Tyler N. Tallman, PhD | *curriculum vitae*

Associate Professor
School of Aeronautics and Astronautics
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Education

University of Michigan	Ann Arbor, MI
PhD, Mechanical Engineering	granted May 2015
MS, Mechanical Engineering	granted December 2012
University of Wisconsin	Madison, WI
BS, Engineering Mechanics	granted May 2010
University of Wisconsin	Eau Claire, WI
BS, Physics and Mathematics	granted May 2010

Professional Experience

Purdue University	West Lafayette, IN
Associate Professor, Aeronautics and Astronautics	August 2023–present
Assistant Professor, Aeronautics and Astronautics	August 2015–August 2023
University of Michigan	Ann Arbor, MI
Post-Doctoral Research Fellow, Mechanical Engineering	June 2015–July 2015
Graduate Student Research Assistant, Mechanical Engineering	September 2010–May 2015
Sandia National Laboratories	Albuquerque, NM
Technical Intern	June 2009–June 2011
Synchrotron Radiation Center	Madison, WI
Technical and Engineering Assistant	October 2008–May 2010
University of Wisconsin	Eau Claire, WI
Teaching Assistant, Mathematics	January 2006–May 2008

Research Interests

Multifunctional materials, embedded sensing, and inverse problems applied to structural assessment, nondestructive evaluation, human health monitoring, and additive manufacturing.

Notable Awards and Appointments

- Elmer F. Bruhn Teaching Award — 2016
  Awarded by the Purdue University School of Aeronautics and Astronautics
- Best Journal Paper in Mechanics and Materials — 2018
  "On the Inverse Determination of Displacements, Strains, and Stresses in a Carbon Nanofiber/Polyurethane Nanocomposite from Conductivity Data Obtained via Electrical Impedance Tomography"
  Awarded by the Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS) Division of the American Society of Mechanical Engineers (ASME)
- Best Journal Paper in Active and Multifunctional Materials — 2020
  "Failure Prediction in Self-Sensing Nanocomposites via Genetic Algorithm-Enabled Piezoresistive Inversion"
  Awarded by the SMASIS Division of ASME, Active and Multifunctional Materials Technical Committee
- Faculty Excellence Award in Early Career Teaching — 2021
  Awarded by the Purdue University College of Engineering

- W. A. Gustafson Teaching Award   2021
  Awarded by the Purdue University School of Aeronautics and Astronautics
- Air Force Summer Faculty Fellowship Program   2022 and 2023
- Air Force Office of Scientific Research Young Investigator Program Award   2023
- National Science Foundation CAREER Award   2023
- Associate Editor for the Journal of Intelligent Material Systems and Structures   2023–present

Journal Articles (student advised by Tallman)

48. H. Hassan, W. A. Crossley, and T. N. Tallman, 2023, "The Effects of Two-, One-, and Half-Norms on Hybrid Optimization Schemes for Solving the Piezoresistive Inversion Problem in Self-Sensing Materials," under review.

47. L. Keiderling, J. Rosendorf, C. E. Owens, K. M. Varadarajan, A. J. Hart, J. H. Schwab, T. N. Tallman, and H. Ghaednia, 2023, "Comparing Machine Learning Algorithms for Non-Invasive Detection and Classification of Failure in Piezoresistive Bone Cement via Electrical Impedance Tomography," under review.

46. S. M. Ghazzawi and T. N. Tallman, 2023, "Deformation-Dependent Electrical Resistivity of Fiber-Reinforced Nanocomposites: A Concentric Cylindrical Model Approach," *Composites Science and Technology*, 243, 110251.

45. T. N. Tallman, S. Frueh, C. Lin, M. Cherry, J. Wertz, Z. D. Apostolov, and L. M. Rueschhoff, 2023, "The Electrical Response of Refractory Carbon/Carbon Composites to High-Temperature Ablation: A Pathway to Embedded Sensing in Extreme Environments," *Composites Part B: Engineering*, 264, 110922.

44. T. N. Tallman, L. Homa, M. Flores, and J. Wertz, 2023, "Damage Mapping via Electrical Impedance Tomography in Complex AM Shapes Using Mixed Smoothness and Bayesian Regularization," *Computer Methods in Applied Mechanics and Engineering*, 414, 116185.

43. L. Homa, M. Sannamani, A. J. Thomas, T. N. Tallman, and J. Wertz, 2023, "Enhanced Damage Imaging in Three-Dimensional Composite Structures via Electrical Impedance Tomography with Mixed and Level Set Regularization," *NDT & E International*, 137, 102830.

42. H. Hassan and T. N. Tallman, 2023, "Precise Damage Shaping in Self-Sensing Composites Using Electrical Impedance Tomography and Genetic Algorithms," *Structural Health Monitoring*, 22, 372-387.

41. R. Jain, N. Kedir, H. Hassan, W. Chen, and T. N. Tallman, 2023, "Self-Sensing of Pulsed Laser Ablation in Carbon Nanofiber-Based Smart Composites," *Journal of Intelligent Material Systems and Structures*, 34, 879-890.

40. J. Gao, N. Kedir, J. A. Hernandez, F. Zhou, J. T. Tsai, T. N. Tallman, M. B. G. Jun, and W. Chen, 2022, "Dynamic Failure of Composite Strips Under Different Projectiles by Reverse Ballistic Impact," *International Journal of Mechanical Sciences*, 234, 107700.

39. J. A. Hernandez, C. Maynard, D. Gonzalez, M. Viz, C. O'Brien, J. Garcia, B. Newell, and T. N. Tallman, 2022, "The Development and Characterization of Carbon Nanofiber/Polylactic Acid Filament for Additively Manufactured Piezoresistive Sensors," *Additive Manufacturing*, 58, 102948.

38. M. Sannamani, J. Gao, W. Chen, and T. N. Tallman, 2022, "Damage Detection in Non-Planar Carbon Fiber-Reinforced Polymer Laminates via Electrical Impedance Tomography with Surface-Mounted Electrodes and Directional Sensitivity Matrices," *Composites Science and Technology*, 224, 109429.

37. L. Chen, H. Hassan, T. N. Tallman, S. S. Huang, and D. Smyl, 2022, "Predicting Strain and Stress Fields in Self-Sensing Nanocomposites Using Deep Learned Electrical Tomography," *Smart Materials and Structures*, 31,045024.

36. J. Gao, N. Kedir, J. A. Hernandez, J. Gao, T. Horn, G. Kim, K. Fezzaa, T. N. Tallman, G. Palmese, R. Sterkenburg, and W. Chen, 2022, "Dynamic Fracture of Glass Fiber-Reinforced Ductile Polymer Matrix Composites and Loading Rate Effect," *Composites Part B: Engineering*, 235, 109754.

35. A. Gallet, S. Rigby, T. N. Tallman, X. Kong, I. Hajirasouliha, A. Liew, D. Liu, L. Chen, A. Hauptmann, and D. Smyl, 2022, "Structural Engineering From an Inverse Problems Perspective," *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 478, 20210526.

