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RESEARCH INTERESTS

- Soft electronics and soft robotics
- Mechanical behavior of low-dimensional nanomaterials
- Micro- and nano-electromechanical system (MEMS/NEMS)
- Sustainable nanomanufacturing

EDUCATION

- Northwestern University, Evanston, IL, USA
Ph.D. in Mechanical Engineering, December 2005
Dissertation: Development of a Nanoscale Material Testing System and *in situ* SEM/TEM Study of the Mechanical Behavior of Nanostructures

M.S. in Mechanical Engineering, December 2001
Thesis: Micromechanical Testing and Simulation of RF MEMS Switches
- University of Science and Technology of China (USTC), Hefei, Anhui, China
B.S. in Mechanics and Mechanical Engineering, July 1999

WORK EXPERIENCE

- **Andrew A. Adams Distinguished Professor**, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC, March 2021 – present
- **Distinguished Professor**, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC, October 2020 – March 2021
- **Professor**, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC, August 2017 – present
- **Affiliate Faculty**, UNC/NCSU Joint Department of Biomedical Engineering, North Carolina State University, Raleigh, NC, November 2014 – present
- **Affiliate Faculty**, Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC, November 2013 – present
- **Associate Professor**, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC, August 2013 – July 2017
- **Assistant Professor**, Department of Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC, August 2007 – July 2013
- **Postdoctoral Research Fellow**, Center for Mechanics of Solids, Structures & Materials, University of Texas at Austin, Austin, TX, November 2005 – July 2007

SELECTED HONORS AND AWARDS

- IEEE Nanotechnology Council Distinguished Lecturer, 2022
- James R. Rice Medal, Society of Engineering Science, 2021
Awarded to a mid-career researcher in the field of engineering sciences, within 10-20 years after PhD degree [1 award per year].
- A.J. Durelli Award, Society of Experimental Mechanics, 2021

- Friedrich Wilhelm Bessel Research Award, Humboldt Foundation, Germany, 2020
- ASME/Pi Tau Sigma Gustus L. Larson Memorial Award, 2019
For outstanding achievement in mechanical engineering, within 10-20 years following graduation with a baccalaureate degree in Mechanical Engineering or related field [1 award per year across all fields in ASME].
- ASME Fellow, 2017
- Eshelby Mechanics Award for Young Faculty, 2016
- University Faculty Scholar, NCSU, 2015
- Sia Nemat-Nasser Early Career Award, ASME, 2015
- Best Wearable Material/Component Development Award at IDTechEx Wearable USA Conference (America's largest event on wearable technology), 2015
- Alcoa Foundation Engineering Research Achievement Award, College of Engineering, NCSU, 2015
- Outstanding Research Award, Department of Mechanical & Aerospace Engineering, NCSU, 2015
- JSA Young Investigator Lecture Award, Society of Experimental Mechanics, 2013
- Sigma Xi Faculty Research Award, NCSU, 2012
- Best Poster Award (1st place), Gordon Research Conference on Thin Film & Small Scale Mechanical Behavior, 2006

PUBLICATIONS (* corresponding author, _ graduate students/postdocs, _^ undergraduate students, # equal contributions)

- 8441 citations, H-index 46, <http://www.researcherid.com/rid/C-4845-2008> (12/2021)
- 11596 citations, H-index 51, <http://scholar.google.com/citations?user=Gx5dkdkAAAAJ&hl=en>

A. Published Journal Articles

1. S. Wu, Z. Cui, G.L. Baker, S. Mahendran, Z. Xie, Y. Zhu*, "Biaxially Stretchable and Self-Sensing Textile Heater using Silver Nanowire Composite", *ACS Applied Materials & Interfaces*, DOI: 10.1021/acsami.1c17651, published online (2021).
2. S. Wu, G.L. Baker, J. Yin, Y. Zhu*, "Fast Thermal Actuators for Soft Robotics", *Soft Robotics*, DOI: 10.1089/soro.2021.0080, published online (2021).
3. Q. Huang, Y. Zhu*, "Patterning of Metal Nanowire Networks: Methods and Applications", *ACS Applied Materials & Interfaces*, DOI: 10.1021/acsami.1c14816, published online (2021). **Invited Review**
4. Y Li, Y Liu, SRA Bhuiyan, Y Zhu*, S Yao*, "Printed Strain Sensors for On-Skin Electronics", *Small Structures*, DOI: 10.1002/ssstr.202100131, published online (2021).
5. F.R. Poblete, K. Mondal, Y. Ma, M.D. Dickey, J. Genzer, Y. Zhu*, "Direct measurement of rate-dependent mode I and mode II traction-separation laws for cohesive zone modeling of laminated glass", *Composite Structures* 279, 114759 (2022).
6. Y. Liu, D. Shukla, H. Newman^, Y. Zhu*, "Soft wearable sensors for monitoring symptoms of COVID-19 and other respiratory diseases: A review", *Progress in Biomedical Engineering* 4, 012001 (2022). **Invited Review**
7. X.T. Fang, Z.K. Li, Y.F. Wang, M. Ruiz, X.L. Ma, H.Y. Wang, Y. Zhu, R. Schoell, C. Zheng, D. Kaoumi, Y.T. Zhu*, "Achieving high hetero-deformation induced (HDI) strengthening and hardening in brass by dual heterostructures", *Journal of Materials Science & Technology* 98, 244-247 (2022).

8. L. Vargas, H.H. Huang, Y. Zhu, X. Hu*, "Object Recognition via Evoked Sensory Feedback during Control of a Prosthetic Hand", *IEEE Robotics and Automation Letters* 7 (1), 207-214 (2022).
9. G. Lee, Q. Wei*, Y. Zhu*, "Emerging Wearable Sensors for Plant Health Monitoring", *Advanced Functional Materials* 2106475 (2021).
10. Y. Liu, H. Wang, Y. Zhu*, "Recycling of Nanowire Percolation Network for Sustainable Soft Electronics", *Advanced Electronic Materials* 7 (9), 2100588 (2021).
11. L. Vargas, H.H. Huang, Y. Zhu, X. Hu*, "Static and dynamic proprioceptive recognition through vibrotactile stimulation", *Journal of Neural Engineering* 18 (4), 046093 (2021).
12. Z. Li, Y. Liu#, O. Hossain, R. Paul, S. Yao, S. Wu, J.B. Ristaino, Y. Zhu*, Q. Wei*, "Real-time monitoring of plant stresses via chemiresistive profiling of leaf volatiles by a wearable sensor", *Matter* 4 (7), 2553-2570 (2021).
13. S. Prasad, M. Farella, M. Paulin, S. Yao, Y. Zhu, L.J. van Vuuren, "Effect of electrode characteristics on electromyographic activity of the masseter muscle", *Journal of Electromyography and Kinesiology* 56, 102492 (2021).
14. P. Ren#, Y. Liu#, R. Song, B.T. O'Connor, J. Dong* and Y. Zhu*, "Achieving High-Resolution Electrohydrodynamic Printing of Nanowires on Elastomeric Substrates through Surface Modification", *ACS Applied Electronic Materials* 3, 192-202 (2021).
15. C. Peng, M. Chen, H.K. Sim, Y. Zhu and X. Jiang*, "Noninvasive and Nonocclusive Blood Pressure Monitoring via a Flexible Piezo-Composite Ultrasonic Sensor", *IEEE Sensors Journal* 21 (3), 2642-2650 (2021).
16. G. Cheng#, S. Yin#, C. Li, T.-H. Chang, H. Gao* and Y. Zhu*, "In situ study of dislocation interaction with twin boundary and retraction in twinned metallic nanowires", *Acta Materialia* 196, 304-312 (2020).
17. R. Song, S. Yao, Y. Liu, H. Wang, J. Dong, Y. Zhu, and B.T. O'Connor*, "Facile Approach to Fabricating Stretchable Organic Transistors with Laser-Patterned Ag Nanowire Electrodes", *ACS Applied Materials and Interfaces* 12, 50675-50683 (2020).
18. S. Wu, S. Yao, Y. Liu, X. Hu, H. Huang, and Y. Zhu*, "Buckle-delamination enabled stretchable silver nanowire conductors", *ACS Applied Materials and Interfaces* 12, 41696-41703 (2020).
19. Y. Xiong, R. Booth, T. Kim, L. Ye, Y. Liu, Q. Dong, M. Zhang, F. So, Y. Zhu, A. Amassian, B. O'Connor, and H. Ade*, "Novel Bimodal Silver Nanowire Network as Top Electrodes for Reproducible and High-efficiency Semitransparent Organic Photovoltaics", *Solar RRL* 4 (10), 2000328 (2020).
20. C. Li, G. Cheng, H. Wang and Y. Zhu*, "Microelectromechanical Systems for Nanomechanical Testing: Displacement- and Force-controlled Tensile Testing", *Experimental Mechanics* 60 (7), 1005-1015 (2020).
21. F.R. Pobleto, Z. Cui, Y. Liu, and Y. Zhu*, "Stretching nanowires on a stretchable substrate: A method towards facile fracture testing and elastic strain engineering", *Extreme Mechanics Letters* 41, 101035 (2020).
22. L. Pan, L. Vargas, A. Fleming, X. Hu, Y. Zhu and H. Huang*, "Evoking Haptic Sensations in the Foot through High-Density Transcutaneous Electrical Nerve Stimulations", *Journal of Neural Engineering* 17 (3), 036020 (2020).
23. W. Zhou#, S. Yao#, H. Wang, Q. Du, Y. Ma and Y. Zhu*, "Gas-Permeable, Ultrathin, Stretchable Epidermal Electronics with Porous Electrodes", *ACS Nano* 14 (5), 5798-5805 (2020).

