Paul Pu Liang

✉ ppliang@mit.edu   •   🌐 https://pliang279.github.io/   •   ⌂ pliang279   •   🎓 Google Scholar

Personal Information

Citizenship: US Citizen
Office: 75 Amherst St, Cambridge, MA 02139, USA
Phone: +1 (347) 282 7736

Short Biography

Paul Liang is an Assistant Professor at MIT Media Lab and EECS. His research advances the foundations of multisensory artificial intelligence to enhance the human experience. He is a recipient of the Siebel Scholars Award, Waibel Presidential Fellowship, Facebook PhD Fellowship, Center for ML and Health Fellowship, Rising Stars in Data Science, and 3 best paper awards. Outside of research, he received the Alan J. Perlis Graduate Student Teaching Award for instructing courses on multimodal machine learning.

Research Interests

- Foundations of multisensory AI: The science and engineering of AI systems that can learn and interact with the world through integrating diverse sensory channels such as text, speech, audio, video, physical sensors, and physiological messages.
- Enhancing the human experience: AI for human physical, emotional, and social well-being, multimedia generative AI to augment human creativity, climate and environment sensing, enhancing human sensory experiences like music, art, cultures, smell, and taste.
- Real-world human-AI interaction: Ensuring fairness, robustness, trust, privacy, and efficiency for responsible deployment.

Academic Career

- Massachusetts Institute of Technology — 2024−Present
  Sony Corporation Career Development Assistant Professor, MIT Media Lab & MIT EECS
  Director, Multisensory Intelligence Research Group
- UC Berkeley Simons Institute for the Theory of Computing — Summer 2024
  Visiting researcher in the program on AI, Psychology, and Neuroscience
- Carnegie Mellon University, Ph.D. in Machine Learning — 2018−2024
  Committee: Louis-Philippe Morency (co-advisor), Ruslan Salakhutdinov (co-advisor), Manuel Blum, Lenore Blum, Trevor Darrell
  Thesis: Foundations of Multisensory Artificial Intelligence
- Carnegie Mellon University, M.S. in Machine Learning — 2017−2018
  Thesis: Computational Modeling of Human Multimodal Language
- Carnegie Mellon University, B.S. in Computer Science & Neural Computation (with university honors) — 2014−2017
  Advisors: Roni Rosenfeld, Ryan Tibshirani, Tai Sing Lee

Professional Experiences

- Google DeepMind, Research Intern with Dani Yogatama, Aida Nematzadeh, Lisa Hendricks — Summer 2021
- Facebook AI Research, Research Intern with Brandon Amos, Tim Rocktäschel, Ed Grefenstette — Summer 2020
- Nvidia AI, Research Intern with Yuke Zhu, Anima Anandkumar, Sanja Fidler — Spring 2020
- Google Research, Research Intern with Manzil Zaheer, Yuan Wang, Amr Ahmed — Summer 2019
- Riken AI Project, Visiting Researcher with Makoto Yamada, Qibin Zhao, Masashi Sugiyama — Winter 2018

Honors and Awards

- MIT Sony Career Development Chair Professorship — 2024
- Siebel Scholars Award ($35,000 award, 80 awardees worldwide) — 2023
- Waibel Presidential Fellowship ($100,000 funding for 1 year, 1 awardee from CMU) — 2023
- University of Chicago & UC San Diego Rising Stars in Data Science — 2023
- Alan J. Perlis Graduate Student Teaching Award — 2023
- NeurIPS 2022 Workshop on Human in the Loop Learning Best Paper Nomination — 2022
- Young Researcher Invitation to the Heidelberg Laureate Forum — 2022
- Facebook PhD Fellowship ($200,000 funding over 2 years, 26 awardees out of 2100 applicants worldwide) — 2021
- Center for Machine Learning and Health Fellowship ($100,000 funding for 1 year, 10 awardees from CMU) — 2021
- MIT Fintech Innovation Prize Grant and Sandbox Innovation Program Funding — 2021
- CVPR 2020 Argoverse Competition Honorable Mention — 2020
- NeurIPS 2019 Workshop on Federated Learning Distinguished Student Paper — 2019
- CMU Machine Learning Department Teaching Assistant Award — 2019
- NSF Graduate Research Fellowship Honorable Mention — 2018
- ICMI 2017 Best Paper Honorable Mention — 2017
- CMU School of Computer Science University Honors — 2017
- CMU School of Computer Science Dean's List — 2015, 2016, 2017

