

Robotics and Control Technologies



Biography. Alexander W. Verl was born in Frunse, USSR in 1966 and moved back to Germany with his German parents in 1976. He received the Dipl.-Ing. degree in Electrical Engineering from Friedrich-Alexander-University Erlangen-Nürnberg in 1991 and the Dr.-Ing. degree in Control Engineering at the Institute of Robotics and Mechatronics (DLR), Oberpfaffenhofen, Germany in 1997 and was appointed Full Professor (Univ.-Prof. W3) at University of Stuttgart, Germany in 2005.

He is currently Full Professor and Head of the Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW) at the University of Stuttgart. 1997 - 2005 he was Founder and Managing Director of AMATEC Robotics GmbH (part of KUKA Roboter GmbH since 2005).

Prof. Verl was awarded the Diesel Gold Medal from the German Institute of Inventions (D.I.E) in 2014, the Julius von Haast Fellowship Award by the Royal Society of New Zealand in 2012, the Honorary doctoral degree (Dr. h.c.) of the Technical University of Cluj-Napoca, Romania in 2012, the Honorary Professor of the University of Auckland, New Zealand in 2012, the Invention & Entrepreneurship Award (IERA Award) of the IEEE Robotics and Automation Society (IEEE RAS), the International Federation of Robotics (IFR) in 2010, and the Honorary doctoral degree (Dr. h.c.) of the "Politehnica" University of Timisoara, Romania in 2009.

Resilient Robots: Concept and Technology

Abstract: Resilient robots are relatively new in the field of robotics. In this talk, the speaker will first discuss the concept of resilience and resilient robots in particular with a focus on the difference of resilience from robustness. Then, the speaker will discuss an architecture of the under-actuated resilient robot and its benefit and some computational issues in operation management and control of the under-actuated resilient robot. Three developments of resilient robots will be illustrated. Finally, a generalized implication of the under-actuated resilient robot to a system that is composed of a group humans and a group of active machines and passive machines is discussed.



Biography. Dr. Zhang is a professor of University of Saskatchewan of Canada and a Chair Professor of East China University of Science and Technology of China under Chinese National 1000 Talent Plan. Dr. Zhang received his Ph.D. from Delft University of Technology (The Netherlands) in 1994 on the design theory and computer aided design of mechanism systems. He was then appointed as Assistant Professor of Manufacturing Engineering at City University of Hong Kong. In June 1998, he was appointed as Associate Professor in the Department of Mechanical Engineering at the University of Saskatchewan (Canada), and an Industrial Research Chair sponsored by Atomic Energy Canada Limited (AECL) to direct the research work at the Advanced Engineering Design Laboratory (AEDL) of the Department. He was also an adjunct professor at

University of Adelaide (Australia) during 2001 to 2006. Dr. Zhang was promoted to a Full Professor at the University of Saskatchewan in 2004.

Dr. Zhang has published over 400 refereed technical publications, among which over 237 papers appear in refereed journals in a broad scope of fields including design and mechatronics, manufacturing, informatics, human-machine systems. His h-index 40 (GS) and h-index 32 (Scopus). Dr. Zhang currently holds 8 patents. Dr. Zhang has supervised or co-supervised 31 PhD, 56 Master (thesis), 10 Master (non-thesis), and 37 Post-Doctoral Students or Visiting Scholars. Among the PhD students, 6 received NSERC PDF awards and 7 received faculty positions in post-secondary institutions in USA, Canada, Hong Kong, and China. This achievement has been recognized by both the university (2012 Distinguished Graduate Supervisor Award by University of Saskatchewan) and the professional realm (2014 Educator of the Year by Saskatoon Engineer Society). Dr. Zhang has been appointed as technical editor/associate editor for three reputed journals, including flagship journal, Journal of Mechatronics, IEEE Transaction on Mechatronics. He has been invited to review technical papers from 70 different journals, which cover design, mechatronics, informatics, management, material, and chemistry. He also served as Chair of Division of Biomedical Engineering at the U of S from 2007 to 2011, growing the division from 24 faculty members to 64 and 20 graduate students to over 60 (half of them on PhD study). Dr. Zhang is a fellow of ASME, senior member of IEEE, and senior member of SME.

Additive Manufacturing: A Reality Check



Abstract: Additive manufacturing comprises a range of incredible technologies that have revolutionized the way we design and bring new products to market, and have become an entirely new catalyst for innovation. Over the last 10 years, it has become a hot-topic that has received an inordinate amount of media coverage and hype. This presentation examines some of this hype and attempts to redress some of the myths that have grown from it in a positive way by looking at real industrial application examples, including some from the world of robotics and mechatronics, which demonstrates the true advantages that additive manufacturing offer if used in the most appropriate way.

Biography: Professor Olaf Diegel is Professor of Product Development, Lund University, Sweden. He is both an educator and a practitioner of product development with an excellent track record of developing innovative solutions to engineering problems.

In his role as professor of product development, in the department of design sciences of the faculty of engineering at Lund University, in Sweden, he is heavily involved in all aspects of product development and is widely published in the areas of additive manufacturing and rapid product development. In his consulting practice he develops a wide range of products for companies around the world. Over the past three decades he has developed over 100 commercialized new products including innovative new theatre lighting products, security and marine products and several home health monitoring products and, for this work, has received numerous product development awards.

Over the last 20 years, Olaf has become a passionate follower of 3D printing (additive manufacturing). He believes it is one of the technologies that has been a real godsend to innovation as it allows designers and inventors to instantly test out ideas to see if they work. It also removes the traditional manufacturing constraints that have become a barrier to creativity, and allows us to get real products to market without the normally high costs that can become a barrier to innovation. In 2012, Olaf started manufacturing a range of 3D printed guitars and basses that has developed into a successful little side-business (and gives Olaf the therapy he needs in allowing him to make things that are a blend of high-technology and traditional hand-crafting).