

RYAN P. MCMAHAN

ASSOCIATE PROFESSOR

University of Central Florida
4328 Scorpius Street
Building 116 – Room 346
Orlando, FL 32816-2362
Email: rpm@ucf.edu
Website: www.ryanmcmahan.com

EDUCATION

Ph.D., Computer Science and Applications, Virginia Tech, December 2011

- Dissertation: Exploring the Effects of Higher-Fidelity Display and Interaction for Virtual Reality Games. Committee: Doug A. Bowman, Rachael B. Brady, Yong Cao, Chris North, Nicholas F. Polys.

M.S., Computer Science and Applications, Virginia Tech, June 2007

- Thesis: Exploring and Evaluating Task Sequences for System Control Interfaces in Immersive Virtual Environments. Committee: Doug A. Bowman, Chris North, Manuel A. Pérez-Quñones.

B.S., Computer Science, Virginia Tech, May 2004

- Graduated magna cum laude.
- Minor: Mathematics.

PRINCIPAL APPOINTMENTS

- Associate Professor, Dept. of Computer Science, University of Central Florida, August 2019 – Present.
- Associate Professor, Dept. of Computer Science, University of Texas at Dallas, September 2018 – August 2019.
- Associate Professor, School of Arts, Technology, and Emerging Communication, University of Texas at Dallas, September 2018 – August 2019.
- Assistant Professor, Dept. of Computer Science, University of Texas at Dallas, August 2012 – August 2018.
- Postdoctoral Associate, Pratt School of Engineering, Duke University, February 2012 – July 2012.
- Research Assistant, Institute of Distance and Distributed Learning, Virginia Tech, August 2008 – January 2012.
- Research Assistant, Virginia Center for Coal and Energy Research, Virginia Tech, January 2006 – August 2008.
- Teaching Assistant, Dept. of Computer Science, Virginia Tech, August 2004 – May 2005.

CONCURRENT APPOINTMENTS

- Assistant Professor, School of Arts, Technology, and Emerging Communication, University of Texas at Dallas, August 2015 – August 2018.
- Assistant Professor, Arts & Technology Program, University of Texas at Dallas, October 2013 – August 2015.
- Adjunct Assistant Professor, Dept. of Anesthesiology, Duke University, August 2012 – July 2014.
- Interim Director, Duke Immersive Virtual Environment (DiVE), Duke University, June 2012 – July 2012.

HONORS AND AWARDS

- NSF CAREER Award, Cyber-Human Systems, National Science Foundation, September 2016.
- Provost's Award for Faculty Excellence in Undergraduate Research Mentoring, University of Texas at Dallas, May 2016.

- Outstanding Faculty Teaching Award, Erik Jonsson School of Engineering and Computer Science, University of Texas at Dallas, May 2016.
- Internet of Things (IoT) Technology Research Award, Google Research, April 2016.
- First Place Award, Virtual Student Center Design Competition, Virginia Tech, May 2008.
- Outstanding Master's Thesis Award, Dept. of Computer Science, Virginia Tech, May 2007.
- First Place Industry Choice Award, Undergraduate Research Symposium, Virginia Tech, April 2004.
- Valedictorian, Marion Senior High School, Marion, VA, May 2001.

PROFESSIONAL MEMBERSHIPS

- American Society for Engineering Education (ASEE).
- Association for Computing Machinery (ACM).
- Special Interest Group on Computer-Human Interaction (SIGCHI).
- Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH).
- Institute of Electrical and Electronics Engineers (IEEE).
- IEEE Computer Society.

RESEARCH INTERESTS

- Extended Reality (XR), Virtual Reality (VR), and 3D User Interfaces (3DUIs).
- Human-Computer Interaction (HCI) and User Experience (UX) Engineering.
- Cyberlearning, Education, and Training.

FUNDED RESEARCH

Grants

1. "CAREER: Leveraging the Virtualness of Virtual Reality for More-Effective Training." September 2016 – August 2021. Funded by National Science Foundation. **\$544,188**. Sole PI. Responsible for 100%.
2. "A Portable, Full-Body, Virtual Reality Training System for Non-Surgeon da Vinci Team Members." January 2016 – December 2018. Funded by Intuitive Surgical Operations, Inc. **\$101,071**. Sole PI. Responsible for 100%.
3. "Virtual Reality for Safety Training." January 2015 – December 2017. Funded by iPerform Industry-University Cooperative Research Center (I/UCRC). **\$80,000**. Sole PI. Responsible for 100%.
4. "VR Collaboration with CASL's Virtual Office Community and Computing (VOCC) Laboratory." January 2014 – May 2015. Funded by Oak Ridge National Laboratory. **\$68,373**. Sole PI. Responsible for 100%.

Gifts

1. "IoT Browser." April 2016. Gift from Google Research. **\$1,500** in equipment.
2. "Mobile Virtual Reality Course." August 2015. Gift from Samsung Research America – Dallas. **\$28,008** in equipment.
3. "Haptic Sleeve Project." July 2013. Gift from T. Boone Pickens Foundation. **\$5,615**.

SCHOLARLY OUTPUT

Google Scholar Profile

- Link: <https://scholar.google.com/citations?user=inGtCcMAAAAJ>
- Citations: 2800+; h-index: 20; i10-index: 32

Books Authored

1. Joseph J. LaViola Jr., Ernst Kruijff, **Ryan P. McMahan**, Doug Bowman, and Ivan Poupyrev. (2017). *3D User Interfaces: Theory and Practice (2nd ed.)*. Addison-Wesley Professional, Boston.

Theses

1. **Ryan P. McMahan**. (2011). Exploring the Effects of Higher-Fidelity Display and Interaction for Virtual Reality Games. Ph.D. Dissertation, Computer Science and Applications. Virginia Tech.
2. **Ryan P. McMahan**. (2007). Exploring and Evaluating Task Sequences for System Control Interfaces in Immersive Virtual Environments. Master's Thesis, Computer Science and Applications. Virginia Tech.

Articles in Edited Volumes

1. **Ryan P. McMahan**. (2018). Virtual Reality System Fidelity. In *Encyclopedia of Computer Graphics and Games*, Newton Lee (ed.). Springer, Cham, 1–8. <https://doi.org/10.1007/978-3-319-08234-9>.
2. **Ryan P. McMahan**, Regis Kopper, and Doug A. Bowman. (2014). Principles for Designing Effective 3D Interaction Techniques. In *Handbook of Virtual Environments*, Kelly S. Hale and Kay M. Stanney (eds.). CRC Press, Boca Raton, 299–325. <https://doi.org/10.1201/b17360>.
3. **Ryan P. McMahan**, Steven Schafrik, Doug A. Bowman, and Michael Karmis. (2010). Virtual environments for surface mining powered haulage training. In *Extracting the Science: A Century of Mining Research*, Jürgen Brune (ed.). Society for Mining, Metallurgy, and Exploration (SME), Littleton, Colorado, USA, 520–528.

