# Nektar++ Workshop 2019

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Nektar++

*spectral/hp element framework*
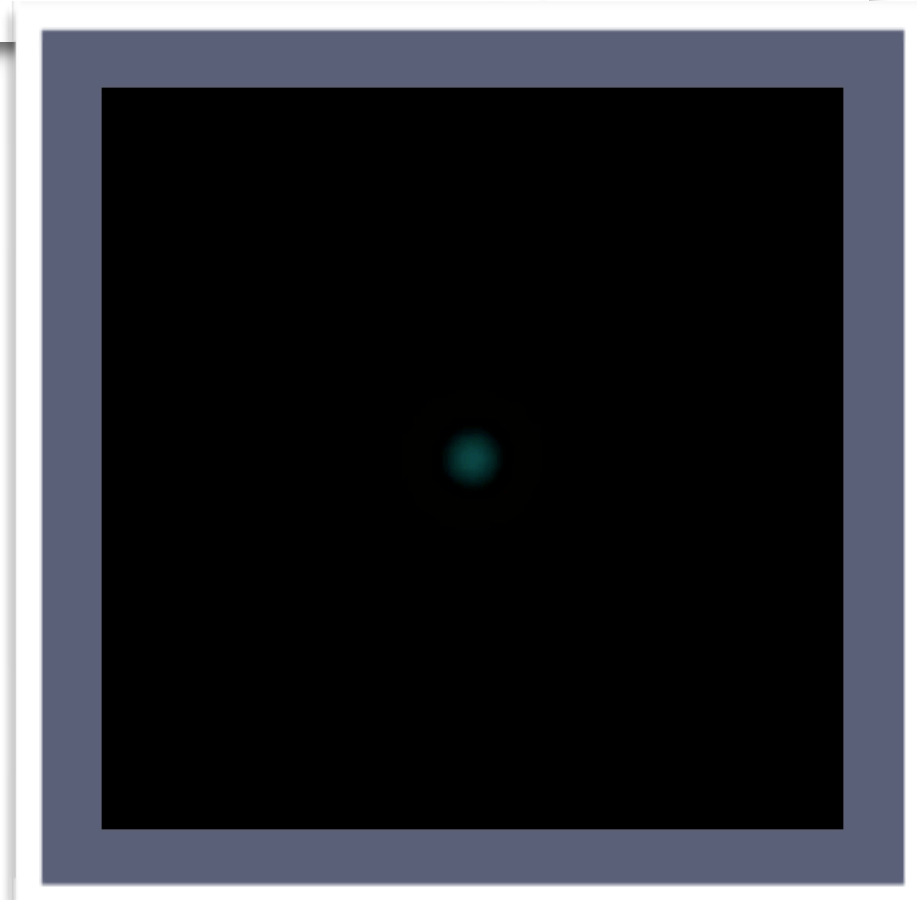