

29th August 2022 - 2nd September 2022

# Course Certificate

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We confirm that

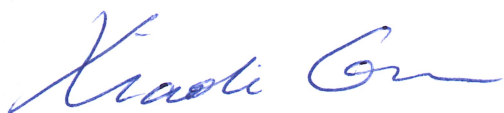
**Jacopo Di Cave**

has completed the course

**SDC PhD summer workshop/school**

at

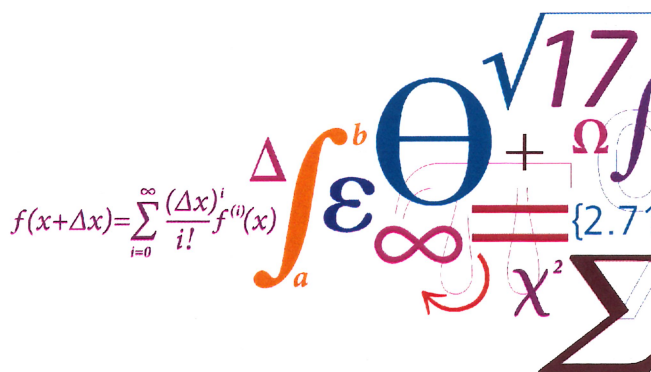
**DTU Wind Energy**



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DTU Wind Energy



Bettina Specht  
Course Coordinator  
DTU Continuing Education



## SDC PhD summer workshop/school

### *Description*

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#### **Contents**

Theme: Estimation of siting conditions – wind resource, extreme wind, turbulence and load

General course objectives: Introduce to the participants the theory and applications of the most relevant elements for estimation of siting conditions for wind turbines and wind farms.

Learning objectives:

After the course, the students will be able to

- Explain the various components in estimating siting conditions for turbines and wind farms
- On resources:
  - o Name at least 5 different things a wind atlas can tell us, and know about how a model chain can be used to create a wind atlas
  - o Explain how wind resource assessment and power forecasting use the output of Numerical Weather Prediction models.
  - o Analyze output from mesoscale models and validate the results against wind-relevant measurements.
  - o Find and interpret satellite scenes for offshore wind energy applications
- On wakes:
  - o Explain the relevance of wind farm wakes and list methods to include them in mesoscale modelling
  - o Explain the wind turbine wake impact on power and load production
  - o Present the different models involved in engineering models of wind farm wake
- On loads and extremes:
  - o Calculate the annual energy production and lifetime fatigue of wind turbines
  - o Basic physical understanding of how the characteristics of the inflow conditions affect loads
  - o Explain the difference between extreme and fatigue load
  - o Qualitatively describe how turbulence depends on surface roughness and atmospheric stability
- o Understand the main principles of an IEC site assessment, and explain how the IEC turbine classification scheme facilitates safe turbine deployment
- o Use measurements to calculate the 50-year wind, and explain how to provide extreme wind calculation for a given place using 2 different methods
- On social aspects:
  - o Name at least five different stakeholders in a typical wind farm project, their interests, and suggestions to accommodate them
  - o Wind turbine noise is a controversial subject in wind turbine deployment. Describe the common reasons for why and how noise may become contested.

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o The notion of NIMBY has been widely used. Please name reasons for why this notion has been criticized and may be counter-productive.

**Target group**

Interest on the theme topics. A relevant Bachelor degree (e.g. B.Eng. or B. Sc.) or Master degree (e.g. M.Eng. or M.Sc.). A computational/programming language.

**Dates**

The course was held on 29th August 2022 - 2nd September 2022

**Organizers**

DTU Wind Energy

**Course instructor**

Xiaoli Guo Larsén, DTU Wind Energy