

## Matt Pharr

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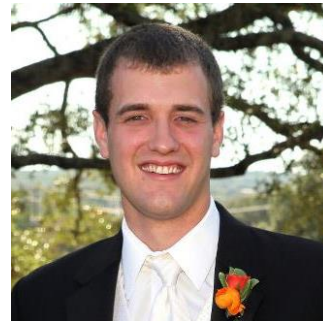
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## Education

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May 2014 Ph.D. in Engineering Sciences, *Harvard University*

May 2010 S.M. in Engineering Sciences, *Harvard University*

May 2008 B.S. in Mechanical Engineering & B.A. in Materials Science, *Rice University*

## Professional Appointments

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Sep. 2022 – present	<i>Texas A&amp;M University, <b>Associate Professor</b></i> Department of Mechanical Engineering Department of Materials Science & Engineering (courtesy)
Aug. 2016 – Aug. 2022	<i>Texas A&amp;M University, <b>Assistant Professor</b></i> Department of Mechanical Engineering Department of Materials Science & Engineering (courtesy)
Aug. 2014 – July 2016	<i>University of Illinois at Urbana-Champaign, <b>Postdoctoral Researcher</b></i> Department of Materials Science and Engineering

## Awards and Honors

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Apr. 2022	The Association of Former Students Distinguished Achievement Award in Teaching
Mar. 2022	TEES Young Faculty Fellow Award
Nov. 2021	TMS LMD Young Leaders Professional Development Award
Sept. 2020	J. Mike Walker '66 Faculty Fellowship
July 2020	Montague-Center for Teaching Excellence Scholars Award
Jan. 2020	NSF CAREER Award
Apr. 2019	Kaneka Junior Faculty Award
Mar. 2019	Peggy L. & Charles Brittan '65 Outstanding Undergraduate Teaching Award
Nov. 2017	Haythornthwaite Research Initiation Grant Award through ASME AMD
Sept. 2013	National Science Foundation Graduate Research Fellowship
Jan. 2011	Harvard University Distinction in Teaching Award
May 2010	Harvard University Distinction in Teaching Award

Apr. 2010 National Defense Science and Engineering Graduate Fellowship  
 Apr. 2010 Department of Energy Office of Science Graduate Fellowship (declined)  
 Mar. 2010 Winston Chen Graduate Fellowship, Harvard University  
 May 2008 Alan J. Chapman Award in Mechanical Engineering, Rice University  
 Apr. 2007 W. L. Moody Engineering Scholarship, Rice University  
 May 2006 Louis J. Walsh Scholarship in Engineering, Rice University  
 Mar. 2004 Rice University Trustee Distinguished Scholarship

## Teaching Experience

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Aug. 2016 – present Instructor, MEEN 223: Principles of Materials and Manufacturing, *Texas A&M University* (4 semesters)  
 Instructor, MEEN 360: Materials and Manufacturing Selection in Design, *Texas A&M University* (8 semesters)  
 Instructor, MEEN 467/625: Mechanical Behavior of Materials, *Texas A&M University* (2 semesters)  
 Instructor, MEEN 475: Materials in Design, *Texas A&M University* (1 semester)  
 Sept. 2011 – May 2014 Leverett House Non-Resident Tutor, *Harvard University*  
 Sept. 2010 – Dec. 2010 Teaching fellow, AP 282: Solids: Structures and Defects, *Harvard University*  
 Jan. 2010 – May 2010 Teaching fellow, ES 120: Introduction to the Mechanics of Solids, *Harvard University*  
 Aug. 2007 – Aug. 2008 College Mentor, *Rice University*  
 Aug. 2006 – Dec. 2006 Teaching assistant, MECH 211: Statics and Dynamics, *Rice University*

## Publications

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<sup>†</sup>denotes equal contribution to the manuscript      <sup>#</sup>denotes corresponding author

### Published Journal Papers

- J73. Yelin Ni, Tucker Bisel, Md Kamrul Hasan, Donghui Li, Witold Fuchs, Scott Cooley, Larry Nichols, **Matt Pharr**, Nathalie Dupuy, Sylvain Marque, Mark K. Murphy, Suresh Pillai, Samuel Dorey<sup>#</sup>, and Leonard S. Fifield<sup>#</sup>. "Compatibility of Ethylene Vinyl Acetate (EVA)/Ethylene Vinyl Alcohol (EVOH)/EVA Films with Gamma, Electron-Beam, and X-ray Irradiation." *npj Materials Degradation* 7 (1), 93 (2023).
- J72. Jungho Shin, Cole D. Fincher, and **Matt Pharr**<sup>#</sup>. "Nano to Macro-Scale Elastic and Plastic Characteristics of Calcium Metal and Implications for Rechargeable Battery Applications." *Extreme Mechanics Letters* 64, 102081 (2023).
- J71. Omid Zargar, Kijie Zhao, Qing Li, Jun Zou, **Matt Pharr**, Scott Finlayson, and Anastasia Muliana<sup>#</sup>. "A Photoacoustic Method to Measure the Young's Modulus of Plant Tissues." *Experimental Mechanics* 63 (8), 1321-1333 (2023).

- J70. Abdelraham Atef Youssef, Shadi Balawi<sup>#</sup>, and **Matt Pharr**. “Mini-Lab Activities to Stimulate Students’ Conceptual Learning.” *2023 ASEE Annual Conference & Exposition* (2023).
- J69. Carlos Corleto<sup>#</sup>, **Matt Pharr**, Bruce Conway, Shadi Balawi, and Bruce Tai. “Faculty-Led Videos of Real-World Industrial and Research Applications in a Materials Science Course.” *2023 ASEE Annual Conference & Exposition* (2023).
- J68. Marcus Hansen, Ainiu Wang, Jiaqi Dong, Yuwei Zhang, Tejas Umale, Sarbajit Banerjee, Patrick Shamberger, **Matt Pharr**, Ibrahim Karaman, and Kelvin Xie<sup>#</sup>. “Crystallographic variant mapping using precession electron diffraction data.” *Microstructures* 3 (4), 1-15 (2023).
- J67. Tiffany Sill, Wasif Zaheer, Caroline Valdes, Victor Balcorta, Lacey Douglas, Torrick Fletcher Jr., Sarah Steiger, Neil Spinner, Stanislav Verkhoturov, Viswanathan Kalyanaraman, Nikhil Verghese, **Matt Pharr**, Kapil Sheth, Rachel Davidson, and Sarbajit Banerjee<sup>#</sup>. “Mechanistic Origins of Corrosion Protection of Aluminum Alloys by Graphene/Polyetherimide Nanocomposite Coatings.” *npj Materials Degradation* 7 (1), 35 (2023).
- J66. Dexin Zhao, Aniket Patel, Aaron Barbosa, Marcus H. Hansen, Ainiu L. Wang, Jiaqi Dong, Yuwei Zhang, Tejas Umale, Ibrahim Karaman, Patrick Shamberger, Sarbajit Banerjee, **Matt Pharr**, and Kelvin Y. Xie<sup>#</sup>. “A Reference-area-free strain mapping method using precession electron diffraction data.” *Ultramicroscopy* 247, 113700 (2023).
- J65. Qing Li, Omid Zargar, Sungkyu Park, **Matt Pharr**, Anastasia Muliana, and Scott A. Finlayson<sup>#</sup>. “Mechanical Stimulation Reprograms the Sorghum Internode Transcriptome and Broadly Alters Hormone Homeostasis.” *Plant Science* 327, 111555 (2023).
- J64. Yuwei Zhang, Cole D. Fincher, Rebeca M. Gurrola, Wilson Serem, Dexin Zhao, Jungho Shin, Sarbajit Banerjee, Kelvin Xie, Patrick Shamberger, and **Matt Pharr**<sup>#</sup>. “Strategic texturation of VO<sub>2</sub> thin films for tuning mechanical, structural, and electronic couplings during metal-insulator transitions.” *Acta Materialia* 242, 118478 (2023).
- J63. Jungho Shin and **Matt Pharr**<sup>#</sup>. “Fracture behavior of metallic sodium and implications for battery applications.” *Materials Horizons* 9, 3102-3109 (2022).
- J62. Min Huang, Md Kamrul Hasan, Suresh D. Pillai, **Matt Pharr**, and David Staack<sup>#</sup>. “Electron beam technology for Re-processing of personal protective equipment.” *Radiation Physics and Chemistry* 202, 110557 (2023).
- J61. Parker Schofield, Adelaide Bradicich, Rebeca M. Gurrola, Yuwei Zhang, Timothy D. Brown, **Matt Pharr**<sup>#</sup>, Patrick J. Shamberger<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. “Harnessing the Metal—Insulator Transition of VO<sub>2</sub> in Neuromorphic Computing.” *Advanced Materials* 2205294 (2022).
- J60. Umme Zakira<sup>#</sup>, Aayushi Bajpayee, **Matt Pharr**, Sarbajit Banerjee, and Bjorn Birgisson. “Grid Nanoindentation on Calcium Sulfoaluminate (CSA)-Kaolinite Pastes.” *Construction and Building Materials* 335, 127523 (2022).
- J59. Nina Girard-Perier, Sylvain R. A. Marque<sup>#</sup>, Nathalie Dupuy<sup>#</sup>, Magalie Claeys-Bruno, Fanny Gaston, Samuel Dorey<sup>#</sup>, Leonard S. Fifield<sup>#</sup>, Yelin Ni, Donghui Li, Witold Fuchs, Mark Murphy, Suresh Pillai, **Matt Pharr**, Larry Nichols “Effects of X-rays, Electron

