

Shannon Bailey, Ph.D.

(407) 401-1347 | shannonkbailey@gmail.com

EDUCATION

University of Central Florida, Orlando, FL

Ph.D. in Human Factors and Cognitive Psychology	2017
M.A. in Applied Experimental and Human Factors Psychology	2016
B.S. in Psychology (Statistics Minor)	2012

WORK EXPERIENCE

Immertec, Inc.

2019 – Present

Human Factors Scientist, Lead Researcher

Supervisor: Jon Clagg, CTO

- Project: Remote Immersive Surgical Trainer
 - o Published peer-reviewed article in high impact medical journal
 - o Designed user interfaces (UI/UX) for virtual reality (VR)
 - o Collected and analyzed surgeons' reactions to the usability of the technology
 - o Developed a research agenda for user testing and experimentation to conduct a training effectiveness evaluation using a modified Kirkpatrick model
 - o Wrote grant applications (*under review*) to funding agencies (i.e., NIH, NSF)
 - o Led external research collaborations and agreements with medical schools

Naval Air Warfare Center Training Systems Division (NAWCTSD)

2014 – 2018

STRIKE Lab

Research Psychologist (2017 – 2018)

Supervisor: Dr. Randy Astwood

- Project: Adaptive Decision-Making Part-Task Trainer for Close Air Support Ground Control
 - o Coordinated extensively with subject matter experts (SMEs) and instructors to create instructional content and feedback for 100+ decision-making scenarios
 - o Wireframed the adaptive computer scenario layout and feedback screens
 - o Piloted content and testbed prototype with military end-users
 - o Developed assessment metrics and designed experiments to test training effectiveness
 - o Contributed to the trainer's adaptation format based on cognitive theory
- Project: Examining the Effects of Game Features on Learning in Simulation-based Training
 - o Co-Principal Investigator
 - o Aided in the development of research questions and experimental design to determine the efficacy of game features on learning from an adaptive computer-based simulation
 - o Bug tested extensively a modified build of the Periscope Operator Adaptive Trainer (POAT), to train periscope operations (e.g., angle on the bow, range)

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- Conducted experiments at the Submarine Officer Basic Course with military users
- Co-authored a book chapter on types of instructional feedback in serious games
- (continuation of STRIKE Lab projects below)

Research Psychologist, StraCon Contractor (2015 – 2017)

Supervisors: Dr. Cheryl Johnson and Dr. Wendi Van Buskirk

- Project: Investigating Low-cost Untethered Virtual Reality Technologies and the Role of Affordances on Training Effectiveness in an Immersive Environment
 - Actively contributed to the design and implementation of three experiments using virtual reality systems (e.g., Oculus Rift, Microsoft Kinect, HTC Vive)
 - Created a task analysis of mechanical maintenance procedures to identify critical cognitive and human performance parameters for instructional design
 - Coordinated with the virtual environment engineering team on the modeling and simulation requirements for a training technology prototype (Unity)
 - Mentored junior researchers on experimental design and writing skills
 - Co-authored a proposal that was awarded for additional funding

Intern (2015)

Supervisor: Dr. Cheryl Johnson

- Project: Efficacy of Feedback Parameters in Adaptive Training Systems
 - Developed and conducted systematic research of a virtual simulation to evaluate human performance (i.e., accurate and timely completion of a spatial task) as a function of feedback characteristics (i.e., immediate or delayed, event or summary, presence of environmental feedback) and psychometric properties (i.e., spatial ability, motivation)
 - Led data analyses (ANCOVA, Regression) and interpreted results for publication
 - Co-authored a proceedings paper, which won Best Paper in Training at the 2016 Interservice/Industry Training, Simulation & Education Conference
 - Facilitated the completion of documents for the Institutional Review Board (IRB)

Research Assistant (2014 – 2015)

Supervisor: Dr. Cheryl Johnson

- Project: Adaptive Training for On-board Periscope Operations
 - Contributed to the creation of protocols and scripts for naval training experiments
 - Synthesized cognitive and human factors research in literature reviews
 - Conducted extensive bug testing of the Periscope Operator Adaptive Trainer (POAT+), a computer-based adaptive simulation that was successfully delivered to submarine schools and to the Fleet (COMSUBLANT, COMSUBPAC, and USS Charlotte SSN 766)

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UCF Applied Cognition and Technology (ACAT) Lab

