

Ursula Laa

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EDUCATION	PhD , Theoretical Particle Physics 2014–2017 Topic: Understanding LHC Searches for new Physics with Simplified Models (Supervisors: Genevieve Belanger, Sabine Kraml) LPSC Grenoble, France
	Master of Science , Physics 2011–2014 Topic: Interpretation of the CMS and ATLAS Simplified Models Results University of Vienna and HEPHY, Austria with distinction
	Bachelor of Science , Physics 2007–2011 University of Vienna, Austria with distinction
PROFESSIONAL EXPERIENCE	Research fellow , Department of Econometrics and Business Statistics & School of Physics and Astronomy since 2017 Topic: Statistical visualisation methods for theoretical particle physics (Advisors: Dianne Cook, German Valencia) Monash University, Australia
RESEARCH VISITS	Physics Department and Data Science Centre, New York University, USA Nov 2019
	Statistics Department, University of Pennsylvania, USA Nov 2019
	Theory Group of LPSC Grenoble, France Mar–Jul 2014
	ERASMUS Exchange, Aarhus University, Denmark 2010–2011
AWARDS & SCHOLARSHIPS	ACEMS Centre of Excellence, associate investigator since 2019
	ENIGMASS Cluster of Excellence, PhD fellowship 2014–2017
	Deans List Faculty of Physics, University of Vienna 2014 (for outstanding academic performance during the Master’s program)
	Zonta Club Wien I-Postgraduate Award 2013
	FEMtech Scholarship for Master’s thesis internship 2013

PUBLICATIONS

JOURNAL PUBLICATIONS	Note: authors are sorted alphabetically for particle physics publications (standard in the field), while they are sorted by contribution for publications in statistics journals (marked by highlighting my name in bold font). A slice tour for finding hollowness in high-dimensional data U. Laa , D. Cook, G. Valencia under review, arXiv:1910.10854
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Fitting in or odd one out? Pulls vs residual responses in $b \rightarrow s\ell^+\ell^-$

B. Capdevila, U. Laa, G. Valencia
under review, arXiv:1908.03338

Using tours to visually investigate properties of new projection pursuit indexes with application to problems in physics

U. Laa, D. Cook
under review, arXiv:1902.00181

Connecting R with D3 for dynamic graphics, to explore multivariate data with tours

M. Kipp, U. Laa, D. Cook
The R Journal (2019) 11:1, <https://doi.org/10.32614/RJ-2019-002>

SModelS v1.2: long-lived particles, combination of signal regions, and other novelties

F. Ambrogio, J. Dutta, J. Heisig, S. Kraml, S. Kulkarni, U. Laa, A. Lessa, et al.
to appear in CPC, <https://doi.org/10.1016/j.cpc.2019.07.013>

Anatomy of a six-parameter fit to the $b \rightarrow s\ell^+\ell^-$ anomalies

B. Capdevila, U. Laa, G. Valencia
Eur.Phys.J. C79 (2019) no.6, 462, <https://doi.org/10.1140/epjc/s10052-019-6944-8>

Dynamical projections for the visualisation of PDFSense data

D. Cook, U. Laa, G. Valencia
Eur.Phys.J. C78 (2018) no.9, 742, <https://doi.org/10.1140/epjc/s10052-018-6205-2>

On the coverage of the pMSSM by simplified model results

F. Ambrogio, S. Kraml, S. Kulkarni, U. Laa, A. Lessa, W. Waltenberger
Eur.Phys.J. C78 (2018) no.3, 215, <https://doi.org/10.1140/epjc/s10052-018-5660-0>

Simplified dark matter models with a spin-2 mediator at the LHC

S. Kraml, U. Laa, K. Mawatari, K. Yamashita
Eur.Phys.J. C77 (2017) no.5, 326, <https://doi.org/10.1140/epjc/s10052-017-4871-0>

SModels v1.1 user manual: Improving simplified model constraints with efficiency maps

F. Ambrogio, S. Kraml, S. Kulkarni, U. Laa, A. Lessa, V. Magerl, J. Sonneveld, M. Traub, W. Waltenberger
CPC 227 (2018) 72-98, <https://doi.org/10.1016/j.cpc.2018.02.007>