- beam, and Gamma Irradiation on Chemical and Physical Properties of EVA Multilayer Films.” *Frontiers in Chemistry* 10, 888285 (2022).
- J58. Nathalie Dupuy<sup>#</sup>, Sylvain R.A. Marque<sup>#</sup>, Leonard S. Fifield, **Matt Pharr**, David Staack, Suresh D. Pillai, Larry Nichols, Mark K. Murphy, and Samuel Dorey. “Supplementing Gamma Sterilization with X-Ray and E-Beam Technologies: An International Industry and Academia Collaboration.” *BioProcess International* 20 (3), 2-6 (2022).
- J57. Min Huang, Md Kamrul Hasan, Kavita Rathore, Md Adbullah Hil Baky, John Lassalle, Jamie Kraus, Matthew Burnette, Christopher Campbell, Kunpeng Wang, Howard Jemison, Suresh Pillai, **Matt Pharr**, and David Staack<sup>#</sup>. “Plasma Generated Ozone and Reactive Oxygen Species for Point of Use PPE Decontamination System.” *PLOS ONE* 17 (2), e0262818 (2022).
- J56. Omid Zargar, **Matt Pharr**, and Anastasia Muliana<sup>#</sup>. “Modeling and Simulation of Creep Response of Sorghum Stems: Towards an Understanding of Stem Geometrical and Material Variations.” *Biosystems Engineering* 217, 1-17 (2022).
- J55. Omid Zargar, Qing Li, Chiedu Nwaobi, **Matt Pharr**, Scott A Finlayson, Anastasia Muliana<sup>#</sup>. “Thigmostimulation alters anatomical and biomechanical properties of bioenergy sorghum stems.” *Journal of the Mechanical Behavior of Biomedical Materials* 105090 (2022).
- J54. Yuting Luo, Shahed Rezaei, David A. Santos, Yuwei Zhang, Joseph V. Handy, Luis Carrillo, Brian J. Schultz, Leonardo Gobatto, Max Pupucevski, Kamila Wiaderek, Harry Charalambous, Andrey Yakovenko, **Matt Pharr**, Bai-Xiang Xu<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. “Cation Reordering Instead of Phase Transitions: Origins and Implications of Contrasting Lithiation Mechanisms in 1D  $\zeta$ - and 2D  $\alpha$ -V<sub>2</sub>O<sub>5</sub>.” *Proceedings of the National Academy of Sciences of the United States of America* 119 (4), 1-11 (2022).
- J53. Yuting Luo, Yang Bai, Aashutosh Mistry, Yuwei Zhang, Dexin Zhao, Susmita Sarkar, Joseph V. Handy, Shahed Rezaei, Andrew Chihpin Chuang, Luis Carrillo, Kamila Wiaderek, **Matt Pharr**, Kelvin Xie, Partha P. Mukherjee<sup>#</sup>, Bai-Xiang Xu<sup>#</sup>, Sarbajit Banerjee<sup>#</sup>. “Effect of crystallite geometries on electrochemical performance of porous intercalation electrodes by multiscale operando investigation.” *Nature Materials* 21 (2), 217-227 (2022).
- J52. Guan-Wen Liu, Yuwei Zhang, Melonie P. Thomas, Ahamed Ullah, **Matt Pharr**<sup>#</sup>, Beth Guiton<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. “Negative Thermal Expansion HfV<sub>2</sub>O<sub>7</sub> Nanostructures for Alleviation of Thermal Stress in Nanocomposite Coatings.” *ACS Applied Materials & Interfaces* 13 (37), 44723-44732 (2021).
- J51. Leonard Fifield<sup>#</sup>, **Matt Pharr**, David Staack, Suresh Pillai, Larry Nichols, James McCoy, Tony Faucette, Tucker Bisel, Min Huang, Md Kamrul Hasan, Lucas Perkins, Scott Cooley, and Mark Murphy. “Direct Comparison of Gamma, Electron Beam and X-ray Irradiation Doses on Characteristics of Low-density Polyethylene, Polypropylene Homopolymer, Polyolefin Elastomer and Chlorobutyl Rubber Medical Device Polymers.” *Radiation Physics and Chemistry* 186, 109505 (2021).
- J50. Richard J.-Y. Park, Christopher M. Eschler, Cole D. Fincher, Andres F. Badel, Pinwen Guan, **Matt Pharr**, Brian W. Sheldon, W. Craig Carter, Vekatasubramanian Viswanathan, and Yet-Ming Chiang<sup>#</sup>. “Semi-Solid Alkali Metal Electrodes Enabling High Critical Current Densities in Solid Electrolyte Batteries.” *Nature Energy* 6, 314-322 (2021).

- J49. Leonard Fifield<sup>#</sup>, **Matt Pharr**, David Staack, Suresh Pillai, Larry Nichols, James McCoy, Tony Faucette, Tucker Bisel, Min Huang, Md Kamrul Hasan, Lucas Perkins, Scott Cooley, and Mark Murphy. "Direct Comparison of Gamma, Electron Beam and X-ray Irradiation Effects on Single-Use Blood Collection Devices with Plastic Components." *Radiation Physics and Chemistry* 180, 109282 (2021).
- J48. David A. Santos, Justin L. Andrews, Yang Bai, Peter Stein, Yuting Luo, Yuwei Zhang, **Matt Pharr**, Bai-Xiang Xu<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. "Bending Good Beats Breaking Bad: Phase Separation Patterns in Individual Cathode Particles upon Lithiation and Delithiation." *Materials Horizons* 7, 3275-3290 (2020).
- J47. Veronica Augustyn<sup>#</sup>, Ruocun Wang, Nina Balke, **Matt Pharr**, and Craig Arnold. "Deformation during Electrosorption and Insertion-type Charge Storage: Origins, Characterization, and Design of Materials for High Power." *ACS Energy Letters* 5 (11), 3548-3559 (2020).
- J46. Justin Andrews, Peter Stein, David Santos, Cody Chalker, Luis R De Jesus, Rachel Davidson, Michelle Gross, **Matt Pharr**, James Batteas, Bai-Xiang Xu<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. "Curvature-Induced Modification of Mechano-Electrochemical Coupling and Nucleation Kinetics in a Cathode Material." *Matter* 3 (5), 1754-1773 (2020).
- J45. Cole D. Fincher<sup>†</sup>, Haley Turman<sup>†</sup>, Aaron French, Matthew Chancey, Jonathan Gigax, Eda Aydogan, Dexin Zhao, Digvijay Yadav, Kelvin Xie, Yongqiang Wang, Mike Borden, Lin Shao, Stuart A. Maloy, and **Matt Pharr**<sup>#</sup>. "Damage Relief in Ion-Irradiated Inconel 718 via Annealing." *Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms* 479, 157-162 (2020).
- J44. Seunghyun Lee<sup>†</sup>, Cole D. Fincher<sup>†</sup>, Russell Rowe, Arber Shasivari, Edwin Torres, Michael Ecker-Randolph, and **Matt Pharr**<sup>#</sup>. "Making something out of nothing: enhanced flaw tolerance and rupture resistance in elastomer-void "negative" composites." *Extreme Mechanics Letters* 40, 100845 (2020).
- J43. Yusheng Lei, Yimu Chen, Ruiqi Zhang, Yuheng Li, Qizhang Yan, Seunghyun Lee, Yugang Yu, Hsinhan Tsai, Woojin Choi, Kaiping Wang, Yanqi Luo, Yue Gu, Xinran Zheng, Chunfeng Wang, Chonghe Wang, Hongjie Hu, Yang Li, Baiyan Qi, Muyang Lin, Zhuorui Zhang, Shadi A. Dayeh, **Matt Pharr**, David P. Fenning, Yu-Hwa Lo, Jian Luo, Kesong Yang, Jinkyoun Yoo, Wanyi Nie, and Sheng Xu<sup>#</sup>. "A fabrication process for flexible single-crystal perovskite devices." *Nature* 583, 790-795 (2020).
- J42. Qing Zhou, Frank Gardea<sup>#</sup>, Zhen Sang, Seunghyun Lee, **Matt Pharr**, and Svetlana A. Sukhishvili<sup>#</sup>. "A Tailorable Family of Elastomeric-to-Rigid, 3D Printable, Interbonding Polymer Networks." *Advanced Functional Materials* 30, 2002374 (2020).
- J41. Seunghyun Lee, Omid Zargar, Carl Reiser, Qing Li, Anastasia Muliana, Scott A. Finlayson, Francisco E. Gomez<sup>#</sup>, and **Matt Pharr**<sup>#</sup>. "Time-dependent Mechanical Behavior of Sweet Sorghum Stems." *Journal of the Mechanical Behavior of Biomedical Materials* 106, 103731 (2020).
- J40. Cole D. Fincher, Yuwei Zhang, George M. Pharr, and **Matt Pharr**<sup>#</sup>. "Elastic and Plastic Characteristics of Sodium Metal." *ACS Applied Energy Materials* 3 (2), 1759-1767 (2020).
- J39. Rachel Davidson, Ankit Verma, David Santos, Feng Hao, Cole D. Fincher, Dexin Zhao, Vahid Attari, Parker Schofield, Jonathan Van Buskirk, Antonio Fraticelli-Cartagena, Theodore E. G. Alivio, Raymundo Arroyave, Kelvin Xie, **Matt Pharr**, Partha P. Mukherjee<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. "Mapping Mechanisms and Growth Regimes of

