

NICHOLAS TRIGGER

Biomedical Engineer

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SUMMARY

Biomedical Engineering alumnus from Duke University specializing in medical device R&D, with hands-on experience designing, prototyping, and validating hardware from PCB-level electronics to mechanical enclosures. Comfortable across embedded systems (C/C++, RTOS, ESP32) and benchtop testing under ISO/FDA-conscious development, with clinical research and leadership experience that bridges engineering and real-world clinical workflows.

EDUCATION

Duke University, Durham, NC

AUG 2022 – MAY 2026

Bachelor's of Science in Biomedical Engineering

Relevant Coursework: Biomaterials, Biomechanics, Medical Device Design, Embedded Medical Devices, Imaging Systems

PROFESSIONAL EXPERIENCE

Research and Development Engineer

DEC 2025 – MAY 2026

Resolute Medical (Durham, NC)

- Designed and validated innovative bacterial testing protocols to enhance product evaluation.
- Conducted comprehensive literature reviews to inform and refine experimental designs.
- Documented and analyzed experimental results, facilitating informed design decisions and technical reporting.

Classroom R&D Engineer

APR 2025 – MAY 2026

Duke University Biomedical Engineering Dpt. (Durham, NC)

- Designed, fabricated, and assembled electronic laboratory hardware for deployment across BME teaching labs.
- Developed a stimulus-responsive EKG simulator generating physiologically accurate signals for lab use.
- Validated hardware performance under extended use conditions to ensure durability and safety.

Makerspace Assistant Manager

AUG 2023 – MAY 2024

The Foundry at Duke University (Durham, NC)

- Supervised daily operations of the Foundry makerspace, enhancing student engagement with fabrication equipment.
- Trained users on the safe operation of 3D printers, laser cutters, CNC machines, and electronics tools.
- Coordinated maintenance schedules to ensure compliance with safety standards, fostering a safe secure environment.

Clinical Research Associate

JUN 2023 – AUG 2024

Christus Spohn Health System (Corpus Christi, TX)

- Supported emergency medicine clinical studies by ensuring compliant data collection and thorough EMR review.
- Collected and documented patient consent in accordance with IRB and FDA guidelines.
- Collaborated effectively with physicians, residents, and research staff to facilitate ongoing clinical investigations.

Engineering Design Teaching Assistant

AUG 2023 – JUN 2024

Duke University Biomedical Engineering Dpt. (Durham, NC)

- Mentored student teams through comprehensive engineering design and prototyping workflows, fostering innovation and collaboration.
- Supported hardware and CAD development for client-driven design projects, ensuring high-quality deliverables.
- Evaluated technical deliverables and conducted design reviews to maintain project standards.
- Oversaw the safe use of machine shop equipment, promoting a culture of safety and responsibility.

Engineering Services Intern (Large Projects Division)

JUL 2023 – AUG 2024

City of Corpus Christi (Corpus Christi, TX)

- Developed and implemented a streamlined workflow to enhance city audit processes, improving efficiency.
- Assisted in the bidding process by organizing documentation for city projects, ensuring accuracy and accessibility.
- Identified discrepancies between contractor agreements and city contracts, promoting better compliance and accountability.

LEADERSHIP & EXTRACURRICULAR INVOLVEMENT

Co-Founder and Developer

AUG 2023 – MAY 2026

P.A.T.S Development (Durham, NC)

- Led the development of a medical training device focused on improving arterial line placement accuracy.
- Directed device design, prototyping, and iterative testing in collaboration with other students and Duke Med School.
- Secured a \$5,000 VentureWell grant to support continued device development.

Community Outreach Manager and Class Lead

OCT 2023 – APR 2025

Duke Robotics Mentorship (DuRM) (Triangle, NC)

- Led weekly robotics instruction sessions for middle school students in Durham-area schools.
- Managed communication and coordination between Duke undergraduate mentors and partner schools.

Equipment Chair and Safety Chair

AUG 2023 – MAY 2026

Duke University Club Ski and Board (Durham, NC)

- Oversaw equipment inventory, inspection, and maintenance to ensure compliance with safety standards.
- Coordinated equipment logistics and distribution to support club operations and travel.

Payload Team Engineer

AUG 2023 – MAY 2025

Duke University Club Aerospace (Durham, NC)

- Developed embedded firmware to control payload release sequencing and system timing.
- Contributed to the development and integration of a CubeSat-style payload for a student-led rocket mission.

