Robert D. White **Curriculum Vitae**

January 2018

Tufts University
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Primary Areas of Interest

Microelectromechanical Systems (MEMS) fabrication, modeling, and testing. Particularly acoustic MEMS (microphones, ultrasound), and aerodynamic measurement technologies (skin friction sensors, aeroacoustic sensors). Acoustics, vibrations, dynamics and controls. Electromechanical systems including robotics. Finite element methods and system modeling. Electronics for measurement. Mechanical measurements.

Education

University of Michigan, Ann Arbor PhD, Mechanical Engineering *2005*
Dissertation: "*Biomimetic Trapped Fluid Microsystems for Acoustic Sensing"* Micromechanical systems (MEMS), dynamics, acoustics, and cochlear mechanics. Advisor: Prof. Karl Grosh.

Massachusetts Institute of Technology MS, Mechanical Engineering *1999*
Master's Thesis: "*Effects of Impact and Vibration on the Performance of a Micromachined Tuning Fork Gyroscope*" at C. S. Draper Labs. Advisors: Dr. Marc Weinberg, Prof. Zaichun Feng.

Massachusetts Institute of Technology BS, Mechanical Engineering *1999*
Minor in mathematics. Concentration in music.

Professional Experience

Associate Professor, Mechanical Engineering, Tufts University, Medford, MA. *Sept. 2011-Present*
Tenured member of the department. Teaching and research in the areas of microsystems, acoustics, vibrations, dynamics, and controls. Research interests include micro- and nano- fabrication, MEMS/NEMS sensors, aerodynamics measurement technologies, ultrasound systems, computational modeling of microsystems, biomimetic design, soft robotics, and inner ear mechanics. Director of the Tufts Micro and Nanofabrication Facility (2007-present). Graduate program director in mechanical engineering (2013-2018). Budget and university priorities committee (2014-2019). Faculty research support and facilities advisory committee (2013-present). Information and Technology Committee (2013-2018).

Ames Associate, NASA Ames Research Center, Moffett Field, CA *Feb 2013-Aug 2013*
Visiting researcher at NASA Ames Research Center, Experimental Aero-Physics Branch, Fluid Mechanics Lab, while on sabbatical leave. Aerodynamic and aeroacoustic testing, wind tunnel instrumentation, and application of MEMS sensors to aero-physics.

Assistant Professor, Mechanical Engineering, Tufts University, Medford, MA. *Sept. 2005-August 2011*
Teaching and research in the areas of microsystems, dynamics, acoustics, vibration, and controls.

Graduate Student Research Assistant, Univ. of Michigan, Ann Arbor, MI. *Jan. 2001-August 2005*
Vibrations and Acoustics Lab and Solid State Electronics Lab. Design, microfabrication, testing of silicon and glass microsystems. Biomimetic design based on cochlear mechanics. Fluid-structure modeling and testing at the microscale including finite element modeling.

MEMS Test Engineer, Charles Stark Draper Laboratories, Cambridge MA. *June 1999-July 2000*
Performance and environmental testing of MEMS gyroscopes. Development of test capabilities.

Draper Fellow, Charles Stark Draper Laboratories, Cambridge MA. *Jan. 1998-May 1999*
Masters thesis on modeling and testing of MEMS gyroscope response to vibration and shock.

Teaching Experience

Microelectromechanical Systems (Graduate Level), Tufts Univ.	*4 times 2007-2013*
Acoustics (Graduate Level), Tufts Univ.	*4 times, 2005-2017*
System Dynamics and Controls (Junior Undergrad), Tufts Univ.	*7 times, 2006-2015*
Dynamics and Vibrations (Junior Undergrad), Tufts Univ.	*4 times, 2006-2016*
Instruments and Experiments (Junior Undergrad), Tufts Univ.	Spring 2014, Spring 2016
Advanced Vibrations (Graduate Level), Tufts Univ.	Spring 2015, Spring 2017

Book Chapters

White, R. D., Littrell, R., and Grosh, K., "A Biomimetic Cochlear Like Sensor", pp. 1-20, in *Microfluidic Technologies for Human Health*, Utkan Demirci, Ali Khademhosseini, Robert Langer, and Jeff Blander, eds., World Scientific Publishing Company, 2013. ISBN 978-9814405515

Journal Publications

1. Dinesh C. Sabarirajan, Thomas Y. George, James Vlahakis, Robert D. White, and Iryna V. Zenyuk, "*Free-standing Pt Nanoelectrode Array as a Model Electrochemical System for Mechanistic Studies"* submitted to The Journal of Physical Chemistry, Part C: January 17, 2018. **Under review.**

2. Nikolas Kastor, Zhengxin Zhao, Robert D. White, "*Multiphysics model investigating performance of a micromachined floating element shear stress sensor*", Sensors and Actuators A: Physical, Volume 269, pp 1-13, 2018. ISSN 0924-4247, https://doi.org/10.1016/j.sna.2017.11.004.

3. Nikolas Kastor, Ritwika Mukherjee, Eliad Cohen, Vishesh Vikas, Barry Trimmer and Robert D. White, *"A Robust and Inexpensive Manufacturing Method for Fast Prototyping of Soft Foam Robots"* submitted to the Journal of Soft Robotics, April 24, 2017. **Under review.**

4. Nikolas Kastor, Vishesh Vikas, Eliad Cohen, and Robert D. White *, "A Definition of Soft Materials for Use in the Design of Robots",* Peer reviewed "letter to the editor", Journal of Soft Robotics, vol 4, no 3, pp. 181-182, 2017.