Journal Papers

1. James Coleman Eubanks, Alec G. Moore, Paul A. Fishwick, and **Ryan P. McMahan**. (2021). A Preliminary Embodiment Short Questionnaire. *Frontiers in Virtual Reality*, 2, 24:1–15. <https://doi.org/10.3389/frvir.2021.647896>.
2. Shanthi Vellingiri, **Ryan P. McMahan**, and Balakrishnan Prabhakaran. (2020). SCeVE: A Component-Based Framework to Author Mixed Reality Tours. *ACM Transactions on Multimedia Computing, Communications, and Applications*, 16(2), 40:1–23. <https://doi.org/10.1145/3377353>.
3. Fei Tang and **Ryan P. McMahan**. (2019). The Syncopated Energy Algorithm for Rendering Real-Time Tactile Interactions. *Frontiers in ICT*, 6, 19:1–16. <https://doi.org/10.3389/fict.2019.00019>.
4. Kanchan Bahirat, Chengyuan Lai, **Ryan P. McMahan**, and Balakrishnan Prabhakaran. (2018). Designing and Evaluating a Mesh Simplification Algorithm for Virtual Reality. *ACM Transactions on Multimedia Computing, Communications, and Applications*, 14(3s), 63:1–26. <https://doi.org/10.1145/3209661>.
5. Animesh Tandon, Barbara E. U. Burkhardt, Maria Batsis, Thomas M. Zellers, Mari Nieves Velasco Forte, Israel Valverde, **Ryan P. McMahan**, Kristine J. Guleserian, Gerald F. Greil, and Tarique Hussain. (2018). Sinus Venosus Defects: Anatomic Variants and Transcatheter Closure Feasibility Using Virtual Reality Planning. *JACC: Cardiovascular Imaging*, 12(5), 921–924. <https://doi.org/10.1016/j.jcmg.2018.10.013>.
6. Alec G. Moore, John G. Hatch, Stephen Kuehl, and **Ryan P. McMahan**. (2018). VOTE: A ray-casting study of vote-oriented technique enhancements. *International Journal of Human-Computer Studies*, 120, 36–48. <https://doi.org/10.1016/j.ijhcs.2018.07.003>.
7. Gary M. Hardee and **Ryan P. McMahan**. (2017). FIJI: A Framework for the Immersion-Journalism Intersection. *Frontiers in ICT*, 4, 21:1–18. <https://doi.org/10.3389/fict.2017.00021>.
8. **Ryan P. McMahan** and Nicolas S. Herrera. (2016). AFFECT: Altered-Fidelity Framework for Enhancing Cognition and Training. *Frontiers in ICT*, 3, 29:1–15. <https://doi.org/10.3389/fict.2016.00029>.
9. Michael J. Howell, Nicolas S. Herrera, Alec G. Moore, and **Ryan P. McMahan**. (2016). A reproducible olfactory display for exploring olfaction in immersive media experiences. *Multimedia Tools and Applications*, 75(20), 12311–12330. <https://doi.org/10.1007/s11042-015-2971-0>.
10. Eric D. Ragan, Doug A. Bowman, Regis Kopper, Cheryl Stinson, Scerbo Scerbo, and **Ryan P. McMahan**. (2015). Effects of Field of View and Visual Complexity on Virtual Reality Training Effectiveness for a Visual Scanning Task. *IEEE Transactions on Visualization and Computer Graphics*, 21(7), 794–807. <https://doi.org/10.1109/TVCG.2015.2403312>.

11. Doug A. Bowman, **Ryan P. McMahan**, and Eric D. Ragan. (2012). Questioning naturalism in 3D user interfaces. *Communications of the ACM*, 55(9), 78–88. <https://doi.org/10.1145/2330667.2330687>.
12. **Ryan P. McMahan**, Doug A. Bowman, David J. Zielinski, and Rachael B. Brady. (2012). Evaluating Display Fidelity and Interaction Fidelity in a Virtual Reality Game. *IEEE Transactions on Visualization and Computer Graphics*, 18(4), 626–633. <https://doi.org/10.1109/TVCG.2012.43>.
13. Tao Ni, Doug A. Bowman, Chris North, and **Ryan P. McMahan**. (2011). Design and evaluation of freehand menu selection interfaces using tilt and pinch gestures. *International Journal of Human-Computer Studies*, 69(9), 551–562. <https://doi.org/10.1016/j.ijhcs.2011.05.001>.
14. **Ryan P. McMahan**, Eric D. Ragan, Anamary Leal, Robert J. Beaton, and Doug A. Bowman. (2011). Considerations for the use of commercial video games in controlled experiments. *Entertainment Computing*, 2(1), 3–9. <https://doi.org/10.1016/j.entcom.2011.03.002>.
15. Regis Kopper, Doug A. Bowman, Mara G. Silva, and **Ryan P. McMahan**. (2010). A human motor behavior model for distal pointing tasks. *International Journal of Human-Computer Studies*, 68(10), 603–615. <https://doi.org/10.1016/j.ijhcs.2010.05.001>.
16. Doug A. Bowman and **Ryan P. McMahan**. (2007). Virtual Reality: How Much Immersion Is Enough? *Computer*, 40(7), 36–43. <https://doi.org/10.1109/MC.2007.257>.

Conference Papers

1. James Coleman Eubanks, Alec G. Moore, Paul A. Fishwick, and **Ryan P. McMahan**. (2020). The Effects of Body Tracking Fidelity on Embodiment of an Inverse-Kinematic Avatar for Male Participants. In *2020 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, Recife/Porto de Galinhas, Brazil, 54–63. <https://doi.org/10.1109/ISMAR50242.2020.00025>.
2. Tiffany D. Do, Joseph J. LaViola, and **Ryan P. McMahan**. (2020). The Effects of Object Shape, Fidelity, Color, and Luminance on Depth Perception in Handheld Mobile Augmented Reality. In *2020 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, Recife/Porto de Galinhas, Brazil, 64–72. <https://doi.org/10.1109/ISMAR50242.2020.00026>.
3. Alec G. Moore, **Ryan P. McMahan**, Hailiang Dong, and Nicholas Ruoizzi. (2020). Extracting Velocity-Based User-Tracking Features to Predict Learning Gains in a Virtual Reality Training Application. In *2020 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, Recife/Porto de Galinhas, Brazil, 694–703. <https://doi.org/10.1109/ISMAR50242.2020.00099>.
4. Chengyuan Lai and **Ryan P. McMahan**. (2020). The Cognitive Load and Usability of Three Walking Metaphors for Consumer Virtual Reality. In *2020 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, Recife/Porto de Galinhas, Brazil, 806–817. <https://doi.org/10.1109/ISMAR50242.2020.00091>.
5. Xinyu Hu, Alec G. Moore, James Coleman Eubanks, Afham Ahmed Aiyaz, and **Ryan P. McMahan**. (2020). Evaluating Interaction Cue Purpose and Timing for Learning and Retaining Virtual Reality Training. In *ACM Symposium on Spatial User Interaction (SUI)*, ACM, Ottawa, Canada, 1–9. <https://doi.org/10.1145/3385959.3418448>.
6. Alec G. Moore, Marwan Kodeih, Anoushka Singhania, Angelina Wu, Tasneen Bashir, and **Ryan P. McMahan**. (2019). The Importance of Intersection Disambiguation for Virtual Hand Techniques. In *2019 IEEE International Symposium on Mixed and Augmented Reality (ISMAR)*, IEEE, Beijing, China, 450–457. <https://doi.org/10.1109/ISMAR.2019.00029>.
7. Afshin Taghavi Nasrabadi, Aliehsan Samiei, Anahita Mahzari, **Ryan P. McMahan**, Ravi Prakash, Mylène C. Q. Farias, and Marcelo M. Carvalho. (2019). A Taxonomy and Dataset for 360° Videos. In *10th ACM Multimedia Systems Conference (MMSys)*, ACM, Amherst, Massachusetts, USA, 273–278. <https://doi.org/10.1145/3304109.3325812>.
8. Fei Tang, **Ryan P. McMahan**, Eric D. Ragan, and Tandra T. Allen. (2017). Subjective Evaluation of Tactile Fidelity for Single-Finger and Whole-Hand Touch Gestures. In *International Conference on Virtual, Augmented and Mixed Reality (VAMR)*, Springer, Vancouver, Canada, 185–200. https://doi.org/10.1007/978-3-319-57987-0_15.
9. Kanchan Bahirat, Chengyuan Lai, **Ryan P. McMahan**, and Balakrishnan Prabhakaran. (2017). A Boundary and Texture Preserving Mesh Simplification Algorithm for Virtual Reality. In *8th ACM on Multimedia Systems Conference (MMSys)*, ACM, Taipei, Taiwan, 50–61. <https://doi.org/10.1145/3083187.3083188>.

