LARA MASON

CURRICULUM VITAE

Date of birth: 18 October 1992. Age: 28
Nationality: South African
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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	• A.S. Cornell, A. Deandrea, B. Fuks, L. Mason, *Future lepton collider prospects for a ubiquitous composite pseudo-scalar* (DOI: 10.1103/PhysRevD.102.035030; arXiv:2004.09825), accepted 11 August 2020
2019	• L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, *Bottom-quark contributions to composite pseudo-scalar couplings at LHC*, Frascati Physics Series ISBN: 9788886409711, 2019, Vol 70, 110-115 • L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, *The ubiquitous pseudo-scalar in composite Higgs models* (proceedings: South African Institute of Physics 2019 ISBN: 978-0-620-88875-2)
2017	• The ATLAS collaboration (co-author): *The ATLAS Tau Trigger in Run 2*, 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) • 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++, Wolfram, HTML.

Software/packages

FeynRules, MG5_aMC, Ma5, Mathematica, 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