5. Peter Lewis, Robert White, and Brian Smith, "*Lessons Learned in the Implementation of Aerosol Jet Printing for Fabricating Multilayer Circuit Boards*" in Advancing Microelectronics Magazine: Vol. 44, No. 3, pp. 12-15, May 2017.

6. Magarian, J. N., White, R. D., and Matson, D. M., "*Real-Time Acoustic and Pressure Characterization of Two-Phase Flow for Quality Control of Expanded Polystyrene Injection Molding Processes*", ASME J. Manuf. Sci. Eng. **138**(5):051002-051002-9, 2015.

7. Krause, J., Gallman, J., Moeller, M., and White, R. D., "*A Microphone Array on a Chip for High Spatial Resolution Measurements of Turbulence*", Journal of Microelectromechanical Systems, **23** (5), pp. 1164-1181, 2014.

8. Shin, M., Zhao, Z., DeBitetto, P., and White, R. D. "*Micromachined Ultrasonic Doppler Velocity Sensor using Nickel on Glass Transducers*", Sensors and Actuators A: Physical, **208**, pp 37-49, 2014.

9. Zhao, Z., Shin, M., Gallman, J. M., and White, R. D. "*A Microfabricated Shear Sensor Array on a Chip with Pressure Gradient Calibration*", Sensors and Actuators A: Physical, **205**, pp. 133-142, 2014.

10. Shin, M., Krause, J. S., DeBitetto, P., and White, R. D. "*Acoustic Doppler Velocity Measurement System using Capacitive Micromachined Ultrasound Transducer Array Technology*", Journal of the Acoustical Society of America, **134** (2), pp. 1011-1020, 2013.

11. Lemmerhirt, D. F., Cheng, X., White, R. D., Rich, C. A., Zhang, M., Fowlkes, J. B., and Kripfgans, O. D., "*A 32x32 Capacitive Micromachined Ultrasonic Transducer Array Manufactured in Standard CMOS*", IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, **59** (7), pp. 1521-1536, 2012.

12. White, R. D., Gray, C., Mandelup, E., Amsden, J. J., Kaplan, D. L., and Omenetto, F. G., "*Rapid Nano Impact Printing of Silk Biopolymer Thin Films*", Journal of Micromechanics and Microengineering, **21** (115014), 2011.

13. Shin, M., Gerratt , A. P., Metallo, C., Brindle, A., Kierstead, B. P., and White R. D., "*Characterization of a Micromachined Parylene Based C-Shape Thermal Actuator",* Journal of Micromechanics and Microengineering, **21** (995028), 2011.

14. White, R. D., Mueller, A. J., Shin, M., Gauthier, D., Manno, V. P., and Rogers, C. B. *"Measurement of Microscale Shear Forces during Chemical Mechanical Planarization",* Journal of the Electrochemical Society, **158** (10), pp. H1041-H1051, 2011.

15. Gray, C., Rogers, C. B., Manno, V. P., and White, R. D. "*Modeling of Dual Emission Laser Induced Fluorescence for Slurry Thickness Measurements in CMP*", Experiments in Fluids, **51** (1), pp. 281-293, 2011.

16. Metallo, C., White, R. D., and Trimmer, B. A., "*Flexible parylene-based micro-electrode arrays for high resolution EMG recordings in freely moving small animals*", Journal of Neuroscience Methods **195**, pp. 176-184, 2011.

17. Doody, C., Lemmerhirt, D., Cheng, X., Collin, R., White, R. D. "*Modeling and Characterization of CMOS-Fabricated Capacitive Micromachined Ultrasonic Transducers*", Journal of Microelectromechanical Systems, **20** (1), pp.104-118, 2011.

18. Saunders, F., Golden, E., White R. D., and Rife, J. "*Experimental Verification of Soft-Robot Gaits Evolved Using a Lumped Dynamic Model",* Robotica, **29** (6), pp. 823-830, 2011.

19. Vlahakis, J., Manno, V. P., Rogers, C. B., and White, R. "*Stick-Slip Transitions in Chemical Mechanical Planarization*", Electrochemical and Solid-State Letters, **13** (6), H206-H208, 2010.

20. Amsden, J., Domachuk,,P., Gopinath, A., White, R.D., Dal Negro, L., Kaplan, D. and Omenetto, F. "*Rapid Nanoimprinting of Silk Fibroin Films for Biophotonic Applications*", Advanced Materials, v. 22, 2010.

21. Thompson, J., Tepolt, G., Racz, L., Rogers, C. B., Manno, V. P., and White, R. D. "*A Multistep Process for Thinning Individual Die to sub-35 μm Thickness*." Journal of Microelectronics and Electronic Packaging, 7.4, pp. 189-196, 2010.

22. Vlahakis, J., Rogers, C., Manno, V., White, R., Moinpur, M., Hooper, D., and Anjur, S., "*Synchronous, In Situ Measurements in Chemical Mechanical Planarization",* Journal of the Electrochemical Society, **156** (10), pp. 794-802, 2009.

23. Mueller, N., Rogers, C. Manno, V., White, R. and Moinpour, M., "*In-Situ Investigation of Slurry Flow Fields during CMP*", Journal of the Electrochemical Society, **156** (12), pp. H908-H912, 2009.

