



Department of Industrial &
Systems Engineering
Cullen College of Engineering

ISE FRIDAY SEMINAR

BROADEN HORIZONS EXTEND MINDS



Professor Barrett S. Caldwell

Edwardson School of IE and School of A&A

Purdue University

West Lafayette, IN

Date: Friday, November 21, 2025

Time: 1 - 1:50 pm

Location: D2 Lect2

Zoom Meeting ID: 97076565407. **Passcode:** 477211

Human-Systems Integration and Automation for Space Exploration: History and Some Forecasts

Abstract: Scientific exploration of space has long benefitted by effective integration of automated systems and human expertise. This talk discusses two centuries (!) of history in human-automation interactions (HAI) and human-systems integration (HSI) for space science and engineering, with a particular focus on distributed and coordinated expertise of team performance. Important aspects of successful HAI coordination involves awareness and HSI designs that recognize dynamic aspects of function allocation, distributed situation awareness, and communication / information flow that is robust to delay or operational lags in forming and executing decision and action policies. These discussions of teams, tasks, and time have importance for improving HSI operations over time scales ranging from seconds to days, and help to identify criteria for effective HAI teaming for future spaceflight operations.

Short Bio: Barrett S. Caldwell, PhD is Professor in the Edwardson School of Industrial Engineering, and the School of Aeronautics & Astronautics, at Purdue University in West Lafayette, IN, USA. He has a PhD (Univ. of California, Davis, 1990) in Social Psychology, and BS degrees in Aeronautics and Astronautics, and Humanities (MIT, 1985). His research team is the Group Performance Environments Research (GROUPER) Laboratory. GROUPER examines and improves how people get, share, and use information in settings including aviation, critical incident response, healthcare, and spaceflight operations. He has published over 50 peer reviewed journal papers, over 150 peer reviewed conference papers, and over 15 book chapters addressing multiple areas of human factors and systems engineering. Prof. Caldwell has been Director and Principal Investigator of the NASA-funded Indiana Space Grant Consortium (INSGC) since 2002. He is a Fellow and Past Secretary-Treasurer of the HFES, and a Fellow of the IISE. He is the faculty advisor for the Purdue Student Chapter for the IISE, and was named outstanding IISE regional faculty advisor for 2022 and 2023.

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