# *Nekmesh*: An open-source high-order mesh generator

Dave Moxey, Michael Turner, Julian Marcon and Joaquim Peiro

**Abstract** The generation of suitable, good quality high-order meshes is a significant obstacle in the academic and industrial uptake of high-order CFD methods. We will present the recently released high-order mesh generator *NekMesh* which is part of the open-source *Nektar++* spectral/*hp* element framework project (`www.nektar.info`) and generates full tetrahedral or mixed prismatic and tetrahedral high-order meshes from existing linear meshes using a pipeline approach. *NekMesh* is a high-order mesh generation and modification program which can: convert meshes from one format to another; edit meshes whilst retaining high-order information; and generate high-order meshes from a CAD definition. It is set up in pipeline style where a series of modules are constructed and executed in order to arrive at a high-order mesh. A typical execution will involve an input stage, some processing (mesh editing) stages if required and an output. This arrangement means that the program can easily be used for a wide number of applications and can, with relative ease, be set up to read or write the high-order mesh in a number of different formats. The modular structure of *NekMesh* makes it easy to incorporate different third-party CAD engines and pre- and post-processors into the process. At the conference we will describe in some detail the various stages involved in the *Nekmesh* pipeline for the generation of high-order meshes from a CAD description.

Dave Moxey
University of Exeter U.K.
e-mail: `d.moxey@exeter.ac.uk`

Michael Turner, Julian Marcon and Joaquim Peiro
Imperial College London, U.K.
e-mail: `[m.turner14;julian.marcon14;j.peiro]@imperial.ac.uk`