Pierre Galea, Post-Baccalaureate Pre-Medical Student
Dr. Jane Hill, College of Engineering and Mathematical Sciences, Principal Investigator

Identifying and Quantifying Volatile Fear Response in Humans

Pierre Galea, Jiangjiang Zhu, Zachary Silberman, Jane Hill
School of Engineering

Research suggests that humans, similarly to other mammals, communicate emotional states via chemosignals, and that the sole act of smelling certain natural human secretions (such as fear-induced sweat and sadness-induced tears) may activate the amygdala, affect mood and risk behavior, and enhance cognitive performance. In this study, we present early work to identify and quantify the volatile organic compounds (VOCs) present in fear-induced sweat through the use of Secondary Electrospray Ionization Mass Spectrometry (SESI-MS). Participants (age 18-45) watched a series of random short scenes each of which either generates fear or a neutral feeling. This was done in a double-blind manner while the participant wore an underarm apparatus designed to carry VOCs present in sweat into the spectrometer. Presence of fear was confirmed by administering State-Trait Anxiety Inventory (STAI) surveys in addition to measuring heart rate and skin conductance. As SESI-MS is capable of analyzing the compounds rapidly, any change in VOCs present can be mapped to a particular time-span during the movie clips. The VOC data was also contrasted with physical-activity-induced sweat in order to assess, identify and quantify differences in VOCs secreted by humans at varying emotional states.