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Education

- May 2018 **Ph.D., Industrial Engineering with Human Factors Concentration**, SUNY at Buffalo.
Advisor: Matthew L. Bolton, Ph.D.
- June 2015 **M.S., Industrial Engineering with Human Factors Concentration**, SUNY at Buffalo.
- Dec 2012 **M.A.E., Secondary Science Education**, The University of Findlay, Findlay, OH.
- May 2010 **B.A., Applied Philosophy**, The University of Findlay, Findlay, OH.

Research and Professional Experience

- July 2018 - **Senior Professional Staff**, *Johns Hopkins University Applied Physics Laboratory*, Laurel MD.
 - Present
 - Investigate operational performance characteristics of the US Navy's Ship Self-Defense System (SSDS) through deep-dive analysis of combat system data;
 - Additional topics of interest include electronic warfare, systems integration, remote platform cybersecurity, and human-machine interaction.
- Jan 2014 - **Research Assistant**, *Formal Human Systems Laboratory*, Buffalo NY.
- May 2018
 - Developed methods to explore interactions between human attacker and defender mental models of computer security vulnerabilities, using formal methods to discover unforeseen cybersecurity consequences of these interactions;
 - Used automated model checkers and analysis tools to explore complex human-agent systems for unanticipated, potentially dangerous interactions;
 - Worked with NASA Ames research partners to model and investigate excessive pilot workload within NextGen Air Transportation System autoland scenarios (award number NNX13AB71A);
 - Analyzed and modeled an Army YMQ-18A Hummingbird UAS crash to discover the root cause erroneous human actions responsible for the documented accident, as well as other unforeseen pilot-system interactions that could lead to future UAS crashes (contract number W911NF1510474);
 - Wrote, co-wrote, and edited a number of academic papers, conference presentations, and grant proposals.
- July 2015 - **Junior Cognitive Systems Engineer**, *Resilient Cognitive Solutions*, Pittsburgh PA.
 - Jan 2018
 - Supported principle-driven designs of human-machine systems, with the central focus being creating effective systems that embed user expertise and support decision making in complex, data-intensive environments;
 - Executed design and capability contributions for counter-cyberespionage decision support systems;
 - Developed prototype cyberthreat tradecraft guides for research partners in the intelligence community;
 - Led a three-person team that developed and refined a semantic search and retrieval engine for open-source cyberdefense intelligence;
 - Led an effort to identify, ingest, and programmatically parse nearly 100,000 open-source intelligence data objects for use in existing analysis tool data architectures;
 - Designed human-subjects tool validation protocols and data analysis plans for partners at the Laboratory for Analytic Sciences (LAS) and the Air Force Research Laboratory (AFRL);
 - Led writing and project coordination tasks for an eight-week intelligence analyst Structured Analytic Tradecraft workshop series;
 - Drafted, executed, and submitted multiple SBIR proposals to the Department of Defense.

Publications and Talks

Peer-Reviewed Journal Articles

Bolton, M.L., Molinaro, K., & **Houser, A.** (2019). A formal method for assessing the impact of task-based erroneous human behavior on system safety. *Reliability Engineering and System Safety*, in press.

Houser, A., Ma, L., Feigh, K., & Bolton, M.L. (2018). Using formal methods to reason about taskload and resource conflicts in simulated air traffic scenarios. *Innovations in Systems and Software Engineering*, 14(1), pp. 1-14.

Bolton, M.L., Zheng, X., Molinaro, K., **Houser, A.**, & Li, M. (2017). Improving the scalability of formal human-automation interaction verification analyses that use task-analytic models. *Innovations in Systems and Software Engineering*, 13(1), pp. 1-17.

Peer-Reviewed Conference Papers

Ma, L., **Houser, A.**, Feigh, K., & Bolton, M.L. (2019). An analysis of air traffic management concepts of operation using simulation and formal verification. In *AIAA SciTech 2019 Forum*, San Diego CA.

Houser, A., & Bolton, M.L. (2017, July). Formal mental models for inclusive privacy and security. In *Proceedings of the Thirteenth Symposium on Usable Privacy and Security (SOUPS)*, Santa Clara CA. 3 pages.

Houser, A., Ma, L., Feigh, K., & Bolton, M.L. (2015). A formal approach to modeling and analyzing human taskload in simulated air traffic scenarios. In *Proceedings of the IEEE International Conference on Complex Systems Engineering, November 2015*, pp. 1-6.

Conference Talks

Houser, A. Formal mental models for inclusive privacy and security. The University at Buffalo's Inter-University Workshop, Buffalo NY. 18 November 2017.

Houser, A. Using simulation and formal methods to examine safety-critical scenarios in aviation. The University of Waterloo's *Inter-University Workshop*, Waterloo ON, CA. 2 December 2016.

Houser, A., & Molinaro, K. Ghosts in the machine: The role of human factors in cybersecurity. The University of Toronto's *Inter-University Workshop*, Toronto ON, CA. 21 November 2015.

Houser, A. Safety not guaranteed: Using formal methods in human factors engineering. The University at Buffalo's *Inter-University Workshop*, Buffalo NY. 15 November 2014.

