



LEAH M. GINSBERG, Ph.D.
STAFF CONSULTANT

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Dr. Leah Ginsberg is a Staff Consultant with Engineering Systems Inc. (ESi). Her background includes mechanical engineering and materials science with emphasis in utilizing applied mechanics and computational modeling to determine the relationship between structures and constitutive material properties. Her interests include multiscale modeling, materials characterization, and experimental mechanical testing. She has significant expertise in using finite-element analysis (FEA) to perform stress analyses of complex scenarios involving nonlinearities, contact mechanics, and other phenomena. Additionally, she has considerable experience using mechanical tests to derive material properties, including atomic-force microscopy (AFM) and micro-compression testing.

In her Ph.D. research, Dr. Ginsberg developed a multi-scale biomechanical analysis to study the mechanical properties of individual components within a living cell. She also developed an analytical model to study the effect of living cells acting as composite reinforcements and polymeric crosslinkers in a soft hydrogel material. Her work has been presented at many technical conference meetings and was published in peer-reviewed scientific literature.

Prior to joining ESi, Dr. Ginsberg worked in the aerospace industry for NASA's Jet Propulsion Laboratory and Boeing Commercial Airplanes. While at NASA, she assembled a ground station for radio communication with small satellites (CubeSats). At Boeing, she developed and documented the finite-element model to be used in bird strike analyses. She also studied fastener mechanics and the mechanical behavior of composites and honeycomb structures in aircraft.

Areas of Specialization

- Applied Mechanics
- Computational Modeling
- Contact Mechanics
- Mechanics
- Mechanical Engineering
- Mechanics of Materials
- Mechanical Testing
- Polymers & Composites
- Vibrations

Education

Ph.D., Mechanical Engineering, California Institute of Technology

M.S., Mechanical Engineering, California Institute of Technology

B.S., Mechanical Engineering, Georgia Institute of Technology

July 2022

Continuing Education

Northwestern University Center for Public Safety – Traffic Crash Reconstruction
American Society of Mechanical Engineers (ASME) - Fracture Mechanics

Professional Affiliations/Honors

- Society of Experimental Mechanics - Member
- Society of Engineering Science - Member
- Journal of Failure Analysis and Prevention – Reviewer
- EAS New Horizons Diversity, Equity & Inclusion Award, Caltech – 2021
- NASA Group Achievement Award – 2019
- Summa Cum Laude, Georgia Institute of Technology – 2016

Positions Held

Engineering Systems Inc., Norcross, GA

Staff Consultant, 2021 - Present

The Boeing Company, Everett, WA

Structural Analysis Intern, Summer of 2015, 2016, and 2017

Jet Propulsion Laboratory

Intern, Summer of 2013, 2014

Publications & Presentations

"Cell wall and Cytoskeletal Contributions in Single Cell Biomechanics of *Nicotiana tabacum*," presented at the Society of Experimental Mechanics Annual Meeting, **L. Ginsberg**, R. McDonald, Q. Lin, R. Hendrickx, G. Spigolon, G. Ravichandran, C. Daraio, E. Roumeli, Pittsburgh, PA, June 14, 2022.

"Cell wall and cytoskeletal contributions in single cell biomechanics of *Nicotiana tabacum*", **L. Ginsberg**, R. McDonald, Q. Lin, R. Hendrickx, G. Spigolon, G. Ravichandran, C. Daraio, and E. Roumeli, *Quantitative Plant Biology*, Vol. 3, January 2022.

Multiscale Mechanical Characterization of Subcellular Structures in Living Walled Cells. Dissertation (Ph.D.), California Institute of Technology (2021).

"Structure and Biomechanics during Xylem Vessel Transdifferentiation in *Arabidopsis thaliana*", E. Roumeli†, **L. Ginsberg**,† R. McDonald, G. Spigolon, R. Hendrickx, M. Ohtani, T. Demura, G. Ravichandran, and C. Daraio, *Plants*, Vol. 9, Issue December, 2020.

"*Bacillus subtilis* as polymeric crosslinker and particle reinforcement in NHMAA hydrogel," presented at Society of Engineering Science Virtual Technical Meeting, **L. Ginsberg**, P. Chittur, S. Sim, J. Kornfield, D. Tirrell, G. Ravichandran, September 29, 2020.

"Microcompression of plant cells to estimate turgor pressure," presented at the Society of Experimental Mechanics XIV International Congress, L. Ginsberg, E. Roumeli, C. Daraio, and G. Ravichandran, August 14, 2020.

† Equal contribution.

“Extracting mechanical properties of plant cells from atomic-force microscopy and micro-compression experiments,” presented at Society of Engineering Science Mechanobiology Annual Symposium, **L. Ginsberg**, E. Roumeli, C. Daraio, and G. Ravichandran, St. Louis, MO, October 12, 2019.

“Extracting mechanical properties of thin biofilms using inverse analysis,” presented at Society of Experimental Mechanics Annual Meeting (SEM 2019); **L. Ginsberg** and G. Ravichandran, Reno, NV, August 3, 2019.