

Switching from Academia to Industry

My journey from particle physics to Data science

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- ⦿ PhD skills for industry jobs
- ⦿ Which industry job suits you?
- ⦿ Tips for being better prepared



Academia

My journey



B.Sc Physics (AUTh)

M.Sc Computational Physics (AUTh)

Ph.D Experimental Particle Physics (UGA - CERN)

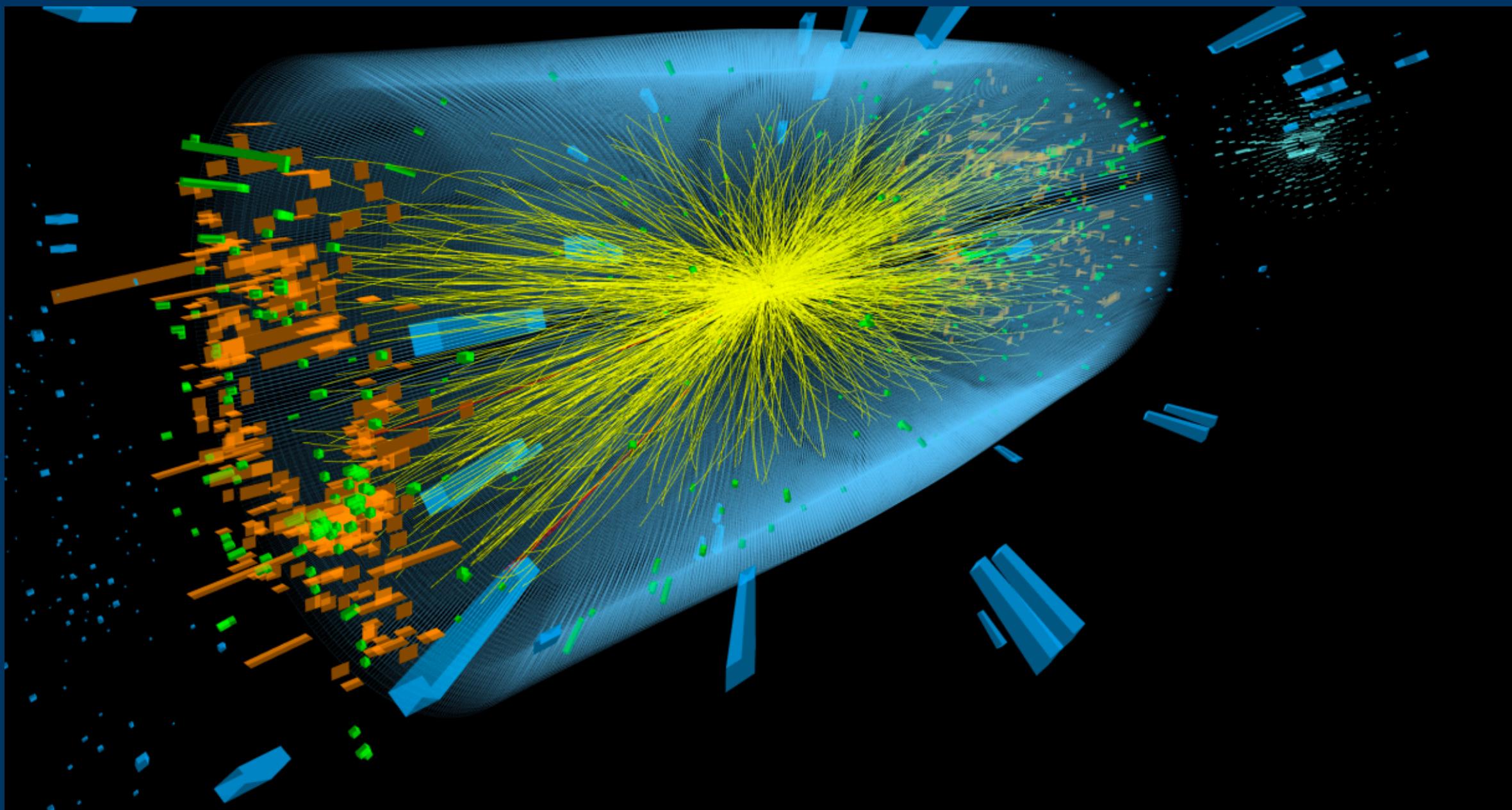
~~PostDoc~~

Data Scientist (AdTech)



Research at CERN

(European Organization for Nuclear Research)



To test our best theories about the fundamental structure of our universe, CERN has build a massive particle collider which generates an enormous amount of data:

