

# ERIC SCHANET

DATA SCIENTIST | PARTICLE PHYSICIST

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Luxembourgish national, located in Zurich (Switzerland) and Munich (Germany).

## PROFILE

Particle physicist with over 3 years of experience in leveraging data science techniques for analysis of petabyte-scale data recorded at the Large Hadron Collider at CERN. In-depth knowledge of advanced statistics and mathematics, and strong expertise in computer science. Core competencies include predictive modelling using machine learning and stochastic methods, exploratory data analysis, deploying pipelines on compute clouds, quantitative problem solving in cross-functional teams, and data visualization. Significant experience working in large, international collaborations and coordinating projects from initiation to completion. Co-author of over 80 peer-reviewed scientific publications ([Google Scholar](#)) and regular speaker at international conferences and workshops.

## EDUCATION

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|------|---|---|
| 2021 | <b>Ph.D. PHYSICS</b><br>Ludwig-Maximilians-University Munich  | <ul style="list-style-type: none"><li>• <b>Thesis:</b> Searches for supersymmetry using data recorded at the Large Hadron Collider at CERN.</li><li>• <b>Grade:</b> <i>Summa cum laude.</i></li></ul>   |
| 2018 | <b>M.Sc. PHYSICS</b><br>Ludwig-Maximilians-University Munich  | <ul style="list-style-type: none"><li>• <b>Selected coursework:</b> Computational physics, advanced theoretical physics.</li><li>• <b>Thesis:</b> Multivariate statistical analysis of LHC data leveraging machine learning algorithms. <b>Grade:</b> <i>Very good.</i></li></ul>                 |
| 2016 | <b>B.Sc. PHYSICS</b><br>Ludwig-Maximilians-University Munich<br>Leopold-Franzens-University Innsbruck | <ul style="list-style-type: none"><li>• <b>Selected coursework:</b> Numerical physics, statistical physics, mathematical methods for theoretical physics, software engineering for physicists</li><li>• <b>Thesis:</b> Sensitivity studies for LHC analyses. <b>Grade:</b> <i>Good.</i></li></ul> |

## PROJECTS

### Fast statistical models

Research Fellow, ATLAS Collaboration  
[Github](#), [Public Talk](#)

### Developed method to approximate the statistical models of physics analyses.

- Implemented in python using NumPy and SciPy stack, relying on PyTorch tensor algebra and automatic differentiation of log-likelihood gradients.
- Achieved up to 250x faster profile likelihood based statistical inference without significant loss in statistical precision.
- Leveraged PCA for optimal compromise between efficiency and accuracy.
- Used by analysis teams in large-scale interpretations of 200 million models.

### Reproducible HEP analyses

Research Fellow, ATLAS Collaboration

### Implemented framework for fully reusable, reproducible, and reinterpretable particle physics analysis pipelines.

- Captured full analysis software environment using Docker containers and Gitlab CI/CD as *Function as a Service*.
- Developed sharable analysis pipelines using declarative workflow format.
- Deployed pipelines on various compute cloud infrastructures (e.g., Kubernetes, HTCondor), allowing highly scalable *Workflows as a Service*.

### Grid computing anomaly detection

Research Fellow, ATLAS Collaboration  
[Github](#)

### Developed low-latency grid computing monitoring and anomaly detection.

- Built ETL processes using raw data from CERN and WLCG databases, cleaning and consolidating into InfluxDB time-series and MySQL metadata databases.
- Implemented visualizations and dashboards using Grafana.
- Used by ATLAS computing shifters for anomaly detection and investigation, achieving 6x improvement in latency over alternative system.

# EXPERIENCE

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Mar. 2014 – Oct. 2018

## Software Engineer, Consultant

Codelight (Freelance), Weabe S.A.

### Full-stack development of various mobile and web applications using Objective-C and Swift. Consulting work on general IT business problems.

- Developed and launched iOS messenger app using Swift frontend, JavaScript backend, MondoDB and PostgreSQL databases.
- Co-founded the start-up *Weabe*, a digital marketplace platform for Luxembourg, reached 100k unique users in first year of operation.
- Implemented ETL pipeline allowing client to meet financial audit deadline.

Apr. 2015 – Aug. 2018

## Teaching Assistant

Ludwig-Maximilians-University Munich

### Teaching assistant for practical course in physics for 800 medical students.

- Assisting students with assignments and general inquiries.
- Supervision of students during practical course.
- Organization and grading of final exams.

Jul. 2016 – Sep. 2016

## Financial Analyst Intern

Dealis Fund Operations

(DekaBank and Allianz Global Investors)

### Involved in various aspects of daily fund operations and financial reporting.

- Identified and implemented improvements to key processes for internal accounting and reporting processes.
- Developed packages for analysis and reporting of financial statements using Excel VBA and internal databases.

# SKILLS

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## Programming Languages

## Libraries

## Databases

## Data Visualization

## Tools and Software

## Operating Systems

## Version Control

## Languages

**Proficient:** Python, Unix Shell Scripting, Objective-C, Swift, TeX

**Knowledge in:** C/C++, Java, JavaScript, R

NumPy, Pandas, Scikit-Learn, SciPy, Keras, PyTorch, Dask, Jupyter

SQL (MySQL, SQLite), NoSQL (InfluxDB, MongoDB, Elasticsearch)

Matplotlib, Seaborn, Flask, Grafana, Plotly, D3.js

Docker, CI/CD, AWS, Kubernetes, OpenShift, XCode, ROOT, React

Linux/Unix, MacOS, Windows

Git, SVN

English (fluent), German (fluent), French (fluent), Luxembourgish (native)

# ACHIEVEMENTS

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March 2019

## PhD Project Grant

Fellow of the Luxembourg National Research Fund

- Selected for prestigious grant by the Luxembourg National Research Fund for research project searching for new physics using data from the LHC at CERN.
- Granted 110.000 EUR over the course of 2.5 years.

June 2019

## Lindau Nobel Laureate Meetings

Fellow of the Wilhelm & Else Heraeus Foundation

- Participation in the 69<sup>th</sup> Lindau Nobel Laureate Meetings, where 580 selected young scientists met 39 Nobel Laureates in Physics for an inspiring dialogue.
- Extraordinary scientific and networking opportunity.

# EXTRACURRICULAR

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Nov. 2018 – PRESENT

## Particle Physics Masterclasses

- Speaker at regional and international masterclasses on particle physics, conveying the fundamental laws of nature to students and high school teachers.

Nov. 2011 – PRESENT

## Astrophotography

- Photographs of planets, stars and galaxies in the night sky using telescope on custom-designed guiding mount. Published in journals and articles.

Oct. 2005 – PRESENT

## Volleyball

- Active player and coach in Luxembourg and Germany. Team captain at CEV Small Countries Division Championship Finals with Luxembourgish national team.