- Magnesium Electrodeposition at High Current Densities.” *Materials Horizons* 7, 843-854 (2020).
- J38. Cole D. Fincher, Daniela Ojeda, Yuwei Zhang, George M. Pharr, and **Matt Pharr**<sup>#</sup>. “Mechanical Properties of Metallic Lithium: from Nano to Bulk Scales.” *Acta Materialia* 186, 215-222 (2020).
- J37. KunHyuck Lee, Xiaoyue Ni, Jong Yoon Lee, Hany Arafa, David Pe, Shuai Xu, Raudel Avila, Masahiro Irie, Joo Hee Lee, Ryder L. Easterlin, Dong Hyun Kim, Ha Uk Chung, Omolara O. Olabisi, Selam Getaneh, Esther Chung, Marc Hill, Jeremy Bell, HoKyung Jang, Claire Liu, Jun Bin Park, Jungwoo Kim, Sung Bong Kim, Sunita Mehta, **Matt Pharr**, Andreas Tzavelis, Jonathan T. Reeder, Ivy Huang, Yujun Deng, Zhaoqian Xie<sup>#</sup>, Charles R. Davies<sup>#</sup>, Yonggang Huang<sup>#</sup>, John A. Rogers<sup>#</sup>. “Mechano-acoustic sensing of physiological processes and body motions via a soft wireless device placed at the suprasternal notch.” *Nature Biomedical Engineering* 4 (2), 148-158 (2020).
- J36. Philipp Mayer<sup>†</sup>, Nandhini Sivakumar<sup>†</sup>, Michael Pritz, Matjia Varga, Andreas Mehmman, Seunghyun Lee, Alfredo Salvatore, Michele Magno, **Matt Pharr**, Helge C. Johannssen, Gerhard Troester, Hanns Ulrich Zeilhofer, and Giovanni Antonio Salvatore<sup>#</sup>. “Flexible and Lightweight Devices for Wireless multi-Color Optogenetic Experiments Controllable via Commercial Cell Phones.” *Frontiers in Neuroscience* 13 (819), 1-14 (2019).
- J35. Yuwei Zhang, Yuting Luo, Cole Fincher, Sarbajit Banerjee, and **Matt Pharr**<sup>#</sup>. “Chemo-Mechanical Degradation in V<sub>2</sub>O<sub>5</sub> Thin Film Cathodes of Li-ion Batteries during Electrochemical Cycling.” *Journal of Materials Chemistry A* 7, 23922-23930 (2019).
- J34. Yuwei Zhang, Coleman Fincher, Scott McProuty, and **Matt Pharr**<sup>#</sup>. “In-operando imaging of polysulfide catholytes for Li-S batteries and implications for kinetics and mechanical stability.” *Journal of Power Sources* 434, 226727 (2019).
- J33. Rachel D. Davidson<sup>†</sup>, Yenny Cubides<sup>†</sup>, Cole Fincher, Peter Stein, Chelsea McLain, Bai-Xiang Xu, **Matt Pharr**, Homero Castaneda<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. “Tortuosity but not Percolation: Design of Exfoliated Graphene Nanocomposite Coatings for Extended Corrosion Protection of Aluminum Alloys.” *ACS Applied Nano Materials* 2, 3100-3116 (2019).
- J32. Seunghyun Lee and **Matt Pharr**<sup>#</sup>. “‘Sideways’ and stable crack propagation in a silicone elastomer.” *Proceedings of the National Academy of Sciences of the United States of America* 116 (19), 9251-9256 (2019).
- J31. Rachel Davidson, Ankit Verma, David Santos, Feng Hao, Coleman Fincher, Sisi Xiang, Jonathan van Buskirk, Kelvin Xie, **Matt Pharr**, Partha Mukherjee<sup>#</sup>, and Sarbajit Banerjee<sup>#</sup>. “Formation of Magnesium Dendrites during Electrodeposition.” *ACS Energy Letters* 4, 375-376 (2019).
- J30. Mohammad Humood, Joseph Lefebvre, Yan Shi, Mengdi Han, Coleman D. Fincher, **Matt Pharr**, John A. Rogers, and Andreas A. Polycarpou<sup>#</sup>. “Fabrication and Mechanical Cycling of Polymer Microscale Architectures for 3D MEMS Sensors.” *Advanced Engineering Materials* 21, 1801254 (2019).
- J29. Yuwei Zhang, Yuting Luo, Coleman Fincher, Scott McProuty, Garrett Swenson, Sarbajit Banerjee, and **Matt Pharr**<sup>#</sup>. “In-Situ Measurements of Stress Evolution in Composite Sulfur Cathodes.” *Energy Storage Materials* 16, 491-497 (2019).
- J28. Ruocun Wang, James B. Mitchell, Qiang Gao, Wan-Yu Tsai, Shelby Boyd, **Matt Pharr**, Nina Balke, and Veronica Augustyn<sup>#</sup>. “Operando Atomic Force Microscopy

