

Maryam, Sravya, Pinaki and Shireen among Discovery Challenge finalists

Four students of Indian origin are among the 40 finalists in the 2004

Discovery Channel Young Scientist Challenge, the nation's premier science competition for students in grades 5 to 8. They include Maryam Khadijah Mohammed who entered her project for the competition as an eighth grader at C W Ruckel Middle School in Niceville, Florida; and Sravya Ramadugu Keremane, who was an eighth grader at Howard Bishop Middle School in Gainesville, Florida, last academic year. Both of them are in the high school now.

The other finalists are Shireen Dhir, now an eighth grader at Feagin Mill Middle School at Warner Robins, Georgia; and **Pinaki Bose**, also an 8th grader now at Dunbar Middle School in Fort Worth, Texas. They entered the contest as seventh graders. The four are the only students of South Asian origin to make the finalists' grade.

The 40 finalists, chosen from 400 semi-finalists, will undertake an all-expense-paid trip to Washington, DC, later this month to compete for scholarships and special prizes worth more than \$100,000. The first prize is a \$15,000 scholarship and the title 'America's Top Young Scientist of the Year.'

Maryam, now a 9th grader at Niceville High School, Niceville, was a nominee of the State Science and Engineering Fair of Florida. Her project was titled 'Keeping Antibiotics Working: Modulatory Effects of OTCMs, Dietary Supplements and Fresh Fruits on the Sensitivity of S. Aureus to Antibiotics.'

She learned about the growing challenge of antibiotic resistance. She wanted to know if everyday supplements and foods affected the bacteria's susceptibility to antibiotics.

She tested 30 over-the-counter medicines, dietary supplements, and fresh fruits. For the tests, she

soaked antibiotic-impregnated discs in solutions of various test substances. She incubated colonies of bacteria in the presence of these discs, then measured the increase or decrease in the antibiotics' effectiveness when used alone. She also tested 150 combinations of her test substances. She found that fresh fruit increased antibiotic sensitivity, while combinations of herbal supplements decreased antibiotic effectiveness



■ Pinaki Bose and Shireen Dhir



■ Sravya Keremane and Maryam Mohammed

At her middle school, she was on the Tech-Bowl and Academic Team and plays tennis. Maryam, daughter of Dr Maqsood Ahmed Mohammed and Dr Anwar Sultana Mohammed, sees her father, an electromagnetics expert, as her science hero and mentor. She wants to become a biomedical researcher.

This is the second year in a row that Sravya, a freshman in the International Baccalaureate Program at the Eastside High School, Gainesville, has been selected as a finalist. Her project is titled, 'Keeping Antibiotics Working: Modulatory Effects of OTCMs, Dietary Supplements and Fresh

Fruits on the Sensitivity of S Aureus to Antibiotics.' She is the daughter of Dr Manjunath Keremane and Dr Chandrika Ramadugu. Sravya is a nominee of the State Science and Engineering Fair of Florida.

After her family's orange tree died during a freeze, Sravya wondered if plants could be made resistant to cold. Her father, a plant virologist, and another scientist encouraged her to explore a gene that slows cell death in plants.

During the first two years of the project, she learned how to insert the gene, Bcl-xl, into a bacterium that infects plants. This year, she treated citrus stems and tomato seedlings with the bacterium, hoping the plants would take up the gene. She then tested plant tissue samples via DNA amplification, finding that they were indeed transgenic - they had incorporated the new gene. These plants are now bearing fruit, and Sravya plans to test them for cold tolerance this winter.

'It is a learning process that never ends,' she says.

She likes to play the trombone, to swim, dance and read. She is also interested in photography and

wants a career as a biotechnology specialist.

'Both my parents are scientists in this field and I can see the unlimited potential,' she said.

She considers her sixth- and seventh-grade science teacher Elaine McCall Taylor her science hero. Taylor 'set very high standards and gave me confidence,' Sravya said.

The Georgia State Science and Engineering Fair nominated Shireen Dhir for her fair-winning project 'How Can You Propagate Stevia by Using the Method of Tissue Culture?' Her grandmother had diabetes, which kept her from enjoying sweets. Shireen wanted to explore the potential of stevia, a shrub native to Paraguay that contains a natural diabetic-safe sweetener. She discovered that large-scale production is tedious because stevia seeds are slow to germinate.

Shireen took samples of shoot tips, nodes, roots and leaves from mature plants. She placed the samples in synthetic plant culture media and added differing concentrations of the two cytokinins, chemicals vital to plant cell division that promote tissue growth. She grew the cultures for four weeks, then measured the growth on each. Shoot tips produced the highest number of new growths (shoots), ranging from 10-15 per sample. She ultimately grew 75 plants in 14 weeks - all offshoot of one mature stevia plant.

She likes to play basketball and tennis and swim and visit the park. She is also active in the school's Art and 4-H Club.

Daughter of Dr Sarwan K Dhir and Seema Dhir, Shireen aims to become a biomedical researcher.

'I would like to learn more about how a particular disease occurs, what causes it and how can we cure it,' she said. Asked who her science hero is, she said it was her father who 'taught me to be a keen observer.'

Pinaki Bose's project was 'Biodegradable Polymers and Their Composites,' and he was a nominee of ExxonMobil Texas Science and Engineering Fair. At an aquarium, **Pinaki** heard about the dangers plastics pose to wildlife. He was delighted to see a dolphin grab a plastic bottle and pass it to a sea lion who tossed it into a recycling bin. He decided to search for an alternative to conventional plastics. He contacted several experts who told him about biodegradable polymers.

He discovered that the high cost of biodegradable plastics kept them from competing in the market. He decided to try to make a less expensive version of the polymer polycaprolactone, made from the milk sugar lactose, by reinforcing it with sawdust - a cheap, renewable resource. In a series of experiments, he mixed molten polycaprolactone with various proportions of fine and coarse sawdust. He shaped the resulting composites via standard plastic-working techniques such as warm rolling, compression molding, and injection molding. He discovered one composite, with 20 percent

sawdust, that was stronger than pure polycaprolactone. All of the composites began to degrade after two months in the environment.

Last year **Pinaki** was the winner at the Invention Convention for his project titled 'Textbooks of Tomorrow.' He was interviewed on the Fox network for its Good Day show.



He likes swimming and playing the piano. He also participates in choir, acting, and his church youth group.

Son of Animesh and Prarthana Bose, **Pinaki** wants to be a biochemist, "because I really love animals, living cells and organic chemistry."

Leonardo da Vinci is his science hero as da Vinci was 'a scientist ahead of his time.'

The October 23-27 competition, to be held at the Cole Field House at the University of Maryland, will help kick off the celebration of 100 years of Albert Einstein's physics in 2005, according to the organizers. The competition was sponsored by Discovery Communications and conducted by Science Service.

The 400 semi-finalists were chosen from 1,795 entrants who were nominated by 259 Science Service-affiliated fairs, representing 47 states, the District of Columbia and Puerto Rico. About 30 of them are of South Asian origin.

'The DCYSC identifies and honors America's top middle-school student who demonstrates the best skills in leadership, teamwork and scientific problem solving. In addition, the ability to be an effective science communicator - a goal that reflects Discovery's philosophy that scientific knowledge is most valuable when it is communicated and shared - is a key component of the judging,' the organizers said.

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