

EDUCATION

Doctor of Philosophy

May 2012

Iowa State University of Science and Technology, Ames, Iowa, USA

Majors: Human–Computer Interaction, Computer Engineering

Dissertation: Identifying and Mitigating the Cognitive Implications of Semi-Natural Virtual Locomotion

Advisor: Professor James H. Oliver

Cumulative GPA: 3.86/4.00

Certification: Preparing Future Faculty Associate (2 semesters)

Master of Science in Engineering

March 2007

Wright State University, Dayton, Ohio, USA

Major: Human Factors Engineering

Emphasis: Human–Computer Interaction

Thesis: An Initial Methodology for the Definition and Implementation of Unmanned Aerial Vehicle Agent Behaviors

Advisor: Professor Raymond R. Hill

Cumulative GPA: 4.00/4.00

Honor Society: Tau Beta Pi Ohio Mu chapter

Bachelor of Science

December 2004

Arizona State University, Tempe, Arizona, USA

Major: Computer Science

Minor: Business

EXPERIENCE

Virtual Reality Project Engineer

November 2015–Present

ESI North America, Inc. on-site at Sikorsky Aircraft Corporation, Stratford, Connecticut, USA

- Consulting on the use of ESI's IC.IDO software for virtual ergonomics reviews of maintenance and assembly tasks.
- Identifying new IC.IDO use cases in aerospace projects throughout the company.
- Specifying hardware and software for virtual reality systems and overseeing facilities upgrades.
- Promoting the use of virtual reality by giving demos, as well as organizing company-wide lunch & learns and open houses.
- Supporting additional ESI projects in the automotive and marine industries, including designing, conducting, and analyzing the results of a user study.

Scientific Researcher

August 2013–August 2015

Institut Image, Arts et Métiers ParisTech, Chalon-sur-Saône, France

- Studied the use of a tablet PC in a CAVE to augment virtual mockups for automotive design review.
- Investigated scale perception biases when using virtual reality in the architecture domain.
- Designed and conducted user studies involving distance perception in a CAVE and on a curved display.
- Analyzed experiment data using Python and R, then interpreted the results for publication.
- Developed novel virtual locomotion interfaces using JavaScript and consumer hardware, such as the Kinect and Razer Hydra.
- Collaborated with an international team to submit a grant proposal for the Horizon 2020 Factories of the Future initiative.

Researcher

January 2012–June 2013

Kognitive Neuroinformatik, Universität Bremen, Bremen, Germany

- Researched spatial cognition in virtual worlds that violate the rules of real-world Euclidean geometry.
- Designed and conducted a series of user studies on locomotion and spatial cognition in a Virtusphere.
- Analyzed experiment data using Python and R, then interpreted the results for publication.
- Collaborated on the design of a new Virtusphere interface that captures user intent with an InertiaCube tracker.

Research Assistant

August 2007–May 2008 and August 2008–December 2011

Virtual Reality Applications Center, Iowa State University, Ames, Iowa, USA

- Researched the use of immersive virtual reality for command and control of multiple unmanned vehicles.
- Designed, conducted, and analyzed user studies regarding the cognitive demands of unnatural locomotion actions.
- Conceived of and implemented an adaptive locomotion interface based on a fuzzy inference system.
- Contributed extensively to the development of a full-featured C++/OpenSceneGraph virtual reality experiment engine.
- Developed C++/OpenSceneGraph/VRJuggler virtual reality applications for use in CAVE systems.
- Collaborated on the development of an OpenGL game to test users' responses to conflicting sensory stimuli.

User Experience Intern

May 2008–August 2008

PRO Unlimited onsite at LSI Corporation, Wichita, Kansas, USA

- Designed user interfaces in Visio for managing large enterprise-grade storage arrays.
- Devised and conducted hardware and software user studies with storage experts.
- Collaborated on user experience designs with an international team of human factors engineers.