34. N. Kedir, <u>J. A. Hernandez</u>, B. H. Lim, J. Gao, X. Zhai, Y. Nie, M. N. Issahaq, T. N. Tallman, and W. Chen, 2021, "Effect of Laser Irradiation Time on the Surface Characteristics of a Carbon Fiber Composite," *Journal of Laser Applications*, 33, 042034.

33. <u>I. T. Karnik</u> and T. N. Tallman, 2021, "An Experimental Study on the Effect of Fatigue Loading on Electrical Impedance in Open-Hole Carbon Nanofiber-Modified Glass Fiber/Epoxy Composites," *Composite Structures*, 276, 114463.

32. A. J. Fairbanks, T. D. Crawford, <u>J. A. Hernandez</u>, J. D. Mateja, X. Zhu, T. N. Tallman, and A. L. Garner, 2021, "Electromagnetic Properties of Multiphase Composites Containing Barium Strontium Titanate and Nickel Zinc Ferrite Inclusions from 1-4 GHz," *Composites Science and Technology*, 211, 108826.

31. J. Gao, N. Kedir, C. Kirk, <u>J. A. Hernandez</u>, J. Wang, S. Paulson, X. Zhai, T. Horn, G. Kim, K. Fezzaa, F. De Carlo, P. D. Shevchenko, T. N. Tallman, R. Sterkenburg, and W. Chen, 2021, "High-Speed Synchrotron X-Ray Phase Contrast Imaging for Evaluation of Microscale Damage Mechanisms and Fracture Toughness of Cross-Ply GFRCs," *Composites Science and Technology*, 210, 108814.

30. J. Gao, Z. Guo, <u>J. A. Hernandez</u>, F. Zhou, Y. Nie, J. Gao, B. H. Lim, N. Kedir, X. Zhai, J. Wang, J. T. Tsai, F. De Carlo, P. D. Shevchenko, T. N. Tallman, M. B-G. Jun, G. R. Palmese, and W. Chen, 2021, "Transverse Impact by RCCs on S-Glass and Kevlar® FRC Strips," *Composites Part A: Applied Science and Manufacturing*, 146, 106425.

29. A. J. Fairbanks, T. D. Crawford, <u>J. A. Hernandez</u>, J. D. Mateja, X. Zhu, T. N. Tallman, and A. L. Garner, 2021, "Electromagnetic Measurements of Composites Containing Barium Strontium Titanate or Nickel Zinc Ferrite Inclusions from 1-4 GHz," *Composites Science and Technology*, 210, 108798.

28. T. D. Crawford, A. J. Fairbanks, <u>J. A. Hernandez</u>, T. N. Tallman, and A. L. Garner, 2021, "Nonlinear Permeability Measurements for Nickel Zinc Ferrite and Nickel Zinc Ferrite/Barium Strontium Titanate Composites from 1-4 GHz," *IEEE Transactions on Magnetics*, 57, 6100810.

27. D. Smyl, T. N. Tallman, D. Liu, and A. Hauptmann, 2021, "An Efficient Quasi-Newton Method for Nonlinear Inverse Problems via Learned Singular Values," *IEEE Signal Processing Letters*, 28, 748-752.

26. D. Smyl, T. N. Tallman, J. A. Black, A. Hauptmann, and D. Liu, 2021, "Learning and Correcting non-Gaussian Model Errors," *Journal of Computational Physics*, 432, 110152.

25. J. Gao, N. Kedir, C. Kirk, <u>J. A. Hernandez</u>, J. Wang, S. Paulson, X. Zhai, T. Horn, G. Kim, J. Gao, K. Fezzaa, F. De Carlo, P. D. Shevchenko, T. N. Tallman, R. Sterkenburg, G. R. Palmese, and W. Chen, 2021, "Real-Time Damage Characterization for GFRCs Using High-Speed Synchrotron X-Ray Phase Contrast Imaging," *Composites Part B: Engineering*, 207, 108565.

24. J. Gao, C. Kirk, N. Kedir, S. Paulson, <u>J. A. Hernandez</u>, J. Gao, X. Zhai, J. Wang, T. Horn, G. Kim, F. De Carlo, P. D. Shevchenko, T. N. Tallman, G. R. Palmese, R. Sterkenburg, and W. Chen, 2021, "A Method for Characterization of Multiple Dynamic Constitutive Parameters of FRCs," *Composites Science and Technology*, 203, 108607.

23. <u>G. M. Koo</u> and T. N. Tallman, 2021, "Frequency-Dependent Alternating Current Piezoresistive Switching Behavior in Self-Sensing Carbon Nanofiber Composites," *Carbon*, 173, 384-394.

22. L. Zhao, T. N. Tallman, and G. Lin, 2021, "Spatial Damage Characterization in Self-Sensing Materials via Neural Network-Aided Electrical Impedance Tomography: A Computational Study," *ES Materials & Manufacturing*, 12, 78-88.

21. <u>H. Hassan</u> and T. N. Tallman, 2020, "A Comparison of Metaheuristic Algorithms for Solving the Piezoresistive Inverse Problem in Self-Sensing Materials," *IEEE Sensors Journal*, 21, 659-666.

20. T. N. Tallman and D. Smyl, 2020, "Structural Health and Condition Monitoring via Electrical Impedance Tomography in Self-Sensing Materials: A Review," *Smart Materials and Structures*, 29, 123001.

19. <u>J. A. Hernandez</u>, N. Kedir, B. H. Lim, W. Chen, and T. N. Tallman, 2020, "An Experimental Study on the Piezoresistive and Mechanical Behavior of Carbon Nanocomposites Subject to High-Rate Elastic Loading," *Composites Science and Technology*, 198, 108285.

18. H. Ghaednia, C. E. Owens, R. Roberts, T. N. Tallman, A. J. Hart, and K. M. Varadarajan, 2020, "Interfacial Load Monitoring and Failure Detection in Total Joint Replacements via Piezoresistive Bone Cement and Electrical Impedance Tomography," *Smart Materials and Structures*, 29, 085039.

17. <u>G. M. Koo</u> and T. N. Tallman, 2020, "Higher-Order Resistivity-Strain Relations for Self-Sensing Nanocomposites Subject to General Deformations," *Composites Part B: Engineering*, 190, 107907.

16. T. N. Tallman and <u>H. Hassan</u>, 2020, "A Computational Exploration of the Effect of Alignment and Aspect Ratio on Alternating Current Conductivity in Carbon Nanofiber-Modified Epoxy," *Journal of Intelligent Material Systems and Structures*, 31, 756-770

15. T. N. Tallman, 2020, "The Effect of Thermal Loading on Negative Permittivity in Carbon Nanofiber/Silicone Metacomposites," *Materials Today Communications*, 22, 100843.

