

# Evan Suma Rosenberg

Assistant Professor

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## Professional Appointments

- 6/2018 - current **Assistant Professor**, *Department of Computer Science & Engineering, University of Minnesota.*
- 7/2013 - 6/2018 **Research Assistant Professor**, *Institute for Creative Technologies and Department of Computer Science, University of Southern California.*
- 3/2012 - 7/2013 **Senior Research Associate**, *Institute for Creative Technologies, University of Southern California.*
- 6/2010 - 3/2012 **Postdoctoral Research Associate**, *Institute for Creative Technologies, University of Southern California,*  
Advisor: Mark Bolas.
- 6/2008 - 8/2009 **Adjunct Lecturer**, *Department of Computer Science, University of North Carolina at Charlotte.*

## Education

- May 2010 **Ph.D. in Computer Science**, *University of North Carolina at Charlotte.*  
Dissertation: "Experimental Evaluation of the Cognitive Effects of Travel Technique in Immersive Virtual Environments."  
Advisor: Dr. Larry F. Hodges.
- May 2005 **B.A. in Computer Science**, *Ithaca College.*

## Honors

- 2018 Steering Committee Chair, ACM Symposium on Spatial User Interaction
- 2018 Keynote, IEEE VR Workshop on Everyday Virtual Reality
- 2017 Google VR Research Award
- 2017 General Chair, IEEE Virtual Reality
- 2016 Keynote, Seoul Creative Dream Conference
- 2015 First Place, ACM SIGGRAPH Immersive Realities AR/VR Contest
- 2015 Keynote, International Symposium on Visual Computing
- 2015 Best Poster Award, ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games
- 2014 Best Poster Award, ACM Symposium on Spatial User Interaction
- 2014 Best Poster Honorable Mention, IEEE Virtual Reality
- 2014 Best Research Demo Honorable Mention, IEEE Virtual Reality
- 2013 General Chair, ACM Symposium on Spatial User Interaction
- 2012 Best Paper Honorable Mention, IEEE Virtual Reality
- 2012 Best Research Demo, IEEE Virtual Reality
- 2011 Best Technote Award, IEEE Symposium on 3D User Interfaces
- 2011 Best Paper Award, Interservice/Industry Training, Simulation, and Education Conference, Emerging Concepts and Innovative Technologies
- 2009 Edward C. Giles Dissertation-Year Graduate Fellowship
- 2007 Best Paper Award, IEEE Symposium on 3D User Interfaces

