

Tianmin Shu

CONTACT INFORMATION	Massachusetts Institute of Technology Building 46-4053 77 Massachusetts Avenue Cambridge, MA 02139	Phone: (310) 948-5180 E-mail: tshu@mit.edu Website: https://www.tshu.io
EMPLOYMENT	Massachusetts Institute of Technology Postdoc	07/2019 - present Advisor: Joshua B. Tenenbaum, Antonio Torralba
EDUCATION	University of California, Los Angeles , Los Angeles, CA, USA Ph.D. in Statistic	09/2014 - 06/2019 Advisor: Song-Chun Zhu
	Fudan University , Shanghai, China B.S. in Electronic Engineering	09/2010 - 06/2014
EXPERIENCE	Facebook AI Research , Menlo Park, CA, USA Research Intern	06/2018 - 09/2018 Mentor: Yuandong Tian
	Salesforce Research , Palo Alto, CA, USA Research Intern	06/2017 - 09/2017 Mentor: Caiming Xiong, Richard Socher

PUBLICATIONS (* indicates equal contribution)

Peer-reviewed Journal Articles

T. Shu, Y. Peng, S.-C. Zhu, and H. Lu. A Unified Psychological Space for Human Perception of Physical and Social Events. *Cognitive Psychology*, 128: 101398, 2021.

Y. Peng, H. Lee, **T. Shu**, and H. Lu. Exploring Biological Motion Perception in Two-stream Convolutional Neural Networks. *Vision Research*, 178: 28-40, 2021.

Z. Nan, **T. Shu**, R. Gong, S. Wang, P. Wei, S.-C. Zhu, and N. Zheng. Learning to Infer Human Attention in Daily Activities. *Pattern Recognition*, 103: 107314, 2020.

D. Xie, **T. Shu**, S. Todorovic, and S.-C. Zhu. Learning and Inferring “Dark Matter” and Predicting Human Intents and Trajectories in Videos. *IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)*, 40(7): 1639-1652, 2018.

T. Shu*, Y. Peng*, L. Fan, H. Lu, and S.-C. Zhu. Perception of Human Interaction Based on Motion Trajectories: from Aerial Videos to Decontextualized Animations. *Topics in Cognitive Science (TopiCS)*, 10(1): 225 - 241, 2018.

Peer-reviewed Conference Papers

T. Shu, A. Bhandwaldar, C. Gan, K. A. Smith, S. Liu, D. Gutfreund, E. Spelke, J. B. Tenenbaum, and T. D. Ullman. AGENT: A Benchmark for Core Psychological Reasoning. *38th International Conference on Machine Learning (ICML)*, 2021. (Acceptance rate: 1184 / 5513 = 21%)

X. Puig, **T. Shu**, S. Li, Z. Wang, J. B. Tenenbaum, S. Fidler, and A. Torralba. Watch-And-Help: A Challenge for Social Perception and Human-AI Collaboration. *9th International Conference on Learning Representations (ICLR)*, 2021. (Spotlight presentation, acceptance rate: 5.6%; a short version won **Best Paper Award** at NeurIPS Cooperative AI Workshop, 2020)

A. Netanyahu*, **T. Shu***, B. Katz, A. Barbu, and J. B. Tenenbaum. PHASE: PHysically-grounded Abstract Social Events for Machine Social Perception. *35th AAAI Conference on Artificial Intelligence (AAAI)*, 2021. (**Acceptance rate: 1692/7911=21%**; short version won **Best Paper Award** at NeurIPS Shared Visual Representations in Human and Machine Intelligence Workshop, 2020)

T. Shu, M. Kryven, T. D. Ullman, and J. B. Tenenbaum. Adventures in Flatland: Perceiving Social Interactions Under Physical Dynamics. *42nd Annual Meeting of the Cognitive Science Society (CogSci)*, 2020.

X. Gao*, R. Gong*, Y. Zhao, S. Wang, **T. Shu**, and S.-C. Zhu. Joint Mind Modeling for Explanation Generation in Complex Human-Robot Collaborative Tasks. *International Conference on Robot & Human Interactive Communication (RO-MAN)*, 2020.

