

CURRICULUM VITAE

ANDREW J. GROSS

Assistant Professor
Mechanical Engineering
University of South Carolina

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EDUCATION

Harvard University Postdoctoral Fellow in the School of Engineering and Applied Sciences Faculty Advisor: Katia Bertoldi Project: Nano-architected materials	September 2015 - July 2019
The University of Texas at Austin Ph.D. in Aerospace Engineering Advisor: K. Ravi-Chandar Thesis: Towards the predictive modeling of ductile failure	August 2010 - August 2015
Iowa State University B.S. in Aerospace Engineering	August 2006 - May 2010

RESEARCH INTERESTS

With a background in solid mechanics, interests are centered on the mechanical properties of materials. Specific topics of interest include:

- Design, fabrication, and characterization of architected materials; especially those with nanoscale constituents
- The use of full field experimental data for the calibration of material models
- Plasticity and fracture behaviors of materials

AWARDS AND HONORS

ASME Rising Star of Mechanical Engineering (2024)
DARPA Young Faculty Award (2023)
Max L. Williams Fellowship (2013)
Eugene A. Ripperger Fellowship (2012)
University of Texas Professional Development Award (2012, 2014)
Center for Mechanics of Structures, Solids, and Materials Travel Grant (2013)

FUNDED RESEARCH

Principal Investigator

1. Qualification and Acceptance Protocol for Additively Manufactured Alloys. Funded by Battelle Savannah River Alliance, LLC. Period of performance: 2025. Funded amount: \$307,000 (\$153,307 my share). Co-PI: Lang Yuan.
2. Creep Testing of W-Re-Ta-Mo High Entropy Alloys. Funded by Battelle Savannah River Alliance, LLC. Period of performance: 2024. Funded amount: \$70,000 (sole PI).
3. Extraction of many material properties from analysis of a few data rich experiments. Funded by DARPA. Period of performance: 2023–2026. Funded amount: \$500,000 (sole PI).

4. Accurate and Efficient Qualification and Acceptance Protocol for Additively Manufactured Alloys. Funded by Battelle Savannah River Alliance, LLC. Period of performance: 2021–2025. Funded amount: \$976,000 (\$508,757 my share). Co-PI: Lang Yuan.
5. An Aerial Platform to Navigate the Troposphere of Venus Enabled by New Cellular Materials. Funded by NASA (EPSCoR). Period of performance: 2021–2022. Funded amount: \$100,000 (\$88,035 my share as sole Science-PI, with \$11,965 for Administrative-PI Cassandra Runyon)

Co-Principal Investigator

1. Matrix 1 – Small Scale. Funded by Devro and SC Dept. of Commerce. Period of performance: 2025. Funding amount: \$31,999 from Devro and \$31,999 from SC Dept. of Commerce. (\$6,716 my share). PI: Tarek Shazly
2. Manufacturing Advanced Composites for Hypersonics. Funded by National Security Technology Accelerator (NSTXL). Period of performance: 2022–2026. Funding to date: \$16,891,937 (\$321,423 my share). PI: Paul Ziehl. Additional Co-PIs: Sourav Banerjee and Tanvir Farouk.
3. Optimized Stringer Design. Funded by Boeing Research and Technology. Period of performance: 2022. Funded amount: \$124,388 (\$47,263 my share). PI: Paul Ziehl.

