

Distinguished Seminar in Robotics, Systems & Control

The Institute of Robotics and Intelligent Systems presents:

Designing and Controlling Robots for Direct Interaction with Humans

Date: November 4, 2016

Time: 15.15

Place: HG G3

Abstract:

The talk will address several implications resulting from the paradigm of putting the humans in the centre of robot design. First, assistance robots are supposed to closely interact with their human user. Therefore they need to be compatible to humans in terms of size and weight, but also regarding velocity and power. They need to be safe and compliant, able to perceive human motions and fast changing environments in real time and to also plan and execute their reactions at human compatible time scales. This poses substantial challenges in terms of hardware and algorithms design, as well as in term of system integration. I will present here the evolvement of DLR robot design and control from compliantly controlled robots with joint torque sensing to intrinsically compliant systems with variable compliance actuation.

Second, putting the human in the centre of robot development also means to use robotics research in order to better understand human motion and intelligence in a synthesizing way by using the analytic tools of robotics. I will particularly highlight in this respect the interplay of biomechanics and neuro-control with robot design and advanced robotics control. Humans can also directly benefit from this research through the development of better human-machine interfaces, robotized medical procedures, and prosthetic and rehabilitation devices which will even more reduce the barrier between humans and robots in the future.

Biography:

Alin Albu-Schäffer graduated in electrical engineering at the Technical University of Timisoara, in 1993 and got the PhD in automatic control from the Technical University of Munich in 2002. Since 2012 he is the head of the Institute of Robotics and Mechatronics at the German Aerospace Center, which he joined in 1995 as a PhD candidate. Moreover, he is a professor at the Technical University of Munich, holding the Chair for "Sensorbased Robotic Systems and Intelligent Assistance Systems" at the Computer Science Department. His personal research interests include robot design, modeling and control, flexible joint and variable compliance



for manipulation and locomotion, physical human-robot interaction, bio-inspired robot design. He received several awards, including the IEEE King-Sun Fu Best Paper Award of the Transactions on Robotics in 2012 and 2014, several ICRA and IROS Best paper Awards, the Eurobotics TechTransfer Award 2016 (3. Prize) and 2011, as well as the DLR Science Award. He is an IEEE Fellow.