

LARA MASON

CURRICULUM VITAE

Date of birth: 18 October 1992. Age: 28
Nationality: South African
Languages: English, French, Afrikaans, Portuguese
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EDUCATION/TRAINING

Tertiary Education

2019 to present	Université Claude Bernard Lyon 1, France and University of Johannesburg, South Africa PhD in High Energy Particle Physics (co-tutelle)
2017-2018	University of the Witwatersrand, South Africa MSc in Medical Physics
2016-2017	University of Melbourne, Australia (with the ATLAS project at CERN, Geneva) MPhil in High Energy Particle Physics with Distinction (First Class)
2011-2015	University of Cape Town, South Africa BSc(Hons) in Physics with Distinction (First Class) BSc in Mathematics, Physics and Business French

Awards/Achievements

2020	Sixth Machine Learning in HEP Summer School: Certificate of Excellence
2019	SAIP Annual Conference: PhD prize (theory division)
2017	ATLAS, CERN: ATLAS authorship

RESEARCH

Topics

2019 to date	High energy physics: Phenomenology of the scalar sector beyond the Standard Model.
2018	Medical physics: Geant4 Monte Carlo simulation of brachytherapy treatment planning.
2016/2017	High energy physics: work done with the Tau Trigger Group at ATLAS, CERN. Responsible for the calculation of trigger efficiencies.
2015	High energy physics: research on the $\mu\mu$ spectrum using data gathered at ATLAS, CERN.

Output

2020	<ul style="list-style-type: none">• A.S. Cornell, A. Deandrea, B. Fuks, L. Mason, <i>Future lepton collider prospects for a ubiquitous composite pseudo-scalar</i> (DOI: 10.1103/PhysRevD.102.035030; arXiv:2004.09825), accepted 11 August 2020
2019	<ul style="list-style-type: none">• L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, <i>Bottom-quark contributions to composite pseudo-scalar couplings at LHC</i>, Frascati Physics Series ISBN: 9788886409711, 2019, Vol 70, 110-115• L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, <i>The ubiquitous pseudo-scalar in composite Higgs models</i> (proceedings: South African Institute of Physics 2019 ISBN: 978-0-620-88875-2)
2017	<ul style="list-style-type: none">• The ATLAS collaboration (co-author): <i>The ATLAS Tau Trigger in Run 2</i>, ATLAS-CONF-2017-061

Talks

- 2020 • Data across Disciplines workshop: Remaking the World through Machine Learning, Johannesburg, South Africa: *"Machine learning for future collider prospects: a case study"* and *"An Introduction to Boosted Decision Trees"* (tutorial)
- 2020 • UJ seminar: *"Future collider prospects (with machine learning) for a composite pseudo-scalar"*
- FCC-ee committee physics meeting (virtual)
- presentation of recent work "Future lepton collider prospects for a ubiquitous composite pseudo-scalar"*
- High Energy Particle Physics Workshop, Thoyandou, South Africa
- "Future collider prospects for a ubiquitous composite pseudo-scalar"*
- 2019 • LFC19: Strong dynamics for physics within and beyond the Standard Model at LHC and Future Colliders Workshop, Trento, Italy: *"A ubiquitous pseudo-scalar in composite Higgs models"*
- South African Institute of Physics Annual Conference, Polokwane, South Africa
- "A ubiquitous pseudo-scalar in composite Higgs models"*

Funding

- 2020/2021 **French Ministry for Europe and Foreign Affairs:** Bourse d'Excellence Eiffel
- Nov/Dec 2019 **Campus France:** PhD Scholarship
- 2019 to date **University of Johannesburg:** NRF PhD scholarship (2019), UJ GES 4.0 award
- 2016 to 2017 **University of Melbourne:** Melbourne Research Full Scholarship
- 2015 **University of Cape Town:**
- Applied/Experimental Physics Department Bursary, UCT Merit Award and NRF Scarce Skills Bursary

PROFESSIONAL DEVELOPMENT**Schools and workshops**

- 2020 **Sixth Machine Learning in High Energy Physics Summer School 2020:**
- Theory and application of machine learning for HEP using PYTHON.
- 2019 **Fundamental Composite Dynamics:** Mainz Institute for Theoretical Physics.
- Collaborative workshop on composite Higgs studies and related fields.
- 2018 **SA-CERN summer school:** Centre of theoretical and mathematical physics, University of Cape Town. Lectures on QFT, SM physics, and heavy ion/QGP physics.

Programming languages

PYTHON, C++, MATHEMATICA, HTML.

Software/packages

FEYNRULES, MG5_AMC, MADANALYSIS 5, XGBOOST, PYTHIA8, DELPHES, GEANT4

Work experience

- 2020 **University of Johannesburg:** Second year physics class tutor
- 2019 **SAIP theory division:** Committee student representative
- 2019 **Université Claude Bernard Lyon-1, France:** Research collaboration visit
- 2019 **University of the Witwatersrand:** First year physics class tutor
- 2015 **University of Cape Town Physics Dept:** First year laboratory demonstrator
- 2015 **CERN, Geneva:** Work-shadow at ATLAS week
- 2011 **IThemba LABS, South Africa:** Work experience on PET
- 2011 - present **Private maths and science tutor:** University and school level