

I am an Assistant Research Scientist at Pervasive Computing Research Center, Institute of Computing Technology, Chinese Academy of Sciences. I build pervasive interfaces to bridge the digital and physical world. My research interests include: 1) Sustainable sensing and interactive systems; 2) Thing-computer interconnection techniques; 3) Human-AI interaction and collaboration.

## EDUCATION

<b>2016-2019</b>	<b>PhD, Human Computer Interaction, Computer Science</b> Tsinghua University, China	Advisor: Prof. Yuanchun Shi
<b>2011-2013</b>	<b>MSc, Electromagnetics, Electrical Engineering</b> The University of Texas at Austin, USA	Advisor: Prof. Andrea Alu
<b>2007-2011</b>	<b>BSc, Chien-Shiung Wu Honors College/Electrical Engineering</b> Southeast University, China	Prof. Tiejun Cui's Lab

## PUBLICATIONS

- 2020** [J.8] **Tengxiang Zhang**, Steve Hodges, Yiqiang Chen. Backscatter Sensing: An Emerging Solution for Data Collection and Interaction at The Very Edge of The Network. Submitted to IEEE Pervasive Computing. (*under review*)
- [C.4] **Tengxiang Zhang**, Xin Jiang, Yinshuai Zhang, Xuhai Xu, Xin Zeng, Jennifer Mankoff, Anind Dey, Yiqiang Chen. BoldMove: Leveraging Semantics to Facilitate Gestural IoT Device Control. Submitted to ACM CHI'21. (*under review*)
- [J.7] **Tengxiang Zhang**, Zi Qian, HsuanWei Fan, Jie Ren, Yuntao Wang, Yuanchun Shi. Easily-add Battery-free Wireless Sensors to Everyday Objects: A System Implementation and Evaluation of BitID. Submitted to Elsevier Pervasive and Mobile Computing. (*under review*)
- [J.6] Yingwei Zhang, Yiqiang Chen, Hanchao Yu, Zeping Lv, Xiaodong Yang, Chunyu Hu, **Tengxiang Zhang**. What Can "Drag & Drop" Tell? Detecting Mild Cognitive Impairment by Hand Motor Function Assessment under Dual-Task Paradigm. *International Journal of Human-Computer Studies* 145:102547.
- [C.3] **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.
- [C.2] Yuntao Wang, Zichao (Tyson) Chen, Hanchuan Li, Zhengyi Cao, Huiyi Luo, **Tengxiang Zhang**, Ke Ou, John Raiti, Chun Yu, Shwetak Patel, and Yuanchun Shi. 2020. MoveVR: Enabling Multiform Force Feedback in Virtual Reality using Household Cleaning Robot. *In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20)*, 1–12.
- [O.4] **Tengxiang Zhang** and Steve Hodges. New Opportunities for Sustainable Interaction using Backscatter Sensors. *Workshop on self-powered sustainable interfaces and interactions (SelfSustainableCHI 2020)*

- 2019** [J.5] **Tengxiang Zhang**, Xin Yi, Ruolin Wang, Jiayuan Gao, Yuntao Wang, Chun Yu, Simin Li, Yuanchun Shi. Facilitating Temporal Synchronous Target Selection through User Behavior Modeling. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, 2,4:159.
- [J.4] Yuntao Wang, Jianyu Zhou, Hanchuan Li, **Tengxiang Zhang**, Minxuan Gao, Zhuolin Cheng, Chun Yu, Shwetak Patel, and Yuanchun Shi. FlexTouch: Enabling Large-Scale Interaction Sensing Beyond Touchscreens Using Flexible and Conductive Materials. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, 3,3:109.
- [O.3] Jianfei Shen, **Tengxiang Zhang**, and Yiqiang Chen. Tap2Pair: Associating Wireless Devices with Tapping. *Adjunct Proceedings of UbiComp/ISWC '19*, Pages 346-349.
- 2018** [J.3] **Tengxiang Zhang**, Xin Yi, Ruolin Wang, Yuntao Wang, Chun Yu, Yiqin Lu, and Yuanchun Shi. 2018. Tap-to-Pair: Associating Wireless Devices with Synchronous Tapping. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 2, 4: 201.
- [O.2] **Tengxiang Zhang**. 2018. Toward Pervasive Interaction: Empowering and Enriching Interactions on Resource-constrained Devices. *Adjunct Proceedings of UbiComp/ISWC '18*, Pages 504-509.
- [O.1] **Tengxiang Zhang**, Xin Yi, Chun Yu, Yuntao Wang, Nicholas Becker, and Yuanchun Shi. 2018. TOUCHPOWER: Interaction-based Power Transfer for Power-as-needed Devices. *GetMobile: Mobile Comp. and Comm.* 22, 2: 27–31. *(Invited Highlights)*
- 2017** [J.2] **Tengxiang Zhang**, Xin Yi, Chun Yu, Yuntao Wang, Nicholas Becker, and Yuanchun Shi. 2017. TouchPower: Interaction-based Power Transfer for Power-as-needed Devices. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.* 1, 3: 121:1–121:20. *(Discussion Paper)*
- [C.1] **Tengxiang Zhang**, Nicholas Becker, Yuntao Wang, Yuan Zhou, and Yuanchun Shi. 2017. BitID: Easily Add Battery-Free Wireless Sensors to Everyday Objects. *In 2017 IEEE International Conference on Smart Computing (SMARTCOMP)*, 1–8. *(Best Paper Runner-up)*
- 2013** [J.1] Huifeng Ma, Bengeng Cai, **Tengxiang Zhang**, Yan Yang, Weixiang Jiang, and Tiejun Cui. 2013. Three-Dimensional Gradient-Index Materials and Their Applications in Microwave Lens Antennas. *IEEE Transactions on Antennas and Propagation* 61, 5: 2561–2569.