14. <u>H. Hassan</u> and T. N. Tallman, 2020, "Failure Prediction in Self-Sensing Nanocomposites via Genetic Algorithm-Enabled Piezoresistive Inversion," *Structural Health Monitoring*, 19, 765-780. **ASME SMASIS Best Journal Paper in Active and Multifunctional Materials and Best Journal Paper in Structural Health Monitoring (Runner Up).**

13. <u>A. J. Thomas</u>, J. J. Kim, C. E. Bakis, and T. N. Tallman, 2019, "Damage Detection in Self-Sensing Composite Tubes via Electrical Impedance Tomography," *Composites Part B: Engineering*, 177, 107276.

12. T. N. Tallman and <u>H. Hassan</u>, 2019, "A Network-Centric Perspective on the Microscale Mechanisms of Complex Impedance in Carbon Nanofiber-Modified Epoxy," *Composites Science and Technology*, 181, 107669.

11. <u>H. Hassan</u>, F. Semperlotti, K. W. Wang, and T. N. Tallman, 2018, "Enhanced Imaging of Piezoresistive Nanocomposites through the Incorporation of Non-Local Conductivity Changes in Electrical Impedance Tomography," *Journal of Intelligent Material Systems and Structures*, 29, 1850-1861.

10. T. N. Tallman and <u>J. A. Hernandez</u>, 2017, "The Effect of Error and Regularization Norms on Strain and Damage Identification via Electrical Impedance Tomography in Piezoresistive Nanocomposites," *NDT & E International*, 91, 156-163.

9. T. N. Tallman, S. Gungor, <u>G. M. Koo</u>, and C. E. Bakis, 2017, "On the Inverse Determination of Displacements, Strains, and Stresses in a Carbon Nanofiber/Polyurethane Nanocomposite from Conductivity Data Obtained via Electrical Impedance Tomography," *Journal of Intelligent Material Systems and Structures*, 28, 2617-2629. **ASME SMASIS Best Journal Paper in Mechanics and Materials.**

8. T. N. Tallman and K. W. Wang, 2016, "An Inverse Methodology for Calculating Strains from Conductivity Changes in Piezoresistive Nanocomposites," *Smart Materials and Structures*, 25, 115046.

7. T. N. Tallman and K. W. Wang, 2016, "Damage and Strain Identification in Multifunctional Materials via Electrical Impedance Tomography with Constrained Sine Wave Solutions," *Structural Health Monitoring*, 15, 235-244.

6. T. N. Tallman, S. Gungor, K. W. Wang, and C. E. Bakis, 2015, "Tactile Imaging and Distributed Strain Sensing in Highly Flexible Carbon Nanofiber/Polyurethane Nanocomposites," *Carbon*, 95, 485-493.

5. T. N. Tallman, F. Semperlotti, and K. W. Wang, 2015, "Enhanced Delamination Detection in Multifunctional Composites through Nanofiller Tailoring," *Journal of Intelligent Material Systems and Structures*, 26, 2565-2576.

4. T. N. Tallman, S. Gungor, K. W. Wang, and C. E. Bakis, 2015, "Damage Detection via Electrical Impedance Tomography in Glass Fiber/Epoxy Laminates with Carbon Black Filler," *Structural Health Monitoring*, 14, 100-109.

3. T. N. Tallman and K. W. Wang, 2014, "The Influence of Nanofiller Alignment on Transverse Percolation and Conductivity," *Nanotechnology*, 26, 025501.

2. T. N. Tallman, S. Gungor, K. W. Wang, and C. E. Bakis, 2014, "Damage Detection and Conductivity Evolution in Carbon Nanofiber Epoxy via Electrical Impedance Tomography," *Smart Materials and Structures*, 23, 045034.

1. T. Tallman and K. W. Wang, 2013, "An Arbitrary Strains Carbon Nanotube Composite Piezoresistivity Model for Finite Element Integration," *Applied Physics Letters*, 102, 011909.

Conference Proceedings

50. J. Meier, S. Turnbull, J. A. Hernandez, C. Maynard, D. Rodriguez, B. Newell, and T. N. Tallman, 2023, "Embedded Sensing and Localization of Pressure in Silicone Skin Using Sensors Printed From CNF/TPU Filament," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Austin, TX.

49. H. D. Moreno, J. A. Hernandez, C. Maynard, T. N. Tallman, B. Newell, and J. Garcia, 2023, "3D Printed Flexible Gripper With Capacitance Sensing," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Austin, TX.

48. S. Ghazzawi and T. N. Tallman, 2023, "An Analytical Model for the Transverse Piezoresistive Response of Fiber-Reinforced Nano-Modified Polymers via an Electrical Concentric Cylinders Assemblage Approach," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Austin, TX.

47. J. A. Hernandez, C. Maynard, C. O'Brien, D. Rodriguez, B. Newell, and T. N. Tallman, 2023, "Finite Strain Sensing via Additively Manufactured CNF/TPU Strain Gauges," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Austin, TX.

46. T. N. Tallman, 2023, "Electrical Impedance Tomography for Embedded Sensing and Nondestructive Evaluation: A Perspective for Advancement," *Proceedings of the 31st ASNT Research Symposium*, Columbus, OH.

45. L. Homa, M. Sannamani, A. J. Thomas, T. N. Tallman, and J. Wertz, 2023, "Mixed Regularization for Damage Localization Using Electrical Impedance Tomography in Three Dimensional Composite Materials," *Proceedings of the 31st ASNT Research Symposium*, Columbus, OH.

44. L. Homa, M. Sannamani, A. J. Thomas, T. N. Tallman, and J. Wertz, 2023, "Mixed Regularization for Damage Mapping in Three-Dimensional Self-Sensing Composites via EIT," *Proceedings of SPIE Smart Structures/NDE*, Long Beach, CA.

43. J. Arora and T. N. Tallman, 2023, "On the Electro-Magnetic Properties of Combined Carbon Nanotube and Carbon-Coated Iron Nanoparticle-Modified Polymer Composites," *Proceedings of SPIE Smart Structures/NDE*, Long Beach, CA.

42. J. Wertz, T. N. Tallman, M. Cherry, R. Haney, and L. Groo, 2022, "Design and Testing of an Additively Manufactured Self-Sensing Composite Material," *Proceedings of the American Society for Composites 37th Technical Conference*, Tucson, AZ.

41. D. Rodriguez, C. Maynard, J. A. Hernanez, C. O'Brien, T. N. Tallman, B. Newell, and J. Garcia, 2022, "3D Printed Flexible Dielectric Electroactive Polymer Sensors," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Dearborn, MI.

40. S. M. Ghazzawi and T. N. Tallman, 2022, "On the Development of a Concentric Cylinder Model for the Deformation-Dependent Electrical Resistivity of Fiber-Reinforced Composites," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Dearborn, MI.

39. G. M. Koo, S. M. Ghazzawi, and T. N. Tallman, 2022, "The Effect of Inter-Filler Transport on AC Piezoresistivity in CNF-Modified Epoxy Nanocomposites," *Proceedings of SPIE Smart Structures/NDE*, Long Beach, CA.

