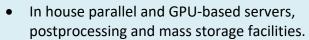# Sixth Madrid Turbulence Workshop

June 2 – July 4, 2025
Universidad Politécnica de Madrid

The goal of the **CAUST** ERC project is to understand whether the ever-increasing power of computers can be leveraged into untangling the causal dynamics of turbulence. Such as by the use of massive ensembles of simulations followed by analysis of the resulting data. All tools are welcome, from classical hypothesis-driven data processing to the grey-box tools of 'artificial intelligence'. The final goal, in any case, should be physics.

Problems of interest: It has been about 50 years since the first papers on deterministic chaos, and on coherent structures in turbulence:

- Are the two related? If so, how?
- How do multiple structures interact?
- Are they relevant to turbulence physics?
- What happens to incoherent turbulence?
- Is any of this related to cause and effect?
- Is it useful? How about control? ROMs?

Resources:

- In house parallel and GPU-based servers, postprocessing and mass storage facilities.
- Access to existing simulation data bases (e.g. channels, homogeneous shear, boundary layers and isotropic turbulence at moderately or 'high' Reynolds numbers, including statistically significant time-resolved sequences in all cases)

Prof. Javier Jiménez