- Reveals Mechanics of Structural Water Driven Battery-to-Pseudocapacitor Transition.” *ACS Nano* 12 (6), 6032-6039 (2018).
- J27. Xinge Yu<sup>†</sup>, Heling Wang<sup>†</sup>, Xin Ning<sup>†</sup>, Rujie Sun, Hassan Albadawi, Marcela Salomao, Alvin C. Silva, Yang Yu, Limei Tian, Ahyeon Koh, Chan Mi Lee, Aditya Chempakasseril, Peilin Tian, **Matt Pharr**, Jianghong Yuan, Yonggang Huang<sup>#</sup>, Rahmi Oklu<sup>#</sup>, and John A. Rogers<sup>#</sup>. “Needle-shaped ultrathin piezoelectric microsystem for guided tissue targeting via mechanical sensing.” *Nature Biomedical Engineering* 2, 165-172 (2018).
- J26. Hongjie Hu<sup>†</sup>, Xuan Zhu<sup>†</sup>, Chonghe Wang<sup>†</sup>, Lin Zhang, Xiaoshi Li, Seunghyun Lee, Zhenlong Huang, Ruimin Chen, Zeyu Chen, Chunfeng Wang, Yue Gu, Yimu Chen, Yusheng Lei, Tianjiao Zhang, NamHeon Kim, Yuxuan Guo, Yue Teng, Wenbo Zhou, Yang Li, Akihiro Nomoto, Simone Sternini, Qifa Zhou, **Matt Pharr**, Francesco Lanza di Scalea, and Sheng Xu<sup>#</sup>. “Stretchable ultrasonic transducer arrays for three-dimensional imaging on complex surfaces.” *Science Advances* 4 (3), eaar3979 (2018).
- J25. Mohammad Humood, Yan Shi, Mengdi Han, Joseph Lefebvre, Zheng Yan, **Matt Pharr**, Yihui Zhang, Yonggang Huang, John A. Rogers, and Andreas A. Polycarpou<sup>#</sup>. “Fabrication and Deformation of 3D Multilayered Kirigami Microstructures.” *Small* 14, 1703852 (2018).
- J24. Yuhao Liu<sup>†#</sup>, **Matt Pharr**<sup>†#</sup>, and Giovanni Salvatore<sup>†#</sup>. “Lab-on-Skin: A Review of Flexible and Stretchable Electronics for Wearable Health Monitoring.” *ACS Nano* 11 (10), 9614-9635 (2017).
- J23. Taisong Pan<sup>†</sup>, **Matt Pharr**<sup>†</sup>, Yinji Ma<sup>†</sup>, Rui Ning, Zheng Yan, Renxiao Xu, Xue Feng, Yonggang Huang, and John A. Rogers<sup>#</sup>. “Experimental and Theoretical Studies of Serpentine Interconnects on Ultrathin Elastomers for Stretchable Electronics.” *Advanced Functional Materials* 27 (37), 1702589 (2017).
- J22. Joselle M. McCracken<sup>†</sup>, Sheng Xu<sup>†</sup>, Adina Badea, Kyung-In Jang, Zheng Yan, David J. Wetzel, Kewang Nan, Qing Lin, Mengdi Han, Mikayla A. Anderson, Jung Woo Lee, Zijun Wei, **Matt Pharr**, Renhan Wang, Jessica Su, Stanislav S. Rubakhin, Jonathan V. Sweedler, John A. Rogers<sup>#</sup>, and Ralph G. Nuzzo<sup>#</sup>. “Deterministic Integration of Biological and Soft Materials onto 3D Microscale Cellular Frameworks.” *Advanced Biosystems* 1 (9), 1700068 (2017).
- J21. Garrett Hardin<sup>†</sup>, Yuwei Zhang<sup>†</sup>, Coleman Fincher, and **Matt Pharr**<sup>#</sup>. “Interfacial Fracture of Nanowire Electrodes of Lithium-Ion Batteries.” *Journal of the Minerals, Metals & Materials Society* 69 (9), 1519-1523 (2017).
- J20. Xiufeng Wang, Yinji Ma<sup>#</sup>, Yeguang Xue, Haiwen Luan, **Matt Pharr**, Xue Feng, John A. Rogers, and Yonggang Huang<sup>#</sup>. “Collapse of liquid-overfilled strain-isolation substrates in wearable electronics.” *International Journal of Solids and Structures* 117, 137-142 (2017).
- J19. Yinji Ma<sup>†</sup>, **Matt Pharr**<sup>†</sup>, Liang Wang, Jeonghyun Kim, Yuhao Liu, Yeguang Xue, Rui Ning, Xiufeng Wang, Ha Uk Chung, Xue Feng, John A. Rogers<sup>#</sup>, and Yonggang Huang<sup>#</sup>. “Soft Elastomers with Ionic Liquid-Filled Cavities as Strain Isolating Substrates for Wearable Electronics.” *Small* 13 (9), 1602954 (2017).
- J18. Jianghong Yuan<sup>#</sup>, **Matt Pharr**, X. Feng, John A. Rogers, and Yonggang Huang, “Design of stretchable electronics against impact.” *Journal of Applied Mechanics* 83 (10), 101009 (2016).

- J17. Jianghong Yuan, Y. Shi, **Matt Pharr**, X. Feng, John A. Rogers, and Yonggang Huang<sup>#</sup>. "A mechanics model for sensors imperfectly bonded to the skin for determination of the Young's moduli of epidermis and dermis." *Journal of Applied Mechanics* 83 (8), 084501 (2016).
- J16. **Matt Pharr**<sup>†</sup>, Yong Seok Choi<sup>†</sup>, Dongwoo Lee, Kyu Hwan Oh, and Joost J. Vlassak<sup>#</sup>. "Measurements of stress and fracture in germanium electrodes of lithium-ion batteries during electrochemical lithiation and delithiation." *Journal of Power Sources* 304, 164-169 (2016).
- J15. Yong Seok Choi, **Matt Pharr**, Kyu Hwan Oh, and Joost J. Vlassak<sup>#</sup>. "A simple technique for measuring the fracture energy of lithiated thin-film silicon electrodes at various lithium concentrations." *Journal of Power Sources* 294, 159-166 (2015).
- J14. **Matt Pharr**, Zhigang Suo, and Joost J. Vlassak<sup>#</sup>. "Variation of stress with charging rate due to strain-rate sensitivity of silicon electrodes of Li-ion batteries." *Journal of Power Sources* 270, 569-575 (2014).
- J13. Yong Seok Choi, **Matt Pharr**, Chan Soon Kang, Seoung-Bum Son, Seul Cham Kim, Kee-Bum Kim, Hyunchul Roh, Se-Hee Lee, Kyu Hwan Oh, and Joost J. Vlassak<sup>#</sup>. "Microstructural evolution induced by micro-cracking during fast lithiation of single crystalline silicon." *Journal of Power Sources* 265, 160-165 (2014).
- J12. **Matt Pharr**, Zhigang Suo, and Joost Vlassak<sup>#</sup>. "Measurements of the Fracture Energy of Lithiated Silicon Electrodes of Li-Ion Batteries." *Nano Letters* 13 (11), 5570-5577 (2013).
- J11. Kejie Zhao, **Matt Pharr**, Lauren Hartle, Joost J. Vlassak, and Zhigang Suo<sup>#</sup>. "Fracture and Debonding in Lithium-ion Batteries with Electrodes of Hollow Core-Shell Nanostructures." *Journal of Power Sources* 218, 6-14 (2012).
- J10. **Matt Pharr**, Kejie Zhao, Xinwei Wang, Zhigang Suo, and Joost J. Vlassak<sup>#</sup>. "Kinetics of Initial Lithiation of Crystalline Silicon Electrodes of Lithium-Ion Batteries." *Nano Letters* 12 (9), 5039-5047 (2012).
- J9. Kejie Zhao, Georgios Tritsarlis, **Matt Pharr**, Wei L. Wang, Onyekwelu Okeke, Zhigang Suo, Joost J. Vlassak, and Efthimios Kaxiras<sup>#</sup>. "Reactive Flow in Silicon Electrodes Assisted by the Insertion of Lithium." *Nano Letters* 12 (8), 4397-4403 (2012).
- J8. **Matt Pharr**, Jeong-Yun Sun, and Zhigang Suo<sup>#</sup>. "Rupture of a Highly Stretchable Acrylic Dielectric Elastomer." *Journal of Applied Physics* 111 (10), 104114 (2012).
- J7. Kejie Zhao, **Matt Pharr**, Qiang Wan, Wei L. Wang, Efthimios Kaxiras, Joost J. Vlassak, and Zhigang Suo<sup>#</sup>. "Concurrent Reaction and Plasticity during Lithiation of Crystalline Silicon in Lithium-ion Batteries." *Journal of the Electrochemical Society* 159 (3), A238-A243 (2012).
- J6. **Matt Pharr**, Kejie Zhao, Zhigang Suo<sup>#</sup>, Fan-Yi Ouyang, and Pilin Liu. "Concurrent Electromigration and Creep in Lead-Free Solder." *Journal of Applied Physics* 110 (8), 083716 (2011).
- J5. Kejie Zhao, Wei L. Wang, John Gregoire, **Matt Pharr**, Zhigang Suo, Joost J. Vlassak, and Efthimios Kaxiras<sup>#</sup>. "Lithium-Assisted Plastic Deformation of Silicon Electrodes in Lithium-Ion Batteries: A First-Principles Theoretical Study." *Nano Letters* 11 (7), 2962-2967 (2011).
- J4. Kejie Zhao, **Matt Pharr**, Shengqiang Cai, Joost J. Vlassak, and Zhigang Suo<sup>#</sup>. "Large Plastic Deformation in High-Capacity Lithium-Ion Batteries Caused by Charge and Discharge." *Journal of the American Ceramic Society* 94 (1), S226-S235 (2011).



