Curriculum Vitae

Robert S. Gutzwiller, PhD

Assistant Professor, Arizona State University
Associate Director, Center for Human, AI and Robot Teaming (CHART)
Ira A. Fulton Schools of Engineering, The Polytechnic School, Human Systems Engineering Mesa, AZ, USA.

I bring applications of theory from psychology and human factors engineering to increase understanding and solution of real-world problems. I have a passion for teaching and mentoring, and instill and encourage the same approach from my students. My funded research interests are in human-automation interaction, applied attention theory, situation awareness, multitasking, and human factors in cyberspace.

Quick links to...

Funding | **Publications** | **Teaching & Mentorship** | **Service** | **Awards** | **Skills** | **References**

Personal

Citizenship: United States of America
Office Phone: (480) 727-3716
Email: robert.gutzwiller@asu.edu
Web – Biographic Sketch, Publications
Web (lab) – Applied Attention Research Lab at ASU
Citations: Google Scholar
@ *Twitter:* https://twitter.com/aarlab1

Education

Ph.D., Cognitive Psychology, Colorado State University (2014)
Switch choice in applied multi-task management
Advisors: Ben Clegg, Chris Wickens, Kurt Kraiger, Stephen Hayne

M.S., Cognitive Psychology, Colorado State University (2011)
Individual differences in working memory affect situation awareness
Advisors: Ben Clegg, Ed Delosh, Stephen Hayne

B.S., Psychology, Baylor University (2008)
Advisor: Charles Weaver, III

Scientific Memberships

Human Factors & Ergonomics Society
Psychonomics Society
Society for Applied Research in Memory & Cognition
American Association for the Advancement of Science
Cyber Human Cognition Working Group (with MIT Lincoln Labs)

Experience

08/2018- **Assistant Professor,** Arizona State University, Ira A. Fulton Schools of Engineering (The Polytechnic School), Human Systems Engineering Program, Mesa, AZ, USA.

- Director of the Applied Attention Research Lab, studying application of human attention theory to cybersecurity, automated systems and complex dynamic operations.
- Associate Director, Center for Human, AI and Robot Teaming (CHART)
- Management, execution and responsibility for over $1.25 Million of awarded funding; over $440k under review as of Fall, 2020.
- Establishing Chair of the *Cybersecurity Technical Group* for the Human Factors and Ergonomics Society
- Teaching advanced seminars in applied attention theory, human systems integration.
- Formal mentorship of master's (3 theses chairs, 5 memberships) and PHD students (3 dissertation chairs, 5 memberships)
- Service on PhD Milestone Development committee (2018-19), leader of weekly program brownbag presentation series Fall 2019-present.
- Affiliate Faculty of the ASU Global Security Initiative's *Center for Human-AI and Robot Teaming* (CHART), and *Center for Cybersecurity and Digital Forensics* (CCDF).

2014-2018 **Scientist**, Space and Naval Warfare Systems Center (SPAWAR) Pacific. (now *Naval Information Warfare Center - NIWC),* San Diego, CA, USA

- Applying the science of human attention and automation-interaction in complex unmanned systems testbeds, shipboard command centers, and defensive cyberspace operations.
- Award of $7 Million+ in competitive funds while managing complex, multidisciplinary teams of computer scientists, software developers, engineers, acquisition professionals, and human factors and perceptual scientists.
- Leading and managing teams building complex, human in the loop simulations of a virtual cyber defense environment, and a command center on a ship.
- Practicing user-centered design methods, including goal-directed and cognitive task analysis techniques, user research methods, and usability testing to improve user experience (UX).
- Creating and maintaining relationships with a variety of internal and external sponsors and customers of human factors research, usability, and user-centered design services.
- Publishing scientific and technical progress in peer-reviewed conference and journal articles.

2008-2014 **Graduate Student**, Colorado State University, Fort Collins, CO, USA

Worked on two grants in partnership with Ben Clegg and Chris Wickens. Taught several courses and guest lectured routinely.

NASA - Modeled Human Performance for Long-Duration Space Missions
Examined and modeled cognition under fatigue, multi-task management, and automated failure states of a complex system of systems. • Selected tasks and simulations for study. • Conducted a literature review on task switching choice. • Created, analyzed and explored models over a series of programmatic experiments in multitasking.

Office of Naval Research (ONR) - Adaptive Supervisory Control
Applied knowledge of training, automation interaction, and feedback, into experiment design to test control strategies of multiple autonomous systems. • Supervised data collection, conducted statistical analyses, and directed a large team of up to 15 research assistants. • Core programming of a microworld simulation. • Mentored two graduate students.

2011-2013 **Research Intern**, Space and Naval Warfare Systems Center Pacific, (now *Naval Information Warfare Center - NIWC),* San Diego, CA, USA

As a winner of three scholarships, completed several paid internships with the US Navy, working closely with scientists and engineers on applied projects in autonomy, including UV Sentry (press article here).

2009-2012 **Research Associate**, Center for Error Management, Denver, CO, USA

Aided in research on training skills necessary for human error avoidance in phlebotomy. • Developed a research proposal to reduce error in blood draws in collaboration with Center for Error Management partners.

Research Funding

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Awarded more than $9 Million as PI / Co-PI

$55,000 awarded. Predicting automation surprise using attentional modeling. **PI: Robert Gutzwiller**.
Goal**:** Use a model of attention to understand and predict surprise driven by automation malfunction.
Source: Arizona State University, Global Security Initiative, **2020**.

