

Pradosh P. Dash

NVH Research Engineer | Ph.D., Mechanical Engineering

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EDUCATION

Georgia Institute of Technology

2020 – 2026

Ph.D., Mechanical Engineering

Atlanta, GA

GPA 4.0/4.0. **Thesis:** Transcranial Focused Ultrasound Therapy and Monitoring Using Nonlinear Acoustics. **Advisor:** Costas D. Arvanitis

Coursework: Acoustics I & II, Nonlinear Acoustics, Acoustic Transducers and Signal Analysis, Dynamics, Quantitative Neuroscience, Medical Imaging, Imaging with Data-driven Models, Finite Element Methods, Vibration of Mechanical Systems, Machine Vision, Optimization Techniques in Engineering

Virginia Tech

2018 – 2020

M.S., Mechanical Engineering

Blacksburg, VA

GPA 4.0/4.0. **Thesis:** Operational Modal Analysis of Rolling Tire: A Tire Cavity Accelerometer Mediated Approach for Structure Borne Noise Prediction. **Advisors:** Ricardo Burdisso & Pablo Tarazaga

Coursework: Finite Element Methods, Modelling and Simulation of Multi-body Dynamics, Vibration of Mechanical Systems, Model Order Reduction, Advanced Engineering Acoustics, Optimization Techniques in Engineering, Applied Linear Systems

National Institute of Technology Rourkela

2011 – 2015

B.Tech., Mechanical Engineering

Rourkela, India

CGPA 9.7/10 (Valedictorian). University Gold Medalist; felicitated by the President of India. **Thesis:** Design of Piezoresistive MEMS Accelerometer With Optimized Device Dimensions. **Advisor:** Subrata Panda

PROFESSIONAL EXPERIENCE

NVH Research Engineer

Jun 2026 – Present

Matic Robots

Menlo Park, CA

- Lead acoustic and vibration performance optimization across the robot platform to sustain best-in-class ultra-quiet operation as a core product differentiator.
- Apply signal processing and modal/structural-acoustic analysis to identify and mitigate airborne and structure-borne noise sources, from component bench testing through full-system validation.
- Develop measurement and simulation methods to root-cause NVH issues early in the design cycle, partnering with mechanical, electrical, and software teams to embed acoustic targets into design decisions at production scale.

Research Scientist Intern

May 2025 – Nov 2025

Meta Platforms Inc., Reality Labs Research

Pasadena, CA

Confidential R&D project (details under NDA)

- Engineered high-performance ultrasonic sensors and signal processing algorithms for wearables and robotic sensing, leveraging expertise in acoustics, sensor physics, system optimization, and real-time analysis.
- Led sensor characterization and algorithm development, driving performance gains through rapid iteration and creating custom imaging tools for system validation.
- Developed Doppler-based motion rejection algorithms to suppress motion artifacts in dynamic wearable environments.
- Collaborated with cross-functional teams in an agile environment to solve complex sensing challenges, advancing projects from initial concept to validated prototype.

Graduate Research Assistant

Aug 2020 – May 2026

Georgia Institute of Technology, Ultrasound Biophysics & Bioengineering Lab

Atlanta, GA

- **Transcranial ultrasound imaging & therapy:** Developed and experimentally validated fast aberration correction algorithms using differentiable acoustic propagators and multi-channel transducer arrays (Verasonics). Implemented GPU-accelerated nonlinear wave propagation simulations for heterogeneous skull bone. Designed beamforming sequences and optimized acoustic hologram topologies for trans-skull focused ultrasound.

- **Signal & image processing:** Applied SVD-based spatiotemporal filtering, strain imaging techniques, and advanced beam-forming (delay-and-sum, angular spectrum) for transcranial passive acoustic mapping and volumetric image reconstruction.
- **Neuromodulation biophysics:** Explored biophysical mechanisms of ultrasound neuromodulation using ultrafast acquisition to capture transient neural responses. Developed novel tools to control neuronal circuits.

Graduate Research Assistant

Aug 2019 – Jul 2020

Virginia Tech, Center for Tire Research (CentiRe) / Vibration & Acoustics Lab

Blacksburg, VA

- Developed experimental and numerical procedures for vibro-acoustic measurement of rolling tires and data-driven modeling for structure-borne noise prediction.
- Experimental modal analysis using laser vibrometry and tire cavity accelerometer arrays under realistic speeds, loads, and excitations.
- Designed a semi-active tuned absorber to reduce rest tremors in Parkinson's patients.