- J3. Kejie Zhao, **Matt Pharr**, Joost J. Vlassak, and Zhigang Suo#. "Inelastic Hosts as Electrodes for High-Capacity Lithium-Ion Batteries." *Journal of Applied Physics* 109 (1), 016110 (2011).
- J2. Kejie Zhao, **Matt Pharr**, Joost J. Vlassak, and Zhigang Suo#. "Fracture of Electrodes in Lithium-Ion Batteries Caused by Fast Charging." *Journal of Applied Physics* 108 (7), 073517 (2010).
- J1. **Matt Pharr**, Yutai Katoh, and Hongbin Bei. "Dependence of Fracture Toughness on Crystallographic Orientation in Single-Crystalline Cubic ( $\beta$ ) Silicon Carbide." *U.S. Department of Energy Journal of Undergraduate Research* 6, 59-64 (2006).

### Conference Presentations & Invited Talks

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- T66. "Mechanical, Structural, and Electronic Coupling during Metal-Insulator Transitions in VO<sub>2</sub> Thin Films." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, New Orleans, LA, Oct. 2023.
- T65. "Texturing VO<sub>2</sub> Thin Films to Tune Mechanical, Structural, and Electronic Properties during Metal-Insulator Phase Transformations." Society of Engineering Science Annual Technical Meeting. Minneapolis, MN, Oct. 2023.
- T64. "Coupling Among Mechanical, Structural, and Electrical Properties during Metal-Insulator Transitions in VO<sub>2</sub> Thin Films." International Conference on Mechanics of Advanced Materials and Structures, College Station, TX, Aug. 2023.
- T63. "Fracture Tolerance in Li/Na Metal and Silicone Elastomers." CECAM Workshop on 3D Cracks and Crack Stability, Lausanne, Switzerland, June 2023.
- T62. "Temperature, Size, and Strain-rate Effects in Li, Na, and K Metal Electrodes." The Minerals, Metals & Materials Society, San Diego, CA, Mar. 2023.
- T61. "Temperature, Size, and Strain-rate Effects in Li, Na, and K Metal Electrodes." Society of Engineering Science Annual Technical Meeting. College Station, TX, Oct. 2022.
- T60. "Fracture Behavior of Li and Na and Implications in Batteries." U.S. National Congress of Theoretical and Applied Mechanics, Austin, TX, June 2022.
- T59. "Nanomechanics of Materials for High-Capacity Rechargeable Batteries." The Minerals, Metals & Materials Society, Anaheim, CA, Mar. 2022.
- T58. "Mechanics of Materials for High-Capacity Rechargeable Batteries." Mechanical and Aerospace Engineering, University of California San Diego, Virtual, Nov. 2021.
- T57. "Mechanics of Materials for High-Capacity Rechargeable Batteries." Materials Science and Engineering, University of Houston, Virtual, Apr. 2021.
- T56. "Mechanical Properties of Metal Anodes of Rechargeable Batteries." Materials Research Society, Virtual, Apr. 2021.
- T55. "Mechanical Behavior of Metal Anodes for Next-Generation Rechargeable Batteries." Society of Photographic Instrumentation Engineers Defense + Commercial Sensing, Virtual, Apr. 2021.
- T54. "Mechanics of Materials for High-Capacity Rechargeable Batteries." Frontiers in Mechanical Engineering and Sciences, Virtual, Dec. 2020.
- T53. "Mechanical Properties of Alkali Metal Anodes of Rechargeable Batteries." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, Virtual, Nov. 2020.

- T52. "Mechanical Failure of Lithium Metal." Society of Engineering Science 57th Annual Technical Meeting, Virtual, Oct. 2020.
- T51. "Mechanics of Metallic Lithium and Sodium Anodes." The Minerals, Metals & Materials Society, San Diego, CA, Feb. 2020.
- T50. "Sideways and stable crack propagation in silicone elastomers." International Conference on Plasticity, Damage, and Fracture, Riviera Maya, Mexico, Jan. 2020.
- T49. "Mechanics of High-Capacity Lithium-ion Battery Electrode Materials." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, Salt Lake City, UT, Nov. 2019.
- T48. "Sideways and stable crack propagation in silicone elastomers." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, Salt Lake City, UT, Nov. 2019.
- T47. "Mechanics of Metallic Lithium and Sodium Anodes." Society of Engineering Science 56th Annual Technical Meeting, St. Louis, MO, Oct. 2019.
- T46. "'Sideways' and stable crack propagation in a silicone elastomer." Society of Engineering Science 56th Annual Technical Meeting, St. Louis, MO, Oct. 2019.
- T45. "In-situ Measurements of Stress Evolution in Composite Sulfur Cathodes." The Electrochemical Society 235<sup>th</sup> Meeting, Dallas, TX, May 2019.
- T44. "Sideways and stable crack propagation in silicone elastomers." American Physical Society March Meeting, Boston, MA, Mar. 2019.
- T43. "Mechanics of sulfur cathodes during electrochemical cycling." Small Scale Mechanical Behavior Symposium, Texas A&M University, College Station, TX, Dec. 2018.
- T42. "Electro-chemo-mechanics of high-capacity Li-S batteries." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, Pittsburgh, PA, Nov. 2018.
- T41. "Electro-chemo-mechanics of high-capacity Li-S batteries." Society of Engineering Science 55th Annual Technical Meeting, Madrid, Spain, Oct. 2018.
- T40. "Mechanical measurements in high-capacity Li-ion battery electrodes." 18<sup>th</sup> U.S. National Congress for Theoretical and Applied Mechanics, Chicago, IL, June 2018.
- T39. "Mechanical Design Strategies in Wearable/Flexible Electronics." The Electrochemical Society 233<sup>rd</sup> Meeting, Seattle, WA, May 2018.
- T38. "Stress and fracture in high-capacity Li-ion battery electrodes." The Minerals, Metals & Materials Society, Phoenix, AZ, Mar. 2018.
- T37. "Experimental Studies of Plasticity and Fracture in Lithium-Ion Batteries." International Conference on Plasticity, Damage, and Fracture, San Juan, Puerto Rico, Jan. 2018.
- T36. "Serpentine Interconnects on Ultrathin Elastomers for Stretchable Electronics." American Society of Mechanical Engineering International Mechanical Engineering Congress and Exhibition, Tampa, FL, Nov. 2017.
- T35. "Serpentine interconnects on ultrathin elastomers for stretchable electronics." Society of Engineering Science 54<sup>th</sup> Annual Technical Meeting, Boston, MA, July 2017.
- T34. "Soft Elastomers with Ionic Liquid-Filled Cavities as Strain Isolating Substrates for Wearable Electronics." Materials Research Society, Phoenix, AZ, Apr. 2017.

- T33. "Measurements of Stress and Fracture in Germanium Electrodes of Li-Ion Batteries." Materials Research Society, Phoenix, AZ, Apr. 2017.
- T32. "Mechanics of Lithium-Ion Batteries and Stretchable Electronics." Department of Electrical and Computer Engineering, University of Houston, Houston, TX, Dec. 2016.
- T31. "Strain Isolation of Wearable Electronics through Liquid-Filled Substrates." Society of Engineering Science 53<sup>rd</sup> Annual Technical Meeting, College Park, MD, Oct. 2016.
- T30. "Measurements of Stress and Fracture in Germanium Electrodes of Li-ion Batteries." Society of Engineering Science 53<sup>rd</sup> Annual Technical Meeting, College Park, MD, Oct. 2016.
- T29. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Mechanical Engineering, Texas A&M University, College Station, TX, Sept. 2016.
- T28. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Materials Science, Texas A&M University, College Station, TX, Sept. 2016.
- T27. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Mechanical Engineering, Texas A&M University, College Station, TX, Mar. 2016.
- T26. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Aerospace Engineering and Engineering Mechanics, University of Texas at Austin, Austin, TX, Mar. 2016.
- T25. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Materials Engineering, Auburn University, Auburn, AL, Feb. 2016.
- T24. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Materials Science and Engineering, University of Florida, Gainesville, FL, Feb. 2016.
- T23. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Mechanical Engineering, Stanford University, Palo Alto, CA, Feb. 2016.
- T22. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, Jan. 2016.
- T21. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA, Jan. 2016.
- T20. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Mechanical Engineering, University of Houston, Houston, TX, Dec. 2015.
- T19. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC, Nov. 2015.
- T18. "Deformation and Fracture of Silicon Electrodes in Lithium-Ion Batteries." Materials Research Society, San Francisco, CA, Apr. 2015.
- T17. "Stress, Deformation, and Fracture of High-Capacity Anodes." Materials Research Society, San Francisco, CA, Apr. 2015.
- T16. "Skin-Mounted Diagnostic Devices." Materials Research Society, San Francisco, CA, Apr. 2015.
- T15. "Concurrent electromigration and creep in lead-free solder." 13<sup>th</sup> International Workshop on Stress-Induced Phenomena in Microelectronics, Austin, TX, Oct. 2014.
- T14. "Deformation and Fracture of Silicon Electrodes in Lithium-Ion Batteries." Society of Engineering Science 51<sup>st</sup> Annual Technical Meeting, West Lafayette, IN, Oct. 2014.