10. Asma Naz, Regis Kopper, **Ryan P. McMahan**, and Mihai Nadin. (2017). Emotional Qualities of VR Space. In *2017 IEEE Virtual Reality (VR)*, IEEE, Los Angeles, CA, USA, 3–11. <https://doi.org/10.1109/VR.2017.7892225>.
11. **Ryan P. McMahan**, Chengyuan Lai, and Swaroop K. Pal. (2016). Interaction Fidelity: The Uncanny Valley of Virtual Reality Interactions. In *International Conference on Virtual, Augmented and Mixed Reality (VAMR)*, Springer, Toronto, Canada, 59–70. https://doi.org/10.1007/978-3-319-39907-2_6.
12. Chengyuan Lai, **Ryan P. McMahan**, Midori Kitagawa, and Iolani Connolly. (2016). Geometry Explorer: Facilitating Geometry Education with Virtual Reality. In *International Conference on Virtual, Augmented and Mixed Reality (VAMR)*, Springer, Toronto, Canada, 702–713. https://doi.org/10.1007/978-3-319-39907-2_67.
13. James Coleman Eubanks, Veena Somareddy, **Ryan P. McMahan**, and Alfonso A. Lopez. (2016). Full-Body Portable Virtual Reality for Personal Protective Equipment Training. In *International Conference on Virtual, Augmented and Mixed Reality (VAMR)*, Springer, Toronto, Canada, 490–501. https://doi.org/10.1007/978-3-319-39907-2_47.
14. Swaroop K. Pal, Marriam Khan, and **Ryan P. McMahan**. (2016). The Benefits of Rotational Head Tracking. In *2016 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Greenville, SC, USA, 31–38. <https://doi.org/10.1109/3DUI.2016.7460028>.
15. Jian Ma, Prathamesh Potnis, Alec G. Moore, and **Ryan P. McMahan**. (2016). VUME: The Voluntary-Use Methodology for Evaluations. In *2016 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Greenville, SC, USA, 129–132. <https://doi.org/10.1109/3DUI.2016.7460042>.
16. Chengyuan Lai and **Ryan P. McMahan**. (2015). Virtual Reality Ladder Climbing for Mine Safety Training. In *International Symposium on the Application of Computers and Operations Research in the Mineral Industry (APCOM)*, Society for Mining, Metallurgy, and Exploration (SME), Fairbanks, AK, USA, 754–760.
17. Chengyuan Lai, **Ryan P. McMahan**, and James Hall. (2015). March-and-Reach: A Realistic Ladder Climbing Technique. In *2015 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Arles, France, 15–18. <https://doi.org/10.1109/3DUI.2015.7131719>.
18. Fei Tang, **Ryan P. McMahan**, and Tandra T. Allen. (2014). Development of a Low-Cost Tactile Sleeve for Autism Intervention. In *2014 IEEE International Symposium on Haptic, Audio and Visual Environments and Games (HAVE)*, IEEE, Richardson, TX, USA, 35–40. <https://doi.org/10.1109/HAVE.2014.6954328>.
19. David J. Zielinski, Regis Kopper, **Ryan P. McMahan**, Wenjie Lu, and Silvia Ferrari. (2013). Intercept Tags: Enhancing Intercept-Based Systems. In *19th ACM Symposium on Virtual Reality Software and Technology (VRST)*, ACM, Singapore, 263–266. <https://doi.org/10.1145/2503713.2503737>.
20. Doug A. Bowman, Cheryl Stinson, Eric D. Ragan, Siroberto Scerbo, Tobias Höllerer, Cha Lee, **Ryan P. McMahan**, and Régis Kopper. (2012). Evaluating effectiveness in virtual environments with MR simulation. In *Interservice/Industry Training, Simulation, and Education Conference (IITSEC)*, National Training & Simulation Association (NTSA), Orlando, FL, USA, 12075:1–11.
21. Eric D. Ragan, Andrew Wood, **Ryan P. McMahan**, and Doug A. Bowman. (2012). Trade-Offs Related to Travel Techniques and Level of Display Fidelity in Virtual Data-Analysis Environments. In *Joint Virtual Reality Conference of ICAT - EGVE - EuroVR (JVRC)*, The Eurographics Association, Madrid, Spain, 81–84. <https://doi.org/10.2312/EGVE/JVRC12/081-084>.
22. David J. Zielinski, **Ryan P. McMahan**, and Rachael B. Brady. (2011). Shadow Walking: An Unencumbered Locomotion Technique for Systems with Under-floor Projection. In *2011 IEEE Virtual Reality Conference (VR)*, IEEE, Singapore, 167–170. <https://doi.org/10.1109/VR.2011.5759456>.
23. **Ryan P. McMahan**, Alexander Joel D. Alon, Shaimaa Lazem, Robert J. Beaton, David Machaj, Michael Schaefer, Mara G. Silva, Anamary Leal, Robert Hagan, and Doug A. Bowman. (2010). Evaluating Natural Interaction Techniques in Video Games. In *2010 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Waltham, MA, USA, 11–14. <https://doi.org/10.1109/3DUI.2010.5444727>.
24. Peter Macedo and **Ryan P. McMahan**. (2009). Virtual Student Center: Connecting e-Learning Students to Virginia Tech Resources. In *25th Annual Conference on Distance Teaching & Learning*, Board of Regents of the University of Wisconsin System, Madison, WI, USA, 20375:1–4.
25. **Ryan P. McMahan**, Doug A. Bowman, Steven Schafrik, and Michael Karmis. (2008). Virtual Environment Training for Preshift Inspections of Haul Trucks to Improve Mining Safety. In *First International Future Mining Conference and Exhibition*, The Australasian Institute of Mining and Metallurgy (AusIMM), Sydney, Australia, 167–174.

26. John D. Lucas, **Ryan P. McMahan**, Ryan Engle, Doug A. Bowman, Walid Thabet, Steven Schafrik, and Michael Karmis. (2008). Improving Health and Safety Through Conveyor System Training in a Virtual Environment. In *First International Future Mining Conference and Exhibition*, The Australasian Institute of Mining and Metallurgy (AusIMM), Sydney, Australia, 161–166.
27. Tao Ni, **Ryan P. McMahan**, and Doug A. Bowman. (2008). Tech-note: rapMenu: Remote Menu Selection Using Freehand Gestural Input. In *2008 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Reno, NE, USA, 55–58. <https://doi.org/10.1109/3DUI.2008.4476592>.
28. **Ryan P. McMahan** and Doug A. Bowman. (2007). An Empirical Comparison of Task Sequences for Immersive Virtual Environments. In *2007 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Charlotte, NC, USA, 25–32. <https://doi.org/10.1109/3DUI.2007.340770>.
29. **Ryan P. McMahan**, Doug Gorton, Joe Gresock, Will McConnell, and Doug A. Bowman. (2006). Separating the effects of level of immersion and 3D interaction techniques. In *ACM Symposium on Virtual Reality Software and Technology (VRST)*, ACM, Limassol Cyprus, 108–111. <https://doi.org/10.1145/1180495.1180518>.

Workshop Papers

1. Xinyu Hu, Alec G. Moore, James Coleman Eubanks, Afham Ahmed Aiyaz, and **Ryan P. McMahan**. (2020). The Effects of Delayed Interaction Cues in Virtual Reality Training. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, IEEE, Atlanta, GA, USA, 63–69. <https://doi.org/10.1109/VRW50115.2020.00019>.
2. Alec G. Moore, Xinyu Hu, James Coleman Eubanks, Afham Ahmed Aiyaz, and **Ryan P. McMahan**. (2020). A Formative Evaluation Methodology for VR Training Simulations. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, IEEE, Atlanta, GA, USA, 125–132. <https://doi.org/10.1109/VRW50115.2020.00027>.
3. James Coleman Eubanks, Chengyuan Lai, and **Ryan P. McMahan**. (2015). Portable Virtual Reality: Inertial Measurements and Biomechanics. In *2015 IEEE 1st Workshop on Everyday Virtual Reality (WEVR)*, IEEE, Arles, France, 1–4. <https://doi.org/10.1109/WEVR.2015.7151686>.
4. Nicolas S. Herrera and **Ryan P. McMahan**. (2014). Development of a Simple and Low-Cost Olfactory Display for Immersive Media Experiences. In *2nd ACM International Workshop on Immersive Media Experiences (ImmersiveMe)*, ACM, Orlando, FL, USA, 1–6. <https://doi.org/10.1145/2660579.2660584>.
5. David J. Zielinski, **Ryan P. McMahan**, Shokur Shokur, Edgard Morya, and Regis Kopper. (2014). Enabling Closed-Source Applications for Virtual Reality via OpenGL Intercept-based Techniques. In *2014 IEEE 7th Workshop on Software Engineering and Architectures for Realtime Interactive Systems (SEARIS)*, IEEE, Minneapolis, MN, USA, 59–64. <https://doi.org/10.1109/SEARIS.2014.7152802>.