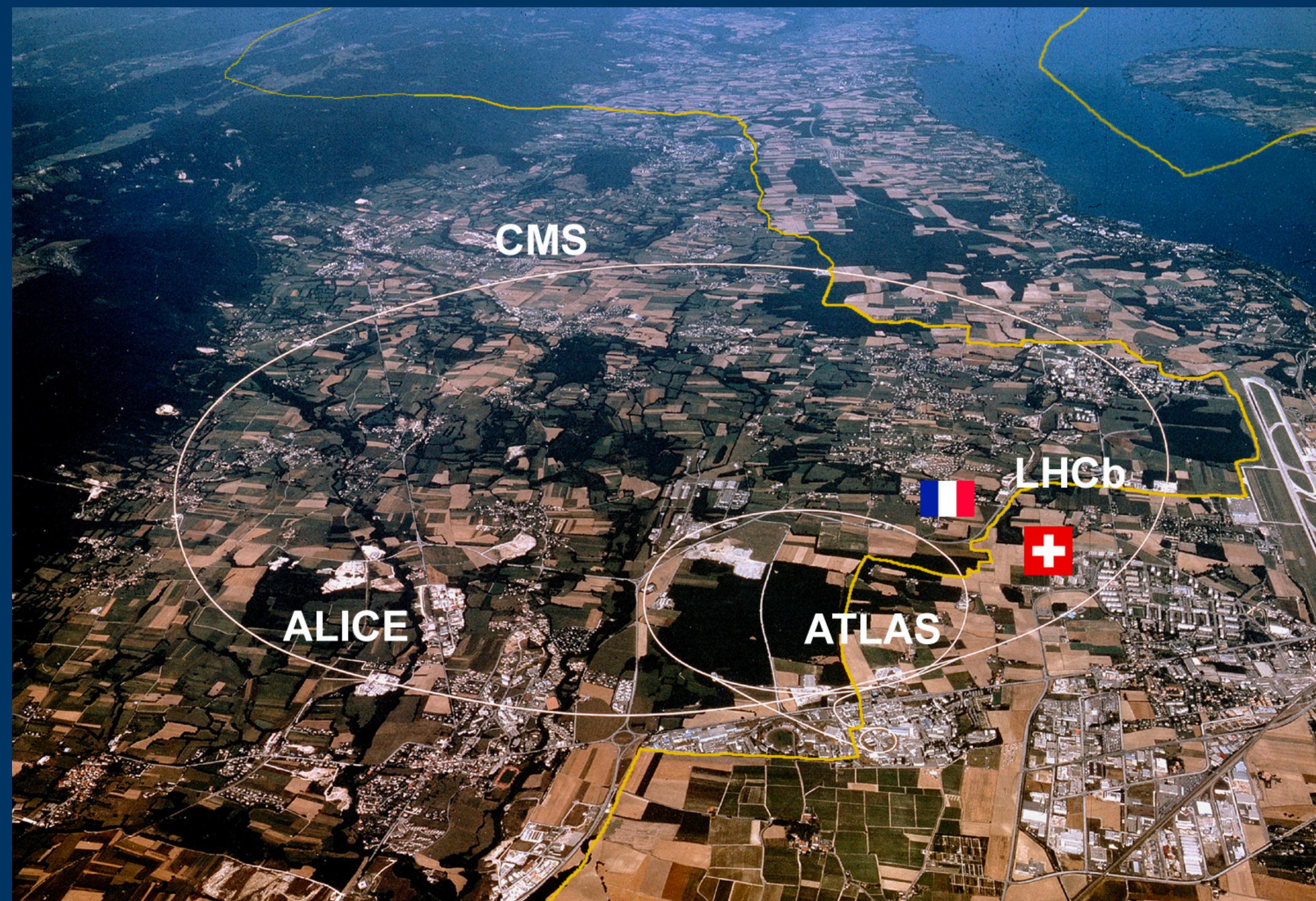
~1 billion of collisions/second -> 1PB of collision data per second

Hundreds of different processes happening all at once

Challenge for researchers: Extract the signal they are interested in by eliminating the background noise