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## Publications

### Journal Papers and Book Chapters

- [1] N. Nilsson, T. Peck, G. Bruder, E. Hodgson, S. Serafin, E. Suma Rosenberg, M. Whitton, and F. Steinicke. 15 years of research on redirected walking in immersive virtual environments. *IEEE Computer Graphics and Applications*, 38(2):44–56, 2018.
- [2] A. Feng, E. Suma Rosenberg, and A. Shapiro. Just-in-time, viable, 3-D avatars from scans. *Computer Animation and Virtual Worlds*, 28(3-4):e1769, 2017.
- [3] C. Mauceri, E. Suma, S. Finkelstein, and R. Souvenir. Evaluating visual query methods for articulated motion video search. *International Journal of Human-Computer Studies*, 77:10–22, 2015.
- [4] D.H. Jeong, S. Ji, E. Suma, B. Yu, and R. Chang. Designing a collaborative visual analytics system to support users' continuous analytical processes. *Human-centric Computing and Information Sciences*, 5(5), 2015.
- [5] A. Shapiro, A. Feng, R. Wang, H. Li, M. Bolas, G. Medioni, and E. Suma. Rapid avatar capture and simulation using commodity depth sensors. *Computer Animation and Virtual Worlds*, 15(3-4):201–211, 2014.
- [6] E. Suma, D. Krum, B. Lange, S. Koenig, A. Rizzo, and M. Bolas. Adapting user interfaces for gestural interaction with the Flexible Action and Articulated Skeleton Toolkit. *Computers & Graphics*, 37(3):193–201, 2013.
- [7] E. Suma, D. Krum, and M. Bolas. Redirected walking in mixed reality training applications. In *Human Walking in Virtual Environments: Perception, Technology, and Applications*, pages 319–331. Springer, 2013.
- [8] E. Suma, Z. Lipps, S. Finkelstein, D. Krum, and M. Bolas. Impossible Spaces: Maximizing natural walking in virtual environments with self-overlapping architecture. *IEEE Transactions on Visualization and Computer Graphics (Proceedings Virtual Reality)*, pages 555–564, 2012. **Best Paper Honorable Mention.**
- [9] B. Lange, S. Koenig, C. Chang, E. McConnell, E. Suma, M. Bolas, and A. Rizzo. Designing informed game-based rehabilitation tasks leveraging advances in virtual reality. *Disability and Rehabilitation*, 34(22):1863–1870, 2012.
- [10] S. Babu, E. Suma, L. Hodges, and T. Barnes. Learning cultural conversational protocols with immersive interactive virtual humans. *International Journal of Virtual Reality*, 10(4):25–35, 2011.
- [11] D. Krum, E. Suma, and M. Bolas. Augmented reality using personal projection and retroreflection. *Personal and Ubiquitous Computing*, 16(1):17–26, 2011.
- [12] S. Finkelstein, A. Nickel, Z. Lipps, Z. Wartell, T. Barnes, and E. Suma. Astrojumper: Motivating exercise with an immersive virtual reality exergame. *Presence: Teleoperators & Virtual Environments*, 20(1):78–92, 2011.
- [13] A. Rizzo, B. Lange, E. Suma, and M. Bolas. Virtual reality and interactive digital game technology: New tools to address obesity and diabetes. *Journal of Diabetes Science and Technology*, 5(2):256–264, 2011.
- [14] D. Krum, E. Suma, and M. Bolas. Sharing and stretching space with full body tracking. In *Whole Body Interaction*, pages 51–62. Springer London, 2011.
- [15] E. Suma, S. Finkelstein, M. Reid, S. Babu, A. Ulinski, and L.F. Hodges. Evaluation of the cognitive effects of travel technique in complex real and virtual environments. *IEEE Transactions on Visualization and Computer Graphics*, 16(4):690–702, 2010.
- [16] S. Koepnick, R. Hoang, M. Sgambati, D. Coming, E. Suma, and W. Sherman. RIST: Radiological immersive survey training for two simultaneous users. *Computers & Graphics*, 34(6):665–676, 2010.
- [17] R. Chang, A. Lee, M. Ghoniem, R. Kosara, W. Ribarsky, J. Yang, E. Suma, C. Ziemkiewicz, D. Kern, and A. Sudjianto. Scalable and interactive visual analysis of financial wire transactions for fraud detection. *Journal of Information Visualization*, 7:63–76, 2008.

### Refereed Conference Papers

- [18] C. Chen and E. Suma Rosenberg. Dynamic omnidirectional texture synthesis for photorealistic virtual content creation. In *IEEE International Symposium on Mixed and Augmented Reality*, 2018, to appear.
- [19] M. Dennison, J. Thomas, T. Trout, and E. Suma Rosenberg. Assessing the quantitative and qualitative effects of using mixed reality for operational decision making. In *International Command and Control Research & Technology Symposium*, 2018, to appear.
- [20] C. Chen, M. Bolas, and E. Suma Rosenberg. View-dependent virtual reality content from RGB-D images. In *IEEE International Conference on Image Processing*, pages 2931–2935, 2017.
- [21] J. Thomas, M. Azmandian, S. Grunwald, D. Le, D. Krum, S. Kang, and E. Suma Rosenberg. Effects of personalized avatar texture fidelity on identity recognition in virtual reality. In *International Conference on Artificial Reality and Telexistence & Eurographics Symposium on Virtual Environments*, pages 97–100, 2017.