2010 – 2017

Graduate Researcher

Supervisor: Dr. Valerie Sims

- Project: Hubble Needs Glasses - Optics Lesson (Dissertation Testbed)
 - o Principal Investigator
 - o Awarded the RADM Fred Lewis Postgraduate Interservice/Industry Training, Simulation & Education Conference Scholarship (\$10,000) to develop the simulation
 - o Designed, conducted, and analyzed (Regression) a series of experiments to test the instructional efficiency of gesture-based interactions as well as the medium of instruction on a computer-based science lesson
 - o Developed instructional content on optics concepts and wireframed (designed) the lesson for programmers to implement
 - o Conducted a series of studies to develop validated natural gesture-based interactions that were perceived as natural by users
 - o Managed a team of computer engineers to program over 30 gesture-based commands (Unity) that could be recognized by the motion-tracker (Microsoft Kinect) and performed extensive bug testing of the computer system

- Project: Measurement Equivalence of Computerized Spatial Ability Tests
 - o Developed and implemented experimental protocols investigating psychometric properties of computerized spatial ability tests
 - o Conducted measurement equivalence tests using structural equation model (SEM) statistical analyses with AMOS and LISREL software
 - o Managed a team of research assistants (5-10 per semester)
 - o Published a first-authored article in a top human factors journal

- Project: Investigating the Effects of Experience on Mental Rotation of Objects
 - o Generated hundreds of visual stimuli in Photoshop and PowerPoint
 - o Created experiment using Superlab and Qualtrics software

- Project: Assessing Predictors of Views about Punishing Animal Cruelty
 - o Published a first-authored paper in a peer-reviewed empirical journal
 - o Analyzed results (Canonical Correlation Analysis, ANOVA) using SPSS and JMP
 - o Performed Bayesian Estimation and presented a comparative analysis of Bayesian versus Null Hypothesis Significance Testing statistical methods to a department-wide briefing

- Project: Perceptions of Text Messages and Mobile Text-based Messaging Apps
 - o Analyzed experimental datasets in statistical packages (SPSS and Excel)
 - o Wrote and presented results of three studies, including first-authored and co-authored published proceedings

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- Project: Child Mental Models of Computer and Intelligent Agents
 - o Transcribed and coded audio files from elementary school children in a longitudinal study on conceptualizations of computers and intelligent agents
- Project: Dichotic Listening of Synthetic and Accented Voices
 - o Conducted an experiment with elderly adult and undergraduate participants through a dichotic listening study. Each participant was given multiple listening tasks, a word span test, and surveys.

Army Research Lab Outside Research Review

2015

Outside Reviewer

- Provided outside technical review of experimental protocol for the Army Research Lab to evaluate the experimental design and scientific contribution

UCF Office of Research and Commercialization

2012 -2014

Program Assistant

- Assisted program managers and principal investigators with the management and organization of proposal, compliance, and deliverable documents for multi-million-dollar research grants from large funding agencies, such as the NSF, NIH, and DoD

UCF Institute for Simulation and Training

2009

Research Assistant

Supervisors: Dr. Curtis Conkey and Dr. Clint Bowers

- Analyzed data from a military assertiveness training computer-based simulation

PUBLICATIONS

Ciccone, B. A., **Bailey, S. K. T.**, & Lewis, J. E. (2021). The next generation of virtual reality: Recommendations for accessible and ergonomic design. *Ergonomics in Design*. doi: 10.1177/10648046211002578

Bailey, S.K.T. & Dean, M. (2020). Remote solution for immersive surgical mentoring. *Medical Education*, 54(5), 485-486. doi: 10.1111/medu.14087

Bailey, S.K.T., Neigel, A.R., Dhanani, L.Y., & Sims, V.K. (2018). Establishing measurement equivalence across computer- and paper-based tests of spatial cognition. *Human Factors*, 60(3), 340-350. doi: 10.1177/0018720817747731

Johnson, C.I., **Bailey, S.K.T.**, & Van Buskirk, W.L. (2017). Designing effective feedback messages in serious games and simulations: A research review. In P. Wouters & H. van Oostendorp (Eds.), *Techniques to Improve the Effectiveness of Serious Games*. Switzerland: Springer International Publishing. doi: 10.1007/978-3-319-39298-1_7

Bailey, S.K.T., Sims, V.K., & Chin, M.G. (2016). Predictors of views about punishing animal abuse. *Anthrozoös*, 29(1), 21-33. doi: 10.1080/08927936.2015.1064217

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Bailey, S.K.T., & Sims, V.K. (2014). Self-reported craft expertise predicts maintenance of spatial ability in old age. *Cognitive Processing*, 15(2), 227-231. doi: 10.1007/s10339-013-0596-7

PEER-REVIEWED PROCEEDINGS / PRESENTATIONS

Bailey, S. K. T., Petterson, S., & Friedland, R. (*accepted*). Validation of live virtual reality for remote surgical education: A usability evaluation in orthopedic surgery. Submitted to the *Association for Surgical Education Annual Meeting 2021*.