RunCorpusChristi

AUG 2020 – JUL 2022

Founder, Event Manager, Team Lead (Corpus Christi, TX)

- Organized running events for charity in Corpus Christi, TX.
- Raised over \$10,000 for the Ronald McDonald House and Driscoll Children's Hospital.

Fish and Herpetology Volunteer

MAY 2017 – APR 2020

The Texas State Aquarium (Corpus Christi, TX)

- Provided care to animals through maintenance, enrichment, and feeding.
- Educated guests on animals and environmental threats to animals.
- Gold Presidents award for Volunteer Service.

CERTIFICATIONS AND SKILLS

Certifications: CSSC: Lean Six Sigma White Belt, Nordic Semi: nRF Connect SDK Fundamentals, Matter Fundamentals

Technical Skills: BioSignal Processing, X-ray, MRI, CT, PET, Medical Device Prototyping, Biomechanics, ISO Standards, FDA Regulations, EMG, Medical Image Processing, Medical Firmware, GD&T, PCB Layout, PCB Design, Python, C, C++, Embedded C, FreeRTOS, Zephyr, JavaScript, TypeScript, HTML/CSS, SQL, SPI, I2C, UART, CAN, BLE, USB, V&V, Bench Testing, System Validation, Bacterial Testing, Phantoms, Data Collection & Analysis, PCB Triage, Prototyping

Tools: SolidWorks, Fusion 360, AutoCAD, OnShape, SolidWorks, KiCAD, EAGLE CAD, Git, GitHub, GitLab, 3D Printing, Laser Cutting, CNC Milling, Manual Machining, Waterjet Cutting, PCB Assembly, PCB Fabrication, Microsoft Office, LaTeX

PATENTS

Device and Methods for Arterial Insertion Training

FILED MAY 2, 2023

US Provisional Patent No. 63/463,432

PROJECTS

Central Line Associated Bloodstream Infection Prevention Device

nicholastrigger.com/projects/clabsi

- Developed handheld UV-C disinfection device for central-line hubs as Duke BME senior capstone, targeting 40,000 annual CLABSIs and eliminating dependency on nurse compliance with Scrub-the-Hub protocol.
- Engineered three custom KiCad PCBs, an SLA 3D printed enclosure, and validated a 4-log CFU reduction and 2.49 mW optical output targeting the 263–273 nm germicidal window.

Stimulus Responsive ECG Synthesizer

nicholastrigger.com/projects/ecg

- Designed and built an ESP32 ECG synthesizer (C++/FreeRTOS) with custom differential analog output stage targeting standard limb lead outputs, enabling repeatable bench validation of ECG acquisition hardware and signal processing algorithms.

Browser Games

nicholastrigger.com/projects/games/

- Built a collection of eight self-contained browser games (Snake, 2048, Tower Defense, Flappy Bird, and more) in React and TypeScript using a registry-driven architecture and a reusable game-player component.

Radial Arterial Line Placement Training Device

nicholastrigger.com/projects/arm

- Co-developed a durable, anatomically accurate arterial line placement training device to address the shortage of realistic, reusable simulation tools for radial a-line insertion training
- Iterated through multiple prototype revisions incorporating clinician/user feedback to improve pulse simulation fidelity, tissue realism, and durability under repeated needle insertions

Factory Scheduling & KPI Reporting API

nicholastrigger.com/projects/factory-scheduler

- Built a constraint-based production scheduling service on OR-Tools CP-SAT that accepts job-shop problems as JSON and returns tardiness-minimizing schedules with KPIs.
- Architected a FastAPI backend with a pluggable adapter, objective, and constraint system, paired with a React and TypeScript Gantt frontend for visualization.

BME 354 Multi-Chip IC Tester

nicholastrigger.com/projects/chip-tester

- Designed a custom KiCad PCB to validate multiple integrated circuits for Duke BME 354 coursework.

PET/CT Brain Phantom Simulator

nicholastrigger.com/projects/pet-ct-sim

- Built a physics-based PET/CT brain phantom simulator in Python and Jupyter, implementing phantom generation, CT simulation, and PET simulation pipelines for medical imaging education.

Dog Activity Trackers

nicholastrigger.com/projects/dog

- Served as consulting TA for two Duke EGR 101 Foundry teams building wearable GPS and accelerometer trackers for foster dogs at Saving Grace Animal Shelter.
- Guided students through sensor selection, prototyping, and iteration on a real-world wearable.

NicholasTrigger.com Portfolio Websiter

nicholastrigger.com

- Built a personal portfolio site in React, Vite, and Tailwind CSS, statically prerendered for GitHub Pages, with an interactive games section and site-wide custom features.