$199,258 awarded. Tools for Implementing Speech Agents in Crew Resource Management Training Systems. PI: Scotty Craig. **Co-PI: Robert Gutzwiller,** Nancy Cooke**.**
Goal: Designing a software training tool for the Navy that will help familiarize trainees with phraseology.
Source: *Department of Defense,* STTR Phase II from *NAVAIR* to *Optimal Synthesis*. **2019-present**

$1,089,388 awarded. Oppositional Human Factors (OHF) Research. **Sole PI: Robert Gutzwiller.**
Goal: Develop and explore human factors methods to study and exploit potential cyber attackers and their cognition.
Source**:** *Department of Defense*, **2018-present**

$5,587,000 awarded. Research and design of a contextualized operational display for cyber defense. **Co-PIs: Robert Gutzwiller**, Kristen Liggett, Eric Holder.
Goal: Research and develop a cross-DoD service solution for cyber defenders to improve information sharing, team coordination and awareness.
Source: *Office of the Assistant Secretary of Defense, Behavioral Social Sciences in Cyber Security.*
2018-2021**.**

$48,000 awarded. Designing a joint contextual operating platform for cyber defense. **Co-PIs: Robert Gutzwiller**, Kristen Liggett, & Eric Holder.
Goal: Research and develop a cross-service solution for cyber defenders to improve information sharing, team coordination and awareness.
Source: *Assistant Secretary of Defense for Research and Engineering,* **2017**.

$980,000 awarded. Battlespace management aids, experimentation and development.
PI: Robert Gutzwiller, Co-PIs: Mark Iversen & Karl Van Orden.
Goal: Use goal-directed task analysis to develop and test battle management aids, course of action tools, and decision aids for use in planning and real-time Navy operations.
Source: *Office of Naval Research, Naval Innovative Science and Engineering Grant.*
2016-2018.

$590,000 awarded. Human limitations and impediments for cyber situation awareness.
PI: Robert Gutzwiller
Goal: to understand the cognition of the cyber defensive analyst in depth and assess, then improve their situation awareness. A defensive scenario was built and experiments were conducted.
Source: *Office of Naval Research, Naval Innovative Science and Engineering*
2015-2018.

$460,000 awarded. Ambient activity monitors for hidden system information.
PI: Jamie Lukos, **Co-PIs: Robert Gutzwiller**, Sunny Fugate.
Goal: to develop novel software visualization techniques to expose otherwise hidden system states to users. We want these to be unobtrusive for detecting cyber threats. Initial work was positive and we have a patent in progress.

Source: *Office of Naval Research, In-House Laboratory Independent Research Program Grant.*
2015-2018.

Under Review

$440,781 under review. Cognition-Inspired Model of Diagnostic Image Quality for Mammography. PI: Jorge Caviedes. **Co-PI: Robert Gutzwiller.**
Goal: Use understanding of human attention and interface design to improve diagnostics and image algorithms for medical use.
Source: National Institutes of Health (NIH), **2020**

Unfunded

$168,997 unfunded**.** Hacking Sunk Cost. **PI: Robert Gutzwiller**, Co-PI: Coty Gonzalez.
Goal**:** Improve cyber security by understanding how to induce biased decision making in attackers through experiments and modeling.
Source**:** Department of Defense, **2020**

$2,174,761 unfunded**.** ACE: Selective Task Reliance on Autonomy through Interfaces for the Growth. Partner with Next Century Corporation (NCC). **ASU PI: Robert Gutzwiller.**
Goal: Develop novel trust measurement and trust calibration techniques for multitasked fighter pilots interacting with dogfight autonomy systems.
Source: *Defense Advanced Research Projects Agency (DARPA), Strategic Technologies Office (STO*), PM: LTC Dan Javorsek. **7/2019.**

$483,961 unfunded. Interactive Machine Learning (IML) to Enhance Human-Agent Teaming. **Sole PI**: Robert Gutzwiller.
Goal: Improve human-autonomy teaming by increasing calibrated trust, preference and familiarity in machine-learned behaviors.
Source: *Office of Naval Research (ONR) Young Investigator Program (YIP)*, **08/2019**

$99,000 unfunded. Dynamic degree of artificial intelligence to individualize support for effective teamwork. PI: Ben Clegg. **Co-PIs**: Chris Wickens, Eric Heggestad, Marissa Shuffler, & **Robert Gutzwiller.**
Goal: Augment the degree of automation framework for AI and individualization for intelligent agents within teams.
Source: *Army Research Lab*, **12/2018**

$99,974 unfunded. Interactive Machine Learning (IML) to Enhance Human Agent Teaming. **PI: Robert Gutzwiller**. Co-PIs: Erin Chiou, Spring Berman.
Goal: Enhance adaptive teaming between humans and machine learning algorithms.
Source: *Army Research Lab*, **12/2018**

$70,000 unfunded. Using the STOM model to predict driver attention during transfer of control in autonomous vehicles. **Sole PI: Robert Gutzwiller.**

Goal: Use a cognitive model (STOM) to predict whether drivers will attend to autonomous-to-human control transition tasks when performing other ongoing tasks (e.g., smart phones, reading).
Source: *Toyota Collaborative Safety Research Center*, **10/2018**.

$65,000 unfunded**.** Applied human-autonomy interaction.
PI: Josh Kvavle, **Co-PIs**: **Robert Gutzwiller**, Jamie Lukos, Sunny Fugate.
Source: *Space and Naval Warfare Systems Center, Workforce Development*. **2016**.

$99,888 unfunded**.** Memory for, and intention to apply, error management training in blood testing industries.
PI: Ben Clegg, **Co-PIs**: Kurt Kraiger & **Robert Gutzwiller**.
Source: *Agency for Healthcare Research and Quality (AHRQ), National Institutes of Health (NIH).*
2009.