- [22] M. Azmandian, T. Grechkin, and E. Suma Rosenberg. An evaluation of strategies for two user redirected walking in shared physical spaces. In *IEEE Virtual Reality*, pages 91–98, 2017.
- [23] T. Grechkin, J. Thomas, M. Azmandian, M. Bolas, and E. Suma. Revisiting detection thresholds for redirected walking: Combining translation and curvature gains. In *ACM Symposium on Applied Perception*, pages 113–120, 2016.
- [24] D. Casas, A. Feng, O. Alexander, G. Fyffe, P. Debevec, R. Ichikari, H. Li, K. Olszewski, E. Suma, and A. Shapiro. Rapid photorealistic blendshape modeling from RGB-D sensors. In *International Conference on Computer Animation and Social Agents*, pages 121–129, 2016.
- [25] M. Azmandian, T. Grechkin, M. Bolas, and E. Suma. Automated path prediction for redirected walking using navigation meshes. In *IEEE Symposium on 3D User Interfaces*, pages 63–66, 2016.
- [26] M. Azmandian, T. Grechkin, M. Bolas, and E. Suma. Physical space requirements for redirected walking: How size and shape affect performance. In *International Conference on Artificial Reality and Telexistence and Eurographics Symposium on Virtual Environments*, pages 93–100, 2015.
- [27] R. McAlinden, E. Suma, T. Grechkin, and M. Enloe. Procedural reconstruction of simulation terrain using drones. In *Interservice/Industry Training, Simulation, and Education Conference*, 2015.
- [28] A. Feng, G. Lucas, S. Marsella, E. Suma, C. Chiu, D. Casas, and A. Shapiro. Acting the part: The role of gesture on avatar identity. In *ACM SIGGRAPH Conference on Motion in Games*, pages 49–54, 2014.
- [29] K. Vasylevska, H. Kaufmann, M. Bolas, and E. Suma. Flexible Spaces: Dynamic layout generation for infinite walking in virtual environments. In *IEEE Symposium on 3D User Interfaces*, pages 39–42, 2013.
- [30] E. Suma, G. Bruder, F. Steinicke, D. Krum, and M. Bolas. A taxonomy for deploying redirection techniques in immersive virtual environments. In *IEEE Virtual Reality*, pages 43–46, 2012.
- [31] D. Krum, E. Suma, and M. Bolas. Spatial misregistration of virtual human audio: Implications of the precedence effect. In *International Conference on Intelligent Virtual Agents*, pages 139–145, 2012.
- [32] E. Suma, S. Clark, S. Finkelstein, Z. Wartell, D. Krum, and M. Bolas. Leveraging change blindness for redirection in virtual environments. In *IEEE Virtual Reality*, pages 159–166, 2011.
- [33] E. Suma, D. Krum, S. Finkelstein, and M. Bolas. Effects of redirection on spatial orientation in real and virtual environments. In *IEEE Symposium on 3D User Interfaces*, pages 35–38, 2011. **Best Technote Award.**
- [34] B. Lange, A. Rizzo, C. Chang, E. Suma, and M. Bolas. Markerless full body tracking: Depth-sensing technology within virtual environments. In *Interservice/Industry Training, Simulation, and Education Conference*, 2011. **Best Paper Award.**
- [35] B. Lange, E. Suma, B. Newman, T. Phan, C. Chang, A. Rizzo, and M. Bolas. Leveraging unencumbered full body control of animated virtual characters for game-based rehabilitation. In *HCI International*, pages 243–252, 2011.
- [36] B. Lange, C. Chang, E. Suma, B. Newman, A. Rizzo, and M. Bolas. Development and evaluation of low cost game-based balance rehabilitation tool using the Microsoft Kinect sensor. In *IEEE Engineering in Medicine and Biology Conference*, pages 1831–1834, 2011.
- [37] E. Suma, S. Finkelstein, S. Clark, P. Goolkasian, and L.F. Hodges. Effects of travel technique and gender on a divided attention task in a virtual environment. In *IEEE Symposium on 3D User Interfaces*, pages 27–34, 2010.
- [38] A. Ulinski, Z. Wartell, P. Goolkasian, E. Suma, and L.F. Hodges. Selection performance based on classes of bimanual actions. In *IEEE Symposium on 3D User Interfaces*, pages 51–58, 2009.
- [39] E. Suma, C. Sinclair, J. Babbs, and R. Souvenir. A sketch-based approach for detecting common human actions. In *International Symposium on Visual Computing*, pages 418–427, 2008.
- [40] E. Suma, S. Babu, and L.F. Hodges. Comparison of travel techniques in a complex, multi-level 3D environment. In *IEEE Symposium on 3D User Interfaces*, pages 147–153, 2007. **Best Paper Award.**
- [41] S. Babu, E. Suma, T. Barnes, and L.F. Hodges. Using immersive virtual humans for training in social conversational protocols in a south indian culture. In *IEEE Virtual Reality*, pages 215–218, 2007.
- [42] R. Chang, M. Ghoniem, R. Kosara, W. Ribarsky, J. Yang, E. Suma, C. Ziemkiewicz, D. Kern, and A. Sudjianto. WireVis: Visualization of categorical, time-varying data from financial transactions. In *IEEE Visual Analytics Science and Technology*, pages 155–162, 2007.

### Miscellaneous Publications

- [43] H. Chen, S. Chen, and E. Suma Rosenberg. Redirected walking strategies in irregularly shaped and dynamic physical environments. In *IEEE VR Workshop on Everyday Virtual Reality*, 2018.
- [44] C. Chen and E. Suma Rosenberg. Virtual content creation using dynamic omnidirectional texture synthesis. In *IEEE Virtual Reality*, 2018.

