Ruofei Du

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Career Goals

Lead cross-functional talents to invent the future in *XR*, *interactive perception and graphics* – fusing the data from both the physical & virtual worlds, and making it interactive, accessible, and useful.

Professional Experience

Interactive Perception & Graphics Lead / Manager at Google AR Jan. 2019 - Present

- Our work on Visual Blocks for ML debut at the Google I/O 2023 & reached $150K+$ media views.
- Our work on live translation in AR was the closing feature at the Google I/O 2022 keynote.
- Research Lead of Rapsai, Technical Lead Manager of ARChat and Visual Captions.
- Technical Lead of Portrait Depth API in TensorFlow.js, which turns a single photo into 3D.
- Technical Lead of ARCore Depth Lab, published in ACM UIST 2020, launched in Play Store.
- Key contributor of uDepth: Real-time 3D Depth Sensing on the Pixel 4.
- Key contributor to ARCore Depth API, covered by The Verge, Engadget, CNET, ZDNet, etc.
- 80+ patents filed and 25+ peer-reviewed papers published at Google.

Microsoft AI+Research, Redmond (MSR) 2017

- Lead of Montage4D for fusing multiview videos in real time with two papers published.

Microsoft Research, Redmond (MSR) 2016

- Key contributor of Mobile Holoportation, demoed to Microsoft CEO, and filed a US patent.

University of Maryland Institute for Advanced Computer Studies 2013 - 2018

- Lead of Geollery.com, one of the first mixed reality social media platforms (ACM CHI 2019).
- **Best Paper Award** for inventing SocialStreetView.com at ACM Web3D 2016.
- HandSight: Real-time text-to-speech with finger-mounted camera for *people who are blind*.

Microsoft Research Asia (MSRA) 2012 - 2013

- 3DVAR: Lead of 3D reconstruction system for AR & VR and won a Best Demo Award.

Center for Brain-like Computing and Machine Intelligence (BCMI) 2011 - 2013

Eye Tracking Laboratory, Shanghai Jiao Tong University 2010 - 2011

Education

University of Maryland, College Park, Maryland, USA.

Ph.D. and M.S. in Computer Science. Advisor: Prof. Amitabh Varshney
Dissertation: Fusing Multimedia Data Into Dynamic Virtual Environments

ACM Honored Class, Shanghai Jiao Tong University, China.

B.S. in Computer Science. Advisors: Prof. Bao-Liang Lu and Prof. Yong Yu

Representative Publications

[C.10] **Ruofei Du**, Eric Turner, Maksym Dzitsiuk, Luca Prasso, Ivo Duarte, Jason Dourgarian, Joao Afonso, Jose Pascoal, Josh Gladstone, Nuno Cruces, Shahram Izadi, Adarsh Kowdle, Konstantine Tsotsos, and David Kim. *DepthLab: Real-Time 3D Interaction With Depth Maps for Mobile Augmented Reality*. Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST), 829–843, 2020. *(100+ citations, 50K+ downloads, 700+ GitHub stars)*

[C.7] **Ruofei Du**, David Li, and Amitabh Varshney. *Geollery: A Mixed Reality Social Media Platform*. Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, 2019. *(4.5K users at geollery.com, two approved U.S. patents)*

[J.3] **Ruofei Du**, Ming Chuang, Wayne Chang, Hugues Hoppe, and Amitabh Varshney. *Montage4D: Real-Time Seamless Fusion and Stylization of Multiview Video Textures.* Journal of Computer Graphics Techniques (JCGT), 8(1), pp. 1–34, 2019. *Debut in Microsoft TechFest 2018*

[C.20] **Ruofei Du**, Na Li, Jing Jin, Michelle Carney, Scott Miles, Maria Kleiner, Xiuxiu Yuan, Yinda Zhang, Anuva Kulkarni, Xingyu "Bruce" Liu, Sergio Escolano, Abhishek Kar, Ping Yu, Ram Iyengar, Adarsh Kowdle, and Alex Olwal. *Rapsai: Accelerating Machine Learning Prototyping of Multimedia Applications Through Visual Programming.* Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems, pp. 1–23, 2023. **Honorable Mentions Award** (top 5%)

[C.21] Xingyu "Bruce" Liu, Vladimir Kirilyuk, Xiuxiu Yuan, Peggy Chi, Xiang "Anthony" Chen, Alex Olwal, and **Ruofei Du**. *Visual Captions: Augmenting Verbal Communication With On-the-Fly Visuals.* Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems, pp. 1–20, 2023. *(100K+ Google Research Blog Media Coverage, Live Demo at UIST 2023)*

Journal and Magazine Publications

[J.10] Safa Medin, Gengyan Li, **Ruofei Du**, Stephan Garbin, Philip Davidson, Gregory Wornell, Thabo Beeler, and Abhimitra Meka. *FaceFolds: Meshed Radiance Manifolds for Efficient Volumetric Rendering of Dynamic Faces.* Proceedings of the ACM on Computer Graphics and Interactive Techniques (I3D), 2024.

