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|  |  |  הטכניון - מכון טכנולוגי לישראל TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY  |
| הפקולטה להנדסה כימיתע"ש וולפסון |  |  |
| The Wolfson Department of Chemical Engineering |  |  |

**Wolfson Department of Chemical Engineering Seminar**

**Wednesday, February 10th, 2021 at 13:30**

**Online seminar via Zoom**

<https://technion.zoom.us/j/97591164072>

**Smart Sensing Patches for Monitoring Psychological Stress**

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**Mid PhD Seminar**

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Stress is one of most dangerous latent conditions that is frequently present in our lives. Every one of us experiences stress daily, but for some of us this condition is affecting them badly. Stress is one of the leading causes of several types of diseases such as cardiovascular diseases, AIDS, depression cancer, as well as causing atrophies affecting cognition and memory. Stress also has economic and social manifestation, such as absence and reduced productivity at work, relationship conflicts and drug abuse. Today stress in underdiagnosed, as the current diagnostic methods are self-reports and clinical checklists, which the individual seeks only after health, social and economic issues arise. Moreover, disadvantages of this approach include the level of the person’s attention and focus while filling the questionnaire, combined with their interest and comfort with reporting the symptoms. Hence, there is a need for a device that can efficiently detect stress in an objective way.

In this research a wearable device in the form of patch will be developed to detect stress levels, providing a suitable solution for the unmet need, as a **non-invasive**, **autonomous,** and **real-time** monitoring device. This device will include an array of chemiresistive hybrid sensors that will detect the pattern of volatile organic compounds emitted from the skin with a combination of other physiological parameters. The research is divided into 3 studies alongside the sensors and patch development: 1) a study with stressed rats to realize detection of biomarkers, 2) a social test with healthy volunteers to realize the effect of acute stress, and 3) a clinical study with PTSD patients to realize diagnosis power and treatment monitoring. Preliminary results from the rat study show several volatile organic compounds (VOCs) that could potentially serve as biomarkers of stress. Behavioral tests were conducted as well as measurement of vital signs, and currently more tests are being done to increase the sample size and verify these promising results. Integration of the three mentioned studies will aid in identifying the physiological biomarkers of stress, developing a sensing platform, and assessing its classification power. The developed patch will enable real-time monitoring of the stress level, thus alerting the individual on the onset of a possible disease, as well as serve as a diagnostic device and a treatment monitoring method of stress-related diseases.