JAEHYEON (ZACH) PARK

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Education

The Cooper Union for the Advancement of Science and Art *Aug. 2020 – May 2026*
Bachelor of Engineering in Mechanical Engineering / Minor in Bioengineering **GPA:** 3.85/4.00

- **Memberships:** Tau Beta Pi (Engineering Honor Society), ASME, and BMES
- **Related Coursework:** Mechatronics, Biomechanics, Feedback Control, Signal Processing, Design & Prototyping, Sports Medicine, Materials Science, Mechanics of Materials, Stress & Applied Elasticity, Mechanical Vibrations

Research & Technical Experiences

Active Upper-Limb Exosuit for Surgical Tremor Mitigation **New York, NY**
Senior Capstone Project Lead *Aug. 2025 – Present*

- Develop sEMG-based active wearable armrest that follows voluntary arm motion and provides adaptive support for static postures, reducing musculoskeletal strain during Ear, Nose, and Throat (ENT) and microsurgical procedures
- Leverage NIST-provided Auxivo EduExo Pro to analyze commercial exosuit designs and develop custom ergonomic prototype optimized for surgical use, redistributing load from shoulders to hips and thighs
- Collaborate with Mount Sinai ENT clinicians and Nicholas Institute of Sports Medicine and Athletic Trauma Lab, using BTS FREEEMG system and IRB-approved passive exosuit dataset for validation and motion analysis

Mount Sinai BioDesign **New York, NY**
Undergraduate Research Intern *Aug. 2025 – Present*

- Engineer patient-specific Chronic Subdural Hematoma (CSDH) surgical simulation platform to test Periscope Kit, neuroendoscopic CSDH evacuation tool enabling active suction through craniotomy access
- Collaborate with neurosurgeons and industry partners including Medtronic and Stryker to validate device prototypes such as soft Intracerebral Hemorrhage (ICH) phantom and burr-hole surgical testbed

Professor David Wootton Group at Cooper Union **New York, NY**
Undergraduate Researcher *Jan. 2025 – Present*

- Devise wearable sensor for arteriovenous fistula failure detection in dialysis patients; build dual-axis piezoelectric module with differential amplifier (12 dB SNR gain) detecting vibration signatures across 4 stenosis levels
- Construct pulsatile flow testbed (40–120 BPM) via 3D-printed molds; assemble Arduino/LabVIEW DAQ with real-time FFT and notch filtering at 1 kHz
- Miniaturize into 42 g wireless wearable through 4 CAD iterations with silicone-molded enclosure and integrated PCB, maintaining signal fidelity within 6%

Research Experiences for Undergraduates (REU) at Wake Forest University **Winston-Salem, NC**
Summer Undergraduate Researcher (Manuscript in Preparation) *May 2025 – Aug. 2025*

- Quantified ISS pre/post-flight vertebral geometry, cortical thickness, vBMD, and spinal muscle volume via qCT/MRI
- Built and validated subject-specific FE spine models predicting strength loss and fracture risk during launch/landing
- Funded by NASA, supporting Risk of Injury from Dynamic Loads countermeasure efforts for astronaut spine health

Ovelia Health (Johns Hopkins University Incubator Project) **Baltimore, MD**
Product Design Lead *Feb. 2025 – Dec. 2025*

- Led product design and development of digital health platform for Polycystic Ovary Syndrome (PCOS) screening and cycle tracking integrating ML-based emotional support and symptom assessment
- Refined UI/UX through 50+ user/clinician interviews (NSF I-Corps) and worked with Johns Hopkins Bloomberg School of Public Health and Aspect Health to prepare IRB-approved clinical validation of screening algorithm
- Secured $23k in funding through accelerator programs and won 2nd place at 2025 TEDCO Expo Pitch Competition

Professor Steffen Ihlenfeldt at Technische Universität Dresden **Dresden, Germany**
Summer Undergraduate Researcher (Manuscript in Preparation) *May 2024 – Aug. 2024*

- Optimized 5 electromagnetic forming parameters via 32-run DOE and LS-DYNA, reducing forming deviation by 18%; modeled assemblies in CATIA V5 with ANSYS stress analysis improving conformance by 12%
- Designed injection-molded plastic housings and evaluated casting and extrusion alternatives with Fraunhofer IWU engineers, applying DFM principles to reduce defects and improve manufacturability across 3 housing variants
- Trained TFT ML models on 150+ datasets to predict form depth within ±0.3 mm, reducing physical trials by 40%

