

Nicholas J. Ginga

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<https://www.gingaresearchlab.com/>

EDUCATION

Ph.D. in Mechanical Engineering

College of Engineering, Georgia Institute of Technology

Dissertation title: “On-chip dielectric cohesive fracture characterization and mitigation investigation through off-chip carbon nanotube interconnects”

M.S. in Mechanical Engineering

College of Engineering, Georgia Institute of Technology

B.S. in Mechanical Engineering

School of Engineering, The College of New Jersey

RESEARCH AND PROFESSIONAL EXPERIENCE

**08/08/22 –
present**

Assistant Professor, Mechanical and Aerospace Engineering, University of Alabama in Huntsville, Huntsville, AL

- Application driven studies and fundamental research in the areas of material characterization, physics-based modeling, and fabrication and behavior of small-scale structures to address key challenges in cross disciplinary fields of flexible electronics, rigid electronics, biomedical engineering, and defense. Research thrusts include ([Lab Website](#), [Instagram](#)):
 1. Mechanical experimentation and modeling of flexible electronics and rigid electronics
 2. Development of new mechanical characterization devices and techniques for flexible electronic and electronic packaging materials.
 3. Fabrication and characterization of nano/microstructures and devices
 4. Mechanical Characterization of lithium and alkaline batteries under compressive loading
 5. Study of Krypton Ion Sputtering/Erosion of Satellite Relevant Materials for Electronic Propulsion.

**01/07/19 –
06/01/2022**

Georgia Institute of Technology, CASPaR Lab with Dr. Suresh Sitaraman: Postdoctoral Research Fellow (01/07/19-08/11/19), Part-Time Research Scientist/Affiliate (06/12/19-2022)

- Advisor – Dr. Suresh Sitaraman, Department of Mechanical Engineering
- Finite element modeling and testing of electronic packages and flexible electronics.
- Developing small scale magnetic actuation test for interfacial adhesion measurement of dielectric thin film materials found near solder balls in electronic packages.

- Finite element modeling and mechanical testing of carbon nanotube infused polymers (Ecoflex[®]) for high level strain sensors and biaxial inflation tests.

**09/01/15 –
06/30/19**

Postdoctoral Research Fellow: Georgia Institute of Technology (10/01/2017-06/30/19) and University of Michigan (09/01/15- 08/01/17), The Takayama Lab - Micro and Nanotechnology for Biomedical Analysis Lab

Performed research focused on biomedical devices and organ-on-a-chip systems.

- Advisor – Dr. Shuichi Takayama, Department of Biomedical Engineering
- Investigating using fracture of oxidized PDMS, hPDMS, and polymer thin films to create micro/nano channels and valves. These elastomeric channels can be used to manipulate nanoparticles, DNA, and chromatin in micro/nano flexible fluidic and valving systems.
- Design and fabrication of biomedical devices to perform injection and withdrawal of liquid and bacteria into human intestinal organoids. This work investigates using such human intestinal organoids as bioreactors and to better understand the interaction of bacteria and the human intestine.
- Design and fabricate 3D printed mechanical devices to investigate the effect of capillary fluid forces on lung cells to mimic the fluid stresses exerted on lung cells during injury. The device prototype is a cyclic mechanical plunger that can be used with multi-well cell culture plates with Transwell inserts for air/liquid culture of lung cells.
- Used soft lithography to make and test PDMS microfluidic devices.

**09/01/2016 –
08/01/17**

Postdoctoral Research Fellow: University of Michigan, The Dasgupta Research Group

Performed research focused on investigating nanoscale coatings by atomic layer deposition (ALD) to tune interphase mechanics in polymer nanostructured composites.

- Advisor – Dr. Neil Dasgupta, Department of Mechanical Engineering
- Design and fabrication of polymer (ex. PMMA) double cantilever beam test specimens to investigate improving interfacial toughness between epoxy matrix and composite filler material.
- Utilizing double cantilever beam test samples in monotonic tensile test configuration with digital image correlation (DIC) and also in a wedge test configuration to measure the interfacial fracture toughness of polymer/ALD/epoxy system.
- Atomic layer deposition (ALD) of films such as aluminum oxide (Al₂O₃) and zinc oxide (ZnO) at low temperatures on polymer substrates.

