

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	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

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.

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

Output

2021	• A.S. Cornell, A. Deandrea, B. Fuks, T. Flacke, L. Mason, <i>Contact interactions and top-philic scalar dark matter</i> , arXiv:2104.12795
2020	• A.S. Cornell, A. Deandrea, B. Fuks, L. Mason, <i>Future lepton collider prospects for a ubiquitous composite pseudo-scalar</i> , Physical Review, D, DOI: 10.1103/PhysRevD.102.035030

- 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**
- 2021
- Top LHC France (poster): *"The impact of dimension-five operators on top-philic scalar dark matter"*
 - 2nd FCC-ee France workshop: *"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"
- 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.

WORK EXPERIENCE

Physics

- 2020/2021
- University of Johannesburg:** Second year physics class tutor
- 2019
- SAIP theory division:** Committee student representative
- 2019
- Université de 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

Other Tutoring/Teaching

- 2011-2021
- Private clients, Johannesburg/Cape Town, South Africa:** virtual and in person
- 2017-2018
- Tutroom, Johannesburg:** Management team/ Head of Science Curriculum/ Tutor
- 2017
- BrightSparkz Tutoring, Johannesburg:** University level Maths/Chemistry tutor
- 2016
- Private client, Paris, France:** Au pair/tutor
- 2012-2013
- Sigma Tutoring, Cape Town:** University-Level Mathematics tutoring