Publications

(Italics indicating mentees / student co-authors) (return to top)

44 peer-reviewed papers, 2 book chapters, 2 media articles and 4 technical reports.

Peer-reviewed Journal Articles

Gutzwiller, R. S., Dykstra, J., & Payne, B. (2020). Gaps and opportunities in situational awareness for cybersecurity. *Digital Threats: Research and Practice*.

Gutzwiller, R. S., & Reeder, J. (2020). Dances with algorithms: Interactive development creates greater preference and trust in machine-learned behaviors. *Human Factors*.

Gutzwiller, R. S., Wickens, C. D., & Clegg, B. A. (2019). The role of reward and effort over time in task switching. *Theoretical Issues in Ergonomics Science*, *20*(2), 196-214.

Roscoe, R., Becker, D. V., Branaghan, R. J., Chiou, E. K., Gray, R., Craig, S. D., **Gutzwiller, R. S.,** & Cooke, N. J. (2019). Bridging psychology and engineering to make technology work for people. Special issue of *American Psychologist, 74*(3), 394-406.

Wickens, C. D., **Gutzwiller, R. S.,** Vieane, A., Clegg, B. A., & Janes, J. (2016). Time sharing between robotics and process control: Validating a model of attention switching. *Human Factors*, *58*(2), 322-343. ***Won the Jerome H. Ely Award for Most Outstanding Paper in Human Factors.**

Gutzwiller, R. S., Wickens, C. D., & Clegg, B. A. (2016). The role of time-on-task in task switching choice. *Journal of Applied Research in Memory & Cognition*, *5,* 176-184.

Wickens, C. D., **Gutzwiller, R. S.,** & Santamaria, A. (2015). Discrete task switching in overload: A meta-analyses and a model. Special issue of *International Journal of Human Computer Studies, 79,* 79-84.

Blalock, L. D., Sawyer, B., Kiken, A., **Gutzwiller, R. S**., McGill, C. L., & Clegg, B. A. (2014). Cognitive load while driving impairs memory of moving but not stationary elements within the environment. *Journal of Applied Research in Memory and Cognition, 5*(2), 95-100.

Gutzwiller, R. S., Clegg, B. A., & Blitch, J. G. (2013, invited). Part-task training in the context of automation: Current and future directions. *American Journal of Psychology*, *126*(4), 417-432.

Gutzwiller, R. S., & Clegg, B. A. (2013). The role of working memory in levels of situation awareness. *Journal of Cognitive Engineering and Decision Making, 7*(2), 141-154.

Peer-reviewed Proceedings Papers

Burton, A., Chiou, E. K., & **Gutzwiller, R. S.** (in press). A brief literature review on human perceptions of service robots with a focus on healthcare. *Human Factors and Ergonomics Society Annual Meeting, 2020.*

Das, S., **Gutzwiller, R. S.,** Roscoe, R. D., Rajivan, P., Wang, Y., Camp, L. J., & Hoyle, R. (in press). Humans and technology for inclusive privacy and security. *Human Factors and Ergonomics Society Annual Meeting, 2020.*

Ferguson-walter, K. J., Major, M. M., van Bruggen, D. C., Fugate, S. J., & **Gutzwiller, R. S.** (2019). The World (of CTF) is Not Enough Data: Lessons learned from a cyber deception experiment. *IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA).*

Nyre-Yu, M., **Gutzwiller, R. S.**, & Caldwell, B. (2019). Observing cyber security incident response environments: Qualitative themes from field research. *Proceedings of the Human Factors and Ergonomics Society.*

Gutzwiller, R. S., Ferguson-Walter, K. J., & Fugate, S. J. (2019). Are cyber attackers thinking fast and slow? Exploratory analysis reveals evidence of decision-making biases in red teamers. *Proceedings of the Human Factors and Ergonomics Society.*

Gutzwiller, R. S., Chiou, E. K., Craig, S., *Lewis, C. M., Lematta, G*., & *Hsiung, C.-P.* (2019). Positive bias in the 'Trust in Automated Systems Survey'? An examination of the Jian et al. (2000) scale. *Proceedings of the Human Factors and Ergonomics Society.*

Paul, C.L., Blaha, L. M., Bos, N., Fallon, C. K., Gonzalez, C., & **Gutzwiller, R. S.** (2019). Opportunities and challenges for human-machine teaming in cybersecurity operations. *Proceedings of the Human Factors and Ergonomics Society.*

Gutzwiller, R. S., Cosley, D., Ferguson-Walter, K., Fraze, D., & Rahmer, R. (2019). Research sponsors talk: Cyberspace past, present, and future. *Proceedings of the Human Factors and Ergonomics Society.*

Shulte, A., Donath, D., Lange, D., & **Gutzwiller, R. S.** (2018). A heterarchical urgency-based design pattern for human automation interaction. In

Engineering Psychology and Cognitive Ergonomics: 15th International Conference, EPCE 2018 Proceedings (Vol. 10906, p. 42-54).

Gutzwiller, R. S., Ferguson-Walter, K. J., Fugate, S. J., & Rogers, A. (2018) "Oh, look! A butterfly!" A framework for distracting attackers to improve cyber defense. *Proceedings of the Human Factors and Ergonomics Society, 62*, 272-276. ***Won the Marc Resnick Best Paper Award.**

Gutzwiller, R. S., Espinosa, S. H., Kenny, C., & Lange, D. S. (2018). A design pattern for working agreements in human-autonomy teaming. *Advances in Intelligent Systems and Computing, 591*, 12–24.