[J.9] Ananta Balaji, Clayton Kimber, David Li, Shengzhi Wu, **Ruofei Du**, and David Kim. *RetroSphere: Self-Contained Passive 3D Controller Tracking for Augmented Reality.* Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 41, No. 4, pp. 1–36, 2022. (**Distinguished Paper Award** in Ubicomp/IMWUT '23)

[J.8] **Ruofei Du** and Amitabh Varshney. *Saliency Computation for Virtual Cinematography in 360 Videos.* IEEE Computer Graphics and Applications, Vol. 41, No. 4, pp. 99–106, 2021.

[J.7] David Li, **Ruofei Du**, Adharsh Babu, Camelia D. Brumar, and Amitabh Varshney. *A Log-Rectilinear Transformation for Foveated 360-Degree Video Streaming.* IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 27, No. 5, 2638–2647, 2021. (**TVCG Honorable Mentions** in IEEE VR 2021)

[J.6] Xiaoxu Meng, **Ruofei Du**, Joseph F. JaJa, and Amitabh Varshney. *3D-Kernel Foveated Rendering for Light Fields.* IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 27, No. 8, 3350–3360, February 2020.

[J.5] Xiaoxu Meng, **Ruofei Du**, and Amitabh Varshney. *Eye-dominance-guided Foveated Rendering.* IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 26, No. 5, 1972–1980, 2020.

[J.4] Changqing Zou, Haoran Mo, Chengying Gao, **Ruofei Du**, and Hongbo Fu. *Language-based Colorization of Scene Sketches.* ACM Transaction on Graphics (TOG), Vol. 38, No. 6, Article 233, 1–16, 2019. (SIGGRAPH Asia 2019)

[J.2] Xiaoxu Meng, **Ruofei Du**, Matthias Zwicker, and Amitabh Varshney. *Kernel Foveated Rendering.* Proceedings of the ACM on Computer Graphics and Interactive Techniques (PACM CGIT, Vol. 1, No. 5, 1–20, 2018. (Most Read Paper in PACM CGIT, 2023)

[J.1] Lee Stearns, **Ruofei Du**, Uran Oh, Catherine Jou, Leah Findlater, David A. Ross, and Jon E. Froehlich. *Evaluating Haptic and Auditory Directional Guidance to Assist Blind Persons in Reading Printed Text Using Finger-Mounted Cameras.* In ACM Transactions on Accessible Computing, Vol. 8, No. 5, 1–38, 2016.

Conference Publications*

* My research is across Virtual and Augmented Reality, Computer Graphics, Human Computer Interaction, and Computer Vision. As such, it attracts readers with various backgrounds. In this regard, it is worth noting that unlike in many academic fields where journal papers are the premiere forums for publication, the top conferences in Human-Computer Interaction (CHI, UIST) and Computer Vision (CVPR, ICCV, ECCV) are highly selective venues intended for archival papers only. These conferences exceed many journals in their selectivity, visibility, and impact. For a study of the impact of ACM conference proceedings, see Conference Paper Selectivity and Impact by Jilin Chen and Joseph Konstan.

[C.27] Xun Qian, Feitong Tan, Yinda Zhang, Brian Collins, Alex Olwal, David Kim, Karthik Ramani, and **Ruofei Du**. *ChatDirector: Enhancing Video Conferencing With Space-Aware Scene Rendering and Speech-Driven Layout Transition.* Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI), 2024.

[C.26] Xingyu "Bruce" Liu, Jiahao "Nick" Li, David Kim, Xiang 'Anthony' Chen, and **Ruofei Du**. *Human I/O: Towards a Unified Approach to Detecting Situational Impairments in Everyday Activities.* Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI), 2024.

[C.25] Siyou Pei, David Kim, Alex Olwal, Yang Zhang, and **Ruofei Du**. *UI Mobility Control in XR: Switching UI Positionings Between Static, Dynamic, and Self Entities.* Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI), 2024.

[C.24] Yiqin Zhao, Rohit Pandey, Yinda Zhang, **Ruofei Du**, Feitong Tan, Chetan Ramaiah, Tian Guo, and Sean Fanello. *Portrait Expression Editing With Mobile Photo Sequence.* SIGGRAPH Asia 2023 Technical Communications, 2023.

[C.23] Ziqian Bai, Feitong Tan, Zeng Huang, Kripasindhu Sarkar, Danhang Tang, Di Qiu, Abhimitra Meka, **Ruofei Du**, Mingsong Dou, Sergio Orts-Escolano, Rohit Pandey, Ping Tan, Thabo Beeler, Sean Fanello, and Yinda Zhang. *Learning Personalized High Quality Volumetric Head Avatars From Monocular RGB Videos.* 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

[C.22] Erzhen Hu, Jens Grnbk, Wen Ying, **Ruofei Du**, and Seongkook Heo. *ThingShare: Ad-Hoc Digital Copies of Physical Objects for Sharing Things in Video Meetings.* Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems, 2023.

