Danika MacDonell

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Education

University of Victoria — Victoria, Canada
Ph.D. in Experimental Particle Physics — 2018–2022

- Thesis: "Search for Dark Matter Produced in pp Collisions with the ATLAS Detector"

University of British Columbia — Vancouver, Canada
M.S. in Experimental Particle Physics — 2016–2018

- Thesis: "Calibration of SuperCDMS Dark Matter Detectors for Low-Mass WIMPs"

University of Victoria — Victoria, Canada
B.S. with Distinction in Honours Physics (Minor in Mathematics) — 2011–2016

- Thesis: "Photon Entanglement: The Search for Einstein's Hidden Variables"

Experience

University of Victoria — Victoria, Canada
Graduate Research Assistant (Doctoral) — Sept. 2018 - July 2022

- Authorship qualification work and PhD dissertation with the UVic ATLAS group
- Developed containerized cloud computing infrastructure as part of authorship qualification work for the ATLAS collaboration. Served as primary analyst and contact person for a 7-person international team of scientists to perform a sophisticated analysis of particle collision data from the Large Hadron Collider, which searched for evidence of dark matter production in the high-energy collisions.

ATLAS Collaboration — Remote
Analysis Preservation Contact — Feb. 2020 - Oct. 2021

- Analysis preservation contact person for the ATLAS collaboration (5,000 members)
- Developed numerous analysis preservation workflows using a framework developed for high-energy physics that incorporates Docker, GitLab CI and Kubernetes. Provided technical assistance, liaison, and central documentation to support analysis teams with the development of their own analysis preservation frameworks. Organized hands-on training events to familiarize analysts with the tools involved with analysis preservation.

University of British Columbia — Vancouver, Canada
Graduate Research Assistant (Master's) — Sept. 2016 - Aug. 2018

- DAQ development and detector calibration
- Designed a real-time 'baseline control? algorithm to maintain signal integrity for data collected by cryogenically-cooled solid-state SuperCDMS detectors currently being installed at the SNOLAB facility in Sudbury, Ontario. Analyzed calibration data in collaboration with a 8-person international team of scientists to improve the modelling of ionization yield from nuclear recoil events in solid-state Ge and Si detectors.

Teaching

- **Organizer and Instructor** at CERN — March 2021
  ATLAS Analysis Preservation Tutorial
- **Instructor** at CERN — Summer 2019+2020
  US-ATLAS Computing Bootcamp
- **Instructor** at CERN — February 2020
  ATLAS+CMS Analysis Preservation Bootcamp
- **Lab Instructor** at University of Victoria — Fall 2018-2020
  Physics 102A/110/120
- **Lab Instructor** at University of British Columbia — Fall 2019
  Physics 107 (Enriched Physics 1)

Skills

- **Programming:** Python | C++ | MATLAB | ROOT | HTML | LaTeX
- **Version Control:** GitHub | GitLab | Gitblit | Git CI/CD
- **Software Virtualization:** Docker | OpenStack | Kubernetes | Terraform
- **Database Management:** MySQL | MariaDB

Languages

- **English:** Fluent
- **French:** Conversational

Projects

- **Dark Matter Search (2019-2022)**

  Analyzed particle collision data to search for evidence of dark matter using the Python, C++ and ROOT programming environments.

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Scholarships and Awards

- University of Victoria Graduate Awards (total value: $15,000) — 2018–2022
- Best Particle Physics Division Poster at Canadian Association of Physicists Congress (value: $300) — 2021
- Charles S. Humphrey Graduate Student Award (value: $2,500) — 2021
- Nora & Mark Degoutiere Memorial Scholarship (value: $13,000) — 2020
- Eric Forster Graduate Scholarship (value: $1,900) — 2019
- UVic Graduate Entrance Awards (value: $14,000) — 2018
- NSERC USRA (value: $4,500) — 2015
- UBC Trek Excellence Scholarship (value: $1,500) — 2012
- UBC Major Entrance Award (value: $5,000) — 2011

Extracurricular Activities

- Physics and Astronomy Graduate Student Association (PAGSA) Sports Representative — Sept. 2020 - Oct. 2021
  Organized regular weekly runs and bicycle rides, and created and maintained slack workspace for graduate students in the UVic Physics and Astronomy department.
- Volunteer at UVic ATLAS Masterclass — April 2019 and 2021

Performed lab demonstrations and mentored high school students, with the aim of introducing students to the field of high energy particle physics.

- Volunteer at Explore UVic Jan. 2019
  Discussed my experience as a student in the Physics and Astronomy department at UVic with prospective students.