





## 3<sup>rd</sup> High-Fidelity Industrial LES/DNS Symposium *Paving the Way for Future Accurate CFD*

### FIRST ANNOUNCEMENT

14<sup>th</sup> to 16<sup>th</sup> December 2022, Brussels, Belgium



Supported by the EU Horizon 2020 HiFi-TURB project  

### HiFiLeD Symposium objectives<sup>1</sup>

The simulation of turbulent flows using CFD methods has progressed rapidly over the last decades and has given rise to significant changes in the design processes of many areas of fluid mechanics. However, despite over a century of research, the modelling of turbulence and transition in industrial relevant configurations is still far from being achieved successfully.

With the advent and growing availability of large scale computing power and facilities, a new area of turbulence research is opening with the ability to perform reliable high-fidelity large-eddy simulations (LES) and direct numerical simulations (DNS) for industrial relevant flow configurations.

**This availability is opening exciting new avenues towards understanding and modeling turbulence and transition by:**

- i. Direct generation of High-Fidelity LES/DNS to fully predict complex flows, by capturing most or all of the relevant turbulent scales and interactions
- ii. Analyzing in depth the underlying physics, supported in particular by new technologies of Machine Learning
- iii. Confronting available turbulence and transition models, identifying their deficiencies, improving the range of validity of current models and generate new ones.



This novel approach of High-Fidelity LES/DNS data has attracted many researchers in recent years, stimulated by other emerging areas, as Big Data, Artificial Intelligence (AI) and Machine Learning (ML), providing new efficient methodologies for interrogating and investigating very large data sets.

The HiFiLeD Symposium will be focusing on all aspects related to these objectives, ranging from issues concerning the complexity, reliability, accuracy and uncertainties in generating the High-Fidelity LES/DNS data, to their application towards turbulence and transition modelling. It will include progress on the underlying high-order numerical methods (HOMs), innovative approaches for CPU acceleration for LES and DNS, exploitation of massive parallel architectures, efficient post-processing on massive parallel hardware, innovative machine learning methods, as well as experimental data. Moreover, the Symposium offers the opportunity to communicate and exchange knowledge for academic researchers, graduate students, industrial engineers, as well as industrial R&D managers and consultants working in the



<sup>1</sup> The figures show snapshots of turbulence and transition with HOM and 22.6 billion DoF by P. Vincent et al (ICL 2017)

fields of turbulent flow modelling, simulations, measurements and multidisciplinary CFD applications.

## Call for Contributions

**Contributions by participants are expected on the following topics:**

- Understanding Turbulence and Transition from High-Fidelity LES/DNS simulations
- Understanding Turbulence and Transition from new experimental data
- Advances in Turbulence and Transition modelling, based on LES/DNS databases
- Machine Learning applications to LES/DNS analysis and modelling
- New LES/DNS data generation for reference configurations
- Applications of high fidelity LES/DNS to industrial configurations
- Algorithmic and modelling issues for LES simulations, including Wall Modelled LES (WMLES)
- Advances in high-order methods, including curved grid generation
- HPC related issues on multiple platforms (CPU/GPU)

**Mini-symposia are organized on the following topics:**

- **Turbulence Modeling – Suad Jakirlic (TU Darmstadt)**
- **Scale Resolving Simulations – Oriol Lehmkuhl (Barcelona Supercomputing Center)**
- **Artificial Intelligence/Machine Learning in CFD – Corentin Lapeyre (Cerfacs)**

## Abstract submission

An abstract (1-2 page(s) max.) is requested with the **ultimate deadline** being **20th October 2022**. Acceptance to present will be notified by end of October 2020.

Please send the abstract to [info@hifiled-conference.eu](mailto:info@hifiled-conference.eu).

## Keynote speakers

- **Ricardo Vinuesa (KTH Stockholm)** – Modeling and controlling turbulent flows through deep learning
- **Sylvain Laizet (Imperial College London)** – Toward exascale scale-resolving simulations of turbulent flows on a Cartesian mesh with high-order finite-difference schemes
- **Cetin C. Kiris (NASA Ames Research Center)** – Advancements in Scale Resolving Simulations for Certification by Analysis
- **Kunal Puri (Cadence Belgium)** – Towards industrial High-Order Scale Resolving Simulations

**Location: Brussels, Belgium**

TBC

**Date: 14<sup>th</sup> to 16<sup>th</sup> of December 2022**

**Hotel and Travel:** Hotel and travel information will be available on the Symposium web site (coming soon)

## HiFiLeD Symposium fee

The **symposium fee** is **450€** - and will contain a booklet-of-abstracts, coffee breaks, lunches and a symposium dinner.

For **Students** and **HiFi-TURB partners** a reduced fee of **350€** applies.

## Registration

Submit your intention to attend to [info@hifiled-conference.eu](mailto:info@hifiled-conference.eu)

An online registration will be available later.

**For further information**, please contact the Local Organising Committee members under: [info@hifiled-conference.eu](mailto:info@hifiled-conference.eu)