Publications

Preprints

65. HEMM: Holistic Evaluation of Multimodal Foundation Models
Paul Pu Liang, Akshay Goindani, Talha Chafekar, Leena Mathur, Haofei Yu, Ruslan Salakhutdinov, Louis-Philippe Morency
[code]

64. IoT-LM: Large Multisensory Language Models for the Internet of Things
Shentong Mo, Ruslan Salakhutdinov, Louis-Philippe Morency, **Paul Pu Liang**
[code]

63. MMoE: Enhancing Multimodal Language Models with Mixtures of Multimodal Interaction Experts
Haofei Yu, Jason Qi, Lawrence Jang, Ruslan Salakhutdinov, Louis-Philippe Morency, **Paul Pu Liang**
[code]

62. MultiIoT: Benchmarking Machine Learning for the Internet of Things
Shentong Mo, Louis-Philippe Morency, Ruslan Salakhutdinov, **Paul Pu Liang**
[code]

61. Semantically Corrected Amharic Automatic Speech Recognition
Samuael Adnew, **Paul Pu Liang**
[code]

60. Advancing Social Intelligence in AI Agents: Technical Challenges and Open Questions
Leena Mathur, **Paul Pu Liang**, Louis-Philippe Morency
[code]

2024

59. Foundations of Multisensory Artificial Intelligence
Paul Pu Liang
PhD Thesis. Committee: Louis-Philippe Morency, Ruslan Salakhutdinov, Manuel Blum, Lenore Blum, Trevor Darrell

58. Foundations & Trends in Multimodal Machine Learning: Principles, Challenges, and Open Questions
Paul Pu Liang, Amir Zadeh, Louis-Philippe Morency
ACM Computing Surveys, Tutorials at ICML & ICMI 2023, CVPR & NAACL 2022 [website] [videos 2023] [videos 2022]

57. Think Twice: Perspective-Taking Improves Large Language Models' Theory-of-Mind Capabilities
Alex Wilf, Sihyun Shawn Lee, **Paul Pu Liang**, Louis-Philippe Morency
ACL 2024 [code]

56. Modeling Dense Multimodal Interactions Between Biological Pathways and Histology for Survival Prediction
Guillaume Jaume, Anurag Vaidya, Richard Chen, Drew Williamson, **Paul Pu Liang**, Faisal Mahmood
CVPR 2024 [code]

55. FLHetBench: Benchmarking Device and State Heterogeneity in Federated Learning
Junyuan Zhang, Shuang Zeng, Miao Zhang, Runxi Wang, Feifei Wang, Yuyin Zhou, **Paul Pu Liang**, Liangqiong Qu
CVPR 2024 [code]

54. Multimodal Learning Without Labeled Multimodal Data: Guarantees and Applications
Paul Pu Liang, Chun Kai Ling, Yun Cheng, Alex Obolenskiy, Yudong Liu, Rohan Pandey, Alex Wilf, L.-P. Morency, R. Salakhutdinov
ICLR 2024 [code]

2023

53. Quantifying & Modeling Multimodal Interactions: An Information Decomposition Framework
Paul Pu Liang, Yun Cheng, Xiang Fan, Chun Kai Ling, Suzanne Nie, Richard Chen, Zihao Deng, Nicholas Allen, Randy Auerbach, Faisal Mahmood, Ruslan Salakhutdinov, Louis-Philippe Morency
NeurIPS 2023 [code]

52. Factorized Contrastive Learning: Going Beyond Multi-view Redundancy
Paul Pu Liang*, Zihao Deng*, Martin Ma*, James Zou, Louis-Philippe Morency, Ruslan Salakhutdinov
NeurIPS 2023 [code]

51. Localized Symbolic Knowledge Distillation for Visual Commonsense Models
Jae Sung Park, Jack Hessel, Khyathi Chandu, **Paul Liang**, Ximing Lu, Qiuyuan Huang, Peter West, Jianfeng Gao, Ali Farhadi, Yejin Choi
NeurIPS 2023 [code]