Graduate Research Assistant

September 2005–March 2007

Department of Human Factors and Industrial Engineering, Wright State University, Dayton, Ohio, USA

- Maintained C# codebase for software designed to simulate scenarios involving multiple unmanned vehicles.
- Added the ability for non-programmer users to define and implement agent behaviors within a simulation.
- Designed and implemented a new lab website using raw HTML and CSS.
- Produced a software demo DVD, user's guide, and programmer's guide.

PUBLICATIONS

Journal Articles

Marsh, W. E., Kelly, J. W., Dickerson, J., & Oliver, J. H. (2014). Fuzzy navigation engine: Mitigating the cognitive demands of semi-natural locomotion. *Presence: Teleoperators and Virtual Environments*, 23(3), 300–319.

Marsh, W. E., Kelly, J. W., Dark, V. J., & Oliver, J. H. (2013). Cognitive demands of semi-natural virtual locomotion. *Presence: Teleoperators and Virtual Environments*, 22(3) 216–234.

Marsh, W. E. & Hill, R. R. (2008). An initial agent behaviour modelling and definition methodology as applied to unmanned aerial vehicle simulations. *International Journal of Simulation and Process Modelling*, 4(2), 119–129.

Conference Papers

Marsh, W. E. & Kluss, T. (2015). Capturing user intent in a Virtusphere. In *Proceedings of CHIItaly 2015 (Short Papers)*.

Kluss, T., **Marsh, W. E.**, Zetsche, C., & Schill, K. (2015). Representation of impossible worlds in the cognitive map. In *Cognitive Processing – International Quarterly of Cognitive Science*. Germany:Springer-Verlag.

Marsh, W. E. & Mérienne, F. (2015). Nested immersion: Describing and classifying augmented virtual reality. In *Proceedings of the IEEE Virtual Reality Workshop on Perceptual and Cognitive Issues in Augmented Reality (PERCAR)*.

Marsh, W. E., Chardonnet, J.-R., & Merienne, F. (2014). Virtual distance estimation in a CAVE. In C. Freksa, B. Nebel, M. Hegarty, & T. Barkowsky (Eds.), *Spatial Cognition IX, Lecture Notes in Artificial Intelligence 8684* (pp. 354–369). Switzerland:Springer.

Marsh, W. E., Hantel, T., Zetsche, C., & Schill, K. (2013). Is the user trained? Assessing performance and cognitive resource demands in the Virtusphere. In *Proceedings of the IEEE Symposium on 3D User Interfaces (3DUI)*.

Marsh, W. E., Putnam, M., Kelly, J. W., Dark, V. J., & Oliver, J. H. (2012). The cognitive implications of semi-natural virtual locomotion. In *Proceedings of IEEE Virtual Reality (Short Papers)*. 47–50.

Marsh, W. E., Swartzentruber, L., Holub, J., Gilbert, S., Oliver, J. & Winer, E. (2010). Interfaces for 3D flight path visualization. In *Proceedings of the ASME 2010 World Conference on Innovative Virtual Reality (WINVR)*.

Marsh, W. E., Faas, D., Niedergeses, D., & Whitney, K. (2009, April). A preliminary incongruent movement study in an immersive virtual reality setting. Paper presented at the Emerging Technologies Conference (ETC), Ames, IA.

Other Conference Presentations

Mérienne, F., **Marsh, W. E.**, Aykent, B., & Martinez, J.-L. (2015). Institut Image—Le2i. In *Proceedings of IEEE Virtual Reality 2015 (Lab and Project Presentations)*.

Marsh, W. E., Chardonnet, J.-R., & Mérienne, F. (2015). Distance perception during cooperative virtual locomotion. In *Proceedings of the IEEE Symposium on 3D User Interfaces (3DUI) (Posters)*.

Marsh, W. E., Kelly, J. W., Dark, V. J., & Oliver, J. H. (2012). The cognitive implications of virtual locomotion with a restricted field of view. In I. E. McDowall & M. Dolinsky (Eds.), *Proceedings of SPIE, Vol. 8289, The Engineering Reality of Virtual Reality 2012*. 82890I:1–82890I:8. SPIE.

Marsh, W. E., Kelly, J. W., Dark, V. J., & Oliver, J. H. (2011). Assessing the use of cognitive resources in virtual reality. In *Extended Abstracts of HCI International 2011 (Posters)*, 120–124.

