



## CWSF 2017 - Regina, Saskatchewan



## Sergiu Pocol

## Air Gap Thickness and Torque Ripple Induced by Asymmetries

Challenge: Discovery Category: Senior

Youth Science Canada

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Region: Waterloo-Wellington City: Kitchener, ON

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Abstract: In haptic devices, direct drive actuators perform optimally with low torque

> ripple, the variance in the output torque of a motor. The effect of the thickness of the air gap on torque ripple was determined in a mechanically commutated DC motor, wherein the rotor's mass is asymmetrically distributed. A loose positive correlation between the two was noted, while

power showed a negative correlation.

## **Biography**

My name is Sergiu Pocol and I am a grade 11 student in Kitchener, Ontario. Being a physics enthusiast, my experiment involves the determination of torque related parameters in asymmetric motors and how the thickness of the air gap might affect them. Many direct drive actuators require low torque ripple, which is a negative quality in motors. As such, I wanted to develop an easy and accessible method for investigating torque ripple, relying on physics and calculus. In spare time, I enjoy volunteering at summer camps and cycling. Also, I am a member of a local choir and orchestra and enjoy both playing and listening to music. Furthermore, I am an avid science lover and have participated in related programs like Gene Researcher for a Week. As I am an ardent reader, I have won first prizes at the Waterloo County English Awards.

Awards	Value
Excellence Award - Senior - Silver Medal	
Sponsor: Youth Science Canada	
Dalhousie University Faculty of Science Entrance Scholarship	\$2 500
Senior Silver Medallist - \$2500 Entrance Scholarship	
Sponsor: Dalhousie University, Faculty of Science	
UBC Science (Vancouver) Entrance Award	\$2 000
Senior Silver Medallist - \$2000 Entrance Scholarship	
Sponsor: The University of British Columbia (Vancouver)	
University of Ottawa Entrance Scholarship	\$2 000
Senior Silver Medallist - \$2000 Entrance Scholarship	
Sponsor: University of Ottawa	
Western University Scholarship	\$2 000
Silver Medallist - \$2000 Entrance Scholarship	
Sponsor: Western University	
Total	\$8 500





