

RESEARCH INTERESTS

Virtual & Augmented Reality: geo-spatial mixed-reality, multiview videos, and panoramas.
Computer Graphics and Vision: real-time 4D reconstruction, CUDA, and foveated rendering.

EDUCATION

University of Maryland, College Park, Maryland, USA Sep. 2013 - present
 Ph.D. Candidate, M.S. in 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, GRE: 1520 / 1600.

RESEARCH EXPERIENCE

Microsoft Research, Redmond (MSR) May. - Aug. 2016 and 2017
Research Intern advised by Sameh Khamis, Shahram Izadi, Ben Cutler, and Hugues Hoppe.

- Developed and published Montage4D for fusing multiview video textures in real time.
- Shipped Mobile Holoportation, demoed at TechFest 2018, and filed patents. (C++, CUDA, HLSL)

Institute for Advanced Computer Studies, University of Maryland (UMIACS)

Research Assistant at Augmentarium Lab advised by Dr. Varshney Dec. 2014 - present

- SocialStreetView.com: The first system blending street views and geo-tagged social media in 3D.
 - **Best Paper Award** at ACM Web3D 2016, Anaheim, California.
- Kernel Foveated Rendering for accelerating deferred shading, light fields, and ray tracing.
- VideoFields.com: Rendering surveillance videos with automatic segmentation in virtual reality.
- VRSurus.com: Tangible puppets with gestures recognition and haptic feedback demoed at UIST.
- 4D reconstruction, light field compression, deep learning in graphics, 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.

PEER-REVIEWED PAPERS

Du, R., Chuang, M., Chang, W., Hoppe, H., Varshney, A. *Montage4D: Interactive Seamless Fusion of Multiview Video Textures*. To appear in Proceedings of the 2018 ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games (I3D). [[PDF](#)] [[Video](#)]

Meng, X., **Du, R.**, Varshney, A. *Kernel Foveated Rendering*. To appear in proceedings of the ACM on Computer Graphics and Interactive Techniques 2018 and ACM I3D 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. [[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. [\[PDF\]](#) [\[Poster\]](#) [\[Code\]](#) [\[Video\]](#) (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.**, Chang, W., Cutler, B. *Fusing, Texturing, and Rendering Views of Dynamic Three-Dimensional Models*. US Patent filed in January 2018.
- **Du, R.**, Varshney, A. *System and Methods for Social Street View*. US Patent 1475-40PCT filed on March 20, 2016; US Provisional Patent 62/135941 filed on March 20, 2015.
- Varshney, A., Ferrick, C., Agarwal, M., **Du, R.**. *Low-Cost Commodity Camera Array for Acquiring Virtual Environments*. US Provisional Patent 62/327,354 filed on April 25, 2016.

AWARDS

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
1st-class Academic Excellence Scholarship (ranked #2/180) in SJTU CS. Oct. 2012
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

HONORS

Vice President of SJTU Alumni in DC Metro Area. Dec. 2014 - Present
Chief Technology Officer of Microsoft ARD Intern Community. Nov. 2012 - Feb. 2013
Volunteer Star Award for Excellent Service in the World EXPO 2010 in Shanghai Oct. 2010

PROFESSIONAL SERVICE

- Reviewer: ACM SIGGRAPH 2018, SIGCHI 2013-2018, InfoVis 2018, Mobile HCI 2015-2018, CGI 2018, DIS 2018, CAD&CG 2017, IDC 2015-2017, CSCW 2016, ISMAR 2015, UIST 2015.
- Teaching Assistant: Data Structure and Algorithms (CS 484), Data Structure (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, Machine Learning
- Graduate Courses: Graphics, Vision, Geometry, NLP, HCI, Infomation Visualization.