

# Ching-Yi Tsai

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XR Interaction, Design Tools, Haptics

## Education

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### National Taiwan University

*M.S. in Networking and Multimedia*

Advisor: [Mike Y. Chen](#) & [Lung Pan Cheng](#)

**Taipei, Taiwan**

Sept 2020 - Jun 2022

### National Taiwan University

*B.S. in Computer Science and Information Engineering*

**Taipei, Taiwan**

Sept 2016 - Jun 2020

## Research / Work Experience

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### National Taiwan University

*Graduate Research Assistant at NTU HCI lab*

Advisor: [Lung Pan Cheng](#)

**Taipei, Taiwan**

Sept 2023 - Present

### Obligatory Military Service

*Marine Corps*

**Kaohsiung, Taiwan**

April 2023 - Aug 2023

### University of Waterloo

*Graduate Research Assistant at Waterloo HCI lab*

Advisor: [Daniel Vogel](#)

**Ontario, Canada / Remote**

Nov 2022 - Present

### National Taiwan University

*Graduate Research Assistant at NTU HCI lab*

Advisor: [Mike Yen Chen](#)

**Taipei, Taiwan**

Sept 2022 - Nov 2022

### AINTU

*Undergraduate / Graduate Research Student at NTU Joint Research Center*

*for AI Technology and All Vista Healthcare*

*(Working on building legal term corpus and training NLP model using Istm)*

**Taipei, Taiwan**

May 2020 - Dec 2020

## Publication



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### Full Paper


- [C6] Shun-Yu Wang, Wei-Chung Su, Serena Chen, [Ching-Yi Tsai](#), Marta Misztal, Katherine M. Cheng, Alwena Lin, Yu Chen, Mike Y. Chen **“RoomDreaming: Generative-AI Approach to Facilitating Iterative, Preliminary Interior Design Exploration”**  
*To appear in Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI'24)*
- [C5] Pin Chun Lu, Che Wei Wang, Yu Lun Hsu, Alvaro Lopez, [Ching-Yi Tsai](#), Chiao-Ju Chang, Wei Tian Mireille, Mike Y. Chen **“VeeR: Exploring the Feasibility of Deliberately Designing VR Motion that Diverges from Mundane, Everyday Physical Motion to Create More Entertaining**

## VR Experiences"

To appear in *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI'24)*

- [A1] Yi-Shuo Lin\*, Ching-Yi Tsai\*, Lung-Pan Cheng **"Clonemator: Composing Spatiotemporal Clones to Create Interactive Automators in Virtual Reality"** (\* equal contribution) *arXiv:2311.04427, Nov. 2023. <https://doi.org/10.48550/arXiv.2311.04427>*
- [C4] Po-Yu Chen\*, Ching-Yi Tsai\*, Wei-Hsin Wang\*, Chao-Jung Lai, Chia-An Fan, Shih Chin Lin, Chia-Chen Chi, Mike Y. Chen 2023 **"AirCharge: Amplifying Ungrounded Impact Force by Accumulating Air Propulsion Momentum"** (\* equal contribution)  
*Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST'23)*
- [C3]  Ching-Yi Tsai, I-Lun Tsai, Chao-Jung Lai, Derrek Chow, Lauren Wei, Lung-Pan Cheng, Mike Y Chen 2022 **"AirRacket: Perceptual Design of Ungrounded, Directional Force Feedback to Improve Virtual Racket Sports Experiences"**  
*Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI'22)*  
**Best Paper Award, Top 1% in all submitted papers**
- [C2]  Yu-Hsin Lin, Yu-Wei Wang, Pin-Sung Ku, Yun-Ting Cheng, Yuan-Chih Hsu, Ching-Yi Tsai, Mike Y Chen 2021 **"HapticSeer: A Multi-channel, Black-box, Platform-agnostic Approach to Detecting Video Game Events for Real-time Haptic Feedback"**  
*Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI'21)*  
**Honorable Mention Award, Top 5% in all submitted papers**
- [C1] Chin Guan Lim, Chin Yi Tsai, Mike Y Chen 2020 **"MuscleSense: Exploring Weight Sensing using Wearable Surface Electromyography (sEMG)"**  
*Proceedings of the Fourteenth International Conference on Tangible, Embedded, and Embodied Interaction (TEI'20)*

## Demo, Poster, and Extended Abstract

- [E2]  Ching-Yi Tsai, Chen-Kuo Sun, Lung-Pan Cheng 2022 **"Garnish into Thin Air"**  
*The Adjunct Publication of the 35th Annual ACM Symposium on User Interface Software and Technology (UIST '22 Adjunct, Student Innovation Contest)*  
**People's Choice Best SIC Award**
- [E1] Yu-Wei Wang, Yu-Hsin Lin, Yoko Miyatake, Ching-Yi Tsai, Pin-Sung Ku, Mike Y. Chen 2021 **"JetController: High-speed Ungrounded 3-DoF Force Feedback Controllers using Air Propulsion Jets"**  
*ACM SIGGRAPH 2021 Labs (SIGGRAPH'21 Labs)*
- [D1] Yu-Wei Wang, Yu-Hsin Lin, Pin-Sung Ku, Yōko Miyatake, Po-Yu Chen, Chun-Miao Tseng, Ching-Yi Tsai, Mike Y Chen **"Demonstration of JetController: High-speed Ungrounded Force Feedback Controllers Using Air Propulsion Jets"**  
*Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI'21 EA)*  
  
(Works in submission)

Shun-Yu Wang, Wei-Chung Su, Serena Chen, [Ching-Yi Tsai](#), Marta Misztal, Katherine M. Cheng, Alwena Lin, Yu Chen, Mike Y. Chen **“RoomDreaming: Generative-AI Approach to Facilitating Iterative, Preliminary Interior Design Exploration”** (CHI'24)

Pin Chun Lu, Che Wei Wang, Yu Lun Hsu, Alvaro Lopez, [Ching-Yi Tsai](#), Chiao-Ju Chang, Wei Tian Mireille, Mike Y. Chen **“MRTrain: Exploring the Feasibility of Using Redirection to Turn Mundane, Everyday Motion into More Entertaining VR Motion Experiences”** (CHI'24)

**Note about venues:** CHI (ACM Conference on Human Factors in Computing Systems) is recognized as a very top-tier HCI conference and venue (ranked #1 on Google Scholar). The average acceptance rate for CHI is 23%.

