

CONTACT INFO	Email: <a href="mailto:yixin.zhu@ucla.edu">yixin.zhu@ucla.edu</a> Homepage: <a href="http://www.yzhu.io">www.yzhu.io</a>
RESEARCH INTERESTS	<b>Computer Vision</b> Functionality, Physics, Intention, Causality, Analogy <b>Computer Graphics</b> Physics-based Simulation <b>Cognitive Science</b> Intuitive Physics, Mental Simulation, Causality <b>Robotics</b> Functional Manipulation, Service Robot
EDUCATION	Ph.D. in Statistics, UCLA <span style="float: right;">April 2018</span> Advisor: Prof. Song-Chun Zhu. Funded by <ul style="list-style-type: none"> <li>- DARPA XAI N66001-17-2-4029 <i>Learning and Communicating Explainable Representations for Analytics and Autonomy</i></li> <li>- ONR MURI N00014-16-1-2007 <i>Understanding Scenes and Events through Joint Parsing, Cognitive Reasoning and Lifelong Learning</i></li> <li>- DARPA SIMPLEX N66001-15-C-4035 <i>Learning Homogeneous Knowledge Representation from Heterogeneous Data for Quantitative and Qualitative Reasoning in Autonomy</i></li> <li>- DARPA MSEE FA 8650-11-1-7149 <i>SEE on a Unified Foundation for Representation, Inference and Learning</i></li> <li>- ONR MURI N00014-10-1-0933 <i>Knowledge Representation, Reasoning and Learning for Understanding Scenes and Events</i></li> <li>- NSF IIS-1423305 <i>Inferring the "Dark Matter" and "Dark Energy" from Image and Video</i></li> </ul> M.S. in Computer Science, UCLA <span style="float: right;">December 2013</span> B.E. in Software Engineering, Xi'an Jiaotong University, China <span style="float: right;">July 2012</span>
EXPERIENCES	Postdoctoral Scholar <span style="float: right;">April 2018 - present</span> Advisor: Prof. Song-Chun Zhu Center for Vision, Cognition, Learning and Autonomy (VCLA), UCLA VP of Operations <span style="float: right;">October 2018 - August 2019</span> DMAI, Inc. Research Director <span style="float: right;">January 2018 - August 2019</span> DMAI, Inc. Graduate Research Assistant <span style="float: right;">March 2013 - April 2018</span> Advisor: Prof. Song-Chun Zhu Center for Vision, Cognition, Learning and Autonomy (VCLA), UCLA Visiting Student <span style="float: right;">July 2017</span> Host: Prof. Chenfanfu Jiang Computer Graphics Group, Penn Research Intern <span style="float: right;">Summer 2012</span> Mentor: Prof. Gil Alterovitz Biomedical Cybernetics Laboratory, Harvard Medical School UCLA-CSST Program <span style="float: right;">Summer 2011</span> Advisor: Prof. Todd Millstein Computer Science Department, UCLA

AWARDS AND SCHOLARSHIPS	Outstanding Reviewer, CVPR	2017, 2019
	GPU Donation Program for Researchers, Nvidia	2018
	Outstanding Statistician Award, UCLA Statistics Department	2018
	RAS Travel Grant, ICRA	2018
	Doctoral Student Travel Grants, UCLA	2017
	Doctoral Student Travel Grants, UCLA Statistics Department	2017, 2018
	Sponsorship for VisionMeetsCognition Workshop at CVPR, Intel	2017
	Fellowship, University of California, Los Angeles	2015 - 2018
	CUDA Hardware Donation Program for Researchers, Nvidia	2014
	Honor Graduate Certificate, Xi'an Jiaotong University, China	2012
	Google Scholarship, Google	2011
	UCLA-CSST Scholarship, University of California, Los Angeles	2011
	Samsung Scholarship, Samsung	2010
Excellent Student Scholarship, Xi'an Jiaotong University, China	2008 - 2011	

