

# Ruofei Du

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- CAREER GOAL**      Inventing future technologies in interactive 3D graphics, fusing the information from both the physical and virtual worlds, and making it interactive, accessible, and useful in VR, AR, and MR.
- EDUCATION**      **University of Maryland**, College Park, Maryland, USA      Sep. 2013 - Dec. 2018  
Ph.D. and M.S. in Computer Science, GPA: 3.9 / 4.0. Advisor: Prof. Amitabh Varshney  
Dissertation: Fusing Multimedia Data Into Dynamic Virtual Environments
- ACM Honored Class, Shanghai Jiao Tong University**, China      Sep. 2009 - Jul. 2013  
B.S. in Computer Science. GPA: 88.0 / 100.0. Advisor: Prof. Bao-Liang Lu  
Thesis: Research on Fatigue Driving Detection System Based on Video Signals
- RESEARCH EXPERIENCE**      **Research Scientist at Google, San Francisco**      Jan. 2019 - Present
- Google Research profile: <https://research.google/people/RuofeiDu>
  - Research Lead of ARCore Depth Lab.
  - Key contributor to uDepth: Real-time 3D Depth Sensing on the Pixel 4
  - Key contributor to ARCore Depth API, covered by The Verge, Engadget, CNET, ZDNet, etc.
- Research Intern at Microsoft AI+Research, Redmond (MSR)**      May – Aug. 2017
- Lead of Montage4D for fusing multiview videos in real time with two papers published.
- Research Intern at Microsoft Research, Redmond (MSR)**      May – Aug. 2016
- Key contributor of Mobile Holoportation, demoed to Microsoft CEO, and filed a US patent.
- Research Assistant at UMIACS**      Aug. 2013 – Dec. 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.
  - **Best Poster Award** for applying spherical harmonics to real-time saliency maps for 360° videos.
  - HandSight: Real-time text-to-speech with finger-mounted camera for *people who are blind*.
- Research Intern at Microsoft Research Asia (MSRA)**      Jul. 2012 - Feb. 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)**      Jul. 2011 - Jul. 2013
- **Second Prize Award** on the China International Industry Fair (CIIF) in November, 2011.
- REPRESENTATIVE PUBLICATIONS**      [C.11] **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), 2020.
- [C.10] **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.
- [J.6] **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), 2019.

JOURNAL  
PUBLICATIONS

[J.5] Xiaoxu Meng, **Ruofei Du**, Joseph F. JaJa, Amitabh Varshney. *3D-Kernel Foveated Rendering for Light Fields*. IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 26, No. 6, 1–11, 2020.

[J.4] Xiaoxu Meng, **Ruofei Du**, Amitabh Varshney. *Eye-dominance-guided Foveated Rendering*. IEEE Transaction on Visualization and Computer Graphics (TVCG), Vol. 26, No. 5, 1–9, 2020.

[J.3] Changqing Zou, Haoran Mo, Chengying Gao, **Ruofei Du**, Hongbo Fu. *Language-based Colorization of Scene Sketches*. ACM Transaction on Graphics (SIGGRAPH Asia), Vol. 38, No. 6, Article 233, 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, 1(5), 2018.

[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, 8(5), 1–38, 2016.

CONFERENCE  
PUBLICATIONS

[C.9] Zhenyi He, **Ruofei Du**, and Ken Perlin. *CollaboVR: A Reconfigurable Framework for Multi-User to Communicate in Virtual Reality*. 2019 IEEE International Symposium on Mixed and Augmented Reality, 2020.

[C.8] **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, 1–9, 2019.

[C.7] 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, 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 [D.2] **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.1] **Ruofei Du**, David Li, and Amitabh Varshney. *Experiencing a Mirrored World With Geo-tagged Social Media in Geollery*. Extended Abstracts of the CHI Conference on Human Factors in Computing Systems, INT040, 2019.

POSTERS [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-Tolerant 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 Potaszniak, 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.

PATENTS [PA3] **Du, R.**, Varshney, A. *System and Methods for Generating A Social Street View*. US Patent 10,380,726. Granted. Priority date: March 20, 2015.

[PA2] **Du, R.**, Chang, W., Cutler, B. *Fusing, Texturing, and Rendering Views of Dynamic Three-Dimensional Models*. US Patent 10,504,274. Granted. Priority date: January 5, 2018.

[PA1] **Du, R.**, Varshney, A. *System and Methods for Rendering Virtual Environments for Social Interaction*. US Provisional Patent 62/788,577. Filed.

HONORS AND AWARDS **Best Paper Award** at the 21st International Conference on 3D Web Technology. Aug. 2016  
**Best Student Poster Award** for spherical harmonics saliency at ACM I3D 2018. May. 2018  
**Volunteer Star Award** for Excellent Service in 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 Nation Olympiad in Informatics (NOI 2008) Aug. 2008  
**First Prizes & Top 3** in Nation Olympiad in Informatics in Province (NOIP) 2005-2007

PROFESSIONAL SERVICES

- Associate Chair on the Technical Program committee (Engineering Interactive Systems and Technologies subcommittee) of ACM CHI 2021.
- Associate Chair on the Late Breaking Work committee of ACM CHI 2020.
- Program Committee member of ACM ICMI 2020.
- 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.
- Reviewer for over 100 journals and conference papers:  
ACM CHI 2013–2020, ACM SIGGRAPH 2018, ACM SIGGRAPH Asia 2018–2019, ACM UIST 2015, 2018–2019, ACM Mobile HCI 2015–2018, ACM CSCW 2018–2019, ACM ICMI 2019, ACM DIS 2018–2019, ACM IDC 2015–2016, ACM C&C 2015, ACM CHI Play 2015; IEEE InfoVis and VAST 2018–2020, IEEE ISMAR 2015–2019, IEEE Virtual Reality and 3D User Interface 2018–2019; Graphical Interface 2016, 2019; CAD & Graphics 2017; EuroVis 2019.
- Student Volunteer: ACM CHI 2014, Toronto, Canada.

