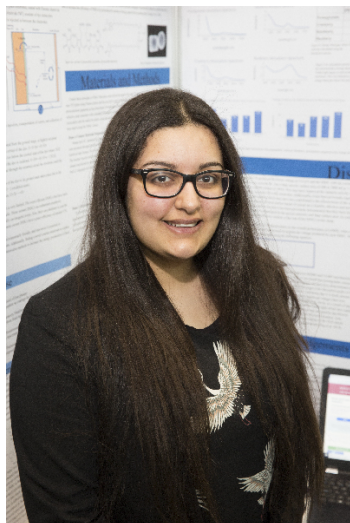


# CWSF 2019 - Fredericton, New Brunswick



## Pakeeza Mushtaq

### A Novel DSSC Using Bio-Photosensitizer Pigments and Diatom Frustules

**Challenge:** Energy  
**Category:** Senior  
**Region:** Southeast Alberta  
**City:** Brooks, AB  
**School:** Brooks Composite High School  
**Abstract:** Drawbacks of silicon solar cells have prompted research into new photovoltaic devices such as dye-sensitized solar cells (DSSCs). Current ruthenium-based DSSCs are costly and toxic with poor efficiencies. This project focused on the development of novel DSSCs using bio-photosensitizer pigments from algae and plants as well as diatom frustules and activated charcoal counter electrodes to optimize voltage production. Promising results indicate potential for commercial applications.

#### Biography

Pakeeza is a grade 11 student attending Brooks Composite High School. As an avid volunteer she contributes her time to numerous local and global organizations such as the hospital and WE organization. Pakeeza is involved with several youth boards and clubs and is Chair of the local library's Teen Advisory Board. Pakeeza has gained leadership skills as a result of her involvement with Student Council and has been able to further these skills by attending provincial and national leadership conferences. Pakeeza is also a member of the Alberta Education Minister's Youth Council. Pakeeza has received numerous academic awards such as the Highest Academic Achievement Award at her school as well as awards for math competitions. Pakeeza enjoys writing and has had her work published in student prose anthologies. Pakeeza hopes to one day pursue a career in medicine. Pakeeza got the inspiration for this project when learning about photosynthesis in biology class last year which encouraged her to explore how this natural phenomenon could be applied to solar cells. In the future Pakeeza would like to investigate commercializing this innovation. Pakeeza recommends students thinking about doing a project choose a topic they are genuinely interested in.

#### Awards

#### Value

Awards	Value
Renewable Energy Award - Senior Sponsor: Ontario Power Generation	\$1 000
Excellence Award - Senior - Gold Medal Sponsor: Youth Science Canada	
Challenge Award - Energy - Senior Sponsor: Youth Science Canada	
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
Youth Can Innovate Awards - Senior Sponsor: The Gwyn Morgan and Patricia Trotter Foundation	\$1 000
<b>Total</b>	<b>\$29 000</b>

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