**08/01/2008 –
08/15/2015**

Ph.D. Research: Georgia Institute of Technology, CASPaR Lab with Dr. Suresh Sitaraman

Investigated CNTs as off-chip electrical interconnects for thermomechanical reliability of flip-chip packages.

- Developed process to selectively grow tall (~100 μm) vertically aligned carbon nanotube (CNT) forests on patterned copper films for use as electrical interconnects. Process utilizes clean room photolithography,

sputter and evaporation metal deposition, plasma reactive ion etching, and thermal chemical vapor deposition.

- Developed process to assemble silicon flip-chips with patterned CNT interconnects (~100 μm diameter and ~200 μm pitch) to organic FR4 substrate using stencil patterned electrically conductive adhesive. Assembled electronic packages were thermal cycled to investigate thermomechanical reliability of CNT based off-chip interconnects.
- Conducted measurements of the effective mechanical modulus of carbon nanotube forests using several methods including a modified nanoindentation method, semi-insitu SEM based method with custom compression fixture and load cell, and a traditional uniaxial load frame method. Measurements were used in development of a material model for finite element analysis (FEA) of electronic packages with CNT interconnects (DARPA funded).
- Performed FEA of electronic packages utilizing CNT off-chip interconnects. The analysis demonstrated the mechanical decoupling of the silicon chip from the organic substrate by the CNTs, resulting in the reduction of thermal stresses in the silicon chip for improved reliability.

Developed new micro/nano-scale method to measure cohesive fracture toughness of thin films.

- Developed a cohesive fracture test which is fixtureless and utilizes a film with high intrinsic stress on top of the test material film to initiate and drive fracture of the test film. The test method was demonstrated with a thin film of SiO_2 (common dielectric material). The method utilizes clean room photolithography, sputter metal deposition, plasma reactive ion etching, and plasma enhanced chemical vapor deposition.
- Performed FEA of the newly developed thin film fracture toughness test to calculate fracture parameters and investigate effects of film thicknesses, crack length, and intrinsic stress.

09/1/2005 –
08/01/2008

M.S. Research: Georgia Institute of Technology, CASPaR Lab with Dr. Suresh Sitaraman

Investigated and demonstrated a previously published test method which utilizes a highly stressed film to measure the interfacial fracture toughness of thin film systems.

- A highly stressed film (Cr) was used to initiate and drive interfacial fracture between the substrate (Si) and test material (Ti). Gained experience and developed skill with many of the Georgia Tech clean room micro/nano fabrication equipment.
- Measured and characterized intrinsic stress in magnetron sputtered Cr thin films as a function of argon pressure to use for interfacial and cohesive fracture tests. Measured intrinsic stress using contact profilometry.

TEACHING EXPERIENCE

08/14/2019 – 06/01/2022 **University of Alabama in Huntsville** (Full-time Lecturer: Fall 2020-Spring 2022 and Assistant Professor: Fall 2024-present)

Course: MAE211 – Introduction to Computational Tools: Course was comprised of computer aided design and solid modeling concepts including 3D model definition through geometry sketching, constraining, and dimensioning; 3D solid modeling techniques; engineering drawings; assembly creation; assembly animations; and rendering. (currently teaching at UAH)

- Developed and taught sophomore undergraduate CAD course.
- Prepared and delivered weekly lectures.
- Course utilized Solid Edge CAD software.
- Course included semester-long 3D modeling projects.
- Created online version of course with ~120 videos to be university certified.

Course: MAE490&MAE491 – Senior Design I&II: Application of basic design principles including: design methodology, decision making, creativity, product liability, human factors, patents, ethics, and technical writing. Students are assigned to multi-disciplinary teams to develop project requirements and initial concepts. (currently teaching at UAH)

- Developed new senior design course based on the design of an electric race car for the FSAE electric vehicle (EV) competition.
- Created and delivered weekly lectures.
- Developed local engineering industry relationships for course support, sponsorship, and student interaction.

Course: MAE378 – Materials and Manufacturing Process: The objectives of this course are to understand the principles of material properties, how material structure influences material properties, considerations for material selection during design, and the fundamentals of manufacturing processes such as casting, forming, machining, and how these processes effect material properties.

