ESR 10: Regularisation of turbo-machinery flows with unsteady flow separations

Rolls-Royce Deutschland, Dahlewitz, Germany (RRD)

The hosting group

Rolls-Royce Deutschland (RRD) is part of the Rolls-Royce Aerospace Group and is responsible for the design, development and manufacture of aero-engines in the thrust range from 13,000 to 40,000 lbf. The current main development programmes are related to BR700 family with a thrust range from 14,000lbs to 23,000lbf, aiming at both the regional aircraft market covering 60 to 130 seats and the long range business jet market. The ESR will be working at Rolls-Royce Dahlewitz, located just south of Berlin, and the position includes secondments to Queen Mary University, London, INRIA Sophia-Antipolis, France, and Warsaw University of Technology.

The work is supervised by Dr. M. Meyer, member of the CFD Methods group at RRD. He is working on numerical CFD, design and optimization methods and has more than 11 years experience in numerical methods for CFD and optimization and their application in different engineering disciplines.

The work

- Familiarisation with current industrial practice concerning aerodynamic design and with the Hydra solver suite and current Rolls-Royce design tools used for shape optimization and with the application of automatic differentiation (AD) tools to CFD codes.
- Application of unsteady AD to Hydra. Basic implementation and verification, tuning of parameters to optimise memory and CPU use.
- Application of unsteady AD to realistic unsteady turbo-machinery design cases.

The project will be conducted in close liaison with network partners QMUL and INRIA.

Required background

Essential: You need to have

- a good Masters degree (or equivalent) in Mechanical/Aerospace Engineering. Candidates with a Masters-level background in Applied Mathematics, Physics or Computer Science will also be considered if they have an acceptable background in modelling of fluid flow.
- experience with CFD code development (programming) as well as its application.
- the ability to give presentations and write scientific publications
- the willingness and ability to attend the regular network training events in the EU and to spend secondments at network partners

Desired: it would be good if you had experience with

- programming in Fortran and Linux environment, software development
- numerical optimisation,
- a good knowledge of numerical methods

Salary, conditions and environment

The salary is approx. 36000€ per annum of which taxes, social contributions and pension payments have to be paid.
The network will provide a range of workshops on scientific aspects relevant to adjoint-based optimisation that will be directly or indirectly relevant to the work in this research position, see the About Flow webpage for details. You will also be offered a range of skills complementary to your core research area such as project management, thesis writing and entrepreneurial skills.
Rolls-Royce Deutschland and the About Flow project are committed to Equal Opportunities for all candidates and will follow the principles of the European Charter for Researchers.

How to inquire and apply

Applications for the position are open. For informal enquiries about this position please contact
Dr. Marcus Meyer
+49 33708 61743
Marcus.Meyer@Rolls-Royce.com

To apply for the position please send a CV and two signed reference letters to the following address:

Marcus.Meyer@Rolls-Royce.com

or by mail to

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Closing Date: Sept. 30 2012