[C.19] Onur Guleryuz, Philip Chou, Hugues Hoppe, Danhang Tang, **Ruofei Du**, Philip Davidson, and Sean Fanello. *Sandwiched Image Compression: Increasing the resolution and dynamic range of standard codecs.* 2022 Picture Coding Symposium (PCS), 2022. (Best Paper Finalist)

[C.18] Brandon Feng, Yinda Zhang, Danhang Tang, **Ruofei Du**, and Amitabh Varshney. *PRIF: Primary Ray-Based Implicit Function.* European Conference on Computer Vision (ECCV), 2022.

[C.17] Shengzhi Wu, Daragh Byrne, **Ruofei Du**, and Molly Steenson. *Slurp Revisited: Using Software Reconstruction to Reflect on Spatial Interactivity and Locative Media.* Proceedings of the Designing Interactive Systems Conference (DIS), 2022.

[C.16] Dhruv Jain, Khoa Nguyen, Steven Goodman, Rachel Grossman-Kahn, Hung Ngo, Aditya Kusupati, **Ruofei Du**, Alex Olwal, Leah Findlater, and Jon Froehlich. *ProtoSound: A Personalized and Scalable Sound Recognition System for Deaf and Hard of Hearing Users.* Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI), 2022.

[C.15] Zhang Chen, Yinda Zhang, Kyle Genova, Thomas Funkhouse, Sean Fanello, Sofien Bouaziz, Christian Haene, **Ruofei Du**, Cem Keskin, and Danhang Tang. *Multiresolution Deep Implicit Functions for 3D Shape Representation.* 2021 IEEE/CVF International Conference on Computer

Vision (ICCV), 2021.

[C.14] Zhenyi He, Keru Wang, Brandon Feng, **Ruofei Du**, and Ken Perlin. *GazeChat: Enhancing Virtual Conferences With Gaze Awareness and Interactive 3D Photos.* Proceedings of the 34th Annual ACM Symposium on User Interface Software and Technology (UIST), 2021.

[C.13] Onur Guleryuz, Philip Chou, Hugues Hoppe, Danhang Tang, **Ruofei Du**, Philip Davidson, and Sean Fanello. *Sandwiched Image Compression: Wrapping Neural Networks Around a Standard Codec.* 2021 IEEE International Conference on Image Processing (ICIP), 2021.

[C.12] Feitong Tan, Danhang Tang, Mingsong Dou, Kaiwen Guo, Rohit Pandey, Cem Keskin, **Ruofei Du**, Deqing Sun, Sofien Bouaziz, Sean Fanello, Ping Tan, and Yinda Zhang. *HumanGPS: Geodesic PreServing Feature for Dense Human Correspondence.* 2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021.

[C.11] Zhenyi He, **Ruofei Du**, and Ken Perlin. *CollaboVR: A Reconfigurable Framework for Multi-User to Communicate in Virtual Reality.* 2020 IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2020.

[C.9] **Ruofei Du**, David Li, and Amitabh Varshney. *Project Geollery.com: Reconstructing a Live Mirrored World with Geotagged Social Media.* The 24th International ACM Conference on 3D Web Technology (Web3D), 1–9, 2019.

[C.8] Yue Jiang, **Ruofei Du**, Christof Lutteroth, and Wolfgang Stuerzlinger. *ORC Layout: Adaptive GUI Layout with OR-Constraints.* Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI), Article 413, 1–12, 2019.

[C.6] **Ruofei Du**, Ming Chuang, Wayne Chang, Hugues Hoppe, and Amitabh Varshney. *Montage4D: Interactive Seamless Fusion of Multiview Video Textures.* Proceedings of the 2018 ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D), 124–133, 2018.

[C.5] Changqing Zou, Qian Yu, **Ruofei Du**, Haoran Mo, Yi-Zhe Song, Tao Xiang, Chengying Gao, Baoquan Chen, and Hao Zhang. *SketchyScene: Richly-Annotated Scene Sketches.* Proceedings of European Conference on Computer Vision (ECCV), 438–454, 2018.

[C.4] **Ruofei Du** and Amitabh Varshney. *Social Street View: Blending Immersive Street Views with Geo-tagged Social Media.* The 21st Annual International Conference on 3D Web Technology, 77–85, 2016. **Best Paper Award**.

[C.3] **Ruofei Du**, Sujal Bista, and Amitabh Varshney. *Video Fields: Fusing Multiple Surveillance Videos into a Dynamic Virtual Environment.* The 21st Annual International Conference on 3D Web Technology, 165–172, 2016.

