



**SAUMIL BANDYOPADHYAY**

**Maggie L. Walker Governor’s School for Government and International Studies, Richmond, Virginia**

**HOMETOWN: Glen Allen, Virginia**

**PROJECT: Universal detector of light and  $\beta$ -radiation: multifunctionality enabled by quantum-mechanical wavefunction and density-of-states engineering, photomodulated electron tunneling, and quantum confined charge transport in nanowires**

**FIELD: Electrical Engineering**

**MENTOR: Dr. Gary C. Tepper, Dr. Dmitry Pestov, and Dr. Supriyo Bandyopadhyay, Virginia Commonwealth University**

*“I believe that although it is nice to understand something theoretically for knowledge’s sake, it is more important to apply it.”*

Saumil Bandyopadhyay became interested in optical processes in semiconductors after reading about photodetectors and their use in life-saving applications such as car collision avoidance systems, mine detection, night vision, and missile defense. After learning about the challenges of making infrared photodetectors, Saumil set out to create a photodetector that can work at room temperature, a problem for these detectors. He spent two summers and several days every week during the school year working late into the night to train in nanofabrication and characterization methods. He then invented a universal photon and particle detector built with semiconductor nanowires that can operate at room temperature and detects the entire electromagnetic spectrum from infrared to ultraviolet, with infrared detectivity at least 10 times higher than state-of-the-art. He focused on making his detector ultra-sensitive, rugged, reliable, inexpensive and mass-producible. Potential applications include buried mine detection, monitoring of global warming, radiation therapy, and homeland security. He spent an estimated 1,600 hours on the project.

Saumil has worked as a laboratory intern since the seventh grade. He plans to major in electrical engineering in college towards a career as a scientific researcher. A Davidson Fellows scholarship winner, he placed first overall in Research at the International Space Olympics and won second place in Physics and Astronomy at the Intel International Science & Engineering Fair. Saumil has mentored students in the laboratory through the Richmond Area Program for Minorities in Engineering. In his free time he enjoys playing the violin. A senior, he is head editor of his school’s Academic Competition, a tournament of 500 questions written and edited by his school’s team and played nationwide. He looks forward to the Walker Model Congress in April 2013, a conference he is directing aimed at educating students about the American government.