

# Shaoyu Cai

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Citizenship: China

## Research interests

Human-Computer Interaction, Cross-modal Learning, Texture Modelling and Rendering, Tactile Signal Processing, Haptic Interface, Virtual Reality

## Education

**City University of Hong Kong**

Hong Kong SAR, China

Doctor of Philosophy

09/2019 – Present

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

[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, 2021.*

[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, December 14-17, 2021. ACM, New York, NY, USA, 2 pages.*

[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.

[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.

[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

**The University of Tokyo** Tokyo, Japan  
Graduate School of Information Science and Technology Visiting Researcher  
Cyber Interface Lab 01/2020 – 03/2020  
Mentors: Prof. Takuji Narumi and Prof. Yuki Ban

**City University of Hong Kong** Hong Kong SAR, China  
School of Creative Media Research Assistant  
Multimodal and Embodied Interaction (MEI) Lab 09/2018 – 08/2019  
Mentor: Prof. Kening Zhu

**National Taipei University** Taipei, China Taiwan  
Department of Electrical Engineering Exchanging Student  
Artificial Intelligence & Robotics Technology Lab 09/2016 – 01/2017  
Mentor: Prof. Hooman Samani

## Teaching experience

**SM1103A: Introduction to Media Computing** Teaching Assistant  
School of Creative Media, City University of Hong Kong Fall 2020 & 2021

	<b>SM2715: Creative Coding</b>	Teaching Assistant
	School of Creative Media, City University of Hong Kong	Spring 2021
Industry experience	<b>WISfur Thermal Technology</b>	Wuhan, China
	Intern	Summer 2017
	<b>YTO Group Corporation</b>	Luoyang, China
	Student Intern	Summer 2016
Talks and tutorials	<b>IROS 2021</b>	09/2021
	Online oral presentation for RA-L paper	
	<b>ICAT-EGVE 2020</b>	12/2020
	Online presentation for <i>FrictGAN</i> published in ICAT-EGVE 2020	
	<b>The Night of IEEE VR, China VR 2020 workshop</b>	09/2020
	Online presentation for <i>ThermAirGlove</i> published in IEEE VR	
	<b>IEEE Virtual Reality 2020</b>	03/2020
	Online oral presentation for the full paper of <i>ThermAirGlove</i>	
	<b>SIGGRAPH Asia 2019, Emerging Technologies</b>	11/2019
	Oral presentation and real-time demo for <i>ThermAirGlove</i>	
Honors	Best Paper Audience Choice Award	ICAT-EGVE 2020
	Research Tuition Scholarship 2020/21	City University of Hong Kong
	Special Thanks for Speakers	China VR 2020
	Outstanding Graduate Certificate	HZAU
Skills	<b>Programming</b>	
	Proficient in: Python, TensorFlow, PyTorch, Keras, MATLAB.	
	Familiar with: C, JavaScript, HTML.	
	<b>Prototyping</b>	
	Proficient in: Arduino, Processing, 3D Printing & Laser cutting.	
	Familiar with: AutoCAD, PCB, Circuit design.	
	<b>Languages</b>	
	Mandarin Chinese (Native), English (Fluent), Cantonese (Competent), Japanese (Basic).	
Service and outreach	<b>Paper Reviewing</b>	
	ISS 2021 Journal Papers	

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

**Committee Member**

CHI 2021 Late-Breaking Work  
CHI 2020 Late-Breaking Work

**Memberships**

ACM student member 2019.10-present

**References**

**Prof. Kening Zhu** PhD supervisor

Associate Professor at the School of Creative Media & Department of Computer Science, City University of Hong Kong  
Email: [keninzhu@cityu.edu.hk](mailto:keninzhu@cityu.edu.hk)

**Prof. Takuji Narumi** Research mentor

Associate Professor at the Graduate School of Information Science and Technology, The University of Tokyo  
Email: [narumi@cyber.t.u-tokyo.ac.jp](mailto:narumi@cyber.t.u-tokyo.ac.jp)