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Italy Section

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Neuroergonomics and optical brain imaging: Towards Ubiquitous and Continuous Measurement of Brain Function during Everyday Life

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On line: [LINK](#)

Abstract:

The understanding of the brain functioning and its utilization for real world applications is the next frontier. Existing studies with traditional neuroimaging approaches have accumulated overwhelming knowledge but are limited in scope, i.e. only in artificial lab settings and with simplified parametric tasks. As an interdisciplinary new field, *neuroergonomics* aims to fill this gap: Understanding the brain in the wild, its activity during unrestricted real-world tasks in everyday life contexts, and its relationship to action, behavior, body, and environment. Functional near infrared spectroscopy (fNIRS), a noninvasive brain monitoring technology that relies on optical techniques to detect changes of cortical hemodynamic responses to human perceptual, cognitive, and motor functioning, is an ideal candidate tool. Ultra-portable wearable and wireless fNIRS sensors are already breaking the limitations of traditional neuroimaging approaches that imposed limitations on experimental protocols, data collection settings and task conditions at the expense of ecological validity. This talk will discuss emerging trends for fNIRS applications, from aerospace to medicine, with diverse populations and towards clinical solutions. We will review recent studies, such as mental workload assessment of specialized operators performing standardized and complex cognitive tasks and development of expertise during practice of complex cognitive and visuomotor tasks (ranging from aircraft piloting and robot control). Various recent synergistic fNIRS applications for human-human and human-machine interaction, interpersonal neural synchronization and brain computer interfaces, highlight the potential use and are ushering the dawn of a new age in applied neuroscience and neuroengineering.

Bio: Hasan Ayaz, PhD is a Provost Solutions Fellow and Associate Professor at Drexel University's School of Biomedical Engineering, Science, and Health Systems, brings expertise at the intersection of neuroscience, and biomedical technologies.

Dr. Ayaz's research is centered around Neuroergonomics, the study of brain function in everyday life tasks. His work encompasses diverse real-world and realistic environments and spans the entire lifespan, addressing conditions from health to clinical, through collaborative efforts with domain experts and clinical partners with over 300 publications.