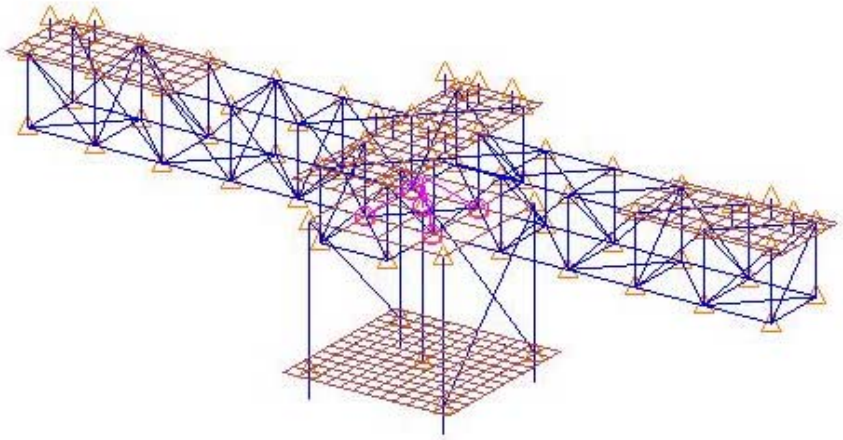
Deborah J. Howell

Research Interests: My work focuses on the differences between model and experiment of complex opto-mechanical systems. In the early design stages of these systems, the model fidelity is important for design space exploration. Its also important that these models be physical, not just tuned to one specific configuration. I'm also interested in finding out how to get the most useful information out of scaled models or testbeds during the design process.
Lab affiliation at MIT: Space Systems Lab
Class Project: This project is the simulation of a testbed that structurally represents a spacecraft interferometer. Below is a visualization of the finite element model.



The three main disciplines in this project are structures, optics and controls. There are two beams of laser light that travel along the main truss of the testbed. The two objectives are to maximize the optical pathlength and to minimize the pointing error on the collecting surface (in this case a CCD camera), while keeping the optical pathlength difference to within a fraction of a wavelength. The pointing error is defined as the distance between the centroid of these two beams on the CCD camera. The design vector includes the placement of the outermost mirrors (called siderostat mirrors) on the truss, and the value of PID control gains (three separate gains). The control is accomplished through the steering of the laser light onto the camera via fast steering mirrors, which are downstream of the siderostat mirrors.

Short Bio:

09/01 – present	Masters student at MIT (Cambridge, MA)
Summer 2002	Internship at Jet Propulsion Laboratory
09/97-06/01	Undergraduate at RPI (Troy, NY)
Summer 1999	Internship at NASA Glenn Research Center
01/00-07/00	Co-op at Sikorsky Aircraft (Stratford, CT)