- Prepared and delivered weekly lectures.
- Developed course assignments and tests.

Course: MAE674 – Finite Element Analysis: This graduate level course is predominantly based on providing students an understanding of the theory of finite element analysis and includes some demonstrations with commercially available finite element software (ex. Ansys). Topics include derivation of the finite element formulation and derivation of various element types.

- Developed new version of the course focused on finite element theories and derivations.
- Created and delivered weekly lectures and lab demonstrations.
- Created and graded homework and tests
- Students completed semester long open-ended projects using finite element analysis software to investigate their topics.

01/07/2019 –
05/04/2019

Georgia Institute of Technology

Course: ME6124 – Finite Element Method: Theory and Practice

- Instructor of record for graduate level course
- Provided an in-depth understanding of the theory and formulation behind various finite elements with exposure to applications in mechanical engineering.
- In addition to lectures based on finite element theory, provided hands-on experience with practical aspects of finite-element modeling using ANSYS software.

08/01/2007 –
05/01/2013

Graduate Teaching Assistant, Georgia Institute of Technology

Course: ME4041 – Computer Graphics and Computer Aided Design

- Developed and taught senior level undergraduate CAD/FEA lab course.
- Prepared and delivered weekly tutorials and lab session lectures.
- Created and graded homework assignments and tests.
- Course software included I-DEAS and UGS-NX.

04/01/2009 –
06/01/2010

**Nanotechnology Research Center (NRC) Equipment Trainer (Staff),
Georgia Institute of Technology**

- Responsible for weekly training sessions of clean room users on the operation of Tencor and Dektak contact profilometers and Wyko optical non-contact profilometer.
- Developed training literature for Dektak contact profilometer and Wyko optical non-contact profilometer.

INDUSTRY EXPERIENCE

Summer
2006

Graduate Intern - Intel Corporation (ATD Q&R), Chandler, AZ

- Developed experiments to understand the solder joint reliability of lead-free microelectronic packages.
 - Examined effect of variation of loading frequencies in a cyclic four-point bend test.
 - Correlated solder joint crack size with in-situ data acquisition during four-point bend testing.
- Created the *Solder Joint Reliability Data Summary Document* for engineers and technicians to easily organize, archive, and compare existing and new reliability data.
- Required to demonstrate an in-depth understanding of microelectronic packaging, solder joint reliability, and failure analysis at completion of internship.

Summer
2004

**Undergraduate Intern - YORK International HVAC Engineering Sales
Group, Edison, NJ**

Summer
2003

- Created bid submissions to large construction firms for industrial size HVAC equipment.
 - Tracked monthly/yearly quota pace of regional engineering sales group.
- Undergraduate Intern – Public Service Electric and Gas (PSE&G) Apprentice Engineering Technician, Secaucus, NJ**
- Corrected and updated circuit CAD diagrams and conducted electrical equipment field-checks.
 - Gained technical understanding of the electric utility system.

GRANTS and FUNDING

- **Semiconductor Research Corporation (SRC)**
 - Title: Cohesive/Interfacial Fracture Metrology Method for BEOL Materials for Reliability Modeling and Risk Evaluation Down-the-line
 - Nicholas Ginga (PI)
 - Amount: ~\$25,000
 - Status: Funded, In-Progress
- **NASA EPSCoR R3**
 - Title: Study of Krypton Ion Erosion of Satellite Relevant Materials
 - L. Dale Thomas (PI), Nicholas Ginga (Sci-I), Kunning, G.Xu (Co-I), Judy Schneider (Co-I)
 - Amount: ~\$100,000
 - Status: Funded, In-Progress
- **FBI Hazardous Devices Tools and Technologies Unit (HDTTU)**
 - Title: Characterization of Batteries Subjected to Impact Loading
 - PI's: George Nelson (PI), Nicholas Ginga (Co-PI), Nathan Spulak (Co-PI)
 - Amount: \$142,000 budget for my portion of GRA support and summer salary
 - Status: Funded, In-Progress
- **UAH Research and Creative Experience for Undergraduates (RCEU) Program 2025**
 - Title: Stretchable electronics based on electrically conductive liquid filled micro/nanochannels created with controlled cracking
 - Amount: \$4000
 - Status: First round accepted, in second round review stage
- **UAH Undergraduate Research Program (URP)**
 - Title: Fabrication and Mechanical Testing of Flexible Electronics Using Custom Testing Systems
 - Period: Fall 2023-Fall 2024
 - Amount: \$3,000
 - Status: Funded, Completed

