Peter Sushko

AI and Computer Vision

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RESEARCH INTERESTS

My research focuses on building open, large-scale multimodal systems that can perceive, reason, and act in the world. I am broadly interested in how vision and language can be unified to enable actionable intelligence — from agents that navigate and interact with digital environments to generative models that understand and transform visual content.

WORK EXPERIENCE

Allen Institute for AI (Ai2) Seattle, WA
Research Engineer *March 2025 – Current*

- First author behind MolmoWeb, a state-of-the-art open-source browser agent.
- Led large-scale distributed pipelines for web-agent evaluation and synthetic data generation.
- Trained multimodal vision–language models using distributed multi-GPU training with FSDP.
- Co-authored research submissions to NeurIPS, ECCV, ICML, ICLR, CVPR, and ACL.
- Collaborators: Tanmay Gupta, Ranjay Krishna, Ali Farhadi.

Skills: Agentic AI, Multimodal, Pretraining, RL, Inference, JAX, Post-training, Reinforcement Learning.

RAIVN Lab, University of Washington Seattle, WA
AI Researcher (Advisor: Ranjay Krishna) *Jun 2023 – Feb 2025*

- Developed RealEdit (CVPR), a state-of-the-art diffusion-based model for conditional image generation and editing.
- Built a large-scale dataset of 150K image-text pairs for training generative models.
- Optimized deep learning architectures for high-resolution image generation and multi-modal alignment.
- Collaborated with senior researchers to design experiments, analyze results, and refine hypotheses.

Skills: Generative AI, Diffusion Models, Multimodal Learning, Experimentation, PyTorch, Python.

Neustar (Acquired by TransUnion) San Francisco, CA
Senior Machine Learning Engineer *Dec 2021 – Aug 2022*

- Developed ML models for customer attribution and campaign optimization, improving predictive accuracy.
- Led a model development team, ensuring statistical rigor and alignment with business objectives.
- Collaborated with research scientists and SWE teams to refine models and enhance performance.
- Presented insights and KPIs to C-suite, translating technical findings into actionable strategies.

Skills: Machine Learning, Ranking & Recommendation Models, Model Optimization, Scalable ML Pipelines.

Neustar (Acquired by TransUnion) San Francisco, CA
Machine Learning Engineer *May 2020 – Dec 2021*

- Designed, trained, deployed, and validated ML models to measure marketing campaign efficiency.
- Improved customer acquisition models, boosting revenue by up to 6% for clients BofA and Nike.
- Automated GCP SQL queries, reducing EDA time from 3 days to 5 hours using Python.
- Analyzed pricing sensitivity using ML models, driving higher revenue and new customer acquisition.

Skills: Model Deployment, Scalable ML Systems, SQL & Cloud Pipelines, Automation & Optimization.

Palo Alto Networks Santa Clara, CA
Data Analyst *Aug 2019 – Mar 2020*

- Implemented data pipelines to extract insights and KPIs on revenue streams of recent acquisitions.
- Decreased team workload by 200+ man-hours per month by developing an automated Python script for monthly revenue reports.
- Detected data trends, predicted KPIs, and visualized results with Pandas, NumPy, and Seaborn.

Skills: Data Pipelines, Data Wrangling, Data Visualization, Dashboards, Forecasting, SQL, Python.

EDUCATION

University of Washington Seattle, WA
Master of Sciences in Statistics, GPA: 3.8 — Advisor: Ranjay Krishna

- Coursework: Computer Vision & Deep Learning

Santa Clara University Santa Clara, CA
Bachelor of Arts in Mathematics; Bachelor of Arts in Economics

PUBLICATIONS

*Equal contribution.

[8] Haoquan Fang, Jiafei Duan, Donovan Clay, Sam Wang, Shuo Liu, Weikai Huang, Xiang Fan, Wei-Chuan Tsai, Shirui Chen, Yi Ru Wang, Shanli Xing, Jaemin Cho, Jae Sung Park, Ainaz Eftekhar, **Peter Sushko**, Karen Farley, Angad Wadhwa, Cole Harrison, Winson Han, Ying-Chun Lee, Eli VanderBilt, Rose Hendrix, Suveen Ellawela, Lucas Ngoo, Joyce Chai, Zhongzheng Ren, Ali Farhadi, Dieter Fox, Ranjay Krishna. *MolmoAct2: Action Reasoning Models for Real-world Deployment*.
Preprint, 2026.

[7] Madeline Brumley, Cheng-Yu Hsieh, **Peter Sushko**, Chun-Liang Li, Ranjay Krishna. *Understanding Attention and Positional Biases in Transformers*.
Preprint.

[6] **Peter Sushko***, Tanmay Gupta*, Piper Wolters*, Zixian Ma*, Rock Yuren Pang, Diego Llanes, Yue Yang, Taira Anderson, Boyuan Zheng, Zhongzheng Ren, Harsh Trivedi, Taylor Blanton, Caleb Ouellette, Winson Han, Ali Farhadi, Ranjay Krishna. *MolmoWeb: Open Visual Web Agent and Open Data for the Open Web*.
Preprint, 2026.

[5] Xiang Fan, Sharath Girish, Vivek Ramanujan, Chaoyang Wang, Ashkan Mirzaei, **Peter Sushko**, Aliaksandr Siarohin, Sergey Tulyakov, Ranjay Krishna. *OmniView: An All-Seeing Diffusion Model for 3D and 4D View Synthesis*.
In submission, Preprint.

[4] Vasily Ilin, **Peter Sushko**, Ranjay Krishna. *DiScoFormer: Plug-In Density and Score Estimation with Transformers*.
ICML 2026, Spotlight (2.2%).

[3] Ruoxi Chen, Dongping Chen, Siyuan Wu, Sinan Wang, Shiyun Lang, **Peter Sushko**, Gaoyang Jiang, Yao Wan, Ranjay Krishna. *MultiRef: Controllable Image Generation with Multiple Visual References*.
ACMMM 2025.

[2] Vasily Ilin, **Peter Sushko**, Jingwei Hu. *Score-Based Deterministic Density Sampling*.
Communications on Pure and Applied Analysis (CPAA), 2026.

[1] **Peter Sushko**, Ayana Bharadwaj, Zhi Yang Lim, Vasily Ilin, Ben Caffee, Dongping Chen, Mohammadreza Salehi, Cheng-Yu Hsieh, Ranjay Krishna. *REALEDIT: Reddit Edits As a Large-scale Empirical Dataset for Image Transformations*.
CVPR 2025.

SERVICE

Workshop Organizer

- Multimodal Digital Agents Workshop, ECCV 2026

Conference Reviewer

- NeurIPS
- ECCV
- CVPR
- ICML

Mentorship

- Ayana Bharadwaj, MS Student, UW 2024–2025
- Lex Hackett, BS Student, SCU 2026–Present