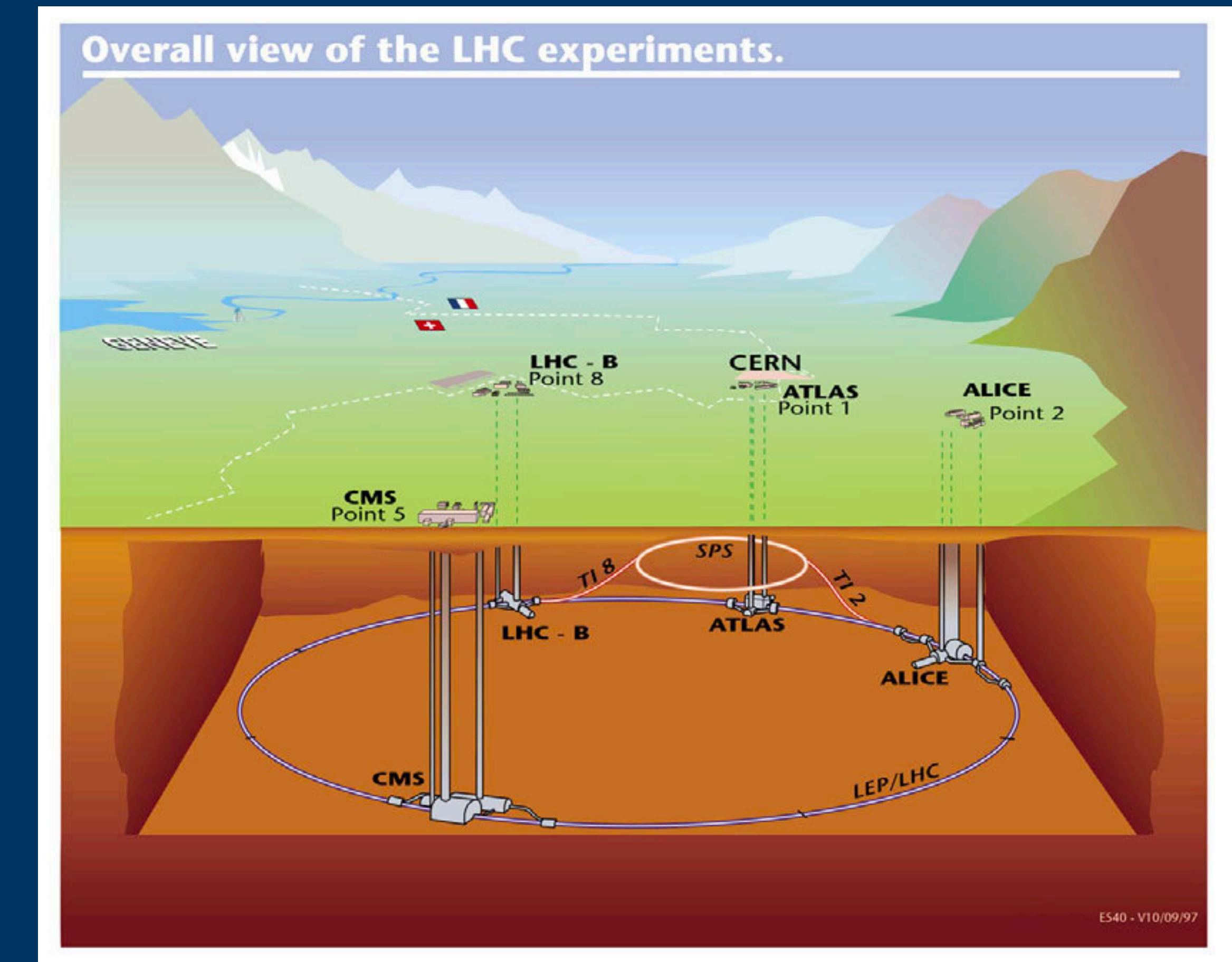
Research at CERN



CERN involves around 17k people



is located on the border of France and Switzerland

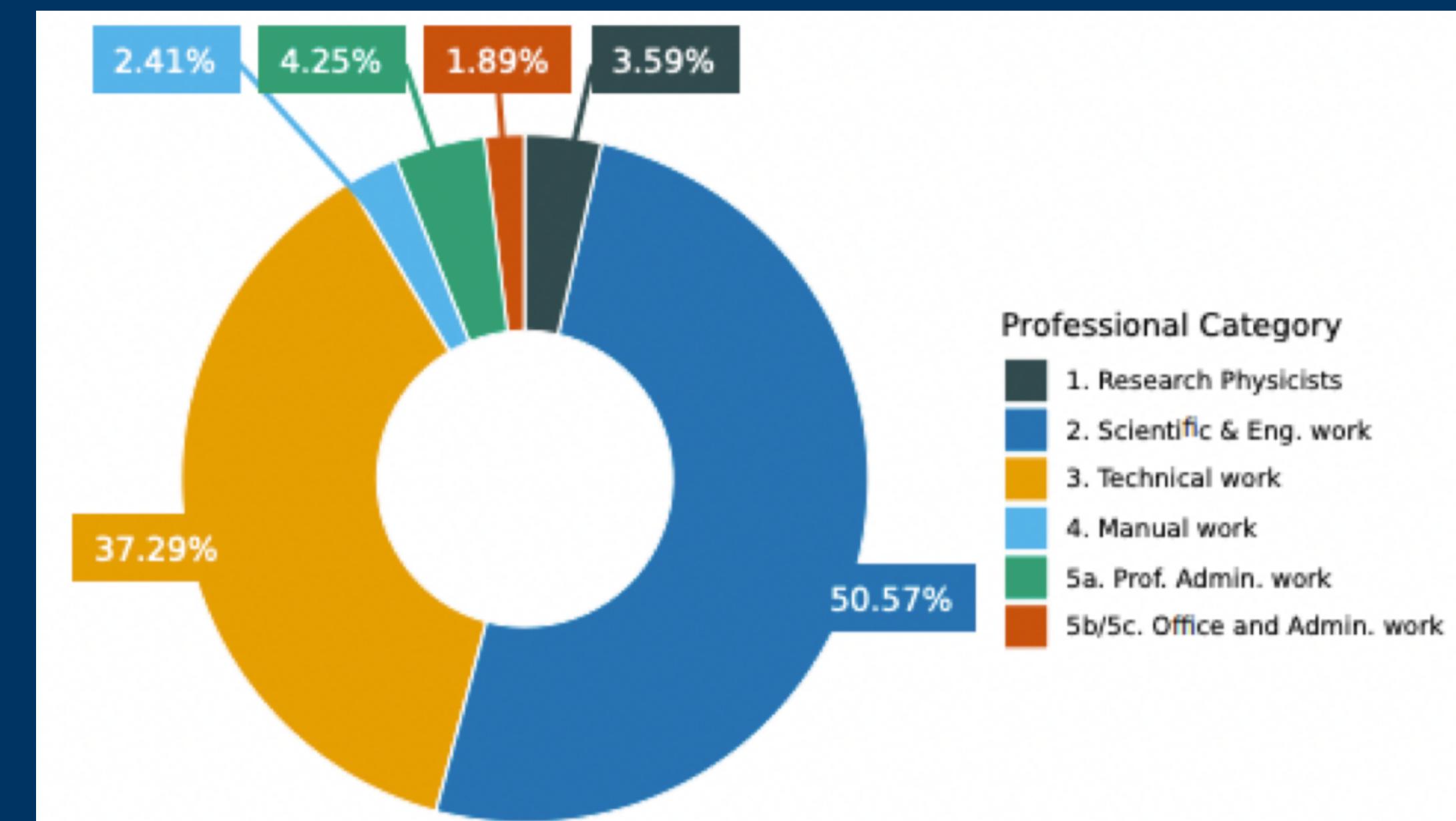


Research at CERN

At CERN, the primary focus is physics, but physicists are the minority!