50. Read and Reap the Rewards: Learning to Play Atari with the Help of Instruction Manuals
Yue Wu, Yewen Fan, **Paul Pu Liang**, Amos Azaria, Yuanzhi Li, Tom Mitchell
NeurIPS 2023, ICLR 2023 Workshop on Reincarnating RL (oral) [code]

49. Difference-Masking: Choosing What to Mask in Continued Pretraining
Alex Wilf, Syeda Akter, Leena Mathur, **Paul Pu Liang**, Sheryl Mathew, Mengrou Shou, Eric Nyberg, Louis-Philippe Morency
EMNLP 2023 Findings [code]

48. Multimodal Fusion Interactions: A Study of Human and Automatic Quantification
Paul Pu Liang, Yun Cheng, Ruslan Salakhutdinov, Louis-Philippe Morency
ICMI 2023 [code]

47. HIINT: Historical, Intra- and Inter- personal Dynamics Modeling with Cross-person Memory Transformer
Yubin Kim, Dong Won Lee, **Paul Pu Liang**, Sharifa Algohwinem, Cynthia Breazeal, Hae Won Park
ICMI 2023

46. Lecture Presentations Multimodal Dataset: Towards Understanding Multimodality in Educational Videos
Dong Won Lee, Chaitanya Ahuja, **Paul Pu Liang**, Sanika Natu, Louis-Philippe Morency
ICCV 2023 [code]

45. Cross-modal Attention Congruence Regularization for Vision-Language Relation Alignment
Rohan Pandey, Rulin Shao, **Paul Pu Liang**, Ruslan Salakhutdinov, Louis-Philippe Morency
ACL 2023 [code]

44. Language Models Get a Gender Makeover: Mitigating Gender Bias with Few-Shot Data Interventions
Himanshu Thakur, Atishay Jain, Praneetha Vaddamanu, **Paul Pu Liang**, Louis-Philippe Morency
ACL 2023 [code]

43. Nano: Nested Human-in-the-Loop Reward Learning for Few-shot Language Model Control
Xiang Fan, Yiwei Lyu, **Paul Pu Liang**, Ruslan Salakhutdinov, Louis-Philippe Morency
ACL Findings 2023, NeurIPS 2022 Workshop on Human in the Loop Learning (oral, best paper nomination) [code]

42. MultiViz: Towards Visualizing and Understanding Multimodal Models
Paul Pu Liang, Yiwei Lyu, Gunjan Chhablani, Nihal Jain, Zihao Deng, Xingbo Wang, Louis-Philippe Morency, Ruslan Salakhutdinov
ICLR 2023, CHI 2023 Late-Breaking Work [code]

41. FindAdaptNet: Find and Insert Adapters by Learned Layer Importance
Junwei Huang, Karthik Ganesan, Soumi Maiti, Young Min Kim, Xuankai Chang, **Paul Liang**, Shinji Watanabe
ICASSP 2023

40. Face-to-Face Contrastive Learning for Social Intelligence Question-Answering
Alex Wilf, Martin Ma, **Paul Pu Liang**, Amir Zadeh, Louis-Philippe Morency
FG 2023 [code]

39. Beyond the Imitation Game: Quantifying and Extrapolating the Capabilities of Language Models
442 authors including **Paul Pu Liang**
TMLR 2023 [code]

2022

38. High-Modality Multimodal Transformer: Quantifying Modality & Interaction Heterogeneity for High-Modality Representation Learning
Paul Pu Liang, Yiwei Lyu, Xiang Fan, Jeffrey Tsaw, Yudong Liu, Dani Yogatama, Louis-Philippe Morency, Ruslan Salakhutdinov
TMLR 2022 [code]

37. MultiZoo & MultiBench: A Standardized Toolkit for Multimodal Deep Learning
Paul Pu Liang, Yiwei Lyu, Xiang Fan, Arav Agarwal, Yun Cheng, Louis-Philippe Morency, Ruslan Salakhutdinov
JMLR Open Source Software 2022 [website] [code]

