



## **Wind Energy : a Challenging Nonlinear Problem**

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Due to many compelling reasons (e.g. the Kyoto protocol), a fast development of renewable energy sources is foreseen to solve the energy problem. Among those, wind energy is very promising for the next decades and has known a tremendous technological development. However, it has been dominated by practical experiences and empirical knowhow with consequent limitations. For instance, due to a large underestimation of the wind fluctuations turbine fatigues were often largely underestimated resulting in a drastic reduction of their life time and the electricity production was poorly managed. The industry has just started to recognize these limitations and the resulting deficiencies. In this lecture, we emphasize the need for a basic research in wind energy ranging from a better understanding, modelling and prediction of atmospheric turbulence and its intermittency, particularly in the boundary layer, up to the design of wind parks and their grid integration, as well as the prediction and management of this intermittent source of energy.