Frederick Thompson

815.354.2862
frederickt.com
frederick.v.thompson@gmail.com

About Me

I am an engineer-turned human factors practitioner who specializes in addressing human-computer interaction challenges in the mixed reality space (AR and VR). Between my time at the Virtual Reality Applications Center, and my latest position at a research center for a multinational corporation, I have created, evaluated, and deployed a number of software solutions for traditional platforms (PC, tablet, mobile) and mixed reality platforms (tablet-based AR, CAVEs, LVC environments, commodity HMDs). I believe a multidisciplinary skillset is important, and I have enjoyed working on a range of challenging projects in the last few years– drafting software guidelines for usability, developing interaction design, conducting user testing, and programming are all responsibilities of my day-to-day work.

In addition to this experience on customer-facing software projects, I've conducted fundamental research towards VR technologies (e.g. stereoscopic imaging, gestural interaction, and vibrotactile feedback).

Objective

My objective is to be involved in a challenging work environment where I can utilize my technical and creative background to develop new and meaningful software experiences, while partnering with industry veterans to continue my personal skill development.

Education and Credentials

MS, Human-Computer Interaction, 2014. (GPA: 3.95)
MS, Mechanical Engineering, 2014. (GPA: 3.95)

Iowa State University of Science and Technology, Ames IA
Thesis: Evaluation of a commodity VR interaction device for gestural object manipulation in a three dimensional work environment
Committee members: Eliot Winer (Advisor), Jim Oliver, Stephen Gilbert

BS, Mechanical Engineering, 2009.

Iowa State University of Science and Technology, Ames IA
Focus: Robotics and Mechatronics, Architecture

NCEES Fundamentals of Engineering Certification (FE)

Mechanical Engineering, 2010

Relevant Experience and Skills

User centered design:	Interviews, survey authoring / administering, wireframing, A/B testing, remote data collection, human subject testing, behavior encoding, cognitive modeling
UX Software Tools:	Axure, JustInMind Prototyper, Omnigraffle, Noldus Observer, UserZoom
Programming:	C, C#, C++, HTML 5 + CSS, OpenGL, OpenCV, OpenSceneGraph, VRJuggler
Engines / IDEs:	Unity3D / MonoDevelop, Visual Studio, XCode, Torque Game Engine, DreamWeaver
Design tools:	Photoshop, Illustrator, Sketch
Commodity VR:	Oculus Rift DK1 / DK2 / CV1, HTC Vive, Samsung GearVR, LEAP Motion Controller, Kinect
High-End VR:	CAVEs, Powerwalls, LVC environments, Vicon / ART / Optitrack IR camera systems

Work Experience

Human-Machine Interface Research Scientist / Engineer. United Technologies Research Center
East Hartford, CT. September 2015 to Present

The HMI team focuses on rapid generation and evaluation of software challenges at the forefront of technology – areas with few established usability guidelines and no turnkey solution.

Some of my key accomplishments while working at UTRC:

- Project manager of an international team composed of 5 separate businesses distributed across North America and Europe, working to develop a VR tool on a 2 month time frame.
- Lead the interaction design and software development of 7 separate immersive VR projects for UTCs business units, marketing team, and internal R&D. One of these was shown to the public at the Sustainable Brands 2016 conference in San Diego.
- Designed a low-cost CAVE and sourced supplementary hardware, including an IR camera-based tracking system and multi-GPU workstation to power the displays.
- Lead the design of a cargo loader interface for UTAS, to be equipped on commercial aircraft.
- Co-authored a human factors requirements document and evaluation plan for an optionally manned aircraft, which can be controlled by a tablet from the cockpit or on the ground.

Research Assistant. Virtual Reality Applications Center
Iowa State University, Ames, IA. August 2012 to December 2014

In graduate school at the VRAC, I was able to develop new VR experiences, design and conduct user studies and perform the follow-up statistical analysis, publish several papers - and a lot more. In addition to experience with VRAC's cutting-edge VR visualization and interaction devices, my experience with tools in our UX lab has allowed me to apply a rigorous user-centered approach to software design on traditional platforms (PC / tablet / phone).

One significant accomplishment I would like to highlight is my multi-year study on augmented reality. I planned and executed this study on AR technology in partnership with Boeing, where we compared different visual cues to discover the best way to communicate information through AR, and evaluated the workload reduction of AR technology for maintenance tasks.

Staff Engineer Nexus Engineering
Oakbrook Terrace, IL. January 2010 to August 2012. February 2015 to August 2015

As an engineering consultant, I worked with many clients but served most of my time as the manager of the fire protection program at Progress Energy's Brunswick Nuclear Power Plant for about a year and a half during a staff change. Duties for this position included verifying code compliance for plant modification designs and maintaining the plant's insurability with Nuclear Electric Insurance Limited (NEIL). A particularly interesting deliverable at this position was a report on the explosion risk of an on-site spent fuel storage area.

Other Work Highlights

Engineering Intern @ Joule Technologies. McHenry, IL. Summers 2006, 2007, and 2009.
Lots of machining and CAD work. Designed and fabricated a robot to test a prototype mechanical assembly.

Research Assistant @ the Developmental Robotics Laboratory. Iowa State University. Ames, IA. September 2008 to December 2009.
Helped design, fabricate, and program a humanoid robot that teaches itself by interacting with its environment.

Research Assistant @ the Vibration and Noise Control Laboratory. Iowa State University. Ames, IA. February 2008 to December 2008.
Helped design and implement a feedback-based control system for active sound dampening.

Research Assistant @ Ames Laboratory. Ames, IA. October 2007 to January 2008.
Tested the resonant frequencies of nuclear fuel rods while developing a new method to detect leaks.

Publications

Evaluation of a Commodity VR Interaction Device for Gestural Object Manipulation in a Three Dimensional Work Environment. Thompson, F. Iowa State University M.S. Thesis for Human Computer Interaction and Mechanical Engineering, 2014

An Application of Conceptual Design and Multidisciplinary Analysis Transitioning to Detailed Design Stages. Renner, A., Thompson, F., Kalivarapu, V., Winer, E., Oliver, J. 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, submitted 2014

Fusing Self-Reported and Sensor Data from Mixed-Reality Training. Richardson, T., Gilbert, S., Holub, J., Thompson, F., MacAllister, A., Radkowski, R., … & Terry, S. I/ITSEC 2014

Comparing Training Performance With Vibrotactile Hit Alerts vs. Audio Alerts. Gilbert, S., Civitate, A., Kelly, J., Thompson, F., Smith, A., Kopecky, K., … & de la Cruz, J. I/ITSEC 2013