24. S. Yin#, G. Cheng#, Y. Zhu* and H. Gao*, “Competition between shear localization and tensile detwinning in twinned nanowires”, *Physical Review Materials* 4, 023603 (2020).
25. C. Li, D. Zhang, G. Cheng and Y. Zhu*, “Microelectromechanical Systems for Nanomechanical Testing: Electrostatic Actuation and Capacitive Sensing for High-Strain-Rate Testing”, *Experimental Mechanics* 60, 329-343 (2020).
26. L. Vargas, H. Huang, Y. Zhu and X. Hu*, “Object Shape and Surface Topology Recognition using Tactile Feedback Evoked through Transcutaneous Nerve Stimulation”, *IEEE Transaction on Haptics* 13 (1), 152-158 (2020).
27. S. Yao, P. Ren, R. Song, Y. Liu, Q. Huang, J. Dong, B.T. O’Connor and Y. Zhu*, “Nanomaterial-Enabled Flexible and Stretchable Sensing Systems: Processing, Integration, and Applications”, *Advanced Materials* 32 (15), 1902343 (2020). **Invited Review in Special Issue: Flexible Hybrid Electronics**
28. T. Kim, Z. Cui, W. Chang, H. Kim, Y. Zhu and X. Jiang, “Flexible 1-3 Composite Ultrasound Transducers with Silver Nanowire-based Stretchable Electrodes”, *IEEE Transactions on Industrial Electronics* 67 (8), 6955-6962 (2020).
29. G. Cheng, Y. Zhang, T.-H. Chang, Q. Liu, L. Chen, W. Lu, T. Zhu* and Y. Zhu*, “In situ nano-thermo-mechanical experiment reveals brittle to ductile transition in silicon nanowires”, *Nano Letters* 19, 5327-5334 (2019).
30. S. Yin#, G. Cheng#, G. Richter, H. Gao* and Y. Zhu*, “Transition of Deformation Mechanisms in Single-Crystalline Metallic Nanowires”, *ACS Nano* 13, 9082-9090 (2019).
31. F.R. Poblete and Y. Zhu*, “Interfacial shear stress transfer at nanowire-polymer interfaces with van der Waals interactions and chemical bonding”, *Journal of the Mechanics and Physics of Solids* 127, 191-207 (2019).
32. L. Vargas, H. Shin, H. Huang, Y. Zhu and X. Hu*, “Object stiffness recognition using haptic feedback delivered through transcutaneous proximal nerve stimulation”, *Journal of neural engineering* 17, 016002 (2019).
33. S. Yao, J. Yang, F.R. Poblete, X. Hu and Y. Zhu*, “Multifunctional Electronic Textiles using Silver Nanowire Composites”, *ACS Applied Materials and Interfaces* 11, 31028-31037 (2019).
34. S. Yao and Y. Zhu*, “Silver nanowire-based wearable sensors”, *HDIAC Journal* 6 (2), 40-46 (2019).
35. S. Yin#, G. Cheng#, T.-H. Chang, G. Richter, Y. Zhu* and H. Gao*, “Hydrogen embrittlement in metallic nanowires”, *Nature Communications* 10, 2004 (2019).
36. Y. Zhu*, M.T.A. Saif, F.W. DelRio, “Recent Advances in Micro, Nano, and Cell Mechanics”, *Experimental Mechanics* 59 (3), 377-378 (2019).
37. Z. Cui, F.R. Poblete and Y. Zhu*, “Tailoring Temperature Coefficient of Resistance of Silver Nanowire Nanocomposites and Application as Stretchable Temperature Sensors”, *ACS Applied Materials and Interfaces* 11 (19), 17836-17842 (2019).
38. F. Wang, L. Yang, L. Wang, Y. Zhu, and T. Fang*, “Maximum spread of droplet impacting onto solid surfaces with different wettabilities: adopting a rim-lamella shape”, *Langmuir* 35 (8), 3204-3214 (2019).
39. L. Vargas, G. Whitehouse, H. Huang, Y. Zhu, and X. Hu*, “Evoked Haptic Sensation in the Hand with Concurrent Non-Invasive Nerve Simulation”, *IEEE Transactions on Biomedical Engineering* 66, 2761-2767 (2019).
40. Q. Qin, J. Li, S. Yao, C. Liu, H. Huang, and Y. Zhu*, “Electrocardiogram of a Silver Nanowire Based Dry Electrode: Quantitative Comparison with the Standard Ag/AgCl Gel Electrode”, *IEEE Access* 7, 20789-20800 (2019).

41. Q. Huang and Y. Zhu*, “Printing Conductive Nanomaterials for Flexible and Stretchable Electronics: A Review of Materials, Processes, and Applications”, *Advanced Materials Technologies* 4 (5), 1800546 (2019). **Cover Art, Invited Review**
42. T. Jiang*, Z. Wang, X. Ruan and Y. Zhu*, “Equi-biaxial compressive strain in graphene: Grüneisen parameter and buckling ridges”, *2D Materials* 6, 015026 (2019).
43. J. Cui, F. Poblete and Y. Zhu*, “Origami/Kirigami-Guided Morphing of Composite Sheets”, *Advanced Functional Materials* 28, 1802768 (2018).
44. Q. Huang and Y. Zhu*, “Gravure Printing of Water-based Silver Nanowire ink on Plastic Substrate for Flexible Electronics”, *Scientific Reports* 8, 15167 (2018).
45. J. Cui, J. Adams^ and Y. Zhu*, “Controlled Bending and Folding of a Bilayer Structure consisting of a Thin Stiff Film and a Heat Shrinkable Polymer sheet”, *Smart Materials and Structures* 27, 055009 (2018).
46. J.H. Min, Y.A. Chen, I.T. Chen, T. Sun, D.T. Lee, C. Li, Y. Zhu, B.T. O’Connor, G.N. Parsons and C.H. Chang*, “Conformal Physical Vapor Deposition Assisted by Atomic Layer Deposition and Its Application for Stretchable Conductors”, *Advanced Materials Interfaces* 5, 1801379 (2018).
47. H. Shin, Z. Watkins, H. Huang, Y. Zhu and X. Hu*, “Evoked Haptic Sensations in the Hand via Non-Invasive Proximal Nerve Stimulation”, *Journal of Neural Engineering* 15 (4), 046005 (2018).
48. X. Kong, Y. Zhu, P. Cohen and J. Dong*, “Characterization and Modeling of Catalyst-free Carbon-Assisted Synthesis of ZnO Nanowires”, *Journal of Manufacturing Processes* 32, 438-444 (2018).
49. Z. Cui, Y. Han, J. Dong and Y. Zhu*, “Electrohydrodynamic Printing of Silver Nanowires for Flexible and Stretchable Electronics”, *Nanoscale* 10, 6806-6811 (2018).
50. S. Yao, L. Vargas, X. Hu* and Y. Zhu*, “A Novel Finger Kinematic Tracking Method based on Skin-like Wearable Strain Sensors”, *IEEE Sensors Journal* 18, 3010-3015 (2018).
51. S. Yao, P. Swetha and Y. Zhu*, “Nanomaterial-Enabled Wearable Sensors for Healthcare”, *Advanced Healthcare Materials* 7, 1700889 (2018). **Invited Review, Journal’s top cited research**
52. G. Cheng#, S. Yin#, T.-H. Chang#, H. Gao* and Y. Zhu*, “Anomalous Tensile Detwinning in Twinned Nanowires”, *Physical Review Letters* 119, 256101 (2017).
53. J. Cui, J. Adams^ and Y. Zhu*, “Pop-up assembly of 3D structures actuated by heat shrinkable polymers”, *Smart Materials and Structures* 26, 125011 (2017). **Featured Article**
54. J. Cui, S. Yao, Q. Huang, J. Adams^ and Y. Zhu*, “Controlling the self-folding of a polymer sheet by a local heater: effect of the polymer-heater interface”, *Soft Matter* 13 (21), 3863-3870 (2017). **Cover Art**
55. A. Bagal, X.A. Zhang, R. Shahrin, E.C. Dandley, J.J. Zhao, F.R. Poblete, C.J. Oldham, Y. Zhu, G.N. Parsons, C. Bobko and C.H. Chang*, “Large-Area Nanolattice Film with Enhanced Modulus, Hardness, and Energy Dissipation”, *Scientific Reports* 7, 9145 (2017).
56. Y. Zhu*, “Mechanics of Crystalline Nanowires: An Experimental Perspective”, *Applied Mechanics Reviews* 69 (1), 010802 (2017). **Invited Review**
57. S. Yao, J. Cui, Z. Cui and Y. Zhu*, “Soft Electrothermal Actuators using Silver Nanowire Heaters”, *Nanoscale* 9 (11), 3797-3805 (2017). **Cover Art**