[C.2] Lee Stearns, **Ruofei Du**, Uran Oh, Yumeng Wang, Leah Findlater, Rama Chellappa, and Jon E. Froehlich. *The Design and Preliminary Evaluation of a Finger-Mounted Camera and Feedback System to Enable Reading of Printed Text for the Blind.* In Proceeding of the European Conference on Computer Vision (ECCV) 2014 Workshops, 615–631, 2014.

[C.1] **Ruofei Du**, Renjie Liu, Tianxiang Wu, and Bao-Liang Lu. *Online Vigilance Analysis Combining Video and Electrooculography Features.* Neural Information Processing - 19th International Conference, 447–454, 2012.

Demonstrations

* I believe live demos play crucial roles in technical HCI and interactive graphics. They serve as vital bridge from idea to reality, from research to product, and gather real-world user insights by demonstrations. "Talk is cheap, show me the demo."

[D.7] **Ruofei Du**, Na Li, Jing Jin, Michelle Carney, Xiuxiu Yuan, Kristen Wright, Mark Sherwood, Jason Mayes, Lin Chen, Jun Jiang, Jingtao Zhou, Zhongyi Zhou, Ping Yu, Adarsh Kowdle, Ram Iyengar, and Alex Olwal. *Experiencing Visual Blocks for ML: Visual Prototyping of AI Pipelines.* Adjunct Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST), 2023.

[D.6] Xingyu "Bruce" Liu, Vladimir Kirilyuk, Xiuxiu Yuan, Alex Olwal, Peggy Chi, Xiang "Anthony" Chen, and **Ruofei Du**. *Experiencing Visual Captions: Augmented Communication With Real-time Visuals Using Large Language Models.* Adjunct Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST), 2023.

[D.5] **Ruofei Du**, Na Li, Jing Jin, Michelle Carney, Xiuxiu Yuan, Ping Yu, Ram Iyengar, Adarsh Kowdle, and Alex Olwal. *Experiencing Rapid Prototyping of Machine Learning Based Multimedia Applications in Rapsai.* Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, 2023.

[D.4] **Ruofei Du**, Alex Olwal, Mathieu Le Goc, Shengzhi Wu, Danhang Tang, Yinda Zhang, Jun Zhang, David Tan, Federico Tombari, and David Kim. *Opportunistic Interfaces for Augmented Reality: Transforming Everyday Objects Into Tangible 6DoF Interfaces Using Ad Hoc UI.* Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems, 2022.

[D.3] **Ruofei Du**, Eric Turner, Maksym Dzitsiuk, Luca Prasso, Ivo Duarte, Jason Dourgarian, Joao Afonso, Jose Pascoal, Josh Gladstone, Nuno Cruces, Shahram Izadi, Adarsh Kowdle, Konstantine Tsotsos, and David Kim. *Experiencing Real-Time 3D Interaction With Depth Maps for Mobile Augmented Reality in DepthLab.* Adjunct Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology, 2020.

[D.2] **Ruofei Du**, David Li, and Amitabh Varshney. *Experiencing a Mirrored World With Geotagged Social Media in Geollery.* Extended Abstracts of the CHI Conference on Human Factors in Computing Systems, INT040, 2019.

[D.1] **Ruofei Du**, Liang He. VRSurus. UIST 2016 Student Innovation Contest, Charlotte, NC, USA.

Short Papers / Late Breaking Work / Posters

[P.8] Xingyu "Bruce" Liu, Jun Zhang, Leonardo Ferrer, Susan Xu, Vikas Bahirwani, Boris Smus, Alex Olwal, and **Ruofei Du**. *Modeling and Improving Text Stability in Live Captions.* Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, 2023. *(Landed in the Live Transcription app with $\sim$ 1M DAUs)*

[P.7] David Li, Yinda Zhang, Christian Hne, Danhang Tang, Amitabh Varshney, and **Ruofei Du**. *OmniSyn: Intermediate View Synthesis Between Wide-Baseline Panoramas.* 2022 IEEE Conference on Virtual Reality and 3D User Interfaces, 2022.

[P.6] David Li, Eric Lee, Elijah Schwelling, Mason Quick, Patrick Meyers, **Ruofei Du**, and Amitabh Varshney. *MeteoVis: Visualizing Meteorological Events in Virtual Environments.* Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems, 1–9, 2020.

[P.5] **Ruofei Du**, David Li, and Amitabh Varshney. *Interactive Fusion of 360° Images for a Mirrored World.* The 26th IEEE Conference on Virtual Reality and 3D User Interfaces, 900–901, 2019.

[P.4] **Ruofei Du**, Eric Lee, and Amitabh Varshney. *Tracking-Tolerent Visual Cryptography.* The 26th IEEE Conference on Virtual Reality and 3D User Interfaces, 902–903, 2019.

[P.3] **Ruofei Du** and Liang He. *VRSurus: Enhancing Interactivity and Tangibility of Puppets in*

Virtual Reality. Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems, 2454–2461, 2016.

