Brandon Y. Feng

Postdoctoral Associate
Computer Science & Artificial Intelligence Laboratory
Massachusetts Institute of Technology

branfeng@mit.edu
brandonyfeng.github.io
51 Vassar St, Cambridge MA 02139

Research Interests

My research integrates artificial intelligence and physics to extend current limits of human and machine vision. I aim to accelerate scientific discoveries by revealing valuable phenomena hidden in data captured under challenging conditions—from biological processes behind scattering tissues to faint exoplanets far away in the cosmos. My objectives are twofold: (1) to build AI-powered vision systems that can uncover new insights and accelerate discoveries in diverse disciplines such as medicine and astronomy, and (2) to create unprecedented datasets that fuel next-generation AI systems capable of addressing grand challenges in science and healthcare.

Experience

2023 – Now **Massachusetts Institute of Technology** – Cambridge, MA
Postdoctoral Associate at MIT CSAIL
Advisor: William T. Freeman

2024 – Now **Harvard–Smithsonian Center for Astrophysics** – Cambridge, MA
Visiting Scientist at AstroAI

2022 – 2023 **Google** – San Francisco, CA
Research Scientist Intern

Education

2019 – 2023 **University of Maryland** – College Park, MD
Ph.D. in Computer Science
Advisor: Amitabh Varshney

2018 – 2019 **University of Virginia** – Charlottesville, VA
M.S. in Statistics

2015 – 2018 **University of Virginia** – Charlottesville, VA
B.A. in Computer Science
B.A. in Statistics

Journal Publications

J7   **Exoplanet Imaging via Differentiable Rendering**
B. Y. Feng, R. Ferrer-Chávez, A. Levis, J. Wang, K. Bouman, W. T. Freeman.
IEEE Transactions on Computational Imaging, 2024.

J6   **HoloCamera: Advanced Volumetric Capture for Cinematic-Quality VR Applications.**
J. Heagerty, S. Li, E. Lee, S. Bhattacharyya, S. Bista, B. Brawn, B. Y. Feng, S. Jabbireddy, J. F. JaJa, H. Kacorri, D. Li, D. T. Yarnell, M. Zwicker, A. Varshney.
IEEE Transactions on Visualization and Computer Graphics, 2024.

J5   **FPM-INR: Fourier ptychographic microscopy image stack reconstruction using implicit neural representations.**
H. Zhou*, B. Y. Feng*, H. Guo, S. Lin, M. Liang, C. A. Metzler, C. Yang.
Optica, 2023.

J4   **NeuWS: Neural Wavefront Shaping for Guidestar-Free Imaging Through Static and Dynamic Scattering Media.**
B. Y. Feng*, H. Guo*, M. Xie, V. Boominathan, M. K. Sharma, A. Veeraraghavan, C. A. Metzler.
Science Advances, 2023.

J3   **Neural Subspaces for Light Fields**.
B. Y. Feng, A. Varshney.
IEEE Transactions on Visualization and Computer Graphics, 2022.

J2   **TurbuGAN: An Adversarial Learning Approach to Spatially-Varying Multi-frame Blind Deconvolution with Applications to Imaging Through Turbulence.**
B. Y. Feng*, M. Xie*, C. A. Metzler.
IEEE Journal on Selected Areas in Information Theory, 2022.

J1   **Benchmarking AlphaFold for Protein Complex Modeling Reveals Accuracy Determinants**.
R. Yin, B. Y. Feng, A. Varshney, R. G. Pierce.
Protein Science, 31 (8).

Conference Publications

C18   **Temporally Consistent Atmospheric Turbulence Mitigation with Neural Representations.**
H. Cai*, J. Chen*, B. Y. Feng, W. Jiang, M. Xie, K. Zhang, C. Fermuller, Y. Aloimonos, A. Veeraraghavan, C. A. Metzler.
The Thirty-eighth Annual Conference on Neural Information Processing Systems (NeurIPS), 2024.

C17   **Physics-Based Interaction with 3D Objects via Video Generation.**
T. Zhang, H. Yu, R. Wu, B. Y. Feng, C. Zheng, N. Snavely, J. Wu, W. T. Freeman.
European Conference on Computer Vision (ECCV), 2024.

