Dr. Inbal Nahum-Shani

Title of talk: "Hybrid Experimental Designs for Optimizing Digital Interventions at Varying Timescales."

Description:
Advances in mobile and wireless technologies offer tremendous opportunities to extend the reach and impact of theory-based interventions and for adapting interventions to the unique and changing needs of individuals. Existing experimental designs can be used to answer questions either about human-delivered components that are typically sequenced and adapted at relatively slow timescales (e.g., monthly) or about digital components that are typically sequenced and adapted at much faster timescales (e.g., daily). However, these methodologies do not accommodate sequencing and adaptation of components at multiple timescales and hence cannot be used to empirically inform the joint sequencing and adaptation of human-delivered and digital components. The talk will introduce the hybrid experimental design (HED)—a new experimental approach that can be used to answer scientific questions about building psychological interventions in which human-delivered and digital components are integrated and adapted at multiple timescales. The talk will describe the key characteristics of HEDs (i.e., what they are), explain their scientific rationale (i.e., why they are needed), and provide guidelines for their design and corresponding data analysis (i.e., how can data arising from HEDs be used to inform effective and scalable psychological interventions).

Dr. Justin T. Baker

Title of Talk: "Sensing Psychosis: Intensive Longitudinal Assessment of Severe Mental Illness"

Description:
The talk will cover the topics associated with gathering and processing intensive longitudinal data using digital health technologies. This will include:

- Best practices for collecting and maintaining high quality complex multivariate behavioral data streams from individuals over extended periods of time.
- Quality control procedures for intensive longitudinal study design.
- Approaches to gather deep phenotyping data for behavior.
- Approaches to ensure comparability of longitudinal behavioral data.
- Novel and modified tools that can be used in any longitudinal deep phenotyping study, available to the scientific community, including robust and extensible tools for data aggregation, processing, and visualization.

Dr. Predrag "Pedja" Klasnja

Title of Talk: A year in steps: Modeling longitudinal trajectories of physical activity in a cohort of 80 sedentary adults

Description:
How active a person is on any given day is affected by a range of factors, including psychological factors like motivation, physical environment (e.g., weather), and the person's current circumstances (level of busyness, the need to care for sick family members, etc.). These determinants do not disappear when one enrolls in a physical activity intervention; especially over the long-term, physical activity remains highly variable even when a person is using an intervention to try to increase their level of activity. In this talk, I will present the findings from a recent deployment of the HeartSteps mHealth intervention

that demonstrate the variability in participants' activity and the factors that shape that variability over the course of a year. I will conclude by discussing the implications of these findings for the design of physical-activity interventions aimed at supporting physical activity maintenance over extended periods of time.

Drs Genevieve Dunton and Stephen Intille
Title of Talk: "Understanding Micro-Temporal Processes Underlying Physical Activity Adoption and Maintenance: the TIME Study"

Description:
Recognized challenges in promoting long-term physical activity maintenance may be due to inconsistencies in the conceptualization and measurement of behavior maintenance terminology in physical activity research. A primary reason for ambiguity in this area is an absence of longitudinal mobile sensing studies. The Temporal Influences on Movement and Exercise (TIME) study collected up to 12 months of ecological momentary assessment and sensor-based passive monitoring (e.g., location, activity levels) using smartwatches and smartphones worn and carried by young adults. Using these data, we can compare and validate different indicators of physical activity maintenance such as intensity threshold, duration above the threshold, and allowances for duration below the threshold. We will discuss how these data can be used, and some of the challenges of interpreting longitudinal data collected in uncontrolled settings. Interpretation of these data raises new challenges such as how to customize delineation of a day to individual wake and sleep times and use algorithms to reliably detect activity and sleep, accounting for highly unusual wake/sleep patterns.