24. Cheng, L., White, R. D., and Grosh, K. "*Three Dimensional Viscous Finite Element Formulation for Acoustic Fluid Structure Interaction*" Computer Methods in Applied Mechanics and Engineering, **197** pp. 4160–4172, 2008.

25. Galbraith, C. ,White, R. D., Cheng, L., Grosh, K. and Rebeiz, G. M. "*Cochlea-Based RF Channelizing Filters*", IEEE Transactions on Circuits and Systems I: Regular Papers, **55** (4), pp. 969-979, 2008.

26. Liu, S. and White, R. D. "*Orthotropic material properties of the gerbil basilar membrane*", Journal of the Acoustical Society of America, **123** (4), pp. 2160-2171, 2008.

27. Gray, C., White, R. D., Manno, V. P., and Rogers, C. B. *"Simulated Effects of Measurement Noise on Contact Measurements between Rough and Smooth Surfaces",* Tribology Letters, **29** (3), pp. 185-192, 2008.

28. White, R. D., Cheng, L., and Grosh, K. "*Microfabrication of Coupled Fluid-Structure Systems with Applications in Acoustic Sensing*", Sensors and Actuators A: Physical, **141** (2), pp. 288-298, 2008.

29. Martin, M. J., White, R. D., Kurabayashi, K., and Boyd, I. D., "*Fabrication of beam structures with micro-scale cross-sections and meso-scale spans*," Journal of Micromechanics and Microengineering, **17** (12), pp. 2516-2521, 2007.

30. White, R. D., and Grosh, K. "*Microengineered hydromechanical cochlear model*" Proceedings of the National Academy of Sciences **102** (5), pp. 1296-1301, 2005.

Patents

1. Thomas P. James, Robert D. White, and Eric C. Schmitt, "*Micro Forming Devices and Systems and Uses Thereof*", US application number 14/910,957 filed February 8, 2016 claims the benefit of PCT application number PCT/US2014/050753, filed August 12, 2014. Also claims the benefit of U. S. provisional application Serial No. 61/865,018, filed August 12, 2013. [UNDER REVIEW]

2. Robert D. White and Zhengxin Zhao, "*Shear Sensor Array*", US application number 14/522,653, filed October 24, 2014. Claims the benefit of U.S. provisional application Serial No. 61/895,802, filed October 25, 2013. [UNDER REVIEW]

3. Paul D. Lehrman, Chris Penny, Cody Chen, Noel Hwang, and Robert White, U.S. Patent 9,767,774 *"Synthesizer with Cymbal Actuator",* issued September 19, 2017.

4. R. White and K. Grosh, U.S. Patent 8,130,986, "*Trapped Fluid Microsystems For Acoustic Sensing*", issued March 6, 2012.

Invited Talks

Robert D. White, Peter Lewis, and Brian Smith "*Packaging of MEMS for Aerodynamic Measurements*" in the 43rd iMAPS New England Symposium and Expo, Boxborough, MA, May 3, 2016.

White, R. D. "*Aerodynamic Testing of MEMS Surface Sensors*", at the International Microelectronics and Packaging Society (iMAPS) New England Chapter 42nd Symposium and Expo, Boxborough, Massachusetts, May 5, 2015.

White, R. D. "*Micromachined Aerodynamic Measurement Technologies"*, University of Vermont Mechanical Engineering Seminar co-sponsored by the Vermont Space Grant Consortium, March 28, 2014.

White, R. D. "*Microsystems for Acoustic and Flow Sensing"* at Brüel and Kjær, Nærum, Denmark, December 13, 2013.

Zhao, Z, Krause, J.S., Liu, S.,Shin, M., Kastor, N., Lewis, P., and White, R. D. "*MEMS Sensors for Surface Flow Sensing in Aerospace Applications*" at the International Microelectronics and Packaging Society, New England, 40th Symposium & Expo, Boxborough, MA, May 7, 2013.

White, R. D. "*Array-on-a-Chip MEMS Microphones and Shear Sensors for Boundary Layer Characterization*" NASA Ames Research Center Fluid Mechanics Lab Seminar, June 26, 2012.

White, R.D. "*MEMS Microphone Array on a Chip for Turbulent Boundary Layer Measurements*" Iowa State University Aerospace Engineering Seminar Series, April 5, 2012.

White, R.D. "*MEMS Microphone Array on a Chip for Turbulent Boundary Layer Measurements*" Worcester Polytechnic Institute Mechanical Engineering Seminar Series, March 14, 2012.

White, R. D., Zhao, Z., Shin, M., Krause, J.S. and Liu, S. "*Nickel on Glass Acoustic Microsystems*", at the 162nd meeting of the Acoustical Society of America, San Diego, October 31 – November 4, 2011.

White, R. D. "*Microsystems for Acoustic Sensing*", University of Rhode Island Mechanical Engineering Seminar Series, March 4, 2011.

White, R.D., Krause, J., Liu, S., Zhao, Z., Gallman, J., and Moeller, M. "*Array-on-a-Chip Pressure and Shear Stress Sensors for Boundary Layer Characterization*" at the AIAA Aerospace Sciences Meeting, ASM 2011, Orlando, FL, Jan 3-7, 2011.

White, R. D. "*Application of micromachined devices to cochlear mechanics, biomedical ultrasound, and aeroacoustics*", Boston University Mechanical Engineering Seminar Series, January 22, 2010.

