Marilyn Hughes Blackmon, PhD, ICS Affiliate

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URLs leading to more information

- CV for Marilyn Hughes Blackmon, PhD
- Marilyn Hughes Blackmon, Google Scholar Profile, https://scholar.google.com/citations?user=icYBIEMAAAAJ&hl=en
- Marilyn Hughes Blackmon, ResearchGate Profile, https://www.researchgate.net/profile/Marilyn-Blackmon
- ORCID Profile, public view: https://orcid.org/0000-0003-4228-6505/print
- Professional memberships, all continuous from 1999 to 2021:
    - Association of Psychological Science, https://www.psychologicalscience.org
    - Association for Computing Machinery (ACM), https://www.acm.org
    - ACM Special Interest Group on Computer Human Interaction (SIG-CHI), https://www.acm.org/special-interest-groups/sigs/sigchi and annual CHI conferences, https://sigchi.org/conferences/upcoming-conferences/.
- ACM Digital Library, record of 5 conference papers presented at ACM CHI conferences (5 of 22 total publications), https://dl.acm.org/action/doSearch?ContribAuthorRaw=Blackmon%2C+Marilyn+Hughes&sortBy=Ppub_desc

Summary of affiliated research work with ICS

In 1999 I earned my PhD in Cognitive Psychology from the CU Boulder Department of Psychology and have been affiliated with ICS as a Research Associate for 22 years (1999 to 2021). I focused on doing experiments and publishing empirical and theoretical professional papers in the field of Human Computer Interaction (HCI). For seven years (2005-2012) I was concurrently a part-time Lecturer with the Department of Psychology and Neuroscience at CU Boulder. For 14 semesters I taught Psych 4145/5145, Advanced Cognitive Psychology, a research methods course for upper-level undergraduate majors in Psychology and Neuroscience and graduate students from many departments represented by ICS Fellows: Computer Science, Education, Business, Linguistics, and Speech, Hearing and Learning Sciences. I had an appointment to the graduate faculty at CU Boulder to qualify me to (a) teach Psych 5145, the graduate level of Advanced Cognitive Psychology, and (b) serve on thesis committees and mentor independent study projects for five Ph.D. students and six M.S./M.A. students—one at CU Denver in Biostatistics and five at CU Boulder in Cognitive Psychology, Cognitive Science, Computer Science, Education, and Linguistics. I mentored two doctoral dissertation research and hosted Web-navigation experiments on my https://autocww2.colorado.edu research server (currently offline). ICS Fellow Peter Polson, the official chair of the doctoral committees, and I jointly supervised these two students writing their dissertations.

My research while affiliated as a Research Associate with ICS drew on the work of four ICS Fellows: Peter Polson, Clayton Lewis, Tom Landauer, and Walter Kintsch. My first-authored research publication that has accrued the most citations (383 in Google Scholar) was "Cognitive Walkthrough for the Web," a paper presented at the ACM CHI '02 Conference. That CHI '02 paper was co-authored by Clayton Lewis and Peter Polson, developers of the original Cognitive Walkthrough, and by Muneo Kitajima, a Japanese HCI researcher (https://scholar.google.com/citations?user=RReyGEQAAAAJ&hl=en&oi=ao). Kitajima, Polson, and I were co-authors of a theoretical paper about CoLiDeS published in 2000, which has accrued my second highest number of citations (237 in Google Scholar). CoLiDeS is a comprehension-based simulation model of web navigation developed primarily by Kitajima while he was affiliated with ICS and collaborating with Peter Polson.

Both my empirical and theoretical research made extensive use of Walter Kintsch's theory of comprehension and Tom Landauer's Latent Semantic Analysis (lsa.colorado.edu), a machine learning model that reports a cosine measure of semantic similarity between any two passages of text. I attended Landauer's ICS lab meetings and contributed a co-authored chapter for his book, *Handbook for Latent Semantic Analysis* (2007). My empirical and theoretical contribution to developing the Cognitive Walkthrough for the Web was funded by a career development grant from the National Science Foundation, NSF Grant No. 0137759.

My controlled experiments and professional publications all fall into the field of Human-Computer Interaction (HCI), a field also called Computer-Human Interaction (CHI). I designed and conducted over a dozen experiments confirming that people first focus attention on the area of the webpage with high semantic similarity to their search query, and then they click on a link with high semantic similarity within the focused-on area of the webpage, confirming the CoLiDeS cognitive model of web navigation.