## PATENTS

- 2020** [P.9] **Tengxiang Zhang**, Xin Zeng, Yiqiang Chen. A Smart Ring Based Input Method, System, and Apparatus: CN 202010413596.3 *(pending)*
- [P.8] **Tengxiang Zhang**, Xin Zeng, Yiqiang Chen. A Smart Ring Based Gesture Recognition Method and System: CN 202010411317.X *(pending)*
- [P.7] **Tengxiang Zhang**, Jiayuan Gao, Yiqiang Chen. Apparatus and Method for Cognitive Load Analysis Based on Near-infrared Imaging of Subcutaneous Veins: CN 202010459503.0 *(pending)*

- [P.6] **Tengxiang Zhang**, Jiayuan Gao, Yiqiang Chen. A Movement Symmetry Based Smart Prosthesis Control Method and System: CN 202010425034.0 (*pending*)
- 2018** [P.5] Yuanchun Shi, Yinshuai Zhang, **Tengxiang Zhang**. Smart Ring and its Wearing Method: CN 201810971684.8 (*pending*)
- [P.4] Yuanchun Shi, Yinshuai Zhang, **Tengxiang Zhang**. One type of Smart Ring: CN 201821371671.9
- [P.3] Yuanchun Shi, Yinshuai Zhang, **Tengxiang Zhang**. Smart Ring: CN 201821371641.8
- [P.2] Yuanchun Shi, **Tengxiang Zhang**, Xin Yi, Yuntao Wang and Chun Yu. Pairing method and wireless device for pairing using wireless signals. International Patent No. PCT/CN2018/094468.
- [P.1] Yuanchun Shi, **Tengxiang Zhang**, Xin Yi, Yuntao Wang, Chun Yu. An association method and apparatus to pair devices based on wireless signals: CN 201810723952.4

### **GRANTS**

- 2020** [I.2] **Principle Investigator:** Resources Cross-modality Association and Matching Techniques (1.08 Million CNY), sub-project of Key Technologies for Modern Service Resource Management, National Key Research and Development Plan.
- [I.1] **Co-investigator:** Hearing Aid Automatic Fitting Models (0.3 Million CNY), Key Technologies of Proactive Health and Aging Population, National Key Research and Development Plan.

### **HONORS AND AWARDS**

- 2019** Graduate with Honor (CS), Tsinghua University, China
- 2018** Finalist, Global Innovation Competition'18
- 2017** Best Paper Runner-up, SMARTCOMP'17
- 2017** Discussion Paper, UbiComp'17
- 2012** First Prize, International Mathematical Contest in Modeling

### **PROFESSIONAL EXPERIENCE**

- 2019-present** **Assistant Research Scientist, Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China**
- Conduct research on ultra-low-power sensors, wearable devices, and human-centered interconnections techniques
  - Ubiquitous sensing hardware: Analog backscatter wireless touch sensing interface with  $\mu$ W power consumption (*on-going*)
  - User-centered collaborative system: AR-facilitated digital resource manipulation (*on-going*)
  - Pervasive interaction technique: Function association mechanism for gesture interfaces (*on-going*)

- 2015-2016**      **RF Engineer/Product Manager, Tomoon Technology, Beijing, China**
- Smartwatch and Bluetooth tracker antenna design
  - Bluetooth tracker product definition, project management, field deployment
- 2013-2015**      **Product and Test Engineer, Silicon Labs, Austin, Texas, USA**
- IoT MCU chips (e.g. Sub-GHz、 ZigBee) RF calibration and test
  - Test program (C/Perl) development, hardware design and layout
  - Developed on-chip test program that saved over 30% test time for EM357

## SERVICES

<b>Review</b>	CHI'20'21, IMWUT'20, UIST'20, MobileHCI'20, ISS'20, IUI'20, TEI'20, EICS'19, TEI'21 WIP Program Committee
<b>Volunteer</b>	ACM UBICOMP/ISWC 2018, Singapore; The 4th UN World Urban Forum 2008, Nanjing, China
<b>Academic Speaker</b>	GIX 2020 Access Computing Summer Program
<b>Mentor</b>	GIX 2019 Winter Camp

## STUDENT SUPERVISION AND MENTORSHIP

<b>Xin Zeng</b>	UCAS Ph.D (CS). Co-supervising with Prof. Yiqiang Chen
<b>Xinyi Yang</b>	BJTU Undergraduate (CS)
<b>Xinran Chen</b>	UESTC Undergraduate (CS)
<b>Jiayuan Gao</b>	Tsinghua Undergraduate (CS); Now Ph.D at UCAS (CS)
<b>*Jiayin Wang</b>	Tsinghua Undergraduate (CS); Now Master at Tsinghua (CS)
<b>*Simin Li</b>	Beihang Undergraduate (CS); Now Master at Georgia Tech (CS)
<b>*Zi Qian</b>	Tsinghua Undergraduate (CS); Now Master at U of Toronto (CS)
<b>*Hsuan-Wei Fan</b>	Tsinghua Undergraduate (CS); Now Master at Cornell Tech (CS)
<b>*Hanwei Wang</b>	Tsinghua Undergraduate (Physics); Now Ph.D at UIUC (EE)
<b>* Alumni</b>	

## SKILLS

<b>Programming languages:</b>	Python, C, C++, C#, Java, Matlab
<b>Prototyping:</b>	Arduino, Processing, Altium, 3D printing
<b>Software:</b>	Matlab, CST, Keras, Scikit-learn
<b>Hardware:</b>	Signal generator, Vector network analyzer, Spectrum analyzer