



STRONG - Cycle 1, FY19

Macro Signatures of Success in Human-Autonomy Teams

PIs / Collaborators: Noshir S. Contractor (Northwestern), Leslie A. DeChurch (Northwestern), Malte F. Jung (Cornell), & Aaron Schechter (University of Georgia)

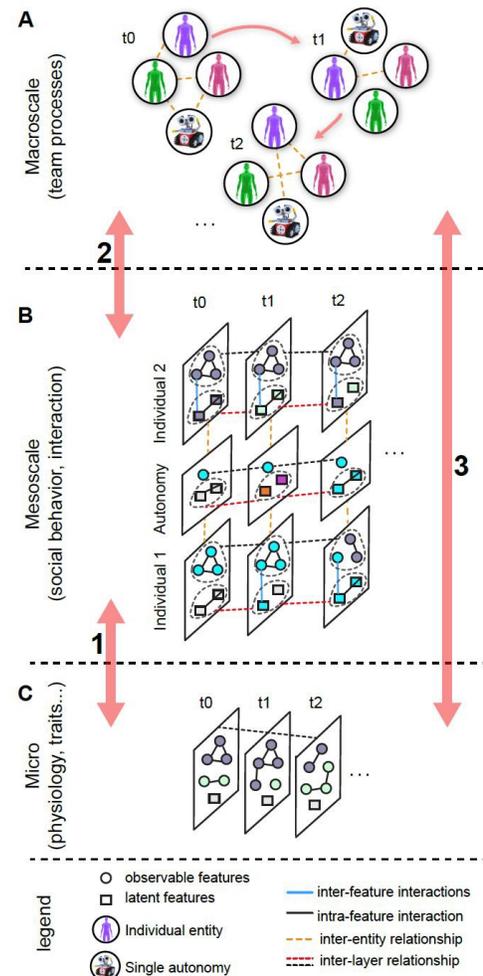
Primary POC: Dr. Noshir S. Contractor, nosh@northwestern.edu

Summary: U.S. Army squads are facing two transformative changes. Each with the potential to significantly augment military capability. First, advances in AI and computer science are enabling intelligent, autonomous agents to join military teams. This invites new theorizing on how the processes and outcomes of human autonomy teams extend or amend current theories on human teams. Second, wearable sensors and advanced real time processing are making it possible to leverage human physiological and behavioral data streams to understand and enhance performance not only in human teams but also to feed data into autonomy systems to enable smooth human autonomy collaboration. Clearly, enabling human-autonomy teaming requires foundational knowledge spanning time scales and units of analysis, from brain signals to inter-team cognition.

This project focuses on the first of these two challenges - extending extant theories of human teams to human-autonomy teaming. The companion project focuses on the second of these two challenges - expanding extant theories of human teaming and human-autonomy teaming to include human physiological and behavioral explanations grounded at more micro and meso levels of analyses (Panels B and C in Figure).

This project has three research objectives (ROs):

- RO1: Identify the team processes and properties that predict success in human-autonomy teams.
- RO2: Isolate the unique effects of autonomy (versus humans) on team processes and outcomes.
- RO3: Identify learning signatures associated with successful human-autonomy teaming.





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These objectives advance theoretical understanding on human-autonomy teaming along two dimensions. First, we move current thinking from dyadic human-autonomy interactions to complex, systemic human autonomy teaming. Second, we move from the extant - largely static - human teaming theories to dynamical network theories of the impact of human autonomy teaming on team processes and outcomes.

These programmatic experiments on human-autonomy teaming conducted over three years will allow us to understand the multilevel emergence of moving from physio and other micro oriented individual signals into meso level attention, eye gaze, and other social, into macro teaming processes and states that underpin team performance. This project focuses primarily on discovery of the macro level processes, leveraging other STRONG teams who are focusing primarily on the middle and bottom layers in human-autonomy teaming.