58. Y. Zhang, J. Yu, J. Wang, N.J. Hanne, Z. Cui, C. Qian, C. Wang, H. Xin, J.H. Cole, C.M. Gallippi*, Y. Zhu* and Z. Gu*, "Thrombin-Responsive Transcutaneous Patch for Auto-Anticoagulant Regulation", *Advanced Materials* 29 (4), 1604043 (2017). **Cover Art**
59. J. Yu, C. Qian, Y. Zhang, Z. Cui, Y. Zhu, Q. Shen, F.S. Ligler, J.B. Buse and Z. Gu*, "Hypoxia and H₂O₂ Dual-Sensitive Vesicles for Enhanced Glucose-Responsive Insulin Delivery", *Nano Letters* 17 (2), 733-739 (2017).
60. T. Kim, A. Saini, J. Kim, A. Gopalathnam, Y. Zhu, F.L. Palmieri, C.J. Wohl and X. Jiang*, "Piezoelectric Floating Element Shear Stress Sensor for the Wind Tunnel Flow Measurement", *IEEE Transactions on Industrial Electronics* 64 (9), 7304-712 (2017).
61. K. Jagannadham, J. Cui and Y. Zhu, "Substrate Effects on Growth of MoS₂ Film by Laser Physical Vapor Deposition on Sapphire, Si and Graphene (on Cu)", *Journal of Electronic Materials* 46, 1010-1021 (2017).
62. S. Yao, A. Myers, A. Malhotra, F. Lin, A. Bozkurt, J. F. Muth* and Y. Zhu*, "Wearable Hydration Monitor with Conformal Nanowire Electrodes", *Advanced Healthcare Materials* 6 (6), 1601159 (2017). **Cover Art, Most downloaded and read paper of the month**
63. J. Di, J. Yu, Q. Wang, S. Yao, D. Suo, Y. Ye, M. Pless, Y. Zhu, Y. Jing*, Z. Gu*, "Ultrasound-Triggered Noninvasive Regulation of Blood Glucose Levels Using Microgels Integrated with Insulin Nanocapsules", *Nano Research* 10, 1393-1402 (2017).
64. Z. Jiang, Z. Cui, T. Yue, Y. Zhu* and D.H. Werner*, "A Compact, Highly-efficient and Fully-flexible Circularly-Polarized Antenna Enabled by Silver Nanowires for Wireless Body-area Networks", *IEEE Transactions on Biomedical Circuits and Systems* 11 (4), 920-932 (2017).
65. T.-H. Chang, G. Cheng, C. Li and Y. Zhu*, "On the size-dependent elasticity of pentatwinned silver nanowires", *Extreme Mechanics Letters* 8, 177-183 (2016).
66. Y. Zhu*, D.S. Gianola and T. Zhu, "Editorial for the focus issue on "Nanomechanics" in Extreme Mechanics Letters", *Extreme Mechanics Letters* 8, 125-126 (2016).
67. Y. Zhang, J. Yu, H.N. Bomba, Y. Zhu* and Z. Gu*, "Mechanical Force-Triggered Drug Delivery", *Chemical Reviews* 116, 12536-12563 (2016).
68. S. Yao and Y. Zhu*, "Nanomaterial-Enabled Dry Electrodes for Electrophysiological Sensing: A Review", *JOM* 68 (4), 1145-1155 (2016). **Invited Review**
69. J. Dieffenderfer, H. Goodell, S. Mills, M. McKnight, S. Yao, F. Lin, E. Beppler, B. Bent, B. Lee, V. Misra, Y. Zhu, O. Oralkan, J. Strohmaier, J. Muth, D. Peden, and A. Bozkurt, "Low Power Wearable Systems for Continuous Monitoring of Environment and Health for Chronic Respiratory Disease", *Journal of Biomedical and Health Informatics* 20, 1251-1264 (2016).
70. Y. Zhu*, "In-situ Nanomechanical Testing of Crystalline Nanowires in Electron Microscopes", *JOM - The Journal of The Minerals, Metals & Materials Society (TMS)* 68 (1), 84-93 (2016). **Invited Review**
71. Y. Chen, Y. Liu*, Y. Yan, Y. Zhu and X. Chen*, "Helical Coil Buckling Mechanism for a Stiff Nanowire on an Elastomeric Substrate", *Journal of the Mechanics and Physics of Solids* 95, 25-43 (2016).
72. Y. Zhang, J. Yu, Y. Zhu* and Z. Gu*, "Elastic drug delivery: could treatments be triggered by patient movement?", *Nanomedicine* 11, 323-325 (2016). **Invited Editorial**
73. G. Cheng, S. Yao, X. Sang, B. Hao, D. Zhang, Y.K. Yap and Y. Zhu*, "Evolution of Irradiation-Induced Vacancy Defects in Boron Nitride Nanotubes", *Small* 12 (6), 818-824 (2016).

74. Y. Chen, Y. Zhu, X. Chen* and Y. Liu*, "Mechanism of the Transition from In-Plane Buckling to Helical Buckling for a Stiff Nanowire on an Elastomeric Substrate", *Journal of Applied Mechanics* 83, 041011 (2016).
75. Y. Zhu* and T.H. Chang, "A Review of Microelectromechanical Systems for Nanoscale Mechanical Characterization", *Journal of Micromechanics and Microengineering* 25, 093001 (2015). **Topical Review**
76. S. Yao and Y. Zhu*, "Nanomaterial-Enabled Stretchable Conductors: Strategies, Materials and Devices", *Advanced Materials* 27 (9), 1480-1511 (2015). **Cover Art, Top 20 hottest papers in 2015 (based on number of page views)**
77. G. Cheng, C. Miao, Q. Qin, J. Li, F. Xu, H. Haftbaradaran, E.C. Dickey, H. Gao* and Y. Zhu*, "Large Anelasticity and Associated Energy Dissipation in Single-Crystalline Nanowires", *Nature Nanotechnology* 10, 687-691 (2015).
78. Q. Qin#, Y. Sheng#, G. Cheng, X. Li, T.-H. Chang, G. Richter, Y. Zhu* and H. Gao*, "Recoverable Plasticity in Penta-twinned Metallic Nanowires Governed by Dislocation Nucleation and Retraction", *Nature Communications* 6, 5983 (2015).
79. J. Di#, S. Yao#, Y. Ye, Z. Cui, J. Yu, T. Ghosh, Y. Zhu*, Z. Gu*, "Stretch-Triggered Drug Delivery from Wearable Elastomers Containing Therapeutic Depots", *ACS Nano* 9 (9), 9407–9415 (2015).
80. V. Misra, A. Bozkurt, B. Calhoun, T.N. Jackson, J. Jur, J. Lach, B. Lee, J. Muth, O. Oralkan, M.C. Ozturk, S. Troler-McKinstry, D. Vashaee, D. Wentzloff, and Y. Zhu, "Flexible Technologies for Self-Powered Wearable Health and Environmental Sensing", *Proceedings of the IEEE* 103 (4), 665-681 (2015).
81. S. Narayanan, G. Cheng, Z. Zeng, Y. Zhu*, and T. Zhu*, "Strain Hardening and Size Effect in Five-fold Twinned Ag Nanowires", *Nano Letters* 5 (6), 4037-4044 (2015).
82. T. Jiang and Y. Zhu*, "Measuring Graphene Adhesion using Atomic Force Microscopy with a Microsphere Tip", *Nanoscale* 7, 10760-10766 (2015).
83. G. Guo and Y. Zhu*, "Cohesive-Shear-Lag Modeling of Interfacial Stress Transfer between a Monolayer Graphene and a Polymer Substrate", *Journal of Applied Mechanics* 82 (3), 031005 (2015).
84. Z. Cui#, F.R. Poblete#, G. Cheng, S. Yao, X. Jiang and Y. Zhu*, "Design and Operation of Silver Nanowire Based Flexible and Stretchable Touch Sensors", *Journal of Materials Research* 30, 79-85 (2015). **Invited article** for a focus issue on Soft Nanomaterials
85. A.C. Myers, H. Huang and Y. Zhu*, "Wearable Silver Nanowire Dry Electrodes for Electrophysiological Sensing", *RSC Advances* 5, 11627-11632 (2015).
86. G.M. Cheng, T.-H. Chang, Q. Qin, H. Huang and Y. Zhu*, "Mechanical Properties of Silicon Carbide Nanowires: Effect of Size-Dependent Defect Density", *Nano Letters* 14, 754-758 (2014).
87. A. Gururajan, Y. Yu, L. Su, Y. Yu, F. Suarez, S. Yao, Y. Zhu, M.C. Ozturk, Y. Zhang and L. Cao, "Surface Energy-Assisted Perfect Transfer of Centimeter-scale Monolayer and Few-layer MoS₂ Films onto Arbitrary Substrates", *ACS Nano* 8, 11522-11528 (2014).
88. L. Song[^], A.C. Myers, J.J. Adams and Y. Zhu*, "Stretchable and Reversibly Deformable Radio Frequency Antennas Based on Silver Nanowires", *ACS Applied Materials and Interfaces* 6, 4248-4253 (2014).

