# Digitally mapping the human behaviorome

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## KEYNOTE ABSTRACT

Researchers and practitioners in numerous fields yearn to understand human behavior and use that knowledge to improve the quality of life for individuals and populations. Until recently, theories of behavior and its relationship with genetics, health, and the environment have been based on self-report or human-observed information. Given the meteoric rise of pervasive and machine learning technologies, researchers now have the necessary tools to map a personalized human behaviorome.

Despite these recent technology advances, we still face numerous challenges that limit our current ability to learn reliable, complete personal profiles. The ability to perform machine learning-based behavior observation and analysis in uncontrolled environments, where the physical twin lives, is a fundamental requirement. This capability is not only a key to understanding the relationship between behavior and its influences, but also represents an unmet need.

In this talk, we highlight methods that have been designed at the WSU CASAS lab to lay the foundation for digitally mapping a human behaviorome. We mention hurdles that were faced along the way, which unexpectedly created new research opportunities. We also tour some of the applications of the human behaviorome that the group is exploring, specifically to impact health and quality of life for adults as they age.

## SPEAKER BIOGRAPHY

Diane Cook is Regents Professor and Huie-Rogers Chair in the School of Electrical Engineering and Computer Science at Washington State University, founding director of the WSU Center for Advanced Studies in Adaptive Systems (casas.wsu.edu), and co-director of the WSU AI Laboratory. She received her PhD in Computer Science from University of Illinois in 1990, MS in Computer Science in 1987, and BS in Math/Computer Science from Wheaton College in 1985. She is a Fellow of the IEEE and a Fellow of the National Academy of Inventors. She is featured in BBC ("Will we ever have robot carers?", 2019), IEEE The Institute ("Smart homes could monitor medical issues for elderly", 2018), Smithsonian ("How will artificial intelligence help the aging?", 2017), The White House Fact Sheet (2015), the Wall Street Journal ("Using sensor technology to lower elder care costs", 2014), AARP Magazine ("Are smart homes the answer to the long-term care crises?", 2014), and ABC News ("Smart homes prevent illness, run the dryer", 2012). She has been a Visiting Scientist at IBM Research, serves as co-editor-in-chief for Knowledge and Information Systems, and is an associate editor for six major journals. Her research is aimed at creating smart environments that automate health monitoring and intervention, and her lab's Smart Home in a Box is installed in over 160 sites across 9 different countries. Dr. Cook is actively involved in training students in the transdisciplinary field of gerontechnology, having obtained federal grants to develop open-source curricular materials and involve students from underrepresented groups in gerontechnology research. Her research is currently developing machine learning methods for "mapping the human behaviorome" and integrating these insights into technologies that extend and enhance functional performance. Details about her research are found at http://eecs.wsu.edu/ cook.

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