Mingi Kang

Los Angeles, CA
+1 (818) 795-2054 | mkang2@bowdoin.edu | mingikang31@gmail.com
GitHub | LinkedIn | Website

EDUCATION

Bachelor of Arts in Computer Science and Minor in Mathematics — Expected May 2026
Bowdoin College, ME
GPA: 3.67/4.00

Study Abroad Semester, Computer Science — August - December 2024
Aquincum Institute of Technology, Budapest, Hungary

RESEARCH INTERESTS

Computer Vision * Computational Imaging * Deep Learning Architectures * Machine Learning

TECHNICAL SKILLS

Programming Languages

- Python, R, SQL, C, Java, TypeScript, JavaScript, Kotlin

Machine Learning & Deep Learning

- PyTorch, TensorFlow, Keras, Scikit-Learn, Numpy, Pandas, SciPy, Matplotlib, OpenCV

HPC & Developer Tools

- **HPC:** Slurm (sbatch), IBM LSF (bsub)
- **Tools:** Git, Bash, LaTeX, Markdown

RELEVANT COURSEWORK

Computer Science:

- Artificial Intelligence, Computer Systems, Algorithms, Data Structures, Software Engineering, Mobile Software Engineering, Cryptography, Data Science, Computational Game Theory, Computational Creativity

Mathematics:

- Linear Algebra, Multivariable Calculus, Probability, Statistics, Mathematical Reasoning, Advanced Topics in Probability and Statistics

PUBLICATIONS AND PRESENTATIONS

Publications

1. Yang, Z., **Kang, M.**, Farias, J. (2025). ZiLU activation. *To be submitted to the International Conference on Pattern Recognition (ICPR) 2026.*
2. **Kang, M.**, Farias, J. (2025). Attention via Convolutional Nearest Neighbor. *To be submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2026.*
3. Kumar, A.A., **Kang, M.**, Kronenberger W.G., Jones M.N., Pisoni D. (2024). Structures and process-level lexical interactions in memory search: A case study of individuals with cochlear implants and normal hearing. *Proceedings of the 46th Annual Meeting of the Cognitive Science Society (Vol. 46)*. DOI: https://escholarship.org/uc/item/7vn9q9hh

Technical Reports

1. **Kang, M.** (2025). Parallel qMRI Reconstruction from 4x Accelerated Acquisitions. *Technical Report for McKelvey Engineering Summer Research Fellowship 2025.*

Oral Presentation

1. **Kang M.** (July 2025). Parallel qMRI Reconstruction from 4x Accelerated Acquisitions. *McKelvey School of Engineering Summer Symposium,* St. Louis, Missouri.

Poster Presentations

1. **Kang M.**, Farias J. (October 2025). Convolutional Nearest Neighbors: Reinterpreting Convolution Through K-Nearest Neighbor Selection. *2025 IEEE MIT Undergraduate Research Technology Conference (MIT URTC)*, Cambridge, Massachusetts.
2. **Kang M.** (July 2025). Parallel qMRI Reconstruction from 4x Accelerated Acquisitions. *McKelvey School of Engineering Poster Palooza,* St. Louis, Missouri.
1. **Kang M.**, Kumar A. (July 2024). Structure and process-level lexical interactions in memory search: A case study of individuals with cochlear implants and normal hearing. *Annual Conference of the Cognitive Science Society 2024*, Rotterdam, Netherlands.

RESEARCH EXPERIENCE

Senior Honors, Bowdoin College, Brunswick, Maine August 2025 – Present
Advisor: Jeova Farias

- Finalizing *ConvNN* and *ConvNN-Attention* algorithm for submission to IEEE/CVF CVPR 2026.
- Designing and evaluating hybrid layer architectures combining standard convolution, *ConvNN*, and self-attention mechanisms in VGG, ResNet, and Vision Transformer architectures.
- Achieved 4-8% classification accuracy improvement over baseline VGG on CIFAR-10 and CIFAR-100 using branching architectures with Conv2d and *ConvNN* layers.
- Demonstrated 2 dB PSNR increase in image denoising tasks through hybrid branching layer U-Net architecture on CIFAR-10.

Computational Imaging Group, Washington University in St. Louis, St. Louis, Missouri May 2025 – August 2025
McKelvey Summer Engineering Fellow
Advisor: Ulugbek S. Kamilov
Graduate Student Mentor: Shirin Shoushtari

- Extended SPICER framework with supervised learning approach incorporating clinical patient qMRI datasets from Washington University Medical School for enhanced reconstruction accuracy.
- Achieved 4x parameter reduction by redesigning Deep Unfolding U-Net from SPICER into streamlined non-cascading U-Net and Attention U-Net architectures with automatic coil sensitivity map estimation.
- Developed normalization techniques (ACS region-specific and coil-instance normalization) for preprocessing under-sampled k-space measurements, achieving 37 dB PSNR and 0.923 SSIM reconstruction performance.