Bohner, R., D’Adamo, N., Faeth, A., Kaplan, S. R., & **Marsh, W. E.** (2009). Edible Earth: Dining on seasonal and local ingredients. In *Extended Abstracts of the Conference on Human Factors in Computing Systems (CHI) (Student Design Competition)*. 2811–2816.

Jordan, Z., **Marsh, W. E.**, Luse, A. W., & Tao, L. E. (2008). GuardDV: A proximity detection device for homeless survivors of domestic violence. In *Extended Abstracts of the Conference on Human Factors in Computing Systems (CHI) (Student Design Competition)*. 3855–3860.

TEACHING

Courses

Instructor: CSC-K224 (Java Programming II) August 2017–present
Three Rivers Community College, Norwich, Connecticut, USA
Online, Computer Science Department

Instructor: Human–Machine Interaction, Perception, and Immersion November 2013–January 2014
Arts et Métiers ParisTech, Chalon-sur-Saône, France
Master’s program

Teaching Assistant: ME 484/584 (Technology, Globalization, and Culture) August 2011–December 2011
Iowa State University of Science and Technology, Ames, Iowa, USA
Cross listed in the Department of Mechanical Engineering and the Department of World Languages and Cultures.

Instructor: Introduction to Computer Programming June 2010
Iowa State University of Science and Technology, Ames, Iowa, USA
Summer Program for Interdisciplinary Research and Education - Emerging Interface Technologies, sponsored by NSF.

Mentoring

Mentor: Undergraduate Research Group

May 2010–August 2010

Iowa State University of Science and Technology, Ames, Iowa, USA

Summer Program for Interdisciplinary Research and Education - Emerging Interface Technologies, sponsored by NSF.

Guest Lecture

Invited speaker: Interfaces for 3D flight path visualization

April 2010

Missouri Western University, Saint Joseph, Missouri, USA

ACTIVITIES

Training

Software

- 2015: IC.IDO, ESI Group internal training, Stuttgart, Germany

French Language

- 2015: Levels 1 and 2, Alliance Française, Dijon, France
- 2014–2015: Français Langue Étrangère, Arts et Métiers ParisTech, Cluny, France
- 2014: Français Langue Étrangère, Université Populaire du Chalonnais, Chalon-sur-Saône, France

German Language

- 2013: Level A2 for Academic Staff, Goethe-Institut, Bremen, Germany
- 2012: Level A1.2 Intensive, Bremer Volkshochschule, Bremen, Germany
- 2012: Level A1.1, CASA International Sprachschule, Bremen, Germany

Public Speaking

- 2008–2009: TGIF Toastmasters, Ames, Iowa, USA
- 2008: Jam’N Toastmasters, Wichita, Kansas, USA

Conferences

International Conference on Tangible, Embedded and Embodied Interactions (TEI)

- 2017: Paper Reviewer

IEEE Virtual Reality

- 2012, 2016–2018: Paper Reviewer

ACM Symposium on Virtual Reality Software and Technology (VRST)

- 2015: Paper Reviewer

IEEE Symposium on 3D User Interfaces (3DUI)

- 2014–2016: Program Committee Member

ACM Conference on Human Factors in Computing Systems (CHI)

- 2013–2015: Works-in-Progress Program Committee Member
- 2012: Paper Reviewer, Works-in-Progress Reviewer
- 2008–2012: Student Volunteer

ASME International Design Engineering Technical Conference (IDETC)

- 2013: Paper Reviewer

ASME World Conference on Innovative Virtual Reality (WINVR)

- 2010: Technical Publication Reviewer

Organizations at Iowa State University of Science and Technology

Graduate and Professional Student Senate

- 2008–2010: Senator for the Human–Computer Interaction Program
- 2009–2010: Rules Committee Member

Faculty Senate Curriculum Committee

- 2009–2010: Graduate Student Representative

Human–Computer Interaction Student Organization

- 2008–2009: Treasurer

Student Organization Recognition Board

- 2008–2009: Graduate Student Representative