Abstract: Despite the existence of various advanced monitoring devices in the modern intensive care units (ICU) that enables measurement of several physiological signals, the ability to analyze these data for real-time clinical care remains intuitive and primitive. This presentation provides an overview on the statistical, mathematical and informatics tools that have been applied to the large volume of clinical physiological data routinely monitored at UCLA Neuro-ICU with the goal of identifying better biomarkers of brain-related adverse events and providing clinicians with improved ability to target specific goals in the management of patients with acute neurological conditions such as traumatic brain injury or stroke.