Beadle, S., Spain, R., Goldberg, B., Ebnali, M., **Bailey, S.**, Ciccone, B., ... & Keebler, J. (2020, December). Virtual reality, augmented reality, and virtual environments: Demonstrations of current technologies and future directions. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 64, No. 1, pp. 2119-2123). Sage CA: Los Angeles, CA: SAGE Publications. doi: 10.1177/1071181320641514

Bailey, S.K.T. & Johnson, C.I. (2020). A Human-Centered Approach to Designing Gestures for Natural User Interfaces. In: Kurosu M. (eds) *Human-Computer Interaction: Multimodal and Natural Interaction. HCII 2020. Lecture Notes in Computer Science*, vol 12182. Springer, Cham. doi: 10.1007/978-3-030-49062-1_1

Johnson, C.I., **Bailey, S.K.T.**, & Mercado, A.D. (2020). Does Gamification Work? Analyzing Effects of Game Features on Learning in an Adaptive Scenario-Based Trainer. In: Sottolare R., Schwarz J. (eds) *Adaptive Instructional Systems. HCII 2020. Lecture Notes in Computer Science*, vol 12214. Springer, Cham. doi: 10.1007/978-3-030-50788-6_36

Bailey, S.K.T. & Johnson, C.I. (2019). Performance on a Natural User Interface Task is Correlated with Higher Gesture Production. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 63, 1384-1388. doi: 10.1177/1071181319631181
***Selected Best Poster by the Individual Differences Technical Group**

Johnson, C.I., Marraffino, M.D., Whitmer, D.E., & **Bailey, S.K.T.** (2019) Developing an Adaptive Trainer for Joint Terminal Attack Controllers. In: Sottolare R., Schwarz J. (eds) *Adaptive Instructional Systems. HCII 2019. Lecture Notes in Computer Science*, vol 11597. Springer, Cham doi: 10.1007/978-3-030-22341-0_25

Bailey, S.K.T., Johnson, C.I., & Sims, V.K. (2019) Using Natural Gesture Interactions Leads to Higher Usability and Presence in a Computer Lesson. In: Bagnara S., Tartaglia R., Albolino S., Alexander T., Fujita Y. (eds) *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018). IEA 2018. Advances in Intelligent Systems and Computing*, vol 826. Springer, Cham. doi: 10.1007/978-3-319-96065-4_70

Johnson, C. I., **Bailey, S.K.T.**, & Whitmer, D. E. (2018). *Exploring sensory feedback modalities in virtual reality to promote transfer of training*. Poster presented at the 20th Congress of the International Ergonomics Association, Florence, Italy.

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- Bailey, S.K.T.**, Johnson, C.I., Schroeder, B.L., & Marraffino, M.D. (2017). Using virtual reality for training maintenance procedures. *Proceedings of the Interservice/Industry Training, Simulation and Education Conference*
- Schroeder, B.L., **Bailey, S.K.T.**, Johnson, C.I., & Gonzalez-Holland, E.E. (2017). Presence and usability do not directly predict procedural recall in virtual reality training. In Stephanidis C. (Ed.), *Communications in Computer and Information Science: Vol. 714. HCII 2017 - Posters' Extended Abstracts* (pp. 54-61). Berlin, Germany: Springer. doi: 10.1007/978-3-319-58753-0_9
- Bailey, S.K.T.**, Whitmer, D.E., Schroeder, B.L., & Sims, V.K. (2017). Development of gesture-based commands for natural user interfaces. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 61*. doi:
- Johnson, C.I., **Bailey, S.K.T.**, Marraffino, M.D., & Schroeder, B.L. (2017, November). *Gesturing in virtual reality leads to better procedural learning for low spatial individuals*. Poster presented at the 58th Psychonomic Society Meeting, Vancouver, B.C., Canada.
- Bailey, S.K.T.** & Sims, V.K. (2017, April). *Determining gesture-based commands for a natural user interface*. Poster presented at the 1st Southeastern Human Factors Applied Research Conference, Raleigh, NC.
- Landsberg, C.R., **Bailey, S.K.T.**, Van Buskirk, W.L., Gonzalez-Holland, E., & Johnson, C.I. (2016). Designing effective feedback in adaptive training systems. *Proceedings of the Interservice/Industry Training, Simulation and Education Conference*. ***Selected Best Paper in Training**
- Bailey, S.K.T.**, Schroeder, B.L., Whitmer, D.E., & Sims, V.K. (2016). Perceptions of mobile instant messaging apps are comparable to texting for young adults in the United States. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 60*, 1235-1239. doi: 10.1177/1541931213601288
- Schroeder, B.L., Whitmer, D.E., **Bailey, S.K.T.**, & Sims, V.K. (2016). Individual differences in middle school and college students' texting. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 60*, 1215-1219. doi: 10.1177/1541931213601284
- Whitmer, D.E., Sims, V.K., **Bailey, S.K.T.**, & Schroeder, B.L. (2016). Time to decide: To call or not to call 911 during weather crises. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 60*, 1160-1164. doi: 10.1177/1541931213601271
- Bailey, S.K.T.**, Schroeder, B.L., & Sims, V.K. (2015). Unsafe texting and socially problematic texting: Need for cognition as an underlying predictor. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 59*, 971-975. doi: 10.1177/1541931215591279
- Sinatra, A.M., Sims, V.K., **Bailey, S.K.T.** & Najle, M.B. (2013). Differences in the performance of older and younger adults in a synthetic speech dichotic listening task.

