

## CWSF 2015 - Fredericton, New Brunswick



### Nathan Kuehne

#### Phenylalanine Self-Diagnostic Test for Phenylketonuria Patients

**Challenge:** Health

**Category:** Senior

**Region:** Vancouver Island

**City:** Victoria, BC

**School:** Glenlyon Norfolk School

**Abstract:** An at-home test was developed for phenylketonuria patients, a genetic condition where phenylalanine is not metabolized. This diet-controlled disease leads to toxic buildup of phenylalanine, causing neurological defects. To identify the phenylalanine, a urine sample is filtered in a 3D-printed device, followed with the synthesis of gold nanoparticles, initiating a colour-change. This test requires minimal user-interaction and expedites the results compared to current testing methods.

#### Biography

I am a Grade 11 student, currently attending Glenlyon Norfolk School in Victoria, BC. I play competitive basketball, compete provincially and nationally in Ukrainian Dance, and play multiple instruments. I am honoured to have been selected to attend the Canada-Wide Science Fair (CWSF) for the third time. I travelled to CWSF in Windsor, Ontario last year where I won a gold medal for developing a urine-based test for multiple kinds of tumour-based cancers. In attempting to extend my research of last year, I became aware of a worldwide need for an at-home test for phenylketonuria (PKU) patients, and my focus shifted to filling this void in PKU management and treatment. I hope to continue working on his project, and produce a marketable device that could be sold to those with PKU, directly impacting the lives of those suffering with this condition. After high school, I plan on pursuing a career in medicine or engineering, and continue to positively impact the world.

#### Awards

#### Value

Excellence Award - Senior - Gold Medal Sponsor: Youth Science Canada	\$250
Dalhousie University Faculty of Science Entrance Scholarship Senior Gold Medallist - \$5000 Entrance Scholarship Sponsor: Dalhousie University, Faculty of Science	\$5 000
UBC Science (Vancouver) Entrance Award Senior Gold Medallist - \$4000 Entrance Scholarship Sponsor: The University of British Columbia (Vancouver)	\$4 000
University of Manitoba Entrance Scholarship Senior Gold Medallist - \$5000 Entrance Scholarship Sponsor: University of Manitoba	\$5 000
University of New Brunswick Canada-Wide Science Fair Scholarship Gold Medallist - \$5000 Entrance Scholarship Sponsor: University of New Brunswick	\$5 000
University of Ottawa Entrance Scholarship Senior Gold Medallist - \$4,000 Entrance Scholarship Sponsor: University of Ottawa	\$4 000
Western University Scholarship Gold Medallist - \$4000 Entrance Scholarship Sponsor: Western University	\$4 000
<b>Total</b>	<b>\$27 250</b>