סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ד' 21.12.16 (כא' בכסלו, תשע"ז), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 13:30.

תרצה: הדס זיסו

מנחה: פרופ' משה שהם

מנחה שותף: פרופ' מנשה זערור, ראש מחלקת נוירוכירורגיה, המרכז הרפואי רמב"ם

על הנושא:

Robot for Minimally Invasive Neurosurgery

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

We present a novel robotic system for minimally invasive neurosurgery, initially intended for the treatment of Multiforme Glioblastoma brain tumor. The robotic system consists of a ~4 mm diameter external needle and a self-reassembled inner needle, carrying real-time detection and therapeutic tools. The robot will perform the therapeutic procedure automatically according to preoperative treatment plan made on MR images, combined with intraoperative real-time detection and local therapy, thus overcoming brain shift effect. For that purpose, a novel self-reassembled inner needle mechanism was built from magnetic bead chain. The mechanism passes through a shaped external needle, progressively exit laterally at 90-degree curve, and straighten upon exit. Tumor real-time detection is performed using 5-ALA fluorescence, detected by a fiber optic photodiode. The therapy is conducted using high intensity fiber optic diode laser.

The system performance was successfully demonstrated in animal trials. Tumor detection was evaluated in brain tumors ex-vivo and was found feasible and suitable for the robotic system. Laser therapy was evaluated ex-vivo and in-vivo, demonstrating its accuracy and confined ablated volume. Animal trials showed the applicability of registration and robotic needle insertion into the brain. The complete robotic surgical procedure, including needles motion, detection and therapy, was successfully demonstrated in rat brain tumor.

Our robotic system will offer a wide array of benefits including tumor removal with unparalleled sparing of healthy tissue, minimally invasiveness replacing large craniotomy and long recuperation, high spatial accuracy, intraoperative tumor detection and repeatability if required. This robot is able to reach large volumes in the brain through a single minimally invasive cranial path, and thus will open new horizons in reduced trauma treatment of brain tumors.

בברכה,

פרופ"א שאול אופנסקי

מרכז הסמינרים