Collider limits on new physics within micrOMEGAs

D. Barducci, G. Belanger, J. Bernon, F. Boudjema, J. Da Silva, S. Kraml, U. Laa, A. Pukhov
CPC 222 (2018) 327-338, <https://doi.org/10.1016/j.cpc.2017.08.028>

Scalar versus fermionic top partner interpretations of $t\bar{t} + E_T^{\text{miss}}$ searches at the LHC

S. Kraml, U. Laa, L. Panizzi, H. Prager
JHEP 1611 (2016) 107, [https://doi.org/10.1007/JHEP11\(2016\)107](https://doi.org/10.1007/JHEP11(2016)107)

Probing U(1) extensions of the MSSM at the LHC Run I and in dark matter searches

G. Belanger, J. Da Silva, U. Laa, A. Pukhov
JHEP 1509 (2015) 151, [https://doi.org/10.1007/JHEP09\(2015\)151](https://doi.org/10.1007/JHEP09(2015)151)

Constraints on sneutrino dark matter from LHC Run 1

C. Arina, M. E. Cabrera Catalan, S. Kraml, S. Kulkarni, U. Laa
JHEP 1505 (2015) 142, [https://doi.org/10.1007/JHEP05\(2015\)142](https://doi.org/10.1007/JHEP05(2015)142)

SModelS: A tool for interpreting simplified-model results from the LHC and its application to supersymmetry

S. Kraml, S. Kulkarni, U. Laa, A. Lessa, W. Magerl, D. Proschofsky-Spindler, W. Waltenberger

Eur.Phys.J. C74 (2014) 2868, <https://doi.org/10.1140/epjc/s10052-014-2868-5>

SOFTWARE

Main developer of the R packages **spinebil** (for evaluating the performance of projection pursuit index functions) and **galahr** (a GUI for the tourr package)

Maintainer of the R packages **binostics** (calculation of graph-theoretic scagnostics) and **tourrGUID3** (D3 based tourr GUI)

Contributor to the R package **tourr** (implementation of tour algorithms in R)

Developer of the Python package **SModelS** for re-interpretation of results in particle physics

CONFERENCE PAPERS & PREPRINTS

SModelS – new developments and applications

U. Laa

PoS ICHEP2018 (2019) 516

Les Houches 2017: Physics at TeV Colliders New Physics Working Group

arXiv:1803.10379

On the coverage of the pMSSM by simplified model results

U. Laa

PoS EPS-HEP2017 (2017) 300, arXiv:1709.10386

Les Houches 2015: Physics at TeV colliders – new physics working group report

arXiv:1605.02684

Interpreting LHC searches for new physics with SModelS

U. Laa

PoS EPS-HEP2015 (2015) 105, arXiv:1510.01999

SModelS v1.0: a short user guide

S. Kraml, S. Kulkarni, U. Laa, A. Lessa, V. Magerl, W. Magerl, D. Proschofsky-Spindler, M. Traub, W. Waltenberger

arXiv:1412.1745

TEACHING

TEACHING EXPERIENCE

Tutor at Monash University

Statistical Learning

from 2020

Practical Exercises at University Grenoble Alpes

Nuclear physics for Radioprotection Master

Nuclear physics for Physics Master

Muon measurements for Physics Bachelor

2015–2017

Tutor at University of Vienna

Weekly seminar for first semester physics students

2011–2013

SUPERVISION

Co-advised several PhD, Honours and undergraduate research students

Main advisor in ongoing Honours project on machine learning and visualisation for particle physics searches