36. Brainish: Formalizing A Multimodal Language for Intelligence and Consciousness
Paul Pu Liang
Association for the Scientific Study of Consciousness 2022, Models of Consciousness 2022 (oral)

35. Uncertainty Quantification with Pre-trained Language Models: A Large-scale Empirical Analysis
Yuxin Xiao, **Paul Pu Liang**, Umang Bhatt, Willie Neiswanger, Ruslan Salakhutdinov, Louis-Philippe Morency
EMNLP Findings 2022 [code]

34. GEMv2: Multilingual NLG Benchmarking in a Single Line of Code
77 authors including **Paul Pu Liang**
EMNLP Demo Track 2022 [code]

33. PACS: Physical Audiovisual Commonsense Reasoning
Samuel Yu, Peter Wu, **Paul Pu Liang**, Ruslan Salakhutdinov, Louis-Philippe Morency
ECCV 2022 [code]

32. DIME: Fine-grained Interpretations of Multimodal Models via Disentangled Local Explanations
Yiwei Lyu, **Paul Pu Liang**, Zihao Deng, Ruslan Salakhutdinov, Louis-Philippe Morency
AIES 2022 [code]

31. Rethinking Architecture Design for Tackling Data Heterogeneity in Federated Learning
Liangqiong Qu*, Yuyin Zhou*, **Paul Pu Liang***, Yingda Xia, Feifei Wang, Li Fei-Fei, Ehsan Adeli, Daniel Rubin
CVPR 2022 [code]

2021

30. MultiBench: Multiscale Benchmarks for Multimodal Representation Learning
Paul Pu Liang, Yiwei Lyu, Xiang Fan, Z. Wu, Y. Cheng, J. Wu, L. Chen, P. Wu, M.Lee, Y. Zhu, R. Salakhutdinov, L.-P. Morency
NeurIPS 2021 [website] [code]

29. Understanding the Tradeoffs in Client-side Privacy for Speech Recognition
Peter Wu, **Paul Pu Liang**, Jiatong Shi, Ruslan Salakhutdinov, Shinji Watanabe, Louis-Philippe Morency
Asia Pacific Signal and Information Processing Association Annual Summit and Conference 2021 [code]

28. Towards Understanding and Mitigating Social Biases in Language Models
Paul Pu Liang, Chiyu Wu, Louis-Philippe Morency, Ruslan Salakhutdinov
ICML 2021 [code]

27. Learning Language and Multimodal Privacy Preserving Markers of Mood from Mobile Data
Paul Pu Liang*, Terrance Liu*, A. Cai, M. Muszynski, R. Ishii, N. Allen, R. Auerbach, D. Brent, R. Salakhutdinov, L.-P. Morency
ACL 2021 (oral)

26. Cross-Modal Generalization: Learning in Low Resource Modalities via Meta-Alignment
Paul Pu Liang*, Peter Wu*, Liu Ziyin, Louis-Philippe Morency, Ruslan Salakhutdinov
ACM Multimedia 2021 (oral) [code]

25. StylePTB: A Compositional Benchmark for Fine-grained Controllable Text Style Transfer
Yiwei Lyu*, **Paul Pu Liang***, Hai Pham*, Eduard Hovy, Barnabás Póczos, Ruslan Salakhutdinov, Louis-Philippe Morency
NAACL 2021 [code]

24. Anchor & Transform: Learning Sparse Embeddings for Large Vocabularies
Paul Pu Liang, Manzil Zaheer, Yuan Wang, Amr Ahmed
ICLR 2021 [code]

2020

23. MOSEAS: A Multimodal Language Dataset for Spanish, Portuguese, German and French
Amir Zadeh, Yansheng Cao, Simon Hessner, **Paul Pu Liang**, Soujanya Poria, Louis-Philippe Morency
EMNLP 2020

22. Diverse and Admissible Trajectory Prediction through Multimodal Context Understanding
Seong Hyeon Park, Gyubok Lee, Manoj Bhat, Jimin Seo, Minseok Kang, Jon Francis, Ashwin Jadhav, **Paul Liang**, L.-P. Morency
ECCV 2020, CVPR 2020 Argoverse competition (honorable mention award) [code]