H. Wang, W. Wang, **T. Shu**, W. Liang, and J. Shen. Active Visual Information Gathering for Vision-Language Navigation. *European Conference on Computer Vision (ECCV)*, 2020. (**Acceptance rate: 1360 / 5150 = 26%**)

T. Shu, Y. Peng, H. Lu, and S.-C. Zhu. Partitioning the Perception of Physical and Social Events Within a Unified Psychological Space. *41st Annual Meeting of the Cognitive Science Society (CogSci)*, 2019. (**Oral presentation, acceptance rate: 205/810 = 25.3%**)

T. Shu and Y. Tian. M³RL: Mind-aware Multi-agent Management Reinforcement Learning. *7th International Conference on Learning Representations (ICLR)*, 2019. (**Acceptance rate: 525 / 1591 = 33%**)

P. Wei, Y. Liu, **T. Shu**, N. Zheng, and S.-C. Zhu. Where and Why Are They Looking? Jointly Inferring Human Attention and Intentions in Complex Tasks. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. (**Acceptance rate: 979/3303 = 30%**)

T. Shu, C. Xiong, and R. Socher. Hierarchical and Interpretable Skill Acquisition in Multi-task Reinforcement Learning. *6th International Conference on Learning Representations (ICLR)*, 2018. (**Acceptance rate: 337 / 935 = 36%**)

T. Shu*, Y. Peng*, L. Fan, H. Lu, and S.-C. Zhu. Inferring Human Interaction from Motion Trajectories in Aerial Videos. *39th Annual Meeting of the Cognitive Science Society (CogSci)*, 2017. (**Oral presentation, acceptance rate: 255/873 = 29%**) **Computational Modeling Prize**

T. Shu, S. Todorovic, and S.-C. Zhu. CERN: Confidence-Energy Recurrent Network for Group Activity Recognition. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017. (**Acceptance rate: 783/2680 = 29%**)

T. Shu, X. Gao, M. S. Ryoo, and S.-C. Zhu. Learning Social Affordance Grammar from Videos: Transferring Human Interactions to Human-Robot Interactions. *IEEE International Conference on Robotics and Automation (ICRA)*, 2017. (**Acceptance rate: 939/2289=41%**)

T. Shu*, S. Thurman*, D. Chen, S.-C. Zhu, and H. Lu. Critical Features of Joint Actions that Signal Human Interaction. *38th Annual Meeting of the Cognitive Science Society (CogSci)*, 2016.

T. Shu, M. S. Ryoo, and S.-C. Zhu. Learning Social Affordance for Human-Robot Interaction. *25th International Joint Conference on Artificial Intelligence (IJCAI)*, 2016. (**Acceptance rate: 558/2294= 24%**)

T. Shu, D. Xie, B. Rothrock, S. Todorovic, and S.-C. Zhu. Joint Inference of Groups, Events and

Human Roles in Aerial Videos. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015.* (**Oral presentation, acceptance rate: 71/2123 = 3.3%**)

Peer-reviewed Workshop Papers

X. Gao, R. Gong, **T. Shu**, X. Xie, S. Wang, and S.-C. Zhu. VRKitchen: an Interactive 3D Environment for Learning Real Life Cooking Tasks. *ICML Reinforcement Learning for Real Life Workshop, 2019.*

T. Shu, C. Xiong, Y. N. Wu, and S.-C. Zhu. Interactive Agent Modeling by Learning to Probe. *NeurIPS 2018 Deep Reinforcement Learning Workshop, 2018.*

SELECTED HONORS AND AWARDS	Best Paper Award, NeurIPS Shared Visual Representations in Human and Machine Intelligence Workshop	2020
	Best Paper Award, NeurIPS Cooperative AI Workshop	2020
	Computational Modeling Prize in Perception/Action, Cognitive Science Society	2017
	Outstanding Bachelor Thesis of Fudan University	2014
	Shanghai Outstanding Graduate Award, Shanghai Municipal Education Commission, China	2014
	National Scholarship of China, Ministry of Education, China	2013

MEDIA COVERAGE “AI can learn real-world skills from playing StarCraft and Minecraft.” *Science News*. May 14, 2019

