

Stanford



C. Karen Liu

Associate Professor of Computer Science

Bio

BIO

C. Karen Liu is an associate professor in the Computer Science Department at Stanford University. Prior to joining Stanford, Liu was a faculty member at the School of Interactive Computing at Georgia Tech. She received her Ph.D. degree in Computer Science from the University of Washington. Liu's research interests are in computer graphics and robotics, including physics-based animation, character animation, optimal control, reinforcement learning, and computational biomechanics. She developed computational approaches to modeling realistic and natural human movements, learning complex control policies for humanoids and assistive robots, and advancing fundamental numerical simulation and optimal control algorithms. The algorithms and software developed in her lab have fostered interdisciplinary collaboration with researchers in robotics, computer graphics, mechanical engineering, biomechanics, neuroscience, and biology. Liu received a National Science Foundation CAREER Award, an Alfred P. Sloan Fellowship, and was named Young Innovators Under 35 by Technology Review. In 2012, Liu received the ACM SIGGRAPH Significant New Researcher Award for her contribution in the field of computer graphics.

ACADEMIC APPOINTMENTS

- Associate Professor, Computer Science
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Wu Tsai Human Performance Alliance

HONORS AND AWARDS

- SIGGRAPH Significant New Research Award, ACM (2012)
- Alfred P. Sloan Research Fellowship, Alfred P. Sloan Foundation (2010)
- Young Innovators Under 35, MIT Technology Review (2007)
- CAREER Award, National Science Foundation (2007)

PROFESSIONAL EDUCATION

- BS, National Taiwan University , Computer Science (1999)
- MS, University of Washington , Computer Science (2001)
- PhD, University of Washington , Computer Science (2005)

LINKS

- <https://www.cs.stanford.edu/~karenliu>: <https://www.cs.stanford.edu/~karenliu>

Teaching

COURSES

2021-22

- Character Animation: Modeling, Simulation, and Control of Human Motion: CS 348E (Spr)
- Computer Graphics in the Era of AI: CS 348I (Aut)

2020-21

- Character Animation: Modeling, Simulation, and Control of Human Motion: CS 348E (Spr)
- Computer Graphics in the Era of AI: CS 348I (Aut)

2019-20

- Character Animation: Modeling, Simulation, and Control of Human Motion: CS 348E (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Nick Bianco, Michael Raitor, Davis Rempe

Postdoctoral Faculty Sponsor

Seunghwan Lee, Jackson Wang, Zhaoming Xie

Master's Program Advisor

David Lüdeke, Takara Truong

Doctoral (Program)

Joao Araujo, Michelle Guo, Yifeng Jiang, Jiaman Li, Keenon Werling, Albert Wu

Publications

PUBLICATIONS

- **Learning Human Search Behavior from Egocentric Visual Inputs** *COMPUTER GRAPHICS FORUM*
Sorokin, M., Yu, W., Ha, S., Liu, C.
2021; 40 (2): 389-398
- **The Role of Physics-Based Simulators in Robotics** *ANNUAL REVIEW OF CONTROL, ROBOTICS, AND AUTONOMOUS SYSTEMS, VOL 4, 2021*
Liu, C., Negrut, D., Leonard, N. E.
2021; 4: 35-58
- **Protective Policy Transfer**
Yu, W., Turk, G., Liu, C. K.
2021
- **SimGAN: Hybrid Simulator Identification for Domain Adaptation via Adversarial Reinforcement Learning**
Jiang, Y., Zhang, T., Ho, D., Bai, Y., Liu, C. K., Levine, S., Tan, J.
2021
- **Policy Transfer via Kinematic Domain Randomization and Adaptation**
Exarchos, I., Jiang, Y., Yu, W., Liu, C. K.
2021
- **Fast and Feature-Complete Differentiable Physics for Articulated Rigid Bodies with Contact**
Werling, K., Omens, D., Lee, J., Exarchos, I., Liu, C. K.