21. Towards Debiasing Sentence Representations
Paul Pu Liang, Irene Li, Emily Zheng, Yao Chong Lim, Ruslan Salakhutdinov, Louis-Philippe Morency
ACL 2020 [code]

20. On Emergent Communication in Competitive Multi-Agent Teams
Paul Pu Liang, Jeffrey Chen, Ruslan Salakhutdinov, Louis-Philippe Morency, Satwik Kottur
AAMAS 2020 (oral) [code]

19. Empirical and Theoretical Studies of Multimodal Co-learning
Amir Zadeh, **Paul Pu Liang**, Louis-Philippe Morency
Elsevier Information Fusion 2020

2019

18. Think Locally, Act Globally: Federated Learning with Local and Global Representations
Paul Pu Liang*, Terrance Liu*, Liu Ziyin, Nick Allen, Randy Auerbach, David Brent, Ruslan Salakhutdinov, Louis-Philippe Morency
NeurIPS 2019 Workshop on Federated Learning (oral, distinguished student paper award) [code]

17. Deep Gamblers: Learning to Abstain with Portfolio Theory
Liu Ziyin, Zhikang Wang, **Paul Pu Liang**, Ruslan Salakhutdinov, Louis-Philippe Morency, Masahito Ueda
NeurIPS 2019 [code]

16. Learning Representations from Imperfect Time Series Data via Tensor Rank Regularization
Paul Pu Liang*, Zhun Liu*, Yao-Hung Hubert Tsai, Qibin Zhao, Ruslan Salakhutdinov, Louis-Philippe Morency
ACL 2019

15. Multimodal Transformer for Unaligned Multimodal Language Sequences
Yao-Hung Hubert Tsai, Shaojie Bai, **Paul Pu Liang**, Zico Kolter, Louis-Philippe Morency, Ruslan Salakhutdinov
ACL 2019 [code]

14. Social-IQ: A Question Answering Benchmark for Artificial Social Intelligence
Amir Zadeh, Michael Chan, **Paul Pu Liang**, Edmund Tong, Louis-Philippe Morency
CVPR 2019 (oral) [code]

13. Strong and Simple Baselines for Multimodal Utterance Embeddings
Paul Pu Liang*, Yao Chong Lim*, Yao-Hung Hubert Tsai, Ruslan Salakhutdinov, Louis-Philippe Morency
NAACL 2019 (oral) [code]

12. Learning Factorized Multimodal Representations
Yao-Hung Hubert Tsai*, **Paul Pu Liang***, Amir Zadeh, Louis-Philippe Morency, Ruslan Salakhutdinov
ICLR 2019 [code]

11. Found in Translation: Learning Robust Joint Representations by Cyclic Translations Between Modalities
Hai Pham*, **Paul Pu Liang***, Thomas Manzini, Louis-Philippe Morency, Barnabás Póczos
AAAI 2019 [code]

10. Words can Shift: Dynamically Adjusting Word Representations Using Nonverbal Behaviors
Yansen Wang, Ying Shen, Zhun Liu, **Paul Pu Liang**, Amir Zadeh, Louis-Philippe Morency
AAAI 2019 [code]

2018

9. [Computational Modeling of Human Multimodal Language: The MOSEI Dataset and Interpretable Dynamic Fusion](#)
   Paul Pu Liang, Ruslan Salakhutdinov, Louis-Philippe Morency
   Master's Thesis, CMU Machine Learning Data Analysis Project (first runner-up award) [code]

8. [Multimodal Language Analysis with Recurrent Multistage Fusion](#)
   Paul Pu Liang, Ziyin Liu, Amir Zadeh, Louis-Philippe Morency
   EMNLP 2018 (oral)

7. [Multimodal Local-Global Ranking Fusion for Emotion Recognition](#)
   Paul Pu Liang, Amir Zadeh, Louis-Philippe Morency
   ICMI 2018

6. [Multimodal Language Analysis in the Wild: CMU-MOSEI Dataset and Interpretable Dynamic Fusion Graph](#)
   Amir Zadeh, **Paul Pu Liang**, Jon Vanbriesen, Soujanya Poria, Edmund Tong, Erik Cambria, Minghai Chen, Louis-Philippe Morency
   ACL 2018 (oral) [code]

