Vasileios Kouloumentas

phone: +1 (404) 751-7133 • vkouloumentas3@gatech.edu • linkedin.com/in/vasileios-kouloumentas

Education

Georgia Institute of Technology – Atlanta, GA **Expected Graduation May 2026**
Bachelor of Science in Biomedical Engineering • Pre-Med Concentration • Minor in Applications of AI/ML
GPA 4.0, Faculty Honors and Dean's List Fall 2022 - Fall 2025

Athens College – Athens, Greece **July 2022**
High School Diploma, GPA 19.9/20
Excellence Award by the Ministry of Education • President's Academic Excellence Award List

Research & Industry Experience

Undergraduate Researcher, Ultrasound Biophysics Lab Georgia Tech - Atlanta, GA **November 2023 - Present**
• Built an automated ultrasound-driven microbubble (MB) stimulation platform for immune cell modulation, including real-time cavitation control and custom MATLAB GUI to run the full experimental workflow
• Established the acoustic safety window for macrophages by determining the cavitation threshold and exposure limits from viability assays; these constraints are now used for all follow-up studies
• Presented validated findings on MB control and cell response at the Georgia Tech BME Research Symposium (Spring 2025)
• Designed and 3D printed custom transducer and well-plate holders, and calibrated each transducer's resonant frequency and focal distance using a hydrophone to ensure accurate, repeatable targeting
• Ongoing: Independently collect large MB and MB–macrophage datasets under varied ultrasound conditions (pressure, PRF, number of cycles, MB concentration), using machine learning to relate acoustic emissions to macrophage phenotypic changes

Observer and Research Assistant, Orthopedics at Massachusetts General Hospital – Boston, MA **May 2024 – June 2024**
• Co-authoring a systematic review on ACL injury prevention programs (abstract accepted - AOSSM 2026)
• Conducted literature review, data extraction, and analysis of Level I & II studies
• Observed 100+ hours of orthopedic surgeries and 150+ hours of outpatient clinical visits gaining exposure to perioperative workflow and clinical decision-making

Mechanical Engineering Intern, Elvalhalcor – Oinofyta, Greece **June 2023 - July 2023**
• Supported maintenance team in industrial aluminum production facility; assisted with equipment sketches, documentation, and logistics
• Produced equipment drawings in SolidWorks and documentation improving workflow traceability and safety compliance

Projects

Finger Mounted Digital Otoscope with AI-Assisted Image Capture – Atlanta, GA **August 2025 - Present**
• Built a finger-mounted digital otoscope with custom silicone ear tips to improve ear canal alignment and visualization
• Implemented automated image capture significantly reducing acquisition time without compromising diagnostic image quality
• Designed a button-free, three-step workflow in which users simply position the device and obtain a diagnostically usable otoscopic image; users consistently preferred the finger-mounted design over traditional handheld scopes
• Awarded Best Overall Create-X Project at Georgia Tech and selected for InVenture Prize semifinals (Golden Ticket)

Surface EMG Neck Pain Analysis System – Atlanta, GA **August 2025 – December 2025**
• Developed a surface EMG data acquisition system using Arduino Uno and dual op-amp circuits to record and process muscle activity from the cervical region
• Designed experimental and participant classification protocols using validated pain and handedness questionnaires to study correlations between neck-muscle asymmetry and self-reported neck pain
• Verified system performance by detecting distinct activation patterns across neck muscle groups for 36 participants

Electrosurgical Pencil Redesign – Atlanta, GA **August 2024 – December 2024**
• Prototyped ergonomic electrosurgical pencil with integrated smoke evacuation system
• Developed a magnetic pencil holder that attaches to the surgical table to prevent contamination from drops, improving workflow efficiency and reducing desterilization risk
• Created and validated 3D-printed prototypes and drafted FDA Class II (510k) regulatory and manufacturing plan

At-Home Preeclampsia Monitoring Device – Atlanta, GA **January 2024 – May 2024**
• Built ear-mounted PPG sensor (Arduino Nano + 3D printing) with <10 % HR error vs controls
• Modeled stroke volume & MAP from PPG data for BP estimation and analyzed bias across skin tones

Leadership & Activities

Ambassador, BME Ambassadors Georgia Tech – Atlanta, GA **January 2025 – Present**
• Leading tours/presentations on BME curriculum, research, and career paths for prospective students

Teaching Assistant, Georgia Tech – Atlanta, GA **January 2024 – May 2025**
• Biomechanics (Spring 2025): Led recitations and review sessions for 120+ students on dynamics and deformable bodies in human anatomy
• Physics I & II (2024): Coordinated Mechanics and Electromagnetism labs; prepared weekly review content and guided 60+ students through conceptual problem sets

Vice President, API Chapter Georgia Tech – Atlanta, GA **January 2023 – December 2024**
• Assisted with coordinating across officers and increasing member engagement to grow participation in club activities focused on accessible prosthetic design

Engineer, Medical Robotics Club Georgia Tech – Atlanta, GA **January 2023 – December 2023**
• Contributed to design and fabrication of robotic arm components using CAD and 3D printing, and laser cutting

Co- founder, Pet-Link – Athens, Greece **September 2020 – August 2021**
• Designed algorithm matching pets with adopters; led 30+ member team to win international social startup award

Skills

Technical: MATLAB • Python • SOLIDWORKS • Fusion 360 • Arduino • CAD & 3D Printing
Analytical: Signal & Image Processing • Machine Learning • Object-Oriented Programming
Languages: Greek (Native) • English (Fluent) • German (Intermediate)