Open Early Stage Researcher/PhD Position at Weierstrass Institute for Applied Analysis and Stochastics, Germany, as part of

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European Innovative Training Network
Reduced Order Modelling, Simulation and Optimization of Coupled systems (ROMSOC)
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ROMSOC is a European Industrial Doctorate (EID) project in the programme Innovative Training Networks (ITN) and part of Marie Skłodowska Curie Actions within the Horizon 2020 programme. The ROMSOC EID Network brings together 15 international academic institutions and 11 industry partners and supports the recruitment of eleven Early Stage Researchers (ESRs). Each ESR will be working on an individual research project in the host institution with secondments related to their research in other academic and industrial partners of the network. The research is focused on three major topics: coupling methods, model reduction methods, and optimization methods, for industrial applications in well selected areas, such as optical and electronic systems, economic processes, and materials. The ROMSOC EID Network offers a unique research environment, where leading academics and innovative industries will integrate ESRs into their research teams for the training period, providing an excellent structured training programme in modelling, simulation and optimization of whole products and processes.

We seek excellent open-minded and team-spirited PhD candidates who will get unique international, interdisciplinary and inter-sectoral training in scientific and transferable skills by distinguished leaders from academia and industry. Within the ROMSOC network we offer the following PhD position at Weierstrass Institute for Applied Analysis and Stochastics:

Optimal Shape Design of Air Ducts in Combustion Engines.
Reference number: ROMSOC-ESR11

For performance optimization of combustion engines, in particular in the automobile industry, the optimal shape design of several components of the enigine, such as airducts, is crucial. In this context, for computer based rapid prototyping constrained free form shape optimization techniques are typically superior to parameterization based techniques due to their geometric flexibility. The associated numerical solution requires an efficient computation and yet accurate approximation of an adjoint-based shape gradient and also elements of higher order in a shape-gradient-related descent method for high Reynolds number flows. Moreover, geometric constraints need to be taken care of.

The PhD candidate shall develop a software tool for the numerical solution of this constrained shape optimization task. The work includes the implementation and analysis of a finite volume or finite element based optimization tool which involves a flow model, that is equipped with a proper turbulence model, and an associated adjoint scheme. The newly developed solver has to be tested for industry relevant use cases in a parallel computing environment. The PhD candidate will spend secondments for technical and scientific training at Math.Tec (Austria). The PhD degree will be awarded by Humboldt-Universität zu Berlin, Germany.

Requirements:
   - Master degree (or equivalent) in Applied Mathematics, Mathematical Engineering, Scientific Computing or related disciplines.
   - Experience in numerical solution of differential equations, continuous optimization, and numerical analysis, and relevant aspects of continuum mechanics.
   - Programming skills in object oriented languages as well as Python/Matlab.
   - Strong interest in interdisciplinary scientific work.
   - Ability to work independently and as part of a team.
   - Strong motivation to pursue a PhD degree.

- Preferred qualifications include excellent grades, research talent (as proven by the master thesis), affinity with mathematical modeling, simulation and optimization in engineering applications, and personal ambition.
- Excellent command of English, together with good academic writing and presentation skills.

Starting Date:	1st of March 2018
Contract:	Full-time contract for 36 month
Host institution:	Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany
Salary:	The Marie Skłodowska-Curie programme offers highly competitive and attractive salaries. Gross and net amounts are subject to country-specific deductions as well as individual factors and will be confirmed upon appointment.
Information/Contact:	Prof. Dr. Michael Hintermüller (Primary Supervisor) Email: hintermueller@wias-berlin.de
Application:	Applications (motivation letter, detailed CV, certificates, list of MSc courses and grades, copy of the master thesis, reference letter etc) with indication of the position reference number should be send to jobs@wias-berlin.de Applicants that apply for more than one individual research project should indicate the order of preference (e.g. 1st, 2nd and 3rd choice).
DEADLINE	**15.12.2017**

To ensure the equality of opportunities we strongly encourage women with the appropriate qualifications to apply. If equally qualified, handicapped applicants will be preferred.

Eligibility: *The candidate recruited in the ROMSOC project must be in the first four years from the date when the candidate obtained the degree entitling him or her to embark on a doctorate (e.g. master degree). No doctoral degree has been awarded during these four years. The candidate must not have resided or carried out her/his main activity (work, studies, etc.) in Germany for more than 12 months in the 3 years immediately prior to the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account. The candidate must work exclusively for the project during the employment contract. The candidate must fulfill the conditions to be admitted in the PhD programme indicated in the job vacancy. Tuition fees will be covered by the fellowship. These conditions must be fulfilled at the starting date of the contract. The starting date for each position is tentative.*