PIN-SUNG KU

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RESEARCH FOCUS

Drawing from human-computer interaction, ubiquitous computing, and sensing, I develop wearable on-skin technologies to augment human body by means of modular and customizable wearable systems.

Keywords: **Sensing, Soft Wearable Interface, On-skin Prototyping**

EDUCATION

PhD, Information Science 2020 – Present
Hybrid Body Lab, Cornell University

· Thesis Committee: Cindy Hsin-Liu Kao (Chair, HCD), Cheng Zhang (IS), Malte Jung (IS)

Master of Science, Computer Science & Information Technology 2018
National Taiwan University

· Advisor: Mike Y. Chen (CSIE)

Bachelor of Science, Physics 2016
National Taiwan University

AWARDS AND HONORS

Research Awards

· 2023 Distinguished Paper Award (ACM UbiComp, top 1%) [C13]
· 2021 Best Paper Honorable Mention Award (ACM CHI, top 5%) [C8]

RESEARCH EXPERIENCE

PhD student, Cornell University 2020 – Present
Advisor: Cindy Hsin-Liu Kao (HCD)

· Designed ECSkin, a customizable EC display for skin wear using modular electrochromic films. [C16]
· Developed SkinLink, an on-body circuit construction approach for in-situ on-skin prototyping. [C13]
· Designed SkinKit, the first construction toolkit for on-skin interfaces, enabling fast, low-fidelity prototyping of on-skin devices. [C11]
· Designed and crafted shape-changing woven patches for dynamic clothing and on-skin haptics. [C12]

Visting Scholar, Dartmouth College 2018 – 2019
Advisor: Prof. Xing-Dong Yang (CS), Prof. Xia Zhou (CS)

· Prototyped an interactive thread using a model-based impedance sensing technique. [C6]
· Designed and implemented an interactive zipper that enables touch input, pinch gesture input, user identification, and position tracking. [C7]

Research Assistant, NTU HCI Lab 2016 – 2020
Advisor: Prof. Mike Y. Chen (CSIE)

· Developed a multi-channel, black-box, platform-agnostic approach to detecting game events for real-time haptic feedback. [C8]
· Designed air jets systems for haptic feedback in VR. [C9]
· Conducted human factors studies focused on eye-based interactions in AR. [C5]
· Designed debugging tools for circuit prototyping by electric current visualization and auto-detection of circuit components. [C1] [C2]

PUBLICATIONS

[C16] **Pin-Sung Ku**, Shuwen Jiang, Wei-Hsin Wang, and Hsin-Liu Cindy Kao. 2024. "ECSkin: Tessellating Electrochromic Films for Reconfigurable On-skin Displays." *In Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 8, 2, Article 60 (May 2024).*

[C15] Chi-Jung Lee, David Yang, **Pin-Sung Ku**, and Hsin-Liu Cindy Kao. 2024. "SweatSkin: Rapidly Prototyping Sweat-Sensing On-Skin Interface Based on Microfluidics." *In Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 7, 4, Article 166 (December 2023).*

[C14] Shuwen Jiang, **Pin-Sung Ku**, and Hsin-Liu (Cindy) Kao. 2024. Exploring On-Skin Prototyping Toolkits for Wearable Creation: A Workshop Study with Middle School Students.*In 2024 International Symposium on Wearable Computers (ISWC '24).*

[C13] **Pin-Sung Ku**, Kunpeng Huang, Nancy Wang, Boaz Ng, Alicia Chu, and Hsin-Liu Cindy Kao. 2023. "SkinLink: On-body Construction and Prototyping of Reconfigurable Epidermal Interfaces." *In Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 7, 2, Article 62 (June 2023).*

[C12] **Pin-Sung Ku**, Kunpeng Huang, and Cindy Hsin-Liu Kao. 2022. "Patch-O: Deformable Woven Patches for On-body Actuation." *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22).*

[C11] **Pin-Sung Ku**, Md. Tahmidul Islam Molla, Kunpeng Huang, Priya Kattappurath, Krithik Ranjan, and Hsin-Liu Cindy Kao. 2022. "SkinKit: Construction Kit for On-Skin Interface Prototyping." *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 5, 4, Article 165 (Dec 2021), 23 pages.*

[C10] Kunpeng Huang, Md. Tahmidul Islam Molla, Kat Roberts, **Pin-Sung Ku**, Aditi Galada, and Cindy Hsin-Liu Kao. 2021. "Delocalizing Strain in Interconnected Joints of On-Skin Interfaces." *In 2021 International Symposium on Wearable Computers (ISWC '21).*

[C9] Yu-Wei Wang, Yu-Hsin Lin, **Pin-Sung Ku**, Yoko Miyatake, Yi-Hsuan Mao, Po Yu Chen, Chun-Miao Tseng, and Mike Y. Chen. 2021. "JetController: High-speed Ungrounded 3-DoF Force Feedback Controllers using Air Propulsion Jets." *In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21).*

