Colin Dietrich

Master Student in Engineering Physics

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Education

Research MS in Engineering Physics *Polytechnique Montreal* **Montreal, CA** *2022-2024*
GPA : 4.0/4.0
Coursework : Quantum Optics, Quantum Information, Ultrafast Photonics, A.I.: methods and algorithms, Quantum Field Theory (McGill University).

MS in Engineering Physics *École Polytechnique de Bruxelles* **Brussels, BE** *2021 - 2024*
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/Statistical Physics, Linear Algebra, Semiconductor Physics, Object-oriented programming.

Work and Associative Experience

Student Research Associate *(Laboratoire des Fibres Optiques)* **Montreal, CA** *2022 - 2024*
Full-time research focused on developing a bright entangled photon source, contributing to the experimental validation of "band conditioned states" (Virally et al.). The project involved injecting femtosecond pulses into an SHG crystal to seed SPDC, generating high-rate entangled photon pairs, and utilizing balanced homodyne detection with intensity post-selection for quantum state engineering. *(Supervisor: Dr. Virally).*

Laboratory Instructor and Teaching Assistant *(Polytechnique Montreal)* **Montreal, CA** *2023 - 2024*
Led teams and assessed physical engineering projects (PHS1903) on topics such as pulse oximeters, infrared thermometers, wireless energy transfer systems, and laser sensing. Additionally, evaluated coursework for Statistical Physics (PHS2111) and Biophotonics (GBM8802) courses.

Development Cooperation Project *(Codepo, 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.

Youth Scout Leader *(Rosaire)* **Brussels, BE** *2018 - 2021*
Coordinated events and programs for 8-12-year-olds, fostering teamwork and outdoor skills. Led summer camp planning and logistics.

Projects

Poster Presentation *(7th Montreal Photonics Networking Event)* **Montreal, CA** *2022 - 2024*
Presented at the 7th Montreal Photonics Networking Event : Developed a genetic algorithm for the inverse design of second order nonlinear materials to generate pure entangled photon pairs via SPDC. *(Supervisor : Dr. Virally).*

Design of a Low-Noise Ultrafast Fiber Laser System *(Polytechnique Montreal)* **Montreal, CA** *2023*
Developed an ultrafast fiber laser system for quantum optics applications, incorporating an EDFA for amplification to achieve broadband, high-peak-power pulses. *(Supervisor : Dr. Virally).*

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 - 2020*
Developed and published an arcade game on the App Store using Swift. Also created a tower defense game in Java (not published).

Skills

Programmation: Python, C, C++, Java, Swift, HTML, CSS, Javascript, LateX, MATLAB, GNU Octave.
Software: Github, PowerPoint, Excel, word, Adobe PhotoShop, Inkscape, Mathematica.
Language: Native French, proficient in English and Dutch.
Soft Skills: Presentation, Planning, Organized, Teamwork, Active Listening, Adaptability, Analytical Thinking.