Blackmon (2012) presented the culminating version of the Cognitive Walkthrough for the Web (CWW or AutoCWW) and reported two new experiments with a large dataset of 428 experimental tasks completed by 82 participants. I analyzed the data using a four-variable stepwise multiple regression model, explaining a commendable 57% of the variance for the four independent variables, $F(4,419) = 142.183$, $p < 0.0001$, adjusted $R^2 = 0.57$. Equally significant, the competing headings variable entered first in the stepwise regression (the variable with the biggest F to remove) accounted for 44% of the variance in the dependent variable, time participants took to find the correct webpage for each of 32 search goals attempted during the experiment. Whenever a participant failed to find the correct page to successfully complete the search task, the time expired at 130 seconds and that data point was scored as 130. The logfiles proved that participants persistently clicked links nested under headings very high in semantic similarity to the goal, confirming a primary hypothesis. Whenever the correct link was nested under a heading with very high semantic similarity to the goal, participants completed the task very quickly and mean solution time approached 10 seconds. In contrast, for tasks with one competing heading participants persistently clicked links nested under the competing heading, links that could never complete the search task. For tasks on webpages with multiple competing headings, wasted even more time clicking links under headings that they found intuitively attractive and often failed to accomplish the task before the time limit expired. For these search tasks and the mean completion time approached 130, the maximum time allowed to complete the task. The take-home message for website designers is that they must be meticulous about designing a system of heading categories that lures website visitors to pay attention to semantically similar headings on a correct solution path and avoid luring visitors to competing headings.

My key collaborators and co-authors from outside CU Boulder include Muneo Kitajima from Japan (https://scholar.google.co.jp/citations?user=RReyGEQAAAAJ&hl=ja) and Bonnie E. John from Carnegie Mellon and IBM TJ Watson Research Center (https://www.researchgate.net/profile/Bonnie-John/experience). Bonnie John and I were co-authors on several joint papers, including (a) CHI papers, (b) joint web navigation research with John and her PhD student at Carnegie Mellon who used my experimental data, (c) joint research conducted by John and her colleagues at IBM TJ Watson Research Center, which required a contract signed by administrators at both IBM and CU Boulder, and (d) collaboration on an aviation research project led by Principal Investigator Lance Sherry at George Mason University and funded by NASA, including a subcontract on which I was a co-PI.

Summary of current research interests

I am currently writing a book that engages curiosity about a series of deep questions. The book grew out of teaching Psych 4145/5145 for seven years and teaching students to do a literature search using Web of Science. I want the book to target college-educated readers who are curious about deep question and willing to invest the effort to search for evidence-based, trustworthy interdisciplinary answers to one or more deep questions. I also plan to design web-based experiments on how information search depends on two levels of question depth: shallow factual questions versus deep questions about causal antecedents/consequences.

Each chapter of the book presents a worked-out example of an information search to get an evidence-based answer to one deep question, weaving together six strands common to all chapter:

1. Formulate deep, complex, theory-based interdisciplinary scientific questions about causal antecedents and causal consequences (following Arthur Graesser's work on deep questions)
2. Teach readers how to do a literature search using Web of Science tools and Boolean search queries to electronically search the database of peer-reviewed experimental papers, reviews, and meta-analyses and identify the researchers whose highly cited papers deliver answers highly respected by other scientists. Seek scientific truth by identifying researchers with Google Scholar h-index ratings above 50, who regularly publish highly cited papers in top-quartile professional journals.
3. Teach readers how to locate experimental reports and understand at least one experiment to grasp how scientists think.
4. To support readers searching for scientific truth and promoting evidence-based practice, each chapter will include an example of meta-analyses or systematic reviews that combine evidence from multiple experiments to answer the question.
5. To promote the common good and commitment to professional ethics, each chapter will explore individual differences in altruism vs. antagonism in the HEXACO personality traits of Honesty-Humility, Agreeableness, and Emotionality-Empathy.

My literature search skills grew out of seven years of teaching the Psych 4145/5145 research methods course, and my literature search skills advanced from helping individuals in many walks of life search for trustworthy solutions to painful life challenges or to practical real-world problems. Each chapter in the book will provide an instructive worked-out example of a deep question that can be answered with interdisciplinary cognitive science. For example, the first chapter looks at the active field of research on dark personalities and the HEXACO model of six personality factors, focusing on individuals who score very low on all three of the HEXACO altruistic personality traits of honesty-humility, agreeableness, and emotionality-empathy. These individuals are usually considered normal because they have no criminal record and do not seek psychotherapy, but their actions nevertheless cause domestic violence and serious harm to family members and close associates. This chapter explains how to use the Web of Science "Analyze Authors" tool to identify the top experts researching dark personalities, especially researchers who have high h-index scores on Google Scholar and have published the greatest number of highly cited papers on dark personalities. The Web of Science "Analyze Author" tool makes it easy to identify the top research experts on dark personality traits and pinpoint the publications most worth reading, allowing any non-expert to efficiently uncover the most trustworthy scientific evidence to answer the question.