PRESENTATIONS

COLLOQUIA & WORKSHOPS	Data Visualisation New York Meetup High-dimensional data visualisation with tours	Nov 2019
	Technical Talk ARC Centre of Excellence for Mathematical & Statistical Frontiers An Introduction to the Visualisation Ecosystem in R (with Stuart Lee)	Sep 2019
	Colloquium School of Physics and Astronomy, Monash University, Australia High-dimensional data visualisation for physics applications	Apr 2019
	Workshop Business Analytics Seminar, Monash University, Australia An Introduction to gganimate (with Mitch O'Hara-Wild and Nick Spyrisson)	Mar 2019
CONFERENCE TALKS & POSTERS	Conference on Computing in High Energy and Nuclear Physics Adelaide, Australia Talk: High-dimensional data visualisation with the grand tour	Nov 2019
	UseR! Toulouse, France Talk: Visualising high-dimensional data: new developments of the tourr package using Shiny and plotly	July 2019
	Visualisation Matters Canberra, Australia Invited talk: Visualisation in Physics	May 2019
	Australian Meeting on Accelerator-Based Particle Physics Melbourne, Australia Talk: Anatomy of a six-parameter fit to the $b \rightarrow s\ell^+\ell^-$ anomalies	Feb 2019
	International Conference on High Energy Physics Seoul, Korea Talk: SModelS - new developments and applications	Aug 2018
	European Physical Society Conference on High Energy Physics Venice, Italy Talk: On the coverage of the pMSSM by Simplified Model results	July 2017
	Rencontres de Physique des Particules Centre de Physique des Particules de Marseille, France Talk: Simplified dark matter models with a spin-2 mediator at the LHC	April 2017
	Open Questions in Particle Physics and Cosmology Convention Centre by the Observatory, Goettingen, Germany Talk: Simplified dark matter models with a spin-2 mediator at the LHC	April 2017
	(Re)interpreting the results of new physics searches at the LHC CERN, Geneva, Switzerland Talk: Scalar versus fermionic top partner interpretations of $t\bar{t} + E_T^{miss}$ searches at the LHC	Dec 2016
	(Re)interpreting the results of new physics searches at the LHC CERN, Geneva, Switzerland Talk: On the coverage of the pMSSM by Simplified Model results	Jun 2016

	GDR Terascale Subatech, Nantes, France Talk: SModelS & Simplified Model Sensitivity to Spin Structure	May 2016
	Dark Matter at the Large Hadron Collider 2016 Amsterdam, Netherlands Poster: Interpreting LHC searches for new physics with SModelS	Mar-Apr 2016
	SUSY 2015 Lake Tahoe, California, USA Talk: Constraints on sneutrino dark matter from LHC Run 1	Aug 2015
	European Physical Society Conference on High Energy Physics Vienna, Austria Poster: Interpreting LHC searches for new physics with SModelS	Jul 2015
	GDR Terascale Saclay, France Talk: Constraints on sneutrino dark matter from LHC Run 1	Mar-Apr 2015
	GDR Terascale Palaiseau, France Talk: SModelS – Interpreting Simplified Model Results	Jun 2014
	ÖPG/SPS 2013 Annual Meeting Linz, Austria Talk: Application of CMS and ATLAS Simplified Models Results to Theories Beyond the Standard Model	Sept 2013
SEMINARS	IFAE Seminar Barcelona, Spain High-dimensional data visualisation for physics applications	July 2019
	HEPHY Seminar Vienna, Austria High-dimensional data visualisation for physics applications	July 2019
	Particle Physics Pheno Seminar University of Milan, Italy High-dimensional data visualisation for physics applications	June 2019
	LPSC Theory Seminar Grenoble, France High-dimensional data visualisation for physics applications	June 2019
	Feast-of-Facts Seminar RSAA (ANU) Canberra, Australia High-dimensional data visualisation for physics applications	May 2019
	Seminar Ewha Womans University, Seoul, Korea Statistical visualisation of particle physics data: Sensitivity of parton distribution functions	Aug 2018
	Business Analytics Seminar Monash University, Australia Statistical visualisation of particle physics data	June 2018
	Particle Physics Seminar Monash University, Australia Understanding LHC searches for new physics with simplified models	March 2018

	PhD Thesis Defence LPSC Grenoble, France Understanding LHC searches for new physics with simplified models	Sept 2017
	Doctoral Seminar LPSC Grenoble, France Interpreting LHC searches for new physics with SModels	Mar 2016
SERVICE	Referee for Physical Review D Seminar organiser for Monash Business Analytics (from 2020)	
COMPUTING	Python, R, git Familiar with particle physics simulation and analysis software including MadGraph5, Pythia, Delphes and MadAnalysis5 Author of several open-source software packages	
LANGUAGES	German (native speaker) English (fluent) French (conversant)	
NATIONALITY	Austrian	