

Colin Dietrich

Master student in Engineering Physics

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Profile

Driven engineering student with dual degrees from École Polytechnique de Bruxelles and Polytechnique Montréal, eager to pursue a career in the quantum computing industry to contribute to cutting-edge technological breakthroughs.

Education

Research MS in Engineering Physics *Polytechnique Montreal* **Montreal, CA** 2022-Present

GPA : 4.0/4.0

Coursework : Quantum Optics, Quantum Information, Ultrafast Photonics, A.I.: methods and algorithms, Quantum Field Theory (McGill University).

Research : Full time dedicated to a supervised research project, consisting in developing a bright source of entangled photons.

MS in Engineering Physics *École Polytechnique de Bruxelles* **Brussels, BE** 2021-Present

Grade : 18.62/20

Coursework : Quantum Mechanics II, Laser Physics, Numerical Methods, Plasma Physics, Digital Electronics, Nuclear Physics.

BS in Engineering Physics *École Polytechnique de Bruxelles* **Brussels, BE** 2018-2021

Honors : Magna Cum Laude

Coursework : Quantum and Statistical Physics, Linear Algebra, Quantum Mechanics I, Semiconductor Physics.

Projects

Nonlinear Materials optimization for Bright Quantum State Generation, *(Polytechnique Montreal)* **Montreal, CA** 2022 - Present

Presented at the 7th Montreal Photonics Networking Event : Developed a genetic algorithm for the inverse design of second order nonlinear materials to maximize entangled photon generation via SPDC, advancing quantum technology applications.

Novel Source of Engineered Quantum States of Light, *(Polytechnique Montreal)* **Montreal, CA** 2022-Present

Under Dr. Virally's guidance, leading a project to experimentally validate theoretical "band conditioned states" detailed in [Virally et al.](#) by injecting femtosecond pulses into an SHG crystal, seeding a SPDC process for high-rate entangled photon pairs. Employing balanced homodyne detection on one branch and intensity-based post-selection on its entangled counterpart allows for precise quantum state engineering.

Low-Noise Ultrafast Fiber Laser System, *(Polytechnique Montreal)* **Montreal, CA** 2023

Developed an ultrafast, low-noise all-PM Er:fiber laser system operating at 60.9 MHz for quantum optics, achieving high peak power pulses for nonlinear frequency mixing, with a broadband EDFA amplifying pulse energy to 4.2 nJ and enabling controlled spectral broadening to 55 nm (FWHM).

Development Cooperation Project, *(CAMESKIN)* **Kinshasa, RDC** 2021 - 2022

Engineered a solar energy monitoring system tailored for the Democratic Republic of Congo's rural regions, programming microcontrollers, developing a Kalman filter for enhanced accuracy, and implementing a MQTT-based remote monitoring app. The system was successfully installed in Kinshasa to monitor solar panels and batteries essential for medical storage.

Solver for two-dimensional Poisson equation, *(École Polytechnique de Bruxelles)* **Brussels, CA** 2020

Developed a C program employing iterative multi-grid methods and preconditioning techniques to efficiently solve 2D Poisson equations, optimizing convergence and computational performance for various membrane shapes.

Video Game Development, **Brussels, BE** 2018

Developed and published an arcade game on the App Store using Swift, showcasing innovative gameplay and engaging design.

Skills

- **Programming:** Python, C, C++, Java, Swift, HTML, CSS, Javascript, LaTeX, MATLAB, GNU Octave.
- **Software:** Github, PowerPoint, Excel, word, Adobe PhotoShop, Inkscape, Mathematica.
- **Language:** Native in French, professional skills in Dutch (obtaining the CNaVT, allowing higher education in Dutch) and English.
- **Soft Skills:** Presentation, Planning, Organized, Creative Problem-Solving, Teamwork, Active Listening, Adaptability, Analytical Thinking.

Work And Associative Experience

Laboratory Instructor and Teaching Assistant, (*Polytechnique Montreal*) **Montreal, CA** 2023 - present

- Led teams and evaluated initial concept projects in physical engineering (PHS1903), including pulse oximeters, infrared thermometers, wireless energy transfer systems, and laser sensing.
- Served as an evaluator for Statistical Physics (PHS2111) and Biophotonics courses (GBM8802).

Private Tutoring in Mathematics and Sciences, **Brussels-Montreal** 2021 - Present

- Self-employed as a private tutor, providing mathematics and science lessons to high school and university students.
- Delivered weekly instruction ranging from 4 to 12 hours, tailoring content to individual learning needs.

Youth Center Management, (*Jeugdhuis 't Uilekot*) **Brussels, BE** 2018 - 2022

- Managed a youth center, overseeing daily operations and event coordination.
- Organized various events, enhancing community engagement and youth participation.
- Handled financial management and collaborated on joint projects with the municipality of Uccle and external organizations.

Youth Scout Leader, (*Rosaire*) **Brussels, BE** 2018 - 2021

- Coordinated scouting events and educational programs for 8-12-year-olds, fostering teamwork and outdoor skills.
- Led the planning and execution of summer camps.

Tennis Instructor, (*BATD*) **Halle, BE** 2016 - 2018

- Provided individual and group tennis lessons to children, teenagers, and adults, totaling 4 to 10 hours weekly at TC Sollenbeemd, Halle, Belgium.
- Conducted all tennis coaching sessions in Dutch, ensuring effective communication and instruction.

Hobbies

- **Running** : Completed multiple marathons and currently training for my first ultra-marathon (100km).
- **Music** : Guitar (10 years of formal training at the Academy of Uccle) and piano.
- **Tennis** : Competitively ranked at C15.2 in Belgium.
- **Backpacking**
- **Physics**
- **Programming**