38. J. A. Hernandez, H. Zhu, F. Semperlotti, and T. N. Tallman, 2022, "Electrode Spacing-Induced Signal Filtering for Transient Piezoresistivity," *Proceedings of SPIE Smart Structures/NDE*, Long Beach, CA.

37. Y. Wen and T. N. Tallman, 2022, "Baseline-Free Damage Detection in Self-Sensing Composites via Frequency-Difference EIT," *Proceedings of SPIE Smart Structures/NDE*, Long Beach, CA.

36. R. Jain, N. Kedir, H. Hassan, W. Chen, and T. N. Tallman, 2021, "Electrical Self-Sensing of Pulsed Laser Ablation in Nanofiller-Modified Composites," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

35. C. Maynard, J. A. Hernandez, D. Gonzalez, M. Viz, C. O'Brien, T. N. Tallman, J. Garcia, and B. Newell, 2021, "Functionalized Thermoplastic Polyurethane for FDM Printing of Piezoresistive Sensors," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

34. M. Sannamani and T. N. Tallman, 2021, "The Effect of Sensitivity Matrix Formulation on Damage Detection in Carbon Fiber Composites with Surface-Mounted Electrodes via Electrical Impedance Tomography," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

33. J. A. Hernandez, H. Zhu, F. Semperlotti, and T. N. Tallman, 2021, "The Transient Response of Piezoresistive CNF-Modified Epoxy Rods to One-Dimensional Wave Packet Excitations," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

32. J. C. Major and T. N. Tallman, 2021, "Student Paper: The Current State of Pedagogy on Nondestructive Methods in Engineering Education," *Proceedings of ASEE Virtual Annual Conference*, digital forum.

31. H. Ghaednia, C. E. Owens, L. E. Keiderling, A. J. Hart, K. M. Varadarajan, J. Schwab, and T. N. Tallman, 2021, "Characterization of Interfacial Failure in Cemented Total Joint Replacements via Self-Sensing Bone Cement, Electrical Impedance Tomography, and Machine Learning," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

30. H. Hassan and T. N. Tallman, 2021, "Inverse Determination of Delamination Shape and Size in Self-Sensing Composites Using Electrical Impedance Tomography and Genetic Algorithms," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

29. J. A. Hernandez, C. M. Maynard, D. Gonzalez, M. Viz, J. Garcia, B. Newell, and T. N. Tallman, 2021, "On the Performance of Additively Manufactured CNF/PLA Piezoresistive Strain Sensors," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

28. J. Gao, N. Kedir, C. Kirk, J. A. Hernandez, X. Zhai, J. Wang, T. N. Tallman, K. Fezzaa, and W. Chen, 2020, "Real-Time Visualization of Damage Progression Inside GFRP Composites via High-Speed X-Ray PCI Technique," *Proceedings of the Society for Experimental Mechanics 14th International Congress*, Albuquerque, NM.

27. J. Gao, N. Kedir, C. D. Kirk, J. A. Hernandez, J. Wang, X. Zhai, T. Horn, G. Kim, K. Fezzaa, F. De Carlo, P. Shevchenko, T. N. Tallman, R. Sterkenburg, and W. Chen, 2020, "In-Situ Observation of Dynamic Damage Evolution Inside GFRCs Through High-Speed X-Ray PCI," *Proceedings of the American Society for Composites 35th Technical Conference*, Hoboken, NJ.

26. J. A. Hernandez and T. N. Tallman, 2020, "The Piezoresistive Response of CNF/Epoxy to One-Dimensional Strain Excitation via Remote Loading," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

25. C. M. Maynard, J. A. Hernandez, A. Doak, B. Mardikis, M. Viz, B. Newell, J. Garcia, and T. N. Tallman, 2020, "A Computational Study of Strain Sensing via 3D-Printed CNF-Modified PLA Strain Gauges," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

24. I. T. Karnik and T. N. Tallman, 2020, "The Effect of Fatigue Loading on Electrical Impedance in Open-Hole Carbon Nanofiber-Modified Glass Fiber/Epoxy Composites," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, digital forum.

23. G. M. Koo and T. N. Tallman, 2020, "An Experimental Exploration of Deformation-Dependent AC Conductivity in Carbon Nanofiber-Modified Epoxy," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

22. H. Hassan and T. N. Tallman, 2020, "Damage Sizing in Self-Sensing Materials Using a Genetic Algorithm-Supplemented Electrical Impedance Tomography Formulation," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

21. N. Kidambi, V. Agarwal, T. N. Tallman, and K. W. Wang, 2020, "In-Situ Tunable Auxeticity in Pressurized Soft Mechanical Metamaterials," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

20. C. Maynard, J. A. Hernandez, D. Gonzalez, T. N. Tallman, J. Garcia, and B. Newell, 2020, "The Effect of Extrusion Temperature and Cycles on Electrical Resistivity in Carbon Nanofiber-Modified PLA Filament for Multi-Functional Additive Manufacturing," *Proceedings of SPIE Smart Structures/NDE*, digital forum.

19. J. Gao, Z. Guo, Y. Nie, J. A. Hernandez, B. H. Lim, N. Kedir, T. N. Tallman, and W. Chen, 2019, "Transverse Impact on a Single Layer S-Glass/SC15 Epoxy Composite Strip," *Proceedings of the American Society for Composites 34th Technical Conference*, Atlanta, GA.

18. A. J. Thomas and T. N. Tallman, 2019, "Damage Detection via Electrical Impedance Tomography in a Filament Wound Glass Fiber/Epoxy Composite Tube with Carbon Black Filler," *Proceedings of the International Workshop on Structural Health Monitoring*, Stanford, CA.

17. H. Hassan and T. N. Tallman, 2019, "Experimental Identification of Stress Concentrations in Piezoresistive Nanocomposites via Electrical Impedance Tomography," *Proceedings of SPIE Smart Structures/NDE*, Denver, CO.

16. J. A. Hernandez and T. N. Tallman, 2019, "On the Transient Piezoresistive Response of Impacted Nanofiber-Modified Epoxy," *Proceedings of SPIE Smart Structures/NDE*, Denver, CO.

15. T. N. Tallman, 2019, "A Microscale Percolation Model for Nanocomposite Complex Impedance," *Proceedings of SPIE Smart Structures/NDE*, Denver, CO.

14. T. N. Tallman, 2018, "Damage Detection in Nanofiller-Modified Composites with External Circuitry via Resonant Frequency Shifts," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, San Antonio, TX.

13. G. M. Koo and T. N. Tallman, 2018, "On the Development of Tensorial Deformation-Resistivity Constitutive Relations in Conductive Nanofiller-Modified Composites," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, San Antonio, TX.

12. H. Hassan and T. N. Tallman, 2018, "Predicting Failure from Conductivity Changes in Piezoresistive Nanocomposites," *Proceedings of SPIE Smart Structures/NDE*, Denver, CO.

11. T. N. Tallman, 2017, "On the Effect of Electrical Impedance Tomography Error and Regularization Norms for Damage Identification in Piezoresistive Composites," *Proceedings of the American Society for Composites 32nd Technical Conference*, West Lafayette, IN.