- JOURNAL PUBLICATIONS
- \* denotes equal contribution
- [3] C. Jiang\*, S. Qi\*, **Y. Zhu\***, S. Huang\*,  
Jenny Lin, Lap-Fai Yu, D. Terzopoulos, and S.-C. Zhu.  
*Configurable 3D Scene Synthesis and 2D Image Rendering with Per-Pixel Ground Truth using Stochastic Grammars.*  
International Journal of Computer Vision (IJCV) 126.9 (2018): 920-941.  
doi:10.1007/s11263-018-1103-5
- [2] Y. Hu, Y. Fang, Z. Ge, Z. Qu, **Y. Zhu**, A. Pradhana, and C. Jiang.  
*A Moving Least Squares Material Point Method with Displacement Discontinuity and Two-Way Rigid Body Coupling.*  
ACM Transactions on Graphics (TOG) (Proceedings of ACM SIGGRAPH) 37.4 (2018): 150-163.  
doi:10.1145/3197517.3201293
- [1] T. Ye\*, S. Qi\*, J. Kubricht, **Y. Zhu**, H. Lu, and S.-C. Zhu.  
*The Martian: Examining Human Physical Judgments Across Virtual Gravity Fields.*  
Invited Talk at IEEE VR 2017 and VRLA 2017.  
IEEE Transactions on Visualization and Computer Graphics (TVCG) 23.4 (2017): 1399-1408.  
doi:10.1109/TVCG.2017.2657235

- CONFERENCE PUBLICATIONS
- \* denotes equal contribution
- [29] C. Zhang, B. Jia, F. Gao, **Y. Zhu**, H. Lu, and S.-C. Zhu.  
*Learning Perceptual Inference by Contrasting.* **[Spotlight]**  
33rd Conference on Neural Information Processing Systems (NeurIPS), 2019.
- [28] S. Huang, Y. Chen, T. Yuan, S. Qi, **Y. Zhu**, and S.-C. Zhu.  
*3D Object Detection from a Single RGB Image via Perspective Points.*  
33rd Conference on Neural Information Processing Systems (NeurIPS), 2019.
- [27] Y. Chen\*, S. Huang\*, T. Yuan, **Y. Zhu**, S. Qi, and S.-C. Zhu.  
*Holistic<sup>++</sup> Scene Understanding: Single-view 3D Holistic Scene Parsing and Human Pose Estimation with Human-Object Interaction and Physical Commonsense.*  
17th International Conference on Computer Vision (ICCV), 2019.
- [26] X. Xie\*, C. Li\*, C. Zhang, **Y. Zhu**, and S.-C. Zhu.  
*Learning Virtual Grasp with Failed Demonstrations via Bayesian Inverse Reinforcement Learning.* **[Oral]**  
32nd International Conference on Intelligent Robots and Systems (IROS), 2019.
- [25] M. Edmonds, S. Qi, **Y. Zhu**, J. Kubricht, S.-C. Zhu, and H. Lu.  
*Decomposing Human Causal Learning: Bottom-up Associative Learning and Top-down*

