

## Work Experience

- since 03/2019 **Postdoc**, *Institut für Theoretische Physik*, Heidelberg
- Group leader generative neural networks for phenomenology
  - Development of new techniques for event generation and inference
  - Extension and improvement of the global Higgs effective field theory fit with *SFitter*
- 03/2018 – 02/2019 **Research Scientist for Machine Learning**, *NEC*, Heidelberg
- Development of algorithms for classification and generation of graph structured data
- 11/2017 – 12/2017 **Postdoc**, *Institut für Theoretische Physik*, Heidelberg
- Development of new Machine Learning methods for Higgs channel categorization

## Education

- 10/2014 – 11/2017 **Ph.D.**, *ITP, Universität Heidelberg*  
Ph.D. thesis “Global Fits for New Physics at the LHC and Beyond”  
supervised by Tilman Plehn
- 10/2012 – 10/2014 **Master of Science**, *Universität Heidelberg*  
Master thesis “Constraining the NMSSM with LHC and Planck”  
carried out at LAL in Orsay, France, supervised by Dirk Zerwas and Tilman Plehn
- 09/2009 – 10/2012 **Bachelor of Science**, *Universität Heidelberg*  
Bachelor thesis “Cuts on Fox-Wolfram Moments”  
supervised by Catherine Bernaciak and Tilman Plehn
- 08/2000 – 03/2009 **AbiBac**, *Bertha-von-Suttner-Gymnasium, Andernach*  
Bilingual German-French education program leading to Abitur plus Baccalauréat

## Fellowships, Prices and Grants

- 2020 **HEiKA Project**, “*Machine Learning in LHC Theory*”  
Funding for a shared postdoc position with Gudrun Heinrich (KIT)
- 2017 **Dr.-Wilma-Moser-Preis 2017**  
Price for youngest female Ph.D. to obtain summa cum laude,  
awarded by Heidelberg University, Naturwissenschaftliche Gesamtfakultät
- 01/2015 – 12/2017 **Graduate College Associate**  
Intensive graduate program including units of studying, teaching of lecture, travel funding
- 01/2015 – 09/2017 **HGSFP Distinguished Fellowship**  
Ph.D. scholarship
- 09/2013 – 07/2014 **Erasmus scholarship**, *Université Paris-Sud*

---

## Teaching

### Lectures

- 12/2020 **Machine Learning for Particle Physicists**,  
*Vietnam School of Physics*, online, 5 lectures, 90 minutes each
- 06/2020 **How to GAN LHC events**,  
*MCNet Summer school Lund*, online, 1 hour lecture
- 01/2017 **Fitting Dark Matter**, *student lecture*, 3 lectures, 1 hour each

### Tutorials

- 10/2020 – 02/2021 **Electrodynamics**, Coordination of tutorials
- 10/2019 – 02/2020 **Quantum Field Theory**, Tutorial, 2 hours per week
- 04/2019 – 08/2019 **Analytical Mechanics and Thermodynamics**, Tutorial, 2 hours per week
- 09/2015 – 10/2015 **Mathematischer Vorkurs**, Tutorial, 3 weeks full time
- 04/2015 – 08/2015 **Quantum Mechanics**, Tutorial, 2 hours per week
- 10/2014 – 02/2015 **Mathematical Methods**, Tutorial, 2 hours per week

---

## Co-Supervision

- since 10/2020 **Master's student, Nathalie Soybelman**  
Symbolic regression
- since 03/2019 **PhD student, Marco Bellagente**  
Unfolding of detector effects using conditional generative adversarial networks
- 03/2019 – 10/2020 **PhD student, Ramon Winterhalder**  
PhD thesis "How to GAN - Novel simulation methods for the LHC"
- 03/2020 – 06/2020 **Bachelor's student, Mathias Backes**  
Bachelor thesis "How to unweight with GANs"
- 10/2019 – 03/2020 **Bachelor's student, Armand Rousselot**  
Bachelor thesis "Inverting LHC Detector Effects with Conditional INNs"
- 03/2017 – 12/2017 **Master's student, Elias Bernreuther**  
Master thesis "Mono-X Signals from Final States"

---

## Professional service

- since 09/2020 **Convener for ToolsSession IRN Terascale**
- since 02/2020 **Co-PI of IEA between IJCLab Orsay and ITP Heidelberg**  
Titel "Exploration de l'inflation avec des données cosmologiques et du LHC"
- since 2020 **Referee for Journals**  
SciPost Physics, Computing and Software for Big Science
- since 05/2019 **ITP Advisory Board of Directors**  
elected member
- 09/2010 – 10/2013 **Faculty Council**  
elected student representative

