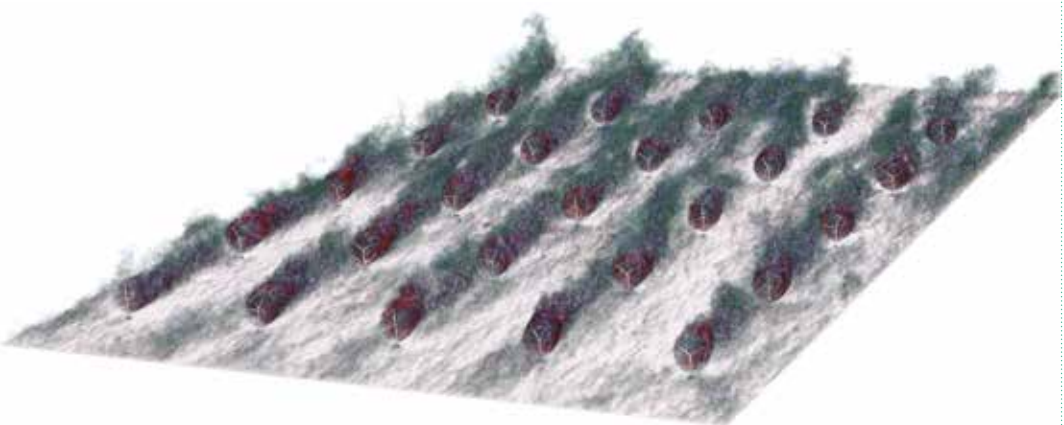
archer2



The UK's National Supercomputing Service

Flow within and around a large wind farm

Modern large-scale wind farms consist of multiple turbines clustered together in wind-rich sites. Turbine clustering suffers some drawbacks, as downstream turbines operate within the wake of upstream ones, resulting in the reduction of their power output due to wind speed deceleration and the increase of fatigue loads due to increased wind fluctuations. High-fidelity turbulence-resolving simulations allow us to study the dynamics of the interacting turbine wakes, providing insight into complex flow phenomena such as wake meandering, tip and hub vortex breakdown, and the interaction of the wind farm with the atmospheric boundary layer. The data was generated with the open-source flow solver Xcompact3D on ARCHER2.

Dr Nikolaos Bempedelis, Imperial College London, Department of Aeronautics

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