



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 35 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 American Institute of Aeronautics and Astronautics (AIAA), a life fellow of the Institute of Electrical and Electronic Engineers (IEEE), and a fellow of the American Society of Mechanical Engineers (ASME).

Mark Balas is a control systems expert in the theory and practice of adaptive control systems. He has made theoretical contributions in linear and nonlinear systems, especially in the control of distributed and large-scale systems. His results in low-order control of infinite-dimensional systems are the key to practical controller design and operation for many new engineering systems application, e.g., large aerospace structures and flexible mechanical systems, high precision optics, high performance aircraft, and possibly quantum information systems. His adaptive control research has led to the first mathematically rigorous proof of stable control of an infinite-dimensional system by a finite-dimensional controller. His current work in the theory of control of systems in Hilbert space is setting the stage for the first use of adaptive control on quantum gates in quantum information systems and quantum computing.

He was one of the founders of aerospace structure control. His research in reduced-order control and the alleviation of instability via residual mode filtering is well known throughout the field of active aerospace structures. Balas has developed controllers for many space systems, including Hubble Telescope, the Teledesic Communications Satellite Array, and the US Air Force Deployable Optical Telescope Demonstration project. His development of adaptive precision control algorithms has made it possible to alleviate a wide variety of ambient disturbances in a nanometer-precision Air Force structures experiment.

He has been one of the principal researchers in the area of variable -speed, horizontal-axis wind turbine control for electric power generation where he has produced advanced controllers for utility-scale wind turbines to enhance energy capture and reduce vibrations. This research, supported by the National Renewable Energy Laboratory/ National Wind Technology Center, incorporates aerodynamics, flexible structures, power electronics and controls to reduce the cost of wind energy.

He developed the area of evolving systems which is the autonomous assembly of flexible structures to reach a higher purpose or goal. This research focuses on future space missions to Mars and beyond where human intervention in the assembly and construction of scientific satellites and laboratories is vastly limited.

He has produced over 350 published papers in control theory and applications, and has two books in progress: 1) Control Theory for Finite and Infinite Dimensional Systems-A Unified Approach, and 2) Modern Control of Large Wind Turbines. His survey article: " Trends in Large Space Structure Control Theory: Fondest Hopes; Wildest Dreams," IEEE Trans. Automatic Control, AC-27, 522-535, 1982, is one of the most often cited papers in the field of Aerospace Structure Control.

He is an associate editor of the Journal of Optimization Theory and Applications, the Pan American Mathematical Journal, the Journal of Computational Analysis and Applications, the Journal of Intelligent Materials and Systems (JIMSS), and the where he handles nonlinear control, adaptive systems, partial differential equations and functional analysis, smart structures, and aerospace and renewable energy applications. And he is the editor of the Wiley book series on Dynamics and Control of Electromechanical Systems.

His conference activity and leadership spans IARIA, AIAA, IEEE, and the American Control Conference (ACC). As well as presenting papers, he has given the keynote talks “Evolving Systems: An Introduction” at International Conference on Autonomic and Autonomous Systems in Venice, Italy in 2011 and “The Role of Adaptive Control in Quantum Information Systems” at International Conference on Autonomic and Autonomous Systems in Chamonix, France in 2014, and will present the keynote: “Adaptive Model Tracking for Control of Linear Infinite-Dimensional Systems” at International Conference on Adaptive and Self-Adaptive Systems and Applications, March 2015 in Nice, France. He has also been the General Program Chair for the international AIAA Guidance Navigation and Control Conference.

He has been a volunteer firefighter in both urban and wildlands events, a counselor for victims of sexual assault and domestic violence, and he is the father of the well-known Denver drum and bass DJ known as Despise, who is his daughter Maggie.