“VRKitchen: An interactive virtual environment to train and test AI agents.” *Tech Xplore*. Mar. 27, 2019

“Robots taught to work alongside humans by giving high fives.” *New Scientist*. Apr. 27, 2017

INVITED TALKS “Benchmarking Machine Social Intelligence.” *Sony Computer Science Laboratories, Paris*, Feb. 17, 2021

“Perceiving Social Interactions Under Physical Dynamics.” *Virtual Computational Neuroscience (VCN) Journal Club hosted by Stanford, MIT/Harvard, and Princeton*, Nov. 18, 2020

“A Unified Modeling of Physical and Social Events.” *The Annual Meeting of Multidisciplinary University Initiative (MURI), Edinburgh, UK*, Sep. 4, 2019

“Towards a Better Agent Modeling for Multi-agent Reinforcement Learning.” *CLVR Speaker Series, University of Southern California*, Nov. 29, 2018

“Social Perception on Heider-Simmel Animations.” *The Annual Meeting of Multidisciplinary University Initiative (MURI), White Mountain, NH*, Sep. 26, 2018

“Modeling Human Social Interactions.” *The Annual Meeting of Multidisciplinary University Initiative (MURI), UCLA*, Aug. 23, 2017

“Inferring Human Interactions.” *3rd Vision Meets Cognition Workshop in Conjunction with CVPR 2017, Honolulu, HI*, Jul. 21, 2017

PROFESSIONAL SERVICE

Conference Reviewer:

- CVPR (2017-2021)
- ICCV (2017, 2019, 2021)
- ECCV (2018, 2020)
- ICLR (2021)

- NeurIPS (2020-2021)
- ICML (2021)
- AAAI (2019-2021)
- ICRA (2019)
- IROS (2017, 2019, 2021)
- WACV (2021)
- BMVC (2019-2020)
- ACCV (2019)
- PRCV (2019-2020)

Journal Reviewer:

- IEEE Transactions on Image Processing (TIP)
- IEEE Robotics and Automation Letters
- Autonomous Robotics
- Frontiers in Psychology
- Quarterly Journal of Experimental Psychology
- Computers in Industry

Workshop Organizers & Committee:

- ICRA 2021 Workshop on Social Intelligence in Humans and Robots
- ICLR 2021 Workshop on Embodied Multimodal Learning
- NeurIPS 2019 Workshop on Learning with Rich Experience: Integration of Learning Paradigms
- ICML 2018 Workshop on Theoretical Foundations and Applications of Deep Generative Models
- 3rd Vision Meets Cognition Workshop in Conjunction with CVPR 2017

Department and University Services:

- Student Reviewer, UCLA Computer Science Graduate Admission (2017-2019)
- Grad Student Consultant, the American Statistical Association (ASA) DataFest (2015)

TEACHING
EXPERIENCE

University of California, Los Angeles, Department of Statistics

STATS 232C: Cognitive Artificial Intelligence

Spring 2018

- Special Reader

STATS 102A: Introduction to Computational Statistics with R

Fall 2017, Winter 2018

- Teaching Assistant

STATS 232A: Statistical Modeling and Learning in Vision and Cognition

Winter 2016

- Special Reader

STATS 130: Getting up to Speed with SPSS, Stata, SAS, and R

Spring 2015

- Teaching Assistant

MENTORING

At MIT

Undergraduate Research:

- Karen Chung (2021 - present; Currently UROP, MIT)
- Nakul Shenoy (2020 - present; Currently UROP, MIT)
- Annika Magaro (2020 - present; Currently UROP, MIT)
- Arpan Kaphle (2021)

At UCLA

Undergraduate Research:

- Qingyi Zhao (2018; Master in Computer Science, UCLA)

- Adam Brownell (2017 - 2018)
- Xiaofeng Gao (2016 Summer; currently Ph.D. student in Statistics at UCLA)
- Xiaopei Zhang (2015 - 2018; Master in Electrical Engineering, UCLA)
- Peimeng Sui (2015 - 2016; Master in Data Science, NYU)

Master Research:

- Yixin Chen (2017 - 2018; currently Ph.D. student in Statistics at UCLA)