Computer Science Department, Bowdoin College, Brunswick, Maine January 2025 - May 2025
Research Assistant
Advisor: Jeova Farias

- Developed *Convolutional Nearest Neighbor Attention (ConvNN-Attention)* algorithm featuring hard selection of K-Nearest Neighbor tokens through norm-based similarity metrics integrated with convolutional layers.
- Implemented PyTorch modules for *ConvNN-Attention* with linear projections enabling compatibility with Transformer and Vision Transformer architectures.
- Achieved 16% reduction in computational cost (GFLOPs) compared to standard self-attention while maintaining comparable performance (within 1-2% accuracy) on CIFAR-10 and CIFAR-100 classification.
- Explored depthwise separable convolution variants to optimize parameter efficiency while preserving model expressiveness.

Ungated Research, Bowdoin College, Brunswick, Maine April 2024 - August 2025
Research Assistant
Advisor: Martin Abel

- Developed automated data pipeline integrating Google Sheets API, MariaDB, and Amazon S3 for economics research platform, achieving 85% reduction in processing time.

Computer Science Department, Bowdoin College, Brunswick, Maine January 2024 - August 2024
Christenfeld Summer Research Fellow
Advisor: Jeova Farias

- Developed *Convolutional Nearest Neighbor (ConvNN)* algorithm extending standard convolution with norm-based K-Nearest Neighbor pixel selection for enhanced spatial feature learning.
- Built modular PyTorch implementations of 1D and 2D *ConvNN* layers with configurable random/spatial sampling, pixel-shuffling, and coordinate encoding variations.
- Conducted ablation studies analyzing impact of sampling strategies and neighborhood sizes on model performance.

Lexicon Lab, Bowdoin College, Brunswick, Maine December 2022 - May 2024
Research Assistant
Advisor: Abhilasha Kumar

- Conducted computational cognitive science research investigating semantic, phonological, and frequency-based lexical processes in memory search, comparing neurotypical and prelingually deaf populations with cochlear implants.
- Executed behavioral experiments using verbal fluency tasks in animal domains, utilizing analytical frameworks for within- and between-cluster transitions in cognitive search behavior.
- Developed joint semantic embeddings combining word2vec and speech2vec embeddings extending Python package *Forager* for quantitative analysis of memory search.

TEACHING & MENTORING EXPERIENCE

Quantitative-Tutor, Bowdoin College, Brunswick, Maine August 2025 - Present
Bowdoin College Baldwin Center for Learning and Teaching

- Provide one-on-one academic support in Computer Science, Mathematics, and Economics courses.

Learning Assistant, Bowdoin College, Brunswick, Maine January 2025 - Present
Courses: Introduction to Statistics, Introduction to Computer Science

- Conduct weekly office hours providing guidance on course material, coding assignments, and R/Python programming.
- Mentor students in career development, research opportunities, and technical skill development.

Sophomore Bootcamp Leader, Bowdoin College, Brunswick, Maine January 2025/2026
Career Exploration and Development Group

- Led professional development workshops for sophomores on resume writing, technical interview preparation, and navigation of internship recruitment in technology and research sectors.
- Mentored student teams in Bowdoin's inaugural Sophomore Bootcamp Hackathon, providing technical guidance on end-to-end project development.

AWARDS AND HONORS

John L. Roberts Fund Fall Research Award , Bowdoin College, $2,463 October 2025
Best Poster Presentation Award in Summer Poster Competition, Washington University in St. Louis, $100 July 2025
McKelvey Engineering Summer Research Fellowship, Washington University in St. Louis $7,200 May 2025
Allen B. Tucker Computer Science Research Prize, Bowdoin College $50 May 2025
CRA Undergraduate Award, Last Mile Education $4,000 April 2025
NYC Stem Award, Last Mile Education $1,500 March 2025
Google AI 2024 Award, Last Mile Education $595 January 2025
Christenfeld Summer Research Fellowship, Bowdoin College $4,800 April 2024
NSF Student Faculty Research Fellowship, Bowdoin College $1,800 January 2024

LANGUAGES

English (Native) * Korean (Native) * German (Conversational)

PERSONAL INTERESTS

Snowboarding * Cooking * Weightlifting * Matcha/Coffee * Films/Shows * Traveling * Pottery * Basketball

PERSONAL ACCOMPLISHMENTS

- 215 lbs. Max Bench Press at (160 lbs. bw)
- 6:13 Mile Run
- Dinner party of 12 people, serving as primary chef