tions—such as why Melanesia is so incredibly diverse. "We are talking about very complex relationships ... that reflect the influence of different migrations" at different times, Friedlaender says. And the right genes can continue to tease apart that history, he says.

–BERNICE WUETHRICH

Bernice Wuethrich writes from Washington, D.C.

SCIENCE EDUCATION

Science Fairs Pump Up The Rewards of Talent

If you can't run the nation's most prestigious high school science fair, start your own—and make it even more lucrative for the winners. That's the genesis of the Siemens Westinghouse Science & Technology Competition, which announced its first winners this week in Washington, D.C. In doing so, Siemens prompted Intel, which last year beat out Siemens for sponsorship of the venerable Science Service Talent Search, to raise its prize money as well.

Lisa Harris of Dalton High School in New York City won this year's top Siemens prize for individuals—a $100,000 college scholarship—for developing a new method to detect carriers of a gene responsible for cystic fibrosis. Daniar Hussain of Richland High School in Johnstown, Pennsylvania, and Steven Malliaris of New Trier High School in Winnetka, Illinois, won the team competition and will divide a $90,000 scholarship for their method of generating computer programs to store data more efficiently. A total of 12 individuals and teams chosen from six regional competitions competed for the top prizes; combined with awards to students who score well on advanced placement tests and their teachers, the total Siemens pot comes to nearly $1 million.

Young stars. High school seniors Daniar Hussain, Steven Malliaris, and Lisa Harris win the first annual Siemens Westinghouse Science & Technology Competition.

Last year was tumultuous for the world of U.S. high school science competitions. Westinghouse ended 57 years of support for the annual Science Service Talent Search, which has been a scientific launching pad for five Nobel Prize winners and 30 members of the National Academy of Sciences. In a competition for a new sponsor, Siemens—which bought Westinghouse after it dropped its support—was one of 75 companies vying for the honor. After Intel won, Siemens decided to start its own contest.

"It was enlightened self-interest," says Albert Hoser, head of the Siemens Foundation, a corporate charity created in 1998. "We need employees at the cutting edge of science and math. We want to inspire students to give those subjects top priority." Not to be outdone, Intel has doubled the prize money awarded to Science Service Talent Search winners, including $100,000 to be awarded in March for first place among 40 finalists, and is offering a total pool that exceeds $1.2 million. "We like to think we're serving as a catalyst for other corporations to raise the bar," says Siemens spokesperson Esra Ozer.

Indeed, one Nobelist urges other industrial giants to follow the lead of the German telecommunications company and the U.S. chipmaker. "The more the merrier," says physicist Leon Lederman, who attended the Siemens awards ceremony. "What's wrong with General Motors? Why don't they have a prize, or Ford, or any other corporation?"

Harris started working at the Public Health Research Institute in New York City at 16 and already is a co-author of a paper classifying the virulence of different strains of tuberculosis. For the competition, she used a fluorescent marker to tag blood samples that harbor a mutation in the cystic fibrosis gene, producing a test that is simpler and faster than current techniques. "I hit a wall over the summer," she says about a project that took 11 months. "The most exciting thing for me was to make it work." She finished the latest experiments just in time to write them up for her poster session at the awards ceremony.

Hussain and Malliaris took a computer science class together in Illinois before Hussain's family moved to Pennsylvania earlier this year. "We knew the distance wouldn't be a problem," says Malliaris, who collaborated with Hussain via the Internet. The students used evolutionary principles to improve polynomials that direct the storage of items from large data sets. They introduced random mutations in a population of techniques and then repeatedly eliminated the ones that were unfit and selected ones that distributed data most efficiently.

The Siemens competition focuses on the quality of the student research projects, whereas the Intel talent search also judges contestants on creativity and their knowledge of science. In addition to these competitions, the National Science Teachers Association (NSTA) hosts three national contests that focus on a student's imagination—some are entirely conceptual—and don't require them to work in a lab outside school. "The Intel competition is for students already definitely going into science, who are already interested in science," says NSTA spokesperson Cindy Workosky. "We're trying to turn them on to science."

For Lederman, every science competition "is another opportunity for the kids in America to excel."

–LAURA HELMUTH

TECHNOLOGY

Nanotubes Generate Full-Color Displays

TOKYO—Liquid crystal displays (LCDs) are fast becoming ubiquitous—just glance at your wristwatch, laptop, or calculator. But they still can't compete with bulky cathode ray tubes (CRTs) for displaying high-quality images. Now, a team of Korean researchers at Samsung has produced a working display that promises to combine the quality of CRT images with the convenience of a flat panel by using carbon nanotubes as its source of electrons. Their work, published in the 15 November issue of *Applied Physics Letters*, gives Samsung a small lead in a heated race to commercialize the technology.

The CRT is a dinosaur in the fast-changing world of electronics, surviving because of its brightness, resolution, and ability to show moving images. But it may be driven to extinction by a technology called field emission, which like the CRT uses electrons to light up colored phosphors on a glass screen (*Science*, 31 July 1998, p. 632). Instead of a single electron gun at the far end of a bulky and heavy cone-shaped tube, however, field-emission displays use thousands of tiny pointed electron emitters arrayed within a flat panel. An electric field pulls a stream of electrons from each point. Field-emission displays can be built as thin as LCDs, yet consume less power and promise to produce images comparable to a CRT. The problem to date has been finding materials that are easily fabricated into pointed shapes yet can hold up to the intense stream of electrons.

Carbon nanotubes, which conduct electrons freely, could fit the bill—if researchers can find a way to control their fabrication and place them in a precise pattern. The Samsung group has done just that. The result, reported by Won Bong Choi and col-

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