

# Jiahao Nick LI

✉ ljhnick@ucla.edu 📞 +1 424 355 6278 🌐 <https://jiahaoli.net>

## RESEARCH FOCUS

My research focuses on the intersection of human-computer interaction (HCI) and machine learning (ML), where I design full-stack AI systems to assist humans with everyday tasks. This includes collecting and curating data from real users for targeted applications, creating interactive systems for embodied AI assistance, and evaluating these approaches.

Areas of Interest: Human-AI Interaction; Multimodal AI Agents; Pervasive Augmented Reality; Generative AI.


## PROFESSIONAL EXPERIENCE

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|-----------|--|-----------------|
| 2022/2023 | <b>Meta Reality Labs</b> , Research Scientist Intern.<br><i>Mentor: Tovi Grossman, Yan Xu</i><br>Developed OmniActions [F.7], a <i>multimodal pipeline</i> powered by LLMs that predicts users' follow-up actions when interacting with real-world multimodal information.<br>Crowdsourced data for coding the design space of follow-up actions via a diary study.<br>Performed empirical evaluation on <i>finetuning</i> and <i>in-context learning</i> of the language model. | Toronto, Canada |
| 2021      | <b>Adobe Research</b> , Research Intern.<br><i>Mentor: Li-Yi Wei, Rubaiat Habib Kazi, Stephen DiVerdi</i><br>Developed an interactive creativity-support tool designed for crafting AR effects using physical objects. Filed a <i>patent</i> for this work [P.3].  | San Jose, CA    |
| 2022      | <b>Igarashi Lab at University of Tokyo</b> , Visiting Ph.D. student<br><i>Supervisor: Takeo Igarashi</i><br>Built a data collection pipeline for 6D pose estimation of physical objects.   | Tokyo, Japan    |
| 2019      | <b>PARC, A Xerox Company</b> , Research Intern.<br><i>Mentor: Erva Ulu, Nurcan Ulu</i> Developed an interactive tool to generate supporting materials with varying density. Filed two patents for this work [P.1, P.2].  | Palo Alto, CA   |
| 2018–2019 | <b>DMAI Inc.</b> , Part-time Robotic Design Engineer.  | Los Angeles, CA |
| 2018–2023 | <b>UCLA HCI Research</b> , Research Assistant.   | Los Angeles, CA |

## EDUCATION

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|-----------|--|
| 2018–2024 | University of California, Los Angeles<br>Ph.D. in Mechanical Engineering (with a focus on Human-Computer Interaction)<br>Advisor: Xiang 'Anthony' Chen |
| 2017–2018 | University of California, Los Angeles<br>M.S. in Mechanical Engineering  |
| 2013–2017 | Shanghai Jiao Tong University<br>B.E. in Naval Architecture and Ocean Engineering  |

## PUBLICATIONS

- [F.12] **Jiahao Nick Li\***, Li Gu\*, Yang Wang. EgoRAG: Multimodal Retrieval Augmented Generation for Natural Language Query in Egocentric Videos. *Work in progress*.
- [F.11] **Jiahao Nick Li**, Yan Xu, Tovi Grossman, Stephanie Santosa, Michelle Li. OmniActions: Predicting Digital Actions in Response to Real-World Multimodal Sensory Inputs with LLMs. *In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*.
- [F.10] Xingyu Bruce Liu, **Jiahao Nick Li**, Xiuxiu Yuan, David Kim, Xiang 'Anthony' Chen, Ruofei Du. Human I/O: Towards a Unified Approach to Detecting Situational Impairments. *In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*.  
 **Best Paper Honorable Mention.**
- [F.9] **Jiahao Nick Li\***, Toby Chong\*, Zhongyi Zhou, Hironori Yoshida, Koji Yatani, Xiang 'Anthony' Chen, Takeo Igarashi. RoCap: A Robotic Data Collection Pipeline for the Pose Estimation of Appearance-Changing Objects. *arXiv:2407.08081*.
- [F.8] **Jiahao Nick Li**, Ruolin Wang, Li-Yi Wei, Rubaiat Habib Kazi, Stephen DiVerdi, Xiang 'Anthony' Chen. RealityPlay: Authoring Interactive and Embedded Graphics Driven by Everyday Objects with User-defined Mappings. *arXiv*.
- 2022 [F.7] Xiaoying Yang, Jacob Sayono, Jess Xu, **Jiahao Nick Li**, Josiah Hester, Yang Zhang. MiniKers: Interaction-Powered Smart Environment Automation. *In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 6 Issue 3, September. 2022*.
- [F.6] **Jiahao Nick Li**, Alexis Samoylov, Jeeun Kim, Xiang 'Anthony' Chen. Roman: Making Everyday Objects Robotically Manipulable with 3D-printable Add-on Mechanisms. *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22)*.
- [F.5] Abul Al Arabi, **Jiahao Nick Li**, Xiang 'Anthony' Chen, Jeeun Kim. Mobiot: Augmenting everyday objects into moving IoT devices using 3D printed attachments generated by demonstration. *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22)*.
- 2020 [F.4] **Jiahao Nick Li**, Meilin Cui, Jeeun Kim, Xiang 'Anthony' Chen. Romeo: A Design Tool for Embedding Transformable Parts in 3D Models to Robotically Augment Default Functionality. *In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST '20)*.
- [F.3] Zhaoliang Zheng, **Jiahao Nick Li**, Parth Agrawal, Ethan Uetrecht, Zhao Lei, Joseph Prince Mathew, Dinesh Kumar Karri, Ankur Mehta. User Design Parameters Based Design and Evaluation System for Indoor Airships. *arXiv:2110.09748*.
- 2019 [F.2] Erva Ulu, Nurcan Gecer Ulu, **Jiahao Nick Li** and Walter Hsiao. Curvy: An Interactive Design Tool for Varying Density Support Structures. *arXiv:2102.10013*.
- [F.1] **Jiahao Nick Li**, Jeeun Kim, Xiang 'Anthony' Chen. Robiot: A Design Tool for Actuating Everyday Objects with Automatically Generated 3D Printable Mechanisms. *In Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology (UIST '19)*.

