

# Kevin Fan

Toronto, ON, Canada - Tel: +1-647-224-7332  
kevin.sw.fan@gmail.com - www.kevinfan.com

- HCI/VR/AR researcher/engineer with 7+ years of experience from native C++ to engines (Unity/UE5) using HMDs (Oculus/VIVE/HoloLens).
- Experienced in designing and building end-to-end interactive technical solutions for emerging products (XR, mobiles/wearables, vehicles, IoT), and delivering to stakeholders.
- Awarded Microsoft Research Asia PhD Fellowship for excellency in R&D.

## TECHNICAL SKILLS

- **Languages:** C++, C#, Python, Java
- **VR/AR HMDs:** Oculus (Meta), HTC VIVE, HoloLens
- **VR/AR engines:** Unity, UE5
- **Motion capture:** OptiTrack, Leap Motion, Kinect
- **Machine and deep learning:** Scikit-learn, PyTorch, Tensorflow
- **Arduino** and hardware tinkering

## EXPERIENCE

**Huawei Canada, Toronto, Canada** **03/2019 – present**

*Senior HCI Researcher*

- Research, design, and build interaction techniques and IP for emerging technology and products.

**wrnchAI, Montreal, Canada** **04/2018 – 02/2019**

*Deep Learning Engineer*

- Developed a human pose estimation training pipeline including data preprocessing, heatmap generation, data augmentation in Tensorflow (C++/Python) based on RGB camera image.
- Utilized a VGG based CNN architecture for facial keypoints training and estimation (Python).

**National Institute of Advanced Industrial Science and Technology** **04/2017 – 03/2018**

*Postdoctoral Researcher*

- Developed VR experience for embodying multiple digital humans with motion capture (C++)
- AR utilizing HoloLens for brining digital humans to the real world with embodiment (Unity).
- Utilize human motion analysis and haptic feedback for assisting motor learning.
- Provide VR consultation for agile prototyping real world interaction evaluations.

**National Institute of Advanced Industrial Science and Technology** **04/2016 – 03/2017**

*Research Assistant*

- Developed VR support (C++/Oculus native SDK) for a desktop digital human software platform.

**Microsoft Research Asia – HCI Group** **05/2015 – 11/2015**

*Research Intern*

- Experimented human skin in reaction to functional electric stimulation by designing PCB.

**Singapore University of Technology and Design – Augmented Human Lab** **11/2013 – 01/2014**

*Research Intern*

- Developed a video see-through HMD with Oculus using native SDK (C++/OpenGL).
- Utilized two cameras with video texture blending (GLSL shader) for extended HMD FOV.
- Computer vision optical flow analysis to detect movement surrounding HMD user.

**Research Assistant**

- Assisted the development (C++/OpenGL) and exhibitions of virtual reality immersion system.
- Developed with omnidirectional camera video stitching, video-passthrough HMDs.

**EDUCATION****Graduate School of Media Design, Keio University, Tokyo, Japan****09/2013 – 03/2017*****Ph.D. in Media Design (HCI/VRAR)***

Thesis: Blended Reality: Extending Existence into Multiple Realities

Advisors: Prof. Masahiko Inami and Prof. Kouta Minamizawa

Awards: Microsoft Research Asia Fellowship, Keio University Research Grant

**Graduate School of Media Design, Keio University, Tokyo, Japan****09/2011 – 09/2013*****Master in Media Design (HCI/VRAR)***

Thesis: Immersive Alternate Reality Experience through Ubiquitous Substitutional Reality

Advisors: Prof. Masahiko Inami and Prof. Kouta Minamizawa

Awards: VRSJ Promising Young Researcher's Award

**University of British Columbia, Vancouver, B.C., Canada****09/2006 – 06/2010*****Bachelor of Applied Science in Computer Engineering (Software Engineering Option)***

Awards: President's Entrance Scholarship, B.C. Government Scholarship

**AWARDS & GRANTS**

|  |      |
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| ● Microsoft Research Asia PhD Fellowship               | 2014 |
| ● Keio University Research Grant for Doctoral Students | 2014 |
| ● Microsoft Research Asia CORE9 Funding                | 2013 |
| ● Promising Young Researcher's Award, VRSJ 2012        | 2012 |
| ● Monbukagakusho Honors Scholarship                    | 2011 |
| ● President's Entrance Scholarship                     | 2006 |
| ● B.C. Government Scholarship                          | 2006 |

**PUBLICATIONS & PATENTS***Publications*

- Bardot, S., Rey, B., Audette, L., **Fan, K.**, Huang, D.Y., Li, J., Li, W. and Irani, P. One Ring to Rule Them All: An Empirical Understanding of Day-to-Day Smart-ring Usage Through In-Situ Diary Study. In Proc. IMWUT 2022 vol 6(3), ACM, pp.1-20.
- Herath, A., Rey, B., Bardot, S., Rempel, S., Audette, L., Zheng, H., Li, J., **Fan, K.**, Huang, D.Y., Li, W. and Irani, P. Expanding Touch Interaction Capabilities for Smart-rings: An Exploration of Continual Slide and Microroll Gestures. In Proc. CHI EA 2022, ACM, pp. 1-7.
- Bardot, S., Rawat, S., Nguyen, D.T., Rempel, S., Zheng, H., Rey, B., Li, J., **Fan, K.**, Huang, D.Y., Li, W. and Irani, P. ARO: Exploring the Design of Smart-Ring Interactions for Encumbered Hands. In Proc. MobileHCI 2021, ACM, pp. 1-11.
- Faleel, S.A., Gammon, M., **Fan, K.**, Huang, D.Y., Li, W. and Irani, P. HPUI: Hand Proximate User Interfaces for One-Handed Interactions on Head Mounted Displays. In Proc. IEEE TVCG 20021 vol 27(11), IEEE, 4215-4225.
- Saniee-Monfared, G., **Fan, K.**, Xu, Q., Mizobuchi, S., Zhou, L., Irani, P.P. and Li, W., Tent Mode Interactions: Exploring Collocated Multi-User Interaction on a Foldable Device. In Proc.

