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Fixed-term position – Post-Doctorate Development of a Cartesian or Octree Meshing Library

Reference: CFD-2023-BOU-03
Team: CFD Team
Salary: ~39 k€/year (Gross salary)
Starting date: September 2023
Application deadline: End of July 2023

Location: 42 avenue Gaspard Coriolis – 31057 Toulouse
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Level of education required: Ph.D.

HOST LABORATORY

Cerfacs is a center for fundamental and applied research, specialized in modeling and numerical simulation. Through its resources and expertise in high-performance computing, it tackles major scientific and technical challenges in both public and industrial research. The teams at Cerfacs bring together physicists, applied mathematicians, numerical analysts, and computer scientists who design and develop innovative methods and software solutions to meet the needs of the aeronautics, space, climate, energy, and environmental sectors. Cerfacs works closely with its seven partners: **Airbus, Cnes, EDF, Météo France, Onera, Safran** et **TotalEnergies.**

JOB DESCRIPTION

Thematic(s): Development of a Cartesian or Octree meshing library

Title: Post-Doctorate

Subject and job description:
The project aims to develop an automatic mesh generation tool based on a Cartesian or Octree representation. This library will then be integrated into a CFD solver to perform simulations on complex geometries. The candidate will work in collaboration with experienced research teams and will benefit from a stimulating work environment.

Your responsibilities will include:
• Develop an autonomous library capable of generating 3D Cartesian or Octree meshes from complex geometries represented by 3D surface meshes in STL format.
• Implement mesh refinement features based on wall distance, using "Level-Set" functions available in the bitpit library or implicit surfaces such as spheres, cylinders, cones, etc.
• Integrate the developed library into the CFD solver JAGUAR (belonging to CERFACS and ONERA) and perform calculations.
• Work closely with doctoral students, engineers, and interns.
• Collaborate closely with external partners such as ONERA and INRIA to leverage their respective expertise and ensure an efficient integration of the library.

Ideal profile:
• You hold a **Ph.D.** in the field of computational fluid dynamics, applied mathematics, or a closely related field.
• You have strong programming skills (particularly in C++) and experience in developing scientific software.
• You have knowledge of mesh generation methods, especially Cartesian or Octree meshes.
• You have experience with the bitpit (https://optimad.github.io/bitpit/) and/or p4est (http://www.p4est.org) libraries.
• You are independent, creative, and able to work within a multidisciplinary team.

To apply, please send your CV along with a detailed cover letter outlining your achievements and relevant skills. We would be pleased to review your application and assess how you can contribute to our team.