

# Ke Sun

## *Curriculum Vitae*

HCI Technical Researcher and Senior Designer  
Consumer Business Group  
Huawei Technologies Co.

Email: k-sun14@tsinghua.org.cn

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**Overview:** I am a senior Human-Computer Interaction (HCI) researcher and designer in the Human Factors Research and UX Innovation Department, Huawei CBG. My current work focuses on understanding and improving human performance in multiple scenarios, defining platform interaction guidelines and standards, and creating new sensing and interface technologies that open new modes of interaction between humans and computers. I have a solid background in computer science. My work often incorporates applied machine learning, signal processing, computer vision, interaction design and user experiment. Some of my work has been shipped with millions of products and has improved the user experience.

## Section 1: Education and Academic Research

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### Education

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| <b>Tsinghua University</b> , Department of Computer Science<br>Ph.D. in Human-Computer Interaction<br>Thesis title: Interaction optimization of mobile devices under constrained conditions<br>Advisors: <a href="#">Prof. Yuanchun Shi</a> and <a href="#">Prof. Chun Yu</a><br>Graduate with honors | 2014 - 2019 |
| <b>Tsinghua University</b> , Department of Computer Science<br>B.Eng. in Computer Science<br>GPA rank: 13/129<br>Graduate with honors   | 2010 - 2014 |

### Publications

- [8] **Ke Sun**, Chun Yu, Yuanchun Shi. Exploring Low-Occlusion Soft QWERTY Keyboards on Mobile Devices Using Spatial Landmarks. ACM Trans. Comput.-Hum. Interact. 26, 4, Article 20 (TOCHI 2019), 33 pages. ([First TOCHI paper in mainland China](#))
- [7] **Ke Sun**, Chun Yu, Weinan Shi, Lan Liu, Yuanchun Shi. Lip-Interact: Improving Mobile Device Interaction with Silent Speech Commands. In Proceedings of the 31st Annual ACM Symposium on User Interface Software and Technology (UIST '18). 581-593.
- [6] **Ke Sun**, Yuntao Wang, Chun Yu, Yukang Yan, Hongyi Wen, and Yuanchun Shi. 2017. Float: One-Handed and Touch-Free Target Selection on Smartwatches. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17). ACM, New York, NY, USA, 692-704.
- [5] Chun Yu, **Ke Sun\*** (first student author), Mingyuan Zhong, Xincheng Li, Peijun Zhao, and Yuanchun Shi. 2016. One-Dimensional Handwriting: Inputting Letters and Words on Smart Glasses. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (CHI '16). ACM, New York, NY, USA, 71-82. ([Honorable Mention Award, Top 5%](#))
- [4] Tengxiang Zhang, Xin Zeng, Yinshuai Zhang, **Ke Sun**, Yuntao Wang, and Yiqiang Chen. 2020. ThermalRing: Gesture and Tag Inputs Enabled by a Thermal Imaging Smart Ring. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20), 1-13.
- [3] Yukang Yan, Chun Yu, Xiaojuan Ma, Xin Yi, **Ke Sun**, and Yuanchun Shi. 2018. VirtualGrasp: Leveraging Experience of Interacting with Physical Objects to Facilitate Digital Object Retrieval. In Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI '18), 1-13
- [2] Yuntao Wang, **Ke Sun**, Lu Sun, Chun Yu, and Yuanchun Shi. 2016. SkinMotion: what does skin movement tell us?. In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct (UbiComp '16). ACM, New York, NY, USA, 914-917.
- [1] Xin Yi, Chun Yu, Mingrui Zhang, Sida Gao, **Ke Sun**, and Yuanchun Shi. 2015. ATK: Enabling Ten-Finger Freehand Typing in Air Based on 3D Hand Tracking Data. In Proceedings of the 28th Annual ACM Symposium on User Interface Software and Technology (UIST '15). ACM, New York, NY, USA, 539-548.

## Section 2: Employment Experience

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### Huawei

2019 – Present

Design and innovation of input and interaction for new forms of technology and scenarios. Major work includes:

#### 1. Interaction Unification.

Current mobile devices mainly rely on touchscreen interactions. Beyond smartphones, more and more types of smart devices appear in every digital scenario, such as tablets, PCs, smart wearables, televisions, vehicle-mounted devices, virtual reality (VR), and augmented reality (AR). An application may run on multiple types of devices. And users may adopt diversified input modes to interact with the application on a device. Therefore, the user interface must be able to automatically identify and support different input devices, and allow users to interact with the application with ease and as expected. We call this the ability of interaction unification. As the design lead of this feature, I:

- **Make the Human-Computer Interaction design guidelines for EMUI and HarmonyOS.** I defined the characteristics, functions and interaction rules for various interaction modes and input devices. For each interaction task, I sorted out the standard input interaction behaviors when using various input devices, that is, to normalize different interaction events to the same standard interaction event. A brief version can be accessed at [Design basics-Overview \(harmonyos.com\)](https://developer.harmonyos.com/en/design/basics-overview).
- **Modify all the UI controls of EMUI and HarmonyOS to have the ability of interaction unification.** To implement the above design specifications, I was deeply involved in the development of the operating system on both the framework input subsystem and the control side. I provided technical solutions and helped write the development guide. As a result, we achieve “development once, multi-device effective” for interaction and ultimately improve the consistency of user experience.
- **Try to make the above specifications an International Standard.** I wrote the proposal of “Mapping framework of interaction events across devices” to ISO. The proposal has passed the domestic review and is being reviewed at the ISO’s WG9 meeting.

**2. Novel Interaction Techniques.** This part involves low level empirical studies to improve the understanding of the human factors, and the design and implementation of novel techniques and interfaces to provide natural and enhanced user experiences. Topics include: touch gestures, cross-device interactions, wearable and spatial interactions in smart home, and user interfaces for automotive intelligent cockpit. Some of the work has been included into product planning and will be reflected in future products.

**3. Accessibility.** I wrote the “Accessibility Screen Reader Development Specification”, which became Huawei’s internal software development standard and has been integrated into the IPD process. I also empowered all developers, designers, and test engineers. As a core member of the accessibility special team, I participated in the improvement of 1000+ problems. As a result, Huawei ranked 1st among domestic mobile phones in IFENG.COM’s professional accessibility evaluation (<https://tech.ifeng.com/c/82PZhblXVvD>).

### JD.com

2018

Research Intern. Augmenting Input and Output Interfaces of Chatbot for Customer Service.

### HISCENE

2016

Engineering Intern. Developing a pipeline tool that takes image sequence as input and outputs the reconstructed 3D mesh model.

## Section 3: Awards and Patents

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### Awards

Outstanding Graduate by the Department of Computer Science, Tsinghua University	2019, 2014
National Scholarship by Ministry of Education	2016
Honorable Mention Award by ACM CHI 2016	2016
Comprehensive Excellence Scholarship by Tsinghua University	2013, 2011
Academic Excellence Scholarship by Tsinghua University	2012

### Patents

- [10] Chun Yu, **Ke Sun**, Mingyuan Zhong, Xincheng Li, Yuanchun Shi. Device and Method of One-Dimensional Handwriting Text Input. CN105549890A, WO2017114002A1.
- [9] Chun Yu, **Ke Sun**, Yuanchun Shi. Silent Speech Input Recognition Method, Computing Device and Computer Readable Media. CN201811168994.
- [8-1] Eight patents produced in Huawei have been submitted to the Intellectual Property Office but have not been made public. I am the first inventor of four of them.

## Section 4: Skills

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### Programming languages

C++, Java, Python

### English

Fluent