- [45] H. Chen, S. Chen, and E. Suma Rosenberg. Redirected walking in irregularly shaped physical environments with dynamic obstacles. In *IEEE Virtual Reality*, 2018.
- [46] C. Hutton, S. Ziccardi, J. Medina, and E. Suma Rosenberg. Please don't puke: Early detection of severe motion sickness in VR. In *IEEE Virtual Reality*, 2018.
- [47] T. Trout, S. Russell, A. Harrison, R. Spicer, E. Suma Rosenberg, and J. Thomas. Collaborative mixed reality (MxR) and networked decision making. In *Proc. SPIE 10653, Next-Generation Analyst VI*, page 106530N, 2018.
- [48] C. Chen, M. Bolas, and E. Suma Rosenberg. Rapid creation of photorealistic virtual reality content with consumer depth cameras. In *IEEE Virtual Reality*, pages 473–474, 2017.
- [49] R Spicer, S. Russell, and E. Suma Rosenberg. The mixed reality of things: Emerging challenges for human-information interaction. In *Proc. SPIE 10207, Next-Generation Analyst V*, page 102070A, 2017.
- [50] A. Feng, E. Suma Rosenberg, and A. Shapiro. Just-in-time, viable, 3D avatars from scans. In *ACM SIGGRAPH Talks*, number 19, 2017.
- [51] M. Azmandian, T. Grechkin, M. Bolas, and E. Suma. The Redirected Walking Toolkit: A unified development and deployment platform for exploring large virtual environments. In *IEEE VR Workshop on Everyday Virtual Reality*, 2016.
- [52] C. Chen, M. Bolas, and E. Suma. Real-time 3D rendering using depth-based geometry reconstruction and view-dependent texture mapping. In *ACM SIGGRAPH Posters*, number 84, 2016.
- [53] C. Hutton and E. Suma. A realistic walking model for enhancing redirection in virtual reality. In *IEEE Virtual Reality*, pages 183–184, 2016.
- [54] N. Nilsson, E. Suma, R. Nordahl, M. Bolas, and S. Serafin. Estimation of detection thresholds for audiovisual rotation gains. In *IEEE Virtual Reality*, pages 241–242, 2016.
- [55] E. Suma, M. Azmandian, T. Grechkin, T. Phan, and M. Bolas. Making small spaces feel large: Infinite walking in virtual reality. In *ACM SIGGRAPH Emerging Technologies*, number 16, 2015.
- [56] M. Bolas, A. Kuruvilla, S. Chintalapudi, F. Rabelo, V. Lympouridis, C. Barron, E. Suma, C. Matamoros, C. Brous, A. Jasina, Y. Zheng, A. Jones, P. Debevec, and D. Krum. Creating near-field VR using stop motion characters and a touch of light-field rendering. In *ACM SIGGRAPH Posters*, number 19, 2015.
- [57] D. Casas, O. Alexander, A. Feng, G. Fyffe, R. Ichikari, P. Debevec, R. Wang, E. Suma, and A. Shapiro. Blendshapes from commodity RGB-D sensors. In *ACM SIGGRAPH Talks*, number 33, 2015.
- [58] D. Casas, O. Alexander, A. Feng, G. Fyffe, I. Ryosuke, , P. Debevec, R. Wang, E. Suma, and A. Shapiro. Rapid photorealistic blendshapes from commodity RGB-D sensors. In *ACM SIGGRAPH Symposium on Interactive 3D Graphics and Games*, page 134, 2015. **Best Poster Award**.
- [59] T. Grechkin, M. Azmandian, M. Bolas, and E. Suma. Towards context-sensitive reorientation for real walking in virtual reality. In *IEEE Virtual Reality*, pages 185–186, 2015.
- [60] E. Suma, D. Krum, T. Richmond, and M. Bolas. The MxR Lab at the USC Institute for Creative Technologies. In *IEEE Virtual Reality*, 2015.
- [61] M. Azmandian, R. Yahata, M. Bolas, and E. Suma. An enhanced steering algorithm for redirected walking in virtual environments. In *IEEE Virtual Reality*, pages 65–66, 2014. **Best Poster Honorable Mention**.
- [62] A. Shapiro, A. Feng, R. Wang, G. Medioni, M. Bolas, and E. Suma. Automatic acquisition and animation of virtual avatars. In *IEEE Virtual Reality*, pages 185–186, 2014. **Best Research Demo Honorable Mention**.
- [63] J. Thomas, R. Bashyal, S. Goldstein, and E. Suma. MuVR: A multi-user virtual reality platform. In *IEEE Virtual Reality*, pages 115–116, 2014.
- [64] R. Spicer, R. Yahata, M. Bolas, and E. Suma. A raycast approach to hybrid touch / motion capture virtual reality user experience. In *ACM Symposium on Spatial User Interaction*, page 160, 2014. **Best Poster Award**.
- [65] C. Chen, R. Spicer, R. Yahata, M. Bolas, and E. Suma. Real-time and robust grasping detection. In *ACM Symposium on Spatial User Interaction*, page 159, 2014.
- [66] A. Feng, A. Shapiro, R. Wang, M. Bolas, G. Medioni, and E. Suma. Rapid avatar capture and simulation using commodity depth sensors. In *ACM SIGGRAPH Talks*, number 16, 2014.
- [67] M. Azmandian, M. Bolas, and E. Suma. Countering user deviation during redirected walking. In *ACM Symposium on Applied Perception*, page 129, 2014.
- [68] K. Vasylevska, H. Kaufmann, M. Bolas, and E. Suma. Flexible spaces: A virtual step outside of reality. In *IEEE Virtual Reality*, pages 109–110, 2013.
- [69] S. Finkelstein, Z. Lipps, T. Barnes, Z. Wartell, and E. Suma. Evaluation of the exertion and motivation factors of a virtual reality exercise game for children with autism. In *IEEE VR Workshop on Virtual and Augmented Assistive Technology*, 2013.

