Viviana Risca

Intel Science Talent Search Winner 2000

The message spelled out “June 6 Invasion: Normandy,” but this wasn’t the plot of a World War II movie. It was the message encoded in a strand of DNA for the top winning research project at the 2000 Intel Science Talent Search (STS) where Viviana Risca presented her novel approach to steganography. Steganography is a data encryption technique that embeds coded messages in a large amount of other irrelevant information. Her research combined the disciplines of cryptography, steganography, and molecular computing. Risca encrypted the D-Day message, inserted it in the gene sequence of a DNA strand, and flanked it by two 'primer' DNA sequences. Then she combined the molecule with many other similar molecules. The hidden message could be retrieved only by someone knowing the two secret primer sequences − the keys to the code.

Risca emigrated from Romania to New York in 1992 and attended Paul D. Schreiber Senior High School, a “regular suburban public high school with a really great research program.” The school selects ten students each year to enter a three-year science research program that culminates in a project entry for the Science Talent Search. Risca’s project inspiration came from her mentor, biophysics and physiology professor Carter Bancroft, of the Mount Sinai School of Medicine.

“Winning the Intel STS had a huge impact on me. First of all, I had worried about how I would pay for my education since the sixth grade, and winning the scholarship was a tremendous relief for me and for my parents. The other aspect of winning, at least for me, has been the responsibility of living up to the title and of making some kind of contribution to science. In college, that has meant getting over my fears of inadequacy and pushing myself to explore the limits of my abilities.”

Following her success at the Intel STS, and still only 17 years old, Risca shared the podium at a DNA seminar with Princeton University assistant professor Laura Landweber and genetics pioneer and Nobel Laureate James Watson. She went on to co-author a paper with Catherine Taylor Clelland in the scientific journal *Nature*. Now she is studying physics at Stanford University.

“I spent my first two years at Stanford preparing for a biology major, but at the end of sophomore year decided to declare physics instead. ... My current research, on the other hand, is still in biology.” Last summer Risca worked in the Microbiology and Immunology Department, and has continued that lab work with the hope of having some publishable results by the end of the academic year.

“My schedule does not allow much time for extracurricular pursuits, but last spring I managed to volunteer for a tutoring group called SAT Success, and had a great time. ... I like to spend whatever free time I have going to art events.” Risca’s interest in the arts includes painting, pottery and writing poetry. As for her own future, Risca adds, “All I have ever hoped for is to spend the rest of my life learning and teaching, as a university professor. Anything else would be icing on the cake.”