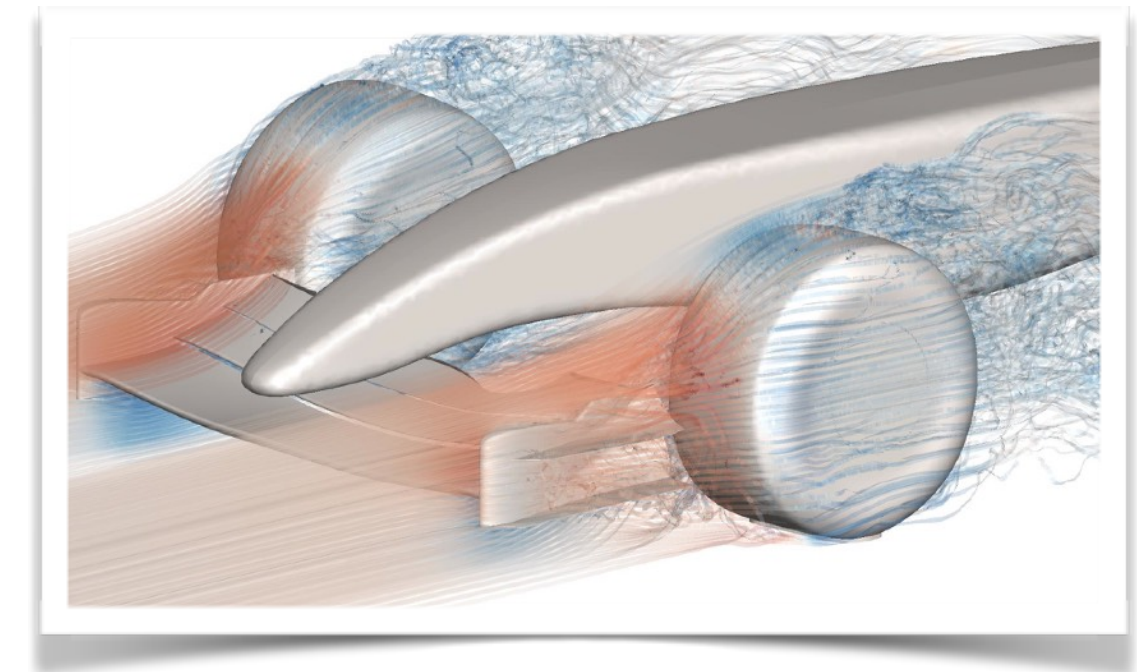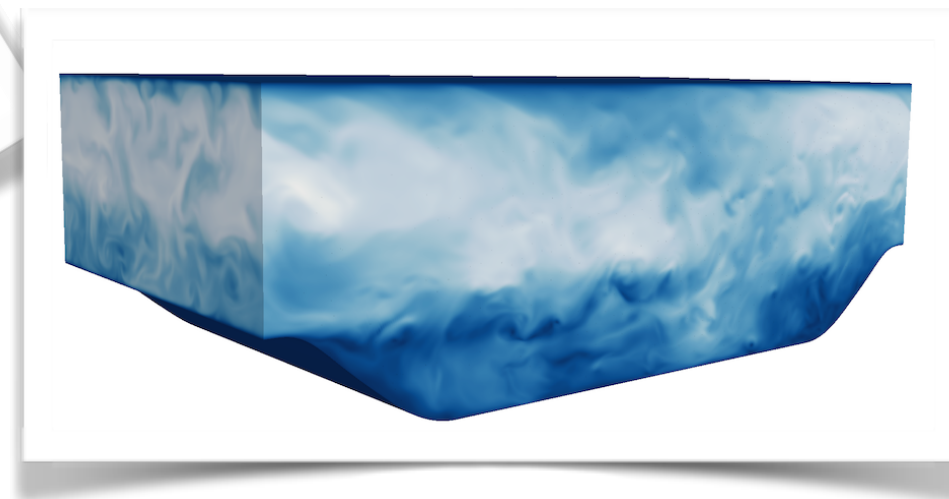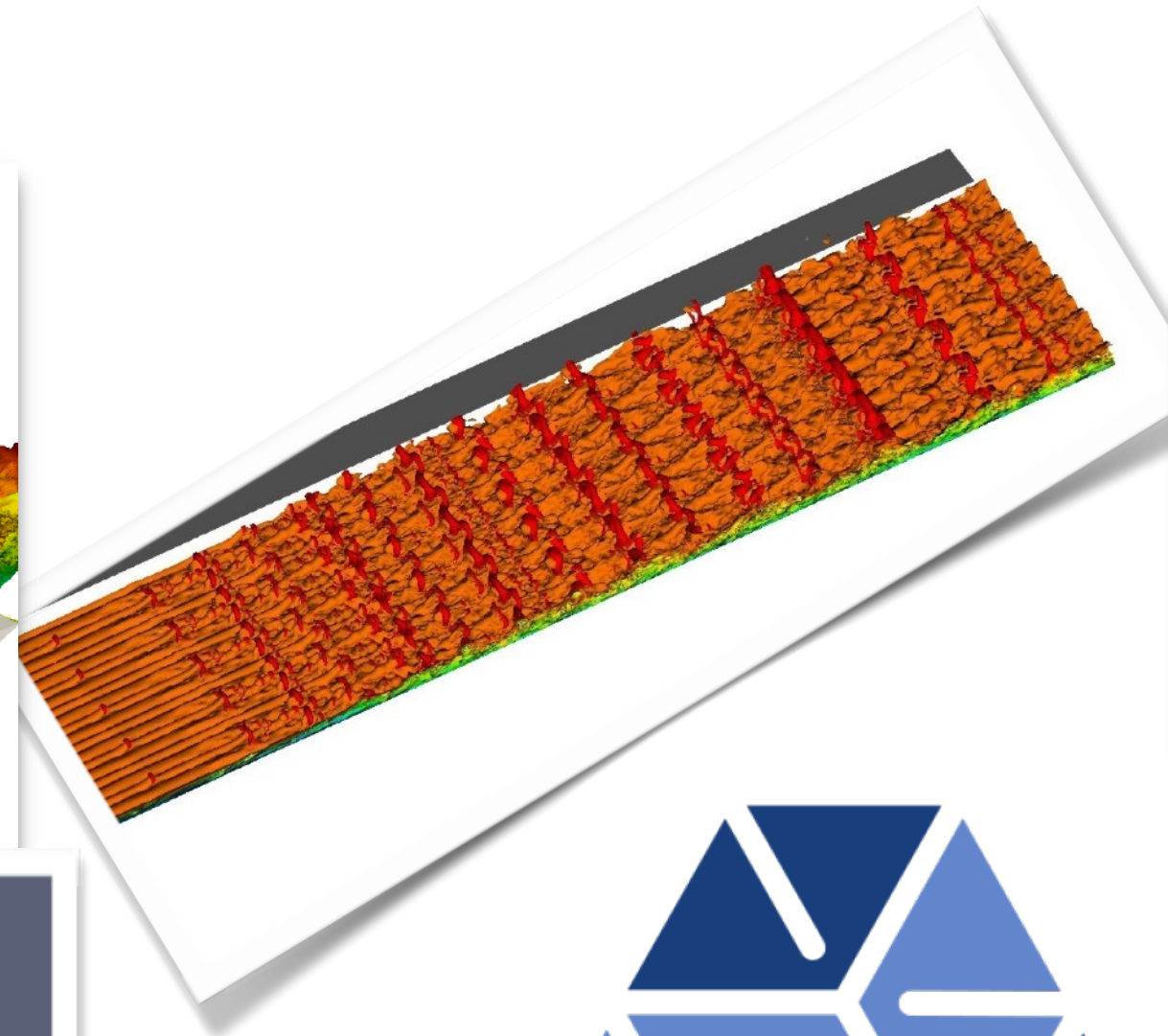
# Nektar++

