

# Samuel J. Audia

Senior Software Engineer, High Performance Simulations and Scientific Machine Learning

## Profile

Website | LinkedIn | Google Scholar

Senior software engineer specializing in high performance, GPU-accelerated systems and scientific ML research seeking a culture of innovation and collaboration bringing research ideas to production.

## Professional Experience

### Supervisor, Scientific Computing and Software Development

Johns Hopkins University Applied Physics Lab | January 2024–Present

- Pitched and communicated with program managers to maintain over \$1.3 million in funding
- Built a grass roots platform team that created and maintained infrastructure tools for software developers across the organization
- Hired and mentored a team of software developers to build better, more maintainable products with avenues for career growth
- Architected and maintained a suite of GPU accelerated high performance electromagnetics simulations including core simulations, language bindings, visualization, and post processing tools

### Software Engineering Lead

Johns Hopkins University Applied Physics Lab | October 2021–December 2023

- Led a four-person agile team developing high-performance physics simulations for scalable, high-throughput analysis
- Mentored interns and junior engineers in computational electromagnetics, C++, and modern software practices, delivering systems typically requiring senior-level teams
- Influenced software engineering strategy in 2000 person sector through highly visible software engineering working group and continuously briefing leadership
- Built and maintained Linux-based development infrastructure supporting modern workflows, including continuous integration and delivery

### Associate Staff

Johns Hopkins University Applied Physics Lab | July 2020–August 2021

- Implemented complex numerical physics method in existing GPGPU accelerated simulation to address long standing numerical issue
- Self taught graduate computational electromagnetics theory and methods to quickly provide meaningful contributions to the team
- Interviewed over 40 software engineering leads to establish standards and best practices
- Founded software community of practice to improve software knowledge and quality

## Publications

2 Papers in Review at Top ML Conference, “*Differentiable Simulations in Fluids and Optical Lens Design*,” (Double-Blind).

**Samuel Audia**, Matthias Zwicker, Dinesh Manocha, “*Neural Electrostatics: A 3D Physics-Informed Poisson Equation Solver for Exterior Fields*,” EuCAP, 2026.

**Samuel Audia**, Dinesh Manocha, Matthias Zwicker, “*Accelerated, Memory-Efficient Far-Field Scattering Computation with Monte Carlo SBR*,” IEEE Transactions on Antennas and Propagation, 2025.

**Samuel Audia**, Soheil Feizi, Matthias Zwicker, Dinesh Manocha, “*How Learnable Grids Recover Fine Detail in Low Dimensions: A Neural Tangent Kernel Analysis of Multigrid Parametric Encodings*,” ICLR, 2025.

Archit Kambhamettu, Samantha Snyder, Maliheh Fakhar, **Samuel Audia**, Ross Miller, Jae Kun Shim, Aniket Bera, “*VidSole: A Multimodal Dataset for Joint Kinetics Quantification and Disease Detection with Deep Learning*,” AAAI Conference, 2025.

Aayush Sharma, Greta Kintzley Rachel Hartig, **Samuel Audia**, Matthew Landes, Benjamin Estacio, “*Hypervelocity Impact Properties of Polyimide Aerogels for Space Debris Shielding and Capture*,” IEEE Conference on Aerospace, 2024.

Ruichen Wang, **Samuel Audia**, Dinesh Manocha, “*Indoor Wireless Signal Modeling with Smooth Surface Diffraction Effects*,” EuCAP, 2024.

## Contact

(410) 707-8761  
Columbia, MD  
samuel.j.audia@gmail.com

## Education

### PhD Computer Science

University of Maryland, College Park  
2023–2027 (Expected), GPA: 4.0/4.0

### MS Applied Mathematics

Johns Hopkins University, Baltimore  
2020–2022, GPA: 4.0/4.0

### BS Computer Science

University of Maryland, College Park  
2016–2020, Summa Cum Laude

### BS Mechanical Engineering

University of Maryland, College Park  
2016–2020, Summa Cum Laude

## Skills

### Programming + Systems

- C++
- C
- Python
- CUDA, GPU Acceleration
- DevSecOps
- Linux
- SLURM

### Scientific Modeling

- Finite Element Methods
- Numerical PDE Solvers
- Monte Carlo Simulation

### Differentiable Simulation

- Differentiable Programming
- Physics-based Optimization
- End-to-end ML Systems
- Inverse Design

### Machine Learning

- Deep Learning
- Experiment Tracking
- PyTorch
- Dr. Jit