Posters

Houser, A., & Bolton, M.L. (2016, March). *A formal approach to modeling and analyzing human taskload in simulated air traffic scenarios*. Poster presented for the 2016 Industrial and Systems Engineering Poster Competition and 2016 School of Engineering and Applied Sciences Poster Competition, Buffalo NY.

Invited Talks

Houser, A. Dark and full of terrors: Using systems engineering and applied psychology to secure humans online. Cinco Ranch High School, Katy TX. 13 October 2017.

Houser, A. The value of a liberal arts education for careers in science. Keynote address for the University of Findlay's *Symposium for Scholarship and Creativity*, Findlay OH. 7 April 2017.

Houser, A. Practical Kuhn: Philosophy of science for scientists. The University of Findlay's *Philosophy of Science* course, Findlay OH. 5 April 2017.

Houser, A. HFES@UB: A student chapter's perspective. Oregon State University's *Human-Centered Design Seminar*, Corvallis OR. 24 February 2017. Webinar.

Houser, A. A tour of the Lambda Calculus. The University at Buffalo's *IE640: Formal methods for reliable human-interactive systems* course, Buffalo NY. 28 November 2016.

Journal Articles and Conference Papers In Preparation

Bolton, M. L., Molinaro, K., & Houser, A.. (ND). A formal method for assessing the impact of task-based erroneous human behavior on system safety. Under review in *Reliability Engineering and System Safety*.

Houser, A., Bisantz, A.M., Zhuang, J., & Bolton, M.L. (ND). Discovering unanticipated human-automation interaction in cybersecurity using formal methods techniques. In preparation.

Houser, A., Zhuang, J., Bisantz, A.M., & Bolton, M.L. (ND). Investigating cybersecurity vulnerabilities in cloud storage utilities using formal representations of mental and folk models. In preparation.

Doctoral Dissertation

Houser, A. (2018, May 25). Mental models for cybersecurity: A formal methods approach. State University of New York at Buffalo, Buffalo NY.

Grant Writing Experience

“Dare Mighty Things: Deterrence through Revolutionary Decision Support,” United States Air Force SBIR 16.2 Submission for AF162-D004.

Principal Investigator: William C. Elm, Resilient Cognitive Solutions

This \$1.5mil, Direct to Phase II submission proposed a radical reconceptualization of USSTRATCOM Missile Wing Command Centers as decision support environments, where updates to the information space, physical layout, crew tasking, and role allocation would result in decision superiority for missile command operations. In addition to highly specific potential improvements in mission reliability, readiness, and deterrence enabled through command center redesign, work also included a projected cost volume, complete fifteen-month performance plan, customer travel and site visit schedules, and product commercialization suggestions, among other components. Fifty pages.

Programming and Software Experience

Languages	Python, Java, Haskell
Modeling	EOFM, SysML, UML, Symbolic Analysis Laboratory, temporal logics, Matlab
Visual	Adobe Illustrator, Inkscape, Microsoft Visio, \LaTeX
Miscellaneous	Minitab, XML, Linux operating systems

Leadership Positions

- 2013 - Human Factors and Ergonomics Society, *Officer and Member*
- Present
 - o Served as president (2016), vice-president (2015), and webmaster (2016 - 2018).
- 2014 Inter-University Workshop, *Fundraising Chair and Workshop Co-Chair*
 - o Designed the donation schedule with both taxable and tax-deductible options;
 - o Contacted potential sponsoring organizations by phone, email, and in-person meetings;
 - o Worked with businesses within and beyond the Buffalo-Niagara region to raise nearly \$7000 in workshop funding;
 - o Managed a group of ten student volunteers over the course of a year to orchestrate conference proceedings;
 - o Delegated and oversaw responsibilities for securing facilities and catering; producing advertising and programs; selecting and making travel arrangements for two keynote speakers; coordinating with other attending universities; and reviewing submissions.

Honors and Awards

SUNY Buffalo

- 2016 Best Poster, *Industrial and Systems Engineering Poster Competition*
- 2014 & 2015 Recipient, *Robert H. & Catherine H. Goldsmith Scholarship*
- 2013 Second Place, *Auburn Engineers Ergonomic Design Competition*
 - o Selected from a pool of 42 international teams.

Additional Awards

- 2013 Rookie Teacher of the Year, *Spring Independent School District*
 - o Selected from a pool of more than 300 first-year teachers.
- 2013 Rookie Teacher of the Year, *Spring High School*

Service Activities

Service to the Profession

- 2016 - HFES Human Performance Modeling Technical Group, *Member and Webmaster*
- Present
- 2016 - Human Factors and Ergonomics Society, *Annual Meeting Submissions Student Reviewer*
- Present
- 2015 - Human Factors and Ergonomics Society, *Member*
- Present HFES Cognitive Engineering and Decision Making Technical Group, *Member*
- 2013-2015 Western New York Field Federal Safety and Health Council, *Member*

Outreach

- 2017 Judge for the Twin Tiers Regional Science Fair at *St. Bonaventure University, Allegany NY.*
- 2016 "I'm an engineer, ask me anything!" at *Allegany-Limestone High School, Allegany NY.*
- 2014 Student group leader and experimental activity designer at *K-8 STEM Activities Day, Buffalo NY.*