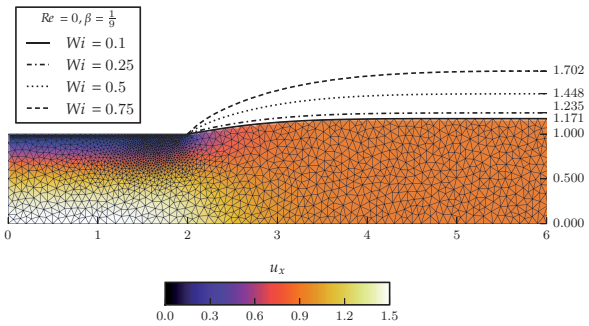
Chair for Computational Analysis of Technical Systems

RWTH AACHEN UNIVERSITY

Doctoral Positions

in Model Reduction in Engineering Context Using Data Science Techniques

The Chair for Computational Analysis of Technical Systems at the Faculty of Mechanical Engineering of the RWTH Aachen University seeks scientific co-workers in various areas of incompressible fluid flow modeling, simulation, optimization, and scientific computing. The candidates are expected to conduct research leading to a doctoral thesis. The positions are offered in the framework of the Excellence Cluster 2023 “Internet of Production” and Helmholtz School for Data Science in Life, Energy and Environment HDS-LEE:



Melt speed and die swell in extrusion molding.

Numerical Design of Manufacturing Processes Current numerical design of manufacturing processes is based on a digital twin simulation of the process machines. This digital twin is, however, not suitable to support real-time decision-making directly at the machine; the digital shadow is based on a reduced simulation model, initially based on parameterized partial differential equations, which focuses on only currently relevant aspects. An important addition will be the development of error estimators that quantify the variation between the reduced models and the fully-resolved models in order to automatically determine the level of approximation.

Biotechnology Processes Involving Reactors Building on recent efforts in the computational fluid dynamics community augmenting classical model reduction with machine learning, we will explore the combination of POD-type methods and artificial neural networks as an efficient and automated way of generating reduced models for high-fidelity fluid flow simulations. The developed concepts will be applied to biotechnology processes involving reactors.

Your profile: Requirement for the position is a master’s degree in computational or mechanical engineering, applied mathematics, or a similar subject with a superior academic record. Practical programming experience in Fortran, C, or C++ as well as with parallelization (MPI or OpenMP) are of advantage. Familiarity with UNIX operating systems would be ideal. We expect you to contribute to general tasks at the institute, such as teaching and advising master or project theses. Language skills in German are not required.

Our offer: The candidate will be employed as a regular employee and must meet required personal qualifications. This is a full-time position with salary according to German civil service pay scale TV-L E 13 (roughly 3600 euros/month before taxes). The expected appointment period is up to five years, with an initial appointment for one year.

At our chair, we consider serious and reliable research an important task. At the same time, we can offer you to become part of a very social and well-functioning team of currently roughly 20 members. Especially for international students, open doors and regular social events help become acquainted with the German culture quickly. Furthermore, we can assure you that we will support your personal development in all ways possible, thus giving you a good starting point for a future career in both academia or industry. Feel free to contact us for further information!

Contact: Stefanie Elgeti · Tel +49 241 80 99922 · elgeti@cats.rwth-aachen.de

Starting date: July 2019

Chair for Computational Analysis of Technical Systems · Prof. Marek Behr, Ph.D. · Prof. Dr.-Ing. Stefanie Elgeti
Schinkelstr. 2 · D-52062 Aachen · Tel 0241 80 999 00 · Fax 0241 80 999 10 · www.cats.rwth-aachen.de