PUBLICATIONS

Published journal articles

26. Wang, G., Khan, S. A., Gross, A., & Xue, X. (2025). A general fabrication approach for rapid prototyping of ceramic oxygen separation membranes ranging from microtubes to hollow fibers. *Journal of Membrane Science*, 734, 124405.
25. Al Aridi, R., & Gross, A. J. (2025). A simple design rule for variable thickness shell based architected materials with improved stiffness. *Mechanics of Materials*, 105455.
24. Karna, S., Yuan, L., Zhang, T., Al-Aridi, R., Gross, A. J., Morrall, D., ... Hitchcock, D. (2025). Microstructural analysis and defect characterization of additively manufactured AA6061 aluminum alloy via laser powder bed fusion. *Journal of Materials Science & Technology*, 219, 288–306.
23. Karna, S., Yuan, L., Zhang, T., Gross, A. J., Morrall, D., Krentz, T., & Hitchcock, D. (2025). On the microstructure evolution of AA6061 with pulsed laser powder bed fusion. *Materials Research Letters*, 1–9.
22. Vitalis, T., Gross, A., Tzortzinis, G., Schagen, B., & Gerasimidis, S. (2024). Enhancing mortar composite matrices with three-dimensional auxetic truss lattice materials for reinforced concrete structures. *Construction and Building Materials*, 457, 139165.
21. Emami, F., & Gross, A. J. (2024). Better than linear strength scaling of multifunctional ceramic truss lattice materials. *International Journal of Mechanical Sciences*, 283, 109725.
20. Emami, F., & Gross, A. J. (2024). Warren truss inspired hierarchical beams for three dimensional hierarchical truss lattice materials. *Mechanics of Materials*, 197, 105088.
19. Karna, S., Yuan, L., Zhang, T., Al-Aridi, R., Gross, A. J., Morrall, D., ... Hitchcock, D. (2024). Microstructural analysis and defect characterization of additively manufactured AA6061 aluminum alloy via laser powder bed fusion. *Journal of Materials Science & Technology*.
18. Vitalis, T., Gross, A., & Gerasimidis, S. (2024). Mechanical response and failure modes of three-dimensional auxetic re-entrant lpb-manufactured steel truss lattice materials. *Journal of Applied Mechanics*, 91(9).
17. Ince, F. D., Karna, S., Zhang, T., Gross, A. J., Krentz, T., Hitchcock, D., ... Özel, T. (2024). An experimental process parameter study on the identification of defects in additively fabricated al6061 with laser powder bed fusion. *Materials Science in Additive Manufacturing*, 3(3), 3652.

16. Luo, K., Gross, A. J., Brown, J., Chang, W., & Li, C. (2024). A fully 3d-printed flexible polymeric heat pipe. *Journal of Thermal Science and Engineering Applications*, 1–15.
15. Al Aridi, R., DiNova, V., Zhang, T., Karna, S., Yuan, L., Krentz, T., ... Gross, A. J. (2024). Characterization of defects in additively manufactured materials from mechanical properties. *Materials Science and Engineering: A*, 898, 146390.
14. Tzortzinis, G., Gross, A., & Gerasimidis, S. (2022). Auxetic boosting of confinement in mortar by 3d reentrant truss lattices for next generation steel reinforced concrete members. *Extreme Mechanics Letters*, 52, 101681.
13. Derveni, F., Gross, A. J., Peterman, K. D., & Gerasimidis, S. (2022). Postbuckling behavior and imperfection sensitivity of elastic–plastic periodic plate-lattice materials. *Extreme Mechanics Letters*, 50, 101510.
12. Pal, A., Bertoldi, K., Pham, M. Q., Schaezner, M., & Gross, A. J. (2020). Optimal turbine blade design enabled by auxetic honeycomb. *Smart Materials and Structures*, 29(12), 125004.
11. Gross, A. J., & Bertoldi, K. (2019). Additive manufacturing of nanostructures that are delicate, complex, and smaller than ever. *Small*, 1902370.
10. Shanian, A., Jette, F.-X., Salehii, M., Pham, M. Q., Schaezner, M., Bourgeois, G., ... others (2019). Application of multifunctional mechanical metamaterials. *Advanced Engineering Materials*, 1900084.
9. Vasios, N., Gross, A. J., Soifer, S., Overvelde, J. T., & Bertoldi, K. (2019). Harnessing viscous flow to simplify the actuation of fluidic soft robots. *Soft robotics*.
8. Gross, A., Pantidis, P., Bertoldi, K., & Gerasimidis, S. (2019). Correlation between topology and elastic properties of imperfect truss-lattice materials. *Journal of the Mechanics and Physics of Solids*, 124, 577–598.
7. Gross, A., & Ravi-Chandar, K. (2017). On the deformation and failure of Al 6061-T6 in plane strain tension evaluated through in situ microscopy. *International Journal of Fracture*, 1–26.
6. Gross, A., & Ravi-Chandar, K. (2016). On the deformation and failure of Al 6061-T6 at low triaxiality evaluated through in situ microscopy. *International Journal of Fracture*, 200(1-2), 185–208.
5. Boyce, B., ..., Gross, A., et al. (2016). The second sandia fracture challenge: predictions of ductile failure under quasi-static and moderate-rate dynamic loading. *International Journal of Fracture*, 198(1-2), 5–100.
4. Gross, A., & Ravi-Chandar, K. (2016). Prediction of ductile failure in Ti–6Al–4V using a local strain-to-failure criterion. *International Journal of Fracture*, 198(1-2), 221–245.
3. Gross, A., & Ravi-Chandar, K. (2015). On the extraction of elastic–plastic constitutive properties from three-dimensional deformation measurements. *Journal of Applied Mechanics*, 82(7), 071013.
2. Boyce, B. L., ..., Gross, A., et al. (2014). The sandia fracture challenge: blind round robin predictions of ductile tearing. *International Journal of Fracture*, 186(1-2), 5–68.
1. Gross, A., & Ravi-Chandar, K. (2014). Prediction of ductile failure using a local strain-to-failure criterion. *International Journal of Fracture*, 186(1-2), 69–91.

