

Convergence in the Era of Intelligent Cognitive Assistants What does this mean? Opportunities and Challenges

Daniel J.C. Herr

Joint School of Nanoscience and Nanoengineering/UNC-Greensboro



Abstract

This presentation examines convergence as a key enabler for Intelligent Cognitive Assistants and Systems. It also examines the potential challenges and barriers to the successful launch of these autonomous emergent systems. This presentation builds on the 2018 Intelligent Cognitive Assistants (ICA) Workshop Summary and Research Needs document, the 2018 Semiconductor Synthetic Biology Roadmap, the 2018 Convergence in Education Conference and recent developments in the field of intelligent cognitive assistants. It explores several high-impact research opportunities in convergent foundational technologies for brain-like computing and ICA and examples of current entry-level applications in the aerospace, healthcare and comfort industries. This presentation also will consider some guiding principles and values aimed at ensuring that these emergent technologies remain focused on addressing strategic societal needs and challenges. In this context, key values and guiding principles considered include: Enhance and serve, not replace, human capabilities; adapt with flexibility to dynamic, real-world environments; cultivate “trust” among humans and machines; facilitate “natural” interactions; and incorporate multi-disciplinary, multi-stakeholder perspectives.

Bionote

Dr. Herr serves as professor and Nanoscience department chair at the University of North Carolina’s Joint School of Nanoscience and Engineering (JSNN). He leads a highly collaborative and transdisciplinary team that explores and addresses emerging and convergent nanoscale research opportunities, with a focus on functional nanomaterials, nanobioelectronics, computational nanotechnology, nanobiology/medicine, nanometrology, functional self-

assembled nanomaterials and biomimetic systems. Additionally, he serves as founding Director of North Carolina's Nanomanufacturing Innovation Consortium. Dr. Herr also is passionate about communicating the joy of science and STEAM opportunities to the community and to the next generations of scientists, engineers, and other creative people. His current research interests include useful sustainable and nano-enhanced agriculture, extreme self-assembled and biomimetic nanosystems, nanobioelectronics, composite nanomaterials, and nanoenergy.