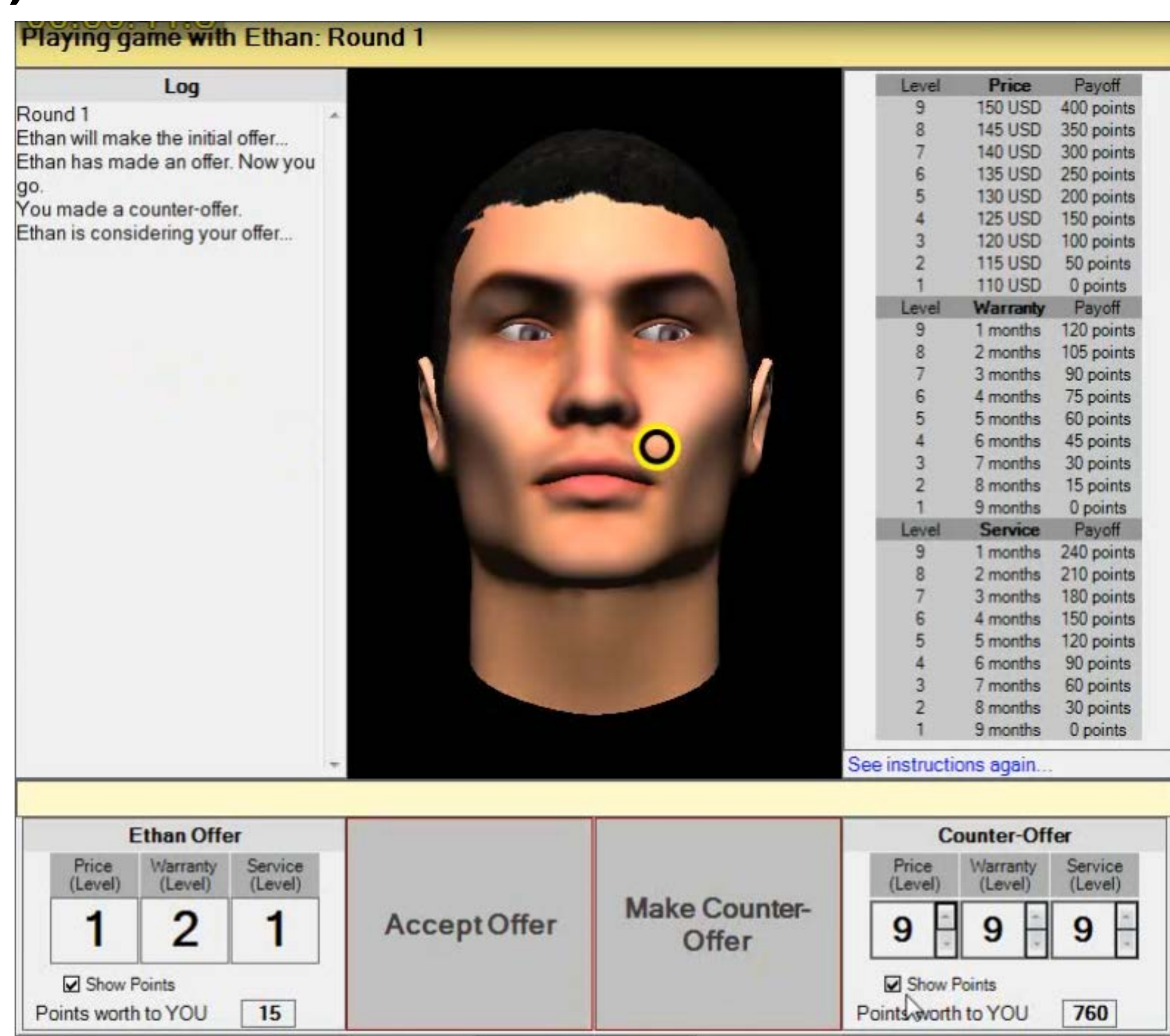


S&T Campaign: Human Sciences
Human Behavior
Human Variability

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Research Objective

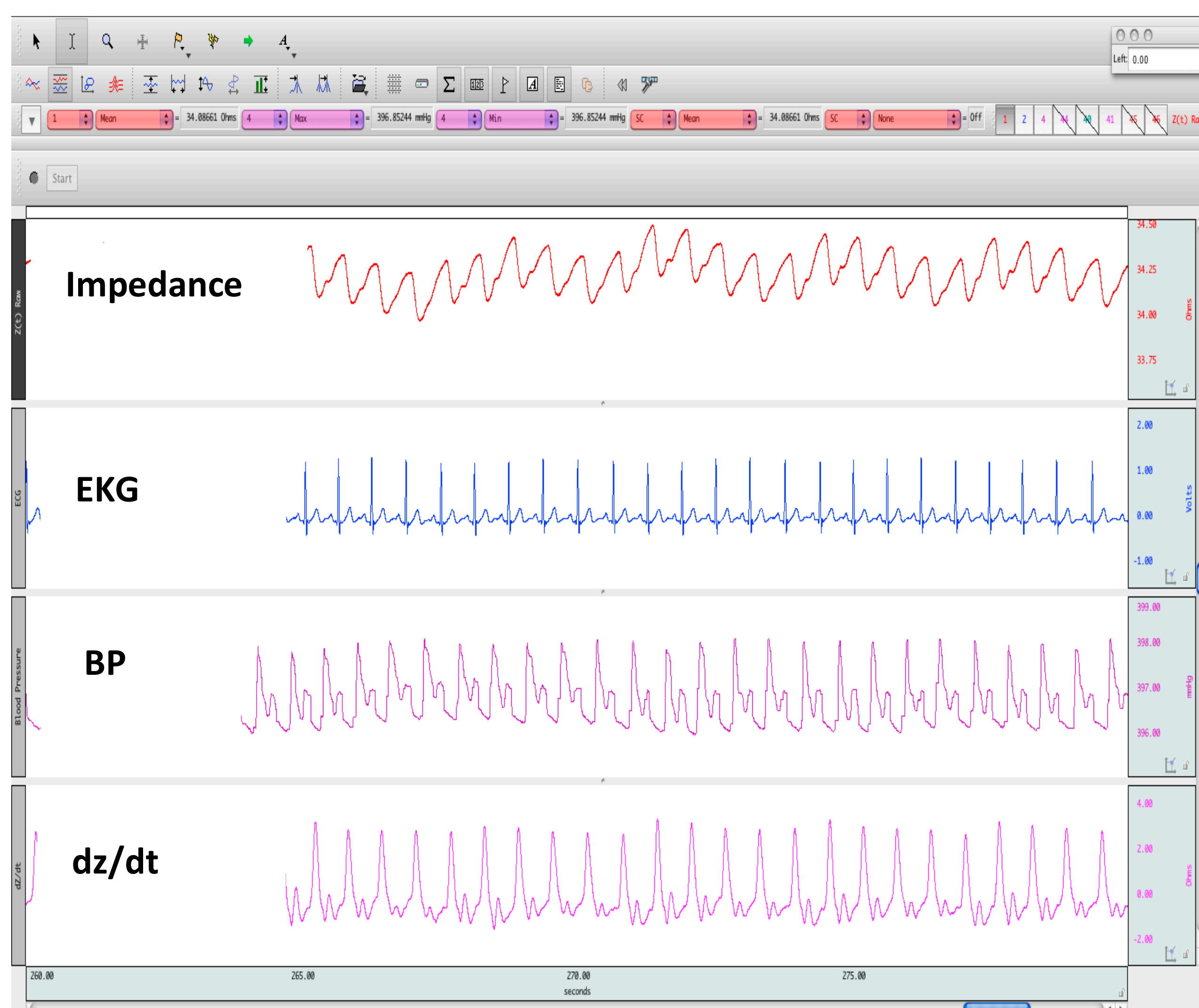
- Study social cues, game structure, and individual differences in behavior and/or physiological changes in people
- Use ecologically valid yet controlled virtual humans (VH) and environments



Virtual Human (VH) Decision Making Study User Interface

Challenges

- Determining how to characterize and represent simultaneous measures of participant non-verbals (facial, vocals) and physiological state
- Real-time analysis of cardiovascular measures in response to events in virtual world



Cardiovascular measures of blood flow used to infer neuroendocrine processes of sympathetic nervous system

ARL Facilities and Capabilities Available to Support Collaborative Research

- Psychophysiology of Immersive Experiences (PIE) Lab (NICO100C for impedance cardiography; CNAP for continuous blood pressure) at ARL West (Playa Vista, CA)
- ICT Virtual Human Toolkit
- Tobii 300X eye tracker

Preliminary Findings:

- VH inconsistent facial expressions relative to their behavior and framing cause cardiovascular patterns reflective of a threat motivational state (Khooshabeh et al., 2013; 2015; 2016)
- Selected References:

Khooshabeh, P., de Melo, C. M., Volkman, C. B., Gratch, J., Blascovich, J. J., & Carnevale, P. (2013). Negotiation strategies with incongruent facial expressions of emotion cause cardiovascular threat. In *Cognitive Science Society* (pp. 770–775). Berlin, Germany.

Khooshabeh, P., Lin, R., de Melo, C. M., Ouimette, B., Blascovich, J., & Gratch, J. (2016). Neurophysiological Effects of Negotiation Framing. In *Cognitive Science Society* (pp. 2369–2374). Philadelphia, PA.

Complementary Expertise / Facilities / Capabilities Sought in Collaboration

- Signal processing expertise to integrate across multimodal channels
- Sensor development to support ambulatory impedance cardiography and blood pressure
- Proxy measures of blood flow that are highly related to biopsychosocial model measures
- Affecting computing mappings and representations for how interfaces and virtual humans should respond to changes in psychophysiological states
- For culture research, access to populations that are not available in USA