Systems Engineering at CSU

The Department of Systems Engineering is a graduate-only program focused on equipping students, both in Colorado and nationwide, with cutting-edge research and design skills. With over $2 million in active aerospace-related research, we are deeply engaged with the aerospace industry.

Engineering Better Robotic Space Systems

Steve Simske

Professor of Systems Engineering

In his 20+ years in industry, Steve directed teams in research on 3D printing, education, life sciences, sensing, authentication, packaging, analytics, imaging and manufacturing. He is the author of more than 450+ publications and has 200+ patents. He teaches ENGR 533: Spaceflight and Biological Systems.

Michael A. Cabrera

Ph.D. Candidate in Systems Engineering and Project Manager with Jacobs

Cabrera's research focuses on systems engineering challenges associated with the next generation space suit and the development of tools to support the optimization of requirements engineering.

Research Highlights

Cabrera studies and designs scoring tools based largely around established INCOSE practices. These tools are designed to facilitate requirement assessment, ensuring that critical system drivers are strengthened to guarantee an optimal final product. After vetted testing with NASA engineers and university students, the tools have shown favorable results in user satisfaction and reducing the risks associated with underdeveloped requirements.

Space Mission Engineering

Jim Adams

Assistant Professor of Systems Engineering (retired 2023)

Adams has 20+ years of systems engineering experience in Department of Defense, satellite and aircraft systems, and diameter and thickness gauging systems. While employed at Lockheed Martin, he worked on the Overhead Persistent Infrared (OPIR) ground segments including Space Based Infra-Red Satellite (SBIRS) and Next Generation OPIR. He supported Lockheed programs for the Space Defense Agency and NOAA.

Laura Duffy

Ph.D. alumna in Systems Engineering and Space Systems Engineer at Canyon Consulting

Duffy is a systems engineer working on the Global Positioning System (GPS), space battle management systems, Navigation Technology Satellite – 3 (NTS-3), and cislunar systems.

Research Highlights

Cislunar Space Systems Architecture Evaluation and Optimization includes a needs analysis of current technologies and planned programs in cislunar space, a SysML model of a cislunar systems architecture, application of evaluation techniques to the architecture resulting from the model, and application of optimization techniques to the architectures resulting from the model. The goal of the research is to find an optimal cislunar space systems architecture.

"We tell professionals and students to come back and earn your graduate degree, your field has advanced and so have you. We will help you build your applied systems engineering research skills to serve your career and future innovations."

Tom Bradley
Woodward Professor of Systems Engineering & Department Head

Detecting Wildfires Using UAVs

Kamran Eftekhari Shahroudi

Professor of Systems Engineering and Technical Fellow at Woodward Inc.

Shahroudi has 25 years of industrial experience delivering practical actuator systems solutions for the turbine, engine and aircraft industries. He is also a founding member of the Systems Engineering program at CSU, where he teaches rigorous systems thinking and researches its application to solving complex real-world or systemic problems.

Set Crawford

Ph.D. alumnus in Systems Engineering and Senior Manager at Lockheed Martin Corporation

Crawford has over 20 years of experience in design, development and fabrication of spacecraft propulsion systems and various flight systems developments for military an experimental aircraft. His research involved the development of methodologies used for design space exploration and sizing of hybrid propulsion UAV systems used for wildfire detection and communications.

Research Highlights

Crawford's dissertation research addressed the design characteristics of an affordable aerospace platform for wildfire detection and communication, including UAV propulsion electrification and airframe integration strategies, and the critical mission segments that drive the overall system design options for terrestrial platforms.

Electrifying Thrust Reverse Actuation Systems

James Cale

Associate Professor of Systems Engineering, with joint appointment in Electrical and Computer Engineering

Cale's research in aerospace applications is focused on power-electronic drives, electric machinery, magnetics and controls for onboard power and actuation systems.

Cláudio Lima

Ph.D. student in Electrical Engineering

Lima's research models the design and stability of nonlinear control approaches for thrust reverse actuation systems in hybrid-electric aircraft.

Research Highlights

The aerospace industry is increasingly transitioning from fully mechanical to "more electric" drive systems for reduced weight and maintenance. Our research develops power-electronic hardware and advanced control approaches to enable the electrification of thrust reverse actuation systems. We are also validating our research using a newly developed aerospace actuation testbed at the CSU Powerhouse Energy Campus.

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