Professor Michelle Rosen Group at Cooper Union **New York, NY**
Undergraduate Researcher *Jan. 2024 – May 2025*

- Conducted FEA to characterize soft actuator nonlinear hyperelastic behavior and wall-thickness variation instabilities
- Applied origami-inspired geometries to prototype compact soft robots aimed at disaster-response navigation
- Modeled and tested manufacturing process, including silicone molding techniques, to optimize actuator performance

Professor Dongjun Lee at Seoul National University **Seoul, South Korea**
Undergraduate Researcher *Jun. 2021 – Aug. 2021*

- Developed modular AGVs with ROS-based multi-point coupling architecture enabling swarm collaboration
- Created Blender animations visualizing collaborative AGV motion and optimized docking/connection sequences

Awards & Scholarship

Maroon & Gold Labs Full Grant Winner **Nov. 2025**

- Awarded $5,000 Cooper Union incubator funding supporting Ovelia Health clinical study and validation

NIH NIBIB/VentureWell DEBUT Challenge 2nd Place Winner **Oct. 2025**

- Engineered wearable AVF monitoring device for early detection of fistula stenosis using piezoelectric sensors
- Awarded $15,000 prize and invited to present at 2025 BMES Annual Meeting, selected from 123 teams nationwide

Pfizer Digital Hackathon 2nd Place Winner (Team Lead) **Sep. 2025**

- Prototyped HIPAA- and COPPA-compliant digital companion platform for pediatric cancer patients and caregivers
- Led team and presented our solution at Pfizer NY Headquarters to 50+ Pfizer Digital professionals

Pfizer Inaugural Digital Hackathon 2nd Place Winner **Sep. 2024**

- Built NLP-based virtual companion app promoting student mental health and resilience across NYC schools

Cooper Union President Half & Full Tuition Scholarship **Aug. 2020 – May 2026**

Poster Presentations

"Personalizing an Average Male Human Body Model With MRI-Derived Muscle Data From Long-Duration Astronauts"

- Biomedical Engineering Society (BMES) Annual Meeting (Oct. 8-12, 2025) / Full Travel Grant from Wake Forest University and Cooper Union
- Wake Forest University Summer Symposium (Jul. 31, 2025) / Awarded Undergraduate Research Presentation Certificate

"Optimizing Small Wind Turbine Efficiency Through Attaching a Novel Structure"

- National Conference for Undergraduate Research (NCUR) (Apr. 7-9, 2025) / Full Travel Grant from Cooper Union

"Real-Time Multi-Drone Control through Hand Gesture Recognition with MediaPipe"

- Cooper Union Vertically Integrated Projects (VIP) Spring Showcase (Apr. 25, 2024)

Extracurricular Activities

The Cooper Union for the Advancement of Science and Art **New York, NY**
Mechanical Engineering Department Student Ambassador *Sep. 2025 – Present*

- Serve as Bioengineering ambassador and act as representative speaker for ME department's external presentations

Vice President of Biomedical Engineering Society (BMES) *Aug. 2025 – Present*

- Manage research mentoring and funding; organize faculty research panels and guest lectures by external companies

President of Korean Association of Cooper Union (KACU) *Aug. 2024 – Present*

- Spearhead Korean cultural events and major-specific mentorship to help 30+ students adapt to school

Exam Proctor *Mar. 2024 – Jan. 2025*

- Ensured equitable testing access for students with disabilities while securely handling confidential exam data

Skills & Certificates

Programming Languages & Frameworks: Python, PyTorch, MATLAB, C++, ROS, React Native, JavaScript
Software & Tools: Visual3D, JMP, NI LabVIEW, Mimics, LS-DYNA, Fusion 360, Arduino, SolidWorks, MS Office
Certificates (BMES/CITI Program): Biomedical Investigators; GCP for Clinical Trials with Investigational Drugs and Biologics (ICH Focus); Fundamentals and Perspectives in Medical Product Regulation for Biomedical Engineers; Optimized Data-Driven AI for Biomedical Data Analysis