A review of the aerodynamics, design and analysis, and optimization of wind turbines, combined with the author’s unique software

*Aerodynamics of Wind Turbines* is a comprehensive introduction to the aerodynamics, scaled design and analysis, and optimization of horizontal-axis wind turbines. The author—a noted expert on the topic—reviews the fundamentals and basic physics of wind turbines operating in the atmospheric boundary layer. He then explores more complex models that help in the aerodynamic analysis and design of turbine models. The text contains unique chapters on blade element momentum theory, airfoil aerodynamics, rotational augmentation, vortex-wake methods, actuator-line modeling, and designing aerodynamically scaled turbines for model-scale experiments. The author clearly demonstrates how effective analysis and design principles can be used in a wide variety of applications and operating conditions.

The book integrates the easy-to-use, hands-on XTurb design and analysis software that is available on a companion website for facilitating individual analyses and future studies. This component enhances the learning experience and helps with a deeper and more complete understanding of the subject matter. This important book:

- Covers aerodynamics, design and analysis and optimization of wind turbines
- Offers the author’s XTurb design and analysis software that is available on a companion website for individual analyses and future studies
• Includes unique chapters on blade element momentum theory, airfoil aerodynamics, rotational augmentation, vortex-wake methods, actuator-line modeling, and designing aerodynamically scaled turbines for model-scale experiments

• Demonstrates how design principles can be applied to a variety of applications and operating conditions

Written for senior undergraduate and graduate students in wind energy as well as practicing engineers and scientists, *Aerodynamics of Wind Turbines* is an authoritative text that offers a guide to the fundamental principles, design and analysis of wind turbines.

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**ABOUT THE AUTHOR**

**SVEN SCHMITZ** is an Associate Professor in the Department of Aerospace Engineering at The Pennsylvania State University. His main area of research is rotary wing aerodynamics, with particular emphasis on wind turbines and rotorcraft. He has more than a decade of research experience in the area of wind turbine aerodynamics and has developed two courses in wind energy at Penn State University.

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