Wickens, C. D., & **Gutzwiller, R. S.** (2017). The status of the Strategic Task Overload Model (STOM) for predicting multi-task management. *Proceedings of the Human Factors and Ergonomics Society, 61,* 757–761.

Borghetti, B., Funke, G., Pastel, R., & **Gutzwiller, R. S.** (2017). Cyber human research from the cyber operator's view. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 61,* 350.

Gutzwiller, R. S., & Sitzman, D. M. (2017). Examining task priority effects in multi-task management. *Proceedings of the Human Factors and Ergonomics Society, 61*, 762–766.

Dzieciuch, I., Reeder, J., **Gutzwiller, R. S**., Gustafson, E., Coronado, B., Martinez, L., … Lange, D. S. (2017). Amplifying human ability through autonomics and machine learning in IMPACT. *Proceedings of SPIE Micro- and Nanotechnology Sensors, Systems, and Applications IX, 10194,* 101941Y1-11.

Gutzwiller, R. S., & Reeder, J. (2017). Human interactive machine learning for trust in teams of autonomous robots. *In IEEE Conference on Cognitive and Computational Aspects of Situation Management, CogSIMA*.

Vieane, A. Z., Funke, G. J., **Gutzwiller, R. S.**, Mancuso, V. F., Sawyer, B. D., & Wickens, C. D. (2016). Addressing human factors gaps in cyber defense. *Proceedings of the Human Factors and Ergonomics Society, 60*, 770–773.

Fugate, S., Lukos, J., **Gutzwiller, R. S.**, & Lester, C. (2016). Position paper: Proposing ambient visualization and pre-attentive processing for threat detection. In *ACM International Conference Proceeding Series (Vol. Part F1306).*

Gutzwiller, R. S., & Lange, D. S. (2016). Tasking teams: Supervisory control and task management of autonomous unmanned systems. In *International Conference on Virtual, Augmented and Mixed Reality* (pp. 397-405). Springer International Publishing.

Gutzwiller, R. S., Hunt, S. M., & Lange, D. S. (2016). A task analysis toward characterizing cyber-cognitive situation awareness (CCSA) in cyber defense analysts. In *IEEE International Multi-Disciplinary Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA),* 14-20.

Lange, D. S., & **Gutzwiller, R. S.** (2016). Human-autonomy teaming patterns in the command and control of teams of autonomous systems. In *International Conference on Engineering Psychology and Cognitive Ergonomics* (pp. 179-188). Springer International Publishing.

Gutzwiller, R. S., Fugate, S., Sawyer, B., & Hancock, P. A. (2015). The human factors of cyber network defense. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 59,* 322-326. ***Nominated for best paper award.**

Gutzwiller, R. S., Wickens, C. D., & Clegg, B. A. (2015). The role of individual differences in the executive attentional network in switching choice and multi-task management. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 59*, 632-636.

Gutzwiller, R. S., Lange, D. S., Reeder, J., Morris, R. L., & Rodas, O. (2015). Human-computer collaboration in adaptive supervisory control and function allocation of autonomous system teams. *In International Conference on Virtual, Augmented and Mixed Reality* (pp. 447-456). Springer International Publishing.

Clegg, B. A., Wickens, C. D., Vieane, A., **Gutzwiller, R. S.**, & Sebok, A. (2015). Circadian effects on fault management and multitasking. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 59,* 627-631.

Gutzwiller, R. S., Wickens, C. D., & Clegg, B. A. (2014). Workload overload modeling: An experiment with MATB II to inform a computational model of task management. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 58,* 849-853.

Clegg, B. A., Vieane, A., Wickens, C. D., **Gutzwiller, R. S.**, & Sebok, A. (2014). The effects of automation-induced complacency on fault diagnosis and management performance in process control. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 58*, 844-848.

Lange, D. S., **Gutzwiller, R. S.**, Verbancsics, P., & Sin, T. (2014). Task models for human-computer collaboration in supervisory control of teams of autonomous systems. *IEEE Conference on Cognitive and Computational Aspects of Situation Management, CogSIMA*, 97-102.

Gutzwiller, R. S., Clegg, B. A., Smith, C. A. P., *Lewis, J. L.,* & *Patterson, J. D.* (2013). Predicted failure alerting in a supervisory control task does not always enhance performance. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 57*, 364-368.

Lange, D., Verbanscics, P., **Gutzwiller, R. S.**, & Reeder, J. (2013). Trust in sparse supervisory control. *Trust and Autonomous Systems: Papers from the 2013 AAAI Spring Symposium,* 39-43.

Gutzwiller, R. S., & Clegg, B. A. (2012). Training for unmanned vehicle allocation with automation in a dynamic microworld. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 56*, 2497-2501.

Blitch, J. G., Bauder, C. J., **Gutzwiller, R. S.**, & Clegg, B. A. (2012). Correlations of spatial orientation with simulation based robot operator training. *Proceedings of the 4th International Conference on Applied Human Factors & Ergonomics (AHFE).*

Lange, D., Verbanscics, P., **Gutzwiller, R. S.**, Reeder, J., & Sarles, C. (2012). Command and control of teams of autonomous systems. *Proceedings of the 17th Monterey Workshop for the Development, Operation and Management of Large-Scale Complex IT Systems,* Oxford, UK.

Sarles, C., Lange, D., Duarte, C., Moraski, L., Brizzolara, B., & **UV Sentry Team**. (2012). UV Sentry: A collaborative approach to creating a collaborative system. *American Society of Naval Engineers Day conference "Naval Warfare – Critical Engineering Challenges"*, Arlington, VA.