10. T. N. Tallman, 2017, "Inverse Calculation of Displacements in CNF/PU from EIT-Imaged Conductivity Changes," *Proceedings of the International Workshop on Structural Health Monitoring*, Stanford, CA.

9. T. N. Tallman, 2016, "Strain Estimation from Conductivity Changes in Piezoresistive Nanocomposites," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Stowe, VT.

8. T. N. Tallman, 2016, "Electrical Resistance Tomography with Constrained Sine-Wave Solutions for Impact Damage Identification in Glass Fiber/Epoxy/Carbon Black Laminate Composites," *Proceedings of SPIE Smart Structures/NDE*, Las Vegas, NV.

7. T. N. Tallman and K. W. Wang, 2015, "Impact Damage Identification in Glass Fiber/Epoxy Laminates with Carbon Black Filler via Electrical Impedance Tomography," *Proceedings of the International Workshop on Structural Health Monitoring*, Stanford, CA.

6. T. N. Tallman and K. W. Wang, 2015, "The Influence of Filler Volume Fraction on Sensitivity to Distributed Strain in Carbon Nanofiber/Polyurethane Nanocomposites," *Proceedings of the Canadian Congress of Applied Mechanics*, London, ON.

5. T. N. Tallman and K. W. Wang, 2014, "Damage Sensitivity and Multiple Damage Detection in Glass Fiber/Epoxy Laminates with Carbon Black Filler via Electrical Impedance Tomography," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, Newport, RI.

4. T. Tallman, F. Semperlotti, and K. W. Wang, 2013, "Enhanced Damage Detection in Conductive Polymer-based Composites through Piezoresistive Coupling," *Proceedings of the American Society for Composites 28th Technical Conference*, State College, PA.

3. T. Tallman and K. W. Wang, 2013, "Analytically Modeling the Piezoresistivity of CNT Composites with Low Filler Aggregation," *Proceedings of SPIE Smart Structures/NDE*, San Diego, CA.

2. T. Tallman, F. Semperlotti, and K. W. Wang, 2012, "Enhanced Health Monitoring of Fibrous Composites with Aligned Carbon Nanotube Networks and Electrical Impedance Tomography," *Proceedings of SPIE Smart Structures/NDE*, San Diego, CA.

1. D. Villa, T. Tallman, and J. Smith, 2011, "Challenges in Structural Analysis for Deformed Nuclear Reactivity Assessments," *Proceedings of Nuclear and Emerging Technologies for Space*, Albuquerque, NM.

Patents

2. C. Maynard. J. A. Hernandez, T. N. Tallman, B. N. Newell, and J. Garcia 2021, "Wet-Mixing Process, Electrically Conductive Fused Deposition Modeling Material, 3D Printable Fused Deposition Modeling Filament, Electrically Conductive Ink, and Associated Methods," US Provisional Application 69740-01 (C2-6312).

1. K. M. Varadarajan, T. Tallman, and A. J. Hart, 2021, "System and Method for Monitoring Implant Fixation Using Electrical Impedance Tomography," US Patent App. 17/269,763.

Abstracts

3. H. Ghaednia, C. E. Owens, T. N. Tallman, A. J. Hart, and K. M. Varadarajan, 2020, "Non-invasive Diagnosis of Aseptic Loosening via Piezoresistive Bone Cement and Electrical Impedance Tomography," *Orthopaedic Research Society Annual Meeting*, Phoenix, AZ.

2. H. Ghaednia, C. E. Owens, T. N. Tallman, A. J. Hart, and K. M. Varadarjan, 2019, "Non-invasive Diagnosis of Joint Replacement Implant Failure via Electrical Impedance Tomography," *International Society for Technology in Arthroplasty*, Toronto, CA.

1. T. N. Tallman, A. J. Hart, and K. M. Varadarajan, 2019, "Non-invasive Diagnosis of Aseptic Implant Loosening via Electrical Impedance Tomography," *Orthopaedic Research Society Annual Meeting*, Austin, TX. **ORS Best Podium Presentation Award in Implants.**

Technical Reports

1. J. Smith, D. Villa, B. Smith, R. Radel, T. Radel, T. Tallman, R. Lipinski, and P. Wilson, 2010, "Methods for Modeling Impact-Induced Reactivity Changes in Small Reactors," Technical Report, Sandia National Laboratories, SAND2010-6412.

Conference Presentations (presenter*)

53. J. Meier, S. Turnbull, J. A. Hernandez, C. Maynard, D. Rodriguez, B. Newell, and T. N. Tallman,* "Embedded Sensing and Localization of Pressure in Silicone Skin Using Sensors Printed From CNF/TPU Filament," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Austin, TX, 11 September 2023.

52. H. D. Moreno, J. A. Hernandez, C. Maynard, T. N. Tallman, B. Newell,* and J. Garcia, "3D Printed Flexible Gripper With Capacitance Sensing," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Austin, TX, 11 September 2023.

51. S. Ghazzawi* and T. N. Tallman, "An Analytical Model for the Transverse Piezoresistive Response of Fiber-Reinforced Nano-Modified Polymers via an Electrical Concentric Cylinders Assemblage Approach," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Austin, TX, 12 September 2023.

50. J. A. Hernandez, C. Maynard, C. O'Brien, D. Rodriguez, B. Newell, and T. N. Tallman,* "Finite Strain Sensing via Additively Manufactured CNF/TPU Strain Gauges," *Proceedings of ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Austin, TX, 12 September 2023.

49. T. N. Tallman,* "Electrical Impedance Tomography for Embedded Sensing and Nondestructive Evaluation: A Perspective for Advancement," *31st ASNT Research Symposium*, oral presentation, Columbus, OH, 29 June 2023.

48. L. Homa,* <u>M. Sannamani</u>, <u>A. J. Thomas</u>, T. N. Tallman, and J. Wertz "Mixed Regularization for Damage Localization Using Electrical Impedance Tomography in Three Dimensional Composite Materials," *31st ASNT Research Symposium*, oral presentation, Columbus, OH, 29 June 2023.

47. L. Homa, <u>M. Sannamani</u>, <u>A. J. Thomas</u>, T. N. Tallman,* and J. Wertz, "Mixed Regularization for Damage Mapping in Three-Dimensional Self-Sensing Composites via EIT," *SPIE Smart Structures/ NDE*, oral presentation, Long Beach, CA, 15 March 2023.

46. <u>J. Arora</u>* and T. N. Tallman, "On the Electro-Magnetic Properties of Combined Carbon Nanotube and Carbon-Coated Iron Nanoparticle-Modified Polymer Composites," *SPIE Smart Structures/NDE*, oral presentation, Long Beach, CA, 13 March 2023.

45. J. Wertz,* T. N. Tallman, M. Cherry, R. Haney, and L. Groo, "Design and Testing of an Additively Manufactured Self-Sensing Composite Material," *American Society for Composites 37th Technical Conference*, oral presentation, Tucson, AZ, 19 September 2022.

