

## Report on Short Research Visit 'Prediction of rare events in turbulent reacting flows'

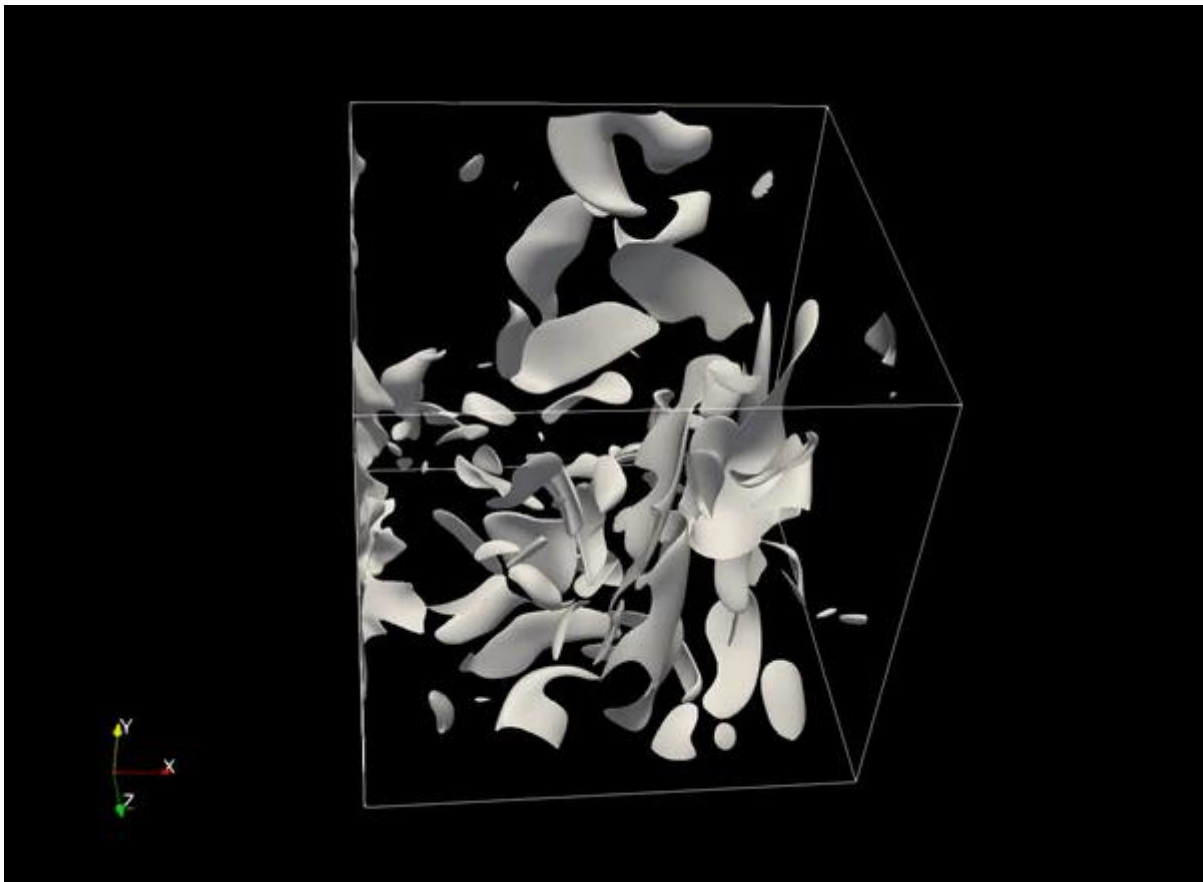
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*Visiting Prof Peter Schmid, Imperial College, London*

Prof Peter Schmid and I met on two occasions at Imperial College London for the SRV.

I shared a database of around 2TB of Direct Numerical Simulation of a turbulent reacting flow. We set up the data management. Now machine learning algorithms (community clustering) are being used for the detection of unpredictable events, for example auto-ignition spots.

The SRV initiated a new direction in this collaboration, resulting in Peter and I, together with Prof Jonas Moeck (NTNU, Norway), writing a paper in quantum mechanics methods for classical fluid dynamics problems.



**Figure 1:** Click on image to run animation (.gif file) of the SRV problem: heat release rate of turbulent MILD combustion solved by direct numerical simulation. The challenge is to time-and-space accurately predict the occurrence of auto-ignition kernels.

*Video courtesy of Dr Nguyen Anh Khoa Doan, a collaborator on this project.*