Highlighted on NSF homepage, "Stretchable Antenna for Wearable Devices" and NSF Science Now by Dena Headlee (<https://www.youtube.com/watch?v=zDk-Jp8JvkY&feature=youtu.be>)

89. Y. Liu, R. D. Mailen, Y. Zhu, M. D. Dickey, and J. Genzer, "Simple geometric model to describe self-folding of polymer sheets", *Phys. Rev. E* 89, 042601 (2014).
90. S. Yao and Y. Zhu*, "Wearable Multifunctional Sensors using Printed Stretchable Conductors made of Silver Nanowires", *Nanoscale* 6, 2345-2352 (2014). **Nanoscale 10th Anniversary: Top Cited Articles.**
91. T. Jiang, R. Huang*, Y. Zhu*, "Interfacial Sliding and Buckling of Monolayer Graphene on a Stretchable Substrate", *Advanced Functional Materials*, 24, 396-402 (2014).
92. T.-H. Chang and Y. Zhu*, "A Microelectromechanical System For Thermomechanical Testing Of Nanostructures", *Applied Physics Letters* 103, 263114 (2013).
93. J. Ouyang, M. McDonald[^] and Y. Zhu*, "Temperature-dependent material properties of Z-shaped MEMS thermal actuators made of single crystalline silicon", *Journal of Micromechanics and Microengineering* 23, 125036 (2013).
94. J.W. Durham and Y. Zhu*, "Fabrication of Functional Nanowire Devices on Unconventional Substrates using Strain-Release Assembly", *ACS Applied Materials & Interfaces* 5, 256-261 (2013).
95. Y. Zhu*, J.B. Tracy, J. Dong, X. Jiang, M.G. Jones and G. Childers, "Teaching a Multidisciplinary Nanotechnology Laboratory Course to Undergraduate Students", *Journal of Nano Education* 5, 17-26 (2013).
96. Q. Qin and Y. Zhu*, "Temperature Control in Thermal Microactuators with Applications to *in-situ* Nanomechanical Testing", *Applied Physics Letters* 102, 013101 (2013).
97. M. Zu, Q.-W. Li, Y.T. Zhu, Y. Zhu, G. Wang, J.-H. Byun and T.-W. Chou, "Stress relaxation in carbon nanotube-based fibers for load-bearing applications", *Carbon* 52, 347-355 (2013).
98. Q. Qin, F. Xu, Y. Cao, P.I. Ro and Y. Zhu*, "Effect of Clamping on Resonance Frequency and Measured Young's Modulus of a Single-Clamped Nanowire", *Small* 8 (6), 2571-2576 (2012).
99. Y. Zhu*, Q. Qin, F. Xu, F. Fan, Y. Ding, T. Zhang, B.J. Wiley, and Z.L. Wang, "Size effects on elasticity, yielding and fracture of silver nanowires: *In situ* experiments", *Phys. Rev. B* 85, 045443 (2012).
100. F. Xu and Y. Zhu*, "Highly conductive and stretchable silver nanowire conductors", *Advanced Materials* 24 (37), 5117-5122 (2012).
Highlighted on National Nanotechnology Initiative homepage, "Nano-enabled Stretchable Electronics?"
101. J. Ouyang and Y. Zhu*, "Z-Shaped MEMS Thermal Actuators: Piezoresistive Self-Sensing and Preliminary Results for Feedback Control", *Journal of Microelectromechanical Systems* 21, 596-604 (2012).
102. Y. Zhu* and F. Xu, "Buckling of aligned carbon nanotubes as stretchable conductors: a new manufacturing strategy", *Advanced Materials* 8, 1073-1077 (2012).
103. F. Xu, X. Wang, Y.T. Zhu and Y. Zhu*, "Wavy ribbons of carbon nanotubes for stretchable conductors", *Advanced Functional Materials* 22, 1279-1283 (2012).
104. F. Xu, W. Lu and Y. Zhu*, "Controlled 3D buckling of silicon nanowires for stretchable electronics," *ACS Nano* 5, 672-678 (2011).
Invited interview by the ACS Nano podcast to discuss the buckling-induced helical nanowires including its mechanics and applications to stretchable electronics, January 2011.

105. Q. Qin and Y. Zhu*, "Static friction between silicon nanowires and elastomeric substrates," *ACS Nano* 5, 7404-7410 (2011).
106. F. Xu, J.W. Durham III^, B.J. Wiley and Y. Zhu*, "Strain-release assembly of nanowires on stretchable substrates," *ACS Nano* 5, 1556-1563 (2011).
107. C. Guan and Y. Zhu*, "A new electrothermal microactuator with Z-shaped beams: design and characterization", *Journal of Micromechanics and Microengineering* 20, 085014 (2010).
108. F. Xu, Q. Qin, A. Mishra, Y. Gu and Y. Zhu*, "Mechanical properties of ZnO nanowires under different loading modes", *Nano Research* 3, 271-280 (2010).
109. Y. Zhu*, Q. Qin, Y. Gu and Z.L. Wang, "Friction and Shear Strength at the Nanowire-Substrate Interfaces," *Nanoscale Research Letters* 5, 291-295 (2010).
110. Y. Zhu*, F. Xu, Q. Qin, W.Y. Fung and W. Lu, "Mechanical Properties of Vapor-Liquid-Solid Synthesized Silicon Nanowires," *Nano Letters* 9, 3434-3439 (2009).
111. Y. Zhu, K.M. Liechti and K. Ravi-Chandar, "Direct extraction of rate-dependent traction-separation laws for polyurea/steel interfaces," *International Journal of Solids and Structures* 46, 31-51 (2009).
112. M. Locascio, B. Peng, P. Zapol, Y. Zhu, S. Li and H.D. Espinosa, "Compliant bridging bond defects improve strength of multiwalled carbon nanotubes," *Experimental Mechanics* 49, 169-182 (2009).
113. B. Peng, Y. Zhu, I. Petrov and H.D. Espinosa, "A microelectromechanical system for nano-scale testing of one dimensional nanostructures," *Sensor Letters* 6, 76-87 (2008).
114. Y. Zhu, C.H. Ke and H.D. Espinosa, "Experimental techniques for mechanical characterization of one-dimensional nanostructures," *Experimental Mechanics* 47, 7-24 (2007).
115. H.D. Espinosa, Y. Zhu and N. Moldovan, "Design and operation of a MEMS-based nanoscale material testing system," *Journal of Microelectromechanical Systems* 16, 1219-1231 (2007).
116. A. Corigliano, L. Domenella, H.D. Espinosa and Y. Zhu, "Electro-thermal actuator for on-chip nanoscale tensile tests: Analytical modelling and multi-physics simulations", *Sensor Letters* 5, 592-607 (2007).
117. Y. Zhu, A. Corigliano and H.D. Espinosa, "Thermal actuator for nanoscale tensile tests: design and characterization," *Journal of Micromechanics and Microengineering* 16, 242-253 (2006).
118. Y. Zhu and H.D. Espinosa, "An electro-mechanical material testing system for in-situ electron microscopy and applications," *Proceedings of the National Academy of Sciences USA* 102, 14503-14508 (2005).
119. Y. Zhu, N. Moldovan and H.D. Espinosa, "A microelectromechanical load sensor used for in-situ electron and x-ray microscopy tensile testing of nanostructures," *Applied Physics Letters* 86, 013506 (2005).
120. Z.P. Bazant, Z. Guo, H.D. Espinosa, Y. Zhu and B. Peng, "Epitaxially influenced boundary layer model for size effect in thin metallic films," *Journal of Applied Physics* 97, 073506 (2005).
121. Y. Zhu and H.D. Espinosa, "Effect of temperature on capacitive RF MEMS switch performance – a coupled-field analysis," *Journal of Micromechanics and Microengineering* 14, 1270-1279 (2004).

122. Y. Zhu and H.D. Espinosa, "Reliability of capacitive RF MEMS switches at high and low temperatures," *International Journal of RF and Microwave computer-aided engineering* 14, 317-328 (2004).
123. H.D. Espinosa, Y. Zhu, M. Fischer and J.W. Hutchinson, "An experimental/computational approach to identify moduli and residual stress in MEMS radio-frequency switches," *Experimental Mechanics* 43, 309-316 (2003).