[P.2] **Ruofei Du**, Kent R. Wills, Max Potasznik, and Jon E. Froehlich. *AtmoSPHERE: Representing Space and Movement Using Sand Traces in an Interactive Zen Garden.* Proceedings of the 2015 CHI Conference Extended Abstracts on Human Factors in Computing Systems, 1627–1632, 2015.

[P.1] Leah Findlater, Lee Stearns, **Ruofei Du**, Uran Oh, David Ross, Rama Chellappa, and Jon E. Froehlich. *Supporting Everyday Activities for Persons With Visual Impairments Through Computer Vision.* In Proceedings of the 17th International ACM SIGACCESS Conference on Computers & Accessibility, 383–384, 2015.

Technical Reports

[T.4] Changqing Zou, Haoran Mo, **Ruofei Du**, Xing Wu, Chengying Gao, and Hongbo Fu. *LUCSS: Language-Based User-Customized Colourization of Scene Sketches.* arXiv:1808.10544, 2018.

[T.3] Weiwei Yang, Xuetong Sun, and **Ruofei Du**. *Learning Depression Patterns From MyPersonality and Reddit.* University of Maryland, College Park. Department of Computer Science, 2015

[T.2] **Ruofei Du**. *UistViz: 26 Years of UIST Coauthor Network Visualization.* University of Maryland, College Park. Department of Computer Science, 2013.

[T.1] Tiffany Chao, **Ruofei Du**, Jonathan Gluck, Hitesh Maidasani, Kent Wills, and Ben Shneiderman. *C-Flow: Visualizing Foot Traffic and Profit Data to Make Informative Decisions.* University of Maryland, College Park. Department of Computer Science, 2012

Patents

[PA.1] **Ruofei Du**, Varshney, A. *System and Methods for Generating A Social Street View.* US Patent 10,380,726. Issued. Priority date: March 20, 2015.

[PA.2] **Ruofei Du**, Chang, W., Cutler, B. *Fusing, Texturing, and Rendering Views of Dynamic Three-Dimensional Models.* US Patent 10,504,274. Issued. Priority date: January 5, 2018.

[PA.3] **Ruofei Du**, Amitabh Varshney *Interactive Mixed Reality Platform Utilizing Geotagged Social Media.* US Patent 16/734,290. US Patent 11,087,553. Issued. Priority date: January 4, 2019.

[PA.7] **Ruofei Du** and Alex Olwal. *Avatar Animation In Virtual Conferencing.* US 11,765,320. Issued. Priority date: August 11, 2021.

[PA.4] David Kim and **Ruofei Du**. *Geometry-Aware Augmented Reality Effects With a Real-Time Depth Map.* PCT/US2020/070094. (Pending)

[PA.5] **Ruofei Du** and David Kim. *Computational Photography Features With Depth.* PCT/US2020/070075. (Pending)

[PA.6] **Ruofei Du**, Hendrik Wagenaar, and Alex Olwal. *Foveated Beamforming for Augmented Reality Devices And Wearables.* US 17/446,877. (Pending)

[PA.8] Feitong Tan, Danhang Tang, Mingsong Dou, Kaiwen Guo, Rohit Pandey, Cem Keskin, **Ruofei Du**, Deqing Sun, Sofien Bouaziz, Sean Fanello, Ping Tan, and Yinda Zhang. *Systems and methods for training models to predict dense correspondences in images using geodesic distances.* WO 2922/188086. (Pending)

[PA.9] Onur Guleryuz, Philip Chou, Hugues Hoppe, Danhang Tang, **Ruofei Du**, Philip Davidson, and Sean Fanello. *End-to-end learning-based, eg neural network, pre-processing and post-processing*

optimization for image and video coding.. PCT/US2021/037593. (Pending)

[PA.10] **Ruofei Du**, Yinda Zhang, Weihao Zeng. *Computer vision models using global and local information.*. PCT/US2021/025044. (Pending)

[PA.11] Alex Olwal and **Ruofei Du**. *Attention Tracking to Augment Focus Transitions.* US Patent Application 17/933,631, 2022. (Pending)

[PA.12] Alex Olwal and **Ruofei Du**. *Anchored Messages for Augmented Reality.* US Patent Application 17/451,587, 2021. (Pending)

[PA.13] Alex Olwal and **Ruofei Du**. *Response to Sounds in an Environment Based on Correlated Audio and User Events.* US Patent Application 18/047,494, 2021. (Pending)

[PA.14] Alex Olwal and **Ruofei Du**. *Context-aided Identification.* US Patent Application 18/050,329, 2021. (Pending)

[PA.15] **Ruofei Du**, Alex Olwal, Mathieu Le Goc, David Kim, and Danhang Tang. *Tangible six-degree-of-freedom interfaces for augmented reality.* U.S. Patent Application 17/656,818. (Pending)

50+ more US Patent Applications are in pending status.