SUPERVISION AND TEACHING

- Xiaoxu Meng (UMD Ph.D. Candidate)
- David Li (UMD Ph.D. Student)
- Mukul Agarwal (UMD M.S.)
- Akanksha Shrivastava (UMD M.S.)
- Corey Ferrick (UMD B.S.)
- Naeem Alam, Teddy Corrales, Erin Estes, Erick Guzman, Kevin Ho, Austin Hom, Mughil Muthupari, Justin Pan, Justin Shen (Gemstone Project, Undergraduate Thesis Proposal Committee)
- Teaching Lead for Data Structures (CMSC 420) and Computer Architecture (CMSC 411).
- Teaching Assistant for Data Structures and Algorithms (CS 484) and Object Oriented Programming I-II (CMSC 131-132).

MEDIA COVERAGE

- Engadget Dec 9, 2019.  
*Google's new depth feature makes its AR experiences more realistic ([ARCore](#))*
- CNET Dec 9, 2019.  
*Google's new phone AR update can hide virtual things in the real world ([ARCore](#))*
- VentureBeat Dec 9, 2019.  
*Googles ARCore Depth API enables AR depth maps and occlusion with one camera ([ARCore](#))*
- The Verge Dec 9, 2019.  
*Google shows off stunning new AR features coming to web and mobile apps soon ([ARCore](#))*
- Science X May 7, 2019.  
*New open source software eases the pain of multiple UI designs (Project [ORC Layout](#))*
- University of Maryland Institute for Advanced Computer Studies. January 2, 2019.  
*Augmentarium Alumnus Imagines an Immersive World (Project [Geollery](#))*
- Division of Research, University of Maryland. March 30, 2017.  
*UMD Researchers Create Affordable Camera Array That Captures Light Fields for Virtual Reality*
- Big Ten Network. October 13, 2017.  
*How Maryland Researchers Are Improving Reading For The Visually Impaired.*
- TERP Magazine. June 9, 2017.  
*A New Way With Words*
- WUSA9. June 15, 2017.  
*UMD Researchers Hope To Help The Blind 'Experience the World'*
- Futurism. November 15, 2016.  
*This New Tech Is Letting Blind People Read Without Braille*
- PSFK. November 15, 2016.  
*Fingertip Cameras May Help The Blind Read Without Braille*
- PC Magazine. November 10, 2016.  
*Fingertip Camera Reads to the Blind*
- New Scientist. November 10, 2016.

- Tiny Fingertip Camera Helps Blind People Read Without Braille*
- University of Maryland Institute for Advanced Computer Studies. August 5, 2016.  
*Varshney and Graduate Student Du Win Best Paper Award at 2016 Web3D Conference*
  - University of Maryland, College Park. July 28, 2015.  
*CompSci Connect Students Present Projects, Explore Virtual and Augmented Reality*
  - Microsoft Research Asia. January 17, 2013.  
*Finding Insights in Diverse Networks* (Project UISTViz)
  - The Seattle Times. March 5, 2013.  
*TechFest Gives Glimpse of Microsofts Future* (Project 3DVAR)
  - Microsoft Research Asia. January 17, 2013.  
*Champion Demo at Student TechFest (In Chinese)* (Project 3DVAR)
  - Shanghai Jiao Tong University News May 30 2011.  
*Lab Inspection by The Ministry of Education in China. (In Chinese)* (Project 3DEye)

#### PRESENTATIONS

- Project Geollery.com: Reconstructing a LiveMirrored World with Geotagged Social Media.  
*ACM Web3D 2019. Los Angeles, CA. July 27, 2019.*
- Geollery: A Mixed Reality Social Media Platform.  
*ACM CHI 2019. Glasgow, UK. May 19, 2019.*
- 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  
*IEEE VR 2019. Osaka, Japan. March 25, 2019.*
- 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, Human-Computer Interaction, GPU Algorithms, Social Media, Chatbot, and Information Visualization.

#### OPEN SOURCED SOFTWARE

- 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-mounted 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  
Director of Research and Engineering, Google, CA, USA.
- Dr. David Kim  
Research Scientist and Software Engineer Manager, Google, CA, USA.
- Dr. Hugues Hoppe  
Principle Research Scientist, Google, 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.
- Dr. Wolfgang Steurzlinger  
Professor at the School of Interactive Arts and Technology, Simon Fraser University, Vancouver, Canada.
- Prof. Baoquan Chen  
Professor at the School of Electrical Engineering and Computer Science and Director of the Center on Frontiers of Computing Studies, Peking University, Beijing, China.
- Prof. Timo Ojala  
Professor and Director of Center of Ubiquitous Computing, Faculty of Information Technology and Electrical Engineering, University of Oulu, Finland.
- Prof. Bao-Liang Lu  
Professor at the Department of Computer Science and Engineering, Shanghai Jiao Tong University, China.
- Prof. Yong Yu  
Professor at the Department of Computer Science and Engineering, Shanghai Jiao Tong University, China.