- Schema Reasoning*.  
41st Annual Conference of the Cognitive Science Society (CogSci), 2019.
- [24] C. Zhang\*, F. Gao\*, B. Jia, **Y. Zhu**, and S.-C. Zhu.  
*RAVEN: A Dataset for Relational and Analogical Visual Reasoning*.  
32nd Computer Vision and Pattern Recognition (CVPR), 2019.
- [23] X. Xie, H. Liu, Z. Zhang, Y. Qiu, F. Gao, S. Qi, **Y. Zhu**, and S.-C. Zhu.  
*VRGym: A Virtual Testbed for Physical and Interactive AI*. **[Best Paper]**  
2nd ACM Turing Celebration Conference (TURC), 2019.
- [22] H. Liu\*, Z. Zhang\*, X. Xie, **Y. Zhu**, Y. Liu, Y. Wang, and S.-C. Zhu.  
*High-Fidelity Grasping in Virtual Reality using a Glove-based System*.  
36th International Conference on Robotics and Automation (ICRA), 2019.
- [21] H. Liu\*, Z. Zhang\*, **Y. Zhu**, and S.-C. Zhu.  
*Self-Supervised Incremental Learning for Sound Source Localization in Complex Indoor Environment*.  
36th International Conference on Robotics and Automation (ICRA), 2019.
- [20] H. Liu, C. Zhang, **Y. Zhu**, C. Jiang, and S.-C. Zhu.  
*Mirroring without Overimitation: Learning Functionally Equivalent Manipulation Actions*.  
**[Spotlight]**  
32nd AAAI Conference on Artificial Intelligence, 2019
- [19] C. Zhang, **Y. Zhu**, and S.-C. Zhu.  
*MetaStyle: Three-Way Trade-Off Among Speed, Flexibility and Quality in Neural Style Transfer*. **[Spotlight]**  
32nd AAAI Conference on Artificial Intelligence, 2019
- [18] S. Huang, S. Qi, Y. Xiao, **Y. Zhu**, Y. N. Wu, and S.-C. Zhu.  
*Cooperative Holistic Scene Understanding: Unifying 3D Object, Layout, and Camera Pose Estimation*.  
32nd Conference on Neural Information Processing Systems (NeurIPS), 2018
- [17] S. Huang, S. Qi, **Y. Zhu**, Y. Xiao, Y. Xu, and S.-C. Zhu.  
*3D Scene Parsing and Reconstruction from a Single RGB Image via Holistic Scene Grammar*.  
15th European Conference on Computer Vision (ECCV), 2018
- [16] M. Edmonds\*, J. Kubricht\*, C. Summers, **Y. Zhu**, B. Rothrock, S.-C. Zhu, and H. Lu.  
*Human Causal Transfer: Challenges for Deep Reinforcement Learning*. **[Oral]**  
40th Annual Conference of the Cognitive Science Society (CogSci), 2018.
- [15] S. Qi, **Y. Zhu**, S. Huang, C. Jiang, and S.-C. Zhu.  
*Human-centric Indoor Scene Synthesis using Stochastic Grammar*.  
31st Computer Vision and Pattern Recognition (CVPR), 2018.
- [14] H. Liu\*, Y. Zhang\*, W. Si, X. Xie, **Y. Zhu**, and S.-C. Zhu.  
*Interactive Robot Knowledge Patching using Augmented Reality*.  
35th International Conference on Robotics and Automation (ICRA), 2018.
- [13] X. Xie\*, H. Liu\*, M. Edmonds, F. Gao, S. Qi, **Y. Zhu**, B. Rothrock, and S.-C. Zhu.  
*Unsupervised Learning of Hierarchical Models for Hand-Object Interactions using Tactile Glove*.  
35th International Conference on Robotics and Automation (ICRA), 2018.
- [12] D. Wang\*, J. Kubricht\*, **Y. Zhu\***, W. Liang, S.-C. Zhu, C. Jiang, and H. Lu.  
*Spatially Perturbed Collision Sounds Attenuate Perceived Causality in 3D Launching Events*.  
**[Oral]**  
25th IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR), 2018.
- [11] W. Liang, **Y. Zhu**, and S.-C. Zhu.  
*Tracking Occluded Objects and Recovering Incomplete Trajectories by Reasoning about Containment Relations and Human Actions*. **[Spotlight]**

- 32nd AAAI Conference on Artificial Intelligence (AAAI), 2018.
- [10] M. Edmonds\*, F. Gao\*, X. Xie, H. Liu, **Y. Zhu**, B. Rothrock, and S.-C. Zhu.  
*Feeling the Force: Integrating Force and Pose for Fluent Discovery through Imitation Learning to Open Medicine Bottles.* [Oral]  
30th International Conference on Intelligent Robots and Systems (IROS), 2017.
- [9] H. Liu\*, X. Xie\*, M. Millar\*, M. Edmonds, F. Gao, **Y. Zhu**, V. J. Santos, B. Rothrock, and S.-C. Zhu.  
*A Glove-based System for Studying Hand-Object Manipulation via Pose and Force Sensing.* [Oral]  
30th International Conference on Intelligent Robots and Systems (IROS), 2017.
- [8] J. Kubricht\*, **Y. Zhu\***, C. Jiang\*, D. Terzopoulos, S.-C. Zhu, and H. Lu.  
*Consistent Probabilistic Simulation Underlying Human Judgment in Substance Dynamics.* [Oral]  
39th Annual Conference of the Cognitive Science Society (CogSci), 2017.
- [7] J. Lin\*, **Y. Zhu\***, J. Kubricht\*, S.-C. Zhu, and H. Lu.  
*Visuomotor Adaptation and Sensory Recalibration in Reversed Hand Movement Task.*  
39th Annual Conference of the Cognitive Science Society (CogSci), 2017.
- [6] J. Lin\*, X. Guo\*, J. Shao\*, C. Jiang, **Y. Zhu**, and S.-C. Zhu.  
*A Virtual Reality Platform for Dynamic Human-Scene Interaction.* [Oral]  
ACM SIGGRAPH Asia 2016, Workshop on Virtual Reality meets Physical Reality
- [5] W. Liang, Y. Zhao, **Y. Zhu**, and S.-C. Zhu.  
*What is Where: Inferring Containment Relations from Videos.* [Oral]  
25th International Joint Conference on Artificial Intelligence (IJCAI), 2016.
- [4] J. Kubricht\*, C. Jiang\*, **Y. Zhu\***, S.-C. Zhu, D. Terzopoulos, and H. Lu.  
*Probabilistic Simulation Predicts Human Performance on Viscous Fluid-Pouring Problem.* [Oral]  
38th Annual Conference of the Cognitive Science Society (CogSci), 2016.
- [3] **Y. Zhu\***, C. Jiang\*, Y. Zhao, D. Terzopoulos, and S.-C. Zhu.  
*Inferring Forces and Learning Human Utilities From Videos.* [Oral]  
29th Computer Vision and Pattern Recognition (CVPR), 2016.
- [2] W. Liang, Y. Zhao, **Y. Zhu**, and S.-C. Zhu.  
*Evaluating Human Cognition of Containing Relations with Physical Simulation.* [Oral]  
37th Annual Conference of the Cognitive Science Society (CogSci), 2015.
- [1] **Y. Zhu\***, Y. Zhao\*, and S.-C. Zhu.  
*Understanding Tools: Task-Oriented Object Modeling, Learning and Recognition.*  
28th Computer Vision and Pattern Recognition (CVPR), 2015.