Book Chapters

Huang, L., Cooke, N. J., **Gutzwiller, R. S.**, Chiou, E. K., Berman, S., Demir, M., & Zhang, W. (in press). Distributed Dynamic Team Trust in Human, Artificial Intelligence, and Robot Teaming. *In J.* Lyons & C. Nam (eds.), *Trust in Human Robot Interaction.*

Heggestad, E. D., Clegg, B. A., Goh, A., & **Gutzwiller, R. S.** (2012). How automation-based training aides and learner cognitive abilities impact training effectiveness. In A. Healy and L. Bourne (Eds.), *Training cognition: Optimizing efficiency, durability, and generalizability* (pp. 112-133). New York, NY: Taylor & Francis.

Magazine Articles

Van Orden, K., & **Gutzwiller, R. S.** (2018). User-centered design should be a cornerstone requirement for system development. *Naval Proceedings, 144(10)*, 1388.

Van Orden, K., Lukos, J., **Gutzwiller, R. S.**, & Buck, H. (2018). Not just a fad: A cognitive science rationale for use of augmented and virtual reality technologies for the Warfighter. *Future Force, 5*(3).

Manuscripts Submitted for Peer Review

Gutzwiller, R. S., Fugate, S., Weigand, K., & Lukos, J. (under review). An Empirical Test of a Visual Display for End Users to Detect PDF File Cyber Threats.

Manuscripts in Preparation

Johnson, C.K., Gervais, J., **Gutzwiller, R. S**., Fugate, S. J., Bilinski, M., & Ferguson-Walter, K. J. (in prep). Operational impacts of decision-making biases in cybersecurity.

Van Orden, K. F., Iden, R., **Gutzwiller, R. S.**, Iversen, M., & Lemon, A. (in prep). Goal Directed Task Analysis on Navy surface combatant Tactical Action Officers (U). Classified publication.

Gutzwiller, R. S., Ferguson-Walter, K. J., *Johnson, C.,* Fugate, S. J., Major, M., & Guo, L. (in prep). Analyzing Tularosa: Providing evidence for cognitive biases in red teamers as an Oppositional Human Factors strategy.

Gutzwiller, R. S., Van Orden, K., & *Gervais, J*. (in prep). Cyber situation awareness: A review and future directions.

Gutzwiller, R. S., *Lewis, C. M*., *Johnson, C. K.,* & Sitzman, D. M. (in prep). Task priority effects in multi-task management.

Technical Reports

Gutzwiller, R. S. (2019). Situation awareness in defensive cyberspace operations: An annotated bibliographic assessment through 2015. *DTIC Technical Report* via Naval Information Warfare Center. Available from https://apps.dtic.mil/dtic/tr/fulltext/u2/1074248.pdf

Van Orden, K.F., Lemon, A.G., & **Gutzwiller, R.S.** (2017). Winning by design: How to improve the performance of shipboard command, control and combat system operator interfaces while reducing manpower requirements and associated costs. SSC Pacific Technical Report 3068: *Space and Naval Warfare Systems Center Pacific*, San Diego, CA.

Bass, T., Zuech, R., & **Gutzwiller, R. S.** (2017). Virtualized Cyberspace - Visualizing patterns & anomalies for cognitive cyber situational awareness. *ResearchGate* Open Publication. Available from https://www.researchgate.net/publication/320008976_Virtualized_Cyberspace_-_Visualizing_Patterns_Anomalies_for_Cognitive_Cyber_Situational_Awareness

Fugate, S., & **Gutzwiller, R. S.** (2016). Re-thinking cyber symbology. *NATO Technical Report STO-MP-IST-HFM-154.* Available from https://www.researchgate.net/publication/314151044_Rethinking_Cyberspace_Symbology.

Workshops (peer reviewed)

Gervais, J., & **Gutzwiller, R. S.** (2020). Cybersecurity 101 Workshop. Full Day Workshop at the *Human Factors and Ergonomics Society Annual Meeting.*

Patent Applications

Fugate, S. J., Lukos, J. R., **Gutzwiller, R. S.**, & Wiegand, K. P. (2016). Computer system anomaly detection using human responses to ambient representations of hidden computing system and process metadata. United States of America.

Invited Seminars, Presentations, & Panels

Gutzwiller, R. S. (2020; *virtual presentation*). Interactive machine learning: A novel approach to human-machine teaming. Invited talk at *General Dynamics Corporation* (04-2020), Phoenix, AZ, USA.

Gutzwiller, R. S. (2020). Interactive machine learning; A novel approach to human-machine teaming. Invited virtual talk to *Facebook*.

Gutzwiller, R. S. (2020; *cancelled due to COVID-19*). Interactive machine learning: A novel approach to human-machine teaming. Invited talk at *Massachusetts Institute of Technology Lincoln Laboratories (MIT)*, 04-2020, Boston, MA, USA.

Gutzwiller, R. S. (2020; *postponed due to COVID-19*). Interactive machine learning: A novel approach to human-machine teaming. Invited talk at *Machine Learning Day*, Arizona State University, West Campus (04-2020), Phoenix, AZ, USA.

Lafon, D., **Gutzwiller, R. S.,** & Ferguson-Walter, K. (2020). Cyber Psychology aids National Security (Panel). Chaired by McGuire, M., Troyer, L., & Fugate, S. *HICSS-53 Symposium.* Maui, Hawaii, USA.

Gutzwiller, R. S. (2019). Invited talk at National Science Foundation (NSF) *Workshop for Psychology and Cybersecurity Experts,* held in Washington, DC, USA.

Gutzwiller, R. S. (2019). Humans, AI and machine learning: Concerns and a way forward. Invited Panel presentation at *Naval Applications of Machine Learning* (NAML) conference, held by U.S. Navy, San Diego, CA, USA.

