Measurement Tools for EDCs in Mixtures, Environmental Protection Agency (July, 2005), reviewed 7 proposals.

- Panelist for Electronics, Photonics and Device Technology, National Science Foundation (January, 2005), reviewed 9 proposals.
  - Panelist for Electronics SBIR/STTR Phase II, National Science Foundation (May, 2003), reviewed 8 proposals.
4. Conference Organizer and Session Chair
    - Co-chair, ASME Micro and Nano Fluid Dynamics Division Technical Committee (2014 – present).
    - Topic Co-organizer, ASME IMECE 2013 Microfluidics-Fluids Engineering in Micro and NanoSystems Symposium.
    - Topic organizer, ASME IMECE 2012 Microfluidics-Fluids Engineering in Micro and NanoSystems Symposium.
    - Topic Co-organizer, ASME IMECE 2011 Microfluidics-Fluids Engineering in Micro and NanoSystems Symposium.
    - Session Organizer/Chair, ASME IMECE 2011 Nanoengineering for Medicine and Biology Track- Bionanofluidics.
    - Session Chair, ASME IMECE 2006 to 2015 Fluids Engineering Division-Micro and Nano Systems Forum.
  5. Services for ASME Fluids Engineering Division Micro and Nano Fluid Dynamics Technical Committee (2005 to present) and Microelectromechanical Systems (MEMS) Division Technical Committee (2005 to present).
  6. Evaluator for NASA-OAI/OSGC Student Research Project Symposium 2007, 2008, 2009.
  7. Organizer and instructor of NSF STEM workshops for middle school students and teachers at Akron (2006, 2007, 2008, 2009).

### **CONTRIBUTION TO SCHOLARLY AND PROFESSIONAL ASSOCIATIONS**

- Fellow, American Society of Mechanical Engineers (2015 – present)
- Member, American Society of Mechanical Engineers (1997 – present).
- Member, Institute of Electrical and Electronics Engineers (2008 – present).
- Member, National Academy of Inventors (2011 – present).
- Co-chair, ASME Micro and Nano Fluid Dynamics Division Technical Committee (2014 – present)
- Member, ASME Micro and Nano Fluid Dynamics Division Technical Committee (2005 – present).
- Member, ASME MEMS Division Technical Committee (2005-present)