

הנדך מוזמנת/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 12.03.15 (כא' באדר, תשע"ה), בבניין דן-קאהן, קומה 0, באודיטוריום 1, בשעה 14:30.

**ירצה:** האנס מולר-ואל  
Hanns Friedrich Müller-Vahl

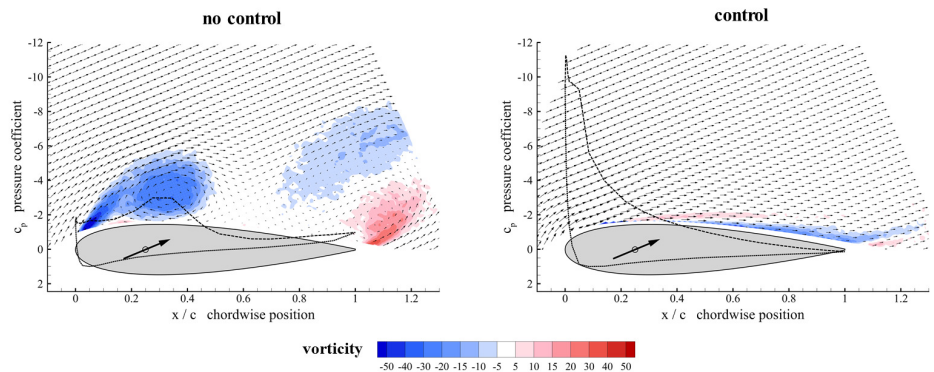
**מנחה:** פרופ' ח דוד גרינבלט

**על הנושא:**

## Wind turbine dynamic stall and its control

**להלן תקציר ההרצאה:**

Dynamic stall is a major problem on wind turbine rotor blades and occurs due to the highly unsteady nature of wind. It is not well understood, but characterized by the formation and shedding of a strong leading-edge vortex (LEV) over the low pressure blade surfaces. This causes power losses and large load oscillations; successful control will lead to significant reductions in the cost of energy. This work studied the dynamic stall and its control under conditions never before reported, achieved by means of a dedicated unsteady wind tunnel with full optical access for flowfield measurements. A notable observation was the presence of a trailing-edge vortex (TEV) in addition to the well-known LEV. Furthermore, the concept of matched reduced frequency (MRF) was introduced and validated. The most striking achievement was unprecedented load control under fully unsteady conditions using a novel flow control concept termed “adaptive momentum-flux control” (AMFC). Initially, static feed-forward control was used to compensate for inflow disturbances. An iterative control approach was subsequently implemented, which successfully identified the control jet momentum flux required to eliminate lift fluctuations for various inflow scenarios. The two figures below show how AMFC inhibits the formation of the LEV, thereby suppressing the associated load excursions.



בברכה,

פרופ' ח דוד גרינבלט

מרכז הסמינריום

**Control of the dynamic stall vortex with AMFC. Phase averaged flow fields and simultaneously measured phase averaged surface pressure distributions.**