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Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 57, 1565-1569. doi: 10.1177/1541931213571349

Sinatra, A.M., Sims, V.K., Najle, M.B., & **Bailey, S.K.T.** (2012). The impact of synthetic and accented speech on unattended recall in a dichotic listening task. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 56*, 1635-1638. doi: 10.1177/1071181312561327

GRADUATE TEACHING EXPERIENCE

Research Methods (lab instructor): 5 semesters, 20-40 students per semester

- Instructed students in weekly lectures on statistics (correlation, t-tests, and ANOVAs), data analysis software (SPSS), and writing APA research papers
- Facilitated group projects in which students conducted five lab experiments throughout the semester, culminating in research papers
- Provided extensive feedback on paper drafts and graded final papers

Cognitive Psychology (lab instructor): 3 semesters, 74-200 students per semester

- Developed a new online lab component in which students simulate classic Psychology experiments, analyze results, and write lab reports (Canvas)
- Graded research papers, written lab modules, and essay-question exams
- Administered and assessed assignments through online portal

Developmental Psychology (online): 3 semesters, 120-400 students per semester

- Administered and assessed assignments through online LMS (Canvas)

Statistical Methods in Psychology (lab instructor), 40 students

- Responsible for grading the lab portion on conducting statistical analyses (SPSS)
- Held quiz reviews and weekly office hours to answer students' questions

Human Factors Psychology, 200 students

- Facilitated and graded group projects in which students designed a product or environment using Human Factors principles
- Graded assignments and exams

General Psychology, 200 students

- Administered and assessed assignments

Motivation (online), 200 students

- Administered and assessed assignments through online portal

INVITED TALKS

MedVR

<https://youtu.be/h4tX1eqHSZ0>

"Livestreaming Video in XR for Remote Medical Education"

2020

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California State University Long Beach <i>Remote</i> "From PhD to Industry: How to Use Human Factors Research to Solve Real-world Problems"	2020
Virtual Reality Training Summit <i>Remote</i> "Panel: How to Design and Measure a Successful VR Training Pilot"	2020
University of Tampa <i>Tampa, Florida</i> "Human Factors in Interactive Media"	2020
Ethical XR Symposium, hosted by Florida Atlantic University <i>Boca Raton, Florida</i> "Ethical and Privacy Considerations for Designing Immersive Technologies in Healthcare"	2020
University of Florida <i>Gainesville, Florida</i> "Designing Virtual Reality Applications for Healthcare"	2020
ProductCamp Gulf Coast <i>Tampa, Florida</i> "Virtual Reality: Product Design Challenges & Solutions"	2019
University of Tampa <i>Tampa, Florida</i> "Not Just a Shiny Demo: Real-world Applications of Emerging Technology"	2019
University of Central Florida <i>Orlando, Florida</i> "Getting Started with Undergraduate Research"	2013 – 2017

PROFESSIONAL SERVICE

Human Factors and Ergonomics Society <i>Member</i>	2015 – Present
<i>Reviewer</i>	2018 – Present
<i>Program Chair, Virtual Environments Technical Group</i>	2020 – Present
British Journal of Educational Technology <i>Reviewer</i>	2019 – Present

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COMMUNITY VOLUNTEERING

Computer Mentors, Teen Business Challenge 2021

- Guided teens from underserved communities to create and develop a virtual reality (VR) application and business plan

SECME District Competition 2017

- Organized and judged events for the diversity in Science, Engineering, Communication, Mathematics, Education (SECME) K-12 District Competition

Society for Neuroscience, Central Florida Chapter 2013 – 2014

- As part of the executive team, facilitated a faculty and professional talk series of neuroscience topics for the new non-profit 501(c)(3) Central Florida Chapter Society for Neuroscience
- Organized a sold-out public event (Music and the Brain) to discuss the effects of music on the brain, featuring a neuroscientist and Julliard-trained violinist
- The Music and the Brain event was featured on the cover of *Orlando Weekly*

Girl Scout STEM Outreach 2013

- Organized speakers of women in science to showcase STEM disciplines with middle school aged girls along with related projects