

Ruofei Du

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- RESEARCH FIELDS** **Virtual & Augmented Reality:** geo-spatial mixed-reality, multiview and 360° videos.
Computer Graphics and Vision: real-time 4D reconstruction, CUDA, and foveated rendering.
- EDUCATION** **University of Maryland**, College Park, Maryland, USA Sep. 2013 - Dec. 2018
Ph.D., Computer Science, GPA: 3.9 / 4.0. Advisor: Prof. Amitabh Varshney
- ACM Honored Class, Shanghai Jiao Tong University**, China Sep. 2009 - Jul. 2013
B.S., Computer Science. GPA: 88.0 / 100.0. Advisor: Prof. Bao-Liang Lu
- PROFESSIONAL EXPERIENCE** **Google** Jan. 2019 - Present
Research Scientist at Google, San Francisco, CA.
- Research areas: VR, AR, 3D reconstruction, hand tracking, and natural user interfaces.
- Microsoft Research, Redmond (MSR)** May. - Aug. 2016 and 2017
Research Intern advised by Ben Cutler, Sameh Khamis, Shahram Izadi, and Hugues Hoppe.
- Developed and published Montage4D for fusing multiview video textures in real time.
 - Collaborated on Mobile Holoportation, demoed at TechFest, and filed patents. (C++, CUDA)
- Institute for Advanced Computer Studies, University of Maryland (UMIACS)**
Research Assistant at Augmentarium Lab advised by Dr. Varshney Dec. 2014 - present
- Geollery.com: A mixed reality social platform with 3D buildings, street views, and social media.
 - **Best Paper Award** for SocialStreetView.com at ACM Web3D 2016, Anaheim, California.
 - Spherical Harmonics for real-time saliency computation in 360° videos. **Best Poster Award**
 - Kernel Foveated Rendering for accelerating deferred shading, light fields, and ray tracing.
 - VideoFields.com: Rendering surveillance videos with automatic segmentation in virtual reality.
 - DuEngine: Opensourced C++ renderer on Github for real-time ray marching, lightfields, etc.
 - 4D reconstruction, light field compression, CNN denoising, GAN, and visual cryptography.
- Research Assistant at Makeability Lab, HCIL advised by Dr. Froehlich* Aug. 2013 - Dec. 2014
- HandSight: Realtime OCR with finger-mounted camera and haptics feedback for 20+ blind users.
 - AtmoSPHERE: A tangible interactive visualization system to represent human traces via Kinect.
- Microsoft Research Asia (MSRA)** Jul. 2012 - Feb. 2013
Research Intern co-advised by Zhiwei Li, Rui Cai, and Lei Zhang
- 3DVAR: Developed a real-time virtual and augmented reality demo for Microsoft TechFest.
 - StereoScanner: Co-implemented a real-time SfM-based 3D surface reconstruction system.
 - **Best Demo Award** in MSRA Intern Techfest 2013; Presented at Microsoft Techfest 2013.
- SELECTED PUBLICATIONS** **Du, R.**, Li, D., Varshney, A. *Geollery: Designing an Interactive Mirrored World with Geotagged Social Media*. To appear in the ACM CHI Conference on Human Factors in Computing Systems, pp. 1–12, 2019. [[Web](#)]
- Jiang, Y., **Du, R.**, Lutteroth, C., Stuerzlinger, W. *ORC Layout: Adaptive GUI Layout with OR-Constraints*. To appear in the ACM CHI Conference on Human Factors in Computing Systems, pp. 1–12, 2019.
- Du, R.**, Chuang, M., Chang, W., Hoppe, H., Varshney, A. *Montage4D: Real-time Seamless Fusion and Stylization of Multiview Video Textures*. In Journal of Computer Graphics Techniques, 7(4),

pp. 1–34, 2018. [[PDF](#)] [[Web](#)] [[Video](#)] [[Slides](#)]

Du, R., Chuang, M., Chang, W., Hoppe, H., Varshney, A. *Montage4D: Interactive Seamless Fusion of Multiview Video Textures*. In proceedings of the 2018 ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D), pp. 124–133, 2018. [[PDF](#)] [[Web](#)] [[Video](#)] [[Slides](#)]

Meng, X., **Du, R.**, Zwicker, M., Varshney, A. *Kernel Foveated Rendering*. In proceedings of the ACM on Computer Graphics and Interactive Techniques, 1(5), pp. 1–20, 2018. [[PDF](#)] [[Video](#)] [[Slides](#)]

Zou, C.Q., Yu, Q., **Du, R.**, Mo, H.R., Song, Y.Z., Xiang, Tao, Gao, C., Chen, B., Zhang, H. *SketchyScene: Richly-Annotated Scene Sketches*. In Proceedings of European Conference on Computer Vision (ECCV), 2018. [[PDF](#)] [[Github](#)]

Zou, C.Q., Mo, H.R., **Du, R.**, Gao, C.Y., Wu, X., Fu, H.B. *LUCCS: Language-based User-customized Colorization of Scene Sketches*. arXiv preprint arXiv:1808.10544 (2018). [[PDF](#)]

Du, R., Varshney, A. *Social Street View: Blending Immersive Street Views with Geo-tagged Social Media*. In Proceedings of the 21st Annual ACM SIGGRAPH Web3D Conference, 2016. pp. 77–85. ACM. [[Demo/Code](#)] [[Video](#)] [[PDF](#)] [[Slides](#)] (**Best Paper Award**)

Du, R., Bista, S., Varshney, A. *Video Fields: Fusing Multiple Surveillance Videos into a Dynamic Virtual Environment*. In proceedings of the 21st Annual ACM SIGGRAPH Web3D Conference, 2016. pp. 165–172. ACM. [[Video](#)] [[PDF](#)] [[Slides](#)] [[Data](#)]

Stearns, L., **Du, R.**, Oh, U., Catherine, Z., Findlater, L., David, R., Froehlich, J.E. *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), pp. 1–38. 2016.

