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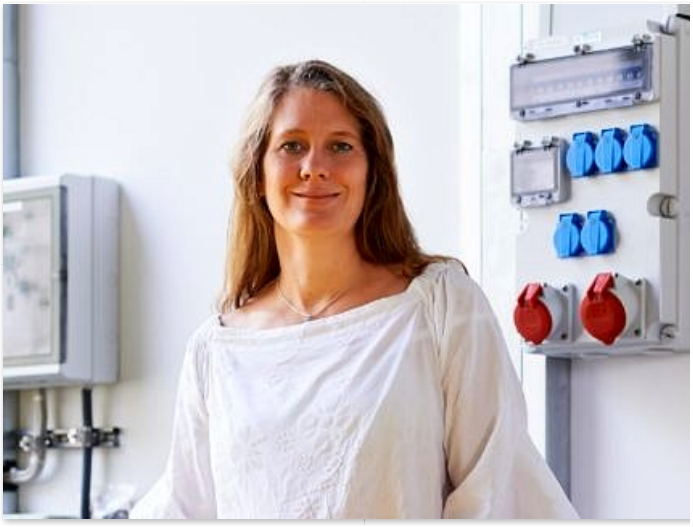
Improved simulation using digital twins

Prestigious EU funding: FAU involved in international doctoral network

October 22, 2019

FAU is involved in a new European training network for doctoral researchers. The 14 research projects focus on the question of how to improve modelling and simulation of complex mechanical systems on computers in future. The European Union is providing approximately 3.6 million euros in funding over a period of four years as part of the Horizon 2020 programme, with roughly 250,000 euros being allocated to FAU. The network is being coordinated by Martin-Luther-Universität Halle-Wittenberg (MLU). A total of twelve universities and research institutions from eight different European countries are involved.



Prof. Dr. Sigrid Leyendecker, Chair of Applied Dynamics at F and project coordinator of the network. (Image: FAU/David Hartfiel)

According to project coordinator Prof. Dr. Martin Arnold from the Institute of Mathematics at MLU, cables for ski lifts, wiring harnesses in the automotive industry and endoscopes for medical purposes may not a pear to have much in common at first sight, but they share one vital characteristic: 'They are made of highly flexible, slender components reminis cent of tubes or ropes.' In practice, this means that their behaviour tends to be rather unpredictable. Arnold believes that most companies at the rent time prefer to rely on knowledge gained through experience when it comes to new products and projects. What is more, optimising products such as these is a difficult and expensive venture.

This is where the new doctoral network Joint Training on Numerical Modelling of Highly Flexible Structures for Industrial Applications comes into play, involving universities from Belgium, Germany, France, Croatia, Norway, Austria, Slovenia and Spain. Its objective is to create a so-called 'digi twin', a virtual prototype which mirrors the original as accurately as possible for use in practical applications. The main aim is not only to model t behaviour of individual components, but also the properties of the entire system. This would allow a great number of simulations to be run even ing the development phase which would be helpful, for example, to calculate material wear and tear.

The research projects are using the so-called beam theory, a model traditionally used in mechanics. It is hoped that the doctoral researchers will able to discover how the model can be adapted for highly complex technical systems. The spectrum of work covered by the researchers ranges from applied mathematics to mechanics to industry. At FAU, one doctoral researcher from the Chair of Applied Dynamics led by Prof. Dr. Sigrid Leyendecker will work together with Karl Storz Video Endoscopy (Estonia), a leading endoscope manufacturer, to model and simulate endoscope for use in a medical context. Prof. Dr. Sigrid Leyendecker is also one of the coordinators of the network.

In addition to academic training, the 14 doctoral candidates will also complete a three month internship in a non-academic partner institute, usua a company. They are also expected to spend time at other partner universities participating in the network. One aim of the network is to encourag

talented researchers at an early stage of their career.

European doctoral networks are funded by the Marie Sklodowska Curie programme of the European Commission. The aim is to equip young researchers with the skills they need to pursue a career in research or industry. For this reason, 13 non-academic partners are involved in the projec alongside European universities and non-university research institutions. Competition for establishing a network is extremely tough. In 2019, func ing was only granted to 103 of the 1,341 applications which were considered.

Further information

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