*spectral/hp element framework*

- Nektar++ is an **open-source MIT-licensed framework** for high-order methods.

- **Arbitrary order** curvilinear meshes to support complex geometries in a **wide range of application areas** including incompressible/compressible fluids.

- **Wide range of discretisation choices:** CG/DG/HDG, Fourier, modal/nodal expansions, 1/2/3D, embedded manifolds.

- **Parallel MPI support**, scalable to many thousands of cores.

- Modern **C++11 API**, extensive testing, CI & distributed source control.

# Some application areas
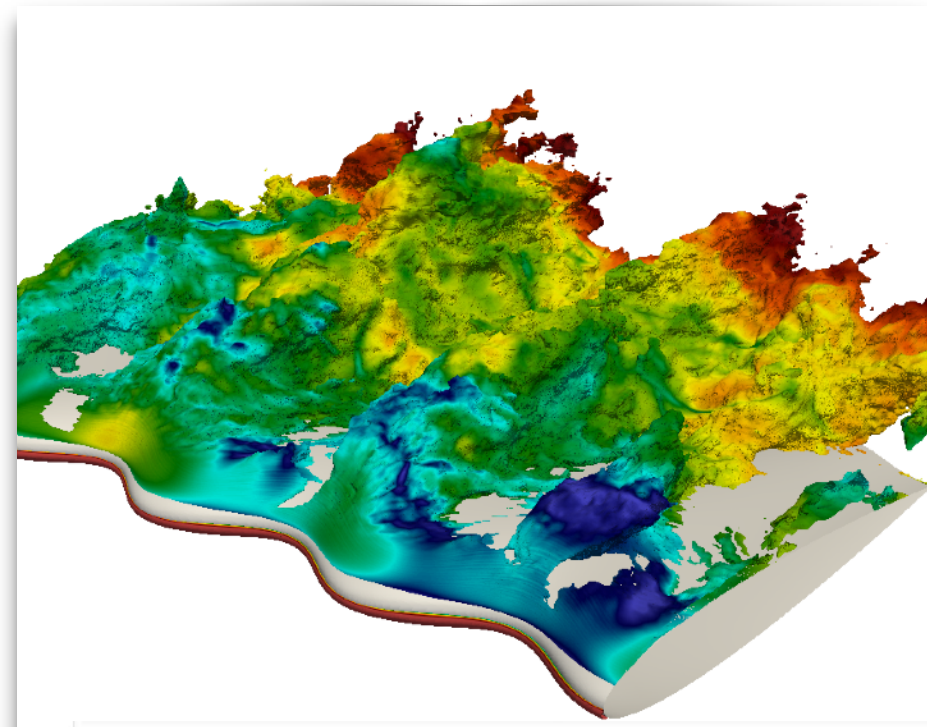


www.nektar.info
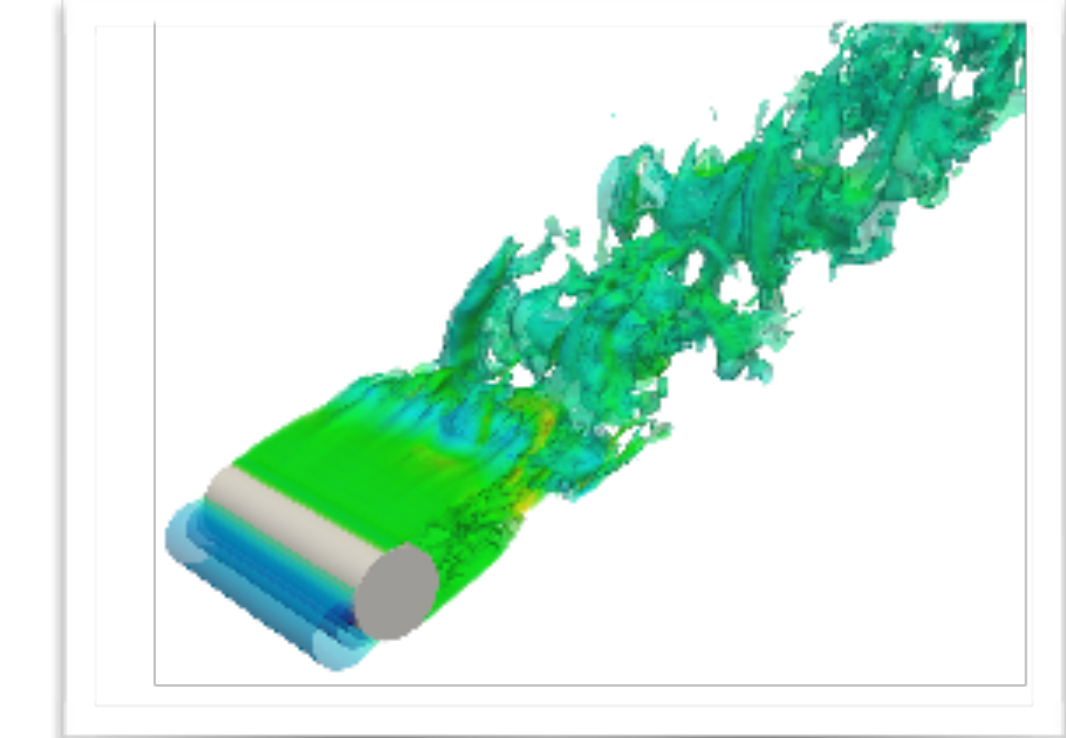