**Abstract**

Detecting early symptoms of health problems within a spacecraft is both challenging and critically important. Current approaches to comprehensive health monitoring require an array of sensors that are individually prone to malfunction, potentially irreplaceable, and collectively cumbersome to the mobility of astronauts. In particular, many health indexes simply cannot be monitored continuously due to their invasive and obstructive nature. These challenges motivate the development of physiological interpolation algorithms that can accurately reconstruct missing or unavailable physiological data with high fidelity using other measures. To address this challenge, we will develop deep learning approaches to enable reliable, real-time reconstruction of missing physiological waveforms using one or more other available waveforms and endeavor to discover the minimal subset of monitoring systems needed to obtain the best overall picture of physiological status.