Refereed Abstracts

1. Alec G. Moore, **Ryan P. McMahan**, Hailiang Dong, and Nicholas Ruoizzi. (2021). Personal Identifiability of User Tracking Data During VR Training. In *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, IEEE, Lisbon, Portugal, 556–557. <https://doi.org/10.1109/VRW52623.2021.00160>.
2. Nafisa Mostofa, Indira Avendano, **Ryan P. McMahan**, and Gregory F. Welch. (2020). Tactile Telepresence for Isolated Patients. In *ICAT-EGVE 2020 - International Conference on Artificial Reality and Telexistence and Eurographics Symposium on Virtual Environments - Posters and Demos*, The Eurographics Association, Orlando, FL, USA, 7–8. <https://doi.org/10.2312/egve.20201272>.
3. Tiffany D. Do, Dylan S. Yu, Alyssa Katz, and **Ryan P. McMahan**. (2020). Virtual Reality Training for Proper Recycling Behaviors. In *ICAT-EGVE 2020 - International Conference on Artificial Reality and Telexistence and Eurographics Symposium on Virtual Environments - Posters and Demos*, The Eurographics Association, Orlando, FL, USA, 31–32. <https://doi.org/10.2312/egve.20201284>.
4. Chengyuan Lai, Xinyu Hu, Ann Segismundo, Ananya Phadke, and **Ryan P. McMahan**. (2020). The Comfort Benefits of Gaze-Directed Steering. In *2020 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)*, IEEE, Recife/Porto de Galinhas, Brazil, 102–103. <https://doi.org/10.1109/ISMAR-Adjunct51615.2020.00040>.
5. Chengyuan Lai, Afham Ahmed Aiyaz, and **Ryan P. McMahan**. (2020). Locomotive and Cognitive Trade-Offs for Target-based Travel. In *2020 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-*

- Adjunct*), IEEE, Recife/Porto de Galinhas, Brazil, 74–75. <https://doi.org/10.1109/ISMAR-Adjunct51615.2020.00034>.
6. Alec G. Moore, Xinyu Hu, James Coleman Eubanks, Afham Ahmed Aiyaz, and **Ryan P. McMahan**. (2020). CARAI: A Formative Evaluation Methodology for VR Simulations. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW)*, IEEE, Atlanta, GA, USA, 621–622. <https://doi.org/10.1109/VRW50115.2020.00161>.
 7. Elizabeth Berger and **Ryan P. McMahan**. (2018). Applying Algorithms to Visual Design Principles in M-Learning. In *3rd International Workshop on Interactive and Spatial Computing (IWISC): Poster and Demonstration Abstracts*, Richardson, TX, USA, 1.
 8. Chengyuan Lai and **Ryan P. McMahan**. (2018). Cognitive Demands on 3D Travel Techniques. In *3rd International Workshop on Interactive and Spatial Computing (IWISC): Poster and Demonstration Abstracts*, Richardson, TX, USA, 3.
 9. Rohan Gupta, Anthony Lau, Adharsh Rajendran, Tanushri Singh, Pooshan Shah, **Ryan P. McMahan**, Tarique Hussain, and Animesh Tandon. (2018). Surgical Planning Using Virtual Reality. In *3rd International Workshop on Interactive and Spatial Computing (IWISC): Poster and Demonstration Abstracts*, Richardson, TX, USA, 4.
 10. Xinyu Hu and **Ryan P. McMahan**. (2018). Virtual Reality: Impacts on Eating Habits. In *3rd International Workshop on Interactive and Spatial Computing (IWISC): Poster and Demonstration Abstracts*, Richardson, TX, USA, 4.
 11. **Ryan P. McMahan**, James Coleman Eubanks, and Alec G. Moore. (2018). Virtual Reality Demonstration for Training Robotic Operating-Room Staff. In *3rd International Workshop on Interactive and Spatial Computing (IWISC): Poster and Demonstration Abstracts*, Richardson, TX, USA, 5.
 12. Alec G. Moore, Michael J. Howell, Addison W. Stiles, Nicolas S. Herrera, and **Ryan P. McMahan**. (2015). Wedge: A Musical Interface for Building and Playing Composition-Appropriate Immersive Environments. In *2015 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Arles, France, 205–206. <https://doi.org/10.1109/3DUI.2015.7131772>.
 13. Alec G. Moore, Nicolas S. Herrera, Tyler C. Hurst, **Ryan P. McMahan**, and Sandra Poeschl. (2015). The Effects of Olfaction on Training Transfer for an Assembly Task. In *2015 IEEE Virtual Reality (VR)*, IEEE, Arles, France, 237–238. <https://doi.org/10.1109/VR.2015.7223383>.
 14. Fei Tang, **Ryan P. McMahan**, Eric D. Ragan, and Tandra T. Allen. (2015). A Modified Tactile Brush Algorithm for Complex Touch Gestures. In *2015 IEEE Virtual Reality (VR)*, IEEE, Arles, France, 295–296. <https://doi.org/10.1109/VR.2015.7223412>.
 15. David J. Zielinski, **Ryan P. McMahan**, Wenjie Lu, and Silvia Ferrari. (2013). ML2VR: Providing MATLAB Users an Easy Transition to Virtual Reality and Immersive Interactivity. In *2013 IEEE Virtual Reality (VR)*, IEEE, Lake Buena Vista, FL, USA, 83–84. <https://doi.org/10.1109/VR.2013.6549374>.
 16. Benjamin Izatt, Kate Scholberg, and **Ryan P. McMahan**. (2013). Super-KAVE: An Immersive Visualization Tool for Neutrino Physics. In *2013 IEEE Virtual Reality (VR)*, IEEE, Lake Buena Vista, FL, USA, 75–76. <https://doi.org/10.1109/VR.2013.6549370>.
 17. **Ryan P. McMahan**, Michael Steele, Ryan Fink, David Turner, and Jeff Taekman. (2013). Identification of Subject-Matter-Expert Effort Required for the Development and Validation of Healthcare Training-based Virtual Environments. In *International Meeting on Simulation in Healthcare (IMSH)*, Society for Simulation in Healthcare (SSH), Orlando, FL, USA, 431.

Unrefereed Papers

1. **Ryan P. McMahan**, Eric D. Ragan, Doug A. Bowman, Fei Tang, and Chengyuan Lai. (2015). FIFA: The Framework for Interaction Fidelity Analysis. Technical Report. Department of Computer Science, The University of Texas at Dallas, UTDCS006-15:1-27.
2. Doug A. Bowman, **Ryan P. McMahan**, Cheryl Stinson, Eric D. Ragan, Siroberto Scerbo, Tobias Höllerer, Cha Lee, and Régis Kopper. (2011). Evaluating effectiveness in virtual environments with MR simulation. In *Marine Corps Warfighting Laboratory Workshop: Physiological Metrics of Immersion*, San Diego, CA, USA, 1–15.
3. Régis Kopper, Mara G. Silva, **Ryan P. McMahan**, and Doug A. Bowman. (2008). Increasing Precision of Distant Pointing for Large High-Resolution Displays. Technical Report. Department of Computer Science, Virginia Tech, TR-08-17:1-42.

Unrefereed Abstracts

1. Rongkai Guo, **Ryan P. McMahan**, and Benjamin Weyers. (2018). 3DUI-League: 9th Annual 3DUI Contest. In *2018 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, IEEE, Reutlingen, Germany, 845. <https://doi.org/10.1109/VR.2018.8446389>.
2. Rongkai Guo, **Ryan P. McMahan**, and Benjamin Weyers. (2017). Augmented Reality Exhibits of Constructive Art: 8th Annual 3DUI Contest. In *2017 IEEE Symposium on 3D User Interfaces (3DUI)*, IEEE, Los Angeles, CA, USA, 253. <https://doi.org/10.1109/3DUI.2017.7893367>.

Special Issues Edited

1. Ryan P. McMahan, John Quarles, and Eric D. Ragan. (2017). Virtual and Augmented Reality for Education and Training. *Frontiers in Virtual Environments*. Retrieved from <http://loop.frontiersin.org/researchtopic/4570>.

