

LARA MASON

CURRICULUM VITAE

Date of birth: 18 October 1992. **Age:** 28. **Nationality:** South African, Portuguese

Languages: English, French, Afrikaans

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EDUCATION/TRAINING

Tertiary education

2019 to present	Université Claude Bernard Lyon 1 (IP2I), France and University of Johannesburg, South Africa PhD in High Energy Particle Physics (dual degree)
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, T. Flacke, B. Fuks, L. Mason, <i>Contact interactions and top-philic scalar dark matter</i> , Journal of High Energy Physics (2021), no. 7, 026 [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> , Phys. Rev. D 102 (2020), no. 3, 035030 [arXiv:2004.09825]
2019	• L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, <i>Bottom-quark contributions to composite</i>

pseudo-scalar couplings at LHC, Frascati Physics Series (2019), v.70, 110-115, [hal-02550156]

- L. Mason, A.S. Cornell, A. Deandrea, B. Fuks, *The ubiquitous pseudo-scalar in composite Higgs models*, proceedings of SAIP (2019) ISBN: 978-0-620-88875-2)

2017

- ATLAS collaboration (co-author): *The ATLAS Tau Trigger in Run 2*, (ATLAS-CONF-2017-061)

Talks

2021

- SAIP 2021: *"Fitting the relic density with contributions from dimension-five operators"*
- 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 physics seminar: *"Future collider prospects (with machine learning) for a composite pseudo-scalar"*
- FCC-ee committee physics meeting: *invited 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 & 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: calculation of trigger efficiencies (Tau Trigger Group at ATLAS, CERN).

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

Corporate

2013

PPMAmerica, Chicago: Internship in fixed income management

2012

Riscura Analytics, Cape Town: Internship in risk assessment