

# JULES DUMONT

## Physics Engineering – Applied Mathematics

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## EDUCATION

### Master in Physics Engineering

#### École polytechnique de Bruxelles – ULB

Sept 2023 – Feb 2026

- Specialization in Applied Mathematics
- Thesis: *Randomized Quantum Approximate Optimization Algorithm* – spectral analysis of cost landscapes, entropy-regularized optimal control, Monte Carlo trainability diagnostics of MaxCut instances, awarded with High Distinction
- Graduated with Distinction

### Bachelor in Civil Engineering

#### Université libre de Bruxelles

2018 – 2021

- 3rd year : Specialization in Physics

## RESEARCH PROJECTS

### Physics-Informed ML for Dynamical Systems

#### Dynamical Meteorology Course – ULB

Dec 2023

- LSTM and Transformer architectures with physics-embedded loss functions applied to Lorenz-63 and Lorenz-96 chaotic systems
- Reconstruction of full system states from partial observations and chaotic statistical behaviour reproduction

### Critical Heat Flux Prediction

#### Internship – Tractebel

July – Sept 2023

- Deep neural network replacing look-up table interpolation for CHF prediction in nuclear fuel elements
- Parallelized Bayesian hyperparameter optimization via Optuna

### Multigrid PDE Solver in C

#### Numerical Methods Course – ULB

- Geometric multigrid-preconditioned conjugate gradient for the 2D Laplace equation on domains with rectangular holes
- V/W/F-cycles, Gauss-Seidel smoothing, CSR storage format

Other projects, descriptions & github repo :

[julesdumont.com](https://julesdumont.com)

## TEACHING

### Teaching Assistant

#### École polytechnique de Bruxelles

2024 – 2026

- Practical sessions for *Introduction to Quantum Physics and Statistics* (2nd-year undergraduate course)

## TECHNICAL SKILLS

Python

C/C++

PyTorch

Optuna

NumPy/SciPy

Git

LaTeX

Linux

## LANGUAGES

French

English



## RESEARCH INTERESTS

- Physics-constrained machine learning
- Quantum algorithms
- Numerical methods & scientific computing
- Data assimilation

## OTHER EXPERIENCE

### Accelerator Physics Program

#### CERN

Jan 2025

### Tutor

#### Schola ULB

2023 – 2024

- Mathematics, physics, and chemistry tutoring in secondary schools