Proceedings Edited

1. Balakrishnan Prabhakaran and **Ryan P. McMahan**. (2018). IWISC '18: Proceedings of the 3rd International Workshop on Interactive and Spatial Computing. ACM, Richardson, TX, USA. <https://doi.org/10.1145/3191801>.
2. George Bebis, Richard Boyle, Bahram Parvin, Darko Koracin, **Ryan P. McMahan**, Jason Jerald, Hui Zhang, Steven M. Drucker, Chandra Kambhampettu, Maha Choubassi, Zhigang Deng, and Mark Carlson. (2014). Advances in Visual Computing: 10th International Symposium (ISVC 2014), Part I. Springer, Las Vegas, NV, USA. <https://doi.org/10.1007/978-3-319-14249-4>.
3. George Bebis, Richard Boyle, Bahram Parvin, Darko Koracin, **Ryan P. McMahan**, Jason Jerald, Hui Zhang, Steven M. Drucker, Chandra Kambhampettu, Maha Choubassi, Zhigang Deng, and Mark Carlson. (2014). Advances in Visual Computing: 10th International Symposium (ISVC 2014), Part II. Springer, Las Vegas, NV, USA. <https://doi.org/10.1007/978-3-319-14364-4>.

Significant Talks

1. **McMahan, Ryan P.** (2015). Bringing Virtual Reality Home. *TEDxUTD: Beneath the Surface*, Richardson, TX, April 12, 2015. Retrieved from <https://youtu.be/nWPx1LHRoZo>.

Invited Talks

1. **McMahan, Ryan P.** (2021). eXtended Reality & Training (XRT) Lab. *VR/AR Association Central Florida February Event*, Online, February 24, 2021.
2. **McMahan, Ryan P.** (2020). The Benefits and Limitations of Virtual Reality. *Scalable Dissemination and Navigation of Video 360 Content for Personalized Viewing Team*, Online, July 10, 2020.
3. **McMahan, Ryan P.** (2019). Towards Virtual Reality Training Solutions for Robotic Operating Room Teams. *School of Simulation, Modeling, and Training (SMST) Seminar Series*, Orlando, FL, October 23, 2019.
4. **McMahan, Ryan P.** (2019). Towards Virtual Reality Training Solutions for Robotic Operating Room Teams. *Department of Computer Science*, Orlando, FL, March 25, 2019.
5. **McMahan, Ryan P.** (2019). Developing Virtual Reality Modules for da Vinci Training and Education. *Intuitive Surgical 2019 Education and Training Research Grant Symposium*, Sunnyvale, CA, February 1, 2019.
6. **McMahan, Ryan P.** (2018). The FIVE Lab and Robotic OR Training. *ATEC Dean's Colloquium*, Richardson, TX, October 26, 2018.
7. **McMahan, Ryan P.** (2018). Virtual Reality Training Solutions for Robotic Operating-Room Staff. *Tech Titans Digital Disruption Series: XR*, Richardson, TX, October 2, 2018.
8. **McMahan, Ryan P.** (2018). Virtual Reality Training Solutions for Robotic Operating-Room Staff. *Dallas Software Lunch Bunch*, Richardson, TX, March 27, 2018.
9. **McMahan, Ryan P.** (2018). Virtual Reality Training Solutions for Robotic Operating-Room Staff. *UT Dallas Explore Engineering Day*, Richardson, TX, February 17, 2018.
10. **McMahan, Ryan P.** (2018). Virtual Reality Training Solutions for Robotic Operating-Room Staff. *UT Dallas Virtual Reality Society Meeting*, Richardson, TX, February 8, 2018.
11. **McMahan, Ryan P.** (2018). Virtual Reality Training Solutions for Robotic Operating-Room Staff. *UT Dallas Computer Science Colloquium*, Richardson, TX, February 2, 2018.

12. **McMahan, Ryan P.** (2018). Developing Virtual Reality Modules for da Vinci Training and Education. *Intuitive Surgical 2018 Clinical and Technology Research Grant Symposium*, Sunnyvale, CA, January 19, 2018.
13. **McMahan, Ryan P.** (2018). The Benefits of Virtual Reality for da Vinci Training and Education. *Intuitive Surgical 2018 Education and Training Research Grant Symposium*, Sunnyvale, CA, January 18, 2018.
14. **McMahan, Ryan P.** (2017). Introduction to Virtual Reality. *UT Dallas Virtual Reality Society Meeting*, Richardson, TX, October 12, 2017.
15. **McMahan, Ryan P.** (2017). Virtual Reality Applications for da Vinci Robotic Surgery. *IIT Alumni Association of North Texas Talks: Toolkit for the Digital Age*, Richardson, TX, February 18, 2017.
16. **McMahan, Ryan P.** (2017). A Brief Introduction to Virtual Reality. *UT Dallas Engineering Week Tech Talks*, Richardson, TX, February 16, 2017.
17. **McMahan, Ryan P.** (2017). Introduction to Virtual Reality. *UT Dallas Virtual Reality Society Meeting*, Richardson, TX, January 31, 2017.
18. **McMahan, Ryan P.** (2017). Developing High-Fidelity Virtual Reality Applications for da Vinci Training and Education. *Intuitive Surgical 2017 Clinical and Technology Research Grant Symposium*, Sunnyvale, CA, January 27, 2017.
19. **McMahan, Ryan P.** (2017). The Benefits of Virtual Reality for da Vinci Training and Education. *Intuitive Surgical 2017 Education and Training Research Grant Symposium*, Sunnyvale, CA, January 26, 2017.
20. **McMahan, Ryan P.** and Eric D. Ragan. (2015). Interactive Computing: Virtual Reality. *1st International Workshop on Interactive and Spatial Computing (IWISC 2015)*, Richardson, TX, December 5, 2015.
21. **McMahan, Ryan P.**, Fei Tang, James Coleman Eubanks, and Addison Stiles. (2015). Future Immersive Virtual Environments (FIVE) Lab. *Computer Science Teachers Association Annual Conference*, Richardson, TX, July 13, 2015.
22. **McMahan, Ryan P.** (2015). Future Immersive Virtual Environments (FIVE) Lab. *Dallas Unity Meetup*, Richardson, TX, June 13, 2015.
23. **McMahan, Ryan P.** (2014). The Effects of Tactile and Olfactory Fidelities. *UT Dallas Computer Science Colloquium*, Richardson, TX, November 7, 2014.
24. **McMahan, Ryan P.** (2014). Virtual Reality: The Future of Learning., *UT Dallas Explore Engineering Day*, Richardson, TX, February 22, 2014.
25. **McMahan, Ryan P.** (2013). Future Immersive Virtual Environments (FIVE) Lab. *UT Dallas Computer Science Alumni Luncheon*, Richardson, TX, November 8, 2013.
26. **McMahan, Ryan P.** (2013). The Effects of System Fidelity for Virtual Reality Applications. *UT Dallas Art Rendezvous Science (ARS) Colloquium*, Richardson, TX, April 10, 2013.
27. **McMahan, Ryan P.** (2012). The Effects of System Fidelity for Virtual Reality Applications. *UT Dallas Computer Science Colloquium*, Richardson, TX, September 21, 2012.
28. **McMahan, Ryan P.** (2012). Virtual Reality and 3D User Interfaces. *ARTSI Alliance Workshop: Advancing Robotics Technology for Societal Impact*, Philadelphia, PA, June 19, 2012.
29. **McMahan, Ryan P.** (2012). Beneficial Uses of Virtual Reality and the Effects of System Fidelity. *UT Dallas Computer Science Seminar*, Richardson, TX, March 21, 2012.
30. **McMahan, Ryan P.** (2011). Exploring the Effects of Higher-Fidelity Display and Interaction for Serious Virtual Reality Games. *Virginia Tech Human-Computer Interaction Seminar*, Blacksburg, VA, September 9, 2011.
31. **McMahan, Ryan P.** (2010). Exploring the Effects of Display Fidelity and Interaction Fidelity. *Duke University Visualization Friday Forum*, Durham, NC, November 19, 2010.
32. **McMahan, Ryan P.** (2010). Evaluating Natural Interaction Techniques in Video Games. *Virginia Tech Center for Human-Computer Interaction Student Speaker Series*, Blacksburg, VA, March 5, 2010.