Professional Services

- **Associate Editor** for Frontiers in Virtual Reality, Technologies for VR.
- **Associate Editor** for IEEE Transactions on Circuits and Systems for Video Technology.
- **Associate Chair** on the Technical Program Committee (Blending Interaction) of ACM CHI 2024.
- **Associate Chair** on the Technical Program Committee of ACM UIST 2023.
- **Associate Chair** on the Technical Program Committee (Computational Interaction) of ACM CHI 2023.
- **Associate Chair** on the Technical Program Committee of ACM UIST 2022.
- **Associate Chair** on the Technical Program Committee (Engineering Interactive Systems and Technologies subcommittee) of ACM CHI 2021-2022.
- **Chair** for the "Learning in VR/AR/XR/Immersive Environments" session at ACM CHI 2023.
- **Chair** for the "XR Toolkit" session at ACM UIST 2022.
- **Chair** for the "AI: Content Generation" session at ACM CHI 2022.
- **Chair** for the "AR and VR" session at ACM CHI 2021.
- **Associate Chair** on the Late Breaking Work committee of ACM CHI 2020-2021.
- **Program Committee member** of ACM ICMI 2020-2023, ACM SIGGRAPH Asia 2020 XR Program.
- **Chair** for the "Augmented and Virtual Reality" session at ACM Web3D 2019.
- **Chair** for the "Making the Virtual Physical" session at ACM CHI 2019.
- **Judge** for SF Hacks 2019 and SF Hacks 2021.
- 10+ special recognitions for UIST, CHI, ISMAR, IMWUT reviews.
- Reviewer for over 300 journals and conference papers:
  ACM CHI 2013–2024; ACM UIST 2015, 2018–2024; ACM SIGGRAPH 2018, 2021-2022; ACM SIGGRAPH Asia 2018–2022; ACM ICMI 2019-2022; ACM Mobile HCI 2015–2018; ACM CSCW 2018–2019; ACM DIS 2018–2019; ACM IDC 2015–2016; ACM C&C 2015; ACM CHI Play 2015; IEEE TVCG 2020–2021; IEEE InfoVis and VAST 2018–2020; IEEE ISMAR 2015–2021; IEEE Virtual Reality and 3D User Interface 2018–2021; Graphical Interface 2016, 2019; CAD & Graphics 2017; EuroVis 2019.
- Student Volunteer: ACM CHI 2014, Toronto, Canada.

Honors and Awards

IMWUT Distinguished Paper Award for RetroSphere. Oct. 2023

Honorable Mentions Award (top 5%) for Rapsai at ACM CHI 2023. Apr. 2023
Best Paper Finalist at the IEEE Picture Coding Symposium 2022. Dec. 2022
TVCG Honorable Mentions Award at the IEEE Virtual Reality Conference 2021. Apr. 2021
Best Student Poster Award for spherical harmonics saliency at ACM I3D 2018. May. 2018
Best Paper Award at the 21st International Conference on 3D Web Technology. Aug. 2016
Volunteer Star Award for Excellent Service at the World EXPO 2010. Oct. 2010
Bronze Medalist in Asia-Pacific Informatics Olympiad (APIO 2008) Apr. 2008
Bronze Medalist in Chinese Team Selection Contest in Informatics (CTSC 2008) Apr. 2008
Bronze Medalist in National Olympiad in Informatics (NOI 2008) Aug. 2008
First Prizes & Top 3 in National Olympiad in Informatics in Province (NOIP) 2005-2007