Gutzwiller, R. S. (2019). Interdependence in cyberspace: A view of automation as applied to cybersecurity. Invited Panel presentation at *Cyber TRAINsitions Workshop*, held by the University of Central Florida, Orlando, FL, USA.

Gutzwiller, R. S. (2018). Focus on the human! Human factors science will help develop automated and autonomous cyber operations. Presented at the *Autonomous Cyber Operations Workshop*, Maryland, USA.

Gutzwiller, R. S. (2018). Predicting attention to tasks in complex systems. Department of Psychology & Neuroscience, *Baylor University*, Waco, TX, USA.

Gutzwiller, R. S. (2018). The human role in cyber defense. Webinar series "Human Factors Applications to Cybersecurity", invited and sponsored by the *Human Factors and Ergonomics Society.*

Gutzwiller, R. S. (2018). Attention to tasks in complex systems**.** Human Systems Engineering program, *Arizona State University,* Mesa, AZ, USA.

Gutzwiller, R. S. (2017). What do humans mean for autonomy in the Navy? *Air Force Institute of Technology*, Dayton, OH, USA.

Gutzwiller, R. S. (2015). Cognition in the wild. Department of Psychology, *San Jose State University*, San Jose, CA, USA.

Gutzwiller, R. S. (2015). Human factors of cyber network defense. Navy's *Human-Systems Integration Working Group*, online presentation.

Gutzwiller, R. S. (2015). A computational model of multi-task switching choice under cognitive load: STOM. *Department of Defense Human-Systems Integration Technical Advisory Group,* online presentation.

Gutzwiller, R. S., & Clegg, B. A. (2009). The generation effect on route memorization in a navigational task. *Rocky Mountain Psychological Association Conference*, Albuquerque, NM, USA.

Poster Presentations

(italics indicate formal mentees and students)

Gutzwiller, R. S. (2019). The Applied Attention Research lab at Arizona State University. Lab poster presented at the *Human Factors and Ergonomics Society Annual Meeting.*

Williams, S., & **Gutzwiller, R. S.** (2018). Battlespace management aids experimentation and development. Presented at the *Navy and Marine Corps. Naval Innovative Science and Engineering Section 219 Technical Exchange Meeting,* Dahlgren, VA.

Lukos, J., Weigand, K., **Gutzwiller, R.S.**, & Fugate, S. (2018). Ambient activity monitors (AAMs) to display hidden computer system information. *NDIA*

Wanic, L., & **Gutzwiller, R. S.** (2017). Human centered design issues for cyber defense. *Navy Research Enterprise Internship Program review,* Space and Naval Warfare Systems Center Pacific.

Gutzwiller, R. S. (2016). Characterizing human limitations and impediments to cyber situation awareness. *Presented at the Navy and Marine Corps. Naval Innovative Science and Engineering Section 219 Expo,* Pentagon, Washington, D.C.

Hunt, S., **Gutzwiller, R. S.**, Rousseau, D., & Iden, R. (2015). Characterization of the human limitations and impediments for cyber situation awareness. *International Applied Human Factors and Ergonomics (AHFE) Meeting.*

Weeks^, V., **Gutzwiller, R. S.**, & Clegg, B. A. (2013). Retraining with errorless learning for driver education. Poster presented at the *Celebrate Undergraduate Research and Creativity (CURC) conference.* **^**Victor Received a College Honors award.

Gutzwiller, R. S., & Lange, D. S. (2012). Integration of machine learning and human factors for unmanned system teams. *Navy Research Enterprise Internship Program review,* Space and Naval Warfare Systems Center Pacific.

Gutzwiller, R. S., & Clegg, B. A. (2011). Situation awareness and training influence multiple vehicle control. *Association for Psychological Sciences Annual Meeting*, Washington, D.C.

Suozzi, K., **Gutzwiller, R. S**., & Clegg, B. A. (2010). Implicit sequence learning with direct stimulus-response mapping. *National Science Foundation Research Experience for Undergraduates (REU) program,* Colorado State University, Fort Collins, CO.

Huckleberry, K., **Gutzwiller, R. S**., Mong, H., & Clegg, B. A. (2009). Explicit knowledge results from incidental learning in the implicit change detection task. *National Science Foundation Research Experience for Undergraduates (REU) program,* Colorado State University, Fort Collins, CO.

Press Coverage

User-centered Design in Acquisition

[Make User-centered Design a Cornerstone of Navy Systems – Published in *Naval Proceedings*] https://www.usni.org/magazines/proceedings/2018-10/make-user-centered-design-cornerstone-navy-systems

Virtual Reality for the Military

[Virtual Reality Really Does Benefit the Military – Published in *Future Force*] http://futureforce.navylive.dodlive.mil/2018/05/not-just-a-fad-virtual-reality-really-does-benefit-the-military/

Studying the Human and Cybersecurity

[Partner to Study Cybersecurity Tools and Training] https://www.federallabs.org/news/ssc-pacific-national-university-partner-to-study-cybersecurity-tools-and-training

Human Automation Interaction with Swarms

[Inside Navy's Secret Swarm Robot Experiment – Published in *Defense One*] http://www.defenseone.com/technology/2014/10/inside-navys-secret-swarm-robot-experiment/95813/

Teaching & Mentoring Experience

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2019- **Instructor of Record,** Arizona State University, Mesa, AZ, USA

HSE 254: Human Systems Integration

- Developed and Taught an undergraduate course in human systems integration. The course focuses on the history and application of modern HSI efforts across military and industrial applications, using current HSI standards and references. [Fall, 2020]

