



JOHNS HOPKINS  
Center for Environmental  
& Applied Fluid Mechanics

## **FALL 2021 CEAFM VIRTUAL SEMINAR SERIES**

### ***“All You Need is Time to Understand and Predict Dynamic Stall”***

**Presented by Prof. Karen Mulleners**

École Polytechnique Fédérale de Lausanne

Institute of Mechanical Engineering

Hosted by Rajat Mittal (MechE)

Dynamic stall on pitching airfoils is an important practical problem that affects for example rotary wing aircraft and wind turbines. It also comprises a number of interesting fundamental fluid dynamical phenomena such as unsteady flow separation, vortex formation and shedding, unsteady flow reattachment, and dynamic hysteresis. Experimental time-resolved velocity field, surface pressure data, and force responses for two-dimensional pitching and rotating airfoils undergoing dynamic stall were analysed to identify the chain of events that lead to stall onset and stall recovery. The individual events will be characterised by their governing time-scales and flow features and recent modelling and control attempts will be presented.



Karen Mulleners is an assistant professor in the institute of mechanical engineering in the school of engineering at EPFL since 2016. She is the head of the unsteady flow diagnostics laboratory (UNFoLD). She is an experimental fluid dynamicist who focuses on unfolding the origin and development of unsteady flow separation and vortex formation. Karen studied physics in Belgium (Hasselt University, previously Limburgs Universitair Centrum) and the Netherlands (TU Eindhoven). She received her PhD in mechanical engineering from the Leibniz Universität

Hannover in Germany in 2010 for her work on dynamic stall on pitching airfoils that she conducted as a member of the German aerospace centre (DLR) in Göttingen. Before joining EPFL in 2016, Karen was a (non-tenure track) assistant professor at the Leibniz Universität Hannover in Germany.

**Friday, November 19, 2021 at 3:00 PM**

**In-Person Gilman Hall 132**

**<https://wse.zoom.us/j/93762992307>**