44. D. Rodriguez, C. Maynard, <u>J. A. Hernanez</u>, <u>C. O'Brien</u>, T. N. Tallman, B. Newell,* and J. Garcia, "3D Printed Flexible Dielectric Electroactive Polymer Sensors," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Dearborn, MI, 12 September 2022.

43. <u>S. M. Ghazzawi</u>* and T. N. Tallman, "On the Development of a Concentric Cylinder Model for the Deformation-Dependent Electrical Resistivity of Fiber-Reinforced Composites," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Dearborn, MI, 13 September 2022.

42. <u>G. M. Koo</u>, <u>S. M. Ghazzawi</u>, and T. N. Tallman,* "The Effect of Inter-Filler Transport on AC Piezoresistivity in CNF-Modified Epoxy Nanocomposites," *SPIE Smart Structures/NDE*, oral presentation, Long Beach, CA, 7 March 2022.

41. <u>J. A. Hernandez</u>,* H. Zhu, F. Semperlotti, and T. N. Tallman, "Electrode Spacing-Induced Signal Filtering for Transient Piezoresistivity," *SPIE Smart Structures/NDE*, oral presentation, Long Beach, CA, 7 March 2022.

40. <u>Y. Wen</u> and T. N. Tallman,* "Baseline-Free Damage Detection in Self-Sensing Composites via Frequency-Difference EIT," *SPIE Smart Structures/NDE*, oral presentation, Long Beach, CA, 7 March 2022.

39. <u>R. Jain</u>, N. Kedir, H. Hassan, W. Chen, and T. N. Tallman,* "Electrical Self-Sensing of Pulsed Laser Ablation in Nanofiller-Modified Composites," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2021.

38. C. Maynard, <u>J. A. Hernandez</u>,* D. Gonzalez, <u>M. Viz</u>, <u>C. O'Brien</u>, T. N. Tallman, J. Garcia, and B. Newell, "Functionalized Thermoplastic Polyurethane for FDM Printing of Piezoresistive Sensors," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2021.

37. <u>M. Sannamani</u> and T. N. Tallman,* "The Effect of Sensitivity Matrix Formulation on Damage Detection in Carbon Fiber Composites with Surface-Mounted Electrodes via Electrical Impedance Tomography," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2021.

36. <u>J. A. Hernandez</u>,* H. Zhu, F. Semperlotti, and T. N. Tallman, "The Transient Response of Piezoresistive CNF-Modified Epoxy Rods to One-Dimensional Wave Packet Excitations," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2021.

35. H. Ghaednia, C. E. Owens, L. E. Keiderling, A. J. Hart, K. M. Varadarajan, J. Schwab, and T. N. Tallman,* "Characterization of Interfacial Failure in Cemented Total Joint Replacements via Self-Sensing Bone Cement, Electrical Impedance Tomography, and Machine Learning," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 22 March 2021.

34. <u>H. Hassan</u>* and T. N. Tallman, "Inverse Determination of Delamination Shape and Size in Self-Sensing Composites Using Electrical Impedance Tomography and Genetic Algorithms," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 22 March 2021.

33. <u>J. A. Hernandez</u>,* C. M. Maynard, D. Gonzalez, <u>M. Viz</u>, J. Garcia, B. Newell, and T. N. Tallman, "On the Performance of Additively Manufactured CNF/PLA Piezoresistive Strain Sensors," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 22 March 2021.

32. J. Gao,* N. Kedir, C. Kirk, <u>J. A. Hernandez</u>, X. Zhai, J. Wang, T. N. Tallman, K. Fezzaa, and W. Chen, "Real-Time Visualization of Damage Progression Inside GFRP Composites via High-Speed X-Ray PCI Technique," *14th Society for Experimental Mechanics International Congress*, oral presentation, Albuquerque, NM, 15 September 2020.

31. J. Gao,* N. Kedir, C. D. Kirk, <u>J. A. Hernandez</u>, J. Wang, X. Zhai, T. Horn, G. Kim, K. Fezzaa, F. De Carlo, P. Shevchenko, T. N. Tallman, R. Sterkenburg, and W. Chen, "In-Situ Observation of Dynamic Damage Evolution Inside GFRCs Through High-Speed X-Ray PCI," *35th American Society for Composites Technical Conference*, oral presentation, Hoboken, NJ, 15 September 2020.

30. <u>J. A. Hernandez</u>* and T. N. Tallman, "The Piezoresistive Response of CNF/Epoxy to One-Dimensional Strain Excitation via Remote Loading," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2020.

29. C. M. Maynard, <u>J. A. Hernandez</u>,* A. Doak, B. Mardikis, M. Viz, B. Newell, J. Garcia, and T. N. Tallman, "A Computational Study of Strain Sensing via 3D-Printed CNF-Modified PLA Strain Gauges," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2020.

28. <u>I. T. Karnik</u>* and T. N. Tallman, "The Effect of Fatigue Loading on Electrical Impedance in Open-Hole Carbon Nanofiber-Modified Glass Fiber/Epoxy Composites," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, digital forum, 15 September 2020.

27. <u>G. M. Koo</u>* and T. N. Tallman, "An Experimental Exploration of Deformation-Dependent AC Conductivity in Carbon Nanofiber-Modified Epoxy," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 27 April 2020.

26. <u>H. Hassan</u>* and T. N. Tallman, "Damage Sizing in Self-Sensing Materials Using a Genetic Algorithm-Supplemented Electrical Impedance Tomography Formulation," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 27 April 2020.

25. N. Kidambi, V. Agarwal, T. N. Tallman,* and K. W. Wang, "In-Situ Tunable Auxeticity in Pressurized Soft Mechanical Metamaterials," *SPIE Smart Structures/NDE*, oral presentation, digital forum, 27 April 2020.

24. C. Maynard, <u>J. A. Hernandez</u>,* D. Gonzalez, T. N. Tallman, J. Garcia, and B. Newell, 2020, "The Effect of Extrusion Temperature and Cycles on Electrical Resistivity in Carbon Nanofiber-Modified PLA Filament for Multi-Functional Additive Manufacturing," *SPIE Smart Structures/NDE*, oral presentationn, digital forum, 27 April 2020.

23. <u>A. J. Thomas</u> and T. N. Tallman,* "Damage Detection via Electrical Impedance Tomography in a Filament Wound Glass Fiber/Epoxy Composite Tube with Carbon Black Filler," *International Workshop on Structural Health Monitoring*, oral presentation, Stanford, CA, 10 September 2019.

22. A. Fairbanks,* X. Zhu, <u>J. A. Hernandez</u>, S. Gao, W. Wu, T. N. Tallman, and A. Garner, "Development and Diagnostics on Composites for Nonlinear Transmission Lines," *IEEE Pulsed Power and Plasma Science Conference*, oral presentation, Orlando, FL, 24 June 2019.

