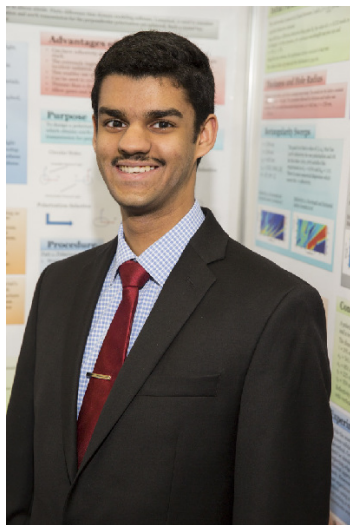


# CWSF 2015 - Fredericton, New Brunswick



## 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
<b>Total</b>	<b>\$12 000</b>