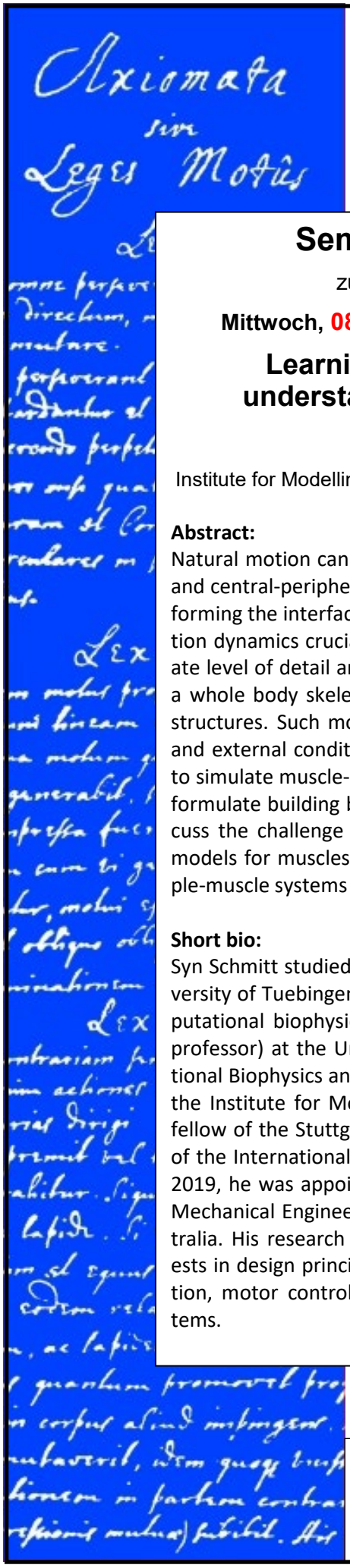

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Mittwoch, 08.03.2023, 13:00 Uhr, Immerwahrstr. 1, Raum 01.025

Learning motion in muscle-driven systems – understanding biology and benefits for robotics

Prof. Dr. Syn Schmitt

Institute for Modelling and Simulation of Biomechanical Systems, University of Stuttgart

Abstract:
Natural motion can be seen as an optimal orchestration of both skeletal-environment and central-peripheral nervous interaction dynamics. With the muscle-tendon complex forming the interface inbetween. Researchers striving to simulate this complex interaction dynamics crucially depend on system dynamic models incorporating an appropriate level of detail and functionality. State-of-the-art system models of humans include a whole body skeleton, multiple muscle-tendon units and hierarchical motor control structures. Such models allow to study adaptation and learning in changing internal and external conditions. Over the last two decades, we have developed a framework to simulate muscle-driven movement. Adopting a cybernetics perspective, we strive to formulate building blocks for movement generation, learning and control. We will discuss the challenge of incorporating known motor control hierarchy into stimulation models for muscles and the increasing amount of information needed to drive multiple-muscle systems in dynamic conditions.

Short bio:
Syn Schmitt studied physics at the University of Stuttgart and graduated from the University of Tuebingen with a PhD in Theoretical Physics (topic: muscle modelling / computational biophysics). In 2012, Schmitt was appointed as Juniorprofessor (assistant professor) at the University of Stuttgart. Since 2018, he is full professor of Computational Biophysics and Biorobotics at the University of Stuttgart and in 2019 he founded the Institute for Modelling and Simulation of Biomechanical Systems. Syn Schmitt is fellow of the Stuttgart Center for Simulation Science (SimTech) and a faculty member of the International Max Planck Research School for Intelligent Systems (IMPRS-IS). In 2019, he was appointed as Adjunct Professor in the School of Chemistry, Physics and Mechanical Engineering of the Queensland University of Technology in Brisbane, Australia. His research focuses on autonomous muscle-driven motion with special interests in design principles of the locomotion apparatus, non-linear dynamics of locomotion, motor control and morphological computation in biological and technical systems.

Prof. Dr.-Ing. P. Steinmann
Prof. Dr.-Ing. K. Willner
Lehrstuhl für Technische Mechanik
Egerlandstraße 5, 91058 Erlangen

Prof. Dr.-Ing. S. Leyendecker
Lehrstuhl für Technische Dynamik
Immerwahrstraße 1, 91058 Erlangen