White, R. D. "*Engineering a Cochlea : Microscale Hydromechanical Cochlear Models*", Eaton Peabody Laboratories of Auditory Physiology Seminar Series, Mass Eye and Ear Infirmary, Harvard University, December 18, 2009.

White, R. D. "*MEMS Acoustic Arrays and Shear Sensor Arrays*", Draper Labs Technical Seminar Series, August 5, 2009.

White, R.D. *"Copying the Cochlea: Biomimetic Acoustic Sensors"*. Florida State University, High Performance Materials Institute Distinguished Speaker Series. Tallahassee, Florida, October 31, 2008.

White, R. D., R. Littrell, and K. Grosh "*Copying the Cochlea: Micromachined Biomimetic Acoustic Sensors*" presented at the International Workshop on Structural Health Monitoring 2007, Stanford University, Palo Alto, CA, September 13, 2007.

White, R. D. "*Copying the Cochlea: Micromachined Biomimetic Acoustic Sensors Based on the Mammalian Cochlea*", presented at the Massachusetts Institute of Technology "Mechanics: Modeling, Experimentation, and Computation" Seminar, Cambridge, MA, February 27, 2007.

Peer-reviewed Conference Publications (with conference proceeding papers)

1. Cassandra M. Donatelli, Zachary T. Serlin, Piers Echols-Jones, Anthony E. Scibelli, Alexandra Cohen, Jeanne-Marie Musca, Shane Rozen-Levy, David Buckingham, Robert White, and Barry A. Trimmer, "*Soft Foam Robot with Caterpillar-Inspired Gait Regimes for Terrestrial Locomotion*" in the 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2017), Vancouver, CA, September 24-28, 2017.

2. Dinesh C. Sabarirajan, James Vlahakis, Robert D. White, Iryna V. Zenyuk, "*Electrochemical Characterization of Free-standing Platinum Nanoelectrode Array Using Atomic Layer Deposition for Polymer Electrolyte Fuel Cells*", Transactions of the Electrochemical Society, 75(14) pp. 747-255, 2016.

3. Nikolas Kastor, Maxwell Hill, Vishesh Vikas, Robert D. White and Barry Trimmer, "*Semi-autonomous Soft Robotic Platform for Terrestrial Locomotion*" in the workshop on New Frontiers and Applications for Soft Robotics at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015), Hamburg, Germany, September 28 - October 3, 2015.

4. Maxwell Hill, Prasong Mekdara, Barry Trimmer, Robert David White, "*Structural Vibration for Robotic Communication and Sensing on One-Dimensional Structures*" in the 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015), Hamburg, Germany, September 28 - October 3, 2015.

5. Hill, L., Mekdara, P., Trimmer, B., and White, R. D. "*Structural Vibration for Robotic Communication and Sensing on One-Dimensional Structures*" in the 7th International Symposium on Adaptive Motion of Animals and Machines (AMAM 2015), Cambridge, MA, June21-25, 2015.

6. Kastor, N., Guasto, J. S., and White, R. D. "*A Synthetic Microswimmer with an Acoustically-Actuated Flagellum*" in the 7th International Symposium on Adaptive Motion of Animals and Machines (AMAM 2015), Cambridge, MA, June21-25, 2015.

7. Zhao, Z., Long, K., Gallman, J., and White, R.D. "*Flow Testing of a MEMS Floating Element Shear Stress Sensor*", AIAA2014-1235, in the Proceedings of the 52nd AIAA Aerospace Sciences Meeting, National Harbor, MD, January 13-17, 2014.

8. Kastor, N., Zhao, Z., and White, R. D. "*Modeling of a MEMS Floating Element Shear Sensor*" in the Proceedings of the Materials Research Society, MRS Fall Meeting, Boston, MA, Dec 1-6, 2013.

9. Schmitt, E.C., Sagar, A., White, R. D., and T.P. James, "*Tissue Scaffold Engineering by Micro-Stamping*" in the Proceedings of the Materials Research Society, MRS Fall Meeting, Boston, MA, Dec 1-6, 2013.

10. Zhao, Z., Shin, M., White, R. D., and Gallman, J. "*A MEMS Floating Element with Bump Shear Stress Sensor Array on a Chip*", AIAA 2013-626, in the Proceedings of the 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, Jan. 7-10, 2013.

11. Aryanpur, R. and White, R.D. "*Multi-link Piezoelectric Structure for Vibration Energy Harvesting*", in the Proceedings of the SPIE, Smart Structures and Materials, San Diego, CA, March 11-15, 2012.

12. White, R. D., Krause, J. S., De Jong, R., Holup, G., Gallman , J., and Moeller, M. "*MEMS Microphone Array on a Chip for Turbulent Boundary Layer Measurements*", AIAA 2012-260, in the Proceedings of the 50th AIAA Aerospace Sciences Meeting, Nashville, Jan. 9-12, 2012.

13. Burns, J. R., Krause, J. S., and White, R. D. "*Low Profile Packaging for MEMS Aeroacoustic Sensors*" in the Proceedings of the Materials Research Society, MRS Fall Meeting, 2011.

14. Zhao, Z., Gallman, J., and White, R. D. "*Micromachined Nickel Floating Element Shear Stress Sensor Array*", in Electrochemical Society Transactions, vol. 41, 2011.

15. Liu, S. and White, R. D., "*Determining the Orthotropic Properties of Gerbil Basilar Membrane from Space Constant Measurements*" in Proceedings of the 11th International Mechanics of Hearing Workshop, C. Shera and E. Olson, eds., pp. 346-349, 2011.