TECHNICAL  
REPORTS

J. Jeon, K. Micinski, J. Vaughan, N. Reddy, **Y. Zhu**, J. Foster, and T. Millstein.  
*Dr. Android and Mr. Hide: Fine-grained security policies on unmodified Android.*  
Technical Reports of the Computer Science Department, University of Maryland,  
2015

PROFESSIONAL  
SERVICES

**Conference Organization**

Webmaster, Computer Vision and Pattern Recognition (CVPR) 2019

Co-chair, Computer Vision and Pattern Recognition (CVPR) 2019 Workshop on  
3D Scene Understanding for Vision, Graphics, and Robotics

Co-chair, Computer Vision and Pattern Recognition (CVPR) 2019 Workshop on  
Vision meets Cognition: Functionality, Physics, Intentionality and Causality

Co-chair, Computer Vision and Pattern Recognition (CVPR) 2018 Workshop on Vision meets Cognition: Functionality, Physics, Intentionality and Causality

Co-chair, Computer Vision and Pattern Recognition (CVPR) 2017 Workshop on Vision meets Cognition: Functionality, Physics, Intentionality and Causality

Co-chair, SIGGRAPH Asia 2016 Workshop on Virtual Reality meets Physical Reality: Modelling and Simulating Virtual Humans and Environments

Co-chair, CogSci 2016 Workshop on Physical and Social Scene Understanding

Student Organizer, MURI Annual Review Meeting, UCLA, 2017.

Student Organizer, MURI Annual Review Meeting, Lake Arrowhead, 2015.

### Peer-reviewed Journals and Conferences

#### *Computer Vision:*

Reviewer, International Journal of Computer Vision (IJCV)

Reviewer, Computer Vision and Pattern Recognition (CVPR), 2015-2019

Reviewer, International Conference on Computer Vision (ICCV), 2015-2019

Reviewer, AAAI Conference on Artificial Intelligence (AAAI), 2020

Reviewer, European Conference on Computer Vision (ECCV), 2018

Reviewer, British Machine Vision Conference (BMVC), 2017-2019

#### *Machine Learning:*

Reviewer, Neural Information Processing Systems (NeurIPS), 2019

#### *Robotics:*

Reviewer, International Conference on Intelligent Robots and Systems (IROS), 2019

