

# Control Seminar



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## The Centrality of Control Theory in Robotics



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3:30 – 4:30 pm 1500 EECS

**ABSTRACT:** The notion of what constitutes a robot has evolved considerably over the past five decades, from simple manipulator arms to large networks of interconnected autonomous and semi-autonomous agents. A constant in this evolutionary development has been the central nature of control theory in robotics to enable a vast array of applications in manufacturing automation, field and service robotics, medical robotics and other areas. In this talk we will present an historical perspective of control in robotics together with specific results in passivity-based control and control of underactuated robots. Finally, we will speculate about the future role of control theory in robotics in the era of human-robot interaction, machine learning, and big data analytics.

**BIO:** Mark W. Spong received his doctorate degree in systems science and mathematics in 1981 from Washington University in St. Louis. He has held faculty positions at Lehigh University (1981-82), Cornell University (1982-1984), and at the University of Illinois at Urbana-Champaign (1984-2008).

He is currently Professor of Systems Engineering, Professor of Electrical and Computer Engineering and holds the Excellence in Education Chair at the University of Texas at Dallas. From 2008-2017 he was the Dean of the Erik Jonsson School of Engineering and Computer Science

at UT-Dallas. He is also Donald Biggar Willett Professor Emeritus from the University of Illinois at Urbana-Champaign.

Professor Spong is Past President of the IEEE Control Systems Society and past Editor-in-Chief of the *IEEE Transactions on Control System Technology*. He is a Life Fellow of the IEEE and a Fellow of IFAC.

His main research interests are in robotics, mechatronics, and nonlinear control theory. He has authored or coauthored more than 300 technical articles in control and robotics, five books and holds one patent. He has made fundamental contributions in robust and nonlinear control of robot manipulators, teleoperators, bipedal walking robots, and multi-robot systems.

Professor Spong's notable awards include the 2018 Bode Lecture Prize from the IEEE CSS, the 2016 Nyquist Lecture Prize from the ASME, the 2011 Pioneer in Robotics Award from the IEEE Robotics and Automation Society, the first IROS Fumio Harashima Award for Innovative Technologies in 2007, the IEEE Transactions on Control Systems Technology Outstanding Paper Award, the Senior Scientist Research Award from the Alexander von Humboldt Foundation, the Distinguished Member Award from the IEEE Control Systems Society, the John R. Ragazzini and O. Hugo Schuck Awards from the American Automatic Control Council, and the IEEE Third Millennium Medal.