# DAVID SCRIPKA

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## Expertise

### MATERIALS SCIENCE – MATERIAL BEHAVIOR IN EXTREME CONDITIONS

- Highly coupled multi-physics simulations of mechanical and optical material behavior in extreme environments
- Laser-driven shock compression experiments employing velocity interferometry and time-resolved optical spectroscopy

### DATA ANALYTICS

- Multivariate data analysis, with focus areas in signal processing, image analysis, and statistical uncertainty estimation
- Data cleaning/processing, analysis, and visualization with R, Python, MATLAB, Microsoft Excel, and Tableau

### COMMUNICATION

- Experienced in effectively organizing and presenting technical information in both formal and informal settings
- Experienced in writing academic papers, technical reports, summary/review documents, and policy analyses

## Education

### PhD MATERIALS SCIENCE AND ENGINEERING – *Georgia Institute of Technology - Atlanta, GA - 2013 to 2017*

- 4.0/4.0 GPA
- Minor in Public Policy

### B.S. MATERIALS SCIENCE AND ENGINEERING – *Georgia Institute of Technology - Atlanta, GA - 2010 - 2012*

- 3.9/4.0 GPA
- Highest Honor, Biomaterials Certificate

## Work Experience

### GRADUATE RESEARCH ASSISTANT – *Georgia Institute of Technology -Atlanta, GA - Jan 2013 to present*

- Designed and conducted novel experiments with high-energy lasers, custom fabricated photonic structures, and time-resolved spectroscopy to study the behavior of complex structural and energetic materials in extreme environments
- Designed and performed complex multi-physics simulations to predict the combined mechanical-optical response of photonic structures in extreme environments, integrating multiple computational techniques and simulation software packages
- Designed, built, and calibrated complex experimental capabilities employing time-resolved spectroscopy and high-energy lasers

### NATIONAL SECURITY DIVISION ANALYST – *Congressional Budget Office - Washington, DC - June to Aug 2016*

- Independently performed a comprehensive risk analysis of the vulnerability of the US electric grid to cyber-attacks
- Organized and summarized analysis methods, results, and conclusions in detailed oral and written reports

### ENERGETIC MATERIALS INTERN – *Lawrence Livermore National Laboratory - Livermore, CA - May to Aug 2012*

- Evaluated and tested an empirical material behavior model by comparing simulation predictions to experimental data
- Identified and corrected an unknown inaccuracy in a material model by mathematically reformulating a key model input

### UNDERGRADUATE RESEARCH ASSISTANT – *Georgia Institute of Technology - Atlanta, GA - Nov 2010 to Dec 2012*

- Characterized the structure and experimentally tested the mechanical behavior of a novel aluminum/steel composite armor
- Performed multi-physics simulations of high speed aluminum extrusion to identify important effects in rail-gun launch systems
- Applied multiple electron microscopy methods to identify chemical reactions in shock-compressed nickel/aluminum nano-foils
- Simulated micrometer scale interactions in granular-type materials to evaluate the effectiveness of microscopic sensors

**INTERIOR MATERIALS INTERN –** *General Motors Corporation - Warren, MI - May to Aug 2011*

- Planned, coordinated, and directed a large-scale field inspection of used vehicles to evaluate real-world material performance
- Performed large-scale mechanical wear testing of molded plastic materials to evaluate intrinsic durability of different designs
- Designed and programmed an automated Microsoft Excel spreadsheet to validate material property data in digital databases
- Organized, analyzed, and presented complex data to GM Department Managers in person and in written reports