Published conference proceedings

1. Gross, A. J., & Al-Aridi, R. (2024). Thermomechanical performance of sandwich structures with optimized variable thickness lattice cores. In *Aiaa scitech 2024 forum* (p. 0360).

2. Emami, F., & Gross, A. J. (2023). Mechanical properties of hierarchical beams for large-scale space structures. In *AIAA SCITECH 2023 forum* (p. 0384).
3. Emami, F., & Gross, A. J. (2023). Design of buoyant architected materials to enable a new aerial platform operating near the surface of venus. In *AIAA SCITECH 2023 forum* (p. 1521).

Patents

1. Gross, A., & Emami, F. (2024, July 18). *Ceramic kelvin foam with geometry optimized for hydrostatic loading*. Google Patents. (US Patent App. 18/512,248)

TEACHING EXPERIENCE

Assistant Professor - University of South Carolina

- Developed and taught an undergraduate/graduate course on experimental solid mechanics
- Developed and taught an introductory undergraduate course on solid mechanics
- Developed and taught an introductory undergraduate course on the finite element method

Assistant Instructor - The University of Texas at Austin

- Developed and taught a course on mechanics of materials with approximately 100 students
- Managed a team of teaching assistants

Teaching Assistant - The University of Texas at Austin

- Managed laboratory setup and led laboratory sessions for a course on measurements (4 semesters)
- Led laboratory sessions for a course on material property testing (1 semester)
- Conducted recitation sessions for a mechanics of materials course (3 semesters)