## Extended Abstract

- 2024 [E.2] **Jiahao Nick Li**, Zhuohao (Jerry) Zhang, Jiaju Ma. OmniQuery: Enabling Question Answering on Personal Memory by Augmenting Multimodal Album Data. *In Adjunct Proceedings of the 37th Annual ACM Symposium on User Interface Software and Technology (UIST '24 Poster)*.
- 2019 [E.1] Ruolin Wang, Yuqi Tang, Hsuan Wei Fan, **Jiahao Nick Li**, Xiang 'Anthony' Chen. Auxiscope: Improving Awareness Surroundings for People with Tunnel Vision. *UIST Student Innovation Competition 2019*.

## Patent

- 2023 [P.3] **Jiahao Li**, Li-Yi Wei, Stephen DiVerdi, Kazi Rubaiat Habib. Interactive virtual graphics with physical objects. *US Patent 20230368452A1*.
- [P.2] Nurcan Gecer, ULUEva ULU, Walter Hsiao, **Jiahao Nick Li**. Controller and 3D printing apparatus for varying density support structures through interpolation of support polygon boundaries with scalar density fields. *US Patent 11654616B2*.
- [P.1] Nurcan Gecer, ULUEva ULU, Walter Hsiao, **Jiahao Nick Li**. Interactive design tool for varying density support structures. *US Patent 11639023B2*.

## SKILLS

I am proficient in building interactive AI systems with full-stack web development, including both frontend and backend. I am also experienced in designing, training and evaluating deep learning models and large foundation models.

**Programming:** Python, C++, HTML/CSS/JavaScript, Kotlin, Swift, Pytorch, Tensorflow, Flask, React.js.

**Development Technologies:** CUDA, Unity, Robotic Operating System (ROS).

**Machine learning techniques:** Vision-language representation learning, Supervised CNNs, Contrastive Learning, Finetuning of pre-trained language models, etc.

**Research Methods:** Data collection design, Data curation, Open coding.

## SERVICE

### Organizing

- 2024-2025 **Proceedings Co-Chair.** ACM UIST.
- 2022 **Student Volunteer.** ACM CHI.

### Program Committee

- 2024 **Associate Chair,** ACM UIST.
- 2020-2021 **Associate Chair.** ACM CHI Late-Breaking Work.

### Reviewing

- 2019-2024 The ACM Symposium on User Interface Software and Technology (UIST).
- 2020-2024 The ACM Conference on Human Factors in Computing Systems (CHI).
- 2023 The ACM Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH) Poster

## INVITED TALKS

- 2023 “Making Everyday Objects Physically Interactable with Robotic-augmented Sensing and Actuation.”  
Dynamic Graphics Project (DGP), University of Toronto (hosted by Bryan Wang).
- 2022 “Making Everyday Objects Physically Interactable with Robotic-augmented Sensing and Actuation.”  
Acuated Experience Lab (Ken Nakagaki) and Human Computer Integration Lab (Pedro Lopes), University of Chicago (hosted by Yudai Tanaka).  
Purdue University (hosted by Liang He).

## PRESS COVERAGE

### Keynote and Plenary Addresses

- 2019      **New Scientist.** Turn any object into a robot using this program and a 3D printer.
- Hackster News.** Robiot Is a Design Tool That Generates Mechanisms to Motorize Everyday Objects.
- Fabbaloo.** Robiot Can Automatically Design Handy Household Machines.

Updated August 2024