B. Book Chapters

1. Y. Liu and Y. Zhu*, "3D printed wearable electronics: techniques, materials, and applications," in *Additive Manufacturing: Materials, Functionalities and Applications*, edited by K. Zhou, Springer, 2021. [*in review*]
2. S. Yao, S. Wu and Y. Zhu*, "Nanomaterials Enabled Wearable Health Monitoring," in *Smart Textiles Applications for Wearable Nanotechnology*, edited by N. Yilmaz, Wiley - Scrivener Publishing, 2021.
3. B. Peng, Y.G. Sun, Y. Zhu, H.-H. Wang and H.D. Espinosa, "Nanoscale testing of one-dimensional nanostructures," in *Micro and Nano Mechanical Testing of Materials and Devices*, edited by F. Yang and James C.M. Li, Springer, 2008.
4. H.D. Espinosa, Y. Zhu, B. Peng and O. Loh "Nanoscale testing of nanowires and carbon nanotubes using a microelectromechanical system," in *Advances in Multiphysics Simulation of MEMS and NEMS*, edited by N. Aluru, C. Cercignani, A. Frangi and S. Mukherjee, Imperial College Press, 2007.
5. H.D. Espinosa, Y. Zhu, and N. Moldovan, "MEMS-based material testing systems," in *Encyclopedia of Materials: Science and Technology*, edited by Patrick Veysière, Elsevier, 2006.
6. B.C. Prorok, Y. Zhu, H.D. Espinosa, Z.Y. Guo, Z.P. Bazant, Y.F. Zhao, and B.I. Yakobson, "Micro- and nano- mechanics," in *Encyclopedia of Nanoscience and Nanotechnology*, edited by H.S. Nalwa, American Scientific Publishers, vol. 5, pp. 555-600, 2004.

SEMINARS/PRESENTATIONS

A. Distinguished or Keynote Lectures

1. "MEMS-based in-situ Nanomechanics of Crystalline Metallic Nanowires", Rice Medal Lecture, Society of Engineering Science Annual Conference, Oct. 2021 [virtual].
2. "*In-situ* Nanomechanics of Crystalline Metallic Nanowires", Society of Experimental Mechanics Annual Conference, Orlando, FL, Sep. 2020 [virtual].
3. "Recent Advances in Silver Nanowire based Flexible Electronics: from Soft Actuators to Scalable Manufacturing", 1st International Conference on Flexible Electronics, Hangzhou, China, Jul. 2018.
4. "*In-situ* Nanomechanics of Crystalline Nanowires", Department of Mechanical Engineering, University of Houston, Aug. 2017.
5. "Interfacial Mechanics of Graphene", 51st Annual Meeting of Society of Engineering Sciences, West Lafayette, IN, Oct. 2014.
6. "*In-situ* Experimental Mechanics of Crystalline Nanostructures", Journal of Strain Analysis Young Investigator Award Lecture, 2013 SEM Annual Conference and Exposition on Experimental and Applied Mechanics, Lombard, IL, Jun. 2013.

B. Invited University/Government Lab/Industry/Workshop Presentations

1. "Silver Nanowire based Soft Electronics", Arizona State University, Oct. 2021.
2. "Recent Advances in Silver Nanowire based Stretchable and Wearable Electronics", SmartMat Lecture Series (#86), Aug. 2021.

3. "Nanomaterial Enabled Wearable Sensors for Human Health Monitoring", Duke Digital Biomarkers Working Group, Apr. 2021.
4. "MEMS-based in-situ Nanomechanics of Crystalline Metallic Nanowires", Max Planck Institute for Iron Research, Mar. 2021.
5. "Nanomaterial Enabled Wearable Sensors for Human Health Monitoring", Duke Medicine DRIVn Conference, Mar. 2021.
6. "AgBio Sensors: Opportunities and Progress", A Symposium on Outbreaks: Tackling Emerging Plant Diseases that Threaten Food Security, NC State University, Jan. 2020.
7. Department of Mechanical and Industrial Engineering, Northeastern University, Mar. 2019.
8. Department of Mechanical Engineering and Applied Science, University of Pennsylvania, Oct. 2018.
9. School of Materials Science and Engineering, Shanghai Jiao Tong University, Jul. 2018.
10. "In-situ Nanomechanics of Crystalline Metallic Nanowires", International Workshop on Grain Boundaries and Dislocations towards High Performance Metals and Alloys, Beijing, China, Jun. 2018.
11. "In-situ Nanomechanics of Crystalline Metallic Nanowires", 11st International Workshop on Materials Behavior at the Micro- and Nano-Scale, Xi'an, China, Jun. 2018.
12. Department of Engineering Mechanics, Tsinghua University, May 2018.
13. Department of Engineering Mechanics, Zhejiang University, May 2018.
14. "Scalable Nanomanufacturing for Nano-enabled Stretchable Electronics", NSF and National Nanomanufacturing Network (NNN) Workshop on Scalable Nanomanufacturing Technologies for Integrated Systems (SNM-IS), Washington DC, Oct. 2017.
15. School of Engineering of Matter Transport and Energy, Arizona State University, Sep. 2017.
16. Department of Mechanical Engineering, Rice University, Aug. 2017.
17. Department of Modern Mechanics, University of Science and Technology of China, May 2017.
18. Institute of Solid Mechanics, Beihang University, May 2017.
19. Department of Mechanical and Aerospace Engineering, University of California at Los Angeles, Apr. 2017.
20. "Soft Sensors based on Metal Nanowires", International Symposium of Flexible & Stretchable Electronics (2016 ISFSE), Wuhan, China, Jun. 2016.
21. Department of Engineering Mechanics, Peking University, Jun. 2016.
22. Institute of Mechanics, Chinese Academy of Sciences, Jun. 2016.
23. "Probing Adhesion and Interfacial Shear Stress Transfer of Graphene", AmeriMech Symposium on Mechanical Behavior of 2D Materials – Graphene and Beyond, Austin, TX, Apr. 2016.
24. "Stretchable and Wearable Sensors using Metal Nanowires", International Union of Theoretical and Applied Mechanics (IUTAM) Symposium on Mechanics of Stretchable Electronics, Hangzhou, China, Mar. 2016.
25. Department of Mechanical and Aerospace Engineering, University of California, San Diego, Nov. 2015.
26. "Stretchable and Wearable Sensors using Metal Nanowires", Department of Mechanical Engineering, Seoul National University, South Korea, Nov. 2015.
27. "Silver Nanowire Enabled Wearable Sensors for Health Monitoring", Medtronic, Minneapolis, MN, Oct. 2015.
28. "Silver Nanowire Enabled Wearable Sensors for Health and Activity Monitoring", Microsoft Applied Sciences Group, Microsoft, Redmond, WA, Jul. 2015.
29. Department of Mechanical Engineering, University of Texas at Dallas, Apr. 2015.
30. School of Mechanical Engineering, Georgia Institute of Technology, Nov. 2014.

31. Department of Mechanical and Aerospace Engineering, Case Western Reserve University, Apr. 2014.
32. Game Changing Development Program, NASA Glenn Research Center, Apr. 2014.
33. Advanced Materials and Processing Branch, NASA Langley Research Center, Dec. 2013.
34. Department of Mechanical Engineering and Materials Science, Duke University, Nov. 2013.
35. Joint School of Nanoscience and Nanoengineering, NC A&T State University and University of North Carolina at Greensboro, Nov. 2013.
36. Department of Materials Science and Engineering, North Carolina State University, Nov. 2013.
37. Department of Mechanical Engineering, University of Connecticut, Jul. 2013.
38. "Externally Triggered Origami of Responsive Polymer Sheets ", in NSF Workshop on Origami Design for Integration of Self-assembling Systems for Engineering Innovation (ODISSEI), Orlando, FL, May 2013.
39. Department of Mechanical and Aerospace Engineering, University of Virginia, Apr. 2013.
40. School of Engineering, Brown University, Feb. 2013.
41. Department of Mechanical Engineering and Engineering Science, University of North Carolina at Charlotte, Nov. 2010.
42. "Semiconductor nanowires: mechanics, assembly and application in stretchable electronics", MRS chapter at NC State University, Oct. 2010.
43. "Mechanics of semiconductor nanowires and nanowire/rubber interfaces", Biotextiles, Biomaterials and Biomanufacturing Seminar, College of Engineering, NC State University, Apr. 2010.
44. "Semiconductor nanowires: mechanics and mechanics-related applications", Nanotechnology Integration Forum, NC State University, Mar. 2010.
45. "MEMS testing stage for in-situ electron microscopy studies of nano scale mechanics", Sony-Ericsson/NC State day, NC State University, Aug. 2008.
46. "Mechanics of nanostructures", Nanotechnology Integration Forum, North Carolina State University, Feb. 2008.
47. "MEMS instrumentation for probing micro, nano and cell mechanics", Institute of Mechanics, Chinese Academy of Sciences, Dec. 2007.
48. Department of Modern Mechanics, University of Science and Technology of China, Dec. 2007.

