

Shaoyu Cai

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Person Webpage: <https://shaoyuca.github.io/mypage/>

Citizenship: China

Research interests

Human-Computer Interaction, Haptic Texture Modelling and Rendering, Cross-modal Learning, Haptic Interface, Virtual & Augmented Reality

Education

City University of Hong Kong

Hong Kong SAR, China

Doctor of Philosophy

09/2019 – 08/2023 (Expected)

Supervisor: Prof. Kening Zhu

Huazhong Agricultural University

Wuhan, China

Bachelor of Engineering

09/2014 – 06/2018

Thesis: Designing of Automatic Flatness Detection System Based on PLC

Publications

[j4] **PropelWalker: A Leg-based Wearable System with Propeller-based Force Feedback for Walking in Fluids in VR**

Pingchuan Ke, **Shaoyu Cai**, Haichen Gao and Kening Zhu.

In 2022 IEEE Transactions on Visualization & Computer Graphics.

[c7] **Multi-modal Transformer-based Tactile Signal Generation for Haptic Texture Simulation of Materials in Virtual and Augmented Reality**

Shaoyu Cai and Kening Zhu.

In 2022 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct).

[j3] **GAN-based image-to-friction generation for tactile simulation of fabric material**

Shaoyu Cai, Lu Zhao, Yuki Ban, Takuji Narumi, Yue Liu and Kening Zhu.

In Computers & Graphics, vol. 102, pp. 460-473, Feb. 2022.

[c6] **Weighted Walking: Propeller-based On-leg Force Simulation of Walking in Fluid Materials in VR**

Pingchuan Ke, **Shaoyu Cai**, Lantian Xu, Kening Zhu.

In SIGGRAPH Asia 2021 Emerging Technologies (SA '21 Emerging Technologies). ACM, New York, NY, USA, Article 19, pp. 1-2. 2021.

[j2] **Visual-Tactile Cross-Modal Data Generation using Residue-Fusion GAN with Feature-Matching and Perceptual Losses**

Shaoyu Cai, Kening Zhu, Yuki Ban, and Takuji Narumi.

In IEEE Robotics and Automation Letters (RA-L), vol. 6, no. 4, pp. 7525-7532. with IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021).

[c5] FrictGAN: Frictional Signal Generation from Fabric Texture Images using Generative Adversarial Network

Shaoyu Cai, Yuki Ban, Takuji Narumi, and Kening Zhu.

In ICAT-EGVE 2020: International Conference on Artificial Reality and Telexistence & Eurographics Symposium on Virtual Environments, pp. 11-15. The Eurographics Association, 2020. (Best Paper Audience Choice Award)

[c4] ThermAirGlove: A pneumatic glove for thermal perception and material identification in virtual reality

Shaoyu Cai, Pingchuan Ke, Takuji Narumi, and Kening Zhu.

In 2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR), pp. 248-257. IEEE VR, 2020. (Acceptance Rate = 21.4%)

[c3] Demonstration of thermairglove: A pneumatic glove for material perception in virtual reality through thermal and force feedback

Shaoyu Cai, Pingchuan Ke, Shanshan Jiang, Takuji Narumi, and Kening Zhu.

In SIGGRAPH Asia 2019 Emerging Technologies, pp. 11-12. 2019. (Acceptance Rate = 20%)

[j1] A sense of ice and fire: Exploring thermal feedback with multiple thermoelectric-cooling elements on a smart ring

Kening Zhu, Simon Perrault, Taizhou Chen, **Shaoyu Cai**, and Roshan Lalintha Peiris.

International Journal of Human-Computer Studies 130 (2019): 234-247.

[c2] Embodied Weather: Promoting Public Understanding of Extreme Weather Through Immersive Multi-Sensory Virtual Reality

Pingchuan Ke, Kai-Ning Keng, Shanshan Jiang, **Shaoyu Cai**, Zhiyi Rong, and Kening Zhu.

In The 17th International Conference on Virtual-Reality Continuum and its Applications in Industry, pp. 1-2. 2019.

[c1] HapTwist: creating interactive haptic proxies in virtual reality using low-cost twistable artefacts

Kening Zhu, Taizhou Chen, **Shaoyu Cai**, Feng Han, and Yi-Shiun Wu.

In SIGGRAPH Asia 2018 Virtual & Augmented Reality, pp. 1-2. 2018.

