**סמינריון**

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב'

9.04.2018 (כ"ד בניסן, תשע"ח), בניין דן קאהן, אודיטוריום 1, 14:30.

**מרצה**: גליה פיינגולד

**מנחה**: פרופ' סטיבן פרנקל

**מנחה שותף**: ד"ר לאוניד טרטקובסקי

**על הנושא:**

**CFD Modeling of a Direct Injection**

**Hydrogen/DME Fueled Internal Combustion Engine**

The seminar will be given in Hebrew

**תקציר ההרצאה :**

Despite media hype, the imminent death of the internal combustion (IC) engine is greatly exaggerated. Research efforts to produce more efficient, cleaner,and stable IC engines are ongoing. Alternative, low carbon intensity fuels such as biomass or hydrogen, or fuel blends are being considered for next generation IC engines. Homogeneous charge compression ignition (HCCI) engines burning hydrogen with dimethyl ether (DME) additives are being studied at the Technion. Issues related to direct injection and mixing of such fuel blends must be properly studied under motored conditions prior to engine combustion studies. Recently discovered novel turbulent-chemistry interactions associated with turbulent jet flames burning DME offer considerable modeling challenges for both RANS and LES.

In this study, we consider three simulation objects using the commercial CFD code called Converge. The first is a variation of the now classic non-premixed piloted Sandia Flame D burning DME for which experimental data and previous predictions are available. This will serve to validate the turbulent combustion model and chemical kinetics for DME combustion. Detailed chemistry via the SAGE solver and a reaction mechanism consisting of 82 species and 351 reactions is compared to a flamelet model using the same mechanism.

The second is a new data set that contains PIV and PLIF data for velocity and scalar (hydrogen) flow fields in a direct injection engine under motored conditions [4]. Recently published RANS predictions using Converge show good agreement with velocity data but mixing is poorly predicted, especially at later stages near TDC, suggesting LES might perform better, validating the solvers' capability to predictively simulate a high-pressure gaseous injection and the consequent mixture propagation in a cylinder.

Finally, the validated numerical setups will be applied to a direct-injection, dual fuel HCCI engine to demonstrate the effects of stratified and variable reactivity on engine performance.

Since the software is relatively new, novel features associated with adaptive mesh refinement (AMR) and the SAGE detailed chemistry solver are also reviewed.

בברכה,

**פרופ"מ מתי סאס**

מרכז הסמינרים