5. [Efficient Low-rank Multimodal Fusion with Modality-Specific Factors](#)
   Zhun Liu, Ying Shen, Varun Lakshminarasimhan, **Paul Pu Liang**, Amir Zadeh, Louis-Philippe Morency
   ACL 2018 (oral) [code]

4. [An Empirical Evaluation of Sketched SVD and its Application to Leverage Score Ordering](#)
   Hui Han Chin, **Paul Pu Liang**
   ACML 2018

3. [Multi-attention Recurrent Network for Human Communication Comprehension](#)
   Amir Zadeh, **Paul Pu Liang**, Soujanya Poria, Prateek Vij, Erik Cambria, Louis-Philippe Morency
   AAAI 2018 (oral) [code]

2. [Memory Fusion Network for Multi-view Sequential Learning](#)
   Amir Zadeh, **Paul Pu Liang**, Navonil Mazumder, Soujanya Poria, Erik Cambria, Louis-Philippe Morency
   AAAI 2018 (oral) [code]

2017

1. [Multimodal Sentiment Analysis with Word-level Fusion and Reinforcement Learning](#)
   Minghai Chen*, Sen Wang*, **Paul Pu Liang***, Tadas Baltrušaitis, Amir Zadeh, Louis-Philippe Morency
   ICMI 2017 (oral, best paper honorable mention) [code]

Teaching

- Co-Instructor: [CMU 11-877 Advanced Topics in Multimodal ML](#) with Daniel Fried — Spring 2024
- Co-Lecturer: [CMU 11-777 Multimodal Machine Learning](#) with Louis-Philippe Morency — Fall 2023
- Co-Instructor: [ICML, ICMI, CVPR, NAACL Tutorials on Multimodal ML](#) with Louis-Philippe Morency — 2022-2023
- Instructor: [African Masters of Machine Intelligence course on Multimodal AI](#) — Summer 2023
- Co-Instructor: [CMU 11-866 Artificial Social Intelligence](#) with Louis-Philippe Morency — Spring 2023
- Co-Instructor: [CMU 11-877 Advanced Topics in Multimodal ML](#) with Louis-Philippe Morency — Spring 2023
- Co-Lecturer: [CMU 11-777 Multimodal Machine Learning](#) with Louis-Philippe Morency — Fall 2022
- Co-Instructor: [CMU 11-877 Advanced Topics in Multimodal ML](#) with Louis-Philippe Morency and Amir Zadeh — Spring 2022
- Head TA & Lecturer: [CMU 11-777 Multimodal Machine Learning](#) by Louis-Philippe Morency — Fall 2020
- Head TA & Lecturer: [CMU 11-777 Multimodal Machine Learning](#) by Louis-Philippe Morency — Fall 2019
- TA: [CMU 10-708 Probabilistic Graphical Models](#) by Eric Xing — Spring 2019
- TA: [CMU 10-715 Advanced Introduction to Machine Learning](#) by Maria-Florina Balcan — Fall 2018
- TA: [CMU 10-601 Introduction to Machine Learning](#) by Roni Rosenfeld — Fall 2016
- TA: [CMU 15-213/18-213/15-513 Introduction to Computer Systems](#) by Brian Railing — Summer 2016

Invited Talks

- **Foundations of Multisensory Artificial Intelligence**
  MIT Institute for Data Systems and Society, Sept 2024
  University of Glasgow, Sept 2024
  Valence Labs, July 2024
  UC Berkeley Simons Institute for the Theory of Computing, June 2024
  University of Maryland CS, April 2024
  MIT Media Lab and Schwarzman College of Computing, April 2024
  University of Southern California CS, March 2024
  Johns Hopkins University CS, March 2024
  UIUC School of Information Sciences, March 2024
  UT Dallas CS and ECE, March 2024
  University of Washington ECE, Feb 2024
  UT Austin CS, Feb 2024
  Boston University Computing & Data Sciences, Feb 2024

University of Virginia CS and Data Science, Feb 2024
Stanford University Management Science and Engineering, Feb 2024
Georgia Tech CS, Feb 2024
Duke University CS and ECE, Feb 2024
Harvard Medical School Rajpurkar Lab, Feb 2024
University of Chicago & UC San Diego Rising Stars in Data Science, Nov 2023

