Vansh Tibrewal

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EDUCATION

California Institute of Technology   2022 – 2026
B.S. in Computer Science   GPA: 4.3/4.3

PUBLICATIONS

Aligning Text, Images, and 3D Structure Token-by-Token
A. Sahoo*, <u>V. Tibrewal</u>*, G. Gkioxari
Under peer review.

Focus of Attention in Self-Supervised Learning for Action Recognition
<u>V. Tibrewal</u>, B. Thomson, M. Hugelshofer, H. Richter, P. Perona, N. Kondapaneni*, M. Marks*
CV4Animals Workshop at Computer Vision and Pattern Recognition (CVPR) 2025.

Using Machine Learning over Fast Camera Images to Classify the Plasma Confinement Mode within the MAST Experiment
D. Brennand, <u>V. Tibrewal</u>, V. Gopakumar, S. Pamela, Z. Li, A. Anandkumar, The MAST team
49th EPS Conference on Plasma Physics 2023.

RESEARCH
EXPERIENCE

Caltech, Georgia Gkioxari Lab   March 2025 – Present
Advised by Prof. Georgia Gkioxari

- Trained 3D tokenizer that encodes complex 3D shapes with an efficient token budget (512 tokens) for high-fidelity reconstruction and effective LLM decoding.
- Proposed a unified LLM framework aligning language, images and structured 3D scenes, a novel modality that encodes object-wise (shape, position) information.
- Trained 3D Multimodal LLMs with unified framework, reframing a variety of 3D, image, and language tasks as next-token prediction. The model can handle single-view 3D scene reconstructions from images, rendering 3D scenes to images, question-answering, instruction-following and real-world 3D object recognition.
- This paper is under peer review as a co-first-author submission.

Caltech, Perona Vision Lab   January 2024 – February 2025
Advised by Prof. Pietro Perona

- Developed a method for improved self-supervised training of DINOv2 for animal action recognition, using SAM2's zero-shot segmentation capabilities to focus DINOv2 on animals during training to overcome the object-centric bias of DINOv2.
- Applied improved DINOv2 feature extraction to identify statistically significant behavioral differences in groups of sheep post-neurosurgery from videos.
- Presented first-author paper at CV4Animals Workshop at CVPR 2025.

Caltech, Anima AI + Science Lab   November 2022 – December 2023
Advised by Prof. Anima Anandkumar

- Researched fourier neural operators to model the magnetohydrodynamic equations governing plasma evolution in Tokamak nuclear fusion reactors.
- Trained binary classifier to classify the plasma confinement mode of a Tokomak nuclear fusion reactor from fast camera images from the MAST experiment.
- Presented as second-author work at 49th EPS Conference on Plasma Physics 2023.

WORK
EXPERIENCE

Citadel, Core Data Team   June 2025 – August 2025
Research Engineer Intern

- Designed and implemented multiple projects from scratch that are (1) live in production (2) handling real-time financial data at scale (3) and integrated into the research platform that serves all of Citadel's Global Quantitative Strategies.

HONORS AND AWARDS		
Henry Ford II Scholar		2025
For engineering students with the best academic record at the end of junior year.		
Doris S. Perpall SURF Speaking Competition Semi-Finalist		2024
For excellence in oral presentation at SURF Seminar Talks.		
Summer Undergraduate Research Fellowship (SURF) Award		2024
For summer research with Professor Pietro Perona.		
William H. and Helen Lang SURF Endowment Award		2023
For summer research with Professor Anima Anandkumar.		
Alexander P. and Adelaide F. Hixon Prize for Writing		2023
For the best composition in a first-year course.		

TEACHING		
CS 24: Computing Systems (Head TA)		Fall 2024, 2025
CS 2: Data Structures (Head TA)		Winter 2024, 2025
CS 3: Software Design in C (TA)		Spring 2024, 2025
CS 1x: Intermediate Computer Programming (TA)		Fall 2023

TALKS

Aligning Text, Images, and 3D Structure Token-by-Token
<u>Vansh Tibrewal</u>, Aadarsh Sahoo, Georgia Gkioxari
Caltech Information Science and Technology Council Meeting 2025.

Focus of Attention in Self-Supervised Learning for Action Recognition
<u>Vansh Tibrewal</u>, Neehar Kondapaneni, Markus Marks, Pietro Perona
SURF Seminar at Caltech 2024.

Forecasting Disruptions and L-H Transitions in Tokamak Nuclear Fusion Reactors Using Fourier Neural Operators and Convolutional Neural Networks
<u>Vansh Tibrewal</u>, Zongyi Li, Anima Anandkumar
SURF Seminar at Caltech 2023.

ACTIVITIES	
Caltech Peer Advocate	2024 - Present
Caltech Board of Control Representative	2023 - Present
Caltech Hackathon Director of Logistics	2023 - 2024
Caltech House Social Events Team	2023 - 2024

SERVICE	
Reviewer, Conference on Computer Vision and Pattern Recognition (CVPR)	2026

RELEVANT COURSEWORK

Advanced Topics in Vision, Advanced Topics in Machine Learning, GPU Programming, Probability & Statistics (Intro, Graduate Level), Linear Algebra (Intro, Graduate Level), Learning Systems, Machine Learning, Compilers, Systems, Algorithms, Networks.

SKILLS

Python, C, Java, JavaScript, C++, R, PyTorch, TensorFlow, Keras, CUDA, Git