HSE 598: Applied Attention Theory

- Developed and Taught a graduate seminar in *Applied Attention Theory*. The course uniquely focuses on the dynamic links between studying the nature of attention in the lab, and applying this understanding to complex environments and engineering efforts, thereby improving safety and performance. [Spring, Fall, 2019; Spring 2020]

- HSE 494: undergraduate section of the 598 course now taught [Spring 2020]

2011-2012 **Instructor of Record**, Colorado State University, Fort Collins, CO, USA

- Taught a semester of an undergraduate, stand-alone lab in Basic Cognitive Psychology. Delivered lecture material, leading students to conduct replications of well-known studies. Students learned how to write each of the major sections of a publication culminating in two full papers: one based on a replication, and one based on an idea of their own.
- Taught a semester of an undergraduate, stand-alone lab in Applied Cognitive Psychology similar in structure to the Basic lab. The focus was on applications of cognitive psychology, such as attention and distraction in driving. Incorporated driving-simulator and eye-tracking systems into lecture and hands-on content.

2008-2014 **Teaching Assistant**, Colorado State University, Fort Collins, CO, USA
Graduate teaching assistant for psychology courses, most exceeding 50 students, including *Introductory Psychology, Research Methods in Psychology, Cognitive Psychology, Learning & Memory, Mind Brain & Behavior,* and *Sensation & Perception*

- Prepared and delivered several guest lectures in each course.
- Responsible for grading assignments and exams.
- Facilitated student learning through in-person interactions, holding office hours and ad-hoc discussions and instruction.
- Recruited and mentored students from these courses in lab research.

Mentoring

(* chair and supervision; ‡ completed)

Dissertations Supervised & Committee Membership

- ***** Chelsea Johnson – Cybersecurity and biases in decision making. *Spring 2021.*
- ***** Joe Gervais – Cybersecurity and human factors. *Spring 2023*
- * David Wallace (Arizona State University) – Design and test of a quick catch medical apparatus. *Fall 2020.*
- David Stinson – Team multitasking. *Spring 2021.*
- Verica Buchanan – Cybersecurity and human factors. *Spring 2021.*
- Glenn Lematta – Human machine teaming. *Spring 2022*.
- **‡** Hansol Rheem – *Fall 2019.* Exploration of methods of bias detection.
- **‡** Mollie McGuire (Claremont University) – *Fall 2016*, on prospective memory and unmanned system command and control.

Thesis Supervised & Committee Membership

- *** ‡** Garrett Zabala. *Summer 2020.*
- ***** Christina Lewis. *Spring 2021.*
- * Jimin (Joy) Kim. *Spring 2021.*

- Shawaiz Bhatti. *Fall 2021.*
- Christopher Lieber. *Fall 2020.*
- ‡ Craig Johnson. *Summer 2020.*
- ‡ Earl Radina S*pring 2019*
- ‡ Alyssa Thompson *Spring 2019*

2018- **Mentoring @ ASU (⁺) = 15 PhD, (^) = 5 Masters Students**

- ⁺ Hansol Rheem – Dissertation committee membership, research mentor. **Graduated 2019.** Now supervising post-doctoral position at ASU. [03/2019 to present]
- ⁺ Chelsea Johnson – Dissertation chair. Mentorship and committee chair for dissertation on situation awareness, augmented reality, attention, and cognitive biases in cybersecurity.
- ⁺ Joe Gervais – Dissertation chair. Mentorship for dissertation, and work on cybersecurity situation awareness.
- ⁺ David Wallace – Dissertation committee member; Mentorship on career advice, research projects and networking.
- ⁺ David Stinson – Dissertation committee member.
- ⁺ Verica Buchanan – Dissertation committee member. Mentorship and collaborative work on cybersecurity testbeds.
- ⁺ Glenn Lematta – Dissertation committee member. Mentoring on thesis project, collaborating on cyber game development.
- ⁺ Christina Lewis – Thesis chair. Mentorship for work in error commission in multitasking and attention, collaborative work on cognitive tunneling, and trust in automation.
- ^ Garrett Zabala – Thesis chair. Mentorship on automation, multitasking, attention modeling.
- ⁺ Christopher Lieber – Thesis committee member.
- ⁺ Craig Johnson – Thesis committee member
- ⁺ Sarah Ligda – Member of lit review committee
- ^ Akuadasuo Ezenyilimba – Mentorship on research, collaboration on multitasking experiments.
- ^ Raghav Bhat – Mentorship and project work on cybersecurity and cognitive tunneling.
- ^ Deepika Thamizhvanan – Program mentorship.
- ^ Mathew Dusharm – Program mentoring, mentorship on career in the government. **Graduated 2019.**
- ⁺Jessika (Curry) Smith (Baylor University) – Mentorship on research methods, statistics, and literature reviews.
- ⁺ Megan Nyre-Yu (Purdue University) – Mentorship and collaboration on cognitive task analysis and mental model exploration of cyber defense analysts in Incident Response Teams. **Graduated 2019.**
- ⁺ Melissa Sheldrup (George Mason University) – Mentorship and review of dissertation project on training with automation support. Further collaboration on manuscript in prep. **Graduated 2019.**

- † Kimberly Ferguson-Walter (University of Maryland) – Mentorship on human subjects research, statistics, and psychology. **Graduated 2019**

2014-2018 **Mentoring at Space and Naval Warfare Systems Center (SPAWAR)**

- Josiah Bryan – Mentor over a three month tour in the user-centered design and engineering branch, with a cyber project emphasis.
- Emmanuel Orozco – Mentor over a three-month tour as a software and virtual machine developer for a human factors cyber testbed.
- Liz Wanic (*Naval Postgraduate School*; now at *US Federal Reserve*) – Mentor during her internship at SPAWAR in cyberspace application design and human factors.
- Anu Venkatesh (*University of California - Riverside*) – Advisor for internship and career development in the Science, Mathematics and Research for Transformation (SMART) Scholarship program.

