

סמינר - SEMINAR

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 29.05.2017 (ד' בסיון, תשע"ז), בבניין דן קאהן, אודיטוריום 1, 14:30.

תרצה:

Dr. Dana Solav

Biomechatronics group, MIT Media Lab

על הנושא:

Towards Automated and Data-driven Optimized Design of Patient-Specific Biomechanical Interfaces

The seminar will be presented in English

להלן תקציר ההרצאה:

The prosthetic socket forms the mechanical interface between the prosthetic limb and the residual biological limb. The most common sources of dissatisfaction in lower limb amputees are discomfort and pain caused by poor fit of the socket. In transtibial (below the knee) amputations, the distribution of soft tissue and bony structures make it highly susceptible to pressure and friction related injuries. A successful socket fit should allow for a proper load transfer by distributing contact pressure onto the socket surface in a way that minimizes pain and soft tissue damage, and maximizes comfort and controllability. Conventional socket design and manufacturing by qualified prosthetists is mostly artisan, skill and experience dependent, non-standard, and insufficiently data-driven. Consequently, major discrepancies exist between the quality of sockets produced by different prosthetists and/or different methods .

In this talk, I will present a framework for designing patient-specific data-driven optimized sockets. The proposed framework involves: 1) Non-invasive imaging to record patient geometry of the skin surface as well as bones and soft tissues. 2) Indentation test to evaluate the mechanical properties of the tissues in different locations across the residual limb. 3) Data-driven and automated construction of patient-specific designs. 4) Patient-specific finite element analysis and iterative socket design optimization with spatially varying mechanical properties. 5) Additive manufacturing of the optimized design using a multi-material approach or a single-material porous lattice structure approach. Furthermore, I will demonstrate how the proposed framework can be used in biomechanical interfaces other than the transtibial socket.

מארח : פרופ'ח אלון וולף

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