C16 **Flash-Splat: 3D Reflection Removal with Flash Cues and Gaussian Splats.**
M. Xie, H. Cai, S. Shah, Y. Xu, B. Y. Feng, J. Huang, C. A. Metzler.
European Conference on Computer Vision (ECCV), 2024.

C15 **EndoSparse: Real-Time Sparse View Synthesis of Endoscopic Scenes using Gaussian Splatting.**
C. Li, B. Y. Feng, Y. Liu, H. Liu, C. Wang, W. Yu, Y. Yuan.
Medical Image Computing and Computer Assisted Intervention (MICCAI), 2024.

C14 **Endora: Video Generation Models as Endoscopy Simulators.**
C. Li*, H. Liu*, Y. Liu*, B. Y. Feng, W. Li, X. Liu, Z. Chen, J. Shao, Y. Yuan.
Medical Image Computing and Computer Assisted Intervention (MICCAI), 2024.

C13 **Seeing the World Through Your Eyes.**
H. Alzayer*, K. Zhang* B. Y. Feng, C. A. Metzler, J. Huang.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024.

C12 **WaveMo: Learning Wavefront Modulations to See Through Scattering.**
M. Xie*, H. Guo* B. Y. Feng, L. Jin, A. Veeraraghavan, C. A. Metzler.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024.

C11 **Visualizing Subtle Motions from Time-Varying Radiance Fields.**
B. Y. Feng*, H. Alzayer*, M. Rubinstein, W. T. Freeman, J. Huang.
International Conference on Computer Vision (ICCV), 2023.

C10 **StegaNeRF: Embedding Invisible Information within Neural Radiance Fields.**
C. Li*, B. Y. Feng*, Z. Fan*, P. Pan, Z. Wang.
International Conference on Computer Vision (ICCV), 2023.

C9 **Learning to Estimate 6DoF Pose from Limited Data: A Few-Shot, Generalizable Approach using RGB Images.**
P. Pan*, Z. Fan*, B. Y. Feng*, P. Wang, C. Li, Z. Wang.
International Conference on 3D Vision (3DV), 2023.

C8 **Continuous Levels of Detail for Light Field Networks.**
D. Li, B. Y. Feng, A. Varshney.
British Machine Vision Conference (BMVC), 2023.

C7 **VIINTER: View Interpolation With Implicit Neural Representations of Images.**
B. Y. Feng, S. Jabbireddy, A. Varshney.
SIGGRAPH Asia, 2022.

C6 **PRIF: Primary Ray-based Implicit Function.**
B. Y. Feng, Y. Zhang, D. Tang, R. Du, A. Varshney.
European Conference on Computer Vision (ECCV), 2022.

C5 **SIGNET: Efficient Neural Representation for Light Fields**.
B. Y. Feng, A. Varshney.
International Conference on Computer Vision (ICCV), 2021.

C4   **GazeChat: Enhancing Virtual Conferences with Gaze-aware 3D Photos**.
Z. He, K. Wang, B. Y. Feng, R. Du, K. Perlin.
ACM Symposium on User Interface Software and Technology (UIST), 2021.

C3   **Deep Depth Estimation on 360° Images with a Double Quaternion Loss**.
B. Y. Feng, W. Yao, Z. Liu, A. Varshney.
International Conference on 3D Vision (3DV), 2020.

C2   **Prostate Segmentation from 3D MRI Using a Two-stage Model and Variable-input Based Uncertainty Measure**.
H. Pan, B. Y. Feng, C. Meyer, X. Feng.
2019 IEEE 16th International Symposium on Biomedical Imaging (ISBI), 2019.

C1   **A Self-adaptive Network for Multiple Sclerosis Lesion Segmentation from Multi-contrast MRI with Various Imaging Sequences**.
B. Y. Feng, H. Pan, C. Meyer, X. Feng.
2019 IEEE 16th International Symposium on Biomedical Imaging (ISBI), 2019.

