

# Jaeho Cho

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## EDUCATION

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### The Cooper Union for the Advancement of Science and Art

New York City, NY

*M.Eng, B.Eng in Electrical Engineering (Joint), Bioengineering Minor*

*Aug 2022 – May 2026\**

- Half Tuition Scholarship | Myron Coe Scholarship | Full Tuition Scholarship 2025-2026
- Courses: Digital Signal Processing, Communication Theory, Engineering Electromagnetics, Digital VLSI System Design, Integrated Circuit Engineering, Theoretical Neuroscience

## RESEARCH EXPERIENCE

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### Master's Thesis | Dr. Jabeom Koo

*Jun 2025 – Present*

*The Cooper Union for the Advancement of Science and Art • New York, NY*

- Conducting research on neuromorphic architectures for ultra-low-power brain-machine interfaces, with current efforts focused on designing a neuromorphic processing block (Analog-to-Digital Converter).
- Designed a chopper-stabilized low-noise amplifier in 65-nm CMOS using Cadence Virtuoso, achieving post-layout (PEX) verified performance of 41 dB gain over 0.6 Hz–5 kHz, 1.6  $\mu$ W power consumption, and a noise-efficiency factor of 1.7.

### Undergraduate Researcher | Dr. Michael Long

*Jun 2025 – Present*

*NYU Langone Health • New York, NY*

- Developed signal-processing and machine-learning pipelines for vocalization analysis, including acoustic feature extraction, unsupervised clustering, dimensionality-reduction techniques, and deep neural models for syllable segmentation and classification.
- Engineered a ROS2-based automated tutoring and data-collection robot enabling long-duration, minimally supervised behavioral experiments.

### Independent Researcher | Dr. Stanislav Mintchev, Dr. Brian Frost Laplante

*Jan 2025 – Present*

*The Cooper Union for the Advancement of Science and Art • New York, NY*

- Develop theory identifying when simplified models of plastic spiking neural networks break down, and deriving corrected models that remain accurate as network dynamics change during learning.
- Studied computational models of neural encoding and decoding, multi-compartment Hodgkin-Huxley dynamics, attractor networks, and plasticity rules in Python.

### Undergraduate Researcher | Dr. Jonathan Dropkin, Dr. Alfred Marc Iloreta

*Feb 2024 – Present*

*The Icahn School of Medicine at Mount Sinai • New York, NY*

- Built and evaluated multi-modal surgical workflow analysis pipelines using the Gemini API, synchronizing endoscopic and external OR video streams for surgical instrument and phase detection.
- Trained and optimized a deep learning model (Ultralytics YOLO) for real-time surgical instrument recognition in endoscopic sinus and skull-base procedures, achieving 96.4% precision, 94.8% recall, and 96.6% mAP50.
- Designing an assistive device to improve surgeon ergonomics during extended procedures, assessing effectiveness through EMG-based fatigue analysis.
- Conducted quantitative ergonomics studies of ENT surgeons using IMU (Opal V2R) and EMG (FREEEMG) sensor arrays; developing signal-processing pipelines for posture and mechanical-exposure analysis.

**Undergraduate Researcher** | Dr. Mili Shah

*Sep 2023 – Present*

*The Cooper Union for the Advancement of Science and Art • New York, NY*

- Mentoring and training four students in ROS2, PCB design, circuit prototyping, and mechanical CAD workflows, as well as broader project framing and management skills.
- Led development of a dual-arm robot; implemented motion-planning pipelines and web-based teleoperation using the ROS 2 framework.
- Building a small spherical robot for decentralized swarm self-assembly; designed and prototyped the mechanical structure and implemented communication and distributed-control routines.
- Designed and fabricated a custom PCB for an e-textile sensor, presented at the 2024 ASTM International Exo Games.

## **PUBLICATIONS**

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[1] C. Stonebraker, J. Cho et al., “Multi-modal Surgical Workflow Analysis with Gemini Image Understanding,” **Submitted** to the *2026 American Rhinologic Society (ARS) at Combined Otolaryngology Spring Meetings (COSM)*.

[2] J. Cho and S. Klymchuk, “MARVIN: Web-Based Teleoperation of a Dual-Arm Robot,” **Submitted** to the *TEI 2026 Student Design Competition*, 2026.

[3] C. Stonebraker, J. Cho et al., “Development of a Computer Vision System for Surgical Instrument Analysis During Endoscopic Sinus and Skull Base Surgery,” **Accepted** to the *2026 North American Skull Base Society (NASBS) Annual Meeting* to be published in the *Journal of Neurological Surgery Part B: Skull Base*, 2026.

## **WORK EXPERIENCE**

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**Data and AI Intern** | Hanwha TotalEnergies Petrochemical

*May 2024 – Aug 2024*

*PwC • Seoul, South Korea*

- Developed time-series forecasting models using GluonTS, Chronos, and Darts to generate three-month market predictions for petrochemical products.
- Refactored Django backend pipelines during a transition from MongoDB to ClickHouse, improving data throughput and service latency.
- Implemented a Django-based article aggregation service integrating private and public APIs to support LLM-driven sentiment analysis.

## **SKILLS**

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- Programming: Python, MATLAB, Rust, C, C++, Verilog, VHDL, Git, Docker, JavaScript, SQL
- Software: Cadence Virtuoso, LTspice, Altium, Vivado, Fusion360, ROS2, Gazebo, Blender, Onshape