- **UAH Research and Creative Experience for Undergraduates (RCEU) Program 2024**
 - Title: Fabrication and Characterization of PDMS Based Materials for Stretchable and Flexible Electronics
 - Amount: \$4000
 - Status: Funded, Completed
- **UAH Research and Creative Experience for Undergraduates (RCEU) Program Summe 2023**
 - Title: Development of mechanical characterization techniques and analysis of flexible electronic materials
 - Amount: \$3750
 - Status: Funded, Completed
- **UAH Undergraduate Research Program (URP), 2022-2023**
 - Title: Design and Application of Instrumentation for Mechanical Characterization of Flexible Electronics
 - Amount: \$2500
 - Status: Funded, completed
- **UAH Research and Creative Experience for Undergraduates (RCEU) Program Summer 2022**
 - Title: Mechanical characterization instrumentation for multi-material systems
 - Amount: \$3750
 - Status: Funded, completed
- **Funding Source: ERC**
 - Corporate support for Formula Society of Automotive Engineers (FSAE) electric vehicle project and UAH senior design course for 2022.
 - Amount: \$2.5K provided
- **Funding Source: Gene Haas Foundation**
 - Sponsorship and grant for Formula Society of Automotive Engineers (FSAE) competition and education for student careers in manufacturing, Principal Investigator, start date: 11/2021-11/2025.
 - Amount: \$10K awarded and ongoing
- **Funding Source: Semiconductor Research Corporation (SRC)**
 - Project: “Magnetic Actuation Metrology for Interfacial Adhesion Measurement for Electronic Packages”, Senior personnel and grant proposal collaborator, Start Date: 1/1/2020.
 - Amount: \$225K over 3 years
 - Status: Completed

BOOK CHAPTERS

- **N.J. Ginga**, R. Slyman, “Double-Barrel Perfusion System for Modification of Luminal Contents of Intestinal Organoids.” In: Sumbalova Koledova, Z. (eds) 3D Cell Culture. Methods in Molecular Biology, vol 2764. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-3674-9_14. (2024)

JOURNAL PUBLICATIONS

- J. H. Lee, J. Han-Ching Chiu, **N.J. Ginga**, T. Ahmed, M.D. Thouless, Y. Liu, S. Takayama, “Super-resolution imaging of linearized chromatin in tunable nanochannels,” *Nanoscale Horizons*, vol. 8, no. 8, pp. 1043–1053, 2023.
- **N. J. Ginga** and S. K. Sitaraman, “Cohesive fracture measurement technique for free-hanging thin films using highly stressed superlayer,” *Thin Solid Films*, vol. 757, p. 139379, Sept. 2022.
- **N. J. Ginga** and S. K. Sitaraman, “Thermomechanical Reliability Investigation of Carbon Nanotube Off-Chip Interconnects for Electronic Packages,” *IEEE Trans. Components, Packag. Manuf. Technol.*, vol. 12, no. 8, pp. 1282–1292, Aug. 2022.
- **N.J. Ginga**, R. Slyman, G.A. Kim, E. Parigoris, S. Huang, V.K. Yadagiri, V.B. Young, J.R. Spence, S. Takayama, “Perfusion System for Modification of Luminal Contents of Human Intestinal Organoids and Realtime Imaging Analysis of Microbial Populations,” *Micromachines*, vol. 13, no. 1, p. 131, Jan. 2022.
- **N.J. Ginga**, J. Han-Ching Chiu, J.H. Lee, M.D. Thouless, S. Takayama, “High-Force, Precise, and Bidirectional Uniaxial Stretcher for Real-Time Imaging of Normally Closed h-PDMS Crack-Valves for Femto-Liter Fluid Delivery,” *Microfluidics and Nanofluidics*, 26, 27 (3/2022).
- Y. N. Chen, **N. J. Ginga**, W. S. LePage, E. Kazyak, A. J. Gayle, J. Wang, M. D. Thouless, N. P. Dasgupta; “Enhanced Interfacial Toughness of Thermoplastic–Epoxy Interfaces Using ALD Surface Treatments,” *ACS Appl. Mater. Interfaces*, vol. 11, no. 46, pp. 43573–43580, Nov. 2019.
- G. A. Kim, **N. J. Ginga**, S. Takayama; “Integration of Sensors in Gastrointestinal Organoid Culture for Biological Analysis,” *Cellular and Molecular Gastroenterology and Hepatology (Cmgh)*, vol. 6, no. 1, pp. 123-131.e1, 2018.
- **N. J. Ginga**, W. Chen, and S. K. Sitaraman, "Waviness reduces effective modulus of carbon nanotube forests by several orders of magnitude," *Carbon*, vol. 66, pp. 57-66, 2014.
- **N. J. Ginga** and S. K. Sitaraman, "The experimental measurement of effective compressive modulus of carbon nanotube forests and the nature of deformation," *Carbon*, vol. 53, pp. 237-244, 2013.
- **N. J. Ginga** and S. K. Sitaraman, "New Method to Measure Tensile Strength of Low Modulus Thin Films," *International Journal of Fracture*, vol. 170, pp. 199-206, 2011.