[C8] 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).*

[C7] **Pin-Sung Ku**, Jun Gong, Te-Yen Wu, Shiyu Zhang, Ziyan Zhu, Barrett Ens, Xing-Dong Yang. 2020. "Zippro: The Design and Implementation of An Interactive Zipper." *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20).*

[C6] **Pin-Sung Ku**, Qijia Shao, Jun Gong, Te-Yen Wu, Ziyan Zhu, Xia Zhou, Xing-Dong Yang. 2020. "ThreadSense: Locating Touch on an Extremely Thin Interactive Thread" *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20).*

[C5] **Pin-Sung Ku**, Yu-Chih Lin, Yi-Hao Peng, Mike Y. Chen. 2019. "PeriText: Utilizing Peripheral Vision for Reading Text on Augmented Reality Smart Glasses." *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR). IEEE, 2019.*

[C4] Yi-Hao Peng, Muh-Tarng Lin, Yi Chen, TzuChuan Chen, **Pin-Sung Ku**, Paul Taele, Chin Guan Lim, Mike Y Chen. 2019. "PersonalTouch: Improving Touchscreen Usability by Personalizing Accessibility Settings based on Individual User's Touchscreen Interaction." *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19).*

[C3] Yu-Chian Wu, Te-Yen Wu, Paul Taele, Bryan Wang, Jun-You Liu, **Pin-Sung Ku**, Po-En Lai, Mike Y Chen. 2018. "Activeergo: Automatic and personalized ergonomics using self-actuating furniture." *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18).*

[C2] Te-Yen Wu, Hao-Ping Shen, Yu-Chian Wu, Yu-An Chen, **Pin-Sung Ku**, Ming-Wei Hsu, Jun-You Liu, Yu-Chih Lin, Mike Y Chen. 2017. "CurrentViz: Sensing and Visualizing Electric Current Flows of Breadboarded Circuits." *Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology (UIST '17).*

[C1] Te-Yen Wu, Bryan Wang, Jiun-Yu Lee, Hao-Ping Shen, Yu-Chian Wu, Yu-An Chen, **Pin-Sung Ku**, Ming-Wei Hsu, Yu-Chih Lin, Mike Y Chen. 2017. "CircuitSense: Automatic Sensing of Physical Circuits and Generation of Virtual Circuits to Support Software Tools." *Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology (UIST '17).*

POSTERS AND DEMOS

[D2] Yu-Wei Wang, Yu-Hsin Lin, **Pin-Sung Ku**, Yoko Miyatake, Po-Yu Chen, Chun-Miao Tseng, Ching-Yi Tsai, Mike Y Chen. 2021. "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).*

[P1] **Pin-Sung Ku**, Te-Yen Wu, and Mike Y. Chen. 2018 "EyeExpress: Expanding Hands-free Input Vocabulary using Eye Expressions." *The 31st Annual ACM Symposium on User Interface Software and Technology Adjunct Proceedings(UIST '18).*

[D1] Ming-Wei Hsu, Te-Yen Wu, Yu-Chian Wu, Yu-An Chen, Yu-Chih Lin, **Pin-Sung Ku**. 2017. "Party animals: Creating immersive gaming experience for physically co-present vr and non-vr players." *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI '17).*

TEACHING EXPERIENCE

Cornell	INFO 6310, Behavior and Information Technology, Teaching Assistant, 2024
NYS 4-H	Youth Development Career Explorations Workshop for Middle and Highschooler, New York State 4-H Cornell Cooperative Extension, Workshop Leader, 2022, 2023, 2024
Cornell	INFO 2950, App Design and Prototyping, Teaching Assistant, 2023, 2024
Cornell	INFO 4340, App Design and Prototyping, Teaching Assistant, 2022
Cornell	DEA 6040, Future Body Craft, Teaching Assistant, 2021
Cornell	INFO 3450, Human-Computer Interaction Design, Teaching Assistant, 2021
NTU CSIE	Advanced Human Computer Interaction, Teaching Assistant, 2017, 2018
OpenHCI	8th Workshop On Human Computer Interaction, Lecturer, 2017

ACADEMIC SERVICE

DIS '24	Papers, Program Committee
CHI '24	Papers, Reviewer
IMWUT '23	Papers, Reviewer
UIST '23	Papers, Reviewer
CHI '23	Papers, Reviewer
UIST '22	Papers, Reviewer
CHI '21	Late-Breaking Work, Reviewer
ISWC '21	Notes & Briefs, Reviewer
DIS '21	PC meeting, Student Volunteer
CHI '20	Late-Breaking Work, Reviewer
UIST '20	Papers, Reviewer

PRESS

Patch-O	*Cornell Bowers CIS Information Science News*
JetController	*ITmedia News, Innovative Tech*