

Evan A. Suma

Postdoctoral Research Associate

Institute for Creative Technologies
5318 McConnell Ave, Los Angeles, CA 90066
☎ (310) 448-5311
✉ suma@ict.usc.edu
<http://www.evansuma.com>

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*.
Project: "Interactive Virtual Client for Teaching Occupational Therapy Evaluative Processes."
Advisor: Dr. Sharon Stansfield

Professional Appointments

- 6/2010 - Current **Postdoctoral Research Associate**, *Institute for Creative Technologies, University of Southern California*, Supervisor: Mark Bolas.
- Summer 2008 **Adjunct Lecturer**, *Department of Computer Science, University of North Carolina at Charlotte*.

Research Interests

- Areas virtual environments, 3D user interfaces, human-computer interaction, serious games
- Summary My interests include the design and evaluation of natural interaction techniques to improve the experience and effectiveness of real-time computing systems. My research in locomotion investigates the use of perceptual illusions that enable users to walk naturally through expansive virtual environments while unknowingly moving in circles within a confined physical space. I am also interested in leveraging full-body interaction and gestural input to address important challenges in the domains of health, rehabilitation, training, and education.

Publications

Journal Papers and Book Chapters

- [1] 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)*, 2012. To appear.
- [2] 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*, 2012. To appear.
- [3] 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.
- [4] D. Krum, E. Suma, and M. Bolas. Augmented reality using personal projection and retroreflection. *Personal and Ubiquitous Computing*, 16(1):17–26, 2011.
- [5] 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.
- [6] 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.

- [7] 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.
- [8] **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.
- [9] 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.
- [10] 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

- [11] **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*, 2012. To appear.
- [12] **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. (19% acceptance rate).
- [13] **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. (33% acceptance rate, **BEST TECHNOTE AWARD**).
- [14] 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**).
- [15] **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. (27% acceptance rate).
- [16] 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. (25% acceptance rate).
- [17] **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. (30% acceptance rate).
- [18] **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. (22% acceptance rate, **BEST PAPER AWARD**).
- [19] 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. (27% acceptance rate).
- [20] 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. (42% acceptance rate).

Non-Refereed Conference, Workshop, and Poster Papers

- [21] **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*, 2012. To appear.
- [22] 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*, 2012. To appear.
- [23] P. Hoberman, D. Krum, **E. Suma**, and M. Bolas. Immersive training games for smartphone-based head mounted displays. In *IEEE Virtual Reality*, 2012. To appear.

- [24] 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*, 2012. To appear.
- [25] **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.
- [26] **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.
- [27] **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.
- [28] 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.
- [29] B. Lange, **E. Suma**, B. Newman, T. Phan, C. Chang, A. Rizzo, and Mark Bolas. Leveraging unencumbered full body control of animated virtual characters for game-based rehabilitation. In *HCI International*, pages 243–252, 2011.
- [30] 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.
- [31] 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.
- [32] **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.
- [33] 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.
- [34] **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.
- [35] **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.
- [36] **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.
- [37] 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.
- [38] 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.
- [39] 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.

Teaching Experience

- Summer 2008 **ITCS 1214: Intro to Computer Science**, *University of North Carolina at Charlotte*.
Adjunct Lecturer. Taught two summer undergraduate courses of introductory computer science. Designed course syllabus, developed lecture materials, programming assignments, and exams, held office hours, graded exams and assignments.
- Fall 2008 **ITCS 1212L: Intro to Computer Science Lab**, *University of North Carolina at Charlotte*.
- Spring 2009 *Chief Lab Instructor*. Assisted instructors with redesign of introductory course to incorporate a lab requirement (approx. 300 students per semester). Developed lab and programming assignments, supervised 9 undergraduate lab assistants, taught multiple lab sections, held office hours, graded exams and programming assignments.
- Summer 2009

- Fall 2006 **ITCS 3143: Operating Systems**, *University of North Carolina at Charlotte*.
 Spring 2007 *Graduate Teaching Assistant*. Developed assignments, graded exams and programming assignments,
 Spring 2008 held office hours, administered exams, taught course when instructor was unavailable.
- Fall 2007 **ITCS 2181: Computer Logic & Design**, *University of North Carolina at Charlotte*.
Graduate Teaching Assistant. Held office hours, administered exams, graded assignments and exams.
- Summer 2006 **Research Experiences for Undergraduates**, *University of North Carolina at Charlotte*.
 Summer 2009 *Graduate Mentor*. Supervised research and advised teams of undergraduate students working in the Future Computing Lab on projects involving virtual environments, virtual humans, and computer vision.
- Spring 2003 - **Undergraduate Teaching Assistant**, *Ithaca College*.
 May 2005 Assisted with instruction for the following courses: Principles of Computer Science I, Principles of Computer Science II, and Intro to Web Development. Graded assignments, supervised labs, held office hours, and tutored students.

