Trevor J Barrett

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Born 1988, Maryland | US Citizen

Technical Skills

Experimental design and data analysis using linear models and extensions, model-based clustering and classification, Bayesian inference and computation, stochastic evidence accumulator models

Technical writing and reproducible research; automated analysis report generation using markdown and interactive data visualizations

Computing laboratory experience

Platforms	_Software_
Windows, Linux, Unix, AWS	R, Julia, Python, SPSS, MS Office

- Strong interest in machine learning and probabilistic programming languages (Stan, PyMC3).
- Experience with HPC infrastructure and analysis workflows using campus cluster and XSEDE resources.
- Deployed hyper-converged RStudio data analysis server in VSphere; built R with Intel compilers and MKL.
- Deployed Twitter harvest and archive server; network / text analysis and visualization using Shiny web apps.

Research Experience

PhD Research | University of California, Santa Barbara | 2012 – 2019
Dissertation | _Ability moderates alternate strategy use during the mental rotation task with molecule-like stimuli_

- Explored effects of strategic ambiguity in a 2-choice forced-response task relating to problem solving in a STEM domain.
- Built predictive classifier of users' cognitive strategy based on response times using discriminant analysis, k-fold cross-validation.
- Discovered 70% of users adopted the more performant strategy, and adoption was moderated by abstract reasoning ability.

Master's Thesis | _Interaction Design and the Role of Spatial Ability in Virtual Molecule Manipulation Performance_

- Investigated the effect of stereoscopic viewing and tangible user interface location in VR system geared towards STEM instruction.
- Discovered interface design manipulation effects depended on user ability level: only low-spatial ability users benefited from co-location.

Graduate Student Researcher | University of California, Santa Barbara | 2013 – 15
NSF research grant | _Modeling, Display, and Understanding Uncertainty in Simulations for Policy Decision Making_

- Designed and conducted experiments related to the "blue dot" of uncertainty common in mobile mapping apps.
- Modeled user heuristics and strategies during decision making with visual displays of geospatial uncertainty.

Graduate Student Researcher | University of California, Santa Barbara | 2012 – 13
NSF research grant | _Representation Translation with Concrete and Virtual Models in Chemistry_

- Designed novel interactive virtual reality system; collected and analyzed real-time motion tracking data.
- Programmed experiments in Python based virtual reality software, Vizard; 3D graphics in Blender, Rhino, 3ds Max.
- Compared user performance with virtual and physical chemistry models; data analysis using Python, R, SPSS.

Leadership Experience

Teaching Assistant | University of California, Santa Barbara | 2013 – 2017

- TA for nine UCSB courses with 20-400 students; courses include: laboratory in advanced research methods, laboratory in cognition, cognitive psychology, human thinking and problem solving, constructs in psychology, hormones and cognition, developmental psychology.
- Led weekly lab sections of 20 students and supervised groups in design, execution, and presentation of experimental research projects.
- Contributed material on statistics and scientific writing for the Advanced Research Methods Laboratory manual.

Undergraduate Researcher Mentor | University of California, Santa Barbara | 2012 – 2017

- Selected, trained, and mentored eight research assistants in experimental design, analysis, and writing.
- Oversaw two undergraduate honors thesis research projects; supervised experimental design, analysis, and presentation.

Selected Publications (3 of 9)

Barrett, T. J., & Hegarty, M. (2016). Effects of interface and spatial ability on manipulation of virtual models in a STEM domain. _Computers in Human Behavior_

Hegarty, M., Friedman, A., Boone, A. P., & Barrett, T. J. (2016). Where are you? The effect of uncertainty and its visual representation on location judgments in GPS-like displays. _Journal of Experimental Psychology: Applied_ (**Raymond Nickerson Best Paper Award**)

Barrett, T. J., Stull, A. T., Hsu, T. M., & Hegarty, M. (2015). Constrained interactivity for relating multiple representations in science: When virtual is better than real. _Computers & Education_

Education	Grants	Selected Awards	Editorial Service
University of California, Santa Barbara	_NSF XSEDE Computational Start-up Grant_	_NSF Graduate Research Fellowship_, Honorable Mention 2015	_Computers in Human Behavior_, Ad-Hoc Reviewer
PhD Psychological & Brain Sciences, 2019 MA Psychological & Brain Sciences, 2015 BA Psychology, 2011	TG-DBS160003 50,000 SU Award 2016		