- M. B. Modi, **N. J. Ginga**, and S. K. Sitaraman, "Microcontact spring reliability: Design against interfacial fracture," *IEEE Transactions on Components and Packaging Technologies*, vol. 32, pp. 197-206, 2009.
- J. Zheng, M. B. Modi, **N. J. Ginga**, and S. K. Sitaraman, "Silicon and nanoscale metal interface characterization using stress-engineered superlayer test methods," *IEEE Transactions on Components and Packaging Technologies*, vol. 32, pp. 333-338, 2009.

CONFERENCE PUBLICATIONS

- **Morgan, N.S., & Ginga, N.J.**, "Characterization of Coupled Mechanical and Electrical Behavior of Porous Conductive PDMS-CNT/Graphene Based Foams Under Multidirectional Strain for Flexible/Stretchable Electronics," *2025 IEEE 75th Electronic Components and Technology Conference (ECTC)*, Dallas, TX, USA, 2025, Accepted.
- **Knee, W, & Ginga, N.J.**, "Multiscale Quasi-Static Finite Element Analysis of Commercial Lithium Primary Batteries." *Proceedings of the ASME 2024 International Mechanical Engineering Congress and Exposition*. Volume 6: Energy. Portland, Oregon, USA. November 17–21, 2024. V006T08A056. ASME. <https://doi.org/10.1115/IMECE2024-142525>.
- **Morgan, N.S.**, K. U. Godbole, B. G. Stewart, S. K. Sitaraman and **N. J. Ginga**, "Investigation of Mechanical Reliability of Flexible/Stretchable Electronic Materials Using Multi-Axial Stretch Techniques," *2024 IEEE 74th Electronic Components and Technology Conference (ECTC)*, Denver, CO, USA, 2024, pp. 1003-1010, doi: 10.1109/ECTC51529.2024.00161.
- **N. J. Ginga**, R. Chen, and S. K. Sitaraman, "Magnetic force-based measurement technique to investigate the effect of lead-free solder intermetallic compounds (IMC) on interconnect reliability," *2023 IEEE 73rd Electron. Components Technol. Conf. (ECTC)*, Orlando, FL, USA, 2023, pp. 297-302, doi: 10.1109/ECTC51909.2023.00057.
- R. Chen, **N. J. Ginga**, and S. K. Sitaraman, "Magnetic-Based Interfacial Adhesion Measurement Technique with Environmental Conditions," *2022 IEEE 72nd Electron. Components Technol. Conf. (ECTC)*, pp. 1594–1601, 2022.
- R. Chen, **N. J. Ginga**, and S. K. Sitaraman, "Magnetic Actuation Metrology for Interfacial Adhesion Measurement with Environmental Conditions," *2022 SRC TechCon*, Austin, Texas September 18-20, 2022.
- R. Chen, **N. J. Ginga** and S. K. Sitaraman, "Magnetically Actuated Test Method for Interfacial Fracture Reliability Assessment," *2021 IEEE 71st Electronic Components and Technology Conference (ECTC)*, 2021, pp. 802-810.
- B. G. Stewart, **N. J. Ginga** and S. K. Sitaraman, "Biaxial Inflation Stretch Test for Printed Electronics," *2020 IEEE 70th Electronic Components and Technology Conference (ECTC)*, 2020, pp. 1106-1113.
- Y. N. Chen, **N. J. Ginga**, W.S. LePage, E. Kazyak, A. J. Gayle, J. Wang, M. D. Thouless, N. P. Dasgupta, "Enhanced interfacial fracture

