

# LARA MASON

## CURRICULUM VITAE

Date of birth: 18 October 1992. Age: 28  
Nationality: South African  
Languages: English, French, Afrikaans, Portuguese  
Email: masonlara316@gmail.com / mason@ipnl.in2p3.fr  
Website: <https://lhmason.github.io/>

### EDUCATION/TRAINING

#### **Tertiary Education**

2019 to present	<b>Université Claude Bernard Lyon 1, France and University of Johannesburg, South Africa</b> PhD in High Energy Particle Physics (co-tutelle)
2017-2018	<b>University of the Witwatersrand, South Africa</b> MSc in Medical Physics
2016-2017	<b>University of Melbourne, Australia (with the ATLAS project at CERN, Geneva)</b> MPhil in High Energy Particle Physics with Distinction (First Class)
2011-2015	<b>University of Cape Town, South Africa</b> 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	<b>High energy physics:</b> Phenomenology of the scalar sector beyond the Standard Model.
2018	<b>Medical physics:</b> Geant4 Monte Carlo simulation of brachytherapy treatment planning.
2016/2017	<b>High energy physics:</b> work done with the Tau Trigger Group at ATLAS, CERN. Responsible for the calculation of trigger efficiencies.
2015	<b>High energy physics:</b> research on the $\mu\mu$ spectrum using data gathered at ATLAS, CERN.

#### **Output**

2020	<ul style="list-style-type: none"><li>• 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</li></ul>
2019	<ul style="list-style-type: none"><li>• 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</li><li>• 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)</li></ul>
2017	<ul style="list-style-type: none"><li>• The ATLAS collaboration (co-author): <i>The ATLAS Tau Trigger in Run 2</i>, ATLAS-CONF-2017-061</li></ul>

**Talks**

- 2021 • 2nd FCC-ee France workshop (virtual)  
*"Future lepton collider prospects for a composite pseudo-scalar"*
- 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 and NRF Scarce Skills Bursary

**PROFESSIONAL DEVELOPMENT****Schools and workshops**

- 2021 **IN2P3 School of Statistics SOS2021:**  
 Concepts and application of statistical techniques for machine learning.
- 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**

- 2019/2020/2021 **WITS/University of Johannesburg:** Undergraduate-level physics class tutor
- 2019 **SAIP theory division:** Committee student representative
- 2015 **University of Cape Town Physics Dept:** First year laboratory demonstrator
- 2015 **CERN, Geneva:** Work-shadow at ATLAS week
- 2011 - present **Private maths and science tutor:** University and school level