Media Coverage

2023   **Science.org**
Neural Wavefront Shaping

2023   **Maryland Today**
UMD Researchers Develop New Imaging Technology That Can 'See' Hidden Objects

2023   **Photonics.com**
Video Tech Enables Imaging Through Scattering Media

2023   **ScienceDaily**
NeuWS camera answers 'holy grail problem' in optical imaging

2023   **Phys.org**
Neural wavefront shaping camera overcomes light scattering problem in optical imaging

2023   **New Scientist**
Eyeball reflections can reveal a 3D model of what you are looking at

2023   **Gizmodo**
Computer, Enhance: Scientists Reconstruct Rooms From Eye Reflections

2023   **TechSpot**
Researchers construct 3D scenes using reflections from eyes

2023   **Tech Xplore**
Rendering three-dimensional images from eye reflections with NeRF

2023   **PetaPixel**
Scientists Can Now Reconstruct Rooms from Eye Reflections in Photos

2023   **Futurism**
Scientists Reconstruct What You're Looking At By Enhancing Reflection In Your Eye

2023 **New Atlas**
Researchers can now 3D-model a room just from your eye reflections

2022 **ITmedia News**
Technology to animate profile picture in video conference

Invited Talks

2025/02 **Machine Learning and Scientific Imaging Conference**
AI as a Lens: Expanding Scientific Vision in Biomedical and Astronomical Imaging.

2025/01 **Annual Meeting of the American Astronomical Society**
AI-Driven Imaging and Inference with Differentiable Computing.

2024/05 **California Institute of Technology** Computational Cameras.
Neural Fields to Solve Inverse Problems in Imaging.

2024/05 **SIAM** Imaging Science.
Ray-based Implicit Function for Neural Surface and Scene Representation.

2023/09 **Massachusetts Institute of Technology** Signals, Information, and Algorithms Laboratory.
Rethinking Machine Learning to Solve Inverse Problems in Imaging with Undetermined Forward Operators.

2022/12 **Massachusetts Institute of Technology** Scene Representation Group.
Designing Neural Fields of Rays and Pixels.

2022/10 **Rice University** Computational Imaging Lab.
Implicit Neural Representations for Graphics and Vision.

2022/09 **University of Maryland** Vision and Learning Lab.
Implicit Neural Representations for Graphics and Vision.

2022/08 **University of Texas at Austin** Visual Informatics Group.
Efficient Implicit Neural Representation for 3D Shapes.

2022/07 **Optica Imaging Congress** COSI.
Adversarial Sensing for Sub-Diffraction Imaging.

2022/06 **Google** AR.
Primary Ray-based Implicit Function.

Honors and Awards

2024 **Oral Presentation**
European Conference on Computer Vision (ECCV) 2024
Selection Rate: 200/8585 = 2.32%

2024 **Oral Presentation**
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2024
Selection Rate: 90/11532 = 0.78%

2023	**Best Poster**
	International Conference on Computational Photography (ICCP) 2023
2022	**Runner-Up**
	CVPR 2022 UG2+ Challenge
2021	**Oral Presentation**
	International Conference on Computer Vision (ICCV) 2021
	Selection Rate: 210/6236 = 3.36%
2019-2021	**Dean's Fellowship**
	University of Maryland Graduate School
2015-2018	**Dean's List of Distinguished Students**
	University of Virginia College of Arts and Sciences

Service

Journal Reviewer	Nature Communications
	IEEE Transactions on Pattern Analysis and Machine Intelligence
	IEEE Transactions on Image Processing
	IEEE Transactions on Computational Imaging
	IEEE Transactions on Circuits and Systems for Video Technology
	ACM Transactions on Graphics
	Photonics Research
	Optics Express
	Biomedical Optics Express
Conference Reviewer	IEEE/CVF Computer Vision and Pattern Recognition Conference (CVPR)
	International Conference on Computer Vision (ICCV)
	European Conference on Computer Vision (ECCV)
	ACM SIGGRAPH
	International Conference on Learning Representations (ICLR)
	Conference on Neural Information Processing Systems (NeurIPS)
	International Conference on Computational Photography (ICCP)
	AAAI Conference on Artificial Intelligence (AAAI)
University Service	Organizer: University of Maryland Computer Vision Seminar
	Organizer: Computational Imaging Workshop at Technica (largest hackathon for underrepresented genders)
	Reviewer: University of Maryland Computer Science Graduate Program Application