NOISE CONTROL ENGINEERING IN HEALTHCARE ENVIRONMENTS

Session Organizers: Jeff Fullerton, Acentech, and Hiroshi Sato, National Institute of Advanced Industrial Science and Technology

Acoustics impacts humans in a wide variety of ways that can be comforting and uplifting, or disruptive and annoying. Our goal of this session is to highlight the frontiers of noise control research and technology to improve our world to be healthy in terms of physical, mental and social aspects. We will begin our exploration of the topic by discussing how acoustics factors into how we experience sound from various sources, such as transportation systems and power facilities using newly developed numerical analysis. The advancements utilize wave theory based noise prediction models and apply the analyses to sources, such as roadways and wind turbine noise. We will then transition the session to discussing noise control engineering in healthcare environments, where properly designed acoustics help support the process of healing and recovery. Specifically, excess noise from patient and staff activity, medical equipment, medical alarms, and many other sources can impede the mission of healthcare facilities. The excess noise also contributes to the potential for medical errors and alarm fatigue, which have direct impacts on patient outcomes. These talks will discuss the acoustics in the current medical environment of the United States of America highlighting drivers for change and possible solutions and noise control. We will conclude the session by discussing how acoustics can be used to improve our understanding of biological information. Our final speaker will discuss auditory biofeedback system for improvements in physical therapy, specifically using brain wave sonification for patients to gain an improved discrimination of sensory information and recognition of environment.

Key issues that are anticipated to be discussed:

- Improved predictions of transportation system noise
- Noise effects on social response from wind energy farm
- Acoustics for healing and recovery in healthcare facilities
- Noise sources in facilities and its control
- Patient privacy concerns
- Financial motivations and incentives for acoustical improvements to US healthcare facilities
- Sonification of biological information
- Brain activity related to acoustical information

Our speakers are Prof. Shinichi Sakamoto (University of Tokyo), whose field is numerical simulation for room acoustics and noise control; Erik Miller-Klein (SSA Acoustics), who will discuss the unique and complex noise control challenges of hospital environments; Mandy Kachur (Soundscape Engineering), who will address issues related to the future of noise control technologies in the healthcare environment; and Hiroko Terasawa (Tsukuba University), whose field is acoustical applications to healthcare.