MobileHCI 2020, ACM, 12 pages.

- **Fan, K.**, Murai, A., Miyata, N., Sugiura, Y. and Tada, M. Multi-Embodiment of Digital Humans in Virtual Reality for Assisting Human-Centered Ergonomics Design. In *Augmented Human Research 2017*, volume 2, article 7, 14 pages.
- **Fan, K.**, Chan, L., Kato, D., Minamizawa, K. and Inami, M. VR Planet: Interface for Meta-View and Feet Interaction of VR Contents. In *Proc. SIGGRAPH 2016, VR Village*, ACM, 2 pages.
- Outram, B., Pai, Y.S., **Fan, K.**, Minamizawa, K., and Kunze, K. AnyOrbit: Fluid 6DOF Spatial Navigation of Virtual Environments using Orbital Motion. In *Proc. SUI 2016*, ACM, 1 page.
- **Fan, K.**, Seigneur, J.M., Nanayakkara, S., and Inami, M. Electrosmog Visualization through Augmented Blurry Vision. In *Proc. AH 2016*, ACM, 2 pages.
- **Fan, K.**, Sugiura, Y., Minamizawa, K., Wakisaka, S., Inami, M., and Fujii, N. Ubiquitous Substitutional Reality: Re-Experiencing the Past in Immersion. In *Proc. SIGGRAPH 2014*, ACM, 1 page.
- **Fan, K.**, Huber, J., Nanayakkara, S., and Inami, M. SpiderVision: Extending the Human Field of View for Augmented Awareness. In *Proc. AH 2014*, ACM, 8 pages.
- Low, S., Sugiura, Y., **Fan, K.**, and Inami, M. Cuddly: Enchant Your Soft Objects With A Mobile Phone. In *Proc. SIGGRAPH Asia 2013 Emerging Technologies*, ACM, 2 pages.
- Low, S., Sugiura, Y., **Fan, K.**, and Inami, M. Cuddly: Enchant Your Soft Objects With A Mobile Phone. In *Proc. ACE 2013*, Springer, 12 pages.
- **Fan, K.**, Izumi, H., Sugiura, Y., Minamizawa, K., Wakisaka, S., Inami, M., Fujii, N., and Tachi, S. Reality Jockey: Lifting the Barrier between Alternate Realities through Audio and Haptic Feedback. In *Proc. CHI 2013*, ACM, 2557-2566.

#### *Patents*

- **Fan, S.W.**, Khan, T.A. and Li, W., 2022. Methods and systems for selection of objects. U.S. Patent Application 17/127,022.
- Khan, T.A., **Fan, S.W.**, Changqing, Z.O.U. and Li, W., Huawei Technologies Co Ltd, 2022. Devices, methods, systems, and media for selecting virtual objects for extended reality interaction. U.S. Patent 11,327,630.
- Changqing, Z.O.U., Akhtar, Y.W., **Fan, S.W.**, Jianpeng, X. and Li, W., 2022. Methods and systems for rendering virtual objects in user-defined spatial boundary in extended reality environment. U.S. Patent Application 17/187,663.
- **Fan, S.W.**, Hengguang, Z.H.O.U., Xu, Q. and Li, W., Huawei Technologies Co Ltd, 2021. System and method for video processing using a virtual reality device. U.S. Patent US20210349308A1.
- Kunita, Y. Ochi, D., Takahashi, K., Kojima, A., Inami, M., Uema, Y., **Fan, K.**, and Sugiura, Y. Image Presentation Method and System. Japan Provisional Patent: 2016-162426.

## **TEACHING & MENTORING**

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### **Keio University**

#### *Teaching Assistant – Graduate Course*

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|---|-------------------|
| <b>Innovation Pipeline - Fabrication</b> – Instructed by Prof. Kouta Minamizawa | 01/2015 – 03/2015 |
| <b>Reality-Based Design</b> – Instructed by Prof. Masahiko Inami                | 04/2014 – 07/2014 |

#### *Master Thesis Mentoring*

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|--|-------------|
| Pei Ying Chiang – Co-mentoring with Yuta Sugiura                               | 2013 – 2015 |
| <b>“OriPOP : The Emotional Impact of Interactive Popcorn Packaging Design”</b> |             |
| Suzanne Low - Co-mentoring with Yuta Sugiura                                   | 2012 – 2014 |
| <b>“Cuddly: Enchant Your Soft Objects With A Mobile Phone”</b>                 |             |

## INVITED TALKS

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*"From Sensations to Embodiment: A Next Step in Virtual Reality"* 08/2016  
Digital Human Consortium, Tokyo, Japan

*"Blended Reality: Beyond Time, Place, and Self"* 12/2014  
VRSJ Special Interest Group of Telexistence, Tokyo, Japan

## ACADEMIC SERVICE

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### Reviewer

CHI'21 | UIST'16'19 | IEEE VR'15'16'18'19 | TEI'17'18'19'21'22'23 | SIGGRAPH Asia'17'20 |  
Informatics'17 | Nature Scientific Reports'16 | AH'14'20

### Committee

MobileHCI 2022 Student Design Competition Co-Chair