

Brian Wei

📍 St. Louis, MO | ✉ b.j.wei@wustl.edu | 🌐 Website | 🔗 LinkedIn | 🐙 GitHub

EDUCATION

Washington University in St. Louis

PhD in Computer Science

B.A. in Data Science | Minor in Economics; GPA: 3.99/4.00

St. Louis, MO

Expected Start: Aug 2026

Aug 2022 – May 2026

Vrije Universiteit Amsterdam

IES Semester Abroad; GPA: 4.00/4.00

Amsterdam, Netherlands

Jan 2025 – May 2025

RESEARCH INTERESTS

Multimodal Representation Learning

Image and Video Generative Modeling

Remote Sensing and Ecology

PUBLICATIONS

Wei, B.*, Sastry, S.*, Cher, D.*, Xing, E., & Jacobs, N. *TerraDiT- Ω : Unified Spatial Control for Satellite Image Synthesis with Any Geospatial Primitive*. In: European Conference on Computer Vision 2026 (**ECCV'26**)

Cher, D., Iqbal, H., Xing, E., **Wei, B.**, & Jacobs, N. *Tesselating The Earth*. In: European Conference on Computer Vision 2026 (**ECCV'26**)

Sastry, S.*, Cher, D.*, **Wei, B.***, Dhakal, A., Khanal, S., Gupta, D., & Jacobs, N. *TerraDiT: Point-Conditioned Diffusion Transformer for Satellite Image Synthesis*. **Preprint** [link]

Cher, D.*, **Wei, B.***, Sastry, S., & Jacobs, N. *VectorSynth: Fine-Grained Satellite Image Synthesis with Structured Semantics*. The IEEE/CVF Winter Conference on Applications of Computer Vision 2026 (**WACV'26**) [link]

RESEARCH EXPERIENCE

Multimodal Vision Research Laboratory

Undergraduate Research Assistant

St. Louis, MO

Sept 2025 – May 2026

- Co-authored 3 papers accepted at peer-reviewed conferences, including 1 as first author.
- Developed test-time attention adaptations for diffusion models to enable grounded trajectory-based motion control in video and improve attribute binding in image generation.

NSF REU Fellow

May 2025 – Aug 2025

- Introduced a novel polygon-guided vision-language model aligning satellite imagery with structured annotations, improving semantic consistency in image generation.
- Outperformed baseline vision-language models on retrieval (+21.91% in Recall@5), dense labeling (+59.1% in F1), and fidelity in generation ($\approx 8.9\%$ improvement in FID).
- Designed a transformer-based classifier leveraging prior text labels to improve difficult rare species herbarium image recognition, surpassing state-of-the-art baselines (+6.8% in top-1 accuracy).

SDS Summer Research Program

Undergraduate Research Fellow

St. Louis, MO

May 2024 – Nov 2024

- Developed distributed spatial autoregressive model to link human mobility and socioeconomic variables to mental health outcomes.

FELLOWSHIPS & AWARDS

NSF AI Advancements and Convergence in Computational, Environmental and Social Sciences (AI-ACCESS) National Research Traineeship (NRT) Fellowship (Aug 2026 – Aug 2028)

NSF Research Experiences for Undergraduates (REU) Fellowship. (May 2025 – Aug 2025)

WashU Statistics & Data Science (SDS) Summer Research Fellowship. (May 2024 – Aug 2024)

PRESENTATIONS

Wei, B., Cher, D., Sastry, S., & Jacobs, N. *Fine-Grained Vision-Language Representations for Satellite Image Synthesis*. Poster, REU Summer Poster Session. Washington University in St. Louis, Aug 2025.

Wei, B., Lin, N., & Li, K. *Using Distributed Estimation to Uncover the Impact of Human Mobility on Mental Health Outcomes*. Poster, Undergraduate Research Symposium. Washington University in St. Louis, Nov 2024.

Wei, B. *The Methods and Extensions of Diffusion Models with Transformers*. Course Presentation, Advances in Computer Vision (CSE 5519). Washington University in St. Louis, Oct 2025.

LEADERSHIP & PROJECTS

Washington University in St. Louis

St. Louis, MO

Teaching Assistant

Jan 2026 – May 2026

- Prepared and graded homeworks and quizzes for CSE 5509: Computer Vision.

WashU Robotics Club

St. Louis, MO

Co-President

Jan 2024 – Aug 2024

- Led 100+ member organization with projects in autonomous navigation, reinforcement learning, virtual reality, and human-robot interaction.
- Wrote and secured \$25,000+ in McKelvey Engineering and Student Union grants.
- Organized large-scale public and campus events, including Robot Day (250+ attendees), Robotics Showcase (100+ attendees), and hands-on engineering workshops.

Software Lead

May 2023 – Dec 2023

- Led a team of 12 undergraduates, mentoring members in ROS2 development and hands-on robotics hardware, including Raspberry Pi-based systems.
- Designed autonomous waypoint navigation in Gazebo for a six-wheel rover, integrating IMU, GPS, and stereo vision for state estimation and control.
- Implemented a teleoperation pipeline enabling real-time remote control of a physical rover in ROS2.

Engineering Test Kitchen

St. Louis, MO

Machine Learning Engineer

Sept 2024 – Dec 2024

- Built a convolutional neural network in TensorFlow/Keras to detect and count staves in barrel production images.
- Designed a Google Sheets + Python data pipeline for continuous image ingestion.

Midland States Bank

St. Louis, MO

Intern

Jun 2024 – Aug 2024

- Developed Optical Character Recognition (OCR) + Salesforce automation for inactive client outreach.
- Delivered Agile-managed technical solutions across departments.

SKILLS

Programming: Python, R, SQL, Java, Stata, XML.

AI/ML: Deep learning with PyTorch, Hugging Face, scikit-learn, PyTorch Lightning, diffusers, timm, TensorFlow/Keras, multi-GPU training.

Data/Visualization: pandas, NumPy, GeoPandas, SciPy, Tableau, matplotlib, Airflow, Snowflake.

Tools: Git, Linux/Bash, Docker, LSF/Slurm, LaTeX.

RELEVANT COURSEWORK

Machine Learning, Computer Vision, Mathematical Statistics, Statistical Computation, Probability, Linear Models, Linear Algebra, Calculus, Data Manipulation and Management, Data Structures and Algorithms.