Contributed Talks

1. **McMahan, Ryan P.** (2018). Smart Streaming of 360-Degree Videos for Improved Virtual Reality Experience. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Richardson, TX, November 8, 2018.
2. **McMahan, Ryan P.** (2017). VR Information-Security Training for Social Engineering Attacks. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Arlington, TX, November 10, 2017.

3. **McMahan, Ryan P.** (2017). Virtual Reality Development Framework. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Richardson, TX, March 31, 2017.
4. **McMahan, Ryan P.** (2016). Framework for Full-Body VR Training Applications. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Arlington, TX, September 22, 2016.
5. **McMahan, Ryan P.** (2016). Framework for Full-Body VR Training Applications. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Arlington, TX, March 4, 2016.
6. **McMahan, Ryan P.** (2015). Framework for Full-Body VR Training Applications. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Richardson, TX, October 9, 2015.
7. **McMahan, Ryan P.** (2015). Framework for Assistive Portable Augmented Reality Applications. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Richardson, TX, October 9, 2015.
8. **McMahan, Ryan P.** (2015). Virtual Reality for Safety Training. *iPerform Industry-University Cooperative Research Center (I/UCRC) Meeting*, Arlington, TX, April 8, 2015.
9. **McMahan, Ryan P.** (2014). Virtual Reality and Robots. *UT Dallas Robotics Initiative Meeting*, Richardson, TX, July 25, 2014.
10. **McMahan, Ryan P.** and Steven Schafrik. (2008). Visualization Initiatives at Virginia Tech. *2nd International Mining Virtual Reality Group Workshop*, Sydney, Australia, November 24, 2008.

Invited Panels

1. Methenitis, Mark, Daniel Creekmore, Michael D. Karson, and **Ryan P. McMahan.** (2018). Virtual Reality & Augmented Reality. *15th Annual Symposium on Emerging Intellectual Property Issues: Disruptive Ideas and Emerging Technology*, Dallas, TX, September 21, 2018.
2. Alford, Ginger, Nick Bontrager, Cole Forston, **Ryan P. McMahan**, and Jinsil Hwaryoung Seo. (2018). Emerging Technologies in Immersive Experiences. *Fort Worth Museum of Science and History 2018 Infinity Festival*, Fort Worth, TX, July 22, 2018.
3. DeNagy, Pete, Chuck Parker, Kevin Hart, and **Ryan P. McMahan.** (2016). AR/VR and Human Interaction Redux. *TIA Network of the Future Conference*, Dallas, TX, June 7, 2016.
4. Banwo, Emiola, Melissa Palmer, Jon Shapiro, **Ryan P. McMahan**, and Lucas Rodrigues. (2015). From University Research to Real World Innovation. *Dallas Startup Week*, Dallas, TX, March 6, 2015.

Other Output

1. Bye, Kent, and **Ryan P. McMahan.** (2015). #168: Ryan McMahan on climbing a ladder in VR with the March-and-Reach Technique. *Voices of VR Podcast*, July 15, 2015. Retrieved from <http://voicesofvr.com/168-ryan-mcmahan-on-climbing-a-ladder-in-vr-with-the-march-and-reach-technique/>.
2. Fishwick, Paul A., Kang Zhang, and **Ryan P. McMahan.** (2014). Generative Art and Virtual Reality. *Voices from the Crowd Podcast*, December 6, 2014. Retrieved from <http://arteca.mit.edu/generative-art-and-virtual-reality>.

TEACHING

Advised Ph.D. Graduates

1. James Coleman Eubanks. (2020). Effects of Full-Body Tracking on Embodiment in Virtual Reality. Ph.D. Dissertation, Arts, Technology, and Emerging Communication. University of Texas at Dallas. Fall 2020. Co-advised with Paul A. Fishwick.
2. Shanthi Vellingiri. (2020). Assessment of QoE and Learning Effectiveness in Collaborative Mixed Reality Environments. Ph.D. Dissertation, Computer Engineering. University of Texas at Dallas. Spring 2020. Co-advised with Balakrishnan Prabhakaran.
3. Elizabeth Berger. (2019). A New Approach to Design Pedagogy Fostering Learning of Visual Design Principles Through M-Learning: Applying Algorithms to Visual Design Principles. Ph.D. Dissertation, Arts, Technology, and Emerging Communication. University of Texas at Dallas. Fall 2019. Co-advised with Midori Kitagawa.
4. Chengyuan Lai. (2019). 3D Travel Techniques for Virtual Reality Cyberlearning Systems. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Summer 2019.

5. Fei Tang. (2018). Evaluating Tactile Fidelity of Resolution, Amplitude, and Algorithms for Grid-Based Tactile Sleeve Displays. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Fall 2018.

Current Ph.D. Advisees

1. Alec G. Moore. Computer Science. University of Central Florida.
2. Xinyu Hu. Computer Science. University of Central Florida.
3. Tiffany Do. Computer Science. University of Central Florida.

Advised M.S. Thesis Graduates

1. Varshini Ramaraj. (2017). Integration of Learning Principles into an Educational Virtual Reality System. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2017.
2. Alec G. Moore. (2016). VOTE: Vote-Oriented Technique Enhancements. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2016.
3. Michael J. Howell. (2016). FACT: Fidelity-Altered Context Techniques. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2016.
4. Lesley Titus Pandian Thamarai. (2015). Developing a High-Precision, High-Fidelity LEGO Simulator. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2015.
5. Jian Ma. (2014). Evaluation and Comparison of Head-Mounted Displays in Immersive Virtual Environments. M.S. Thesis, Computer Science. University of Texas at Dallas. Fall 2014.

Ph.D. Dissertation Committees

1. Gary M. Hardee. (2019). FINESSE: Foundations for Immersive Non-Fiction Narrative as Embodied/Situated Simulation Experiences. Ph.D. Dissertation, Arts, Technology, and Emerging Communication. University of Texas at Dallas. Fall 2019.
2. Ziheng Wang. (2019). Modeling and Evaluation for Robot-Assisted Surgical Training and Intuitive Teleoperation. Ph.D. Dissertation, Mechanical Engineering. University of Texas at Dallas. Fall 2019.
3. Kevin Desai. (2019). Quantifying Experience and Task Performance in 3D Serious Games. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2019.
4. Afshin Nasrabadi. (2019). Improving Quality of Experience for HTTP Adaptive Video Streaming: From Legacy to 360° Videos. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2019.
5. Kanchan Bahirat. (2018). On 3D Content Manipulation: Simplification, Modification and Authentication. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Fall 2018.
6. Junia da Rocha Valente. (2018). Vulnerability Trends in IoT Devices and New Sensor-Assisted Security Protections. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2018.
7. Yuan Tian. (2017). Haptic Rendering in 3D Immersive Virtual Environment. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Fall 2017.
8. John Kay. (2017). Virtual Environments as Communication Technologies of Faith. Ph.D. Dissertation, Arts, Technology, and Emerging Communication. University of Texas at Dallas. Summer 2017.
9. Asma Naz. (2017). An Interactive Living Space for Neo-Nomads: An Anticipatory Approach. Ph.D. Dissertation, Arts, Technology, and Emerging Communication. University of Texas at Dallas. Spring 2017.
10. Suraj Raghuraman. (2017). I3DTI: Interactive 3D Tele-Immersion. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2017.
11. Jeffrey Holcomb. (2016). Computing Generalized Voronoi Diagrams. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2016.
12. Yin Yang. (2013). Physics-Based Subspace Deformation, Theory and Application. Ph.D. Dissertation, Computer Science. University of Texas at Dallas. Spring 2013.

M.S. Thesis Committees

1. Lakshmi Sharma. (2018). Learn DNA: An Interactive VR Application for Learning DNA Structure. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2018.

2. Sudhir Ramalingam. (2016). Importance of Interaction in Interactive 3D Tele-Immersion. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2016.
3. Aaron Plauché. (2015). A Haptic Feedback System for Phase-Based Sensory Restoration in Above-Knee Prosthetic Leg Users. M.S. Thesis, Mechanical Engineering. University of Texas at Dallas. Fall 2015.
4. Cameron Watkins. (2015). Sensor Driven Realtime Animation for Feedback During Physical Therapy. M.S. Thesis, Computer Science. University of Texas at Dallas. Spring 2015.
5. Ganesh Salvi. (2014). Storage and Retrieval of Multimodal 3D Tele-Immersion Data. M.S. Thesis, Computer Science. University of Texas at Dallas. Fall 2014.

