Final Program

Tuesday 8 December

8.45  Registration

9.30  Opening of SimRace
      S. de Chaisemartin, Scientific Correspondent of SimRace (IFPEN, France)
      Welcome address
      E. Heintzé, Scientific director (IFPEN, France)

9.45  Challengers Presentation

Session 1 – High-performance computational and programming models for emerging architecture
Chairperson: J-M Gratien, IFP Energies nouvelles, France

10.30  Keynote address by Barbara Chapman (Univ. of Houston, USA)
       The challenge of portable parallel programming at Exascale

11.15  Automatic generation of adaptive simulation codes
       C. Bastoul¹, C. Sabater² (1 Univ. of Strasbourg, INRIA, France ; 2 Univ. Nacional de Rosario, Argentina)

11.40  Break

12.10  Performance modeling of an industrial hydrocode on recent multicore processors
       T. Gasc¹²³, F. De Vuyst¹, M. Peybernes⁴, R. Poncet⁵, R. Motte³ (1 Maison de la Simulation, 2 CMLA, ENS Cachan Univ. of Paris-Saclay, CNRS, 3 CEA, DAM, DIF, 4 CEA Saclay, DEN, 5 CGG, France)

12.35  Efficient solving strategies for incompressible Navier-Stokes equations for large scale simulations using the open source software Feel++
       V. Chabannes¹, C. Prud’homme⁶, M. Szopos², R. TARABAY⁷ (1 Joseph Fourier Univ., 2 Institut de Recherche Mathématique Avancée, Univ. of Strasbourg, France)

13.00  Lunch
14.30 Generation of adapted meshes on parallel architectures
A. Loseille (INRIA, France)

14.55 Solving strategy for large scale aerothermal simulation using the Open-Source Framework Feel++
Y. Hoarau, C. Prud’homme, J. B. Wahl (Institut de Recherche Mathématique Avancée, ICube, France)

Session 2 – Challenging exaflopic applications
Chairperson: M-C Sawley, Intel, France

15.20 Reactive particulate flows in rotating complex geometries
L. Bennani\textsuperscript{1,2}, H. Neau\textsuperscript{1,2}, P. Fede\textsuperscript{1,2}, C. Baudry\textsuperscript{2}, J. Lavieville\textsuperscript{2}, O. Simonin\textsuperscript{1,2} (1Toulouse Univ., 2 CNRS-Institut de Mécanique des Fluides de Toulouse, 3 EDF R&D, France)

15.45 Volume of fluid methodology for low pressure injection
W. Edelbauer\textsuperscript{1}, D. Greif\textsuperscript{2} (1 AVL List, Austria; 2 AVL-AST d.oo., Slovenia)

16.10 Break

16.40 High performance computation of particle-laden reactive fluidized flows in complex geometries at industrial scale
H. Neau\textsuperscript{1,2}, C. Baudry\textsuperscript{2}, P. Fede\textsuperscript{1,2}, J. Lavieville\textsuperscript{3}, O. Simonin\textsuperscript{1,2} (1 Toulouse Univ., INPT, UPS, IMFT, 2 CNRS-Institut de Mécanique des Fluides de Toulouse, 3 EDF R&D, France)

17.05 Industrial application of HPC for the resolution of complex flows in internal combustion engines

Wednesday 9 December

8.45 Registration

Session 3 – Multi-scale methods and model coupling - 1
Chairperson: B. Scheurer, CEA, France

9.30 Keynote address by Marc Massot (Ecole Centrale Paris, France)

10.15 Drag force for spherical and cylindrical particles at different packed bed porosities and wide range of Reynolds number
R. Brahem, A. Wachs, D. Ferré, A. Hammouti (IFPEN, France)

10.40 Projection-based FEVMS turbulence model with wall laws: application to industrial engineering incompressible fluid flows
S. Rubino (Univ. de Sevilla, Spain/LILL-UPMC, France)

11.05 Break

11.35 Direct numerical simulation of heat/mass transfer in gas-solid flows
F. Euzenat\textsuperscript{1,2}, A. Wachs\textsuperscript{1}, A. Hammouti\textsuperscript{1}, E. Climent\textsuperscript{2}, P. Fede\textsuperscript{2} (1 IFPEN, 2 IMFT, France)