## Research Publications

- **David Scripka**, Garrett LeCroy, Gyuhyon Lee, Changyan Sun, Zhitao Kang, Christopher J. Summers, Naresh N. Thadhani. *"Spectral Response of Multilayer Optical Structures to Dynamic Loading"* Journal of Physics: Conference Series, 2016 (Accepted for publication)
- **David Scripka**, Garrett LeCroy, Christopher J. Summers, Naresh N. Thadhani *"Spectral Response of Multilayer Optical Structure to Dynamic Mechanical Loading."* Applied Physics Letters **106**, 201906 (2015)
- **David Scripka**, Sunil Dwivedi, Naresh Thadhani. *"Correlating computationally derived particle surface stress-strain states to mesoscale shock response."* Journal of Physics: Conference Series **500** 182038, 2014
- Zhitao Kang, Alexandr A. Bansihev, Gyuhyon Lee, **David Scripka**, Jennifer Breidenich, Pan Xiao, James M. Christensen, Min Zhou, Christopher J. Summers, Dana D. Dlott, Naresh N. Thadhani. *Exploration of CdTe quantum dots as mesoscale pressure sensors via time-resolved shock-compression photoluminescent emission spectroscopy.* Journal of Applied Physics **120,** 43107 (2016).
- Pan Xiao, Zhitao Kang, Alexandr A. Bansihev, Jennifer Breidenich, **David Scripka**, James M. Christensen, Christopher J. Summers, Dana D. Dlott, Naresh N. Thadhani, Min Zhou. *"Laser-excited optical emission response of CdTe quantum dot/polymer nanocomposite under shock compression."* Applied Physics Letters, **108**, 011908 (2016)

## Projects

**GEORGIA TECH PhD THESIS TEMPLATE –** *Georgia Institute of Technology, Atlanta, GA - 2016 to present*

- Managed a team of graduate students in the development of the Georgia Tech PhD thesis template, providing both LaTeX and Microsoft Word versions to the 6,000+ graduate student body

**CONSULTING CASE COMPETITION: ATLANTA COMMUNITY FOOD BANK –** *Atlanta, GA - Spring 2015*

- Worked with a team of four to analyze a strategic plan for community food bank expansion, designed new distribution schemes and program re-structuring, presented recommendations to professional industry consultants

**CONSULTING CASE COMPETITION: PHARMACEUTICAL PORTFOLIO –** *Bethesda, Maryland - Spring 2015*

- Worked with a team of 5 to analyze a hypothetical pharmaceutical portfolio, offering strategic recommendations for long-term revenue optimization and market-share growth, presented recommendations to professional industry consultants

## Leadership and Service

**VOLUNTEER CONSULTANT –** *Community Consulting Teams (CCT) Atlanta - Atlanta, GA - 2016 to present*

- Worked with a team of 5 to update and organize the policy and procedures manual for Community Advanced Practice Nurses, a non-profit free clinic offering health care services to homeless and economically disadvantaged residents

**GRADUATE STUDENT BODY PRESIDENT –** *Georgia Institute of Technology – May 2016 to April 2017*

- Primary representative and advocate for 6,500+ graduate students, working extensively with senior Faculty and Administrators
- Develops and manages institute-wide graduate student initiatives, defining Graduate Student Government priorities and plans

**GRADUATE STUDENT GOVERNMENT EXEC. BOARD MEMBER –** *Georgia Institute of Technology - Aug 2015 to May 2016*

- Directed the development of the Georgia Tech PhD Thesis template, working with the GT Department of Graduate Studies
- Helped manage initiatives, elections, appointments to institute-wide committees, and general operations of the legislative body

**GRADUATE STUDENT GOVERNMENT SENATOR –** *Georgia Institute of Technology - Aug 2014 to May 2016*

- Represented the graduate student body to responsibly allocate ~$2 million to student groups and campus services
- Served on institute committees to discuss and set policy on topics ranging from student health to technology-enhanced teaching

**STUDENT MENTOR –** *MSE Student Mentor Program - Georgia Institute of Technology - Atlanta, GA - 2015 to 2016*

- Personally mentors multiple undergraduate students, advising on academic issues, professional goals, and career plans

**FINANCIAL ACCOUNTANT** – *Harbour East Asia – Fall 2015 to 2016*

- Maintains financial records for 501(c)(3) non-profit organization, advises on long-term program and financial strategies

