

סמינריון

הנדך מוזמנ/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 1.06.15 (יד' בסיון, תשע"ה), בניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

ירצה: מרק אפשטיין

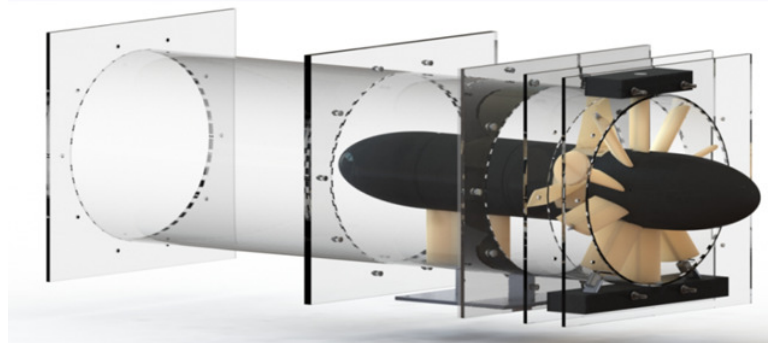
מנחה: פרופ' ח דוד גרינבלט

על הנושא:

## Inlet Guide Vane Separation Control using DBD Plasma Actuators

להלן תקציר ההרצאה:

Inlet guide vanes (IGVs) are a common component in both axial and radial compressors, fans and blowers. They impart swirl to the incoming flow and, if the vanes are variable (VIGVs), act as a flow throttling mechanism. However, IGVs have limitations resulting from highly complex three-dimensional flow separation processes at high stagger angles. The introduction of periodic perturbations at flow instability frequencies is known to ameliorate flow separation on airfoils and wings, but their effect has never been demonstrated on an annular IGV cascade. To study this, a transparent axial flow facility was built with 10 symmetric VIGVs mounted directly upstream of an axial fan; one guide vane was equipped with surface pressure ports. Dielectric barrier discharge (DBD) plasma actuators were installed at the leading-edges of all 10 guide vanes. Large negative deflection of the IGVs revealed large separation bubbles on the vanes' suction surfaces that were comparable to that on a single vane deflected at smaller negative angles. Pulsed perturbations eliminated the separation bubble; this control effect was remarkably similar to that on the single vane deflected at smaller negative angles. However, unlike airfoils and wings, the overall pressure rise across the vane cascade remained virtually the same due to the proximity of the vanes to the fan. Nevertheless, the entire system exhibited a curious nonlinear transient response resulting in a small increase in operational range and efficiency.



בברכה,

פרופ' ח דוד גרינבלט

מרכז הסמינרים