#### *Cognitive Science:*

Reviewer, Annual Conference of the Cognitive Science Society (CogSci), 2015-2019

#### *Human-Computer Interaction:*

Reviewer, IEEE Virtual Reality and 3D User Interfaces (IEEE VR), 2018-2019

Reviewer, ACM User Interface Software and Technology Symposium (UIST), 2018

Reviewer, ACM Tangible, Embedded, and Embodied Interactions (TEI), 2019

Reviewer, ACM Multimedia, 2019

### Department and University Services

External Reviewer, Research Grants Council (RGC) of Hong Kong, 2019

Faculty Leader, Peer Seminars in Math/Stat, UCLA-CSST, 2019,2016

Student Reviewer, UCLA Computer Science Graduate Admission, 2015-2019

Student Reviewer, UCLA-CSST Program Admission, 2016-2018

PhD Student Ambassadors, UCLA Computer Science Department, 2016-2018

### INVITED TALKS

Guest Lecture: Visual Reasoning

at UCLA Statistics 232C: Cognitive Artificial Intelligence

March 2019

Joint Parsing for Understanding 3D Scenes and Human Activities in Videos

at UCLA CDSC/InTrans Project Annual Review

February 2019

Visual Commonsense Reasoning

at PKU-UCLA JRI Annual Symposium

October 2018

Object and Scene Understanding: From Passive Observation to Active Interaction  
at ONR MURI Annual Review Meeting September 2018

Visual Commonsense Reasoning  
at CVPR Workshop on Visual Understanding of Humans in Crowd Scene June 2018

Guest Lecture: Tools and Functionality  
at UCLA Statistics 232C: Cognitive Artificial Intelligence May 2018

Guest Lecture: How to Build a Cognitive Robot  
at UCLA Comm. Study 155: Artificial Intelligence and New Media May 2017

To Feel and Dream: Data for Intelligent Machine Beyond Images and Texts  
at Teddy Talk in plenary session at CRESSTCON 2016 September 2016

Understanding Functionality and Affordance of Objects and Scenes  
at Beijing Institute of Technology May 2016

Functionality and Affordance of Objects and Scenes  
at Princeton Vision Group February 2016

Understanding Objects as Tools, Containers and Chairs  
at UCLA Computational Vision and Learning Lab November 2015

Learning from Human Demonstration: Understanding Objects as Tools  
at ONR MURI Annual Review Meeting September 2015

Understanding Tool Use: a Task-oriented Vision Problem  
at ONR MURI Annual Review Meeting December 2014

What is a Tool? Going beyond what is where  
at DARPA MSEE Annual Review Meeting September 2014

IN THE PRESS

Our work on Scene Understanding was featured in  
UCLA Statistics Moments. June 2016

UCLA Daily Bruin Prime issued a special interview on our work.  
Title: "Give a Robot a Fish" May 2016

Our work on "Understanding Tools" was featured in  
Statistics Department News. June 2015

COLLABORATORS

- Prof. Chenfanfu Jiang  
at Computer Graphics Group, UPenn
- Prof. Demetri Terzopoulos  
at Computer Graphics & Vision Laboratory, UCLA
- Prof. Hongjing Lu  
at Computational Vision and Learning Lab, UCLA
- Dr. James Kubricht  
at GE Research
- Prof. Ying Nian Wu

*at Department of Statistics, UCLA*

- Prof. Tao Gao  
*at Department of Statistics and Communication Studies, UCLA*
- Jiajun Wu  
*at CASIL, MIT*
- Prof. Wei Liang  
*at Media Computing and Intelligent Systems Lab, Beijing Institute of Technology*
- Dr. Brandon Rothrock  
*at Jet Propulsion Laboratory, Caltech*
- Dr. Yibiao Zhao  
*at iSee.ai*
- Prof. Lap-Fai (Craig) Yu  
*at Design Computing and Extended Reality Group, George Mason University*
- Prof. Tianfu Wu  
*at NC State University (NCSU)*
- Eric Peltola and Prof. Veronica Santos  
*at Biomechanics Lab, UCLA*

STUDENTS  
MENTORED

- Xiaolin Fang, PhD in Computer Science, MIT, 2019 Fall
- Shu Wang, PhD in Statistics, UCLA, 2018 Fall
- Wenwen Si, Master in Computer Vision, CMU, 2018 Fall
- Hangxin Liu, PhD in Computer Science, UCLA, 2018 Spring
- Jenny Lin, PhD in Computer Science, CMU, 2017 Fall
- Mark Edmonds, PhD in Computer Science, UCLA, 2017 Fall
- Tian Ye, Master in Robotics, CMU, 2017 Fall
- Feng Gao, Master in Statistics, UCLA, 2017 Fall
- Xu Xie, Master in Statistics, UCLA, 2017 Fall
- Xingwen Guo, Master in Computer Science, Yale, 2017 Fall
- Chi Zhang, Master in Computer Science, UCLA, 2017 Fall
- Jingyu Shao, Master in Statistics, UCLA, 2016 Winter
- Yutong Zhang, Master in Computer Science, UCLA, 2015 Fall