Advised Senior Design Teams

1. James Dunlap, Jacob Greenway, Perry Lee, and Bodie Malik. (2019). Computer Science. University of Texas at Dallas. Spring 2019. Sponsored by Raytheon.
2. Troy Frazier, Marian Lusk, Michael Lyke, David Stenson, and Zana Warren. (2019). Computer Science. University of Texas at Dallas. Spring 2019. Sponsored by Raytheon.
3. Jennifer Bejarano, Akshaya Madhavan, Miguel Medrano, Sunil Sampath, and Gerald Zapata. (2019). Computer Science. University of Texas at Dallas. Spring 2019. Sponsored by Immosis LLC.
4. Cristian Cave, Brandon Christy, Jeff Imam, Randall Moreland, and Tayfun Nalbantoglu. (2019). Computer Science. University of Texas at Dallas. Spring 2019. Sponsored by Immosis LLC.
5. Rohan Gupta, Anthony Lau, Adharsh Rajendran, Pooshan Shah, and Tanushri Tarun Singh. (2018). Computer Science. University of Texas at Dallas. Spring 2018. Sponsored by UT Southwestern. **2nd Place Award.**
6. Husam Abdelhadi, Brandon Marzik, Catherine Nguyen, and Gabriela Rodriguez. (2017). Computer Science. University of Texas at Dallas. Fall 2017. Sponsored by UT Southwestern. **2nd Place Award.**
7. Syed Salman Ahmad, Jackson Duke, Joshua Honeycutt, and Edward Min. (2017). Computer Science. University of Texas at Dallas. Fall 2017. Sponsored by UT Southwestern.
8. Michael Abuda, Scott Prasse, Senay Sahle, Randi Sanchez, and Matthew Valencia. (2017). Computer Science. University of Texas at Dallas. Spring 2017. Sponsored by Raytheon.
9. Johnny Edgett, Sylvia Gong, Kyle Tillotson, and Yunqing Yang. (2016). Computer Science. University of Texas at Dallas. Fall 2016. Sponsored by Raytheon.
10. Mitchell Chapman, Nicholas DiCarlo, Alexander Long, and Aaron Tijerina. (2016). Computer Science. University of Texas at Dallas. Fall 2016. Sponsored by Citigroup.
11. Emiola Banwo, Stephen Hales, and Nuno Resende. (2016). Electrical Engineering. University of Texas at Dallas. Spring 2016.

Classroom Instruction

- CAP 5115 Virtual Reality Engineering, University of Central Florida, Fall 2020 [Evaluation: **4.82** / 5.0].
- CAP 5937 Special Topics: Virtual Reality, University of Central Florida, Spring 2020 [Evaluation: **4.67** / 5.0].
- CAP 6938 Special Topics: Augmented Reality, University of Central Florida, Spring 2020 [Evaluation: **4.64** / 5.0].
- CS 4353 Human Computer Interactions II, University of Texas at Dallas, Spring 2019 [Evaluation: **4.94** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Spring 2019 [Evaluation: **4.92** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Fall 2018 [Evaluation: **4.99** / 5.0].
- CS 4353 Human Computer Interactions II, University of Texas at Dallas, Spring 2018 [Evaluation: **4.90** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Spring 2018 [Evaluation: **4.98** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Fall 2017 [Evaluation: **4.88** / 5.0].
- CS 4353 Human Computer Interactions II, University of Texas at Dallas, Spring 2017 [Evaluation: **4.90** / 5.0].
- CS 7301 Recent Advances: Advanced VR, University of Texas at Dallas, Spring 2017 [Evaluation: **5.00** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Fall 2016 [Evaluation: **4.84** / 5.0].

- CS 4353 Human Computer Interactions II, University of Texas at Dallas, Spring 2016 [Evaluation: **4.81** / 5.0].
- CS 6334 Virtual Reality, University of Texas at Dallas, Fall 2015 [Evaluation: **4.90** / 5.0].
- CS 4353 Human Computer Interactions II, University of Texas at Dallas, Spring 2015 [Evaluation: **4.76** / 5.0].
- CS 4352 Human Computer Interactions I, University of Texas at Dallas, Fall 2014 [Evaluation: **4.88** / 5.0].
- CS 6301 Special Topics: Virtual Reality, University of Texas at Dallas, Fall 2014 [Evaluation: **4.94** / 5.0].
- CS 6301 Special Topics: Virtual Reality, University of Texas at Dallas, Spring 2014 [Evaluation: **5.00** / 5.0].
- CS 4352 Human Computer Interactions I, University of Texas at Dallas, Fall 2013 [Evaluation: **4.71** / 5.0].
- CS 6378 Advanced Operating Systems, University of Texas at Dallas, Fall 2013 [Evaluation: **4.89** / 5.0].
- CS 6301 Special Topics: Virtual Reality, University of Texas at Dallas, Spring 2013 [Evaluation: **4.98** / 5.0].
- CS 6378 Advanced Operating Systems, University of Texas at Dallas, Fall 2012 [Evaluation: **4.78** / 5.0].

Teaching Assistant

- CS 3204 Operating Systems, Virginia Tech, Spring 2005.
- CS 4204 Computer Graphics, Virginia Tech, Fall 2004.

PROFESSIONAL SERVICE

Editorial Service

1. Associate Editor, *International Journal of Human-Computer Studies (IJHCS)*, 2014 – Present.
2. Associate Editor, *IEEE Transactions on Visualization and Computer Graphics (TVCG)*, 2019 – 2021.

Guest Editorial Service

1. Guest Associate Editor, *Computers & Graphics*, 2021 – Present.
2. Guest Associate Editor, *Frontiers in Virtual Reality*, 2020 – Present.
3. Review Editor, *Frontiers in Virtual Environments*, 2014 – 2019.
4. Guest Associate Editor, *Frontiers in Virtual Environments*, 2015 – 2017.

Conference Organizing Service

1. Contest Co-Chair, *IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2021)*.
2. Workshops Co-Chair, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2020)*.
3. 3DUI Contest Co-Chair, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2018)*.
4. 3DUI Contest Co-Chair, *IEEE Symposium on 3D User Interfaces (3DUI 2017)*.
5. Industry and Sponsorship Chair, *ACM Symposium on Spatial User Interaction (SUI 2017)*.
6. 3DUI Contest Co-Chair, *IEEE Symposium on 3D User Interfaces (3DUI 2016)*.
7. Web Co-Chair, *IEEE Virtual Reality Conference (VR 2016)*.
8. Publication Co-Chair, *IEEE Virtual Reality Conference (VR 2015)*.
9. Videos Co-Chair, *IEEE Virtual Reality Conference (VR 2014)*.
10. Student Volunteers Co-Chair, *IEEE Virtual Reality Conference (VR 2008)*.
11. Student Volunteers Co-Chair, *IEEE Virtual Reality Conference (VR 2007)*.

Conference Program Chair Service

1. Program Co-Chair, *International Conference on Artificial Reality and Teleexistence & Eurographics Symposium on Virtual Environments (ICAT-EGVE 2020)*.
2. Virtual Reality Co-Chair, *International Symposium on Visual Computing (ISVC 2014)*.