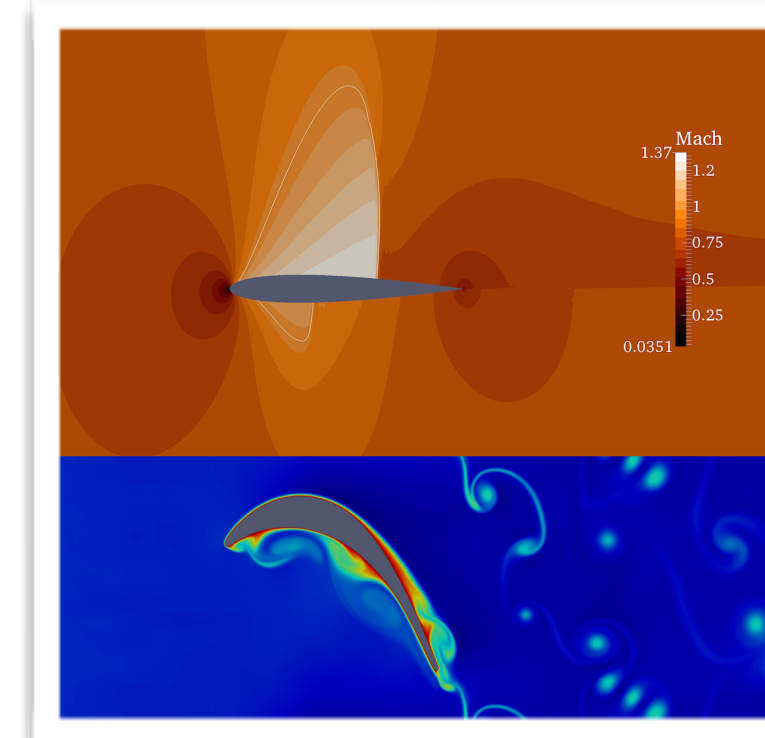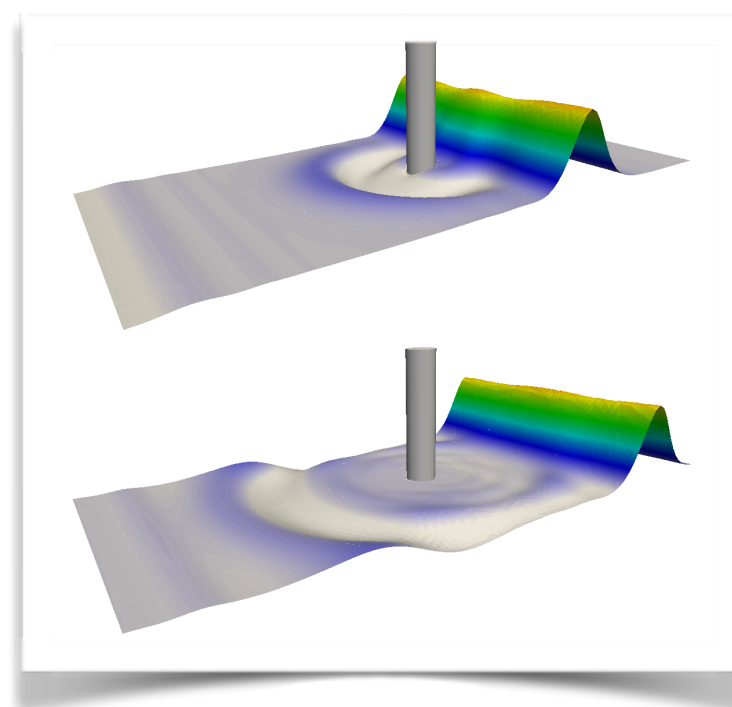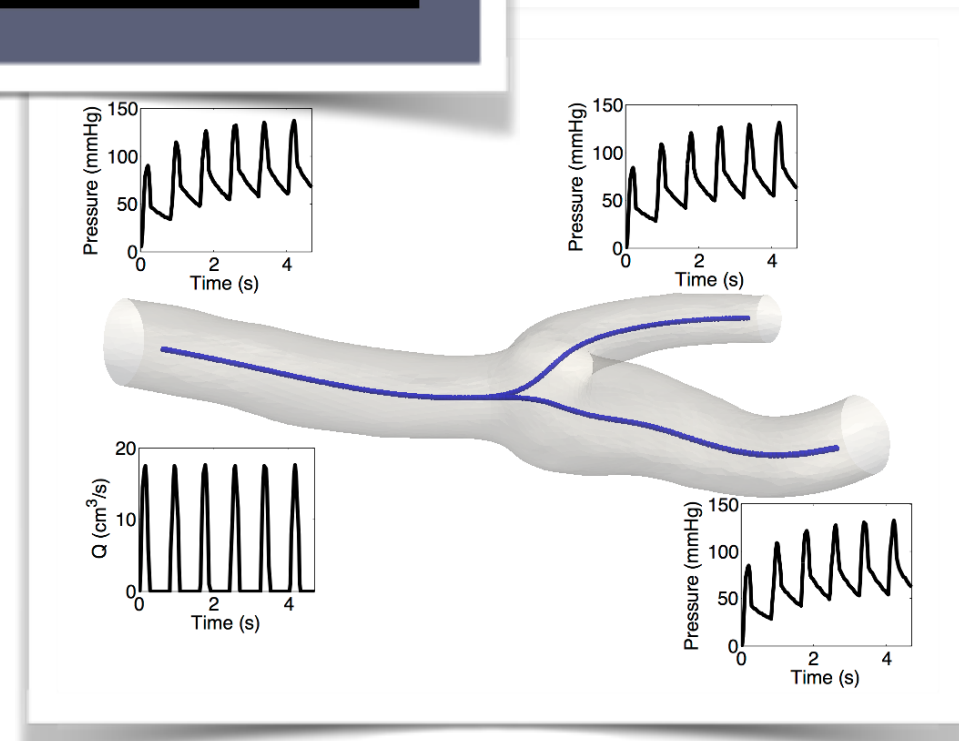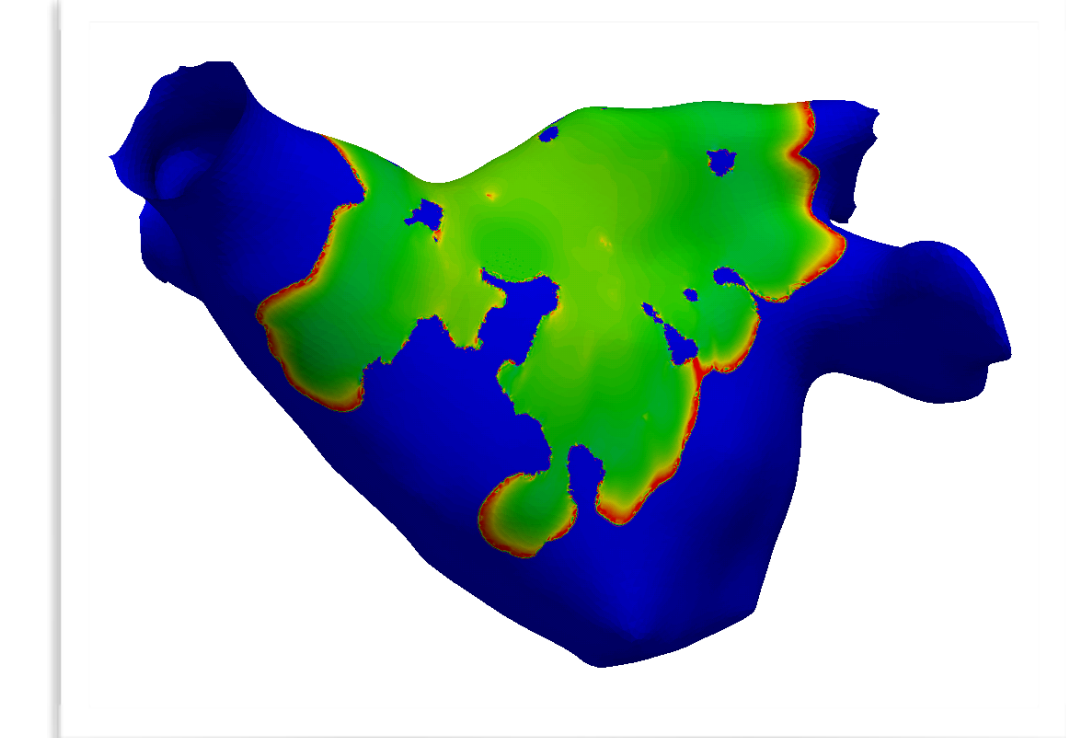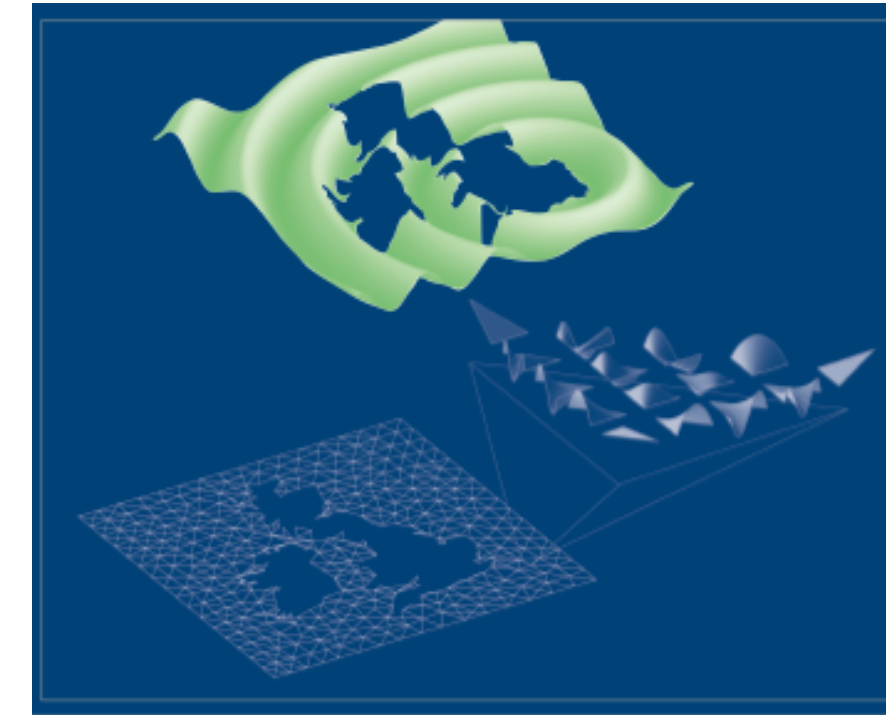
# Development team