---

## Selected Talks (30 in total)

### Conferences & Workshops

- 11/2020 **Tools 2020**, *online*,  
“Generative networks for LHC events”
- 10/2020 **4th Inter-experiment Machine Learning Workshop**, *online*,  
“Invertible Networks or Partons to Detector and Back Again”
- 09/2020 **Top 2020**, *online*,  
“Machine learning models to generate top events”, invited talk
- 09/2020 **QCD at LHC-X**, *online*,  
“Machine Learning techniques for Monte Carlo generation”, invited talk
- 08/2020 **Snowmass Computational Frontier Workshop**, *online*,  
“Interface between simulation and ML”, invited talk
- 06/2020 **LHCP**, *online*,  
“Generative models for LHC physics”, invited talk
- 02/2020 **Machine Learning at the LHC**, *KMI, Japan*,  
“Neural networks for event generation”, invited talk
- 01/2020 **ML4Jets**, *NYU, US*,  
“GAN based event subtraction for Monte Carlo methods”
- 10/2019 **IRN Terascale**, *ULB Brussels, Belgium*,  
“How to GAN LHC events”
- 11/2017 **Forschergruppen meeting**, *BCTP Bonn, Germany*,  
“Deep-learned Top Tagging using Lorentz Invariance and Nothing Else ”
- 08/2017 **Multi-Boson Interactions 2017**, *KIT Karlsruhe, Germany*,  
“The Gauge-Higgs Legacy of the LHC Run I”, invited talk
- 05/2016 **Phenomenology 2016**, *University of Pittsburgh, US*,  
“The Gauge-Higgs Legacy of the LHC”
- 08/2015 **SUSY 2015**, *Lake Tahoe, US*,  
“Invisible Higgs decays and the GCE in the NMSSM”
- 06/2014 **GdR Terascale**, *LLR, France*,  
“SFitter and the NMSSM”, plenary talk

### Seminars

- 02/2021 **Seminar**, *heidelberg.ai, Germany*,  
“Boosting high energy physics with generative networks”, invited talk
- 02/2021 **Seminar**, *Cambridge, UK*,  
“Simulating and unfolding LHC events with generative networks”, invited talk
- 02/2021 **Seminar**, *SLAC, Stanford, US*,  
“Simulating and unfolding LHC events with generative networks”, invited talk
- 01/2021 **Seminar**, *ATLAS joint Statistics Forum & Machine Learning meeting*,  
“Machine learning techniques for event generation and unfolding”, invited talk

- 01/2021 **Seminar**, *HU Berlin/ DESY Zeuthen, Germany*,  
“Simulating LHC events with generative networks”, invited talk
- 11/2020 **Seminar**, *LPTHE, Paris, France*,  
“Simulating LHC events with generative networks”
- 10/2020 **Kolloquium**, *LPSC, Grenoble, France*,  
“Machine Learning in Particle Physics”, invited talk
- 01/2020 **Seminar**, *UC Irvine, US*,  
“Generative Neural Networks for LHC applications”, invited talk
- 12/2019 **Seminar**, *UCL Louvain-la-Neuve, Belgium*,  
“How to GAN LHC events”, invited talk
- 03/2019 **Seminar**, *CPPM, France*,  
“Deep-learned Top Tagging”

---

## Selected Publications (20 in total)

- 2020 **How to GAN Higher Jet Resolution**,  
*with P. Baldi, L. Blecher, J. Collado, J. N. Howard, F. Keilbach, T. Plehn, G. Kasieczka, D. Whiteson,*  
arXiv:2012.11944
- 2020 **Measuring QCD Splittings with Invertible Networks**,  
*with S. Bieringer, T. Heimel, S. Höche, U. Köthe, T. Plehn, S. T. Radev,*  
arXiv:2012.09873
- 2020 **How to GAN Event Unweighting**,  
*with M. Backes, T. Plehn, R. Winterhalder,*  
arXiv:2012.07873
- 2020 **Generative Networks for LHC events**,  
*with T. Plehn,*  
*to appear in Artificial Intelligence for Particle Physics,* arXiv:2008.08558
- 2020 **GANplifying Event Samples**,  
*with S. Diefenbacher, G. Kasieczka, B. Nachman, T. Plehn,*  
arXiv:2008.06545
- 2020 **Invertible Networks or Partons to Detector and Back Again**,  
*with M. Bellagente, et al.,*  
SciPost Phys. **9**, 074 (2020), arXiv:2006.06685
- 2019 **How to GAN Event Subtraction**,  
*with T. Plehn, R. Winterhalder,*  
SciPost Phys. Core **3**, 009 (2020), arXiv:1912.08824
- 2019 **How to GAN LHC Events**,  
*with T. Plehn, R. Winterhalder,*  
SciPost Phys. **7**, 075 (2019), arXiv:1907.03764
- 2019 **The Machine Learning Landscape of Top Taggers**,  
*with G. Kasieczka et al.,*  
SciPost Phys. **7**, 014 (2019), arXiv:1902.09914
- 2018 **Actual Physics behind Mono-X**,  
*with E. Bernreuther, J. Horak, T. Plehn,*  
SciPost Phys. **5**, no. 4, 034 (2018), arXiv:1805.11637
- 2017 **Deep-learned Top Tagging with a Lorentz Layer**,  
*G. Kasieczka, T. Plehn, M. Russell,*  
SciPost Phys. **5**, no. 3, 028 (2018), arXiv:1707.08966
- 2016 **On the Validity of Dark Matter Effective Theory**,  
*with M. Bauer, N. Desai, J. Gonzalez-Fraile, T. Plehn,*  
Phys. Rev. D **95**, no. 7, 075036 (2017), arXiv:1611.09908
- 2016 **The Gauge-Higgs Legacy of the LHC Run I**,  
*with O. J. P. Éboli, J. Gonzalez-Fraile, M.C. Gonzalez-Garcia, T. Plehn,*  
JHEP **1607**, 152 (2016), arXiv:1604.03105
- 2015 **Linking the Galactic Center excess to invisible Higgs boson decays in the NMSSM**,  
*with T. Plehn, M. Rauch, D. Zerwas, S. Henrot-Versillé,*  
Phys. Rev. D **93**, 015011 (2016), arXiv:1507.02288

2013 **Fox-Wolfram Moments in Higgs Physics**,  
*with C. Bernaciak, M. S. A. Buschmann, T. Plehn,*  
Phys. Rev. D **87**, 073014(2013), arXiv:1212.4436