toughness of polymer-epoxy interfaces using ALD surface treatments,” in 19th *International Conference on Atomic Layer Deposition*, Bellevue, Washington, July 2019.

- J. Zheng, M. B. Modi, **N. J. Ginga**, and S. K. Sitaraman, "Silicon, low-K dielectric, and nano-scale metal interface characterization using stress-engineered superlayer test methods," in *Electronic Components and Technology Conference (ECTC)*, Sparks, NV, United States, 2007, pp. 1384-1389.

CONFERENCE PRESENTATIONS

- J.H. Lee, J. Han-Ching Chiu, **N.J. Ginga**, T. Ahmed, M.D. Thouless, Y. Liu, S. Takayama, “Collecting epigenetic information via nanofluidic trapping and super-resolution imaging,” Elsevier, Biosensors 2023, 33rd Anniversary World Congress on Biosensors, Busan, South Korea, June 5-8, 2023.
- **N. J. Ginga**, S. K. Sitaraman, “Mechanical Performance Study of CNT Bundles as Off-Chip Interconnects,” at *ASME International Mechanical Engineering Congress & Exposition (IMECE)*, San Diego, CA, 2014.

INVITED PRESENTATIONS:

- **N. J. Ginga**, “Reliability of Additively Manufacturing Flexible and Stretchable Electronics – Experiments, Models, and Applications,” Presentation, 2024 ASME InterPACK conference, San Jose, Ca, 10/8/2024.
- **N. J. Ginga**, “Thin Film Fracture and Interfaces for Emerging Technologies,” NASA Marshall Space Flight Center, Material Diagnostics, Metallurgy, and Failure Analysis Group, Huntsville, AL. September 09, 2022.

POSTERS

- **A. Sahu, N.J. Ginga**, “Modifying a controlled diffusion microfluidic device through applications of tunable width channels based on PDMS nanocracks,” 28th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS), Montreal, Canada, 10/13/2024.
- **E. Cummins, N.J. Ginga**, “Characterization of Electric Propulsion Krypton Ion Sputtering of Spacecraft Materials,” 2024 American Astronautical Society’s (AAS) von Braun Space Exploration Symposium Student Poster Competition, Huntsville, Al, 10/30/24.
- **E. Hubbard, N.J. Ginga**, “Fabrication and Characterization of PDMS based Materials for Stretchable and Flexible Electronics,” 2024 American Astronautical Society’s (AAS) von Braun Space Exploration Symposium Student Poster Competition, Huntsville, Al, 10/30/24.