Other fields:

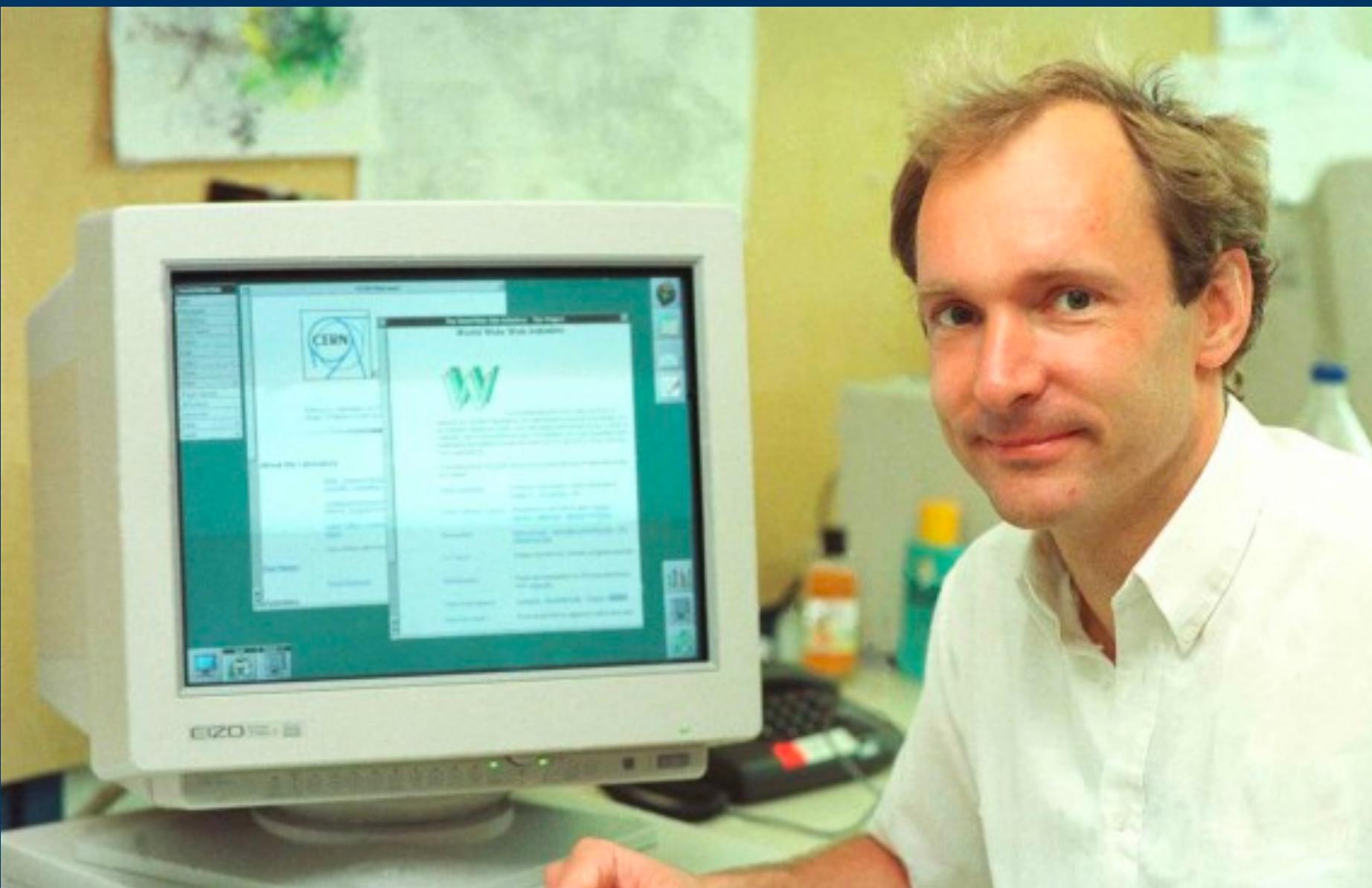
- ⦿ Computer Science
- ⦿ Engineering
- ⦿ Medicine
- ⦿ Environmental protections



Important discoveries at CERN

Physics related:

- Discovery of the Higgs boson (2012)



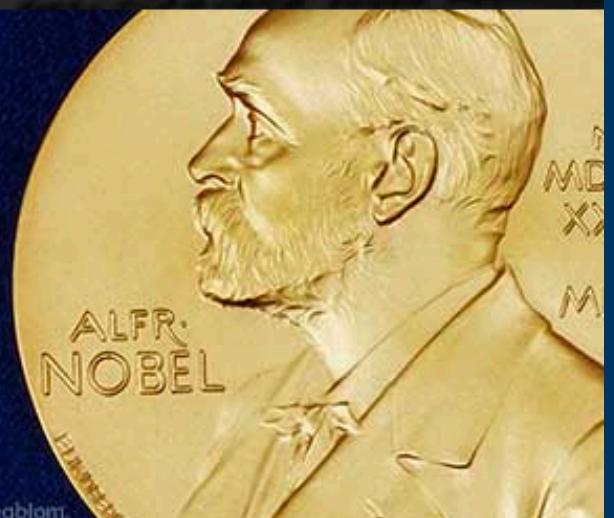
Non-Physics related:

- Development of the World Wide Web (1989)

2013 NOBEL PRIZE IN PHYSICS

François Englert Peter W. Higgs

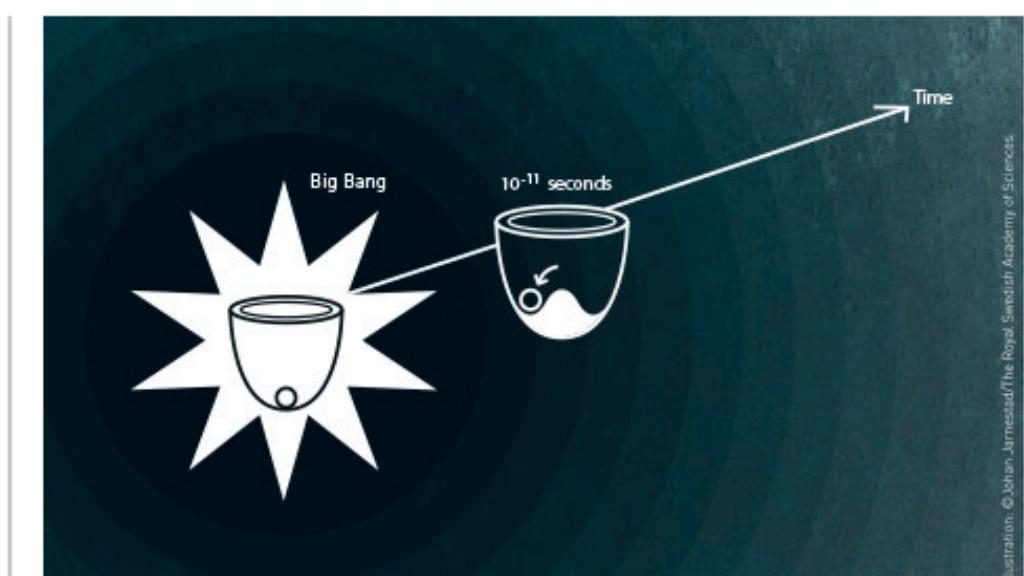
© © The Nobel Foundation. Photo: Lovisa Engblom.



F. Englert and P. Higgs
Photo: Wikimedia Commons

2013 Nobel Prize in Physics

The Nobel Prize in Physics 2013 was awarded jointly to François Englert and Peter W. Higgs "for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass in subatomic particles".



What Happened after the Big Bang?

Illustration: © Nobelpress/The Royal Swedish Academy of Sciences

Announcements of the 2013 Nobel Prizes

Physiology or Medicine:
Announced Monday 7 October

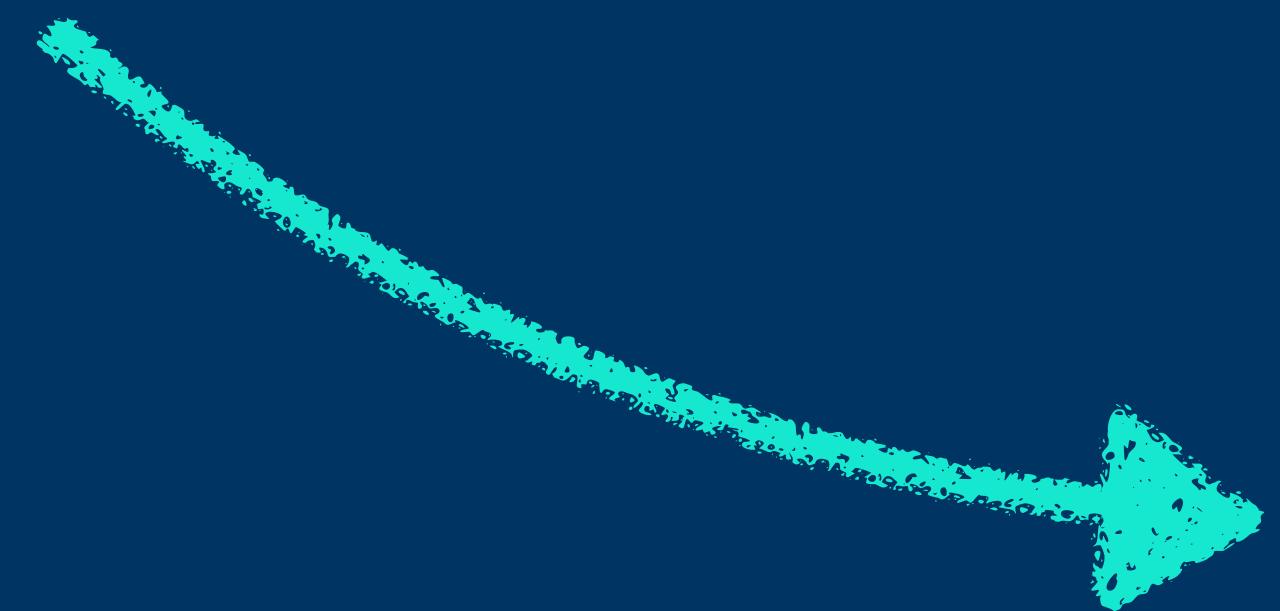
Physics:
Tuesday 8 October, 11:45 a.m. CET
at the earliest

