Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

<u>סמינריון</u>

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, **<u>במסגרת הדוקטורט</u>** שתתקיים
ביום ה' 6.06.2019 (ג' בסיון, תשע"ט), בניין דן קאהן, אודיטוריום 1, 13:45.

<u>מרצה</u>: סינג ויקרם

<u>מנחה</u>: פרופ' סטיבן פרנקל

<u>על הנושא:</u>

Stabilization of High-Order Flux-Reconstruction Scheme for Wall-Modeled Implicit Large Eddy Simulation

The seminar will be given in English

<u>תקציר ההרצאה :</u>

The majority of computational fluid dynamics (CFD) codes used in industry today feature low-order finite-volume methods on body-fitted unstructured grids due to their robustness and ability to handle complex geometries. Advanced designs for aerodynamics and propulsion systems often feature massively separated or complex recirculating turbulent flows requiring scale-resolving simulations, such as large eddy simulation (LES), to achieve insightful and accurate predictions. Unfortunately, low-order numerical methods typically introduce significant numerical dissipation which is undesirable for transition or turbulent flow simulations. High-order numerical methods are generally perceived to be more accurate and cost-effective but their extension to complex geometries has been a long-standing challenge. Recently, numerical methods such as discontinuous Galerkin (DG) or flux-reconstruction (FR) have come on the scene to enable high-order scale-resolving simulations of complex geometry flows.

In this study, various numerical modifications to the FR scheme are explored in order to enable stable high-order FR simulations of turbulent flows in the context of wall-modelled implicit LES. Specifically, issues related to aliasing are addressed through the novel use of so-called split forms designed to satisfy certain important mathematical properties of the governing equations. In this seminar, we focus on the compressible Euler and Navier-Stokes equations for a range of flows from simple box-flows, channels, and external aerodynamics to demonstrate our accomplishments.

בברכה,

פרופ"מ מתי סאס
מרכז הסמינרים