16. Tam, B., Fakhraee, A., and White, R. D., "*Coiled Hydromechanical Scale Model of the Inner Ear*" in Proceedings of the 11th International Mechanics of Hearing Workshop, C. Shera and E. Olson, eds., pp. 374-379, 2011.

17. Krause, J. S., White, R. D., Moeller, M. J., Gallman, J. M., Hollup, G., and deJong, R. "*MEMS Pressure Sensor Array for Aeroacoustic Analysis of the Turbulent Boundary Layer*", AIAA 2010-306, in proceedings of the AIAA, 2010 Aerospace Sciences Meeting, Orlando, FL, January 3-8, 2010.

18. Shin, M., Vlahakis, J., Manno, V. P., Rogers, C. B., Paul, E., Moinpour, M., Hooper, D., and White, R. D, *"In Situ Metrology for Glass and Copper CMP"* in Proceedings of the International Conference on Planarization/CMP Technology, ICPT 2009, Fukuoka, Japan, Nov. 19-21, 2009.

19. Krause, J., White, R., Moeller, M., and deJong R., "*MEMS Pressure Sensor Array for Aeroacoustic Analysis of the Turbulent Boundary Layer",* AIAA 2009-1905, in the Proceedings of the AIAA, AIAA Infotech, Seattle, WA, April 6-9, 2009.

20. Thompson, J., Tepolt, G. Racz, L., Rogers, C. B., Manno, V. P., and White, R. D. *"A Method for Die Thickness Reduction to sub-35 μm"* in the Proceedings of the Materials Research Society, MRS Fall Meeting, December 2008.

21. White, R., Vlahakis**,** J., Gray, C., Manno, V., Braun, N., Gauthier, D., Mueller, A., Rogers, C. and Moinpour, M. *"In Situ Characterization of the Mechanical Aspects of CMP"* in the Proceedings of the International Conference on Planarization/CMP Technology 2008, Hsinchu, Taiwan, November 10-12, 2008.

22. C.B. Doody, R. D. White, J.S. Wadhwa, and D.F. Lemmerhirt, "*Characterization and Modeling of Capacitive Micromachined Ultrasound Transducers for Diagnostic Ultrasound"* in Proceedings of the ASME IMECE, Boston, MA, October 31-November 6, 2008.

23. J. S. Krause, R. D. White, M. J. Moeller, J. M. Gallman, and R. deJong, "*MEMS Pressure Sensor Array for Aeroacoustic Analysis of the Turbulent Boundary Layer"* in Proceedings of the ASME IMECE, Boston, MA, October 31-November 6, 2008.

24. S. Liu, D. A. Gauthier, E. Mandelup, and R. D. White, "*Experimental Investigation of a Hydromechanical Scale Model of the Gerbil Cochlea"* in Proceedings of the ASME IMECE, Boston, MA, October 31-November 6, 2008.

25. D. Gauthier, A. Mueller, R. White, V. Manno, C. Rogers, S. Anjur and M. Moinpour, "*Micromachined Force Sensors for Characterization of Chemical Mechanical Polishing*" in Proceedings of Nanotech 2008, Boston, MA, June 1-6, 2008.

26. J.S. Krause, R.D White, M.J. Moeller, J.M. Gallman and R. De Jong, "*MEMS Pressure Sensor Array for Aeroacoustic Analysis of the Turbulent Boundary Layer on an Airplane Fuselage*" in Proceedings of Nanotech 2008, Boston, MA, June 1-6, 2008.

27. P. D. Fallon, A.P. Gerratt, B.P. Kierstead, and R.D. White, "*Shape Memory Alloy and Elastomer Composite MEMS Actuators*" in Proceedings of Nanotech 2008, Boston, MA, June 1-6, 2008.

28. C.B. Doody, J.S. Wadhwa, D.F. Lemmerhirt, and R.D White, "*Characterization and Modeling of Capacitive Micromachined Ultrasound Transducers for Diagnostic Ultrasound*" in Proceedings of Nanotech 2008, Boston, MA, June 1-6, 2008.

29. Meghan Kate, Greg Bettencourt, James Marquis, Aaron Gerratt, Peter Fallon, Brian Kierstead, Robert White and Barry Trimmer, "*SoftBot: A soft-material flexible robot based on caterpillar biomechanics",* in Adaptive Movement in Animals and Machines, AMAM 2008, Cleveland, OH, June 1-6, 2008.

30. Hughes, M.F., Sanayei, M., Moore, J.A., Zapfe, J.A., and White, R.D., "*Experimental Validation of Building Vibration Propagation Using a Four Story Laboratory Model*," in the Proceedings of the ASCE, Structures Congress 2008, Vancouver, Canada, April 24-26, 2008.

31. D. Gauthier, A. Mueller, R. D. White, V. Manno, C. Rogers, D. Hooper, S. Anjur, M. Moinpour, *"Micromachined Lateral Force Sensors for Characterization of Microscale Surface Forces During Chemical Mechanical Polishing."* in the Proceedings of the Materials Research Society, MRS Spring Meeting, March 24-28, 2008.

32. N. Braun, C. Gray, A. Mueller, J. Vlahakis, D. Gauthier, V. P. Manno, C. Rogers, R. White, S. Anjur, M. Moinpour. "*In-Situ Investigation of Wafer-Slurry-Pad Interactions during CMP*" in the Proceedings of the International Conference on Planarization/CMP Technology, Dresden, Germany, October 25-27, 2007.