Chemistry:
Wednesday 9 October, 11:45 a.m.
CET at the earliest

Literature:
Thursday 10 October 1.00 p.m. CET
Peace:

My research at CERN

- Working at ATLAS experiment
- Analyze experimental data in the search for evidence of new physics
- Use Machine learning models in order to distinguish signal from background events
- Build statistical models to account for detector effects that interfere with the output

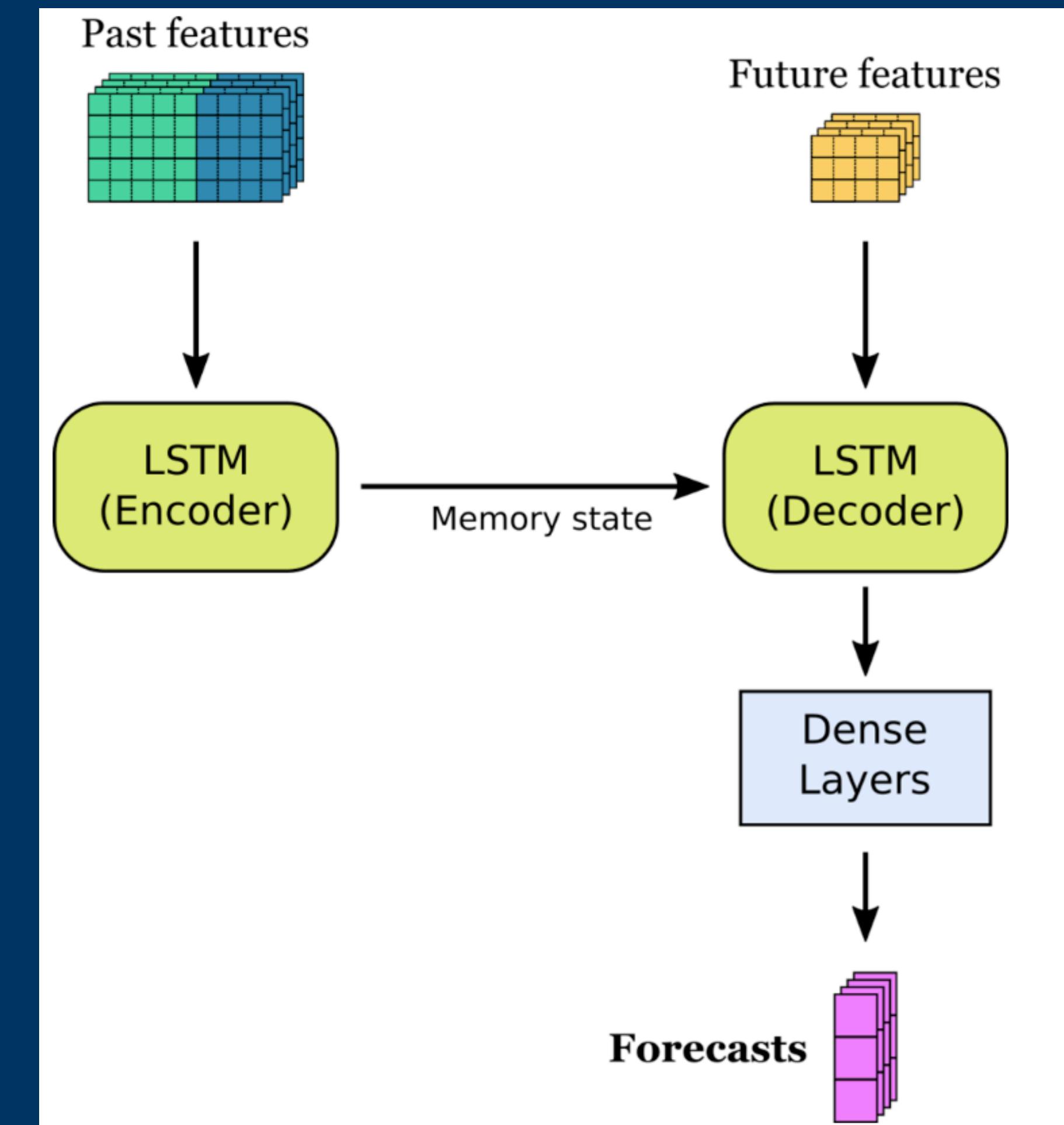
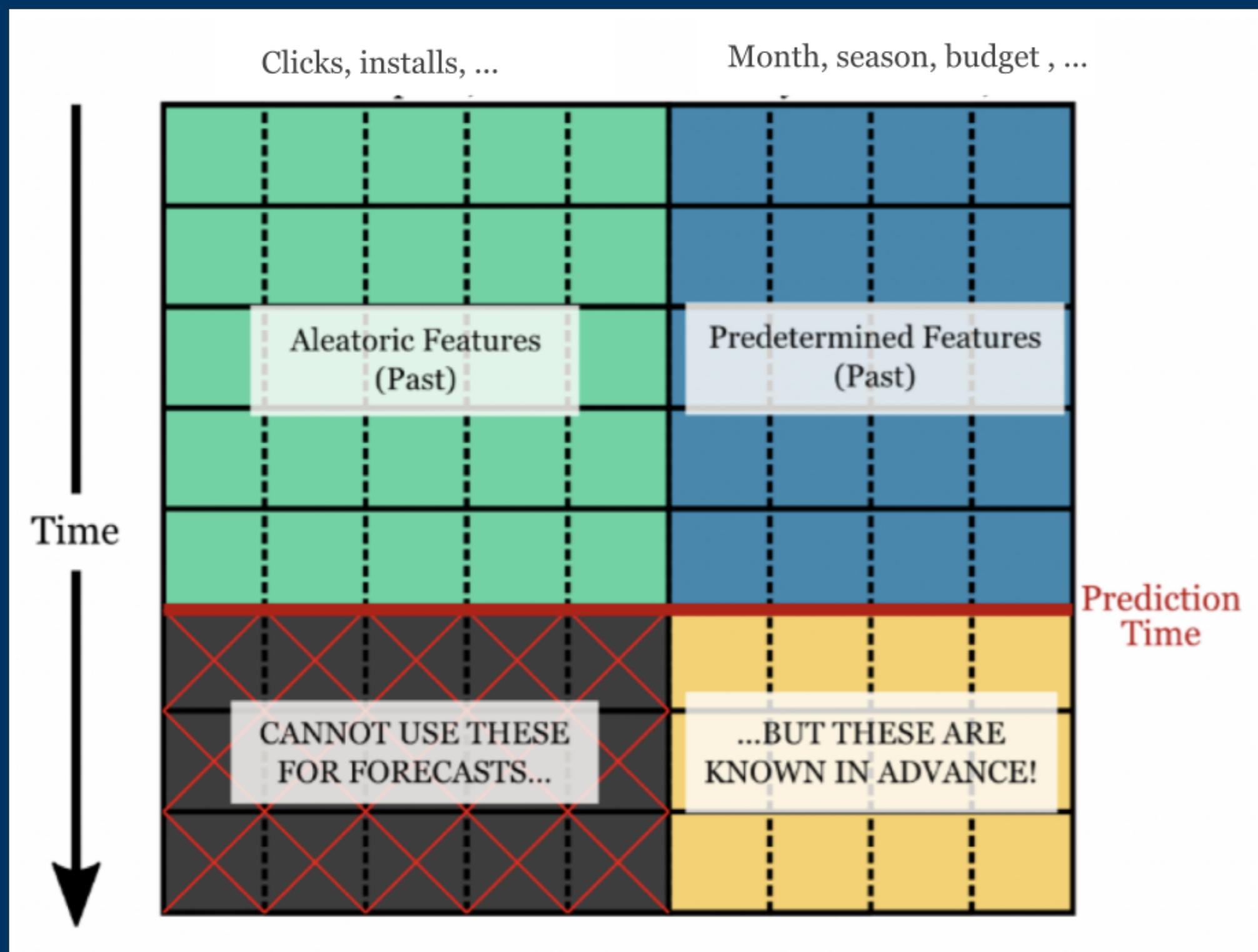