- T13. "Lithium-Ion Batteries: Diffusion, Deformation, and Damage." Department of Mechanical Engineering, University of Colorado Boulder, Boulder, CO, Feb. 2014.
- T12. "Deformation and Failure of Lithium-Ion Batteries and Microelectronics." Department of Engineering Science and Mechanics, Virginia Tech, Blacksburg, VA, Feb. 2014.
- T11. "Fracture Energy of Lithiated Silicon Electrodes of Lithium-ion Batteries." Society of Engineering Science 50<sup>th</sup> Annual Technical Meeting, Providence, RI, June 2013.
- T10. "Kinetics of Initial Lithiation of Crystalline Silicon." Society of Engineering Science 49<sup>th</sup> Annual Technical Meeting, Atlanta, GA, Oct. 2012.
- T9. "Rupture of a Highly Stretchable Dielectric Elastomer." Society of Engineering Science 49<sup>th</sup> Annual Technical Meeting, Atlanta, GA, Oct. 2012.
- T8. "Fracture and Debonding in Coated Hollow Nanostructured Electrodes of Lithium-Ion Batteries." The Electrochemical Society 221st Meeting, Seattle, WA, May 2012.
- T7. "Rupture of a Highly Stretchable Dielectric Elastomer." American Physical Society March Meeting, Boston, MA, Mar. 2012.
- T6. "Small and Soft Electrodes for High-Capacity Lithium-ion Batteries." Materials Research Society, Boston, MA, Nov. 2011.
- T5. "Fracture of Electrodes in Lithium-ion Batteries Caused by Fast Charging." American Society of Mechanical Engineers Applied Mechanics and Materials Conference, Chicago, IL, May 2011.
- T4. "Inelastic Hosts as Electrodes for High-Capacity Lithium-ion Batteries." Materials Research Society, San Francisco, CA, Apr. 2011.
- T3. "Dissolution of Copper in Pb-Free Solder Joints." The Minerals, Metals & Materials Society, San Diego, CA, Mar. 2011.
- T2. "Coupled Creep and Diffusion in Flip Chip Solder Bumps." American Society of Mechanical Engineers International Mechanical Engineering Congress & Exposition, Vancouver, BC, Nov. 2010.
- T1. "Fracture of VHB." New England Workshop on the Mechanics of Materials and Structures, Cambridge, MA, Sept. 2010.

## **Research Funding**

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- F22. "Tissue Banking and Irradiation Effects Study, Polymer Upcycling Comparison Studies, EBeam/ X-ray Irradiation Outreach, Crop Mutation Comparison Studies, and Virus Inactivation Comparison Studies." Battelle Pacific Northwest Division. PI: Suresh Pillai; co-PI: Amit Dhingra, Anand Puppala, David Staack, Matt Pharr, Muthukumar Bagavathiannan, Nithya Subramanian, Oscar Acuna Blanco, Saurabh Biswas, and Michael Moreno. 10/1/2023 – 12/31/2025. \$2,882,638.
- F21. "E-Beam and Its Impact on Material and Product Functionality of Plasma Collection Harnesses and Reservoirs." Haemonetics Corporation. PI: Matt Pharr; co-PI: Suresh Pillai and David Staack. 7/10/2023 – 7/9/2024. \$173,634.
- F20. "Reconfigurable Electronic Materials Inspired by Nonlinear Neuron Dynamics." DOE EFRC. PI: Stan Williams; co-PI: Sarbajit Banerjee, Raymundo Arróyave, Perla Balbuena, Marcetta Darensbourg, Kim Dunbar, Matt Pharr, Xiaofeng Qian, Patrick Shamberger, Andrew Ferguson, Jeffrey Blackburn, Katie Jungjohann, Lance Wheeler,

- Suhas Kumar, Alec Talin, Jinghua Guo, and Eli Rotenberg. 9/1/2022 – 8/31/2026. \$6,382,000.
- F19. “Student Participation in the 2022 Society of Engineering Science Annual Technical Meeting.” NSF-CMMI-MOMS. PI: Ankit Srivastava; co-PI: Matt Pharr. 9/1/2022 – 8/31/2023. \$44,985 (\$22,493).
- F18. “E-Beam and Its Impact on Material and Product Functionality of Plasma Bowls.” Haemonetics Corporation. PI: Matt Pharr; co-PI: Suresh Pillai and David Staack. 6/15/2022 – 6/14/2023. \$46,682 (\$25,102).
- F17. “Ebeam/X-Ray Landscape/Feasibility Studies: Subject Matter Expert Support.” Pacific Northwest National Laboratory. PI: Suresh Pillai; co-PI: David Staack, Matt Pharr, Muthukumar Bagavathiannan, Nithya Subramanian, Oscar Acuna Blanco, and Saurabh Biswas. 4/18/2022 – 4/30/2023. \$637,174 (\$64,170).
- F16. “Filling Data Gaps Related to Material Effects in Polymer Medical Products from E-Beam and X-ray Sterilization.” DOE - National Nuclear Security Administration - Pacific Northwest National Laboratory - AgriLife. PI: Suresh Pillai; co-PI: Matt Pharr and David Staack. 6/10/2021 – 12/31/2021. \$268,444 (\$18,514).
- F15. “PFI-TT: Technology Transfer: Robust Hierarchically-Textured Surfaces for Transportation of Heavy Crude Oils.” NSF-IIP-PFI. PI: Sarbajit Banerjee; co-PI: Matt Pharr. 7/1/2021 – 6/20/2023. \$250,000 (\$125,000).
- F14. “The Influence of Mechanical Loading on the Hydrolysis of Biodegradable Polymer Implants.” NSF-CMMI-MOMS. PI: Anastasia Muliana; co-PI: Matt Pharr and Kumbakonam Rajagopal. 8/1/2021 – 7/31/2024. \$551,017 (\$181,836).
- F13. “Filling Data Gaps Related to Material Effects in Polymer Medical Products from E-Beam and X-ray Sterilization.” DOE - National Nuclear Security Administration - Pacific Northwest National Laboratory - AgriLife. PI: Matt Pharr; co-PI: David Staack. 9/19/2020 – 3/31/2021. \$50,000.
- F12. “CAREER: Electro-Chemo-Mechanics of Li and Na Metal: Toward Dendrite- and Damage-Free Metallic Anodes of Rechargeable Batteries.” NSF-DMR-MMN. PI: Matt Pharr; co-PI: none. 6/1/2020 – 5/31/2025. \$556,720.
- F11. “Electromigration in Lithium Metal.” Texas A&M T3 Triads for Transformation. PI: Matt Pharr; co-PI: Sarbajit Banerjee and Patrick Shamberger. 1/1/2020 – 12/31/2021. \$32,000.
- F10. “Filling Data Gaps Related to Material Effects in Polymer Medical Products from E-Beam and X-ray Sterilization.” DOE - National Nuclear Security Administration - Pacific Northwest National Laboratory - AgriLife. PI: Matt Pharr; co-PI: David Staack. 9/19/2019 – 9/18/2020. \$259,000.
- F9. “A Brain-Inspired Approach to Rapid and Energy Efficient Information Processing: AI on the Fly.” Texas A&M X-grants. PI: Sarbajit Banerjee, co-PI: Patrick Shamberger and Stan Williams co-I: Raymundo Arroyave, Perla Balbuena, James Batteas, Lei Fang, Bani Mallick, Samuel Palermo, Matt Pharr, Xiaofeng Qian, and Kelvin Xie. 9/1/2019 – 8/31/2022. \$1,429,791.