33. Tsioris, K., White, R. D., Kaplan, D., and Wong, P. "*The Effect of Hydrophobic Patterning on Micromolding of Aqueous-Derived Silk Structures*" in the Proceedings of the Material Research Society, MRS Fall Meeting, November 26-30, 2007.

34. White, R. D., Littrell, R., and Grosh, K. "*Copying the Cochlea: Micromachined Biomimetic Acoustic Sensors*" in Structural Health Monitoring 2007, Quantification, Validation and Implementation, Fu-Kuo Chang, ed. Volume 2, pp. 1447-1454, DesTECH Publications, Inc. 2007.

35. Mueller, A. White, R. D., Manno, V., Rogers, C., Barns, C. E., Anjur, S., and Moinpour, M. "*Micromachined Shear Stress Sensors for Characterization of Surface Forces During Chemical Mechanical Polishing*" in the Proceedings of the Material Research Society, Vol. 991, Symposium C, Advances and Challenges in Chemical Mechanical Planarization, 2007.

36. Gray, C., Rogers, C. Manno, V., White, R., Moinpour, M., Anjur S..*"Determining Pad-Wafer Contact using Dual Emission Laser Induced Fluorescence"*, in the Proceedings of the Material Research Society, Vol. 991, Symposium C, Advances and Challenges in Chemical Mechanical Planarization, 2007.

37. Mueller, A., and White, R. D. *"Residual stress variation in polysilicon thin films",* in Proceedings of the 2006 ASME IMECE.

38. Stone, N., Kaiser, K., and White, R. D. *"Autotuning of a PID controller for an active vibration suppression device for the treatment of Essential Tremor",* in Proceedings of the 2006 ASME IMECE.

39. White, R. D. and Grosh, K. "*Fully micromachined lifesize cochlear model"* in Auditory Mechanisms: Processes and Models, A.L. Nuttall, ed., World Scientific, 2006.

40. White, R. D. and Grosh, K. "*Fluid structure traveling wave filters based on the mammalian cochlea"*, in Proceedings of the μTAS 2005 Conference, Ninth International Conference on Miniaturized Systems for Chemistry and Life Science, K. F. Jensen, J. Han, D. J. Harrison, and J. Voldman, eds., pp. 666-668.

41. Galbraith, C., White, R. D., Grosh, K., and Rebeiz, G. M. "*A mammalian cochlea-based RF channelizer filter*" in Microwave Symposium Digest, 2005 IEEE MTT-S International, 12-17 June 2005 pp. 1935-1938.

42. White, R. D., Cheng, L., and Grosh, K. *"Capacitively sensed micromachined hydrophone with viscous fluid-structure coupling",* Proceedings of the SPIE, *Photonics West 2005*, 5718 (121), pp. 89-100.

43. White, R. D. and Grosh, K. *"A micromachined cochlear-like acoustic sensor",* in Proceedings of the SPIE, vol. 4700, 2002, pp. 89-100.

44. White, R. D. and Grosh, K. *"Design and characterization of a MEMS piezoresistive cochlear-like acoustics sensor",* in Proceedings of the 2002 ASME IMECE**.**

45. Borenstein, J., Gerrish, N., White, R., Curie, M., and Fitzgerald, E. *"Silicon germanium epitaxy: a new material for MEMS"*, in Proceedings of the MRS, vol. 657, 2000, pp EE7.4.1-EE7.4.6.

Other Conference Presentations (without conference proceeding papers)

Ligonde, Gardy K., Torres, Daniela A., Abboud, Eric F., Sung, Wang-Kyung, Vlahakis, J., Banfield D. J., and White, R. D., "*Capacitive micromachined ultrasound transducers for acoustic anemometry on Mars*", at the 173rd Meeting of the Acoustical Society of America, Boston, Massachusetts, June 25-29, 2017.

Nikolas Kastor, Ritwika Mukherjee, Eliad Cohen, Vishesh Vikas, Barry Trimmer and Robert D. White, "*SLABot: An Experiment in the Design of Soft Bodied Robots"*, demonstration at the Robot Zoo, in the 8th International Symposium on Adaptive Motion of Animals and Machines, AMAM 2017, Sapporo, Japan, June 27 - 30, 2017.

Nikolas Kastor, Ritwika Mukherjee, Eliad Cohen, Vishesh Vikas, Barry Trimmer and Robert D. White, "*Locomotion of a Simple Foam Robot"* in the 8th International Symposium on Adaptive Motion of Animals and Machines, AMAM 2017, Sapporo, Japan, June 27 - 30, 2017.

D.A. Torres, S.C Barron, A. Kopa, M.R Miller, A.P Magyar, C.L. Gray, R.D White "*Fabrication and Characterization of Novel Low Inductance Micro-Coaxial Cables*" in the 44th iMAPS New England Symposium and Expo, Boxborough, MA, May 2, 2017. **[Best Student Paper Award #1]**

Nikolas Kastor and Robert D. White ,"*Fabrication of Conformal Electronics Packaging with Microfluidic Eutectic Metal Interconnects*" in the 44th iMAPS New England Symposium and Expo, Boxborough, MA, May 2, 2017. **[Best Student Paper Award #2]**

Dinesh C. Sabarirajan, James Vlahakis, Robert D. White, and Iryna V. Zenyuk, "*Free-standing Platinum Nanoelectrode Array Using Atomic Layer Deposition for Polymer Electrolyte Fuel Cells*", presented at the 90th American Chemical Society Colloid and Surface Science Symposium, ACS Colloids 2016, Cambridge, MA, June 5-8, 2016.