12.00 Simulation of interfacial two-phase flows using P4EST, a cell-based AMR library
F. Drui\textsuperscript{1,2}, P. Kestener\textsuperscript{2}, S. Kokh\textsuperscript{1,3}, A. Larat\textsuperscript{1,4}, M. Massot\textsuperscript{1,4} (1 EM2C, CNRS, Ecole Centrale Paris, 2 Maison de la Simulation, 3 CEA/DEN/DANS/DM2S/STMF, CEA Saclay, 4 Fédération de Mathématiques de l’Ecole Centrale Paris, CNRS, France)

12.25 Density-based approach for the simulation of wet combustion
A. Eggers, F. di Mare (Institute of Energy and Power Plant Technology, TU Darmstadt, Germany)

12.50 Lunch
Session 3 – Multi-scale methods and model coupling - 2
Chairperson: R-O Fox, Iowa State University, USA
14.30 Massively parallel direct numerical simulation of three-dimensional water jet destabilization by a fast coaxial air stream
L. Kahouadji¹, O. K. Matar¹, J. Chergui², D. Juric², S. Shin³ (1 Imperial College London, UK ; 2 LIMSI-CNRS, France ; 3 Hongik Univ., Republic of Korea)
14.55 Comparison of numerical schemes for multiphase reactive transport
T. Faney, L. Rouvray, A. Michel (IFPEN, France)
15.20 A Multiscale Discontinuous Galerkin Method for Transport Modeling
A. Konate¹², V. Girault¹, X. Claeyss¹, G. Enchery², S. Desroziers² (1 LJLL, UPMC, 2 IFPEN, France)
15.45 Break
16.15 Industrial session
17.15 Posters session and exhibition
18.30 Bus transfer to the Domaine de Vert-Mont
19.00 Cocktail reception
21.30 Bus transfer from the Domaine de Vert-Mont to the hotels in Rueil and Nanterre, then to Place Charles de Gaulle Etoile in Paris

Thursday 10 December
8.15 Registration

Session 4 – Numerical schemes on general meshes for complex flows
Chairperson: B. Riviere, Rice University, USA
9.00 Keynote address by Lourenço Beirão da Veiga (Univ. of Milan, Italy)
The virtual element method: an introduction with focus on fluid flows
9.45 A virtual volume method for heterogeneous and anisotropic diffusion-reaction problems on general meshes
J. Coatléven (IFPEN, France)
10.10 Positive schemes for diffusion problems on deformed meshes
X. Blanc¹, J-S Camier², F. Hermeline², E. Labourasse² (1 LJLL, Paris Diderot Univ., 2 CEA, DAM, DIF, France)
10.35 Break
11.05 A large time step Lagrange-remap type method for the simulation of all-mach regime compressible flows
C. Chalons¹, M. Girardin², S. Kokh³ (1 LMV-UMR 8100, UVSQY, 2 CMAP-UMR 7641, École Polytechnique, 3 Maison de la Simulation, France)
11.30 Triangular metric-based mesh adaptation for compressible multi-material flows in semi-Lagrangian coordinates
S. Del Pino, I. Marmajou (CEA,DAM,DIF, France)
11.55 Lagrange-flux schemes: reformulating second-order accurate remapped Lagrange schemes for higher operational intensity and improved SIMD treatment
F. De Vuyst¹, T. Gasc¹,²,³, R. Motte⁴, M. Peybernes⁴, R. Poncet⁵ (1 CMLA, ENS Cachan Univ. Paris-Saclay, CNRS, 2 Maison de la Simulation, 3 CEA, DAM, DIF, 4 CEA Saclay, DEN, 5 CGG, France)

12.20 Lunch

Session 5 - Scalable linear solvers

Chairperson: M. Kern, Maison de la Simulation/INRIA, France

14.00 Keynote address by Carol Woodward (Lawrence Livermore National Laboratory, USA)
A Consideration of tradeoffs between nonlinear and linear solution methods in solving nonlinear models in the water cycle

14.45 S-step BiCGStab algorithms for geoscience dynamic simulations
A. Anciaux-Sedrakian¹, L. Grigori², S. Moufawad¹, S. Yousef¹ (1 IFPEN, 2 INRIA, France)

15.10 Adaptive and robust coarse space construction for domain decomposition methods
R. Haferssas, P. Jolivet, F. Nataf (UPMC, France)

15.35 Break

16.05 Using a posteriori error estimator and adaptative mesh refinement tools to enhance the performance of a thermal EOR compositional reservoir simulator
J. M. Gratien, O. Ricois, S. Yousef (IFPEN, France)

16.25 Analysis of IDR(s) solver for reservoir simulations on different parallel architectures
V. Seignole, J. F. Thebault, R. Nabil (Storengy-Engie Group, France)

16.50 Closing address