- **The Future of Large Language Models: Multimodality and Safety**
  American Society for Clinical Pharmacology & Therapeutics Annual Meeting, March 2024
  ACM Multimedia Workshop on Multimodal and Responsible Affective Computing, Oct 2023
  Microsoft Research, July 2023
  IBM Zurich, March 2023
  DeepMind Language Team, Sept 2021

- **Foundations of Multimodal Machine Learning: Principles, Challenges, and Open Questions**
  Guest lectures at CMU 10-707 Deep Learning, Peking University, University of Florida, 2023
  CIFAR DLRL Summer School, July 2023
  ICLR Workshop on Multimodal Representation Learning, April 2023
  Guest lectures at CMU 10-707 Deep Learning, 05-618 Human AI Interaction, 17-728 Machine Learning and Sensing, 2022
  Harvard Medical School AI for Pathology Lab, Oct 2022
  Heidelberg Laureate Forum, Sept 2022
  UC Berkeley Speech Group, Sept 2022
  Stanford University MedAI Group, Sept 2022
  National University of Singapore, Aug 2022
  Amazon AI, Aug 2022
  Allen Institute of AI & University of Washington, June 2022
  Carnegie Mellon University, May 2022

- **Brainish: Formalizing A Multimodal Language for Intelligence and Consciousness**
  Peking University, March 2023
  Models of Consciousness Conference, Sept 2022
  International Joint Conference on Theoretical Computer Science, Aug 2022

- **Towards Real-World Socially Intelligent AI**
  Facebook Fellowship Summit, Sept 2021
  DeepMind Multimodal Team, Sept 2021
  IJCAI Workshop on Multimodal Analytics, Aug 2021
  Agency for Science, Technology, and Research Singapore, June 2021
  Adobe Research, Jan 2021
  Carnegie Mellon University, Oct 2020

- **Think Locally, Act Globally: Federated Learning with Local and Global Representations**
  Agency for Science, Technology and Research Singapore, June 2021
  NeurIPS 2019 Workshop on Federated Learning, Dec 2019

- **Computational Modeling of Human Multimodal Language**
  Google Research, July 2019
  Riken AIP Tokyo Machine Learning Seminar, Jan 2019
  Riken AIP Kyoto Machine Learning Seminar, Dec 2018
  CMU Machine Learning Department Data Analysis Project Presentation, Apr 2018

Student Advising

- Samuael Adnew, Fay Elhassan, Phanie Negho (AMMI)
- Shentong Mo (CMU MS)
- Haofei Yu (CMU MS → UIUC PhD)
- Rana Muhammad Shahroz Khan (Vanderbilt BS → UNC PhD)
- Yun Cheng (CMU BS, MS → Princeton PhD)
- Rulin Shao (CMU MS → Univ of Washington PhD)
- Yuxin Xiao (CMU MS → MIT PhD)
- Dong Won Lee (CMU BS, MS → MIT PhD)
- Yiwei Lyu (CMU BS, MS → Univ of Michigan PhD)
  CRA undergrad research award honorable mention, 2021
  Summer research fellowship winner, 2020
- Peter Wu (CMU BS, MS → UC Berkeley PhD)
- Chiyu Wu (CMU MS → Univ of Waterloo PhD)
- Terrance Liu (CMU MS → CMU PhD)
- Chengfeng Mao (CMU MS → MIT PhD)
- Irene Li (CMU BS, MS → SoundHound)
  CRA undergrad research award honorable mention, 2019
- Yao Chong Lim (CMU MS → DSO National Labs Singapore)
- Zhun Liu (CMU MS → Microsoft Research)
- Ying Shen (CMU MS → Virginia Tech PhD)
- Seong Hyeon Park (Hanyang University MS → KAIST PhD)
- Xiang Fan (CMU BS → Univ of Washington PhD)
  CRA undergrad research award honorable mention, 2022
- Jivat Neet (BITS Pilani BS → MSR → UC Berkeley PhD)
- Rohan Pandey (CMU BS → Reworkd AI, YC S23)
  Glushko prize for best senior thesis, 2023
- Zihao Deng (CMU BS → Univ of Pennsylvania MS)
- Xiangru Tang (Chinese Academy of Sciences BS → Yale PhD)
- Gunjan Chhablani (BITS Pilani BS → Georgia Tech MS)
- Adejuwon Fasanya (CMU BS → Google)
- Samuel Yu (CMU BS → Jump Trading)
  CRA undergrad research award finalist, 2022
  Summer research fellowship winner, 2021
- Holmes Wu (CMU BS → CMU PhD)
- Ziyin Liu (CMU BS → Univ of Tokyo PhD → MIT Postdoc)
- Edmund Tong (CMU BS → Facebook AI Research)