So kind of an industrial
“Data scientist” profile

Industry

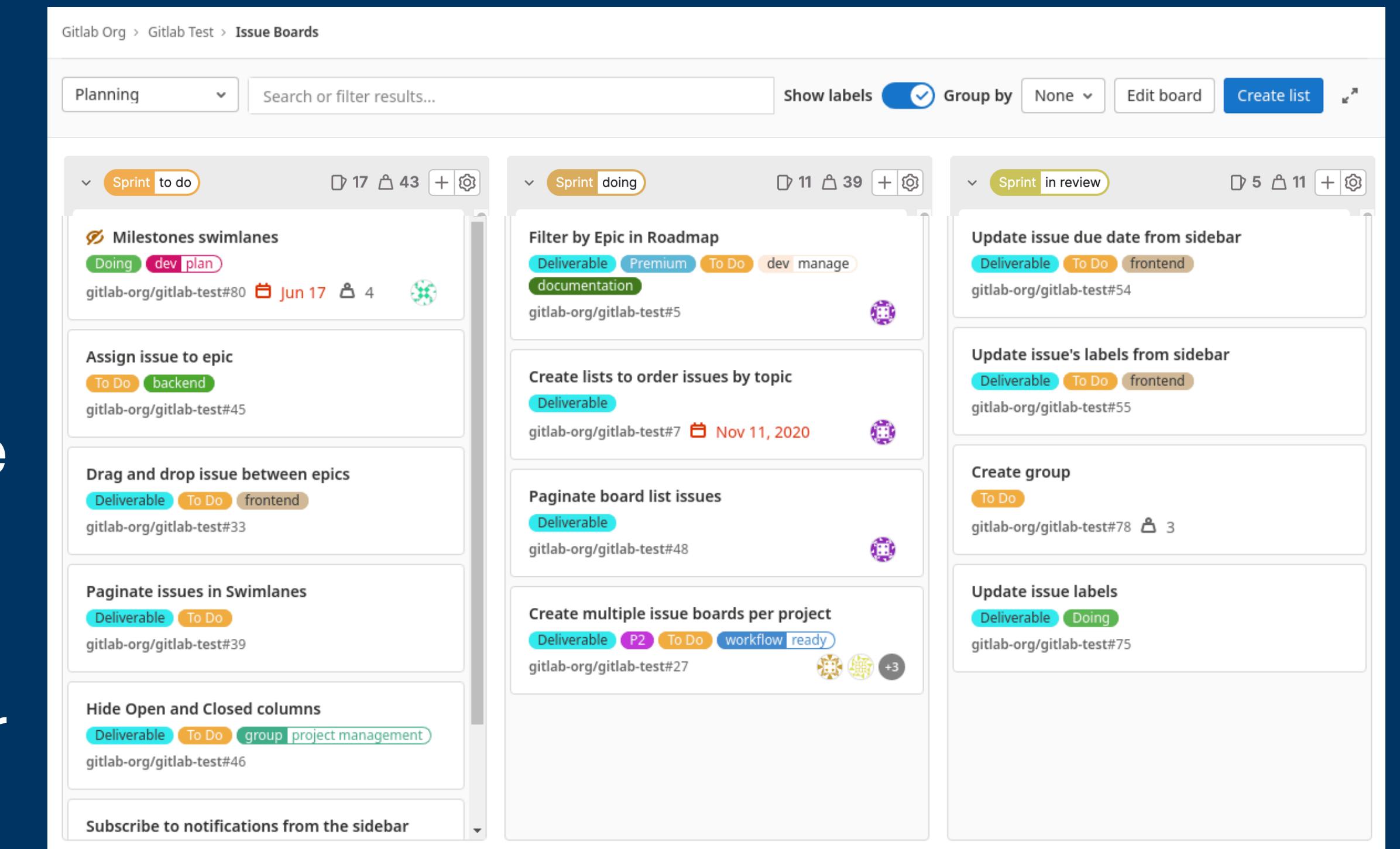
My research in industry

- Time Series forecasting using Neural Network
- Purpose: Predict future revenues
- Based on Encoder-Decoder architecture



Industry workflow

- ⌚ Oftentimes there are meetings with product, business or other tech people
- ⌚ Projects are typically divided into small tasks whose status has to be reported frequently
- ⌚ Organisation and splitting of task is done with the help of “boards”
- ⌚ Project decisions are taken after discussions between tech+product+business teams. However, the tech team is fully in charge of the technical approach
- ⌚ Co-working and open-space offices are common, but also many employees are fully or partially remote



To leave or not to leave?

Why might you hesitate to take on an industry job?



- ⦿ Academics often look down on industry jobs
- ⦿ It is an unknown world that you never experienced
- ⦿ It is all about money
- ⦿ There is no solidarity among colleagues
- ⦿ There is a lot of time pressure

Leaving academia

Why may you want to move?

- ⦿ Opportunity to work on cutting-edge technology and solve real-world problems
- ⦿ Opportunity for career advancements and leadership roles
- ⦿ Opportunity to apply your skills in a different and more challenging environment
- ⦿ Higher salaries and other benefits

Contra leaving academia

Why might you want to remain in academia?

- ⦿ You do not like the stress of competing and continuously trying to catch up with new technology
- ⦿ Teaching & mentorship opportunities: mentor and train students, you enjoy teaching and sharing knowledge
- ⦿ You can work on things that aren't (yet) profitable, but may be super interesting still
- ⦿ You prefer not to rush on your research/projects: less strict deadlines

Academia vs Industry

- ⦿ **Research focus:** oftentimes the driving force is if the project is publishable
- ⦿ **Research pace:** take a rigorous and methodical approach
- ⦿ **Variety:** usually focusing on one given project for years in order to build expertises
- ⦿ **Carrier progression:** ranks of professorship
- ⦿ **Collaboration:** normally among scientists of the same/similar domain

- ⦿ **Research focus:** focus on developing and commercialising products & technologies, applying science to solve problems in the marketplace
- ⦿ **Research pace:** you have to adjust and pivot to changing conditions
- ⦿ **Variety:** typically altering projects
- ⦿ **Carrier progression:** management / leadership roles
- ⦿ **Collaboration:** with variety of experts (business, product, engineers, scientist, clients ...)

Entering the Industry world

PhD skills for industry jobs

- ⦿ Programming skills
- ⦿ Research and analytical skills
- ⦿ Communication and presentation skills
- ⦿ Project management and leadership skills
- ⦿ Decision-making, problem-solving and trouble-shooting
- ⦿ Self discipline

Which industry job suits you?

Role	Key Responsibilities
Research Scientist	Conduct original research in ML and AI. Develop new algorithms, techniques, and models. Improving the performance of existing models.
Data Scientist	Use statistical and machine learning techniques to extract insights from data.
Data Analyst	Extract insights from data using statistical and visualisation tools. Creating dashboards and reports.
Data Engineer	Design, build, and maintain the infrastructure necessary to collect, store, and process large data sets.
Machine Learning Engineer	Design and develop machine learning models and systems. Implement, test and deploy machine learning models to production.
MLOps	Automation of model training and validation processes. Deployment and maintenance of machine learning models in production environments (cloud-based infrastructure).

Tips

- Try to **translate your experience** into the company's goals and emphasis
- Try to emphasise on **connecting the dots** between your experience and the company's needs
- Talk about your **results** and why they matter
- Usually there is **no need** to include all of your **publications**, awards etc
- Keep your CV short to **one-page** long
- They will spend few seconds glancing at your resume: **keep it simple** with emphasis to what they look for
- Often (especially start ups) present things that do not exist. Be careful on the description. -> Just because a company says they work on fancy topic X doesn't mean they really do (especially if they are startups). **Make sure to ask** what exactly the day-to-day work looks like

Tips

- Do not wait until your PhD defense to apply for industry jobs
- Internships are the best way to get to know the industrial world and to build your network
- In industry, work experience matters more than titles
- Oftentimes your PhD work is consider as experience (but not always)
- Interviews in industry take longer and they are more intense
- In industry “personality” checks matter a lot

Thank you & good luck!