21. A. Fairbanks,* X. Zhu, <u>J. A. Hernandez</u>, T. N. Tallman, and A. Garner, "Composite Material Development for Nonlinear Transmission Lines," *21st Annual Directed Energy Science & Technology Symposium*, oral presentation, Destin, FL, 9 April 2019.

20. <u>H. Hassan</u>* and T. N. Tallman, "Experimental Identification of Stress Concentrations in Piezoresistive Nanocomposites via Electrical Impedance Tomography," *SPIE Smart Structures/NDE*, oral presentation, Denver, CO, 6 March 2019.

19. <u>J. A. Hernandez</u>* and T. N. Tallman, "On the Transient Piezoresistive Response of Impacted Nanofiber-Modified Epoxy," *SPIE Smart Structures/NDE*, oral presentation, Denver, CO, 6 March 2019.

18. T. N. Tallman,* "A Microscale Percolation Model for Nanocomposite Complex Impedance," *SPIE Smart Structures/NDE*, oral presentation, Denver, CO, 7 March 2019.

17. T. N. Tallman,* "Damage Detection in Nanofiller-Modified Composites with External Circuitry via Resonant Frequency Shifts," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, San Antonio, TX, 11 September 2018.

16. <u>G. M. Koo</u>* and T. N. Tallman, "On the Development of Tensorial Deformation-Resistivity Constitutive Relations in Conductive Nanofiller-Modified Composites," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, San Antonio, TX, 10 September 2018.

15. <u>H. Hassan</u>* and T. N. Tallman, "Predicting Failure from Conductivity Changes in Piezoresistive Nanocomposites," *SPIE Smart Structures/NDE*, oral presentation, Denver, CO, 27 March 2018.

14. T. N. Tallman,* "On the Effect of Electrical Impedance Tomography Error and Regularization Norms for Damage Identification in Piezoresistive Composites," *32nd American Society for Composites Technical Conference*, oral presentation, West Lafayette, IN, 24 October 2017.

13. T. N. Tallman,* "Inverse Calculation of Displacements in CNF/PU from EIT-Imaged Conductivity Changes," *International Workshop on Structural Health Monitoring*, oral presentation, Palo Alto, CA, 13 September 2017.

12. T. N. Tallman,* "A Comparison of Regularization Norms on Strain and Damage Visualization via Electrical Impedance Tomography in Carbon Nanofiber Composites," *Engineering Mechanics Institute*, oral presentation, San Diego, CA, 7 June 2017.

11. T. N. Tallman,* "Strain Estimation from Conductivity Changes in Piezoresistive Nanocomposites," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Stowe, VT, 28 September 2016.

10. T. N. Tallman,* "Strain and Damage Identification in Piezoresistive Nanocomposites Using Electrical Impedance Tomography with Constrained Sine-Wave Solutions," *Engineering Mechanics Institute*, oral presentation, Nashville, TN, 25 May 2016.

9. T. N. Tallman,* "Electrical Resistance Tomography with Constrained Sine-Wave Solutions for Impact Damage Identification in Glass Fiber/Epoxy/Carbon Black Laminate Composites," *SPIE Smart Structures/NDE*, oral presentation, Las Vegas, NV, 23 March 2016.

8. T. N. Tallman* and K. W. Wang, "Impact Damage Identification in Glass Fiber/Epoxy Laminates with Carbon Black Filler via Electrical Impedance Tomography," *International Workshop on Structural Health Monitoring*, oral presentation, Palo Alto, CA, 1 September 2015.

7. T. N. Tallman* and K. W. Wang, "Distributed Strain Sensing in Carbon Nanofibe/Polyurethane via Electrical Impedance Tomography," *Engineering Mechanics Institute*, oral presentation, Palo Alto, CA, 17 June 2015.

6. T. N. Tallman* and K. W. Wang, "The Influence of Filler Volume Fraction on Sensitivity to Distributed Strain in Carbon Nanofiber/Polyurethane Nanocomposites," *Canadian Congress of Applied Mechanics*, oral presentation, London, ON, 2 June 2015.

5. T. N. Tallman* and K. W. Wang, "Conductivity-Based Health Monitoring in Glass-Fiber Laminates with Carbon Black Filler," *Michigan Space Grant Consortium Fall Conference*, oral presentation, Ann Arbor, MI, 18 October 2014.

4. T. N. Tallman* and K. W. Wang, "Damage Sensitivity and Multiple Damage Detection in Glass Fiber/Epoxy Laminates with Carbon Black Filler via Electrical Impedance Tomography," *ASME Smart Materials, Adaptive Structures, and Intelligent Systems*, oral presentation, Newport, RI, 10 September 2014.

3. T. Tallman,* F. Semperlotti, and K. W. Wang, "Enhanced Damage Detection in Conductive Nanocomposites through Piezoresistive Coupling," *28th American Society for Composites Technical Conference*, oral presentation, State College, PA, 9 September 2013.

2. T. Tallman* and K. W. Wang, "Analytically Modeling the Piezoresistivity of CNT Composites with Low Filler Aggregation," *SPIE Smart Structures/NDE*, oral presentation, San Diego, CA, 12 March 2013.

1. T. Tallman,* F. Semperlotti, and K. W. Wang, "On the Damage Identification of Glass-Fiber Reinforced Polymers with Aligned Carbon Nanotube Networks and Electrical Impedance Tomography," *SPIE Smart Structures/NDE*, oral presentation, San Diego, CA, 12 March 2012.

Invited Presentations

3. T. N. Tallman,* "Conductivity-Based Structural Health Monitoring in Self-Sensing Materials," *Embry-Riddle Aeronautical University*, Daytona Beach, FL, 4 November 2021.

2. T. N. Tallman,* "Research and Applications at the Intersection of Multifunctional Materials, Non-Invasive Imaging, and Inverse Methods," *Birck Nanotechnology Center*, West Lafayette, IN, 25 March 2021.

1. T. N. Tallman,* "On the Development and Applications of Self-Sensing, Characterizing, and Responding Material Systems and Processes," *Army Research Lab*, Aberdeen Proving Ground, MD, 12 July 2017.

