

Colloquium Thermo- and Fluid Dynamics

„The search for the gust-wing interaction *textbook*“

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When confronted with sensor noise and sparsity, a cluster-based Bayesian approach for state estimation of nonlinear systems offers interpretability, and can be used to quantify the degree of uncertainty for each trained state. For sake of illustration, recent progress towards aerodynamic state estimation for a non-slender delta wing in gusty flows is showcased. However, this brute-force approach does not deliver sufficient insight into the physical nature of complex aerodynamics problems. To that end, we have developed an automated experiment with which to extract a so called gust-wind interaction textbook. Some of the first chapters of this textbook will be revealed and interpreted based on classical aerodynamic theory.

Prof. Rivals research interests lie at the interfaces between experimental fluid dynamics, data assimilation, network science and bio-inspiration. In 2020, Prof. Rival was awarded a one-year Alexander von Humboldt research fellowship to conduct research on advanced sensing techniques in Munich. Prior to joining TU Braunschweig, he served as an Associate Professor in Mechanical Engineering at Queen's University, Canada, where he collaborated with colleagues from biomechanics, medicine and biology. At various stages of his career Prof. Rival has conducted research on both sides of the 'pond', e.g. completing his doctoral studies on the aerodynamics of dragonfly flight at TU Darmstadt, working as a postdoctoral associate at MIT on shape morphing in nature, and holding a research chair on atmospheric sensing at the University of Calgary.



Date: Wednesday, 2 April 2025

Time: 16:15 - 17:15 h

Place: ETH Zurich, ML H 44

Host: Prof. Filippo Coletti