Professional Activities

- Service* Organizing Committee, IEEE Virtual Reality (2010-2012)
 Contest-Co-Chair, IEEE Symposium on 3D User Interfaces (2011-2012)
 Program Committee, IEEE Virtual Reality (2012)
 Program Committee, ACM Virtual Reality Software and Technology (2009-2010)
 Program Committee, Foundations of Digital Games (2012)
 Program Committee, Workshop on Perceptual Illusions in Virtual Environments (2011-2012)
 Conference Email List Administrator, IEEE Virtual Reality, (2008-2011)
 Dean Search Student Committee, College of Computing and Informatics, University of North Carolina at Charlotte (2008)
- Panels* Organizer and panelist, "New directions in redirection," IEEE Virtual Reality (2011)
 Panelist, Immersive Tech Era of Experience (2011)
 Panelist, "Visualization and simulation on immersive display devices," International Symposium on Visual Computing (2008)
 Panelist, Graduate Research and Academic Discovery, College of Computing and Informatics, University of North Carolina at Charlotte (2009-2010)
- Invited Talks* Carnegie Mellon University, HCII Seminar Series. *Exploring Impossible Spaces: Practical Illusions in Virtual Reality* (2011)
 IEEE FG Workshop on Facial and Bodily Expressions for Control and Adaptation of Games. *Integrating Full Body Interaction with Virtual Environments and Serious Games* (2011)
 Clemson University, Human-Centered Computing and Visual Computing Seminars. *Virtual Environments: Cognition, Perception, Interaction, Application* (2010)
 University of North Carolina at Charlotte, Graduate Seminar. *Comparison of Travel Techniques in a Complex, Multi-Level 3D Environment* (2007)
- Reviewer* ACM Conference on Human Factors in Computing Systems (CHI) (2011-2012)
 ACM Virtual Reality Software and Technology (2009-2010)
 Foundations of Digital Games (2010-2012)
 Human Factors (2010)
 IEEE Transactions on Visualization and Computer Graphics (2009-2011)
 IEEE Symposium on 3D User Interfaces (2010-2012)

IEEE Virtual Reality (2009-2012)
Joint Virtual Reality Conference EGVE - ICAT - EuroVR (2009)
Presence: Teleoperators & Virtual Environments (2011)

Student Volunteer IEEE Virtual Reality (2004, 2006-2008)

Organizations Member, IEEE
Member, ACM
President, Upsilon Pi Epsilon, Ithaca Chapter, CS Honors Society (2003-2005)
President, Connectivity: Ithaca College Computer Science Club (2003-2005)

Honors

- 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 category
- 2009 Edward C. Giles Dissertation-Year Graduate Fellowship
- 2007 Best Paper Award, IEEE Symposium on 3D User Interfaces
- 2007 First Place, 7th Annual Niner Research Across the Disciplines Graduate Research Fair, Computer Science Division
- 2005-2009 Graduate Assistant Support Plan, University of North Carolina at Charlotte (competitive award)
- 2001-2005 President's Scholarship, Ithaca College (merit-based)

Selected Media Coverage

- NPR* Google's April Fools' Day Joke May Be On Google. 4/4/2011.
- CNN* That 'Gmail Motion' prank? These folks made it real. 4/4/2011.
- Voice of America* Video Game Technology Helps Researchers Develop Interactive Therapies. 1/14/2011.
- Wired* Kinect Hack Turns World of Warcraft Into Full-Body Grind. 12/30/2010.
- L.A. Times* USC researchers hack Microsoft Kinect to play World of Warcraft. 12/28/2010.

Internships

- Spring 2009 Technical Employee (User Study Consultant), Desert Research Institute, Center for Advanced Visualization, Computation and Modeling, Supervisor: Dr. Daniel Coming
- Summer 2007 Summer Intern, Naval Research Laboratory, 3D Virtual and Mixed Environments Lab, Supervisor: Dr. Mark Livingston

References

Available upon request.