Graduate Students Advised

15. Andrew Nguyen, MS   2023–present
    Dissertation: to be determined

14. Kelsey De La Trinidad, MS   2023–present
    Dissertation: to be determined

13. Saranya Ravva, PhD   2023–present
    Dissertation: to be determined

12. Michael Kan, PhD   2023–present
    Dissertation: to be determined

11. Estheru Rani, MS   2022–present
    Dissertation: "Pellicle Embedded Sensing in Semiconductor Manufacturing via EIT"

10. Jassimran Arora, MS   graduated 2023
    Dissertation: "The Electro-Magnetic Properties of Combined Carbon Nanotube and Carbon-Coated Iron Nanoparticles-Modified Polymer Composites"

9. Sultan Ghazzawi, PhD   2019–present
   Dissertation: "Macroscale Analytical Modeling of the Piezoresistive Effect in Nanofiller-Modified Fiber-Reinforced Composites"

8. Julio Hernandez, PhD   graduated 2023
   Dissertation: "Utilizing Embedded Sensing for the Development of Piezoresistive Elastodynamics"

7. Yuhao Wen, MS   graduated 2022
   Dissertation: "The Effect of Artificial Damages on Electrical Impedance in Carbon Nanofiber-Modified Glass Fiber/Epoxy Composites and the Development of fdEIT"

6. Monica Sannamani, MS   graduated 2021
   Dissertation: "The Role of Sensitivity Matrix Formulation on Damage Detection via EIT in Non-Planar CFRP Laminates with Surface-Mounted Electrodes"

5. Rajan Jain, MS   graduated 2021
   Dissertation: "Intrinsic Self-Sensing of Pulsed Laser Ablation in Carbon Nanofiber-Modified Glass Fiber/Epoxy Laminates"

4. Hashim Hassan, PhD   graduated 2021
   Dissertation: "On the Use of Metaheuristic Algorithms for Solving Conductivity-to-Mechanics Inverse Problems in Structural Health Monitoring of Self-Sensing Composites"

3. Goon Mo Koo, PhD   graduated 2020
   Dissertation: "On the Development of Macroscale Modeling Strategies for AC/DC Transport-Deformation Coupling in Self-Sensing Piezoresistive Materials"

2. Ishan Karnik, MS   graduated 2020
   Dissertation: "The Effect of High-Cycle Fatigue Loading on AC Transport in CNF-Modified Glass Fiber/Epoxy Composites"

1. Akshay Jacob Thomas, MS   graduated 2019
   Dissertation: "Structural Health Monitoring of Filament Wound Glass Fiber/Epoxy Composites with Carbon Black Filler via Electrical Impedance Tomography"

Teaching Experience

- AAE 204 – Aeromechanics II
  Course description: AAE 204 – Aeromechanics II introduces aerospace engineering students to the mechanics of solids, concepts of force, stress, equilibrium, deformation and strain, and stress-strain material behaviors. These concepts, through examples, are applied to basic aerospace structural components of rods in tension and compression, shafts in torsion, beams in bending and shear, and thin-walled vessels under pressure.

- AAE 552 – Nondestructive Evaluation of Structures and Materials
  Course description: AAE 552 – Nondestructive Evaluation of Structures and Materials provides an overview the physics, principles, and methods employed for nondestructive evaluation (NDE) of structures and materials. Scope includes both practical considerations and underlying physics. Major NDE techniques covered include radiographs, ultrasonics, eddy currents, penetrants, magnetic particle, and visual/optical methods. An introduction to structural health monitoring (SHM) is also provided.

- AAE 553 – Elasticity in Aerospace Engineering
  Course description: AAE 553 – Elasticity in Aerospace Engineering is a fundamental course in the theory of elasticity with emphasis on understanding the governing principles and solution techniques used in the stress analysis of elastic solids and structures. Cartesian tensors are introduced for formulations of general deformations and states of stress. Constitutive relations and field equations are derived for large deformation and then reduced to small deformation. Two dimensional problems are solved by using the Airy stress function method. Energy methods and approximate solutions using variational principles are included.

- AAE 590 – Introduction to Electrical Impedance Tomography
  Course description: AAE 590 – Introduction to Electrical Impedance Tomography provides an introduction to imaging of electrical properties via impedance tomography. Content includes stating and discretizing the forward problem using linear finite elements, solving the inverse problem via absolute iterative and one-step difference methods, and experimental methods applied to damage detection in composites materials.

Professional Memberships and Service

- Professional Memberships
  American Institute of Aeronautics and Astronautics
  American Society of Mechanical Engineers
  Society of Photo-Optical Instrumentation Engineers
  ASME SMASIS Division
  ASME SMASIS Structural Health Monitoring Technical Committee

- Professional Society Services
  Program committee for the Sensors and Smart Structures Technologies for Civil,
  Mechanical, and Aerospace Systems track of *SPIE Smart Structures/NDE*   2019–present
  Secretary of the ASME SMASIS Structural Health Monitoring Technical Committee   2020–2021
  Co-Chair of the ASME SMASIS Structural Health Monitoring Technical Committee   2021–2022
  Chair of the ASME SMASIS Structural Health Monitoring Technical Committee   2022–2023

- Conference Session Organizer/Chair
  American Society for Composites Technical Conference   2017

Engineering Mechanics Institute	2017
International Workshop on Structural Health Monitoring	2017 and 2019
ASME SMASIS	2018–2023
SPIE Smart Structures/NDE	2016, 2018–2020, and 2022

- Editorial Services

Editorial board for *ES Materials and Manufacturing*	2020–present
Guest editor for special issue of *Inverse Problems*	2022–2023
Associate editor for the *Journal of Intelligent Material Systems and Structures*	2023–present

- Reviewer Services
Additive Manufacturing
Advanced Engineering Materials
AIAA Journal
Applied Composite Materials
Applied Sciences
Carbon
Composites Communications
Composites Part A: Applied Science and Manufacturing
Composites Part B: Engineering
Composites Science and Technology
Composite Structures
Computer-Aided Civil and Infrastructure Engineering
Developments in the Built Environment
Electronics
Engineering Optimization
Finite Elements in Analysis & Design
Functional Composites and Structures
IEEE Sensors Journal
IEEE Sensors Letters
IEEE Transactions on Medical Imaging
International Journal of Engineering Science
Inverse Problems
Journal of Engineering Mechanics
Journal of Intelligent Material Systems and Structures
Journal of Materials Science
Journal of Nondestructive Evaluation
Journal of Orthopaedic Research
Journal of Physics D: Applied Physics
Materials & Design
Materials Letters
Materials Research Express
Measurement Science and Technology
NDT & E International
Polymer International
Review of Scientific Instruments
Science Advances
Sensors
Smart Materials and Structures
Structural Control and Health Monitoring
Structural Health Monitoring

- Outreach Services

Society of Women Engineers Girl Scout Day	2018–2022

The Society of Women Engineers Girl Scout Day invites Girl Scouts from the greater Lafayette/West Lafayette area to the Purdue University campus to participate in hands-on learning activities de-

signed to help attendees to 'think like an engineer.' This bi-annual event attracts approximately 100 elementary-to-middle school-aged students each year. Professor Tallman works closely with Society of Women Engineers students to design, implement, and assess events. To date, he has directly oversaw the following activities – Hovercraft!, Play-Doh Composites, To Catch a Spy, Designing Tornado-Proof Houses, Elephant Prosthetics, Olympic Prosthetics, and Winter Olympic Prosthetics.

Grandparents University   2019
Grandparents University is an annual event hosted by the Women in Engineering Program which invites Purdue alums (grandparents) to return to campus and 'live like a student' with their grandchildren by enrolling in majors/classes. Working closely with the Women in Engineering Program, Professor Tallman designed and implemented a two-day series of activities to celebrate the 50th anniversary of Apollo 11 by replicating key stages of that voyage – designing and launching rockets to get into space, designing orbital trajectories, and safely landing a payload on the lunar surface.