

R&D INTERESTS

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: 3.90 / 4.00. Advisor: Dr. Amitabh Varshney

ACM Honored Class, Shanghai Jiao Tong University, China Sep. 2009 - Jul. 2013
 B.S., Computer Science. GPA: 88.0 / 100.0.

RESEARCH EXPERIENCE

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)

Research Intern co-advised by Zhiwei Li, Rui Cai, and Lei Zhang Jul. 2012 - Feb. 2013

- 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.

PUBLICATIONS

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](#)]

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**)

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., 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 Filed.
- **Du, R.**, Chang, W., Cutler, B. *Fusing, Texturing, and Rendering Views of Dynamic Three-Dimensional Models*. US Patent Filed.

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
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; IEEE InfoVis, ISMAR, VR; CGI, CAD&CG.

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, Infomation Visualization.