Research experience

Shanghai Jiaotong University
School of Mechanical Engineering
Wearable Systems Lab
Mentor: Prof. Peter Shull

Shanghai, China
Visiting Researcher
03/2022 – 07/2022

	The University of Tokyo Graduate School of Information Science and Technology Cyber Interface Lab Mentors: Prof. Takuji Narumi and Prof. Yuki Ban	Tokyo, Japan Visiting Researcher 01/2020 – 03/2020
	City University of Hong Kong School of Creative Media Multimodal and Embodied Interaction (MEI) Lab Mentor: Prof. Kening Zhu	Hong Kong SAR, China Research Assistant 09/2018 – 08/2019
	National Taipei University Department of Electrical Engineering Artificial Intelligence & Robotics Technology Lab Mentor: Prof. Hooman Samani	Taiwan, China Exchanging Student 09/2016 – 01/2017
Teaching experience	SM1103A: Introduction to Media Computing Lecturers: Mike Wong, Daniel Howe, Dick Thung Teaching basic programming of p5.js	Teaching Assistant Fall 2020 & 2021
	SM2715: Creative Coding Lecturers: Mike Wong, Manfred Lau, Ryan Lam Teaching basic programming of Processing	Teaching Assistant Spring 2021
Talks and Demos	Workshop in ISMAR 2022: Transforming Medical Education and Clinical Application through Extended Reality Talk: Haptic modelling and rendering for VR and robotics	10/2022 Singapore
	NUS-HCI Lab Visiting Talk: Tactile modelling and rendering for VR and robotics	10/2022 Singapore
	SCM/ACIM Research Colloquium Talk: Deep Cross-modal Visual-Tactile Generation	02/2022 Hong Kong
	ACM SIGGRAPH Asia 2021 Demonstration: <i>Weighted Walking</i>	12/2021 Online
	IROS 2021 Presentation: <i>Visual-Tactile Data Generation</i> Oral Presentation	09/2021 Online
	Seeing in the Dark: Hong Kong Harbour and Lighthouses Demonstration: <i>Embodied Weather</i>	05/2021 Hong Kong Maritime Museum
	ICAT-EGVE 2020	12/2020

	Presentation: <i>FrictGAN</i> Oral Presentation	Online
	The Night of IEEE VR, China VR 2020 Workshop	09/2020
	Talk: <i>ThermAirGlove</i> Poster Presentation	Online
	IEEE Virtual Reality 2020	03/2020
	Presentation: <i>ThermAirGlove</i> Oral Presentation	Online
	ACM SIGGRAPH Asia 2019	11/2019
	Demonstration & Presentation: <i>ThermAirGlove</i>	Brisbane, Australia
	ACM SIGGRAPH VRCAI 2019	11/2019
	Demonstration: <i>Embodied Weather</i>	Brisbane, Australia
	ACM SIGGRAPH Asia 2018	12/2018
	Demonstration: <i>Haptwist</i>	Tokyo, Japan
Honors	Best Paper Audience Choice Award (Top 3)	ICAT-EGVE 2020
	Special Thanks for Speakers	China VR 2020
	Special Recognitions for Outstanding Reviews	CHI 2020 & 2022
	Research Tuition Scholarship 2020 & 2022 (Amount: 84192 HKD)	CityU
	Outstanding Reviewers	MobileHCI 2020
	Outstanding Graduates (Top 10)	HZAU
Skills	Programming	
	Proficient in: Python, TensorFlow, PyTorch, Keras, MATLAB.	
	Familiar with: C, C#, JavaScript, HTML, Unity.	
	Prototyping	
	Proficient in: Arduino, Processing, 3D Printing & Laser cutting.	
	Familiar with: AutoCAD, PCB, Circuit design.	
	Languages	
	Mandarin Chinese (Native), English (Fluent), Cantonese (Competent), Japanese (Basic).	
Service and outreach	Paper Reviewing	
	CHI 2020 (Special Recognitions) & 2021 & 2022 (Special Recognitions) & 2023 Papers	
	IEEE VR 2023 (TVCG)	
	Elsevier Virtual Reality & Intelligent Hardware	
	ISS 2021 (ACM PAMHCI Journal)	
	VRST 2020 & 2021 Papers	
	ICMI 2021 & 2022 Papers	

ISMAR 2021 & 2022 Posters
UbiComp/ISWC 2021 Posters and Demos
MobileHCI 2020 (Special Recognitions) & 2022 Papers
SIGGRAPH Asia 2019-2022 Emerging Technologies
CHI 2019 Late-Breaking Work

Program Committee Member

CHI 2020 & 2021 Late-Breaking Work
ICMI 2022 Papers

Memberships

ACM student member	2019.10-present
IEEE student member	2022.09-present

References

<u>Prof. Kening Zhu</u>	PhD supervisor
Associate Professor at the School of Creative Media & Department of Computer Science, City University of Hong Kong	
Email: keninzhu@cityu.edu.hk	

<u>Prof. Takuji Narumi</u>	Research supervisor
Associate Professor at the Graduate School of Information Science and Technology, The University of Tokyo	
Email: narumi@cyber.t.u-tokyo.ac.jp	