Supervision and Teaching

- Xun Qian (Purdue Ph.D., Google Research Intern, 2022; Full-time Research Scientist, 2023-Now)
- Ph.D. Dissertation Committee: David Li (UMD Ph.D. candidate)
- M.S. Dissertation Committee: Shivesh Jadon (University of Calgary, advised by Ryo Suzuki)
- Doga Dogan (MIT Ph.D., Google Student Researcher, 2023-2024)
- Erzhen Hu (University of Virginia Ph.D. student, Google Student Researcher, 2022-2024)
- Safa Medin (MIT Ph.D. candidate, Google Student Researcher, 2023-2024)
- Zhongyi Zhou (University of Tokyo Ph.D. candidate, Google Student Researcher, 2023-2024)
- Fengyuan Zhu (University of Toronto Ph.D. candidate, Google Student Researcher, 2023-2024)
- Karl Rosenberg (New York University Ph.D., Google Research Intern, 2023)
- Bruce (Xingyu) Liu (UCLA Ph.D. student, Google Student Researcher, 2022-2023)
- Siyou Pei (UCLA Ph.D. candidate, Google Student Researcher, 2022-2023)
- Brandon (Yushan) Feng (UMD Ph.D., Google Research Intern, 2022)
- Dhruv (DJ) Jain (UW Ph.D., Google Research Intern, 2021, Assistant Professor at University of Michigan)
- Anuva Kulkarni (CMU Ph.D., Google SWE, 2022-Now)
- Jun Zhang (Google SWE, 2020-Now)
- David Li (UMD Ph.D. candidate, Google Research Intern, 2020)
- Ananta Narayanan Balaji (National University of Singapore, Google Research Intern, 2020)
- Weihao (Zack) Zeng (UCSD B.S. student, Google intern, 2020)
- Feitong Tan (SFU Ph.D. student, Google Student Researcher, 2020)
- Chen Zhang (UCSD B.S. student, Google Research Intern, 2020)
- Keru Wang (NYU Ph.D. student)
- Zhenyi He (NYU Ph.D., Research Scientist at Huawei)
- Xiaoxu Meng (Ph.D., Research Scientist at Tencent)
- Mukul Agarwal (M.S., AR Product Designer at Amazon)
- Akanksha Shrivastava (M.S., Senior Product Manager at Walmart Labs)
- Corey Ferrick (B.S., Intellectual Property Analyst at UMD)
- Undergraduate Thesis Proposal Committee Member for: Naeem Alam, Teddy Corrales, Erin Estes, Erick Guzman, Kevin Ho, Austin Hom, Mughil Muthupari, Justin Pan, Justin Shen (Gemstone Project, University of Maryland, College Park)

- **Gesture Lecturer** for Human-Centered AI at Stanford (CS 139).
- **Teaching Lead** for Data Structures (CMSC 420) and Computer Architecture (CMSC 411).
- Teaching Assistant for Data Structures and Algorithms (CS 484 in ACM Class) and Object Oriented Programming I-II (CMSC 131-132).

Media Coverage

- See `https://duruofei.com/media/` for the latest tracking of media coverage in my work.

- Bloomberg May 11, 2022.
  Google Shows Early Preview of Augmented Reality Glasses (Google AR)
- Marktechpost May 11, 2022.
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Presentations

- Visual Blocks for ML: Visual Prototyping of AI Pipelines

Stanford, Palo Alto, California, USA.

- Augmented Communication for a Universally Accessible Metaverse
  University of Maryland, College Park, USA.
- Interactive Perception & Graphics for a Universally Accessible Metaverse
  University of Virginia CS Fall 2023 Distinguished Speakers, Charlottesville, Virginia, USA.
- Rapsai: Accelerating Machine Learning Prototyping of Multimedia Applications through Visual Programming
  ACM CHI 2023, Hamburg, Germany, Apr. 27, 2023.
- Visual Captions: Augmenting Verbal Communication With On-the-fly Visuals
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- Interactive Graphics for a Universally Accessible Metaverse.
  UICC 2023 sponsored by University of Iowa ACM Student Chapter., Iowa City, Iowa, Feb. 24, 2022.
- Interactive Graphics for a Universally Accessible Metaverse.
  University of Maryland, College Park. Hosted by Prof. Amitabh Varshney. Nov. 28, 2022.
- Computational Interaction for a Universally Accessible Metaverse.
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- Polymerizing Physical and Virtual Worlds into An Interactive Metaverse.
  Birmingham City University. Hosted by Prof. Arthur Theil. June 20, 2022.
- Fusing Physical and Virtual Worlds into An Interactive Metaverse.
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- Opportunistic Interfaces for Augmented Reality: Transforming Everyday Objects Into Tangible 6DoF Interfaces Using Ad Hoc UI
  ACM CHI 2022. New Orleans. May 2, 2022.
- Polymerizing Physical and Virtual Worlds into An Interactive Metaverse
  University of Calgary, Canada. Invited by Prof. Ryo Suzuki. 2021.
- Fusing Physical and Virtual Worlds Into Interactive Mixed Reality.
  George Mason University. Invited by Prof. Bo Han. March 19, 2021.
- DepthLab: Real-Time 3D Interaction With Depth Maps for Mobile Augmented Reality.
  ACM UIST 2020. Remote Presentation. October 22, 2020.
- Experiencing Real-Time 3D Interaction With Depth Maps for Mobile Augmented Reality in DepthLab.
  ACM UIST 2020. Remote Presentation. October 23, 2020.
- Project Geollery.com: Reconstructing a Live Mirrored World with Geotagged Social Media.
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- Geollery: A Mixed Reality Social Media Platform.
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- Experiencing a Mirrored World With Geotagged Social Media in Geollery.
  ACM CHI 2019. Glasgow, UK. May 19, 2019.
- Interactive Fusion of 360 Images for a Mirrored World.
  IEEE VR 2019. Osaka, Japan. March 25, 2019.
- Tracking-Tolerent Visual Cryptography
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- Fusing Multimedia Data Into Dynamic Virtual Environments.
  Ph.D. Dissertation, University of Maryland, College Park. October 19, 2018.
- Fusing Multimedia Data Into Dynamic Virtual Environments.
  Facebook Reality Labs, Redmond, WA, USA. November 7, 2018.
- Fusing Multimedia Data Into Dynamic Virtual Environments.
  Google, Mountain View, CA, USA. September 21, 2018.
- Montage4D: Interactive Seamless Fusion of Multiview Video Textures.
  ACM I3D 2018, Montreal, Quebec, Canada. May 17, 2018.
- A Pilot Study of Spherical Harmonics for Saliency Computation and Navigation in 360° Videos.
  ACM I3D 2018, Montreal, Quebec, Canada. May 16, 2018.
- Improving the Visual Quality of Mobile Holoportation.