**BOARD MEMBER** – *MSE Graduate Student Advisory Group - Georgia Institute of Technology - Atlanta, GA - 2014 to 2015*

- Advised the MSE Department on policy changes and initiatives, planned and ran professional development events for students
- Aided in the planning, organization, and implementation of the graduate student recruitment process for the MSE department
- Aided in the planning, organization, and implementation of a MSE poster event with 35+ presenters and over $10,000 in awards

## Formal Communication

### ORAL PRESENTATIONS

- *"Novel Meso-Scale Sensors Employing Multi-Layered Photonic Crystal Structures for Probing Shock-Compression Effects in Heterogeneous Materials."* 2015 Materials Research Society International Conference, Boston, MA
- *"Spectral Response of Multilayer Optical Structures to Dynamic Loading."* 2015 American Physical Society - Shock Compression of Condensed Matter International Conference, Tampa, FL
- *"Dynamic Mechanical and Optical Response of Dielectric Mirrors and Optical Microcavities."* 2014 Aeroballistics Range Association International Symposium, Arcachon, France
- **20+** additional academic and professional talks from miscellaneous events and classes, both formal and informal settings

### POSTER PRESENTATIONS

- *"Spectral Response of Multilayer Optical Structures to Dynamic Loading."* 2015 American Physical Society - Shock Compression of Condensed Matter International Conference, Tampa, FL
- *"Correlating Computationally Derived Particle Surface Stress-Strain States to Mesoscale Shock Response,"* 2013 American Physical Society - Shock Compression of Condensed Matter International Conference, Seattle, WA
- *"Spectral Response of Multilayer Optical Structures to Dynamic Loading."* 2015 Materials Research Society International Conference, Tampa, FL
- *"Dynamic Mechanical and Optical Response of Dielectric Mirrors and Optical Microcavities."* 2015 Minerals, Metals, and Materials Society International Conference, Orlando, FL
- **8+** additional poster presentations from miscellaneous conferences, events, and classes, both formal and informal settings

## Honors and Awards

### PROFESSIONAL FELLOWSHIPS AND AWARDS

- **American Society for Engineering Education National Defense Science & Engineering Graduate Fellowship** – 2014 to 2017
- **Georgia Institute of Technology President's Fellowship –** 2013 to 2017
- **Georgia Institute of Technology Federal Jackets Fellowship –** 2016
- Invited Student Speaker – 2014 ARA International Symposium
- Poster Award – 2016 Defense Threat Reduction Agency Basic Research Program Technical Review
- Best Poster Nominee – 2015 Materials Research Society International Conference
- 1st in category Poster Award – 2015 Georgia Tech Materials Science & Engineering Poster Session
- 2nd in category Poster Award – 2014 Georgia Tech Materials Science & Engineering Poster Session
- 2nd in category Poster Award – 2014 Georgia Tech Institute for Materials Poster Session
- Student Travel Award – 2013 APS-SCCM International Conference
- Student Travel Award – 2015 APS-SCCM International Conference
- Student Travel Award – 2014 ARA International Symposium

### ACADEMIC AWARDS

- Georgia Institute of Technology Faculty Honors – **10** Semesters, 2010 to 2015
- Duncan A. (Sr.) and Elizabeth M. Mellichamp Scholarship – Spring 2012
- Georgia Institute of Technology Dean's List – **2** Semesters, 2011

## Technical Skills

**Programming Languages:** R, Python, LaTeX, MATLAB, HTML/CSS, Javascript, Node, VBA, BASH, C++, SQL
**Office Productivity:** Microsoft Office (Word/Powerpoint/Excel), LibreOffice/OpenOffice, Windows 7/8/10, Linux/Unix
**Data Analytics Software:** Rstudio, MATLAB, Tableau, Excel, SAS
**Communication:** Public speaking (formal and informal settings), technical writing
**Laboratory Equipment:** Lasers, velocity interferometry, oscilloscopes and circuits, optics and fiber optics, machining tools
**Physics Simulation Software:** Simulia Abaqus, ANSYS Workbench, COMSOl Multiphysics, ALE3D, CTH, MEEP