Mike Kirby          Spencer Sherwin          Chris Cantwell          David Moxey

- **Project coordinators:** Joaquim Peiró, Gianmarco Mengaldo

- **Senior developers:** Kilian Lackhove, Douglas Serson, Giacomo Castiglioni

# Nektar++ v5

- **Nektar++ v5.0 release upcoming (v5.0b available now)**

- > 7,000 commits since v4.0 (Sep 2014) from ~40 contributors, ~130 changelog entries

- Lots of new functionality: parallel mesh format, *in situ* processing, Python interface, *AcousticSolver*, variable *p*, *NekMesh*, …

- Preprint submitted to *Comp. Phys. Comm.* to highlight new features

*Nektar++*: enhancing the capability and application of high-fidelity spectral/*hp* element methods

David Moxey[1], Chris D. Cantwell[2], Yan Bao[3], Andrea Cassinelli[2], Giacomo Castiglioni[2], Sehun Chun[4], Emilia Juda[2], Ehsan Kazemi[4], Kilian Lackhove[6], Julian Marcon[2], Gianmarco Mengaldo[7], Douglas Serson[2], Michael Turner[2], Hui Xu[5,2], Joaquim Peiró[2], Robert M. Kirby[8], Spencer J. Sherwin[2]

# Workshop overview

- **Day 1 (Mon/Tues):** Updates on work being done with Nektar++ and future directions in the code

- **Day 2 (Tues/Wed):** Training, support & development break-out groups

# Schedule: 10th June

- **1pm - 2pm: Updates**

- **2pm - 3pm: Applications I (Turbomachinery)**

- **3pm - 4pm: Poster Session**
  *Held in Streatham Court 0.28*

- **4pm - 5:20pm: Applications II (LES)**

- **7pm: Dinner**
  *Samuel Jones Smokehouse, City Centre*

# Schedule: 11th June

- **9:00am - 10:20am: Presentations**

- **10:40am - 12:00pm: Future plans & upcoming features**

- **12:00pm - 12:45pm: Lunch (in Streatham Court)**

- **1pm - 5:30pm: Tutorials and development sessions**
  *Held in the Forum building, Exploration Lab 2*
  - ➡ Building/installing/debugging Nektar++
  - ➡ New feature: Jupyter notebooks with Python interface
  - ➡ Any other Nektar++ or NekMesh tutorials

# Schedule: 12th June

- **9:00am - 12:30pm: Open tutorials and development sessions, break-out group development sessions**
  *Held in the Forum building, Exploration Lab 1*

- **12:30pm: Close**

# Next up

- Chris Cantwell (v5 release)

- Mike Kirby (Library & developer guide updates)

- Spencer Sherwin (Future plans)