



**Davidson Fellow  
Erika DeBenedictis**

(\$25,000 Scholarship Recipient)



**Personal Info**

Age: 17  
Albuquerque, New Mexico

**School, College and Career Plans**

This fall, Erika will be a senior at Albuquerque Academy. She hopes to attend the California Institute of Technology or the Massachusetts Institute of Technology and have a dual major in physics and computer science, possibly pursuing a career in aerospace engineering.

**Davidson Fellows Submission (Science)**

In her project, "Space Mission Design," Erika researched methods of identifying low-energy paths for spacecraft. By carefully planning the route a spacecraft will take, it is possible to reduce the amount of fuel needed by utilizing the natural gravity and motion of planets in the solar system. Erika developed an itinerary-based algorithm to reach specified destinations, which streamlines the process of finding low-energy paths. Such orbits are particularly useful for heavy spacecraft, in which self-propulsion is especially difficult. Use of low-energy paths would allow these spacecraft to reach previously impractical destinations.

**Biography**

Erika attended Catholic elementary, middle and high schools in Albuquerque. In this setting, she was able to take advantage of challenging curriculum that was above her grade level. Erika has been interested in science research since middle school.

As celestial mechanics is a specialized area, it is rarely taught in high school. Erika did not have access to the few researchers in the field, so instead, she found mentors in different areas, specifically calculus and physics. Although this initially made it difficult to get her Davidson Fellows project started, she gained a deeper understanding of each area and their complex cross-disciplinary nature.

Outside of school, she has been an active science fair participant since middle school and has benefited from the many judges and mentors who have encouraged her interests in science and math.

Erika's hobbies include cooking, reading, running, backyard astronomy, and psychology. She also sings in choir and studies piano.

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**Erika DeBenedictis**  
(Cont.)

**Honors/Awards**

- 2009 Davidson Fellow
- 2009 Intel International Science and Engineering Fair; Team Projects First Place and Best of Category
- 2009 New Mexico Supercomputing Challenge; First Place
- 2009 Cray High Performance Computing Award
- 2009 Best Computational Science Award from Sandia National Laboratories
- 2009 The Yale Science and Engineering Award
- 2008 National Siemens Competition, Third Place Team
- 2008 Intel International Science and Engineering Fair; Computer Science Third Place
- 2008 IEEE Computer Society First Place Award
- 2008 United States Air Force Computer Science First Place Award
- 2008 New Mexico Supercomputing Challenge; First Place
- 2008 Named a Duquesa de Albuquerque
- 2007 Intel International Science and Engineering Fair; Computer Science Second Place
- 2007 United States Army Computer Science First Place Award
- 2007 New Mexico Supercomputing Challenge; First Place
- 2007 Intel Excellence in Computer Science Award

**Community Activities**

Erika volunteers for the Supercomputing Challenge, where she teaches middle school students computer modeling, and supports their teachers as they develop computer science programs at their schools. She also represents the contest to her state legislators and assists with various outreach events.

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