Title: Design, modeling and control of assistive exoskeletons

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Abstract:

Exoskeletons are mechatronic systems that are designed to assist, aid, and help people in their body movement. Exoskeletons have found very broad applications including healthcare, elderly assistance, industrial and military uses. For exoskeleton development, mechatronics plays a critical role to achieve a lightweight, compact, and effective solution for enhancing their performance of human-exoskeleton interaction and finally their successful deployment.

In this talk, research challenges in the assistive exoskeleton design and development will be discussed. Relevant issues including mechanism synthesis, physical human-exoskeleton interaction simulation and analysis, design evaluation, intention sensing and control will be covered. Some novel designs and sensing methods will be introduced. Examples of exoskeletons from EU and Danish national projects such as EXO-SUIT, Patient@home, Exo-aider, etc, will be presented.

About the speaker:

Dr. Shaoping Bai is an Associate Professor at the , department of Mechanical and Manufacturing Engineering, Aalborg University (AAU), Denmark. His research interests include linkage synthesis, medical and assistive robots, parallel manipulators and exoskeletons. Dr. Bai leads several national and international research projects in exoskeletons, including EU AXO-SUIT and IFD Grand Solutions project EXO-AIDER, among others. He is a recipient of IEEE CIS-RAM 2017 best paper award, IFToMM MEDER 2018 best application paper award and WearRAcon2018 Grand Prize of Innovation Challenges. Dr. Bai is an Associate Editor of ASME J. of Mechanisms and Robotics and an Associate Editor of IEEE Robotics and Automation Letters. He serves as a deputy chair of IFToMM Technical Committee of Robotics and Mechatronics and also a deputy chair of IFToMM Denmark.