Wind Turbine Modeling & Design Workshop

Presenter: Lakshmi N. Sankar
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About the Presenter: Dr. Sankar is a Regents Professor and Sikorsky Professor in the Guggenheim School of Aerospace Engineering at the Georgia Institute of Technology. As Director of the School's Computational Fluid Dynamics Lab, he leads a research and education program focused on the modeling and simulation of unsteady viscous flow around aircraft, helicopters, horizontal axis wind turbines, and turbo-machinery components. As the Associate Chair of the Undergraduate Programs, he coordinates undergraduate curriculum related activities. He teaches undergraduate and graduate level courses in the areas of aerodynamics, helicopter theory, wind energy, aerodynamic design, and computational aerodynamics. Dr. Sankar is the author of more than 300 technical publications in the fields of 3-D unsteady transonic flow over aircraft, helicopter aeromechanics, wind energy, and aerodynamic design. He is an AIAA Fellow, a Technical Fellow of the American Helicopter Society, and a member of the American Society of Engineering Educators, and the American Society of Mechanical Engineers.

Workshop Structure: The series of lectures will allow attendees to learn about wind energy and its potential, model and design horizontal axis wind turbines, and to analyze the economic benefits of wind turbine systems.

The workshop will provide background and theory on the following topics:

1. Overview of Wind Engineering (1 hour)
2. Actuator disk model of horizontal axis wind turbines (1 hour)
3. Review of airfoil aerodynamics (1 hour)
4. Blade element theory (2 hours; students will use their laptop, software provided)
    - Inflow models based on combined blade element theory
    - Incorporation of swirl losses in inflow
    - Root and tip losses, and stall delay models
    - Assessment of publicly available wind turbine modeling tools
5. Horizontal axis wind turbine design using blade element theory (2 hours, students will use their laptop, software provided)
6. Economic analysis of wind turbine systems (2 hours)
7. Impact of wind turbines on the environment (Handouts only)

Registration Details: The workshop will be conducted at RMIT University City Campus in Swanston Street, Building 12, Level 10, Lecture Theater 2, on the 26th February 2019. Coffee/Tea will be available from 8.30am with the Workshop commencing at 9.00am. The workshop is a preliminary event before the 10th Australian Pacific Vertiflite Conference on the 27th and 28th February.

Personnel wishing to attend the workshop may register (US$275) at the following link: https://vtol.org/events/10th-australian-pacific-vertiflite-conference-on-helicopter-technology-2019

Morning, Afternoon Tea/Coffee/Biscuits and Lunch will be provided.