Professional Service

- Workflow Chair: ICML 2019
- Area Chair: ACL, EMNLP, NAACL, ACL Rolling Review
- Session Chair: AAAI 2019
- Co-organizer: Artificial Social Intelligence Workshop and Challenge at ICCV 2023, ECCV 2024
- Co-organizer: Workshop on Machine Learning for Cognitive and Mental Health at AAAI 2024
- Co-organizer: Tutorial on Multimodal Machine Learning at ICML 2023, ICMI 2023, CVPR 2022, NAACL 2022
- Co-organizer: Workshop on Foundation Models in Vision and Language at ICDM 2022
- Co-organizer: Workshop on Multimodal Artificial Intelligence at NAACL 2022, NAACL 2021
- Co-organizer: Workshop on Tensor Networks in Machine Learning at NeurIPS 2020
- Co-organizer: Grand Challenge and Workshop on Human Multimodal Language at ACL 2020, ACL 2018
- Conference Program Committee: NeurIPS, ICML, ICLR, ACL, EMNLP, NAACL, EACL, COLING, IJCNLP, AACL, COLM, ACL Rolling Review, CVPR, ICCV, ECCV, WACV, ACCV, AAAI, IJCAI, AISTATS, CHI, ICMI, FG, ACML, ML4H, CHIL, ACM Multimedia, ACM Multimedia Asia, ICASSP, Interspeech
- Workshop Program Committee: NeurIPS workshop on Meta-Learning, NeurIPS workshop on ML for Health, ICLR workshop on Embodied Multimodal Learning, ICLR workshop on Never-ending RL, ICLR workshop on Enormous Language Models, ACL workshop on Multimodal Language, EMNLP workshop on NLP Open Source Software, EMNLP workshop on NLP Beyond Text, NAACL workshop on Trustworthy NLP, IJCAI workshop on Federated Learning, WWW workshop on NLP Beyond Text, ICRA workshop on Social Intelligence in Humans & Robots, NeurIPS workshop on Human Evaluation of Generative Models, NeurIPS workshop on Self-Supervised Learning, EMNLP workshop on Generation, Evaluation & Metrics
- Journal Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Affective Computing, IEEE Transactions on Audio, Speech and Language Processing, IEEE Transactions on Multimedia, IEEE Transactions on Cybernetics, IEEE Computational Intelligence Magazine, IEEE Signal Processing Letters, Elsevier Information Fusion, Elsevier Computer Speech and Language, Machine Learning, Transactions on Machine Learning Research, Neural Networks, Journal of Artificial Intelligence Research, Journal of Machine Learning Research, Medical Image Analysis, ACM Transactions on Sensor Networks, Proceedings of the National Academy of Sciences
- CMU Machine Learning Blog Editorial Board: 2019, Chief Editor: 2020, 2021, 2022, 2023
- CMU AI Undergraduate Research Mentor: 2018, 2019, 2020, 2021
- CMU Graduate Applicant Support Program Organizer: 2020
- CMU Machine Learning Department PhD Admissions Committee: 2018, 2019, 2020, 2021, 2022, 2023
- CMU Machine Learning Department Masters Admissions Committee: 2017, 2018
- CMU Singapore Students Association Co-President: 2015

Skills

- Languages: English (fluent), Chinese (fluent)
- Programming Languages: Python, C, C++, R, MATLAB, Standard ML, Haskell, SystemVerilog
- Software: PyTorch, Tensorflow, Theano, Keras, LaTeX