SELECTED PRESENTATIONS

1. Gross, A.J. and Emami, F. Design of Buoyant Architected Materials to Enable a New Aerial Platform Operating Near the Surface of Venus, *AIAA SCITECH Forum*, National Harbor, MD, Jan. 25, 2023
2. Emami, F. and Gross, A.J. Mechanical Properties of Hierarchical Beams for Large-Scale Space Structures, *AIAA SCITECH Forum*, National Harbor, MD, Jan. 23, 2023
3. Derveni, F., Gross, A., Peterman, K., and Gerasimidis S. Classical Postbuckling Behavior Underlies Novel Plate Lattice Material Behavior, *ASME International Mechanical Engineering Congress and Exposition*, Virtual Conference, Nov. 2, 2021
4. Gross, A. Fabrication of Compliant Structural Elements With Additive Manufacturing and Subtractive Post-Processing, *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, Virtual Conference, Aug. 19, 2021
5. Gross, A. Correlation between topology and elastic properties of imperfect truss-lattice materials, *Society of Engineering Science*, Virtual Conference Sept. 30, 2020.
6. Gross, A. Lessons from a comprehensive characterization of common truss-lattice materials, *Society of Engineering Science*, St. Louis, MO, Oct. 15, 2019.
7. Gross, A. and Bertoldi, K. Ultralight, Highly Compressible Nanoscale Lattice-Truss Materials, *European Solid Mechanics Conference*, Bologna, Italy, July 2, 2018.
8. Gross, A. and Bertoldi, K. Ultralight, Highly Compressible Nanoscale Lattice-Truss Materials, *ASME International Mechanical Engineering Congress and Exposition*, Tampa, FL, Nov. 8 2017.
9. Gross, A. and Bertoldi, K. Fabrication and Mechanical Properties of Slender Nanoscale Lattice-Truss Materials, *Society of Engineering Science*, Boston, MA, July 27, 2017.

10. Gross, A. and Bertoldi, K. Design, fabrication, and testing of low-density, high-strength, defect resistant materials, *ASME International Mechanical Engineering Congress and Exposition*, Phoenix, AZ, Nov. 17 2016.
11. Gross, A. and K. Bertoldi, Design fabrication, and testing of low-density, high strength materials, *Society of Engineering Science*, Hyattsville, MD, Oct. 3, 2016.
12. Gross, A. and Ravi-Chandar, K. Confronting the ambiguity of inverse methodologies: the role of the objective function, *Society for Experimental Mechanics*, Costa Mesa, CA, June 9, 2015.
13. Gross, A. and Ravi-Chandar, K. On the extraction of elastic-plastic constitutive properties from three-dimensional deformation measurements, *AmeriMech Symposium*, Austin, TX, Dec. 12, 2014.
14. Gross, A. and Ravi-Chandar, K. Coupling full field deformation measurements and FEM for material characterization, *Society for Experimental Mechanics*, Greenville, SC, June 4, 2014.
15. Gross, A. and Ravi-Chandar, K. Extraction of material properties from 3-D deformation measurements, *ASME International Mechanical Engineering Congress and Exposition*, San Diego, CA, Nov. 18, 2013.

INVITED TALKS

1. Imperfect Architected Materials, Johns Hopkins University, October 28, 2021
2. Imperfect Architected Materials, Savannah River National Laboratory, August 10, 2021
3. Expansion of the design domain for metamaterials fabricated with two-photon polymerization, UK Metamaterials Network, May 26, 2021
4. Nano-Architected Materials: Truss-Lattice Systems, Stony Brook University, April 15, 2019
5. Nano-Architected Materials: Truss-Lattice Systems, University of South Carolina, March 28, 2019
6. Nano-Architected Materials: Truss-Lattice Systems, Virginia Tech, March 19, 2019
7. Nano-Architected Materials: Truss-Lattice Systems, University of Texas at Dallas, Feb. 20, 2019
8. Design, Fabrication, and Testing of Nano-Architected Truss-Lattice Materials, University of Massachusetts Amherst, Oct. 26, 2018
9. Nano-Architected Materials – Investigation of Truss-Lattice Systems, Missouri University of Science and Technology, March 2, 2018

PEER REVIEWER AFFILIATIONS

Proceedings of the National Academy of Sciences
 International Journal of Mechanical Sciences
 Engineering Structures
 Journal of the Mechanics and Physics of Solids
 International Journal of Solids and Structures
 Extreme Mechanics Letters
 Applied Physics A
 International Journal of Fracture
 Bioinspiration & Biomimetics
 Programmable Materials
 Mechanics Based Design of Structures and Machines
 Materials
 Micromachines
 Symmetry
 Molecules