



In celebration of the  
**50<sup>th</sup> Anniversary of the Canaveral Council of Technical Societies (CCTS),**  
CCTS, and co-hosts, the Cape Canaveral Sections of the **American Institute of Aeronautics and Astronautics (AIAA)** and the **American Society of Civil Engineers (ASCE)** proudly present the

## 2011 Engineers Week Awards Banquet Thursday, 24 February

*Presenting*

**Matt Melis, Aerospace Engineer, NASA Glenn Research Center and  
Mike Gordon, Space Shuttle Orbiter Leading Edge Structural Subsystem Manager  
2001-2010**

### Lessons from Columbia

Date: **Thursday, 24 February 2011**

Time: 6:00 – 6:45 Social (**Cash Bar**) --*Exhibits by student branches of co-host societies*

6:45 – 7:10 Dinner (Boneless chicken with Borsini Cream Sauce or Seared Pork Medallion,  
vegetarian alternative also available.)

7:10 – 7:30 Presentation of Awards

7:30 – 9:00 Guest Speakers

Location: **Radisson Resort at the Port, Convention Center Salon 3**

8701 Astronaut Boulevard, Cape Canaveral

Cost: \$300 Corporate Table of Eight

\$38 Members of CCTS-affiliated societies

\$42 Nonmembers

\$28 Student Members of co-host societies



**RSVP by  
Feb. 18**

**Register via PayPal though [cctsonline.org](http://cctsonline.org) (preferred)**

Or Send an e-mail with your name, affiliation and meal choice to [dfleming@fit.edu](mailto:dfleming@fit.edu), and mail a  
check payable to CCTS to David Fleming, Florida Tech MAE, 150 W. University Blvd.,  
Melbourne, FL 32901.

More info? Contact David Fleming at [dfleming@fit.edu](mailto:dfleming@fit.edu) or  
321 674-7241

# Lessons from Columbia

**Matt Melis**

Aerospace Engineer, NASA Glenn Research Center, Cleveland, Ohio  
and

**Mike Gordon**

Space Shuttle Orbiter Leading Edge Structural Subsystem Manager 2001-2010

On February 1, 2003, the Space Shuttle Columbia broke apart during reentry, resulting in loss of the vehicle and its seven crewmembers. For the next several months, an extensive investigation of the accident ensued involving a nationwide team of experts from NASA, industry, and academia, spanning dozens of technical disciplines. The Columbia Accident Investigation Board (CAIB), a group of experts assembled to conduct an investigation independent of NASA, concluded in August, 2003 that the most likely cause of the loss of Columbia and its crew was a breach in the left wing leading edge Reinforced Carbon-Carbon (RCC) thermal protection system initiated by the impact of thermal insulating foam that had separated from the orbiters external fuel tank 81 seconds into the mission's launch. During reentry, this breach allowed superheated air to penetrate behind the leading edge and erode the aluminum structure of left wing, which ultimately led to the breakup of the orbiter. The findings of the CAIB were supported by ballistic impact tests, which simulated the physics of External Tank Foam impact on the RCC wing leading edge material. These tests ranged from fundamental material characterization tests to full-scale Orbiter Wing Leading Edge tests.



Following the accident investigation, NASA spent the next 18 months focused on returning the Shuttle safely to flight. In order to fully evaluate all potential impact threats from the many debris sources on the Space Shuttle during ascent, NASA instituted a significant impact testing program. The results from these tests led to the validation of high-fidelity computer models, capable of predicting actual or potential Shuttle impact events, which were used in the certification of STS-114, NASA's Return to Flight Mission, as safe to fly.

Matt Melis and Mike Gordon provide a look into the inner workings of the Space Shuttle and a behind the scenes perspective on the impact analysis and testing done for the Columbia Accident Investigation and NASA's Return to Flight programs. The presentation is full of rich, still and motion picture imagery.

**Matt Melis** received both a BS in Civil Engineering and an MS in Engineering Mechanics from Michigan State University and has worked at the NASA Glenn Research Center for twenty six years. His primary area of focus is in advanced finite element modeling and analysis methods including nonlinear and dynamic impact loading. Trained in engineering mechanics, he has been recognized for expertise in actively cooled structures, stress analysis, and ballistic impact research.

**Mike Gordon** received a BS in Mechanical Engineering and a MS in Aerospace Engineering with a Materials Certificate from the Florida Institute of Technology. He was manager of the Space Shuttle Orbiter Leading Edge Structural Subsystem from 2001-2010.