Tengxiang Zhang

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I am an Research Associate Professor at the Institute of Computing Technology, Chinese Academy of Sciences. My research interests include: 1) Smart wearables and skin sensors for interaction and long-term health monitoring; 2) Tag-aided wireless spatial computing systems; 3) AI-agents-based user intention understanding.

EDUCATION

2016-2019 **PhD, Human Computer Interaction, Computer Science**
Tsinghua University, China Advisor: Prof. Yuanchun Shi

2011-2013 **MSc, Electromagnetics, Electrical and Computer Engineering**
The University of Texas at Austin, USA Advisor: Prof. Andrea Alu

2007-2011 **BSc, Chien-Shiung Wu Honors College/Electrical Engineering**
Southeast University, China Research supervisor: Prof. Tiejun Cui

PUBLICATIONS

2023 [O.9] Jiayuan Gao, Yingwei Zhang, Yiqiang Chen, **Tengxiang Zhang**, Boshi Tang, XiaoyuWang**.** 2023. Unsupervised Human Activity Recognition via Large Language Models and Iterative Evolution. *Submitted to ICASSP'24.*

[O.8] Xin Zeng, Xiaoyu Wang, **Tengxiang Zhang**, Chun Yu, Shengdong Zhao, Yiqiang Chen**.** 2023. GestureGPT: Zero-shot Interactive Gesture Understanding and Grounding with Large Language Model Agents. *arXiv:2310.12821.*

[O.7] Xin Zeng, Xiaoyu Wang, Zhengtai Gou, Yiqiang Chen, **Tengxiang Zhang.** 2023. WebJump: AR-facilitated Distributed Display of Web Pages. In Extended Abstracts of the CHI 2023.

[C.4] Xin Zeng, Yiqiang Chen, Benfeng Xu, and **Tengxiang Zhang**. 2023. ModalDrop: Modality-aware Regularization for Temporal-Spectral Fusion in Human Activity Recognition. ICASSP'23.

2022 [J.8] **Tengxiang Zhang**, Zitong Lan, Chenren Xu, Yanrong Li, and Yiqiang Chen. 2022. BLEselect: Gestural IoT Device Selection via Bluetooth Angle of Arrival Estimation from Smart Glasses. 2022. IMWUT. 6, 4.

[O.6] **Tengxiang Zhang**, Xin Zeng, Yinshuai Zhang, Xin Jiang, Xuhai Xu, Anind K Dey, and Yiqiang Chen. 2022. BoldMove: Enabling IoT Device Control on Ubiquitous Touch Interfaces by Semantic Mapping and Sequential Selection. In Extended Abstracts of the CHI 2022, 7.

[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 Usability Study. *CCF Transactions on Pervasive Computing and Interaction*.

2021 [O.5] Xin Zeng,Xinyi Yang,**Tengxiang Zhang**,Yukang Yan,Yiqiang Chen. ScreenJump: An AR-facilitated User-centric Interaction System for Fine-grained Resource Manipulation Across Displays. *CHI 2021 Workshop on User Experience for Multi-Device Ecosystems: Challenges and Opportunities.*

[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*.

2020 [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

2022 [P.11] **Tengxiang Zhang**, Yanrong Li ,Yiqiang Chen**.** Smart Glasses-based Facial Action Unit Detection Method and Apparatus *(pending)*

[P.10] **Tengxiang Zhang**, Zitong Lan, Yanrong Li, Yiqiang Chen**.** A Device Selection System and Method: CN 202211410562.4 *(pending)*

[P.9] **Tengxiang Zhang**, Xin Zeng, Yiqiang Chen**.** An AR Device Felicitated Multi-Device Interaction System and Method: CN 202211490160.X *(pending)*

2021 [P.8] **Tengxiang Zhang**, Xin Zeng, Yiqiang Chen**.** A Semantic-based Device Association Method: CN 202110359565.9

2020 [P.7] **Tengxiang Zhang**, Xin Zeng, Yiqiang Chen. A Smart Ring Based Gesture Recognition Method and System: CN 202010411317.X

[P.6] **Tengxiang Zhang**, Jiayuan Gao, Yiqiang Chen**.** Apparatus and Method for Cognitive Load Analysis Based on Near-infrared Imaging of Subcutaneous Veins: CN 202010459503.0

[P.5] **Tengxiang Zhang**, Jiayuan Gao, Yiqiang Chen. A Movement Symmetry Based Smart Prosthesis Control Method and System: CN 202010425034.0

2018 [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

2023 [I.6] **Principal Investigator:** Millimeter Wave Backscatter Tag Design and Localization from Head-mounted FMCW Radar (770K CNY). Industrial Grants.