- **E. Hubbard, N.J. Ginga**, “Fabrication and Characterization of PDMS based Materials for Stretchable and Flexible Electronics,” 2024 UAH Summer Community of Scholars (SCS) (RCEU) Poster Session, Huntsville, Al, 09/19/24.
- **C. Ahmed, N.J. Ginga**, “Mechanical Reliability Assessment of Flexible Capacitor Using Finite Element Analysis,” UAH Graduate Student Poster Session, 2024, Huntsville, Al, 04/01/24.
- **A. Sahu, N.J. Ginga**, “Tunable Width PDMS Nanocracks for Controlled Diffusion Microfluidic Device,” UAH Graduate Student Poster Session, 2024, Huntsville, Al, 04/01/24.
- **N.S. Morgan, N.J. Ginga**, “Improvements of Radial Stretch System for the Mechanical Characterization of Flexible Electronics,” UAH Research Horizons Poster Session, Huntsville, Al, 03/05/24.
- **J.K. Corbin, N.J. Ginga**, “Development of Mechanical Characterization Techniques and Analysis of Flexible Electronic Materials,” UAH Research Horizons Poster Session, Huntsville, Al, 03/05/24.
- **J.K. Corbin, N.J. Ginga**, “Development of Mechanical Characterization Techniques and Analysis of Flexible Electronic Materials,” UAH E-Week Engineering Showcase Poster Session, Huntsville, Al, 2/20/24.
- **J. K. Corbin, N.J. Ginga**, “Development of Interfacial Wedge Testing Technique and Mechanical Characterization of Flexible Electronic Materials,” 2024 IEEE 74nd Electron. Components Technol. Conf., Denver, CO, USA, 2024, Accepted.
- **C. Ahmed, N. J. Ginga**, “Mechanical Reliability Assessment of Flexible Capacitor Using Finite Element Analysis,” 5th Annual Alabama Materials Science Student Research Symposium 2024, Huntsville, Al, 01/26/24.
- **A. Sahu, N. J. Ginga**, “Optimizing a Controlled Diffusion Microfluidic Device through Applications of Tunable Nanocracks in PDMS,” 5th Annual Alabama Materials Science Student Research Symposium 2024, Huntsville, Al, 01/26/24.
- **J. K. Corbin, N. J. Ginga**, “Development of Mechanical Characterization Techniques and Analysis of Flexible Electronic Materials,” UAH Summer Community of Scholars (SCS) (RCEU) Poster Session, Huntsville, Al, 09/13/23.
- **J. K. Corbin, N. J. Ginga**, “Development of Method to Characterize Adhesion of Electrically Conductive Adhesive for Flexible Electronics,” NASA Minority University Research and Education Project (MUREP) Research Colloquium, Huntsville, Al, 07/21/23.
- **J. K. Corbin, N. J. Ginga**, “Development of Method to Characterize Adhesion of Electrically Conductive Adhesive for Flexible Electronics,” UAH Research Horizons Poster Session, Huntsville, Al, 03/07/23.
- **J. K. Corbin, N. J. Ginga**, “Development of Method to Characterize Adhesion of Electrically Conductive Adhesive for Flexible Electronics,” E-Week Engineering Showcase Poster Session, Huntsville, Al, 2/23/23.

- **J. K. Corbin, N. J. Ginga**, “Development of Method to Characterize Adhesion of Electrically Conductive Adhesive for Flexible Electronics,” Research and Creative Experience for Undergraduates (RCEU) Program Poster Session, Huntsville, AL, Sept. 14, 2022.
- **N. J. Ginga, G. T. Ostrowicki, S. Raghava, S. K. Sitaraman**, “Innovative Mechanical Characterization Techniques and Computer-Simulation Tools for Next-Generation, Cu-Low-K Microelectronic Devices,” IEEE Global Interposer Technology Workshop, Atlanta, GA, Nov. 14-16, 2012.
- **N. J. Ginga, S. K. Sitaraman**, “Development of Fixtureless Cohesive Fracture Toughness Measurement Technique for Low-k thin Films,” Georgia Tech Interconnects and Packaging Center (IPC) System Integration Workshop 2011, Atlanta, GA, June 13, 2011.
- **N. J. Ginga, J. Zheng, S. K. Sitaraman**, “Interfacial Fracture Toughness Measurement of Thin Film Interfaces for Ti/Si, Ta/low-k, and Eutectic SnPb solder/CNTs,” 13th Annual Surface Mount Technology (SMTA) Expo, Duluth, GA, April 16, 2009.
- **N. J. Ginga, J. Zheng, S. K. Sitaraman**, “Interfacial Fracture Toughness Measurement of Thin Film Interfaces for Ti/Si and Ta/low-k” Georgia Tech Packaging Research Center (PRC) Industrial Forum Day (IFD) 2007, Atlanta, GA, Mar. 14, 2007.

