

# Robotics and Automation & Biomaterials and Nanomaterials

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## Roger Bostelman

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**Measurement science and test methods towards robot standards**

The National Institute of Standards and Technology (NIST) has been researching various aspects of manufacturing robotics, in some cases stemming from military projects from the 1980's and beyond. Developments in robot cranes, healthcare robotics, and most recently performance measurements of mobile robots, mobile manipulators, and exoskeletons have occurred and will be the focus on this presentation. Highlights will include: the RoboCrane which was transferred to industry for Chernobyl and Fukushima nuclear disaster cleanup and for repainting aircraft; the Home Lift, Position, and Rehabilitation (HLPR) Chair; and novel measurement developments of six degree-of-freedom optical tracking systems, AGV's/mobile robots, mobile manipulators, and exoskeletons. Safety and performance measurement developments have led to new standards published or in process, including a new focus area currently underway towards standards for exoskeletons. Safety and performance of these wearable systems is critical and preliminary results of the new NIST internal review board study on exoskeletons will also be discussed.

### Speaker Biography

Roger Bostelman is an Engineering Project Manager in the Intelligent Systems Division at the National Institute of Standards and Technology. Over his 40 years at NIST, he has managed the Intelligent Control of Mobility Systems Program, and numerous NIST and other organization technology research and development projects. Roger has designed, built, and tested mechanical systems and their interface electronics on autonomous vehicles, robot cranes, and robot arms, including an automated HMMWV, HLPR (Home Lift, Position, and Rehabilitation) Chair, AGVs; Flying Carpet RoboCrane and several other RoboCranes. He is Chairman of the ASTM Committee F45 on autonomous industrial vehicle performance standards and two subcommittees, Chairs the ASTM F48.91 on exoskeleton terminology and serves on test method standards subcommittees, and serves as expert on the ANSI/ITSDF B56.5 sub-committee for AGV safety, RIA 15.08 mobile manipulators, and ISO TC 299 safety of personal care robots. He holds a B.S. degree in Electrical Engineering from the George Washington University, an M.S. degree in Technical Management from the University of Maryland University College, and a PhD in Computer Science from the University of Burgundy, France. He has over 100 publications in books, journals, and conference proceedings and he holds 7 patents.

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