## Ongoing Research Project

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### **Design and Evaluation of Interaction Techniques and Interfaces for Portable and On-the-go Mixed Reality**

with Prof. Dan Vogel

This project incorporates walking variations as an input modality for portable HMDs

- Prototyping walking interfaces for on-the-go mixed reality
- Processing signal from positional tracker data to detect foot gestures
- Understanding users' preference for different gestures through user study

### **Augmenting Everyday Objects with Anthropomorphic Reactions in Mixed Reality to Convey Physical Affordance**

with Prof. Lung-Pan Cheng

This project aims to improve user interaction with everyday objects in mixed reality by anthropomorphizing objects.

- Implementing MR systems that overlay everyday objects with interactive arms and faces to perform human-like reactions.
- Mapping different types of sociability to objects based on their physical properties using LLM model.

### **Enhancing Telepresence Multi-User Soundfield through Adaptive Audio Quality and Bandwidth Control**

assisting Dr. Yang, De-Nian and his M.S. student

This project is about the optimization of physical microphone selection for remote virtual soundfield rendering within network bandwidths

- Developing algorithms tailored for microphone selection in NOMA-based multi-user multi-microphone systems.
- Simulating and visualizing the algorithm's performance using Python.

## Honor & Award

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| 2023 | <b>Special Recognition for Outstanding Review at ACM UIST 2023</b><br>1 recognition for reviewing UIST 2023 papers   |
| 2022 | <b>Best Paper Award for AirRacket [C3] at ACM CHI 2022</b><br>Awarded to top 1% of all submitted papers<br><b>Best SIC Award (People's Choice) for "Garnish into Thin Air" [E2] at ACM UIST 2022</b><br>Awarded to UIST22 student innovation contest group with the most audience votes.<br><b>Special Recognition for Outstanding Review at ACM CHI 2023</b><br>1 recognition for reviewing CHI 2023 papers<br><b>Highly Useful Review at ACM VRST 2023</b><br>1 recognition for reviewing VRST 2023 papers |

### **NTUEE-1975 Innovation and Entrepreneurship Awardee**

(Institutional) Awarded to top students based on academic / industry excellence - NTD 100, 000

### **Gary Marsden Travel Award**

(International) Awarded to early researchers for SIGCHI conference opportunities. - USD 2,500

### **Appier Scholarship**

(National) Awarded to domestic researchers for top conference opportunities. - NTD 50,000

2021 **Honorable Mention Award for HapticSeer [C2] at ACM CHI 2021**

Awarded to top 5% of all submitted papers

### **1st Place Award at Line Hackathon 2021**

(National) Championship over 200+ teams - NTD 100, 000

2019 **Finalist at International WorldQuant Challenge**

(National) Finalist at quant trading competition over 40+ teams.

2018 **Finalist at Bo-Le AI x CSR Competition**

(National) Finalist for AI-based e-commerce solutions for over 50+ startup teams.

## **Academic Service**

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Reviewing (23)	2024 <b>CHI</b>
	2023 <b>UIST* CHI* DIS VRST AH MobileHCI CHI-LBW</b>
	2022 <b>DIS VRST*</b>
	(*: recognition for outstanding or highly useful review)
Host	<b>TAICHI'21</b> Co-host Online Keynote: "TAICHI x UIST- UIST Community in Taiwan"
Invited Talk	<b>SIGGRAPH Asia'22</b> Invited to present AirRacket <b>[C3]</b> in "Best of HCI" Session
	<b>TAICHI'22</b> Presenting AirRacket <b>[C3]</b> in "SIGCHI Corridor" Session
	<b>TAICHI'21</b> Presenting JetController <b>[E1]</b> in "Best of HCI" Session"
Organizer	<b>UCCU 2021</b> , local UIST/CHI/CSCW/UbiComp event due to COVID-19

**Note about conferences:** TAICHI is the top domestic HCI conference in Taiwan.

## **Teaching Experience**

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Teaching Assistant	<b>Advanced Human-Computer Interaction</b>	2021 Fall
	Graduate course at NTU CSIE, CSIE7644	
Teaching Assistant	<b>Introduction to Human-Computer Interaction and Design</b>	2020 Spring
	Undergraduate course at NTU CSIE, CSIE5641	

## **Selected Press Coverage**

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**New Scientist** "Virtual tennis racket uses air jet to recreate feel of hitting a ball."

**VR Times** "Researchers Use Air to Simulate Haptic Feedback in VR Sports."

**MIXED Reality News** "Air pressure simulates racket haptics in VR."

## **Skill & Others**

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Programming Python, Javascript, C++, C, C#, R, HTML, CSS, Matlab.

Dev Tool	Keras, Unity, Xcode, Android Studio, React, Node.js, p5.js, jQuery, Git, Arduino, Fusion360.
Design Tool	Figma, EasyEDA, Arduino, Davinci Resolve, Adobe Creative Cloud.
Interest	Saxophone (jazz / classical), Kirigami, Jogging
Language	English, Chinese