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## Science fair winners investigate variety of topics:[6,1,2,7 Edition]

Bruce Lieberman. **The San Diego Union - Tribune**. San Diego, Calif.: Mar 27, 2004. pg. B.3

**Full Text** (819 words)

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Astronomers have long complained that outdoor lights obscure the night sky, limiting Hresearch, but police and other public safety workers say they need them bright enough to illuminate colors.

Jessica Rucker, a junior at Torrey Pines High School in Encinitas, thinks she may have one answer.

In a project for the 50th annual Greater San Diego Science and Engineering Fair, Rucker, 16, took low-pressure sodium lamps -- the kind astronomers want cities to use -- and augmented them with tungsten lamps to see which power combination might illuminate colors but keep lighting low as possible.

The result? Low-pressure sodium lights augmented by about 25 percent tungsten lights rendered colors nearly normal.

"Anything with a broader spectrum, with more light colors represented, is a problem for astronomers," Jessica, a poised and articulate teenager, said yesterday.

Rucker's project, one of four top winners in the fair's senior division, highlighted the impressive talent displayed at the Balboa Park Activity Center. Nearly 730 students from San Diego and Imperial counties entered projects in this year's fair. The projects remain on display this weekend.

Other top senior division winners include:

- o Edith Pierre-Jerome, a senior at Mount Miguel High School in the Grossmont Union High School District, who studied the genes responsible for how cells differentiate in the roots of a common mustard plant. Understanding how plants develop genetically is important for developing bioengineered crops.
- o Ryan Short, a sophomore at Torrey Pines High School, who studied the genes of a bacterium called *Pyrodictium abyssi* that lives near deep-sea thermal vents. The tiny creatures produce proteins whose tubular structure may someday help build more powerful optic cables to transmit information.
- o Tarang Luthra, a junior at Torrey Pines High School, who proposed a new way to fine-tune receiver antennas used by people who rely on wireless communications for their home computers.

Some of the top winners worked alongside professional mentors from local labs and companies.

Pierre-Jerome worked at the Salk Institute in La Jolla with a researcher to study how a specific growth hormone promotes one type of cell in the roots of *Arabidopsis thaliana*, a common mustard plant studied extensively in plant biology.

"Figuring it out really helps us understand how the cells decide what they're going to be," said Pierre-Jerome, an aspiring pediatrician who expects next week to hear whether she has been accepted to Stanford University and UC Berkeley.

Short, who came up with his idea as an intern at Diversa Corp., where his father works, studied how to grow the bacterial proteins in the lab.

"You can re-create these (proteins) in the lab, instead of going back to the bottom of the ocean to find them," he

said.

Tarang, 16, carried himself yesterday with the poise of a high- tech entrepreneur.

"Wireless networking is showing up everywhere right now, in libraries, in cafes. I even heard about one in a McDonald's," he said as he stood in front of a large display showing his experiment.

Tarang, who wants to study computer science and engineering in college, described how he devised a way to make multiple wireless antennas installed in the home automatically configure themselves to reduce interference and noise. The antenna system can automatically tune itself to a given home environment, he said.

Where did he get his idea? He was at home, working on his computer when he lost the wireless signal coming into his home.

"It's so frustrating adjusting the antenna, so I just decided to see what I could do and run with it," he said.

Major sponsors of the Greater San Diego Science and Engineering Fair include The San Diego Union-Tribune, Qualcomm, Intel, The San Diego County Water Authority, BioMedIRB, The Reuben H. Fleet Science Center, Sony, Balboa Park, Pfizer, the Kiwanis Club of California, General Atomics Fusion Group, the Taiwanese American Foundation of San Diego, the Friedman Family Foundation, the San Diego Science Educators Association, PRICE Self Storage and Subway.

Science fair at a glance

WHEN: Today: 10 a.m. to 5 p.m.; tomorrow: 10 a.m. to 3 p.m.

WHERE: Balboa Park Activity Center, 2145 Park Blvd. (corner of Park Blvd. and Inspiration Park Way)

WHO: Nearly 730 students from San Diego and Imperial counties exhibit their projects in subjects that include genetics, physics and engineering.

FAMILY DAY: Today. Open exhibit hall, entertainment from the San Diego Zoo, Biomed science shows, a scavenger hunt and raffle prizes.

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### **[Illustration]**

4 PICS | 1 CHART; Caption: 1. Jessica Rucker of Torrey Pines High School is one of four senior sweepstakes winners at the Greater San Diego Science and Engineering Fair. The other three senior sweepstakes winners are pictured below. (Eds.1,6,7) 2. Tarang Luthra, Torrey Pines High (Eds.1,6,7) 3. Edith Pierre-Jerome, Mount Miguel High 4. Ryan Short, Torrey Pines High (Eds.1,6,7) 5. Science fair at a glance; Credit: 1,2,3,4. John Gastaldo, Union-Tribune photos

Credit: STAFF WRITER

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People: Rucker, Jessica, Pierre-Jerome, Edith, Luthra, Tarang

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