Dr Dwayne SPITERI

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I am a charismatic individual who likes solving puzzles, with the ability to work effectively independently and within a team. As an early-stage scientific researcher, I am looking for a position that involves data analysis, statistical modelling, and simulations with the opportunity to work with doctoral students on novel techniques within a collaboration.

Education

University of Birmingham (2012 - 2016) : MSci Physics with Particle Physics and Cosmology - 1st Class

University of Glasgow (2016 - 2020) : PhD in Experimental Particle Physics. Based at CERN, Geneva from July 2017 - December 2018. Thesis hyperlink - Higgs boson studies: associated production with a vector boson and decay into b-quarks using the ATLAS Run-2 dataset.

Research Experience

SiD collaboration: University of Glasgow Research Fellow (Feb 2021 - Present)

- Updated legacy software frameworks to produce publication-worthy figures on simulated data that I generated myself.
- Validated novel experimental techniques for seeding tracks in the detector of the SiD.
- Produced comprehensive documentation to increase the ease of use of detector software.

ATLAS experiment: VHbb Analyses Member (March 2018 - May 2020)

- Member of two analysis teams using data collected by the ATLAS detector between 2015 and 2018 to make the first observation and measurements of the Higgs boson decay to b-quarks via associated Vector Boson production (VHbb).
- Applied advanced statistical methods (Binned Maximum Likelihood Estimators) to identify small signals in large backgrounds.
- Contributed to and helped maintain a shared data analysis software framework written in C++ with Python wrapper scripts.
- Developed and optimised the event selection for the analyses by testing alternative trigger regimes and implementing the ones that increased the sensitivity of the analysis.
- Investigated and corrected unexpected fluctuations in a statistical fit model containing thousands of nuisance parameters.
- Contributed to the following publications:
  - Observation of $H \to b\bar{b}$ decays and VH production with the ATLAS detector. [Phys. Lett B786, p59-86, (2018)]
  - Measurement of $H \to b\bar{b}$ as a function of the vector-boson transverse momentum in 13 TeV pp collisions with the ATLAS detector [J. High Energ. Phys, vol. 141, (2019)].

- Measurements of WH and ZH production in the $H \to b\bar{b}$ decay channel in pp collisions at 13 TeV with the ATLAS detector. [arXiv 2007.02873 (2020)]
- Measurement of the associated production of a Higgs boson decaying into b-quarks with a vector boson at high transverse momentum in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector. [arXiv 2008.02508 (2020)]

ATLAS experiment: Tracking Combined Performance Group (July 2017 - November 2018)

- Investigated track objects created as a result of incorrect combinations of hits made in the Inner Detector (fake tracks) of the ATLAS detector.
- Parametrised the differences between Monte Carlo modelling of track objects and tracks reconstructed from data.
- Derived recommendations for the uncertainty on the number of fake tracks found in Monte Carlo simulations for the entire ATLAS collaboration.

FLC: Internship at Deutsches Elektronen Synchotron (DESY) (July 2015 - September 2015)

- Worked in a clean room laboratory testing the electronic properties of silicon sensors for a DESY-based prototype.
- Wrote C++ code to interpret data taken from the laboratory and fit it to various curves.
- Gave several presentations describing my work and wrote a 17 page report summarising my findings.

Public Engagement Experience

Pint Of Science Festival Organiser (November 2016 - April 2020)

- A worldwide science festival bringing researchers to a local pub/café/space to share scientific discoveries.
- Organised events for the Glasgow branch of the festival in 2017 (Creative Reactions), 2019 (Our Society) and 2020 (Planet Earth).
- Led a team of four people to create themed events over three nights for around 90-120 members of the public.

Co-ordinator for ATLAS Virtual Visit Programme (January 2018 - March 2020)

- Managed a team of Volunteers at the CERN lab in Geneva delivering video conferences to schools and the general public on behalf of the ATLAS collaboration.
- Talked with students from many differing education levels and ages about the ATLAS experiment, CERN, and the life of a scientist.
- Explained physics concepts in talks using a variety of perspectives to deepen understanding or teach advanced concepts.
- Represented British scientists in liaisons with government committees.

Institute of Physics (IoP) Festival of Physics (May 2019 - October 2019)

- Liaised with personnel at the University of Edinburgh and the University of Glasgow to create a larger joint proposal for the event.
- Constructed an immersive exhibit explaining the history of particle physics with several physical demonstrations of particle detection experiments past and present, interactions with individual detector components, and a live link to the CERN lab.
- Managed volunteers, obtained funding, organised deliveries of components, liaised with event organisers, and oversaw the arrangement of exhibit at the venue for the three-day event.

Technical Skills

Computer languages (proficient)

- MATLAB, Python and C++, git (gitHub and gitLab).
- Taught undergraduates in Python and MATLAB courses.

Computer languages (familiar)

- SQL, HT Condor

Hardware (familiar)

- Basic electronics, silicon semiconductor technologies, clean room procedures and equipment.

Software (proficient)

- Microsoft Office (Word, Excel, Powerpoint), Keynote, Sublime Text Editor, LaTeX.

Scientific Advancement

- Won a prize for outstanding contribution to the HEP Summer School in 2017.
- Written and edited several successful grant applications.
- Was a lead organiser for the YETI2018 conference in Durham.
- Spent hundreds of hours in the ATLAS control room in Tier-1 and Tier-2 shift work monitoring the Inner Detector and it's auxiliary systems.
- Presented my work at the HEP Summer School in 2017, the ATLAS UK conference in 2017, 2018 and 2019, and the CLASHEP 2019 conference in Argentina. Was also scheduled to do so for the IoP 2020 conference in Bristol.
- Presented group project work at the MCNet and CLASHEP conferences to fellow attendees.
- Was asked to be the representative of British scientists at CERN's inauguration ceremony.
- Taught in undergraduate computing and scientific laboratories. Conducted pedagogical research on a Millikan experiment set-up to try and improve students learning experiences. Produced two reports based on students' findings.

Qualifications and Interests

- Completed the University of Birmingham Personal Skills Award (PSA) Advanced (2015). Short-listed for PSA Student of the Year.
- Completed CMI-accredited Level 3 Project Management Course (2019).
- SISA Level 1 Accreditation Glasgow Business School (2020).
- I play badminton and go bouldering once or twice a week. I also enjoy snowboarding.
- I enjoy tabletop games of skill such as bridge and chess and I have a variety of board games.

References

Available upon request.