UNDERGRADUATE HONORS THESIS ADVISING

- Spring 2024:
 - **Aiden Price**: “Electric Vehicle Steering System Optimization”
 - **Nathan Morgan**: “Improvements of Radial Stretch Tester for the Mechanical”
- Spring 2023
 - **Jarrold Webber**: “Finite Element Analysis of a FSAE Electric Vehicle Suspension Upright”
 - **Grace Liverett**: “Finite Element Analysis of a FSAE Electric Vehicle Suspension Upright”
 - **Jacob Ballentine**: “Electric Vehicle Powertrain Optimization”
 - **Elizabeth Dawson**: “Electric Vehicle Powertrain Optimization”
 - **Jason Calkins**: “A Critical Investigation Into the Structural Properties of Senior Design’s Electric Vehicle Tube Frame Chassis Using Finite Element Analysis”
 - **Samuel Aina**: “A Critical Investigation Into the Structural Properties of Senior Design’s Electric Vehicle Tube Frame Chassis Using Finite Element Analysis”
- Spring 2023
 - **Ethan Rosenow**: “FSAE-EV Chassis Design and Optimization”

GRADUATE THESIS/DISSERTATION COMMITTEE MEMBER

- **Jefferey S. Gaddes**, “Thermal Processing of Al-Zn-Cu-Mg-Zr Laser powder Bed Fusion Material for Increased Ductility,” Advisor: Judith A. Schneider.
- **Terrell Marler**, “Quasi-Static and Dynamic Tension Testing of As-Built and Heat-Treated Additively Manufactured 316L Stainless Steel,” Advisor: Nathan Spulak

AWARDS/HONORS

- **Evan Hubbard (UAH Undergraduate), 1st Place Alabama Space Grant Consortium Award** at the 2024 UAH Summer Community of Scholars (SCS) (RCEU) Poster Session.
- **J. K. Corbin (UAH Undergraduate), 1st Place, Dean's and Director's Award** for Engineering at the 2023 UAH Summer Community of Scholars (SCS) (RCEU) Poster Session
- UAH Honors Day 2022, Student Teacher Appreciation Recognition
- Atlanta Surface Mount Technology Association (SMTA) Scholarship, 2009.
- The College of New Jersey Mechanical Engineering Leadership Award, 2005.
- The College of New Jersey Armstrong Mechanical Engineering Award, 2002-2005.
- New Jersey Scholar's Award, 2001-2003.
- College of New Jersey Scholar Athlete, 2002 and 2003.
- New Jersey Bloustein Scholar, 2001.
- Golden Key Honor Society.

SERVICE / ACTIVITIES

- UAH MAE Undergraduate Committee Member
- NSF Division of Civil, Mechanical and Manufacturing Innovation (CMMI) CGCA Game Changer Academy Panel Fellow.
- UAH Alabama Space Grant Consortium (ASGC) Scholar/Fellow Award Committee – Reviewed and scored graduate and undergraduate applications for this program.
- IEEE International Reliability Physics (IRPS) conference subcommittee member on Packaging and 2.5D/3D Assembly (2023, 2024, 2025).
- UAH Electric Vehicle Club Faculty Co-Advisor, 2021-present.
- UAH Motorsports Club Faculty Advisor, 2020-present.
- Journal/Conference Reviewer for: IEEE Access, IEEE Transactions on Components, Packaging and Manufacturing Technology (TCPMT), IEEE Transactions on Electron Devices, IEEE International Reliability Physics (IRPS) conference.
- Georgia Tech Surface Mount Technology Association (SMTA) Student Chapter President, 2009-2011.
- Georgia Tech Mechanical Engineering Graduate Association Vice President, 2006-2008.

- ASME president of student section at The College of New Jersey, 2004-2005.
- ASME secretary of student section at The College of New Jersey, 2003-2004.
- The College of New Jersey Solar/Electrical Boat Team, 2002-2005.
- 5th place overall at ASME Solar Splash Solar/Electrical Boat Competition, 2005.
- College of New Jersey winter and spring varsity track team, 2001-2003.

PROFESSIONAL ORGANIZATION MEMBERSHIP

- American Society of Mechanical Engineers (ASME).
- Surface Mount Technology Association (SMTA).
- International Microelectronics Assembly and Packaging Society (IMAPS).
- Institute of Electrical and Electronic Engineers (IEEE).