2022 [I.5] **Principal Investigator:** Research on Pervasive Touch Interface and Interaction Design for IoT Device Control (300K CNY). NSFC Fund for Young Scholars.

2021 [I.4] **Principal Investigator:** Ultra-low-power Bluetooth-compatible Ubiquitous Touch Interface (20K CNY). Open project, Beijing Key Laboratory of Mobile Computing and Pervasive Device.

2020 [I.3] **Principal Executing Investigator:** A Movement Symmetry Based Smart Prosthesis Control Method (650K CNY). ICT, CAS Innovation Fund.

[I.2] **Co-Principal Investigator:** Resources Cross-modality Association and Matching

Techniques (2.28 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 (270K 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

PROFESSIONAL EXPERIENCE

2023 **Visiting Scholar, Biomedical Engineering Department, National University of Singapore, Singapore**
- Worked on flexible electronics, skin sensors, and electrochemical sensors

2021- **Associate Research Scientist, Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China**

2019-2021 **Assistant Research Scientist, Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China**
- Conduct research on pervasive sensing and interactive systems with focuses on mixed-reality and ultra-low-power wireless tags
- Published papers on top-tier journals and conferences like CHI and IMWUT
- Granted research funds ~3 million CNY with 2 National Key Research and Development Plan funds

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

Committee Member SIGCHI Sustainability Committee
CCF HCI Technical Program Committee
CCF Ubicomp Technical Program Committee

Chair Ubicomp'23 Workshop Track Co-chair
CHI'23 Associate Chair for Blending Interaction Subcommittee
HHME'22 (largest conference for HCI and ubicomp in China) Tutorial

Review CHI'20'21'22'23, IMWUT'21'22, UIST'20, MobileHCI'20, ISS'20, IUI'20, TEI'20, EICS'19, **,** TEI'21 WIP Program Committee

Volunteer ACM UBICOMP/ISWC 2018, Singapore;
The 4th UN World Urban Forum 2008, Nanjing, China

Invited Speaker	School of Computing and Information Systems, SMU, Singapore School of Computing Science, NUS, Singapore Microsoft Research (Redmond) Tsinghua-UW GIX ACSP (Access Computing Summer Program) 2020
Mentor	Tsinghua-UW GIX ACSP '21'22, GIX 2019 Winter Camp

STUDENT SUPERVISION AND MENTORSHIP

Xin Zeng	UCAS Ph.D (CS). Co-supervising with Prof. Yiqiang Chen
Yanrong Li	UCAS Master (CS). Co-supervising with Prof. Yiqiang Chen
Haotian Zhang	Southeast University Undergraduate (EE)
Xiaoyu Wang	Peking University Undergraduate (CS); Now Master at HKUST
***Bo Liang**	Peking University Ph.D
***Yuming Liuxing**	Peking University Undergraduate
***Jiayuan Gao**	UCAS Ph.D (CS)
***Zhengtai Gou**	Tsinghua Undergraduate (Automation)
***Zitong Lan**	SEU Undergraduate (EE); Now Ph.D at UPenn.
***Xinran Chen**	UESTC Undergraduate (CS)
***Yaobin Su**	University of Copenhagen Master (CS)
***Xinyi Yang**	BJTU Undergraduate (CS); Now Master at CUHK
***Jiayin Wang**	Tsinghua Undergraduate (CS); Now Master at Tsinghua (CS)
****Simin Li***	Beihang Undergraduate (CS); Now Master at Georgia Tech (CS)
****Zi Qian***	Tsinghua Undergraduate (CS); Now Master at U of Toronto (CS)
****Hsuan-Wei Fan***	Tsinghua Undergraduate (CS); Now Master at Cornell Tech (CS)
****Hanwei Wang***	Tsinghua Undergraduate (Physics); Now Ph.D at UIUC (EE)

** Alumni*

SKILLS

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

REFEREES

Yuanchun Shi, Professor, Computer Science, Tsinghua University
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Daqing Zhang, Professor, Computer Science, Peking University
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