Nikolas Kastor and Robert D. White, "*Liquid Metal Interconnects for Conformable Sensor Packaging Enabling Inertial Measurements of Animals and Soft Robots*" in the 43rd iMAPS New England Symposium and Expo, Boxborough, MA, May 3, 2016.

Peter Lewis, Brian Smith and Robert D. White, "*Printed Transceiver Circuit for System-on-chip Sensor and Processor*" in the 43rd iMAPS New England Symposium and Expo, Boxborough, MA, May 3, 2016.

Peter Lewis, Parshant Kumar, Robert D. White, and Brian R. Smith, "*Deposition Characteristics and Electrical Properties of Silver and CNT Inks Deposited by Aerosol Jet*", at the International Microelectronics and Packaging Society (iMAPS) New England Chapter 42nd Symposium and Expo, Boxborough, Massachusetts, May 5, 2015.

Dominic Guri and Robert D. White, "*Signal Processing for Velocity and Range Measurement using a Micromachined Ultrasound Transducer*" at the 168th Meeting of the Acoustical Society of America, Undergraduate Research Exposition, Indianapolis, Indiana, October 28, 2014.

Devyn P. Curley, Zachary A. Hanan, Dan Luo, Christopher W. Penny, Christopher F. Rodriguez, Paul D Lehrman, Chris B. Rogers, Robert D. White, "*Experimental Investigation of Crash Cymbal Acoustic Quality*", at the 168th Meeting of the Acoustical Society of America, Indianapolis, Indiana, October 30, 2014.

Shin, M., Zhao, Z., DeBitteto, P., and White, R.D., "*Capacitive Micromachined Ultrasound Doppler Velocity Sensor using a Nickel on Glass Process*", 164th Meeting of the Acoustical Society of America, Kansas City, Missouri, October 25, 2012.

Minchul Shin, Joshua Krause, Paul DeBitteto, and Robert White, "*Capacitive Micromachined Ultrasound Doppler Velocity Sensor*" presented at the 161st Meeting of the Acoustical Society of America, Seattle, 23-27 May 2011.

Joshua Krause, Alfram Bright, Mark Moeller, Judith Gallman, and Robert White "*Micromachined Reconfigurable Microphone Array for Wind Tunnel Testing"* presented at the 161st Meeting of the Acoustical Society of America, Seattle, 23-27 May 2011. ***Best student paper award in Engineering Acoustics, Spring 2011.***

Joshua Krause and Robert D. White, "*MEMS Microphone Array On a Chip*" presented at the 159th Meeting of the Acoustical Society of America, Baltimore, Maryland, 19-23 April 2010. ***Best student paper award in Engineering Acoustics, Spring 2010.***

Shuangqin Liu and Robert D. White, "*Influence of Hair Bundle Configuration on Biomimetic Hair Sensor Sensitivity*" presented at the 159th Meeting of the Acoustical Society of America, Baltimore, Maryland, 19-23 April 2010.

Shin, M., Vlahakis, J., Gray, C., Braun, N., Gauthier D., White, R. D., Rogers, C., and Manno, V. P "*In-situ Metrology Coupled with Modeling to Improve Control and Operation of CMP Processes*" presented at the SRC/Sematech Engineering Research Center on Environmentally Benign Semiconductor Manufacturing, Tucson, AZ, Feb 19-20, 2009.

White R. D., Rogers, C., and Manno, V. P., *"In Situ Characterization of the Mechanical Aspects of CMP"* presented at the SRC/Sematech ERC on Environmentally Benign Semiconductor Manufacturing Teleseminar series on September 18, 2008.

White, R. D. *"Teaching Undergraduate System Dynamics and Controls with Lego",* presented at the "Teaching with Robots" Workshop at the Robotics, Science and Systems Conference, Zurich, Switzerland, June 29, 2008.

Tsioris, K., White, R. D., Kaplan, D., and Wong, P. "*The Effect of Hydrophobic Patterning on Micromolding of Aqueous-Derived Silk Structures*" presented at the Material Research Society Fall Meeting, Boston, MA, November 26-30, 2007.

Liu, S. and White, R. D. *"Orthotropic material properties of the gerbil basilar membrane."* presented at the 154th Meeting of the Acoustical Society of America, New Orleans, LA, November 28, 2007.

Honors

Tufts Graduate School: "Faculty Teaching and Mentoring Award"	*2017*
Tufts Graduate Student Council: "Outstanding Contribution to Graduate Education"	*2011*
Tufts ASME Student Chapter : "Professor of the Year"	*2008*
Rackham Predoctoral Fellowship, Univ. of Michigan	*2004-2005*
NSF Graduate Research Fellowship	*2001-2004*
Draper Fellowship, CS Draper Labs, Cambridge, MA	*1998-1999*

Grants and Contracts

As Principal Investigator: ($2.0M from 2006-present)
"Arrays of MEMS Microphones for Directional Sensing", contract from Vesper MEMS, $72,964 total costs. Sole PI. 2/1/2018-7/31/2018

"*A Simplified Martian Acoustic Anemometer*", NASA, subcontract from Cornell (NNX16AJ24G), $209,777 total costs to Tufts. Institutional PI, overall project PI at Cornell. 6/1/2016-5/31/2019

"Scandium Doped Aluminum Nitride as a Material for MEMS Acoustic Sensors", contract from Vesper MEMS, $227,189 total costs. Sole PI. 12/15/2015 – 9/15/2017.