C. Invited Conference Presentations

1. "In-situ TEM Mechanical Testing of Crystalline Metallic Nanowires", in 2021 MRS Spring Meeting & Exhibit, Apr. 2021 [virtual].
2. "Brittle to ductile transition in silicon nanowires", Society of Engineering Science Annual Conference (A symposium in honor of K. Ravi-Chandar), Oct. 2020 [virtual].
3. "Interfacial shear stress transfer at nanowire-polymer interfaces", Society of Engineering Science Annual Conference (A symposium in honor of Horacio Espinosa), St. Louis, MO, Oct. 2019.
4. "A MEMS-based nanomechanical testing device: dynamic response and application in high strain rate testing", Society of Experimental Mechanics Annual Conference, Reno, NV, Jun. 2019.
5. "Interfacial shear stress transfer between nanowire and elastomer substrate", Society of Experimental Mechanics Annual Conference, Reno, NV, Jun. 2019.
6. "Dislocation-mediated plasticity and fracture of Si nanowires at elevated temperatures", Society of Experimental Mechanics Annual Conference, Reno, NV, Jun. 2019.

7. "Nanomaterial-Enabled Wearable Sensors for Healthcare", in 2019 MRS Spring Meeting & Exhibit, Phoenix, AZ, Apr. 2019.
8. "Experimental Mechanics of Low-Dimensional Nanomaterials", International Conference in Aerospace for Young Scientists, Beijing, China, Sep. 2018.
9. "Silver Nanowire based Stretchable and Wearable Electronics", International Union of Materials Research Societies – International Conference on Electronic Materials 2018, Daejeon, South Korea, Aug. 2018.
10. "Interface Mechanics and Its Effect on Morphology and Functions of 2D Nanomaterials", in 2018 MRS Spring Meeting & Exhibit, Phoenix, AZ, Apr. 2018.
11. "Silver Nanowire based Stretchable Electronics" (A symposium in honor of John Rogers), in ASME International Mechanical Engineering Congress and Exposition, Tampa, FL, Nov. 2017.
12. "In-situ Nanomechanics of Crystalline Nanowires", in ASME International Mechanical Engineering Congress and Exposition, Tampa, FL, Nov. 2017.
13. "Interface Mechanics and Its Effect on Morphology and Functions of 2D Nanomaterials", in the 12th Annual IEEE International Conference on Nano/Micro Engineered and Molecular Systems, Los Angeles, CA, Apr. 2017.
14. "One-Dimensional Nanomaterials for Stretchable Electronics", in ASME International Mechanical Engineering Congress and Exposition, Phoenix, AZ, Nov. 2016.
15. "Recoverable Plasticity in Twinned Metallic Nanowires", in ASME International Mechanical Engineering Congress and Exposition, Phoenix, AZ, Nov. 2016.
16. "Interfacial Mechanics of A Monolayer Graphene", in ASME International Mechanical Engineering Congress and Exposition, Phoenix, AZ, Nov. 2016.
17. "Giant Anelasticity and Associated Energy Dissipation in Single-Crystalline Nanowires", International Congress of Theoretical and Applied Mechanics (ICTAM), Montreal, Canada, Aug. 2016.
18. "Stretchable and Wearable Sensors using Metal Nanowires", The 2nd International Conference & Exhibition for Nanopia (NANOPIA 2015), Gyeongsangnam-do, South Korea, Nov. 2015.
19. "Silver Nanowire Based Multifunctional Wearable Sensors", in ASME International Mechanical Engineering Congress and Exposition, Houston, TX, Nov. 2015.
20. "Mechanical Properties of Nanowires Under Different Loading Modes" (ASME Sia Nemat-Nasser Award Lecture), in ASME International Mechanical Engineering Congress and Exposition, Houston, TX, Nov. 2015.
21. "Large Anelasticity and Associated Energy Dissipation in Single-Crystalline Nanowires", 52nd Society of Engineering Sciences Annual Meeting, College Station, TX, Oct. 2015.
22. "Recoverable Plasticity in Penta-twinned Metallic Nanowires", Materials Science & Technology 2015 (MS&T15), Columbus, OH, Oct. 2015.
23. "Teaching a Multidisciplinary Nanotechnology Laboratory Course to Undergraduate Students", ASME Applied Mechanics and Materials Conference, Seattle, WA, Jun. 2015.
24. "One-Dimensional Nanostructures for Wearable Devices", in 144th Annual TMS Meeting and Exhibition, Orlando, FL, Mar. 2015.
25. "Size Effects on Mechanical Properties of Silver Nanowires", in ASME International Mechanical Engineering Congress and Exposition, San Diego, CA, Nov. 2013.
26. "One-Dimensional Nanostructures for Stretchable Electronics", in ASME International Mechanical Engineering Congress and Exposition, Houston, TX, Nov. 2012.
27. "Mechanical Properties of Silver Nanowires", in ASME International Mechanical Engineering Congress and Exposition, Houston, TX, Nov. 2012.
28. "Size Effects on Mechanical Properties of Silver Nanowires", in 49th Annual Meeting of Society of Engineering Sciences, Atlanta, GA, Oct. 2012.

29. "In-situ Mechanical Characterization of Nanowires", Society of Tribologists and Lubrication Engineers Annual Conference, St. Louis, MO, May 2012.
30. "Static Friction between Silicon Nanowires and Elastomeric Substrate", Society of Tribologists and Lubrication Engineers Annual Conference, St. Louis, MO, May 2012.
31. "NUE: Bottom-Up Meets Top-Down - An Integrated Undergraduate Nanotechnology Laboratory at NC State", in ASME International Mechanical Engineering Congress and Exposition, Denver, CO, Nov. 2011.
32. "Size Effects on Mechanical Properties of Semiconductor and Metallic Nanowires", International Conference on Computational & Experimental Engineering and Sciences, Las Vegas, NV, Mar. 2010.
33. "Applications of microfabricated devices in the study of cell mechanics", North Carolina Tissue Engineering and Regenerative Medicine conference, Research Triangle Park, NC, Nov. 2008.

D. Conference Proceeding Papers (46) and Presentations (76)

PATENTS (in addition to >10 invention disclosures)

1. J. Muth, A.C. Myers, A. Malhot, S. Yao and Y. Zhu, "Personal Hydration Monitor", US Patent Application #15/160594, May 2016. [Issued, Licensed by a start-up company]
2. Y. Zhu, J. Dong, Z. Cui and Y. Han, "Electrohydrodynamic Printing of Metal Nanowires for Flexible and Stretchable Electronics", US Patent Application #16/792967, Feb. 2020. [Pending]
3. X. Jiang, T. Kim and Y. Zhu, "Flexible Piezo-Composite Sensors and Transducers", US Patent Application #16/808786, Mar. 2020. [Pending]
4. Y. Zhu and Q. Huang, "Gravure Printing of Nanowires for Large-area Printed Electronics", US Patent Application #17/038,502, Sep. 2020. [Pending]
5. Y. Zhu and S. Yao, "Multi-functional Electronic Textiles Employing Silver Nanowire Composite Sensors and Related Methods", US Patent Application #17/232,095, Apr. 2021. [pending]
6. Y. Zhu, W. Zhou and S. Yao, "Gas-Permeable, Ultrathin, Stretchable Epidermal Electronics with Porous Electrodes", Provisional Patent Application #63/179,060, Apr. 2021.
7. Y. Zhu, S. Wu, A. Bozkurt, T. Songkakul, and W. Reynolds, "Wearable Bioimpedance Monitoring System using Conformal Silver Nanowire Electrodes", Provisional Patent Application #63/273,378, Oct. 2021.

NEWS RELEASE

1. "Researchers Demonstrate Technique for Recycling Nanowires in Electronics", Jul. 2021, Science Daily, Phys.org, World Textile Information Network (WTiN), Tech Briefs, WRAL TechWire.
2. "Plant Patch Enables Continuous Monitoring for Crop Diseases", Jul. 2021, National Nanotechnology Initiative, Technewsnow, IDTechEx, The British Society for Plant Pathology, Potato News Today, Technology Networks, WRAL TechWire.
3. "'Breathable' Electronics Pave the Way for More Functional Wearable Tech", Apr. 2020, Science Daily, New Atlas, MedGadget, Printed Electronics World, Wearable Tech Insights, C&EN, The Engineer (UK), and TN (Argentina). Youtube video, etc.
4. "New Technique Uses Templates to Guide Self-Folding 3-D Structures", Aug. 2018, NSF Science360, Phys.org, ScienceDaily, WRAL TechWire, etc.
5. "New Technique Allows Printing of Flexible, Stretchable Silver Nanowire Circuits", Feb. 2018, NSF Science360, ScienceDaily, Physics News, ECNmag, Electronics 360 and etc.

