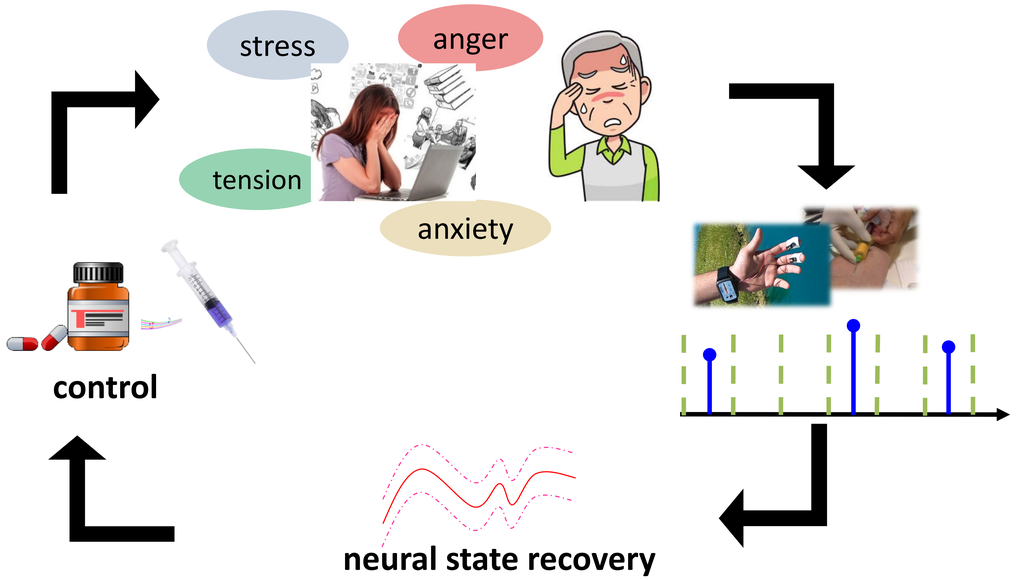
2021 NSF CYBER-PHYSICAL SYSTEMS PRINCIPAL INVESTIGATORS' MEETING

CRII: CPS: Wearable-Machine Interface Architectures (Award#: 1755780)

PI: Rose T. Faghih, Department of Electrical and Computer Engineering, University of Houston

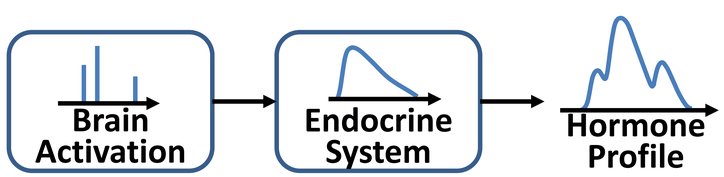
Description:

Wearable devices to infer brain activity from physiological signals and hormone measurements



Goals of This Project:

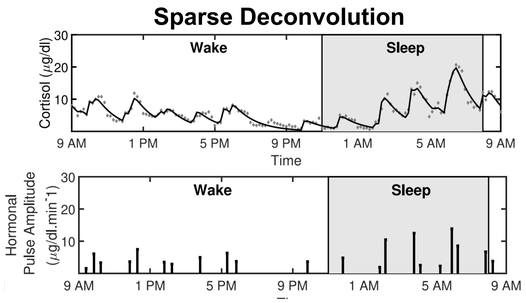
- Infer neural stimuli underlying pulsatile physiological signals (e.g. blood cortisol levels)
- Estimate an unobserved state (e.g., hidden energy state) from underlying pulsatile stimuli
- Apply control to maintain a hidden state within a desired range (e.g., regulate energy state)



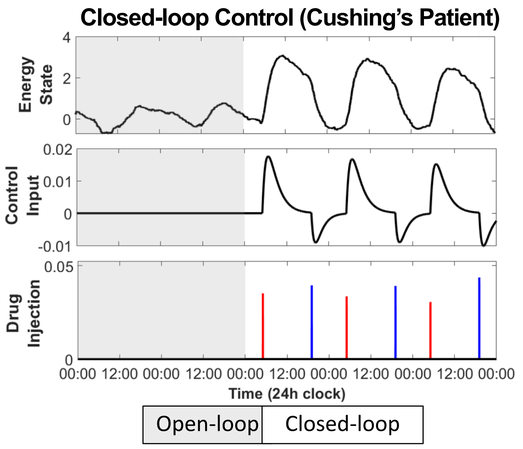
Award#: 1755780
University of Houston
rtfaghih@uh.edu

Findings:

- Characterization of hormonal dysregulation reveals that the chronic fatigue syndrome patients have lower serum cortisol accumulation in the morning period and fibromyalgia syndrome patients have lower cortisol clearance by the liver.

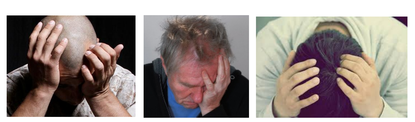


- Closed-loop regulation of an estimated internal energy state using medications to to overcome the challenges with hormonal dysregulation in a simulated study



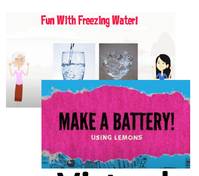
Broader Impact:

● **10** journal articles ● **14** conference papers ● **36** educational videos ● **5** senior design teams ● **8** Undergraduate research projects● Selected to MIT Technology Review's 2020 Innovators Under 35



Neuropsychiatric Disorder

Growth Hormone



Virtual Outreach

Over **130** girls visited our lab in **2018** and **2019** for our outreach events.