Microsoft Research, Redmond, WA. August 18, 2017.

- VRSurus: Enhancing Interactivity and Tangibility of Puppets in Virtual Reality. *ACM CHI 2016, San Jose, CA, USA. May 7-12, 2016.*
- AtmoSPHERE: Representing Space and Movement Using Sand Traces in an Interactive Zen Garden. *ACM CHI 2015, Seoul, Korea. April 18-23, 2015.*
- Social Street View: Blending Immersive Street Views with Geo-tagged Social Media. *SIGGRAPH Web3D 2016, Anaheim, CA. July 23, 2016. Best Paper Award.*
- Video Fields: Fusing Multiple Surveillance Videos into Dynamic Virtual Environments. *SIGGRAPH Web3D 2016 Anaheim, CA. July 24, 2016.*

Skills

- Programming: C++, C, Python, Java, PHP, JavaScript, SQL, C#, and Objective-C.
- Visual Computing: CUDA, GLSL, HLSL, OpenGL, OpenCV, TensorFlow, and Unity.
- Domain Knowledge: Computer Graphics, Computer Vision, Computational Geometry, Virtual and Augmented Reality, Human-Computer Interaction, GPU Algorithms, Social Media, Chatbot, Applications of Large Language Models, WebML, and Information Visualization.

Open Sourced Software

- ARChat: A Rapid Prototyping Platform for Augmented Communication. https://github.com/google/archat
- Visual Blocks: Visual Prototyping of AI Pipelines https://github.com/google/visualblocks
- Portrait Depth API: Turning a Single Image into a 3D Photo with TensorFlow.js. https://github.com/tensorflow/tfjs-models/tree/master/depth-estimation
- DepthLab: Real-Time 3D Interaction With Depth Maps for Mobile Augmented Reality. https://github.com/googlesamples/arcore-depth-lab
- Foveated 360 Video. https://github.com/AugmentariumLab/foveated-360-video
- DuEngine: An efficient and interactive C++ graphics engine. https://github.com/ruofeidu/DuEngine
- DuBibtex: Inpainting unique, complete, and clean BibTeX references. https://github.com/ruofeidu/DuBibtex
- DuCrawler: Mining images from Google and Bing search engines. https://github.com/ruofeidu/DuCrawler
- Language-based Colorization of Scene Sketches. https://github.com/SketchyScene/SketchySceneColorization
- SketchyScene: Richly-Annotated Scene Sketches. https://github.com/SketchyScene/SketchyScene
- VRSurus: Enhancing Interactivity and Tangibility of Puppets in Virtual Reality. https://github.com/ruofeidu/VRSurus
- SketchyScene: Richly-Annotated Scene Sketches. https://github.com/SketchyScene/SketchyScene
- HandSight: An iPad prototype for evaluating using finger-mouted camera with vibration feedback system to enable reading of printed text for people with visual impairments. https://github.com/ruofeidu/HandSight

References

- Dr. Shahram Izadi
  Vice President, Google, CA, USA.
- Dr. David Kim
  AR Prototyping Lead, Google, Zurich.
- Dr. Alex Olwal
  Senior Staff Research Scientist, Google, CA, USA.
- Dr. Hugues Hoppe
  Independent Researcher, WA, USA.
- Prof. Amitabh Varshney

Dean of the College of Computer, Mathematical and Natural Sciences and Professor of Computer Science, University of Maryland, College Park, MD, USA.

- Dr. Norm Whitaker
  Distinguished Scientist and Managing Director, Microsoft Research, Redmond, WA, USA.
- Prof. Wolfgang Steurzlinger
  Professor at the School of Interactive Arts and Technology, Simon Fraser University, Vancouver, Canada.
- Dr. Ken Perlin
  Professor at the New York University, USA.
- Prof. Timo Ojala
  Professor and Director of Center of Ubiquitous Computing, Faculty of Information Technology and Electrical Engineering, University of Oulu, Finland.
- Dr. Koji Yatani
  Associate Professor at the University of Tokyo.
- Prof. Bao-Liang Lu
  Professor at the Department of Computer Science and Engineering, Shanghai Jiao Tong University, China.
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