6. "Researchers Develop Wearable, Low-Cost Sensor to Measure Skin Hydration", Jan. 2017, Sports Illustrated, TechCrunch, GADGETS&WEARABLES, LifeScienceDaily, NSF Science360, Triangle Business Journal, News and Observer, etc.
7. "Elastic Drug Delivery Technology Releases Drugs When Stretched", Aug. 2015, ACS Nano invited video, medGadget, Med Device Online, US News, News and Observer, etc.
8. "Researchers Find Nanowires Have Unusually Pronounced 'Anelastic' Properties", Jul. 2015, NSF Science 360, Phys.org, EurekAlert!, R&D Magazine, ScienceDaily, PrintedElectronicsWorld, Nanowerk, Science Newslite, etc.
9. "Wearable Sensor Smooths Path to Long-Term EKG, EMG Monitoring", Jan. 2015, WRAL Health Team (video), NSF, Phys.org, Nanotechnology Now, medGadget, Gizmag, etc.
10. "Researchers Devise New, Stretchable Antenna for Wearable Health Monitoring", Mar. 2014, NSF Science Now (video), MRS Materials 360, Live Science, MobiHealthNews, Medical Device Daily, medGadget, KurzweilAI News, R&D Magazine, WRAL TechWire (local news), etc.
11. "Silver Nanowire Sensors Hold Promise for Prosthetics, Robotics", Jan. 2014, Washington Post, NSF Science 360, R&D Magazine, Gizmag, Science Daily, MobiHealthNews, Nanotechnology Now, Technician (NCSU newspaper), xataka (in Spanish), etc.
12. "Understanding Interface Properties of Graphene Paves Way for New Applications", Aug. 2013, NSF Science 360, Materials Today, MaterialsViewsChina, Science Daily, R&D Magazine, etc.
13. "Researchers Create Highly Conductive and Elastic Conductors Using Silver Nanowires", Jul. 2012, National Nanotechnology Initiative, Materials Today, EETimes, PlasticElectronics, etc.
14. "Researchers Devise New Means For Creating Elastic Conductors", Jan. 2012, NSF Science 360, Energy Daily, IEEE Spectrum, Materials Today, R&D Magazine and etc.
15. "Stretched Rubber Offers Simpler Method For Assembling Nanowires", Feb. 2011, NSF news, R&D Magazine, dBusinessNews, Institute of Nanotechnology, etc.
16. "Coiled Nanowires May Hold Key To Stretchable Electronics", Jan. 2011, NSF Science 360, International Business Times, NanoWiki, News and Observer (Raleigh newspaper), etc.
17. "Understanding Mechanical Properties of Silicon Nanowires Paves Way for Nanodevices", Nov. 2009, Materials Today, Small Times, Science Daily, Physorg, etc.
18. "Nanostructure strength goes under the microscope", Nanotechweb, Sep. 2005.
19. "World's Smallest Universal Material Testing System", Science Daily, Sep. 2005.

TEACHING AND MENTORING

A. Course Assignment

1. Fall 21 MAE 541, Advanced Solid Mechanics (59 students)
2. Spring 21 MAE 316, Strength of Mechanical Components (125 students)
3. Fall 20 MAE 541, Advanced Solid Mechanics (37 students)
4. Spring 20 MAE 316, Strength of Mechanical Components (140 students)
5. Fall 19 MAE 536, Micro/Nano Electromechanical Systems (27 students)
6. Summer 19 MAE 214, Solid Mechanics (7 students), part of COE Study Abroad program in Zhejiang University
7. Spring 19 MAE 316, Strength of Mechanical Components (128 students)
8. Fall 18 MAE 536, Micro/Nano Electromechanical Systems (42 students)

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| 9. Summer 18 | MAE 214, Solid Mechanics (9 students), part of COE Study Abroad program in Zhejiang University |
| 10. Spring 18 | MAE 316, Strength of Mechanical Components (92 students) |
| 11. Fall 17 | MAE 316, Strength of Mechanical Components (35 students) |
| 12. Fall 17 | MAE 536, Micro/Nano Electromechanical Systems (34 students) |
| 13. Spring 17 | MAE 316, Strength of Mechanical Components (115 students) |
| 14. Fall 16 | MAE 316, Strength of Mechanical Components (52 students) |
| 15. Fall 15 | MAE 316, Strength of Mechanical Components (45 students) |
| 16. Fall 15 | MAE 536, Micro/Nano Electromechanical Systems (26 students) |
| 17. Spring 15 | MAE 314, Solid Mechanics (54 students) |
| 18. Summer 14 | MAE 536, Micro/Nano Electromechanical Systems (10 students) |
| 19. Spring 14 | MAE 316, Strength of Mechanical Components (57 students) |
| 20. Fall 13 | MAE 314, Solid Mechanics (34 students) |
| 21. Fall 13 | MAE 536, Micro/Nano Electromechanical Systems (35 students) |
| 22. Spring 13 | MAE 316, Strength of Mechanical Components, (52 students) |
| 23. Fall 12 | MAE 536, Micro/Nano Electromechanical Systems (44 students) |
| 24. Fall 12 | MAE 495, Introduction to Multidisciplinary Nanotechnology Lab (13 students) |
| 25. Spring 12 | MAE 314, Strength of Mechanical Components (53 students) |
| 26. Fall 11 | MAE 495, Introduction to Multidisciplinary Nanotechnology Lab (16 students) |
| 27. Fall 11 | MAE 536, Micro/Nano Electromechanical Systems (28 students) |
| 28. Spring 11 | MAE 316, Strength of Mechanical Components (76 students) |
| 29. Fall 10 | MAE 314, Solid Mechanics (42 students) |
| 30. Fall 10 | MAE 536, Micro/Nano Electromechanical Systems (21 students) |
| 31. Spring 10 | MAE 316, Strength of Mechanical Components (68 students) |
| 32. Fall 09 | MAE 314, Solid Mechanics (50 students) |
| 33. Fall 09 | MAE 589M, Micro/Nano Electromechanical Systems (17 students) |
| 34. Spring 09 | MAE 316, Strength of Mechanical Components (65 students) |
| 35. Fall 08 | MAE 589M, Micro/Nano Electromechanical Systems (16 students) |
| 36. Spring 08 | MAE 316, Strength of Mechanical Components (63 students) |
| 37. Fall 07 | MAE 314, Solid Mechanics (46 students) |

** MAE536 is a core course in the graduate certificate program in Nano-Systems Engineering and a core course in the Master of Nanoengineering distance education program.

B. Current Research Group

Postdoctoral Research Associates

- Giwon Lee, PhD: Pohang University of Science and Technology (POSTECH)
Topic: Wearable plant sensors (co-advised with Q. Wei at CBE)

Graduate Students

- Yuxuan Liu, 3rd year, MS: Harbin Institute of Technology
Topic: Manufacturing and devices applications of stretchable electronics
- Shuang Wu, 3rd year, MS: Zhejiang University
Topic: Mechanics and devices of soft robotics
- Hongyu Wang, 3rd year, MS: Shanghai Jiaotong University
Topic: In-situ TEM nanomechanical testing
- Darpan Shukla, 2nd year, MS: Indian Institute of Technology, Dhanbad
Topic: Manufacturing and devices applications of wearable sensors
- Langston Baker, 1st year, MS: Mercer University

Topic: Interfacial mechanics of polyester resins on metal substrates

C. PhD Dissertation

1. Zheng Cui, PhD (January 2019)
Title: "Silver Nanowire-based Flexible and Stretchable Devices: Applications and Manufacturing"
2. Chengjun Li, PhD (January 2019)
Title: "Development of Microelectromechanical Systems for Advanced Nanomechanical Characterization"
3. Farhan Rahman (co-chaired w/ T. Hassan and G. Ngaile), PhD (December 2018)
Title: "Development of a novel multiaxial miniature testing system for micro-specimen testing, and multi-scale modeling for continuum-scale material property"
4. Felipe Poblete, PhD (August 2018)
Title: "Rate-dependent Interfacial Mechanics in Advanced Material Systems"
5. Jianxun Cui, PhD (October 2017)
Title: "Self-folding of Engineering Materials Actuated by Heat Shrinkable Polymers"
6. Shanshan Yao, PhD (October 2016)
Title: "Nanomaterial-Enabled Soft Sensors and Actuators"
7. Guangming Cheng, PhD (October 2016)
Title "In Situ Investigation of Deformation Mechanisms in Crystalline Nanowires"
8. Tzu-Hsuan Chang, PhD (August 2016)
Title: "In situ Scanning Electron Microscopy Mechanical Characterization of Crystalline Nanowires using MEMS Devices"
9. Qingquan Qin, PhD (December 2012)
Title: "Mechanical Properties of One-Dimensional Nanomaterials: Size, Time and Temperature Dependent Effects"
10. Feng Xu, PhD (August 2012)
Title: "Applications of One-Dimensional Nanomaterials for Stretchable Electronics"

D. Other Students Working in the Group

- MS students with thesis (4)
- MS students without thesis (12)
- Undergraduate research assistants (51, 15 females)

E. Postdoctoral Research Associates

1. Shanshan Yao (January 2017 – July 2019), Currently: Assistant Professor at Stony Brook University
2. Guangming Cheng (January 2017 – March 2018), Currently: Associate Research Scholar, Princeton University
3. Qijin Huang (September 2015 – July 2017), Currently: Postdoctoral fellow at Virginia Commonwealth University
4. Alper Gurarlan (August 2015 – September 2016), Currently: Associate Professor at Istanbul Technical University, Turkey
5. Tao Jiang (January 2012 – January 2014), Currently: Professor at Jinan University, China

PROFESSIONAL SERVICE

Services in the Department, School, and/or University

1. Group Lead, Mechanics, Materials and Manufacturing Group, Department of Mechanical and Aerospace Engineering, July 2020 – present