Du, R., He, L. *VRSurus: Enhancing Interactivity and Tangibility of Puppets in Virtual Reality*. In Proceeding of the of CHI '16 Extended Abstracts on Human Factors in Computing Systems. pp. 2454–2461. ACM. [[PDF](#)] [[Poster](#)] [[Github](#)] [[Video](#)] (Live demo presented at ACM UIST 2016)

Du, R., Wills, K., Potasznik, M, Froehlich, J.E. *AtmoSPHERE: Representing Space and Movement Using Sand Traces in an Interactive Zen Garden*. In Proceeding of the of CHI '15 Extended Abstracts on Human Factors in Computing Systems. pp. 1627–1632. ACM. [[PDF](#)] [[Poster](#)] [[Video](#)]

Stearns, L., **Du, R.**, Oh, U., Wang, Y., Findlater, L., Chellappa, R., Froehlich, J.E. *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. pp. 615–631. 2014. [[PDF](#)] [[Video](#)]

Du, R., Liu, R., Wu, T., Lu, B.L. *Online Vigilance Analysis Combining Video and Electrooculography Features*. In Proceeding of the 19th International Conference on Neural Information Processing (ICONIP '12), vol. V, pp. 447–453, 2012. [[PDF](#)] [[Slides](#)] [[Video](#)]

PATENTS

- **Du, R.**, Varshney, A. *System and Methods for Social Street View*. US Patent App. 15/559,955.
- **Du, R.**, Chang, W., Cutler, B. *Fusing, Texturing, and Rendering Views of Dynamic Three-Dimensional Models*. US Patent Pending.

HONORS AND AWARDS

Best Student Poster Award for spherical harmonics saliency at ACM I3D 2018. May. 2018
Summer Research Fellowship from the University of Maryland. Summer 2018
Outstanding Research Assistant Award from the University of Maryland. May. 2017

Invention of the Year Finalist for our invention to acquire virtual environments. Feb. 2017
Best Paper Award from ACM SIGGRAPH Web3D Conference. August. 2016
4th Place UIST 2015 Student Innovation Contest. Oct. 2015
Dean Scholarship from UMD Department of Computer Science. Oct. 2013, 2014
Bosch Scholarship (2 out of 300) in Shanghai Jiao Tong University Nov. 2012
Volunteer Star Award for Excellent Service in the World EXPO 2010. Oct. 2010
Schneider Electric Scholarship (1 out of 30 in the ACM Class) Dec. 2010
Bronze Medalist in Chinese Team Selection Contest in Informatics (CTSC 2008) Apr. 2008
Bronze Medalist in Asia-Pacific Informatics Olympiad (APIO 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 SERVICE

- Reviewer for 50+ papers: ACM SIGGRAPH 2018, SIGGRAPH Asia 2018, SIGCHI 2013-2019, UIST 2018, Mobile HCI 2015-2018, IDC, CSCW, DIS, C&C; IEEE InfoVis, VAST, ISMAR, VR 2018-2019; CGI, CAD&CG.
- Teaching Assistant: Data Structures and Algorithms (CS 484), Data Structures (CMSC 420), Computer Architecture (CMSC 411), and Object Oriented Programming I-II (CMSC 131-132).
- Student Volunteer: ACM CHI 2014.

SKILLS

- Programming: C++/ C, Python, Java, PHP, JavaScript, SQL, C# / Objective-C
- Graphics and Vision: CUDA, GLSL, OpenGL, OpenCV, Tensorflow, SVM
- Graduate Courses: Graphics, Vision, Geometry, NLP, HCI, Information Visualization.

MEDIA COVERAGE

- Division of Research, University of Maryland. March 30, 2017.
UMD Researchers Create Affordable Camera Array That Captures Light Fields for Virtual Reality
- 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 (UISTViz Tech Report)
- The Seattle Times. March 5, 2013.
TechFest Gives Glimpse of Microsofts Future (3DVAR Project)
- Microsoft Research Asia. January 17, 2013.
Champion Demo at Student TechFest (In Chinese) (3DVAR Project)
- Shanghai Jiao Tong University News May 30 2011.
Lab Inspection by The Ministry of Education in China. (In Chinese) (3DEye Project)

PRESENTATIONS

- Fusing Multimedia Data Into Dynamic Virtual Environments.
University of Maryland, College Park. Oct 19, 2018.
- Montage4D: Interactive Seamless Fusion of Multiview Video Textures.
Montreal, Quebec, Canada. May 17, 2018.
- Improving the Visual Quality of Mobile Holoportation.
Microsoft Research, Redmond, WA. August 18, 2017.
- Social Street View: Blending Immersive Street Views with Geo-tagged Social Media.
SIGGRAPH Web3D 2016, Anaheim, CA. July 23, 2016.
- Video Fields: Fusing Multiple Surveillance Videos into Dynamic Virtual Environments.
SIGGRAPH Web3D 2016 Anaheim, CA. July 24, 2016.