"MEMS Microphone Array on a Chip for Tunnel Testing", Bombardier Aerospace. $12,865 total costs. Sole PI. 9/1/2014-8/28/2015.

"Undergraduate Education in Nanotechnology and Smart Materials", Richard H. Lufkin Trust. $300,000 total costs. Sole PI. 9/1/2014-8/31/2017.

"MEMS Surface Shear Sensors", National Institute for Aerospace subcontract from NASA. $74,665 total costs. Sole PI. 7/1/2014-8/31/2017.

"Optimization and Characterization of a MEMS Based Acoustic Velocity and Distance Measurement System", C. S. Draper Laboratories, Cambridge, MA, University Research and Development Program, $95,000 total costs, Sole PI, 7/1/2011-6/31/2012.

"*Phase III: Micromachined pressure and shear-stress sensor arrays for turbulent boundary layer characterization*", Spirit Aerosystems, Wichita, KS, $188,287 total costs. Sole PI. 9/1/10-5/31/13.

"MEMS Based Acoustic Doppler Velocity Measurement System", C. S. Draper Laboratories, Cambridge, MA, University Research and Development Program, $87,000 total costs, Sole PI, 9/1/2010-6/31/2011.

"In Situ Characterization of Chemical Mechanical Planarization on Patterned Substrates", SRC/Sematech Engineering Research Center on Environmentally Benign Semiconductor Manufacturing, customized project for Intel Corporation. $64,521 total costs, Sole PI, 9/1/08-8/31/09.

"*Phase II: Micromachined pressure and shear-stress sensor arrays for turbulent boundary layer characterization*", Spirit Aerosystems, Wichita, KS, $228,598 total costs. Sole PI. 9/1/07-8/31/09.

"*Modeling and Characterization of Micromachined Ultrasound Elements"*, Sonetics Ultrasound, Ann Arbor, MI, $67,767 total costs. Sole PI. 6/1/07-5/31/09.

"*Micromachined pressure and shear-stress sensor arrays for turbulent boundary layer characterization*", Spirit Aerosystems, Wichita, KS, $87,180 total costs, sole PI, 9/1/06-8/31/07.

"*Undergraduate Education in Microfabrication Processing*", Richard H. Lufkin Trust, $278,000 direct, 7/1/06-6/30/08.

As Co-Principal Investigator ($360k from 2011 to present):
"*MRI: Biomechanics High-resolution Multi-Material Printing System*", National Science Foundation, $250,702 total costs, Co-PI, 9/1/2011 – 8/31/2013.

"*Micromechanical Punching of Polymer Membranes for Use in Multilayered Tissue Scaffolding*", C. S. Draper Laboratories, Cambridge, MA, $114,000 total costs, Co-PI, 7/1/2012 – 6/30/2013

As Senior Personnel:
"IGERT: Soft Material Robotics", National Science Foundation, $2,709,035 total costs, 7/1/2012 – 6/30/2017.

"*Phase II: Biodegradable Communications Systems*", Defense Advanced Research Projects Agency (DARPA), $4,727,468 total costs, Senior Personnel, 2/1/09-1/31/10.

"NTF Flow Quality Characterization for Laminar Flow Testing", Vigyan, Inc., $199,582 total costs, Senior Personnel, 10/1/08-9/30/09.

"*Chemical Robots: morphing, soft-material robots for covert access*", Defense Advanced Research Projects Agency (DARPA), $3,298,209 total costs, Senior Personnel, 2/14/08-2/13/10.

"*Chemical Communications: Biodegradable Communications Systems*", Defense Advanced Research Projects Agency (DARPA), $2,653,849 total costs, Senior Personnel, 10/1/07-9/30/08.

"Biomimetic Technologies for Soft-Bodied Robots", W. M. Keck Foundation, $730,000 direct, Senior Personnel. Awarded January 2007.

Professional Activities

Full Member, Acoustical Society of America (ASA). Member of the Engineering Acoustics Technical Committee, 2012 – present. Session chair, reviewer, author.

Senior Member, American Institute of Aeronautics and Astronautics (AIAA). Reviewer, author. Member of the Sensors and Sensor Systems technical committee 2010-2014.

Member, American Society of Mechanical Engineers (ASME). Session chair, reviewer, author.

Reviewer for J. of Microelectromechanical Systems, J Acoustical Society of America, Sensors & Actuators A-Physical, AIAA Journal, Applied Physics Letters, Journal of Electronic Materials, Sensors, J Electrochemical Society, IEEE ICRA, IEEE Transactions on Mechatronics, IEEE Sensors Journal, NSF EPDT program, ASME IMECE, AIAA Guidance, Navigation and Control Conference, AIAA ASM, International Science and Technology Center (US State Department & Civilian Research and Defense Foundation), and Springer Publishing.

Institutional Service

2013 – 2018	Graduate Program Director, Mechanical Engineering, Tufts University
2013 – 2018	Information Technology Committee, Tufts University
2013 – 2018	Faculty Research Support and Facilities Advisory Committee, Tufts University
2014 – 2015	Budget & Priorities Committee, Tufts University
2015 – 2017	Co-chair, Budget & Priorities Committee, Tufts University
2015 – 2017	Faculty Rep to Trustees Admin and Finance Committee, Tufts University