

SANGHYUK KIM

Research Engineer: Bridging Low-Level Systems & Medical AI

📍 Boston, MA 🌐 [Homepage](#) ✉ sanghyuk.kim001@umb.edu 🏠 [Github](#) 🔗 [LinkedIn](#) 🎓 [Scholar](#)

EXPERIENCE

Graduate Research Engineer

Machine Psychology Group

📅 Sep 2023 – Present 📍 Boston, MA 🔗 [mpsych.org](#)

- **Meta-D Architecture Design:** Engineered a novel Transformer (T_{meta}) utilizing deterministic metadata routing to mathematically nullify missing data in multi-stream inputs. Boosted segmentation accuracy by 5.12% while slashing model parameters by 24.1% and complexity to $O(N)$. (Submitted to MICCAI 2026). [[ArXiv](#)]
- **Dual IEEE ISBI 2025 Acceptances:** Architected a 2D Bayesian uncertainty pipeline for melanoma detection (**1st Author**), slashing critical false-negatives by 40.5%. Concurrently engineered a client-side JavaScript-injection plugin for zero-latency medical image processing, securing publication acceptances.

AI Systems Architect (Co-advised)

Brain Stimulation & Simulation Lab

📅 May 2025 – Present 📍 Boston, MA 🔗 [bsslab](#)

- **Context-Aware Meta-D Routing:** Architected Meta-D's deterministic routing framework, utilizing 2.5D MRI plane orientation as dynamic metadata to mathematically resolve missing modalities. Deployed the extraction pipeline as a zero-latency, client-side inference engine. [[Live Demo](#)]

Research Engineer Intern @ NuSCI Group

SRI International

📅 May 2024 – Dec 2024 📍 Menlo Park, CA 🔗 [sri.com](#)

- **ARPA-H Production Deployment:** Engineered scalable clinical Python libraries for a \$9.75M reliable AI initiative. Successfully production-ized experimental PyTorch research, transitioning high-accuracy (97.8%) Bayesian inference models into robust, deployment-ready engines.

Systems Kernel Engineer

TmaxOS

📅 Feb 2017 – April 2021 📍 Korea 🔗 [tmaxsoft.com](#)

- **Low-Level Systems Architecture:** Architected custom C/C++ graphics kernels to bridge Linux/Windows ABIs for native PE execution, while concurrently leading a massive enterprise Smart Factory automation deployment with Samsung SDS.

PUBLICATIONS

- S. Kim, et al. "[Meta-D: Metadata-Aware Architectures for Brain Tumor Analysis and Missing-Modality Segmentation.](#)" (Submitted to MICCAI 2026)
- S. Kim, et al. "[Melanoma Detection with Uncertainty Quantification.](#)" *IEEE International Symposium on Biomedical Imaging (ISBI)*, 2025.
- E. Gaibor, ..., S. Kim, et al. "[Boostlet.js: Medical Image Processing via JavaScript Injection.](#)" *IEEE ISBI*, 2025.
- S. Kim, et al. "3D Face Modeling using Face Image." *J. of Int. Soc. for Simulation Surgery*, 2015.
- S. Kim, et al. "Pattern Noise Removal Method Using Wavelet-FFT." *IEIE Summer Conference*, 2012.

STRENGTHS

AI Architecture & Algorithm Design

Designing novel deep learning paradigms from scratch. Expert in custom Transformer cross-attention, deterministic routing, and Bayesian frameworks for robust multi-modal vision.

Clinical AI & Uncertainty Quantification

Architecting mission-critical medical pipelines. Specialized in Out-of-Distribution (OOD) detection and confidence-aware modeling to aggressively mitigate edge-case diagnostic failures.

Hardware-Aware Systems & Edge ML

4+ years of C/C++ OS-kernel development bridging Windows/Unix ABIs. Expert at porting heavy PyTorch architectures and complex standalone software into zero-latency, client-side web inference engines.

EDUCATION

Ph.D. Candidate, Computer Science

University of Massachusetts Boston

📅 2023 – 2028 (expected) 🔗 [umb.edu](#)

- **Lab:** Machine Psychology Group (Advisor: Daniel Haehn).
- **Research Focus:** Medical AI, Transformer optimization, and high-performance inference pipelines.

Graduate Researcher, ECE

Virginia Tech, USA

📅 2022 – 2023 🔗 [vt.edu](#)

- **Systems Research:** Architected signal processing and protocol optimizations for Open Radio Access Networks (O-RAN) prior to PhD transfer.

M.S., Electrical Engineering

Yonsei University, Korea

📅 2015 – 2017 🔗 [yonsei.ac.kr](#)

- **Full Scholarship:** Awarded Brain Korea 21 (BK21) Research Fellowship.

B.E., Digital Imaging

Chung-Ang University, Korea

📅 2011 – 2015 🔗 [cau.ac.kr](#)

- **Algorithm Engineering:** Engineered satellite remote sensing denoising algorithms, securing a co-authored publication.