From 2001- 2007, I **served NASA as a Field Test Teacher** for their **Engineering Design Challenge Program (EDC)**. My work in this capacity allowed me to engage students in the practice of science and **integrate fundamental STEM content** through several high-interest, hands-on aerospace challenges. (See http://edc.nasa.gov/tpc/index.html). The challenges included:

- **thermal protection systems** used on reusable launch vehicles to protect spacecraft upon re-entry into Earth's atmosphere (This challenge followed **NSTA safety standards** including eye protection and proper use of an open flame in the classroom.)
- **propeller design challenge** using a design process to **apply aeronautical engineering principles** and then **create a small propeller model** that generates maximum possible thrust

As a result of my involvement with the EDC program, approximately **600 students have been engaged in scientific inquiry, creative thinking, and investigating** their own solutions to aerospace related concepts.

In Spring 2003, I **single-handedly raised over three thousand dollars** and arranged for a week-long visit of the **Mobile Aerospace Education Laboratory (MAEL)** to the Williamsville Central School District. This was the first time the MAEL was ever in western New York. The MAEL was a **mobile, state-of-the-art, electronically enhanced computerized classroom** operated by NASA Glenn Research Center. Approximately **1000 students from our district and community** were engaged in "hands on/ minds on" **aerospace education learning experiences that integrated STEM core content knowledge**. For example:

- Using **computer-assisted design (CAD) software**, students worked at stations, together with their classmates, to develop an aircraft design and then tested the design using a **virtual reality flight simulation cockpit.**

Curricular activities on the MAEL were **aligned with the National Science Education Standards** and allowed students to **explore applications to careers in aerospace, technology, and engineering**.

In Autumn 2005, I was the **first teacher in the nation to field-test SpaceClass**, a web-based education program aimed at inspiring the next generation of space scientists. Since this initial field test, I have **presented at state and two NSTA national conferences** for over **100 teachers on SpaceClass**. Teachers have since reported using SpaceClass to provide **interdisciplinary learning opportunities for their students**. For example, in *Mission to Mars* students calculate the distance from Earth to Mars and the time it will take to travel from Earth to the Red Planet. Through engagement in SpaceClass' virtual labs, **students learn about new and current research** being conducted for upcoming missions including liquefying oxygen generated from **water electrolysis on the lunar surface**. These **interactive virtual labs emphasizing space exploration** have proven to enhance aerospace education experiences while providing a **relevant context for students to learn science.**

In Winter 2007, after months of **collaboration with my Congressional representative and NASA headquarters**, I arranged for **STS-118 astronaut** and teacher **Barbara R. Morgan** to visit the western New York community. During this two day, unparalleled visit, I coordinated six events where a total of over **2500 students, adults, and members of our community**

viewed Barbara's stunning video clips and photographs as she enthralled her audiences with tales of life in microgravity. Barbara described to students the docking of the space shuttle and ISS as "a delicately choreographed ballet, with each component traveling at 17,500 miles per hour!"

In Spring 2009, I **established and continue to coordinate a Young Astronaut Council (YAC)** for grades 5-8 students at my school. Students in the YAC have **experienced realistic space exploration** as they become immersed in the cockpit of the space shuttle orbiter and use **technology to simulate a rendezvous and docking** with the ISS. These technologies are available to students because over the past three years I have **collaborated with educational specialists at Glenn Research Center to beta-test** NASA's Space Simulation and Lunar Simulation programs. In an effort to have **students connect with the broader aerospace community**, aerospace specialists from the western New York area have come into my classroom to serve as guest speakers. I have also arranged for **YAC students to participate in numerous distance learning experiences** with astronauts, aerospace engineers, and educational specialists from various NASA centers. Within the last two years, I have **worked to provide students with a multicultural viewpoint that transcends national boundaries** including an international partnership with the Japan Aerospace Exploration Agency (JAXA). I have **collaborated with the Space Education Director at JAXA to establish an international partnership** among teachers and students. This collaboration has been successful because three professors from **Hokkaido University of Education in Asahikawa, Japan** have come into my classroom on several occasions to talk with students about science and aerospace during visits to the United States.