2008- 2014 **Mentoring at Colorado State University**

- Supervised 5 to 15 undergraduate research assistants per semester on my projects and others in a human performance lab, with approximately 20-40% newly recruited RAs each year.
- Trained all research assistants in testing projects, protocols, human subjects protection, and data storage procedures. Each of these RAs was also mentored on a research project they performed as part of their undergraduate thesis.
- Mentored two students on their undergraduate honors thesis projects.
- Supervised four paid assistants completed work to assist in our grant research for ONR and NASA, and mentored them into contributing to conference papers and poster presentations.
- Served as the primary mentor for two paid internships sponsored with the National Science Foundation (NSF) Research Experience for Undergraduates (REU) program at Colorado State University.

Record of Service

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Chair, *Cybersecurity Technical Group* of the Human Factors and Ergonomics Society (HFES) (2019-present)

- Established and led the creation of the Cybersecurity TG for HFES
- Developed Cybersecurity ERGOX workshop for 2020, panelists, and talks on cybersecurity and the human factor. Solicited experts, topic areas, and workshop theme. Led program development.
- Oversaw donations made to the TG >$5,000, 2019-2020.
- Contributed to Council of Technical Groups leadership projects to review guidelines and recommendations
- Saw submissions double in one year to the annual meeting 2019-2020.
- Supported workshop to educate the Society on cybersecurity opportunities.

- Manage membership, represent members at Society level

Grant Reviewer

DARPA (Defense Advanced Research Projects Agency)
ONR Global (Office of Naval Research)

Journal Reviewer

Acta Psychologia
Computational Brain & Behavior
Ergonomics
IEEE Presence
IEEE Systems, Man, & Cybernetics
IEEE Transactions on Human-Machine Systems
International Journal of Human-Computer Studies
International Journal of Social Robotics
Human Factors Journal
Human Performance
Journal of Applied Research in Memory & Cognition
Journal of Cognitive Engineering & Decision Making
Journal of Cyber Security Technology
Journal of Experimental Psychology: Applied
Memory & Cognition

Conference Reviewer

Applied Human Factors and Ergonomics (AHFE)
Cognitive Science Society (CSS)
Computer-Human Interaction (CHI)
Human-Computer Interaction International (HCII)
IEEE CogSIMA

Reviewer for Human Factors and Ergonomics Society (HFES): including society awards, best paper competitions, technical group awards, workshops, panels, and general conference submissions (2009-present). * = appointed

* Jerome H. Ely Best Journal Article Award (2018 reviewer)
Augmented Cognition Technical Group
Cognitive Engineering & Decision Making Technical Group
Computer Systems Technical Group
Cybersecurity Technical Group
Human Performance Modeling Technical Group
Internet Technical Group
Perception and Performance Technical Group

Training Technical Group

Institutional Review Board (IRB) Member

Active voting member, Held 2016 – 2018.
Space and Naval Warfare Systems Center (SPAWAR) Pacific, *U.S. Navy*.

Military Construction (MILCON) Department Representative, Cyberspace

Served as Command and Control Representative for a cyber-focused research and development building plan for SPAWAR Pacific, 2017 – 2018.

Awards

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- Lightning Bolt Innovation Team Award, for project work on DAISEY, 2019, Naval Information Warfare Center (U.S. Navy Research Lab).
- Marc Resnick Award for the best paper in the CSTG/ITG track at the Human Factors and Ergonomics Society Annual Conference, 2018, Human Factors and Ergonomics Society.
- Exemplary Achievement Award in recognition for achievements that have been of high value and benefit to the organization, 2018, SPAWAR (U.S. Navy Research Lab).
- Jerome H. Ely Award for the best paper in the Human Factors Journal, 2017, Human Factors and Ergonomics Society.
- Distinguished Achievement in Leadership Award, 2017, Command and Control Department, SPAWAR (U.S. Navy Research Lab).
- David P. McCabe Excellence in Research Award, 2014, Colorado State University.
- Science Mathematics and Research for Transformation (SMART) Scholarship Award, 2012-2014, U.S. Department of Defense.
- Naval Research Enterprise Internship Award, 2012, Office of Naval Research.
- Naval Research Enterprise Internship Award, 2011, Office of Naval Research.
- Graduate Student Travel Award to present a paper at American Psychological Society, Washington, D.C., 2011, Colorado State University.
- Graduate Fellowship, 2008-2012, Department of Psychology, Colorado State University.
- President's Baylor Scholarship, 2004, Baylor University.

Skills

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- Experimental design and implementation for human subject experiments in cognition and applied human factors engineering.
- Advanced statistical methods and analyses. Expert in *SPSS* software.
- Cognitive modeling and discrete event simulation using *IMPRINT*.

- *Eprime* psychological experimentation software.
- *Multi-Attribute Task Battery* (MATB II) multitasking simulation software.
- *AutoCAMS* software simulation of space capsule air management systems.
- *DriveSafety*, *HyperDrive,* high-fidelity driving simulation software.
- *MORAE* user experience recording and analysis software.
- User Experience (UX) and User Research experience performing goal-directed task analysis (GDTA), cognitive task analysis (CTA), knowledge elicitation techniques, session moderating, system usability, and heuristic reviews.

Professional References

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