

## IMAC-XXVIII Plenary Lecture

Monday, February 1, 2010, 9:00 - 10:00 AM



### The Importance of Dynamics in Wind Turbine Technology

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Wind energy is a fascinating collection of multi-disciplinary engineering tasks. Harvesting the wind efficiently, we have to understand how the metrological conditions, the climate and the turbulence induced by the landscape excites the machine in order predict the lifetime performance parameters; thereby, optimizing the material usage over the typical 20 year design lifetime. The challenge of determining the aero-elastic stability and performance of wind turbines is the key to achieve this effectively. The lecture will discuss aspects of different turbine designs with different component concepts and relate these to future requirements for aero-elastic tools, seen from a structural dynamics view point.

**Dr. Carsten Hein Westergaard** earned his PhD in 1994 at the Danish Technical University. His dissertation titled: "PIV measurements of turbulent structures" encompassed optical computing and optical flow measurements. Part of his research was completed with Prof. Ronald Adrian at University of Illinois.

He started his industrial career in wind technology as an aerodynamics blade designer. Through the years, he has been working with fluid and structure dynamics in many different industries. Joining Vestas Technology R&D, he started Vestas office on campus of the National Laboratory for Sustainable Energy in Denmark (Risø). Currently, he is assigned to Vestas' new research office in Houston as Director of Global Technology, guiding the establishment of Vestas' R&D portfolio in Houston. Also he is working with University collaborations and other external partnerships, such as TheWindAlliance.org.