2. Director of Mechanical Engineering Research, Department of Mechanical and Aerospace Engineering, July 2020 – present
3. Department Reappointment, Promotion, and Tenure (RPT) Committee, 2019 – present
4. Department Post-Tenure Review (PTR) Committee, 2019 – present
5. Department Faculty Mentoring Committee, 2018 – present
6. University Faculty Scholar selection committee, 2018 – present
7. Department Faculty Search Committee Chair, 2018 – 2019
8. Shared Mechanical Testing Laboratory Committee Chair, 2018-2019
9. Scanning Electron Microscopy (SEM) Advisory Board, Analytical Instrumentation Facility (AIF), NCSU, 2015 – present
10. Department Seminar Committee, 2013 – 2017
11. Department Undergraduate Curriculum Committee, 2009-2013, 2007-2008
12. Department Faculty Search Committee in Multifunctional materials area, 2010-2011
13. Department Research Committee, 2008-2009
14. Department Faculty Search Committee in Nano/Bio area, 2008-2009
15. Judge, 21th Annual NC State University Undergraduate Research Symposium, 2011

Graduate Committee Members and Graduate School Representatives

>35 PhD students and 10 MS students from MAE, MSE, ECE, BME, Chemical Engineering, Civil Engineering, Industrial Engineering, and Textiles Engineering

Society Membership/Governance

- American Society of Mechanical Engineers (ASME), Fellow since 2017
 - Executive Committee Member, Materials Division, 2014 – 2019 (Chair 2018-2019)
 - Multifunctional Materials Committee, Materials Division, 2007 – present (Chair 2012 – 2013)
 - Experimental Mechanics Committee, Applied Mechanics Division, 2009 - present
- Society of Experimental Mechanics (SEM), Member since 2006
- Society of Engineering Sciences (SES), Member since 2011
- Materials Research Society (MRS), Member since 2006
- Institute of Electrical and Electronics Engineers (IEEE), Senior Member since 2018
- Sigma Xi (Full Member), The Scientific Research Society, Member since 2007
- Tau Beta Pi, The Engineering Honor Society, Member since 2006

Selected Conference Organization (>30 tracks/symposia for ASME/SEM/SES/MRS...)

- Track Organizer, “Advances in Nanomechanics” (with N. Admal), 57th Annual Meeting of the Society of Engineering Sciences, University of Minnesota, Oct. 2020.
- Track Organizer, “Materials: Genetics to Structures” Track (with T. Nakamura), ASME International Mechanical Engineering Congress & Exposition, Tampa, FL, Nov. 2017.
- Scientific Advisory Board Member, 14th International Conference on Fracture, Rhodes, Greece, Jun. 2017.
- Track Co-Organizer, “Mechanics in Materials Science” (with K.T. Ramesh and L. Hu), 53rd Annual Meeting of the Society of Engineering Sciences, College Park, MD, Oct. 2016.
- Symposium Organizer, “Mechanics across Multiple Length and Time Scales” (with P. Zavattieri and C. Ke), SEM Annual Conference and Exposition on Experimental and Applied Mechanics, Orlando, FL, Jun. 2016.
- Symposium Organizer, “Mechanics of Adhesion and Friction” (with F. DeIRio and J. Xiao), ASME International Mechanical Engineering Congress & Exposition, Houston, TX, Nov. 2015.

- Symposium Co-Organizer, “Electron and Focused Ion Beam Microscopy Tools in Materials Characterization” (with Francisco Sola, David W. McComb and Michael D. Uchic), Materials Science & Technology 2015 – MS&T 2015, Columbus, OH, Oct. 2015.
- Symposium Co-Organizer, “Semiconductor Nanowires: Synthesis, Property and Applications” (with Y. Gu, J. Spanier and S. Gradecak), 2014 MRS Spring Meeting, San Francisco, CA, Apr. 2014.
- Conference Organizer, “Southeast Society of Experimental Mechanics Graduate Conference”, Raleigh, NC, Mar. 2013.
- Symposium Organizer, "Mechanics of Nanostructures and Materials" (with C. Ke), SEM Annual Conference and Exposition on Experimental and Applied Mechanics, Indianapolis, IN, Jun. 2010

Book Reviewer

- Reviewed manuscripts of prospective books for Wiley, CRC Press and Pearson Education.

Journal Reviewer

>60 journals including the best journals in the fields of solid mechanics, materials science, nanotechnology and MEMS

- **Solid Mechanics:** Journal of the Mechanics and Physics of Solids (JMPS), Journal of Applied Mechanics, International Journal for Solids and Structures, International Journal of Fracture, International Journal of Plasticity, Experimental Mechanics, Extreme Mechanics Letters
- **Materials Science:** Acta Materialia, Advanced Materials, Advanced Functional Materials, Composites Science and Technology, Journal of Engineering Materials and Technology, Journal of Materials Research, Materials Today, Scripta Materialia, Soft Matter
- **MEMS and Nanotechnology:** ACS Nano, Nano Letters, Nanoscale, Small, IEEE/ASME Journal of Microelectromechanical Systems, Journal of Micromechanics and Microengineering, Nano Today, Nature Nanotechnology, Sensors and Actuators A
- **Multidisciplinary:** Applied Physics Letters, Journal of Applied Physics, Journal of the Royal Society Interface, Journal of Manufacturing Science and Engineering, Langmuir, Nature Communications, PNAS, Polymer, Science, Science Advances, Science Translation Medicine

Commentary

- Invited by *Science News for Students* to comment on a paper published in **Nature Materials** on mechanics of metallic nanocrystals, 2017
- Invited by *Physics Today* to comment on a paper published in **Nature** on stretchable semiconductors, 2016
- Invited by *Chemistry World* to comment on a paper published in **Science** on stretchable electronics, 2015

Proposal Reviewer

- NSF – CMMI, DMR, ECCS, EFRI, NRT, and NUE
- AFOSR
- DOE – BES, NEUP
- American Chemical Society – Petroleum Research Fund (ACS PRF)
- Canada Foundation for Innovation (CFI)

- Hong Kong Research Grants Council (RGC)
- Israel Science Foundation (ISF)
- Singapore Agency for Science, Technology and Research (A*STAR)
- Swiss National Science Foundation
- Argonne National Laboratory Center for Nanoscale Materials
- Center for Integrated Nanotechnologies (LANL and Sandia)

Reviewer for promotion and tenure cases

2021	University in USA (2 cases) and China (1 case)
2020	University in USA (3 cases)
2019	University in USA (1 case)
2018	Universities in USA (2 cases) and Korea (1 case)
2017	Universities in USA (3 cases)
2014	University in Israel (1 case)

External examiner for PhD thesis

2015	University in Hong Kong (1 case)
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Selected Editorial Activities

- Associate Editor, Smart Manufacturing, 5/2021 – present
- Associate Editor, Journal of Applied Mechanics, 4/2018 – present
- Associate Editor, Journal of Experimental Mechanics, 1/2017 – present
- Editorial Board, Journal of Composite Science, 10/2020 – present
- Editorial Board, Science China: Technological Science, 1/2018 – present
- Editorial Board, Multiscale Science and Engineering (Nature series), 1/2018 – present
- Editor, iMechanica journal club, 2016 – 2017
- Editorial Board, Journal of Flexible Electronics, 2014 – present

Edited Journal Special Issues

- F. Barthelat, P. Zavattieri and Y. Zhu (Eds.), “Special Issue in Mechanics and Materials in Honor of Horacio D. Espinosa”, *Extreme Mechanics Letters*, online collection, Jan. 2021.
- Y. Zhu, M.T.A. Saif and F. DelRio (Eds.), “Recent Advances in Experimental Micro/Nano-Mechanics”, special issue of *Experimental Mechanics*, Vol. 59, Issue 3, March 2019.
- Y. Zhu, D.S. Gianola and T. Zhu (Eds.), “Nanomechanics: Bridging Spatial and Temporal Scales”, special issue of *Extreme Mechanics Letters*, Vol. 8, 2016.
- B. Peng, C. Ke, Y. Liu and Y. Zhu (Eds.), “Testing, Measurement, and Characterization of Nanomaterials”, special issue of *Journal of Nanomaterials*, Oct. 2015.

Edited Conference Proceedings

- Y. Zhu and A.T. Zehnder (Eds.), “Experimental and Applied Mechanics, Volume 4” (Proceeding of SEM 2016 annual conference), Springer, ISBN: 978-3-319-42027-1, 2016 [*downloaded 15,023 times, as of 11/2021*].
- W.C. Ralph, R. Singh, G.T. Piyush, R. Thakre, P. Zavattieri and Y. Zhu (Eds.), “Mechanics of Composite and Multi-functional Materials, Volume 7” (Proceeding of SEM 2016 annual conference), Springer, ISBN: 978-3-319-41765-3, 2016 [*downloaded 38,554 times, as of 11/2021*].
- Y. Zhu, Y. Gu, J. Spanier and S. Gradecak (Eds.), “Semiconductor Nanowires: Synthesis, Property and Applications”, MRS Proceeding, Spring 2014.