

Starting in Q1, 2017 there is an open PhD position (3 years) within the [BioTechMed Graz](#) funded flagship project

Image-based Learning in Predictive Personalized Models of Total Heart Function (ILEARNHEART)

hosted at the Medical University Graz (MUG), the Karl Franzens University Graz (KFU) and the Graz University of Technology (TUG).

PhD Position Work package 1 – Electro-mechano-fluidic modeling of the left heart:

Supervisors: Prof. Gernot Plank (Computational Cardiology) & Prof. Gundolf Haase (Scientific Computing)

In the clinic image-based analysis of the dynamics of electrophysiological activity, deformation and blood flow is of pivotal importance in the diagnostic assessment of cardiac function. Computational *in silico* models of cardiac function are emerging as an important complementary modality, which aide in the quantitative analysis and interpretation of clinical data. Recently, we extended our own *in silico* modeling framework to enable simulations of the entire physics involved in a human heart beat that is, bioelectric activation, mechanical deformation and fluid flow. We seek to integrate these methodologies into a comprehensive *in silico* model of the left human heart, which shall be further developed towards a clinical research tool suitable for clinical applications such as e.g. valve replacement therapy. To gain clinical relevance the underlying modeling methodology must transition from using generic models to address fundamental mechanistic questions towards using personalized models, which provide clinically useful biomarkers for indicating or stratifying disease or allow for virtual testing of treatments and predicting outcomes acutely and longitudinally for a given patient.

The successful candidate will work on integrating biomechanical and hemodynamic model components and on the conception of data assimilation techniques for personalizing the combined mechano-fluidic model based on rich multimodal clinical imaging datasets. A large pool of clinical data recorded from pediatric patients treated for aortic valve disease or aortic coarctation is available for this purpose. The candidate will receive intense training on all aspects relevant to cardiac multiphysics modeling within the Computational Cardiology Laboratory at the Medical University of Graz. Due to the multidisciplinary nature of this network project complementary expertise in the fields of cardiology, computational modeling, image processing, optimization and parameter identification and machine learning techniques is brought in by the collaborators of this network project, Prof. Thomas Pock (TU Graz), Prof. Kristian Bredies and Prof. Karl Kunisch (KFU Graz).

Applicants should hold a master's degree in Biomedical Engineering, Mechanical Engineering, Applied Mathematics, Computational Physics or related disciplines with a strong interest in cardiac modeling and scientific computing.

The position is currently financed for three years with the option of an extension depending on the further funding success. The yearly salary will be 21300 EUR with estimated monthly living costs of 900 EUR in Graz. To apply for this position, please send your application by email to gernot.plank@medunigraz.at.

Your email should contain a pdf file as attachment with the following information:

- Curriculum Vitae
- A short description of your qualifications and experience (i.e. list of courses, Diploma or Master thesis)
- A letter describing your scientific interests within the desired project
- Names and email-addresses of at least two scientists willing to provide a reference