Doctoral Researcher

Department Maschinenbau (MB), Erlangen, Vollzeit, Befristete Anstellung, Bewerbungsschluss: 31.10.2024

Ihre Aufgaben

1. Overview of the research programme:

InSilicoHealth is an innovative Doctoral Network (DN) with the ambition to train a new generation of outstanding Doctoral Candidates (DC) that will become effective translators of the rapidly evolving digital technology to tackle existing and future challenges related with healthy ageing in Europe. The research focus of this DN lies in three key domains: the brain, heart, and musculoskeletal (MSK) systems. In the realm of digital technology, InSilicoHealth specifically focuses on virtual human twin (VHT) technology to enhance our understanding of the age-related adaptive changes of the complex human body through predictive multi-scale simulations. The research methodology employs knowledge-driven models enhanced by advanced data-driven inference techniques to optimize the health potential of older individuals.

2. Individual PhD Project Information:

Host institution: Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

Supervisory team: Prof. Silvia Budday (PhD supervisor, FAU), Dr Zhou Zhou PhD co-supervisor, KTH), Dr Xiaogai Li (PhD co-cupervisor, KTH), Dr Oliver Frings (secondment host, Siemens Healthineer).

Enrolment in Doctoral School: Enrolled in Department of Mechanical Engineering (FAU) and the School of Technology and Health (KTH).

3. PhD project description:

This PhD project will focus on generating a full-scale human brain finite element model that accounts for regional and age-related changes in the mechanical properties of brain tissue. The objectives are: 1) Examine the regional and age-related variations in the tissue structural parameters; 2) Assess the changes in the brain tissue mechanical properties due to ageing and disease; 3) Develop age-dependent material models for the different regions of the brain integrating previously generated data (mechanical data, microstructural data from histological images, and in vivo structural data from magnetic resonance and diffusion tensor imaging); 4) Implement the material models into full-scale brain models; 5) Perform benchmark simulations of brain atrophy related to healthy ageing and diseases.

A successful project can result in an improved understanding of the changes in the mechanical properties of the brain tissue due to ageing and potentially neurodegenerative diseases (e.g., Alzheimer and Parkinson), novel Finite Element models of the ageing brain incorporating human data, and curated dataset for healthy ageing studies.

4. Planned secondments:

KTH Neuronic Engineering (August year 2, 6 months): Aims to gain knowledge in the generation of person-specific finite element models of the ageing brain.

Siemens Healthineers (June year 3, 4 months): Opportunity for the DC to gain knowledge on the integration of in silico technologies in an industry setting.

Ihr Profil

Notwendige Qualifikationen:

You have completed a master's degree in Mechanical/Civil Engineering, Computational Engineering, Biomedical Engineering, or possess corresponding qualifications that could provide a basis for successfully completing a doctorate.

Specialization in nonlinear continuum mechanics and/or finite element modeling will be beneficial.

You have a keen interest in biomedical applications.

You have proven your proficiency in English language equivalent to B2 level.

You did not reside or carry out your main activity (work, studies, etc.) in the host institution's country (Germany) for more than 12 months in the three years before 1st of January 2025.

You are ambitious, well organized, a team player, and have excellent communication skills.

You can work independently and have a critical mindset.

You are a pro-active and motivated person, eager to participate in network-wide training events, international mobility, and public dissemination activities.

Wünschenswerte Qualifikationen:

Previous experience in Finite viscoelastic constitutive modelling, Finite growth modelling, nonlinear finite element modelling, and/or hybrid modelling as well as coding experience in C++ and Python is not required but considered a plus.

Stellenzusatz

Befristetes Forschungsvorhaben

Application requirements:

Curriculum vitae.

Motivation Letter, including a clear indication of the preferred DC position(s) within InSilicoHealth Doctoral Network if the applicant postulates for multiple positions.

Academic records (grades) for Bachelor and Master degrees.

Interessiert?

Die vollständige Stellenausschreibung sowie alle Infos zum Bewerbungsverfahren finden Sie hier: