

HPC Combustion Workshop

Friday June 2nd, 2017

Barcelona Supercomputing Center

<http://hpccomb2017.bsc.es/>



The use of numerical simulations in the context of High-Performance Computing (HPC) as a tool for design and understanding modern combustion systems is becoming increasingly important in the last decade as more computing power is currently available. However, the modelling of combustion systems is very demanding in terms of physical models and algorithms, since it not only requires the modelling of combustion and turbulence, but also their interactions with additional phenomena such as atomization, vaporization, phase change, turbulent mixing and stirring. The interaction of the flame with the surroundings is also of crucial importance with influence on different aspects such as near wall behaviour, heat losses or fluid/structure interactions. Furthermore, combustion process usually involves large number of reacting species and radicals depending on the fuels leading to multiscale and multiphysics problems with large disparity of time and length scales. All aspects of combustion simulations inherently need large number of computing resources and this community is well known to be an important player in HPC-related activities worldwide.

The 1st Spanish HPC combustion workshop is dedicated to present the state of the art in modelling and simulation techniques for combustion applications in the national context with representative research institutions. The topics go from multiphase flow calculations, combustion instabilities, alternative fuels, large-eddy simulations, numerical methods for reacting flows to advance multiphysics applications. The event honours the participation of three invites speakers: Amable Liñán, Laurent Y. Gicquel and Heinz Pitsch. The workshop is free, but the places are limited and require registration.

Agenda

09:00 – 09:30h – Registration

09:30 – 09:40h – Welcome: Mateo Valero, BSC Director, and Jose M. Cella, CASE Dpt. Director

09:40 – 10:00h – Red Española de Supercomputación: David Vicente, User support manager, BSC

10:00 – 10:30h – Vision and Welcome: Amable Liñán, Combustion Institute President

10:30 – 11:10h – Plenary speaker: Laurent Y. Gicquel, Cerfacs (France)

11:10 – 11:35h – Coffee break

11:35 – 12:15h – Plenary speaker: Heinz Pitsch, RWTH Aachen (Germany)

12:15 – 13:15h – Technical session Morning (20 min/talk)

- TS1 – Intrinsic flame instabilities in microchannels. Speaker: D. Fernández-Galisteo.
- TS2 – Eulerian-Eulerian Model of Fluidized Bed Combustion. Speaker: N. Fueyo.
- TS3 – Numerical simulation of a pulverized coal furnace using CFD codes FlowFEM and VolFEM3D. Speaker: J.L. Ferrín.

13:15 – 14:30h – Lunch

14:30 – 16:10h – Technical session Afternoon (20 min/talk)

- TS4 – Advanced CFD modelling of Diesel spray combustion processes. Speaker: R. Novella.
- TS5 – Combustion-related research at University Carlos III. Speaker: E. Fernández-Tarrazo.
- TS6 – A novel numerical method to solve transient spray combustion problems. Speaker: J. Carpio.
- TS7 – Numerical modelling of combustion for Large Eddy Simulations in the TermoFluids code, Speaker: J.Ventosa-Molina.
- TS8 – High-fidelity numerical simulations of practical combustion systems using the multiphysics code Alya, Speaker: D. Mira.

16:10 – 16:30h – Coffee break

16:30 – 17:30h – Open discussion: Industrial use of Combustion Simulations

17:30 – 17:45h – Closing

Venue

Barcelona Supercomputing Center

Address: Calle Jordi Girona 31,
08034 Barcelona

Workshop room:

Building Rectorado, Sala de Juntas, 1st floor