- F8. "Filling Data Gaps Related to Material Effects in Polymer Medical Products from E-Beam and X-ray Sterilization." DOE - National Nuclear Security Administration - Pacific Northwest National Laboratory - AgriLife. PI: David Staack; co-PI: Matt Pharr. 8/24/2018 – 8/23/2019. \$140,047.
- F7. "Strain Modulation of 2D Materials as a Means of Enhancing Electrocatalytic Activity." Texas A&M Energy Institute. PI: Matt Pharr; co-PI: Sarbajit Banerjee and Xiaofeng Qian. 8/1/2018 – 7/31/2019. \$50,000.
- F6. "Biomechanical Properties of Bioenergy Sorghum: Changes in Gene Expression Due to Mechanical Stimulation." NSF-CMMI-BMMB. PI: Anastasia Muliana; co-PI: Matt Pharr and Scott Finlayson. 5/15/2018 – 4/30/2022. \$396,688.
- F5. "Simulate Proton Beam Radiation Damage – Annealing of Irradiation Damage in Inconel Windows." DOE-National Nuclear Security Administration – Los Alamos National Laboratory. PI: Matt Pharr; co-PI: Lin Shao. 4/2/2018 – 6/15/2019. \$115,592.
- F4. "Engineering superior bioenergy sorghum: genetic/physiological variations in biomechanical properties." Texas A&M T3 Triads for Transformation. PI: Matt Pharr; co-PI: Anastasia Muliana and Scott Finlayson. 4/1/2018 – 3/31/2020. \$35,000.
- F3. "Electro-chemo-mechanics of lithium metal anodes for high-capacity batteries." Haythornthwaite Foundation Research Initiation Grant: American Society of Mechanical Engineering Applied Mechanics Division. PI: Matt Pharr. 11/1/2017 (one time gift). \$20,000.
- F2. "Virtual/Augmented Reality-based Immersive Learning; MEEN 360: Materials and Manufacturing Selection in Design." Center for Teaching Excellence - Texas A&M Student Success Faculty Fellows Grant Program. PI: Matt Pharr. 10/1/2017 – 12/1/2018. \$10,000.
- F1. "Design Optimization of Additively Manufactured and Self-Folding Structures Considering Multiple Functionalities." Air Force Research Laboratory: Minority Leaders Program / Texas A&M Data-Driven Discovery of Models (AFRL MLP/TAMU D3M). PI: Darren Hartl; co-PI: Richard Malak, Greg Huff, and Matt Pharr. 3/1/2017 – 2/28/2018. ~\$400,000 split among ~13 faculty and 5 research projects.

## **Service and Synergistic Activities**

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### External Professional Service

- Guest editor for a special issue on "Advanced Nanoindentation in Materials" in the journal *Materials* (2016 - 2017)
- Review editor for *Frontiers in Electronics – Flexible Electronics* (2020 - 2022)
- Conference Organization:
  - Symposium chair for Soft Robotics symposium at MRS (2017)
  - Symposium chair for Mechanics of Energy Storage and Conversion symposium at MRS (2017)
  - Organized symposia on Energy Materials and Electrochemistry at SES (2017, 2019, 2020, 2023)
  - Symposium chair for Battery Characterization – Stress and Strain symposium at ECS (2019)
  - Organized symposium on Mechanical Behavior at Micro/Nano-Scale at MRS (2021)

- Organized symposium on Mechanics of Electrochemical Materials and Systems at USNC/TAM (2022)
- Co-chair of the 2022 Society of Engineering Science conference
- Peer Reviewer:
  - Review panelist for the Division of Materials Research of the National Science Foundation (2017, 2020, 2021)
  - Reviewer for the American Chemical Society Petroleum Research Fund (2020, 2022)
  - Panelist for the National Defense Science and Engineering Graduate Fellowship (2015)
  - Journal reviewer for: *Nature Nanotechnology*, *Nature Communications*, *Nature Electronics*, *Proceedings of the National Academy of Sciences*, *Nano Letters*, *Physical Review Letters*, *Advanced Functional Materials*, *ACS Nano*, *Advanced Materials*, *Science Advances*, *Acta Materialia*, *Matter*, *ACS Energy Letters*, *Advanced Energy Materials*, *Energy Reports*, *Proceedings of the Royal Society A*, *Applied Physics Letters*, *Journal of the Mechanics and Physics of Solids*, *Extreme Mechanics Letters*, *Trends in Chemistry*, *Communications Chemistry*, *Energy Storage Materials*, *Journal of Applied Mechanics*, *Journal of Applied Physics*, *Physical Review B*, *Engineering Fracture Mechanics*, *International Journal of Solids and Structures*, *Applied Mechanics Reviews*, *Advanced Energy Materials*, *International Journal of Plasticity*, *Journal of Materials Research*, *Mechanics of Materials*, *Materialia*, *Modelling and Simulation in Materials Science and Engineering*, *IEEE Sensors Journal*, *ACS Sensors*, *International Journal of Applied Mechanics*, *MRS Advances*, *Polymer Testing*, *International Journal of Fracture*, *European Journal of Mechanics - A/Solids*, *ASME Journal of Electrochemical Energy Conversion and Storage*, *Journal of Propulsion and Power*, *Materials Science and Engineering B*, *Journal of Materials Science*, *Experimental Mechanics*, and *Journal of the Electrochemical Society*.

#### University and Community Service

- Reviewer for Postdoctoral Scholar Travel Awards (2016)
- MEEN Seminar Committee (2016 - 2017)
- Mechanical Engineering Shared Services Committee (2017 - 2019)
- Led workshops/lab tours for high school students through AggieSTEM (2017 – 2019, 2022, 2023)
- Represented Texas A&M University at the Los Alamos National Lab sponsored ‘ReACT’ workshop at the Colorado School of Mines in Golden, CO (2018)
- Zachry transition ad-hoc committee (2018)
- Provided feedback on NSF GRFP proposals for Texas A&M students (2018)
- Led workshops during the Youth Adventure Program (2018, 2019, 2021)
- Led workshops during at the STEM 4 Innovation Conference for K-12 Education (2018, 2019)
- MEEN Educational Development Committee (2018 – 2021, 2022 – present)
- Engineering Honors Faculty (2018 – present)

- Presented to the TAMUS Louis Stokes Alliance for Minority Participation (LSAMP) program on success in academia (2019)
- Faculty Host for the Summer 2019 International Research Internship Program (2019)
- STEM Night at Greens Prairie Elementary – participant (2019)
- STEM night at Greens Prairie Elementary: head organizer (2020, 2021)
- MEEN Faculty Advisory Committee (2020 – present)
- MEEN Climate Committee (2021 – present)
- Chair of MEEN Climate Committee (2022 – present)
- MSEN Faculty Search Committee (2022 – 2023)

## **Student Advising**

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### Ph.D. Students Advised

9. Viacheslav Beliaev, 2023 - present
8. Aiden Kang, 2022 – present
7. Victor Balcorta (co-chair with Sarbajit Banerjee), 2021 – present
6. Devleena Samanta, 2021 – present
5. Jungho Shin, 2020 – present
4. Md Kamrul Hasan, “Mechanical Characterization of Irradiated Polymers for Medical Applications” 2022.
3. Omid Zargar (co-chair with Anastasia Muliana), “Biomechanical Behavior of Bioenergy Sorghum and the Influence of Thigmomorphogenesis.” 2022.
2. Yuwei Zhang, “Chemo-Mechanics of Functional Thin Films for Lithium-ion Batteries and Neuromorphic Computing Devices.” 2021.
1. Seunghyun Lee, “Mechanical Behavior of a Silicone Elastomer, Elastomer Composites, and a Natural Composite.” 2020.

### M.S. Students Advised

3. Cole Fincher, “Small-Scale Mechanical Behavior of Metal Electrodes.” 2020.
2. Haley Turman, “Investigation of the Effect of Annealing on Irradiated Alloy 718.” 2019.
1. Garrett Hardin, “Mechanics of Electrodes in High-Capacity Lithium-Ion Batteries.” 2018.

