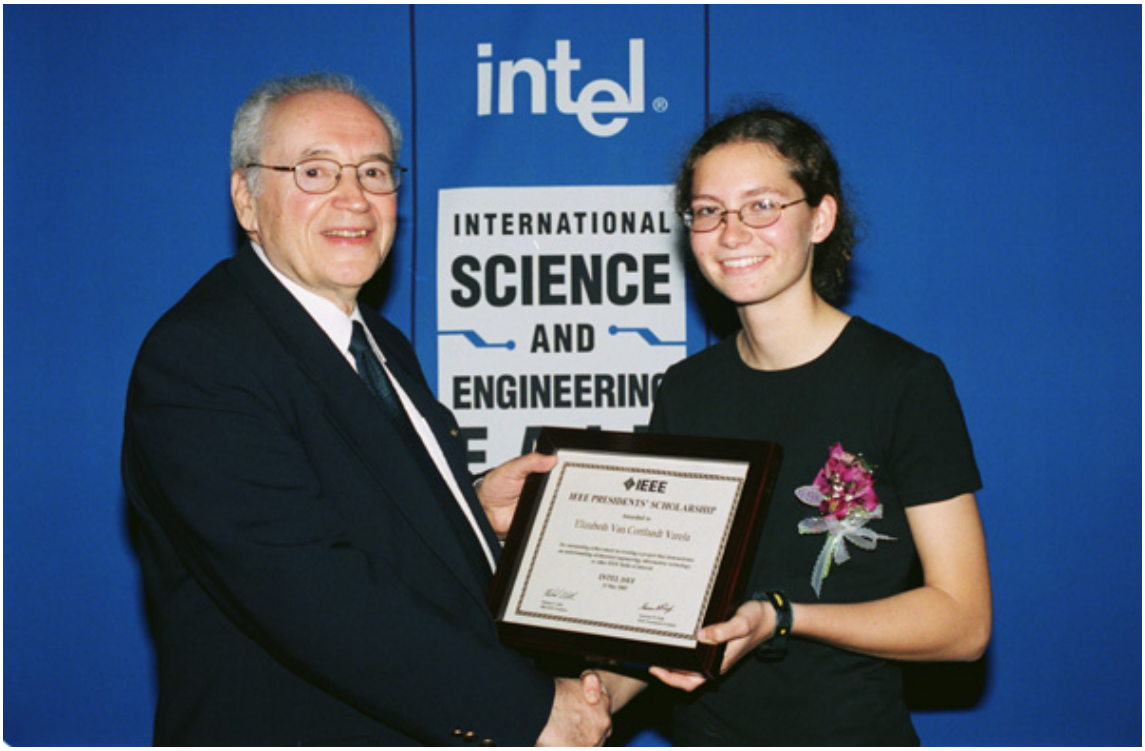
Teen Wins IEEE Presidents' Scholarship with Power Engineering Project
By Lynn Murison



Generating energy by pulsing mercury through a copper coil won 16-year old senior Elizabeth Van Cortlandt Varela from Alexandria, VA, USA the US$10,000 IEEE Presidents' Scholarship. The award was presented by IEEE President-elect Arthur Winston on 15 May at the Special Awards Ceremony at the 2003 Intel International Science and Engineering Fair (ISEF) in Cleveland, Ohio.

The annual scholarship sponsored by the IEEE Foundation is the largest award presented by an organization at the Intel ISEF Special Awards Ceremony. As is customary each year, the host section also presents awards. The IEEE Cleveland Section presented two awards, for US$750 and US$250. Ray Heintel, Lead Judge for the Scholarship, fielded a panel of seven. In one long day, they sorted through the initial 1100 projects from over 35 nations, before choosing a project for outstanding achievement in creating a project that demonstrates an understanding of electrical engineering, information technology, or other IEEE fields of interest.

Heintel called Varela's project, "one that has the ability to improve the generation of energy in a little studied area and which could benefit power engineering."

Varela's "A Magneto Hydrodynamic Direct Current Transformer" is a machine that can generate energy when a DC to AC alternator is not wanted and when DC sources (i.e.: battery, fuel cell) are necessary. Magneto Hydrodynamic (MHD) can be very useful where there are high mechanical costs, such as with turbines in electrical generators. Because it uses liquid metal alloys that are highly conductive, MHD could lead to improved conservation of natural resources, reduced thermal pollution, and lower fuel costs.

What was impressive, IEEE President-elect Winston said about Varela's project, was that she practiced engineering and actually built the equipment using a MHD transformer.

Varela's transformer involved use of an innovative accumulator to cut the circuit through the mercury coil and allow the use of coils and electrodes in series. She went through three distinct design phases, eventually using an auto fuel injector pump. Her transformer is made up of two coils, one of copper wire windings, and the other of mercury-filled tubing, both wrapped about the same iron core.

In the true spirit of investigation, Varela was working on a totally different project, 2 1/2 years ago, when she noticed anomalies appearing in part of her research. I found that these strange things I was seeing were due to MHD, about which I could find very little. I turned to the Internet for my research, she said. Little by little she found MHD so fascinating that she started to build her transformer in order to learn more about MHD. Although she found two researchers, one in Israel and the other in Latvia, to correspond with, she had no direct mentor for her project.

This fall Varela will be a freshman majoring in physics at Duke University in Durham, NC, USA. One of the reasons she chose Duke was that freshman can begin conducting their own research immediately, so she can keep working to improve the efficiencies on her MHD direct current transformer. She also won the United Technologies Corporation top award: 30 shares of UTC stock; Schlumberger Excellence in Educational Development award, for $1,000.00; a trip to meet top Schlumberger scientists, and an internship; NASA top award, an all expense-paid trip to U.S. Space Camp in Huntsville, Alabama; INTEL Engineering Category awards: 4th place Grand Award, for $500.