

# Tuan Pham

## Data Scientist

Geneva, Switzerland | +41 7 54 11 74 09 | [tuanpham1503@gmail.com](mailto:tuanpham1503@gmail.com)



Doctoral researcher at CERN specialised in machine learning solutions for particle physics. 5 years of experience in international and collaborative research projects, with a focus on solving scientific challenges with artificial intelligence.

## Experience

### **Doctoral researcher, European Organization for Nuclear Research. Geneva, Switzerland, 12/2022 - Present**

- Developed a novel algorithm based on graph neural networks for the reconstruction of charged particle trajectories in the ATLAS experiment, attained 30-fold acceleration in computation time on GPU.
- Optimized models on a dataset of 20 million simulated particle collisions, achieved 99% recall and precision.
- Boosted inference speed by up to 50% using technologies such as just-in-time compilation and automatic mixed precision, and quantisation of model parameters.
- Integrated machine learning models designed and trained in Python into ATLAS production software in C++.
- Developed a framework for R&D and oversaw a team of 10 developers to ensure code quality and reproducibility via unit testing and GitLab-CI/CD.
- Delivered 5 presentations at international conferences, authored 2 peer-reviewed publications, and provided technological support to external partners.

### **Research Fellow, Lawrence Berkeley National Laboratory. Berkeley, USA, 01/2022-11/2022**

- Developed generative machine learning algorithms for fast simulation of particle interaction.
- Achieved 70% throughput increase at high fidelity with Generative Adversarial Network and Normalizing Flow trained on 430000 simulated interactions.
- Optimized development cycle with online monitoring and high-performance computing job scheduling.

### **Research Assistant, European Organization for Nuclear Research. Geneva, Switzerland, 01/2020 - 12/2021**

- Analyzed a dataset of 139 trillion particle collisions to quantify production rate of exotic particles.
- Performed statistical hypothesis testing, visualized results, improved search sensitivity by up to 200%.

## Education

**Doctor of Philosophy in Physics – University of Wisconsin-Madison, USA. 01/2020 – 06/2025**

**Master of Science in Physics – University of Wisconsin-Madison, USA. 01/2018 – 06/2020**

**Bachelor of Science in Physics and Chemistry – Union College, USA. 09/2014 – 06/2018**

## Technical skills

Programming languages: Python, C++.

Machine learning: PyTorch, PyTorch Lightning, PyTorch Geometric, TensorFlow, Scikit-learn, XGBoost, ONNX.

Data analysis: SQL, Pandas, NumPy, Matplotlib, Seaborn, Plotly.

Code development: Docker, GitLab, CI/CD, Linux, Slurm/HPC.

Mathematics: Statistical data analysis, linear algebra, differential equation.

Soft skills: Teamwork, technical communication, autonomy, self-education.

## Languages

English (fluent), Vietnamese (native), French (intermediate)

## References

Dr. Jan Stark – Laboratoire des deux Infinis, CNRS, Toulouse. Telephone: +33641440874. Email: [jan.stark@l2it.in2p3.fr](mailto:jan.stark@l2it.in2p3.fr)

Dr. Daniel Murnane – Niels Bohr Institute, Univ. of Copenhagen. Telephone: +4593838958. Email: [daniel.murnane@nbi.ku.dk](mailto:daniel.murnane@nbi.ku.dk)