2021

- **Error-Aware Policy Learning: Zero-Shot Generalization in Partially Observable Dynamic Environments**
Kumar, V. C., Ha, S., Liu, C. K.
2021
- **Learning Task-Agnostic Action Spaces for Movement Optimization** *IEEE Transactions on Computer Graphics and Visualization*
Babadi, A., van de Panne, M., Liu, C. K., Hämäläinen, P.
2021
- **COCOI: Contact-aware Online Context Inference for Generalizable Non-planar Pushing**
Xu, Z., Yu, W., Herzog, A., Lu, W., Fu, C., Tomizuka, M., Bai, Y., Liu, C. K., Ho, D.
2021
- **iGibson 2.0: Object-Centric Simulation for Robot Learning of Everyday Household Tasks**
Li, C., Xia, F., Martin-Martin, R., Lingelbach, M., Srivastava, S., Shen, B., Vainio, K., Gokmen, C., Dharan, G., Jain, T., Kurenkov, A., Liu, C. K., Gweon, et al
2021
- **Co-GAIL Learning Diverse Strategies for Human-Robot Collaboration**
Wang, C., Pérez-D'Arpino, C., Xu, D., Fei-Fei, L., Liu, C. K., Savarese, S.
2021
- **BEHAVIOR: Benchmark for Everyday Household Activities in Virtual, Interactive, and Ecological Environments**
Srivastava, S., Li, C., Lingelbach, M., Martin-Martin, R., Xia, F., Vainio, K., Lian, Z., Gokmen, C., Buch, S., Liu, C. K., Savarese, S., Gweon, H., Wu, et al
2021
- **DASH: Modularized Human Manipulation Simulation with Vision and Language for Embodied AI**
Jiang, Y., Guo, M., Li, J., Exarchos, I., Wu, J., Liu, C. K.
2021
- **Learning to Manipulate Amorphous Materials** *ACM TRANSACTIONS ON GRAPHICS*
Zhang, Y., Yu, W., Liu, C., Kemp, C., Turk, G.
2020; 39 (6)
- **Learning to Collaborate From Simulation for Robot-Assisted Dressing** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Clegg, A., Erickson, Z., Grady, P., Turk, G., Kemp, C. C., Liu, C.
2020; 5 (2): 2746–53
- **Bodies at Rest: 3D Human Pose and Shape Estimation from a Pressure Image using Synthetic Data**
Clever, H. M., Erickson, Z., Kapusta, A., Turk, G., Liu, C., Kemp, C. C., IEEE
IEEE.2020: 6214–23
- **Estimating Mass Distribution of Articulated Objects using Non-prehensile Manipulation**
Kumar, K. N., Essa, I., Ha, S., Liu, C. K.
2020
- **Visualizing Movement Control Optimization Landscapes.** *IEEE transactions on visualization and computer graphics*
Hamalainen, P. n., Toikka, J. n., Babadi, A. n., Liu, K. n.
2020; PP
- **Learning a Control Policy for Fall Prevention on an Assistive Walking Device**
Kumar, V., Ha, S., Sawicki, G., Liu, C. K.
2020
- **Learning a Control Policy for Fall Prevention on an Assistive Walking Device**
Kumar, V. C., Ha, S., Sawicki, G., Liu, C. K.
2020
- **Assistive Gym: A Physics Simulation Framework for Assistive Robotics**
Erickson, Z., Gangaram, V., Kapusta, A., Liu, C. K., Kemp, C. C.

2020

- **Personalized collaborative plans for robot-assisted dressing via optimization and simulation** *AUTONOMOUS ROBOTS*
Kapusta, A., Erickson, Z., Clever, H. M., Yu, W., Liu, C., Turk, G., Kemp, C. C.
2019; 43 (8): 2183–2207
- **Synthesis of Biologically Realistic Human Motion Using Joint Torque Actuation** *ACM TRANSACTIONS ON GRAPHICS*
Jiang, Y., Van Wouwe, T., De Groote, F., Liu, C.
2019; 38 (4)
- **Sim-to-Real Transfer for Biped Locomotion** *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
Yu, W., Kumar, V. C., Turk, G., Liu, C.
2019
- **Policy Transfer with Strategy Optimization**
Yu, W., Liu, C., Turk, G.
2019
- **Multidimensional Capacitive Sensing for Robot-Assisted Dressing and Bathing**
Erickson, Z., Clever, H. M., Gangaram, V., Turk, G., Liu, C., Kemp, C. C.
2019