ABSTRACT:
Interest in inherently infinite dimensional systems described by partial differential equations has rekindled most especially in flexible aerospace structures and the quantum control field. In this talk we consider how to make a linear infinite-dimensional system regulate its output to zero, or track a reference signal, in the presence of persistent disturbances. In our previous work, we have accomplished direct model reference adaptive control and disturbance rejection with very low order adaptive gain laws for MIMO finite dimensional systems, and systems with unknown delays.

This talk will focus on the effect of infinite dimensionality on the adaptive control approach. I will present new conditions required for asymptotic stability with adaptive control and for tracking reference signals. Then I would like to go on and consider some recent issues in the control of quantum information systems.

The topics here may sound highly technical, maybe even forbidding, and to some extent they are. But I hope to give you a version of them that will be reasonably accessible and will still remain as exciting and attractive to you as they are to me.

Information about the speaker:
Mark Balas is a distinguished faculty member in Aerospace Engineering at Embry-Riddle Aeronautical University. He was formerly the Guthrie Nicholson Professor of Electrical Engineering and former Head of the Electrical and Computer Engineering Department at the University of Wyoming. He has the following technical degrees: PhD in Mathematics, MS Electrical Engineering, MA Mathematics, and BS Electrical Engineering. He has held various positions in industry, academia, and government. Among his careers, he has been a university professor for over 30 years with RPI, MIT, University of Colorado-Boulder, and University of Wyoming, and has mentored 42 doctoral students. He has over 350 publications in archive journals, refereed conference proceedings and technical book chapters. He has been visiting faculty with the Institute for Quantum Information and the Control and Dynamics Division at the California Institute of Technology, the US Air Force Research Laboratory-Kirtland AFB, the NASA-Jet Propulsion Laboratory, the NASA Ames Research Center, and was the Associate Director of the University of Wyoming Wind Energy Research Center and adjunct faculty with the School of Energy Resources. He is a life fellow of the AIAA and a life fellow of the IEEE. But he is best known as the father of the Denver drum and bass DJ known as Despise, who is his daughter Maggie.