Chenyang (Danny) Ma

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EDUCATION

University of Oxford Oct 2023 – July 2027 (Expected)
Ph.D. in Computer Science. ***Focus: Human-Centered Robotic Agents, 3D Computer Vision***

University of Cambridge Oct 2022 – July 2023
MPhil in Advanced Computer Science Distinction

University of Michigan—Ann Arbor Sept 2019 – May 2022
B.S.E. in Computer Engineering, Minor in Mathematics Cumulative GPA: 3.97

SELECTED PUBLICATIONS

SpatialPIN: Enhancing Spatial Reasoning Capabilities of Vision-Language Models through Prompting and Interacting 3D Priors. ***NeurIPS, 2024.***
Chenyang Ma*, Kai Lu, Ta-Ying Cheng, Niki Trigoni, Andrew Markham*

Gradient-less Federated Gradient Boosting Tree with Learnable Learning Rates. ***EuroMLSys Workshop, 2023.***
Chenyang Ma*, Xinchi Qiu, Daniel Beutel, Nicholas Lane*

Touch and Go: Learning from Human-Collected Vision and Touch. ***NeurIPS, 2022.***
Fengyu Yang,* ***Chenyang Ma****, Jiacheng Zhang, Jing Zhu, Wenzhen Yuan, Andrew Owens* *(*= Equal Contribution)*

Sparse and Complete Latent Organization for Geospatial Semantic Segmentation. ***CVPR, 2022.***
Fengyu Yang,* ***Chenyang Ma**** *(*= Equal Contribution)*

RESEARCH / INTERNSHIP EXPERIENCES

Research Collaborator at **FAIR, Meta Inc.** June 2024 – Present
Mentors: Xavier Puig & Ruta Desai *Remote / Oxford, UK*

- Propose a new framework towards open-ended, continuous, and realistic human-robot collaboration
- Develop a method to simulate realistic humans within robot simulation software using LLMs and motion data
- Design an approach to align human and robot values through days of collaboration

PhD Student at **CPS, University of Oxford** Oct 2023 – Present
Mentors: Andrew Markham & Niki Trigoni *Oxford, UK*

- First Project: Proposed SpatialPIN — a modular plug-and-play framework that progressively enhances VLM's 3D reasoning capabilities by prompting and interacting with 3D foundational models
- Second Project (ongoing): Open-ended, continuous, and realistic human-robot collaboration

Applied Scientist Intern at **Roku Inc.** July 2024 – Oct 2024
Mentor: Michael Sanders *Cambridge, UK*

- Investigated the problem of IoT camera package delivery detection under adversarial condition
- Framed the problem within and addressed pain points in video-based human action recognition caused by the complexity of real-world data (e.g., high variety of camera angles, backgrounds, illumination, scales, etc.)
- Developed a cost-effective hierarchical ensemble pipeline with a meta-learner to amplify human action signals and learn causal relationships between models, achieving performance ready for real-world deployment

Research Intern at **Flower Labs & CaMLSys, University of Cambridge** Oct 2022 – July 2023
Mentors: Nicholas Lane & Daniel Beutel *Cambridge, UK*

- Developed the first privacy-preserving framework for federated XGBoost under horizontal federated learning setting that does not depend on the sharing of gradients and hessians, which leads to serious privacy concerns
- Proposed a novel method to transform the tree ensembles built by local clients as inputs to neural networks to learn robust learning rate strategies

- Achieved performances comparable to state-of-the-art accuracies on benchmark classification and regression datasets including a9a, cod-rna, higgs, etc.

Research Assistant at **Owens Lab, University of Michigan** July 2021 – Sept 2022

Mentors: Anderw Owens & Wenzhen Yuan *Ann Arbor, US*

- Established Touch and Go — a human-collected visual-tactile dataset with 4000 different real-world objects, 14 hours of videos, and 13,900 touches which enables researchers to study diverse visual-tactile learning applications beyond the robotics-centric domains. Applied our dataset on multimodal learning tasks as follows
- Learned tactile features through self-supervised learning by training a model to associate images with touch. Experiments demonstrated that learned features significantly outperform supervised ImageNet features on a robotic manipulation task, and on recognizing materials in our dataset
- Proposed and applied our dataset on novel task of tactile-driven image stylization (i.e., making the visual appearance of an object more consistent with a given tactile signal)
- Studied multimodal models for future touch prediction by predicting future frames of a touch sensor's recording given both visual and tactile signals. Experiments showed that visual information improves these predictions over touch alone

Independent Researcher at **University of Michigan** Jan 2021 – Feb 2022

- Conducted research on semantic segmentation for remote sensing images by alleviating large intra-class variance in both foreground and background classes
- Constructed a sparse and complete latent structure via prototypes to tackle the above issues by designing a prototypical contrastive learning strategy and modeling all foreground and hardest background objects
- Designed a novel patch shuffle augmentation to encourage the semantic information of an object to be correlated only to the limited context within the patch that is specific to its category
- Outperformed state-of-art methods by evaluating model on iSAID dataset

Research Intern at **Revvity Inc.** Feb 2021 – July 2021

- Researched and developed a real time patient monitoring and alert system for patients who are at risk of being diagnosed with VTE using Spotfire developed by TIBCO Software Inc.
- Extracted keywords from patients Electronic Health Records using transformer-based models to score patients by Padua, Wells, Geneva, and PESI criteria
- System was tested in Shanghai Sixth People's Hospital. Successfully spotted and saved an average of 30% of patients per month

ACADEMIC SERVICES

- **Reviewer:** CVPR (2023), NeurIPS Track on Datasets and Benchmarks (2022)
- **Teaching Assistant:** Machine Learning (2023), Deep Learning in Healthcare (2024)

HONORS & AWARDS

- **Summa Cum Laude**, College of Engineering, University of Michigan 2022
- **James B. Angell Scholar**, College of Engineering, University of Michigan 2021
- **Dean's List**, College of Engineering, University of Michigan 2019-2022
- **University Honors**, University of Michigan 2019-2022
- **Engineering Honors Program Alumni**, College of Engineering, University of Michigan

EXTRACURRICULAR

Diving, PADI, Professional Association of Diving Instructors

- Awarded Advanced Open Water Diver license (2016)
- Awarded Junior Open Water Diver license (2014)