- [70] Y. Huang, M. Bolas, and E. Suma. Fusing depth, color, and skeleton data for enhanced real-time hand segmentation. In *ACM Symposium on Spatial User Interaction*, page 85, 2013.
- [71] E. Suma, B. Lange, A. Rizzo, D. Krum, and M. Bolas. FFAST-R: Defining a core mechanic for designing gestural interfaces. In *The 3rd Dimension of CHI: Touching and Designing 3D User Interfaces*, pages 35–42, 2012.
- [72] J. Jones, E. Suma, D. Krum, and M. Bolas. Comparability of narrow and wide field-of-view head-mounted displays for medium-field distance judgments. In *ACM Symposium on Applied Perception*, page 119, 2012.
- [73] P. Hoberman, D. Krum, E. Suma, and M. Bolas. Immersive training games for smartphone-based head mounted displays. In *IEEE Virtual Reality*, pages 151–152, 2012.
- [74] D. Krum, E. Suma, and M. Bolas. Virtual reality to go: A USC ICT mixed reality lab demonstration. In *IEEE Virtual Reality*, pages 179–180, 2012. **Best Research Demo Award.**
- [75] D. Krum, E. Suma, and M. Bolas. Spatial misregistration of virtual human audio: Implications of the precedence effect. In *IEEE Symposium on 3D User Interfaces*, pages 147–148, 2012.
- [76] N. Burba, M. Bolas, D. Krum, and E. Suma. Unobtrusive measurement of subtle nonverbal behaviors with the Microsoft Kinect. In *IEEE VR Workshop on Ambient Information Technologies*, pages 10–13, 2012.
- [77] E. Suma, D. Krum, and M. Bolas. Redirection on mixed reality walking surfaces. In *IEEE VR Workshop on Perceptual Illusions in Virtual Environments*, pages 33–35, 2011.
- [78] E. Suma, B. Lange, A. Rizzo, D. Krum, and M. Bolas. FFAST: The Flexible Action and Articulated Skeleton Toolkit. In *IEEE Virtual Reality*, pages 247–248, 2011.
- [79] J. L. Olson, D. Krum, E. Suma, and M. Bolas. A design for a smartphone-based head mounted display. In *IEEE Virtual Reality*, pages 233–234, 2011.
- [80] E. Suma, D. Krum, and M. Bolas. Sharing space in mixed and virtual reality environments using a low-cost depth sensor. In *International Symposium on VR Innovation*, pages 353–354, 2011.
- [81] E. Suma, S. Clark, S. Finkelstein, and Z. Wartell. Leveraging change blindness for walking in virtual environments. In *IEEE VR Workshop on Perceptual Illusions in Virtual Environments*, page 10, 2010.
- [82] D. Jeong, E. Suma, T. Butkiewicz, W. Ribarsky, and R. Chang. A continuous analysis process between desktop and collaborative visual analytics environments. In *IEEE Visual Analytics Science and Technology*, pages 231–232, 2010.
- [83] S. Finkelstein, A. Nickel, T. Barnes, and E. Suma. Astrojumper: Motivating children with autism to exercise using a VR game. In *ACM Conference on Human Factors in Computing Systems (CHI)*, pages 4189–4194, 2010.
- [84] E. Suma, S. Clark, S. Finkelstein, and Z. Wartell. Exploiting change blindness to expand walkable space in a virtual environment. In *IEEE Virtual Reality*, pages 305–306, 2010.
- [85] S. Finkelstein, A. Nickel, T. Barnes, and E. Suma. Astrojumper: Designing a virtual reality exergame to motivate children with autism to exercise. In *IEEE Virtual Reality*, pages 267–268, 2010.
- [86] E. Suma, S. Finkelstein, S. Clark, and Z. Wartell. An approach to redirect walking by modifying virtual world geometry. In *IEEE VR Workshop on Perceptual Illusions in Virtual Environments*, pages 16–18, 2009.
- [87] E. Suma, S. Finkelstein, M. Reid, A. Ulinski, and L.F. Hodges. Real walking increases simulator sickness in navigationally complex virtual environments. In *IEEE Virtual Reality*, pages 245–246, 2009.
- [88] S. Finkelstein, A. Nickel, L. Harrison, E. Suma, and T. Barnes. cMotion: A new game design to teach emotion recognition and programming logic to children using virtual humans. In *IEEE Virtual Reality*, pages 249–250, 2009.
- [89] S. Stansfield, T. Butkiewicz, E. Suma, and M. Kane. Interactive virtual client for teaching occupational therapy evaluative processes. In *ACM SIGACCESS Conference on Computers & Accessibility*, pages 186–187, 2005.
- [90] S. Stansfield, C. Dennis, and E. Suma. Emotional and performance attributes of a VR game: A study of children. In *Medicine Meets Virtual Reality*, pages 515–518, 2005.

