Fritz Randulf Diorico, Ph.D.

Deep-Tech Physicist & Engineer — Quantum Technologies, Photonics, Ultra-Stable Lasers
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Profile

Experimental physicist and photonics engineer with 10+ years of experience designing, building, and commercializing advanced laser and quantum-sensing systems. Inventor on four international patents and project leader for a government-funded spin-off fellowship. Strong hands-on background in laser frequency stabilization, cavity systems, photonics hardware, and translating research into deployable prototypes.

Core Skills

Technical: Laser Physics • Frequency Stabilization • Photonics R&D • Quantum Sensing with cold atoms • Cavity Optics • Precision Metrology • Vacuum & Cryogenic Systems • Atomchip Platforms • System Integration & Prototyping

Software & Hardware: Analog/RF Electronics • Experimental Design • C/C++ • MATLAB • Python • Machining/Optics Assembly

Patents

Inventor on 4 international patents: US20250070534A1 (2025), WO2023118305 (2023), EP4336684A1 (2022), and EP4203206A1 (2021) focusing on laser-cavity stabilization, injection-locked laser control, and optical cavity signal monitoring. Core technology of www.tulonphotonics.com

Professional Experience

Research Fellow (Postdoctoral) — Centre for Quantum Technologies (CQT) *2026–Present*
Nanyang Technological University (NTU), Singapore

- Lead R&D in quantum sensing and precision measurement, developing robust, field-deployable quantum systems such as next-generation quantum sensors (inertial and electrometry).
- Engineer ultra-stable laser systems and low-noise photonics, leveraging deep-tech entrepreneurial experience to translate laboratory innovations into scalable real-world applications.

Technical–Entrepreneurial Advisor — Quantum Defense Innovation (QDI) *2025–Present*
Remote (Canada / Europe / UAE)

- Provided technical judgment and startup execution guidance, leveraging prior government-funded spin-off leadership.
- Supported quantum-enhanced authentication and secure architecture efforts by shaping scope, assumptions, risk boundaries, positioning, and commercialization for industry/defense-safe deployment.

Spin-off Founder & Laser Technology Lead — Tulon Photonics / Future Lasers (FFG) *2022–2024*
Institute of Science and Technology Austria

- Led a ∼€500k FFG Spin-off (Austria) Fellowship developing ultra-low-noise, widely tunable laser systems.
- Co-invented new cavity-locking and injection-locking techniques (now patented).
- Designed optical architectures, control electronics, and prototype systems for commercialization.

Postdoctoral Researcher — Quantum Sensing with Atoms & Light *2018–2022*
IST Austria, Onur Hosten Group

- Built and stabilized high-finesse cavity systems achieving 10^{-7} cavity-linewidth-scale frequency stability.
- Co-invented advanced laser stabilization methods used in precision metrology.
- Mentored PhD and MSc students.

Research Assistant (PhD & Post-PhD) — Atomchip & Superconducting Hybrid Quantum Systems *2010–2018*
TU Wien, J. Schmiedmayer Group

- Developed a cryogenic atomchip platform combining superconductors and ultracold atoms.
- Designed magnetic transport systems, vacuum hardware, and experimental control electronics.

Education

Ph.D. in Physics (Dr.rer.nat., Highest Distinction) — TU Wien *("Sub auspiciis" qualified)* *2011–2016*
CoQuS admission interview panel led by **2022 Nobel Laureate Anton Zeilinger**.

MSc Photonics (Erasmus Mundus Full Scholarship, Distinction) — Belgium & Scotland *2008–2010*

BSc Applied Physics (Cum Laude) — University of San Carlos, Philippines *2003–2008*

Publications & Additional

Publications: *Optica, Optics Letters, Applied Optics, PR Applied, PR Research, App. Phys. B, NJP, SciPost*. H-index: 6; citations: 145 (Google Scholar).

Additional: BSF Fellow (Wilbe Science Founder Program). Fluent in English; conversational German. Extensive mentoring experience.