Conference Program Committee Service

1. Journal Papers Program Committee, *IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2021)*.
2. Program Committee, *IEEE International Conference on Intelligent Reality (ICIR 2021)*.
3. Program Committee, *ACM Symposium on Virtual Reality Software and Technology (VRST 2020)*.
4. Program Committee, *IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2020)*.
5. Conference Papers Program Committee, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2020)*.
6. Program Committee, *ACM Symposium on Spatial User Interaction (SUI 2019)*.
7. Program Committee, *IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2019)*.
8. Conference Papers Program Committee, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2019)*.
9. Program Committee, *IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR 2018)*.
10. Program Committee, *ACM Symposium on Spatial User Interaction (SUI 2018)*.
11. Conference Papers Program Committee, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2018)*.
12. Program Committee, *IEEE Symposium on 3D User Interfaces (3DUI 2017)*.
13. Program Committee, *ACM Symposium on Spatial User Interaction (SUI 2017)*.
14. Program Committee, *IEEE Symposium on 3D User Interfaces (3DUI 2016)*.
15. Program Committee, *ACM Symposium on Spatial User Interaction (SUI 2016)*.
16. Program Committee, *IEEE Virtual Reality Conference (VR 2016)*.
17. Program Committee, *ACM Symposium on Virtual Reality Software and Technology (VRST 2016)*.
18. Program Committee, *IEEE Symposium on 3D User Interfaces (3DUI 2015)*.
19. Program Committee, *IEEE Symposium on Haptic, Audio and Visual Environments and Games (HAVE 2015)*.
20. Program Committee, *ACM Symposium on Spatial User Interaction (SUI 2015)*.
21. Program Committee, *IEEE Virtual Reality Conference (VR 2015)*.
22. Program Committee, *ACM Symposium on Virtual Reality Software and Technology (VRST 2015)*.
23. Program Committee, *IEEE Symposium on 3D User Interfaces (3DUI 2014)*.
24. Program Committee, *IEEE Symposium on Haptic, Audio and Visual Environments and Games (HAVE 2014)*.
25. Program Committee, *IEEE Virtual Reality Conference (VR 2014)*.

Conference Judging Service

1. Competition Judge, *IEEE International Conference on Intelligent Reality (ICIR 2021)*.

Conference Session Service

1. Session Chair, *IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2021)*.
2. Session Chair, *IEEE Virtual Reality Conference (VR 2015)*.

Workshop Steering Service

1. Steering Committee, *3rd International Workshop on Interactive and Spatial Computing (IWISC 2018)*.

Workshop Organizing Service

1. Workshop Co-Chair, *Annual Workshop on 3D Content Creation for Simulated Training in eXtended Reality (TrainingXR at IEEE VR 2021)*.

Workshop Program Chair Service

1. Technical Program Chair, *3rd International Workshop on Interactive and Spatial Computing (IWISC 2018)*.

Workshop Program Committee Service

1. Program Committee, *ACM International Workshop on Multimodal Virtual and Augmented Reality (MVAR 2016)*.

Federal Agency Review Service

1. Reviewer, NSF Directorate for Education and Human Resources (EHR), 2021.
2. Panelist, NSF Division of Computer and Network Systems (CNS), 2021.
3. Panelist, NSF Directorate for Education and Human Resources (EHR), 2021.
4. Panelist, NSF Division of Computer and Network Systems (CNS), 2020.
5. Reviewer, NSF Division of Social and Economic Sciences (SES), 2020.
6. Panelist, NSF Small Business Innovation Research Program (SBIR), 2019.
7. Panelist, NSF Division of Information and Intelligent Systems (IIS), 2019.
8. Panelist, NSF Small Business Innovation Research Program (SBIR), 2018.
9. Panelist, NSF Division of Information and Intelligent Systems (IIS), 2018.
10. Reviewer, Army Research Office (ARO), 2018.
11. Panelist, NSF Research Experiences for Undergraduates (REU), 2016.

Ph.D. Dissertation Examination Service

1. External Examiner, Bradley Herbert, University of South Australia, AU, Spring 2021.
2. External Examiner, Hyungon Kim, University of Canterbury, NZ, Fall 2017.

Other Professional Service

1. Founding Committee, The Higher Education Campus Alliance for Advanced Visualizations (THE CAAV), 2015 – 2016.

UNIVERSITY SERVICE

University Directorships

1. Associate Director, Mixed Reality Engineering Graduate Program, University of Central Florida, 2020 – Present.
2. Director, Extended Reality & Training (XRT) Lab, University of Central Florida, 2019 – Present.
3. Director, Future Immersive Virtual Environments (FIVE) Lab, University of Texas at Dallas, 2012 – 2019.

University Memberships

1. Dallas Institute for Interactive and Spatial Computing (UT-DIISC), University of Texas at Dallas, 2015 – 2019.
2. iPerform Industry-University Cooperative Research Center (I/UCRC), University of Texas at Dallas, 2015 – 2019.

University Chair Service

1. Outside Chair, Doctoral Final Exam for Venkata Srikrishna Pillutla, University of Texas at Dallas, Summer 2017.
2. Outside Chair, Doctoral Final Exam for Cheng Shi, University of Texas at Dallas, Summer 2015.
3. Outside Chair, Doctoral Final Exam for Kyung Sung Jung, University of Texas at Dallas, Summer 2013.

University Committee Service

1. CAREER Mentoring Committee in STEM Education and Virtual Reality, University of Central Florida, 2020.
2. Committee on Research Involving Human Subjects, University of Texas at Dallas, 2016 – 2019.
3. Galaxy Portal Revolution Committee, University of Texas at Dallas, 2016 – 2017.
4. Dean of ATEC Review and Recommendation Committee, University of Texas at Dallas, 2015.
5. 3D Visualization Facility Feasibility Study Team, University of Texas at Dallas, 2013 – 2015.

University Mentoring Service

1. Faculty Advisor, Extended Reality Society Student Organization, University of Texas at Dallas, 2016 – 2019.
2. Faculty Mentor, National Merit Scholars LEADER Program, University of Texas at Dallas, 2017.

3. Faculty Mentor, Clark Summer Scholars Research Program, University of Texas at Dallas, 2017.
4. Faculty Mentor, Clark Summer Scholars Research Program, University of Texas at Dallas, 2016.
5. Faculty Mentor, Clark Summer Scholars Research Program, University of Texas at Dallas, 2015.
6. Faculty Mentor, UT Dallas – Mexico Research Summer Program, University of Texas at Dallas, 2015.

Other University Service

1. Reviewer, UCF Seed Funding Program, University of Central Florida, 2019.

School Chair Service

1. Chair, Computer Science Publicity and Website Committee, University of Texas at Dallas, 2013 – 2016.

School Committee Service

1. Computer Science Instructor and Lecturer Faculty Promotion Committee, University of Central Florida, 2020.
2. ATEC Computational Media Area Committee, University of Texas at Dallas, 2018 – 2019.
3. Computer Science Publicity and Website Committee, University of Texas at Dallas, 2013 – 2019.
4. Computer Science Ph.D. Recruitment Committee, University of Texas at Dallas, 2013 – 2019.
5. Computer Science Graduate Admissions Committee, University of Texas at Dallas, 2012 – 2017.
6. Biomedical Innovations Steering Committee, University of Texas Southwestern Medical Center, 2016 – 2017.
7. ATEC Game Production Faculty Search Committee, University of Texas at Dallas, 2016 – 2017.
8. Computer Science Ad Hoc Affiliated Faculty Committee, University of Texas at Dallas, 2017.
9. ATEC Computer Science I Committee, University of Texas at Dallas, 2017.
10. ATEC Game Studies Faculty Search Committee, University of Texas at Dallas, 2015 – 2016.
11. CS Advanced Operating Systems Qualifying Exam Committee, University of Texas at Dallas, 2012 – 2014.

School Senior Design Service

1. Computer Science Senior Design Committees (Groups 1, 19, 23 & 28), University of Central Florida, Spring 2020.
2. Computer Science Senior Design Committees (Groups 11 & 25), University of Central Florida, Fall 2019.

Other School Service

1. Designed Computer Science Computing Research Association member page, University of Central Florida, 2019 – 2020.

Community Service

1. FIVE Lab Research Experience Camp, University of Texas at Dallas, Summer 2018.
2. Engineering & Computer Science Research Experience Camp, University of Texas at Dallas, June 2017.
3. FIVE Lab Research Experience Camp, University of Texas at Dallas, Summer 2016.
4. Engineering & Computer Science Research Experience Camp, University of Texas at Dallas, June 2015.
5. FIVE Lab Research Experience Camp, University of Texas at Dallas, Summer 2015.
6. VR Game Design Camp, University of Texas at Dallas, August 2014.
7. Engineering & Computer Science Research Experience Camp, University of Texas at Dallas, June 2014.
8. FIVE Lab Research Experience Camp, University of Texas at Dallas, Summer 2014.

EXTERNAL SERVICE

Consultant Activities

1. Advisory Board Member, MyndVR, LLC., 2017 – Present.