### Special Issues and Conference Proceedings

- [91] E. Suma Rosenberg, D.M. Krum, Z. Wartell, B. Mohler, S.V. Babu, F. Steinicke, and V. Interrante, editors. *IEEE Virtual Reality Conference Proceedings*. IEEE, 2017.
- [92] T. Hollerer, V. Interrante, A. Lecuyer, and E. Suma, editors. *IEEE Virtual Reality Conference Proceedings*. IEEE, 2016.
- [93] F. Steinicke, E. Suma, and W. Stuerzlinger, editors. *Special Section on Spatial User Interaction*. Computers & Graphics, Elsevier, 2015.

- [94] A. Banic, E. Suma, F. Steinicke, and W. Stuerzlinger, editors. *SUI '15: Proceedings of the 3rd ACM Symposium on Spatial User Interaction*. ACM, 2015.
- [95] A. Wilson, F. Steinicke, E. Suma, and W. Stuerzlinger, editors. *SUI '14: Proceedings of the 2nd ACM Symposium on Spatial User Interaction*. ACM, 2014.
- [96] E. Suma, W. Stuerzlinger, and F. Steinicke, editors. *SUI '13: Proceedings of the 1st Symposium on Spatial User Interaction*. ACM, 2013.

## Patents

- [1] U.S. Patent 9,645,395, Dynamic Field of View Throttling as a Means of Improving User Experience in Head Mounted Virtual Environments. Mark Bolas, J. Adam Jones, Ian McDowall, Evan Suma. Filed March 17, 2014. Issued May 9, 2017.
- [2] U.S. Patent Application 14/694,670, Rapid Avatar Capture and Simulation Using Commodity Depth Sensors. Evan Suma, Gerard Medioni, Mark Bolas, Ari Shapiro, Wei-Wen Feng, Ruizhe Wang. Filed April 23, 2015.

