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
- Member, Bio-X
- Faculty Affiliate, Institute for Human-Centered Artificial Intelligence (HAI)
- Member, Wu Tsai Human Performance Alliance

HONORS AND AWARDS

- ACM SIGGRAPH Academy, ACM (2021)
- SIGGRAPH Significant New Research Award, ACM (2012)
- Alfred P. Sloan Research Fellowship, Alfred P. Sloan Foundation (2010)
- 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

Teaching

COURSES

2022-23
• Character Animation: Modeling, Simulation, and Control of Human Motion: CS 348E (Spr)

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)
Michael Raitor, Jane Wu, Haotian Zhang

Postdoctoral Faculty Sponsor
Seunghwan Lee, Jackson Wang

Doctoral Dissertation Advisor (AC)
Ken Wang

Orals Evaluator
Jane Wu, Haotian Zhang

Master's Program Advisor
Pranay Agrawal, Kamran Ahmed, Katie Dekter, Ashley Jepson, Senyang Jiang, Kevin Lin, David Ludeke, Ruiqi Wang, Warren Xia

Doctoral (Program)
Joao Araujo, Michelle Guo, Yifeng Jiang, Jiaman Li, Tyler Lum, Ruocheng Wang, Keenon Werling, Albert Wu

Publications

PUBLICATIONS

• Characterizing Multidimensional Capacitive Servoing for Physical Human-Robot Interaction IEEE TRANSACTIONS ON ROBOTICS
  Erickson, Z., Clever, H. M., Gangaram, V., Xing, E., Turk, G., Liu, C., Kemp, C. C.
  2022

• A Survey on Reinforcement Learning Methods in Character Animation
  Kwiatkowski, A., Alvarado, E., Kalogeiton, V., Liu, C., Petre, J., van de Panne, M., Cani, M.
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• Learning to Navigate Sidewalks in Outdoor Environments IEEE ROBOTICS AND AUTOMATION LETTERS
  Sorokin, M., Tan, J., Liu, C., Ha, S.
  2022; 7 (2): 3906-3913
• DCL: Differential Contrastive Learning for Geometry-Aware Depth Synthesis *IEEE ROBOTICS AND AUTOMATION LETTERS*
Shen, Y., Yang, Y., Zheng, Y., Liu, C., Guibas, L. J.
2022; 7 (2): 4845-4852

• Task-Specific Design Optimization and Fabrication for Inflated-Beam Soft Robots with Growable Discrete Joints *IEEE International Conference on Robotics and Automation (ICRA)*
Exachos, I., Wang, K., Do, B., Stroppa, F., Coad, M., Okamura, A., Liu, C.
2022

• GIMO: Gaze-Informed Human Motion Prediction in Context
SPRINGER INTERNATIONAL PUBLISHING AG.2022: 676-694

• ADeLA: Automatic Dense Labeling with Attention for Viewpoint Adaptation in Semantic Segmentation *Conference on Computer Vision and Pattern Recognition (CVPR)*
2022

• Data-Augmented Contact Model for Rigid Body Simulation *Learning for Dynamics & Control Conference (LADC)*
Jian, Y., Sun, J., Liu, C.
2022

• Learning Diverse and Physically Feasible Dexterous Grasps with Generative Model and Bilevel Optimization *Conference on Robot Learning (CoRL)*
Wu, A., Guo, M., Liu, C.
2022

• Transformer Inertial Poser: Real-time Human Motion Reconstruction from Sparse IMUs with Simultaneous Terrain Generation *Proceedings of SIGGRAPH Asia*
Jiang, Y., Ye, Y., Gopinath, D., Won, J., Winkler, A., Liu, C.
2022

• BEHAVIOR-1K: A Benchmark for Embodied AI with 1,000 Everyday Activities and Realistic Simulation *Conference on Robot Learning (CoRL)*
Li, C.
2022

• Real-time Model Predictive Control and System Identification Using Differentiable Physics Simulation *IEEE Robotics and Automation Letters*,
Chen, S., Werling, K., Wu, A., Liu, C.
2022

• Scene Synthesis from Human Motion *Proceedings of ACM SIGGRAPH Asia*
Ye, S., Wang, Y., Li, J., Park, D., Liu, C., Xu, H., Wu, J.
2022

• 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**  
  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**  
  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

- **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

- **Visualizing Movement Control Optimization Landscapes.** *IEEE transactions on visualization and computer graphics*  
  2020; PP

- **Estimating Mass Distribution of Articulated Objects using Non-prehensile Manipulation**  
  Kumar, K. N., Essa, I., Ha, S., Liu, C. K.  
  2020

- **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
• Learning a Control Policy for Fall Prevention on an Assistive Walking Device
  Kumar, V., Ha, S., Sawicki, G., Liu, C. K.
  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.
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• 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.
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• Policy Transfer with Strategy Optimization
  Yu, W., Liu, C., Turk, G.
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• Multidimensional Capacitive Sensing for Robot-Assisted Dressing and Bathing
  Erickson, Z., Clever, H. M., Gangaram, V., Turk, G., Liu, C., Kemp, C. C.
  2019