Summer Intern

May 2019 – Aug 2019

Maxxis International-US, Tire NVH/Dynamics Group

Suwanee, GA

- Improved the Maxxis modal analysis procedure and validation; conducted repeatability trials with different boundary conditions.
- Identified complex, coupled tire mode shapes and characterized modal parameters for structure-borne noise identification.

Bajaj Auto Ltd.

Jul 2015 – Jul 2018

Research & Development, Noise and Vibration

Pune, India

Assistant Manager (R&D), Noise & Vibration

Jan 2018 – Jul 2018

- Designed engine-chassis layouts ensuring NVH compliance and seamless powertrain integration for commuter bikes.
- Conducted end-to-end testing and validation from prototype to production; authored SOPs and validation protocols.
- Tuned exhaust psychoacoustic parameters to balance sound quality, performance, and Pass-by-Noise (PBN) regulations.
- Applied DRBFM failure-mode analysis to resolve field issues and enhance product reliability.

Senior Design Engineer, Powertrain NVH

Jul 2016 – Dec 2017

- Led NVH optimization of powertrain subsystems to improve acoustic performance, durability, and regulatory compliance.
- Developed vibration modeling libraries and applied predictive analytics to refine NVH designs with cross-functional teams.
- Performance and durability testing and validation for prototype-to-production batches.
- Resolved design-related field failures using Design Review Based on Failure Mode (DRBFM) analysis.
- Cost reduction in design, manufacturing, and assembly through Value Analysis/Value Engineering (VAVE) proposals.

Graduate Trainee, Active Noise Control & NVH

Jul 2015 – Jun 2016

- Designed and implemented a feed-forward Active Noise Cancellation (ANC) system on a TMS320 DSP platform to abate intake roar in the 0–200 Hz range.
- Developed FxLMS adaptive filtering algorithms achieving 10 dB attenuation in 2nd-order noise during steady-state and transient conditions.
- Conducted end-to-end ANC prototype testing, managing signal acquisition (ADC/DAC) and optimizing loop performance for vehicle integration.
- Identified critical structural modes and implemented design modifications to reduce structure-borne noise from combustion and transmission loads.

Summer Research Assistant

May 2014 – Jul 2014

Otto-von-Guericke University Magdeburg, DAAD WISE Fellowship

Magdeburg, Germany

- Contributed to development and validation of the international standard IEC 62714, "Engineering data exchange format for use in industrial automation systems engineering" (AutomationML).
- Worked on modularization methodologies for production systems and behavior modelling of production system components.

- XML-based system description and component-based library design.

TEACHING

ME 6452: Wave Propagation in Solids

Spring 2025

Teaching Practicum, Georgia Institute of Technology

Advanced graduate course covering elastic wave propagation, dispersion relations, and wave mechanics in solid media. Assisted with lectures and guided complex mathematical derivations and simulations.

ME 6760: Acoustics I

Fall 2022 & Fall 2024

Graduate Teaching Assistant, Georgia Institute of Technology

Fundamental principles of acoustics including sound wave propagation, acoustic impedance, and room acoustics. Led recitation sessions, assisted students with MATLAB projects, and helped with experimental acoustic measurements.

PHY 2216: Physics Laboratory

Spring 2019

Graduate Teaching Assistant, Virginia Tech

Introductory physics laboratory covering mechanics, thermodynamics, and wave phenomena. Instructed 90 sophomores in experimental design, data collection, and scientific report writing.

ME 4006: Mechanical Engineering Lab

Fall 2018

Graduate Teaching Assistant, Virginia Tech

Experimental methods in mechanical engineering including vibration analysis, heat transfer, and fluid mechanics measurements. Instructed 100 seniors on structural health monitoring and wind-induced vibration modeling of tall structures with experimental validation.

SKILLS

Analysis & Simulation

COMSOL Multiphysics & FEM, Ansys, HyperMesh, MSC Adams, ME'Scope, k-Wave, GPU-accelerated simulation

Design & CAD

SolidWorks, Siemens NX, AutoCAD, 3D printing, transducer array & hologram topology design

Hardware & Measurement

Laser vibrometry, accelerometer arrays & hydrophones, TMS320 DSP & sensor prototyping, ADC/DAC, impedance analyzer, oscilloscope, function generator

Programming

Python, C/C++, MATLAB, NumPy, SciPy, PyTorch, CUDA, Simulink, Git, $\LaTeX$