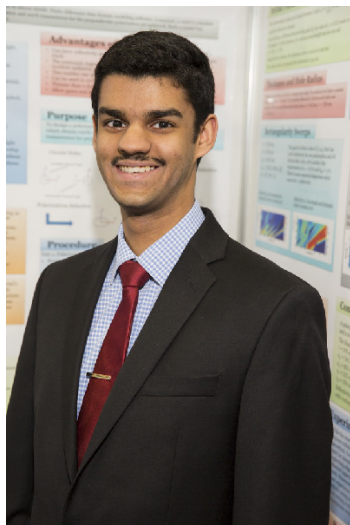


CWSF 2015 - Fredericton, New Brunswick



Twesh Upadhyaya

Polarization-Selective Mirror based on a Silicon Nitride Photonic Crystal Slab

Challenge: Innovation

Category: Senior

Region: Simcoe County

City: Barrie, ON

School: Bear Creek S.S.

Abstract: This project aims to design a polarization-selective photonic crystal membrane in silicon nitride. Finite-difference time domain modeling software, Lumerical, is used to simulate the optical device and optimize parameters. Such a crystal has applications as a component of an all-optical, single-photon transistor. Additionally, photonic crystals are porous and offer a thinner alternative to dielectric stacks.

Biography

My name is Twesh and I am a Grade 12 student at Bear Creek Secondary School in Barrie. This is my second time attending CWSF and I am looking forward to the experience. I am interested in math and science and I plan to go to university in a STEM field. I am a Student Trustee for the Simcoe County District School Board and President of my Student Council. I enjoy playing music and I am a percussionist in three school bands. I also play piano outside of school. My favourite sports are cross-country and basketball. I have a keen interest in mathematics and I have written numerous math contests. I am a member of my school's math club and I tutor in the Math Help Room. While doing my project, I learned many interesting things about the field I was studying. My advice to anyone doing a science fair project is to find a topic that really interests you and to try and combine different fields, as some of the most interesting discoveries happen at the intersection of two different disciplines.

Awards

Value

CAP Physics Prize - Senior Sponsor: Canadian Association of Physicists	\$1 000
Excellence Award - Senior - Silver Medal Sponsor: Youth Science Canada	
Dalhousie University Faculty of Science Entrance Scholarship Senior Silver Medallist - \$2500 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	\$2 500
UBC Science (Vancouver) Entrance Award Senior Silver Medallist - \$2000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	\$2 000
University of New Brunswick Canada-Wide Science Fair Scholarship Silver Medallist - \$2500 Entrance Scholarship Sponsor: University of New Brunswick	\$2 500
University of Ottawa Entrance Scholarship Senior Silver Medallist - \$2000 Entrance Scholarship Sponsor: University of Ottawa	\$2 000
Western University Scholarship Silver Medallist - \$2000 Entrance Scholarship Sponsor: Western University	\$2 000
Total	\$12 000