

LESSA GRUNENFELDER, Ph.D.

Part Time Consultant

lgrunenfelder@engsys.com

Prof. Grunenfelder's expertise is in materials science, with an emphasis in structural composites. She is an associate professor of materials science practice in the Mork Family Department of Chemical Engineering and Materials Science at the University of Southern California Viterbi School of Engineering. She teaches both undergraduate and graduate courses on material properties, processing, selection, and design. Professor Grunenfelder's research background is in the processing science of fiber reinforced plastics for aerospace applications. She has experience in thermal analysis, mechanical testing, and materials characterization. She joined ESI as a part time staff consultant in February of 2023.

Areas of Specialization

Manufacturing of fiber reinforced polymers
Thermal analysis of polymers
Mechanical Behavior and Mechanical Testing of Materials
Materials Characterization Testing and Analysis

Education

Ph.D., Materials Science, University of Southern California, 2012
M.S., Materials Science, University of Southern California, 2009
B.S., Astronautical Engineering, University of Southern California, 2007

Professional Affiliations

University of Southern California (USC)

Associate Professor of Engineering Practice

American Society for Engineering Education (ASEE)

Awards chair, materials division

Society for the Advancement of Material and Process Engineering (SAMPE)

Future conferences and events committee

LA Chapter board of directors – Student chapter liaison

September 2023

Positions Held

Engineering Systems Inc., Anaheim, CA

Part time staff consultant, 2023 - Present

University of Southern California, Los Angeles, CA

Associate Professor of Engineering Practice, 2023 – Present

Senior Lecturer, 2018-2022

Lecturer, 2015-2018

University of California, Riverside, Riverside, CA

Postdoctoral Scholar, Biomimetics and Nanostructure Materials Lab, 2013-2014

University of Southern California, Los Angeles, CA

Graduate Research Assistant, McGill Composites Center, 2007 – 2012

Continued Education, Seminars and Webinars

University of Southern California, Los Angeles, CA

Instructor, Essentials of Composite Manufacturing, USC Executive Education Program, 2017-Present

Society for the Advancement of Material and Process Engineering

Instructor, Half-day tutorial course: “Out-of-autoclave prepregs: Defect control and process efficiency” presented at the SAMPE Technical Conference, 2017.

Instructor, Half-day tutorial course: “Defect control in composite fabrication using out of autoclave prepregs” presented at the SAMPE Technical Conference, 2015.

Publications

S. Schechter, **L.K. Grunenfelder**, S.R. Nutt. Air evacuation and resin impregnation in semi-prepregs: Effects of feature dimensions. *Advanced Manufacturing: Polymer and Composite Sciences*, 2020 [DOI](#)

S. Schechter, **L.K. Grunenfelder**, S.R. Nutt. Design and application of discontinuous resin distribution patterns for semi-prepregs. *Advanced Manufacturing: Polymer and Composite Sciences*, 2020 [DOI](#)

W. Hu, **L.K. Grunenfelder**, T. Centea, S. Nutt. In-situ monitoring and analysis of void evolution in unidirectional prepreg. *Journal of Composite Materials*, 2018;52(21):2847-2858 [DOI](#)

N. Kar, Y. Hu, **L.K. Grunenfelder**. Metallurgy and materials PE exam solved problems. Professional Publications, Inc. Belmont, CA, 2017.

P. Hubert, T. Centea, **L.K. Grunenfelder**, S.R. Nutt, J. Kratz, A. Levy. Out-of-autoclave processing. *In: Comprehensive Composite Materials II*. Elsevier, 2017

Y. Zhang, A. Jain, **L.K. Grunenfelder**, M. Miyauchi, S. Nutt. Process development for penylethynyl-terminated PMDA-type asymmetric polyimide composites. *High Performance Polymers*. 2017;30(6):731-741 [DOI](#)

- L.K. Grunenfelder**, A. Dills, T. Centea, S.R. Nutt. Effect of prepreg format on defect control in out-of-autoclave processing. *Composites: Part A* 2017;93:88-99 [DOI](#)
- N.A. Yaraghi, N. Guarin-Zapata, **L.K. Grunenfelder**, E. Hintsala, S. Bhowmick, J.M. Hiller, M. Betts. E.L. Principe. J.Y. Jung, L. Sheppard, R. Wuhler, J. McKittrick, P. Zavattieri, D. Kisailus. A sinusoidally architected helicoidal biocomposite. *Advanced Materials* 2016;28(32):6835-6844 [DOI*](#)
- E. Escobar de Obaldia, S. Herrera, **L.K. Grunenfelder**, D. Kisailus, P. Zavattieri. Competing mechanisms in the wear resistance behavior of biomineralized rod-like microstructures. *Journal of the Mechanics and Physics of Solids* 2016;96:511-534 [DOI](#)
- E. Escobar de Obaldia, C. Jeong, **L.K. Grunenfelder**, D. Kisailus, P. Zavattieri. Analysis of the mechanical response of biomimetic materials with highly oriented microstructures through 3D printing, mechanical testing and modeling. *Journal of the Mechanical Behavior of Biological Materials* 2015;48:70-85 [DOI](#)
- C. Wang, **L.K. Grunenfelder**, R. Patwardhan, S. Qui, V. Eliasson. Investigation of shock wave focusing in water in a logarithmic spiral duct, Part 2: Strong coupling. *Ocean Engineering* 2015;102:185-196 [DOI](#)
- T. Centea, **L.K. Grunenfelder**, S.R. Nutt. A review of out-of-autoclave prepregs – Material properties, process phenomena and manufacturing considerations. *Composites: Part A* 2015;70:132-154 [DOI](#)
- L.K. Grunenfelder**, E. Escobar de Obaldia, Q. Wang, D. Li, B. Weden, C. Salinas, R. Wuhler, P. Zavattieri, D. Kisailus. Stress and damage mitigation from oriented nanostructures within the radular teeth of *Cryptochiton stelleri*. *Advanced Functional Materials* 2014;24(39):6093-6104 [DOI*](#)
- L.K. Grunenfelder**, S. Hererra, D. Kisailus. Crustacean derived nanostructured biomimetic composites. *Small* 2014;10(16):3207-3232 [DOI](#)
- L.K. Grunenfelder**, N. Suksangpanya, C. Salinas, G. Milliron, N. Yaraghi, S. Herrera, K. Evans-Lutterodt, S.R. Nutt, P. Zavattieri, D. Kisailus. Bio-inspired impact resistant composites. *Acta Biomaterialia* 2014;10(9):3997-4008 [DOI](#)
- L.K. Grunenfelder**, T. Centea, P. Hubert, S.R. Nutt. Tow impregnation in an out-of-autoclave prepreg as a function of room temperature aging time. *Composites: Part A* 2013;45:119-126 [DOI](#)
- L.K. Grunenfelder**, S.R. Nutt. Moisture and pressure effects on void formation in prepreg processed composites. In: Alfred C. Loos, ed. *Manufacturing of Composites: Volume 6 of the American Society for Composites Series on Advances in Composites Materials*. DEStech publications, Inc. Lancaster, Pennsylvania, 2013.
- L.K. Grunenfelder**, S.R. Nutt. Prepreg age monitoring via differential scanning calorimetry. *Journal of Reinforced Plastics and Composites* 2012;31(5):295-302 [DOI](#)
- L.K. Grunenfelder**, S.R. Nutt. Void formation in composite prepregs – effect of dissolved moisture. *Composites Science and Technology* 2010;70(16):2304-2309 [DOI](#)