

Title: Techniques for investigating the causes and consequences of obstructive sleep apnea

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Abstract: Obstructive sleep apnea (OSA) is a highly prevalent disorder that has major consequences for health. The causes and consequences of OSA vary greatly across patients, which has implications for who requires treatment and how best to treat them. This presentation will describe recently-developed techniques that seek to pave the way for precision OSA medicine. First, we developed a method to estimate the leading causes of sleep apnea (upper airway collapsibility, muscle compensation, breathing instability, arousal threshold), which has revealed that understanding individual differences in OSA mechanisms may help to predict responses to different OSA treatments (e.g. pharmacotherapy, supplemental oxygen, hypoglossal nerve stimulation). Second, we developed a method to estimate the severity of upper airway obstruction from the shape of individual breaths, which we used recently to demonstrate an elevated risk of preeclampsia in pregnant women with versus without nocturnal airflow obstruction. Third, we developed a breath-shapes method to identify the specific upper airway tissue structures responsible for OSA. Finally, our work has identified that patients with a higher heart-rate response to OSA events exhibit the greatest treatment-related improvement in risk of adverse cardiovascular outcomes. Results to date suggest that advanced measurements hold great promise for future treatment-related decision-making in the care of patients with OSA.

Biography: Scott Sands PhD is an early career investigator whose research in Boston Massachusetts (Brigham and Women's Hospital and Harvard Medical School) focuses on sleep apnea pathophysiology. His laboratory 1) develops translational methods to identify different causes of sleep apnea from routine sleep studies, and 2) performs physiology-based trials of novel and existing therapies for sleep apnea in selected patients.