### Undergraduate and High School Students Advised

49. Carter Jensen. “E-beam irradiation for sterilization of medical devices.” 2023.
48. Jake Isakson. “Mechanics of metal-insulator transitions in vanadium oxides.” 2023 – present.
47. Johnny Koithan. “Mechanics of hydrolysis in biodegradable polymers.” 2023 – present.
46. Rachel Lee. “Nanoindentation studies of single-crystalline  $V_2O_5$ .” 2023 – present.
45. Matt Coburn. “Combined effects of doping and strain on metal-insulator transitions for neuromorphic computing.” 2022 – 2023.
44. Elliot Manuel. “Functionally-graded auxetic materials.” 2022 – 2023.
43. Chris Resendiz. “Design of an apparatus for applying controlled levels of strain during metal-insulator transitions.” 2022.
42. Becca Cunningham. “3D printing of battery electrodes.” 2022.



41. Aaron Cozart. "The influence of mechanical loading on hydrolysis in biodegradable polymers." 2022 – 2023.
40. Eric Roth. "Experimental studies of anisotropy in geometrically-designed auxetic materials" 2022.
39. Carlos Parra. "Effects of alternative sterilization of medical products on their mechanical, thermal, and chemical properties." 2022.
38. Adam Pipe. "Thermal cycling of hierarchically-textured coatings for transportation of heavy crude oils." 2021 – 2022.
37. Christian Jaramillo. "Changes in polymer surface properties under sterilizing irradiation." 2021.
36. John Rios. "3D modeling of implantable wireless devices for monitoring gastric motility." 2021 – 2022.
35. Saaransh Verma. "Electrodeposition of Li-Mg alloys." 2021 – 2022.
34. Jessica Ganley. "3D printing of auxetic polymers." 2021.
33. Karla Molina. "Architected 3D-printed polymers." 2020 – 2021.
32. Puneet Kohli. "Mechanics of irradiated polymers for medical devices." 2020 – 2021.
31. Chiedu Nwaobi. "Biomechanics of sorghum." 2020 – 2021.
30. Bill Wang, High school student, "In-situ optical observation and stress measurements." 2019 – 2020.
29. Michael Ecker-Randolph, REU student. "Manufactured defects for lightweight elastomers with high strength and toughness." 2019.
28. Temitayo Odunuga, REU student. "Stresses during electrochemical deposition of Li metal." 2019.
27. Kyriakos Avraam, visiting student from Cyprus. "Mechanical testing of ebeam and X-ray sterilized polymers for medical products." 2019.
26. Carl Reiser. "Highly stretchable and conductive electrode gels." 2019 – 2020.
25. Luke Perkins. "Mechanical testing of ebeam and X-ray sterilized polymers for medical products." 2019.
24. Edward Gaffney. "Mechanical testing of ebeam and X-ray sterilized polymers for medical products." 2019 - 2020.
23. Arjun Rao. "Mechanical testing of ebeam and X-ray sterilized polymers for medical products." 2019.
22. James Chin. "Effects of irradiation on mechanical properties of polymers." 2019.
21. Andrew Buske. "Effects of irradiation on mechanical properties of polymers." 2019.
20. Mark Olvera. "Effects of irradiation on mechanical properties of polymers." 2019.
19. Daniel Claybaugh, 2018 – 2020.
18. Raquel Muyshondt, 2018 – 2022.
17. Arber Shasivari, 2018 – 2019.
16. Edwin Torres, 2018 – 2019.
15. Maria Lydia Ioannides, visiting student from Cyprus, 2018
14. Daniela Ojeda, REU student, 2018
13. Russell Rowe, REU student, 2018
12. Jonah Nouredine, 2018
11. Paco Falcon, 2018

10. Kylie Nielson, 2017 – 2018
9. Aaron Garcia, 2017 – 2018
8. Justin Coe, 2017 – 2018
7. Scott McProuty, 2017 – 2018
6. Brenda Cancino, 2017 – 2018
5. Cole Fincher, 2016 – 2017
4. Geoffrey Garner, 2016 – 2017
3. Taiwo Odetola, 2017
2. Garrett Swenson, REU student, 2017
1. Valdemar Solis, 2017

#### Thesis Committees

50. Sumit Khatri, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
49. Griffin Turner, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
48. Jaybelle Pranada, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
47. Milos Dujovic, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
46. Ian Burress, Texas A&M Mechanical Engineering, M.S. (ongoing)
45. Hengxi Chen, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
44. Alex Benson, Texas A&M Chemistry, Ph.D. (ongoing)
43. Jake Nicholson, Texas A&M Chemistry, Ph.D. (ongoing)
42. Vijay Udayamohan, Texas A&M Mechanical Engineering, M.S. (2023)
41. Sam Martin, Texas A&M Mechanical Engineering, Ph.D. (ongoing)
40. Rebeca Gurrola, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
39. Feimo Yang, Texas A&M Mechanical Engineering, M.S. (2022)
38. Ahmad Amiri, Texas A&M Mechanical Engineering, Ph.D. (2022)
37. Vasilis Tsigki, Texas A&M Mechanical Engineering, Ph.D. (2023)
36. Qing Zhou, Texas A&M Materials Science and Engineering, Ph.D. (2022)
35. Min Huang, Texas A&M Mechanical Engineering, Ph.D. (2022)
34. Nithin Kammara, Texas A&M Mechanical Engineering, M.S. (ongoing)
33. Zahra Ghasemi, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
32. Jiaqi Dong, Texas A&M Materials Science and Engineering, Ph.D. (ongoing)
31. Aryabhat Darnal, Texas A&M Mechanical Engineering, Ph.D. (ongoing)
30. Peng Wu, Texas A&M Mechanical Engineering, Ph.D. (2022)
29. Mingzhen Zhao, Texas A&M Materials Science and Engineering, Ph.D. (2022)
28. Yuan Ji, Texas A&M Mechanical Engineering, Ph.D. (2022)
27. Swarn Jha, Texas A&M Mechanical Engineering, Ph.D. (2021)
26. Kwanghae Noh, Texas A&M Materials Science and Engineering, Ph.D. (2023)
25. Jaybelle Pranada, Texas A&M Materials Science and Engineering, M.S. (2021)
24. Yang Gang, Texas A&M Mechanical Engineering, Ph.D. (2022)
23. Ahmad Shahedi Shakil, Texas A&M Mechanical Engineering, Ph.D. (2021)
22. Jian Tan, Texas A&M Mechanical Engineering, Ph.D. (2022)
21. Kian Bashandeh, Texas A&M Mechanical Engineering, Ph.D. (2022)
20. Sumit Khatri, Texas A&M Aerospace Engineering, M.S. (2019)

19. Xuhui Feng, Texas A&M Mechanical Engineering, Ph.D. (2022)
18. Mitchell Shockley, Texas A&M Mechanical Engineering, M.S. (2019)
17. Yu Liu, Texas A&M Material Science and Engineering, Ph.D. (2020)
16. Jamshid Kavosi, Texas A&M Material Science and Engineering, Ph.D. (2020)
15. Yuting Luo, Texas A&M Chemistry, Ph.D. (2022)
14. Lai Jiang, Texas A&M Materials Science and Engineering, Ph.D. (2021)
13. David Santos, Texas A&M Chemistry, Ph.D. (2022)
12. Ruyue Song, Texas A&M Mechanical Engineering, Ph.D. (2020)
11. Ana Rodriguez Atencio, Texas A&M Materials Science and Engineering, Ph.D. (2020).
10. Robert Rodi, Texas A&M Mechanical Engineering, M.S. (substitute) (2019)
9. Wei Deng, Texas A&M Mechanical Engineering, Ph.D. (2019)
8. Mohammadreza Soleymaniha, Texas A&M Mechanical Engineering, Ph.D. (2019)
7. Deep Barua, Texas A&M Mechanical Engineering, M.S. (substitute) (2019)
6. Navin Kumar Subramaniam, Texas A&M Mechanical Engineering, Ph.D. (2018)
5. Mohammad Muneer Humood, Texas A&M Mechanical Engineering, Ph.D. (2018)
4. Eric Coronado, Texas A&M Mechanical Engineering, M.S. (2017)
3. Xiaoyu Zheng, Texas A&M Mechanical Engineering, M.S. (2017)
2. Jonel Ortiz, Texas A&M Mechanical Engineering, M.S. (2017)
1. Michael Liu, Texas A&M Materials Science, M.S. (2017)

I hereby certify that the CV being submitted is current and correct as of the date of signature:

Matt Pharr 11/27/23