## Funding

- Current **National Science Foundation**, *REU Site: Research in Interactive Virtual Experiences*, Evan Suma (PI) and Andrew Gordon (Co-PI), \$376,963, 2016-2019.
- U.S. Army Research Office**, *Mixed Reality and Human Sensor (MRHS) R&D Platform*, Evan Suma Rosenberg (PI), \$648,000, 2016-2018.
- U.S. Army Research Office**, *Mixed, Virtual, and Augmented Reality Research and Development*, Project Leaders: Todd Richmond, Evan Suma Rosenberg, and David Krum, \$574,000, 2018.
- Google**, *Redirect-an-go: Room-Scale VR in Cluttered Physical Spaces*, Evan Suma Rosenberg (PI), \$75,950, Unrestricted Gift.
- Completed **National Science Foundation**, *REU Site: Research in Interactive Virtual Experiences*, Evan Suma (PI) and Mark Bolas (Co-PI), \$359,449, 2013-2016.
- U.S. Army Research Office**, *Deformable Haptic Surfaces Using Micro-Actuators*, Mark Bolas (PI) and Evan Suma (Co-PI), \$500,000, 2015-2017.
- U.S. Army Research Office**, *Walking with Avatars: Joint Locomotion Actions in Immersive Virtual Environments*, Evan Suma (PI) and Mark Bolas (Co-PI), \$300,000, 2015-2016.
- U.S. Army Research Office**, *Mixed Reality Research and Development*, Project Leaders: Todd Richmond, David Krum, and Evan Suma, \$4.6 million, 2014-2017.
- U.S. Army Research Office**, *Mixed Reality Research and Development*, Project Leaders: Mark Bolas, David Krum, and Evan Suma, \$3.1 million, 2012-2014.
- U.S. Army Research Office**, *Mixed Reality Research and Development*, Project Leaders: Mark Bolas, David Krum, and Evan Suma, \$1.3 million, 2010-2011.
- Office of Naval Research**, *Mapping the Field of View*, Mark Bolas (PI), Adam Jones, Evan Suma, and David Krum, \$506,141, 2013-2015.
- Office of Naval Research**, *E2C2: Enhanced Environment for Communication and Collaboration*, Todd Richmond (PI), Mark Bolas, and Evan Suma, \$3.1 million, 2013-2015.
- Defense Advanced Research Projects Agency**, *Detection and Computational Analysis of Psychological Signals*, Mark Bolas and Evan Suma, \$668,716 of \$4.5 million awarded to Skip Rizzo (PI), 2011-2013.

*\*Awards made under ICT's UARC contract are designated to Project Leaders instead of PIs.*



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## Postdoctoral Fellows Supervised

2015 - 2016 Dr. Timofey Grechkin (Magic Leap)

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## Ph.D. Students Supervised

Current Chih-Fan Chen, Jerald Thomas, Courtney Hutton, Samantha Chen  
2013 - 2017 Dr. Mahdi Azmandian

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## Master's Students Supervised

2011 - 2012 Nathan Burba (CEO, Survios)  
2011 - 2012 Robyn Gray (Co-Founder, Otherworld Interactive)

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## Undergraduate Students Supervised

2017 Shelby Ziccardi, Julio Medina, Daniel Kawalsky  
2016 Sonia Grunwald, Donna Le  
2015 Courtney Hutton (Ph.D. Student, USC)  
2014 Dillon Just  
2013 Jerald Thomas (Ph.D. Student, USC), Samantha Goldstein, Raghav Bashyal  
2010 Seth Clark  
2009-2010 Dr. Samantha Finkelstein (Ph.D., CMU)

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## Teaching Experience

- Fall 2017 **Research Assistant Professor**, *University of Southern California*.  
Designed and taught new graduate course on Virtual Reality & 3D User Interfaces.
- Summer 2013 **REU Director**, *University of Southern California*.  
- Summer 2017 Designed and taught weekly seminars for NSF Research Experiences for Undergraduates program.
- Fall 2008 **Chief Lab Instructor**, *University of North Carolina at Charlotte*.  
- Summer 2009 Designed new curriculum for ITCS 1214L: Intro to Computer Science Lab (300 students) and supervised all CS department lab assistants.
- Summer 2008 **Adjunct Lecturer**, *University of North Carolina at Charlotte*.  
Designed and taught two summer courses of ITCS 1214: Intro to Computer Science.
- Summer 2006 **REU Graduate Mentor**, *University of North Carolina at Charlotte*.  
Summer 2009 Supervised projects and mentored students for NSF Research Experiences for Undergraduates program.
- Fall 2005 **Graduate Teaching Assistant**, *University of North Carolina at Charlotte*.  
- Spring 2008 Operating Systems, Computer Logic & Design, and Virtual Environments.
- Spring 2003 **Undergraduate Teaching Assistant**, *Ithaca College*.  
- May 2005 Principles of Computer Science I, Principles of Computer Science II, and Intro to Web Development.

## Professional Activities

- Conferences* General Chair, IEEE Virtual Reality (2017-2018)  
General Chair, ACM Symposium on Spatial User Interaction (2013)  
Program Chair, IEEE Virtual Reality (2016)  
Program Chair, ACM Symposium on Spatial User Interaction (2014-2016)  
Steering Committee, ACM Symposium on Spatial User Interaction (2015-2018)  
Organizing Committee, IEEE Virtual Reality (2010-2018)  
Organizing Committee, IEEE Symposium on 3D User Interfaces (2011-2013)  
Program Committee, IEEE Virtual Reality (2012-2014, 2018)  
Program Committee, ACM Conference on Human Factors in Computing Systems (CHI) (2013)  
Program Committee, ACM Virtual Reality Software and Technology (2009-2014)  
Program Committee, ACM International Conference on Multimodal Interaction (2012)  
Program Committee, ACM Symposium on Applied Perception (2018)  
Program Committee, Foundations of Digital Games (2012, 2014)  
Program Committee, International Symposium on Visual Computing (2011-2013)  
Real-Time Live Subcommittee, ACM Conference on Computer Graphics and Interactive Techniques (SIGGRAPH) (2012)
- Workshops* Organizer, Workshop on Off-The-Shelf Virtual Reality (2012-2013)  
Co-organizer, Workshop on Ambient Information Technologies (2013)  
Program Committee, Workshop on Perceptual Illusions in Virtual Environments (2011-2012)
- Exhibits* "Discovering Near-Field VR: Stop Motion with a Touch of Light-Fields and a Dash of Redirection,"  
ACM SIGGRAPH Immersive Realities (AR/VR) Contest (2015)  
"Making Small Spaces Feel Large: Infinite Walking in Virtual Reality," ACM SIGGRAPH Emerging  
Technologies (2015)
- Keynotes* IEEE VR Workshop on Everyday Virtual Reality (March 18, 2018)  
Seoul Creative Dream Conference (July 10, 2016)  
International Symposium on Visual Computing (December 14, 2015)
- Refereed Talks* "My Digital Face," ACM SIGGRAPH Real-Time Live (2015)  
"Make Me An Avatar," ACM SIGGRAPH Real-Time Live (2014)
- Invited Talks* University of Florida, Human-Centered Computing Seminar (Fall 2017)  
United States Military Academy at West Point (Spring 2017)  
Georgia Institute of Technology, GVI Brown Bag (Fall 2016)  
Harvey Mudd College, Computer Science Colloquium (Fall 2016)  
University of California, Merced, Cognitive Science Seminar (Fall 2016)  
Google (Fall 2016)  
Microsoft Research (Spring 2016)  
University of North Carolina at Charlotte, Viscenter Seminar (Fall 2015)  
Aalborg University Copenhagen (Fall 2012)  
University of North Carolina at Chapel Hill (Spring 2012)  
University of North Carolina at Charlotte, Graduate Seminar (Spring 2012)  
Clemson University, Visual/Human Centered Computing Seminar (Spring 2012)  
Carnegie Mellon University, HCII Seminar Series (Fall 2011)  
Workshop on Facial and Bodily Expressions for Control and Adaptation of Games (Spring 2011)  
Clemson University, Human-Centered Computing and Visual Computing Seminars (Spring 2010)  
University of North Carolina at Charlotte, Graduate Seminar (Spring 2010)



*Panels* Panelist, "AR and VR Futures," ACM SIGGRAPH (2017)  
Panelist, "Lessons to Game Developers from IEEE VR," IEEE Virtual Reality (2016)  
Panelist, "Lessons from IEEE Virtual Reality," Game Developer's Conference (2016)  
Panelist, "Next Gen Evaluation of VR Interfaces," IEEE Virtual Reality (2015)  
Panelist, "The Changing Face of VR Systems," Workshop on Software Engineering and Architectures for Realtime Interactive Systems (2013)  
Panelist, "Open Source Software for RIS," Workshop on Software Engineering and Architectures for Realtime Interactive Systems (2012)  
Organizer, "New directions in redirection," IEEE Virtual Reality (2011)  
Panelist, Immersive Tech Era of Experience (2011)  
Panelist, Graduate Research and Academic Discovery, College of Computing and Informatics, University of North Carolina at Charlotte (2009-2010)  
Panelist, "Visualization and simulation on immersive display devices," International Symposium on Visual Computing (2008)

*Peer Review* ACM Conference on Computer Graphics and Interactive Techniques (SIGGRAPH)  
ACM Conference on Human Factors in Computing Systems (CHI)  
ACM International Conference on Multimodal Interaction  
ACM Symposium on Applied Perception  
ACM Symposium on User Interface Software and Technology  
ACM Symposium on Virtual Reality Software and Technology  
Foundations of Digital Games  
Human Factors  
IEEE Symposium on 3D User Interfaces  
IEEE Transactions on Visualization and Computer Graphics  
IEEE Virtual Reality  
International Conference on Pattern Recognition  
International Journal of Human-Computer Studies  
International Symposium on Mixed and Augmented Reality  
Joint Virtual Reality Conference EGVE - ICAT - EuroVR  
Pattern Recognition Letters  
Presence: Teleoperators & Virtual Environments

*Proposal Review* National Science Foundation (2017, 2015, 2014)

*Organizations* Member, IEEE  
Member, ACM