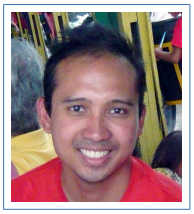
8 Ganciang St., Punta Princesa, Cebu City, Philippines 6000
111 Yunan Crescent Singapore 638222
+63 9222182187
+43 6607667681
fritzdiorico@gmail.com
www.fritzdiorico.com/
www.linkedin.com/in/fritzdiorico/
Nationality: Filipino



Fritz Diorico

Curriculum Vitae

Profile

Physicist with over a decade of experience in quantum physics, photonics, and laser technologies. Track record of translating research into IP and commercial prototypes. Strong experimental and engineering research background, innovation, and academic mentoring. Passionate about developing physics education and research with strong practical applications in the ASEAN region.

Research Interests

- Experimental and applied physics education, basic to advanced
- Quantum Technologies: quantum computing, quantum sensing and precision metrology
- Photonics and laser stabilization technologies
- Fiber-optic sensing applications especially on environmental undersea sensing: seismic, marine, man-made, etc.

Previous/Current Employment

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

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

2025 – Present — **Technical–Entrepreneurial Advisor**, *Quantum Defense Innovation (QDI)*, 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.

May 2023 – Present — **BSF Fellow**, *Wilbe - Home for Scientist Leaders*, London, UK · Remote

- Class 9 - Become Science Founder (BSF9)
  `https://www.wilbe.com/`

August 2022 – October 2024 — **Xista Fellow (formerly TWIST)**, *Institute of Science and Technology Austria*, Klosterneuburg, Austria

- Towards the commercialization of ultra-low frequency noise and widely tunable lasers.
  FFG Spin-Off Fellowship Project Leader: Future Lasers (Tulon Photonics), Start: April 2023.
  `https://xista.io/`
  `https://www.tulonphotonics.com/`

July 2018 – July 2022 — **Postdoctoral Researcher**, *Onur Hosten Group, Institute of Science and Technology Austria (IST-Austria)*, Klosterneuburg, Austria

- Quantum Sensing with Atoms and Light: Towards collective enhancement and spin squeezing with atoms in a high-finesse optical cavity.
  `https://hostenlab.pages.ist.ac.at/`

November 2010 – March 2018 — **Project Research Assistant**, *Atomchip Group, Atominstitut TU Wien*, Vienna, Austria

- PhD and Postdoctoral work on the cryogenic atomchip experiment in Jörg Schmiedmayer's group.
  `https://atomchip.org`

- 2008–2010 **Full Scholar**, *Erasmus Mundus MSc Photonics*, Belgium/Scotland
  Full scholarship grant to pursue the double degree from the Erasmus Mundus MSc Photonics program.
- March-July 2007 **Intern**, *Koshin Philippines Corporation*, Mactan, Philippines
  Worked briefly as an intern on Physical Vapour Deposition of thin film coatings for lenses.

Education

Academic Qualifications

- 2011–2016 **Doctor of Philosophy in Physics, (Completed on 27 October 2016)**, *Atominstitut, Technische Universität Wien*, Vienna, Austria, *PhD work in Jörg Schmiedmayer's group,* **Graduated with the highest possible mark, 'Sub auspiciis Praesidentis' - qualified**, *Official title: Doctor rerum naturalium, Dr.rer.nat*
  Member of the Complex Quantum Systems (CoQuS) Doctoral program.
- 2008–2010 **Erasmus Mundus Masters of Science in Photonics**, *Graduated with Distinction*,
- 2009–2010 **MSc. Thesis and coursework**, *Heriot-Watt University*, Edinburgh, UK, *2nd Year of Erasmus Mundus MSc. Photonics*
  Nanophysics (SUPA course), Nanoscience Primer, Advanced Photonics Laboratory, Nanochemistry
- 2008–2009 **MSc Coursework**, *Ghent University and Vrije Universiteit Brussel*, Belgium, *1st year of Erasmus Mundus MSc. Photonics.*
  1 semester each university for coursework.
- 2003–2008 **BSc. Applied Physics**, *University of San Carlos*, Cebu, Philippines, *Cum Laude*

Notable Projects

- **Postdoctoral work + Technology transfer: 'Future Laser technologies and Quantum Sensing'**
  I was the first and sole postdoctoral researcher in Onur Hosten's Quantum Sensing group at IST-Austria, where I played a pivotal role in the development of groundbreaking quantum sensing experiments. Together with Onur, I co-invented an advanced laser frequency stabilization technology that significantly outperformed industry standards, achieving major breakthroughs in bandwidth and sensitivity for photonics applications. Additionally, I led the Austrian government-funded spin-off project, Future Lasers, driving innovation in laser technology and positioning the project at the forefront of the field.
- **PhD Thesis: 'Novel Atomchip Technologies with Superconductors'**
  The work involved combining ultracold atomic physics and superconductivity. A magnetic transport was built to bring ultracold ^{87}Rb atoms into a cryogenic environment. The setup opens up new atomchip technologies with superconductors either novel superconducting traps or with hybrid quantum systems experiments towards long-lived quantum memories for quantum computers.
- **MSc Thesis: 'Non-Abelian Atom Optics with Ultracold Atoms'**
  Research was completed at the Quantum Optics and Cold Atoms research group of Patrik Öhberg in Heriot Watt University, Edinburgh, UK. The objective was to study the matter-wave inteferometry dynamics of a quantum optically dressed 4-level system exhibiting artificial non-Abelian gauge fields.
- **Industrial and BSc.Thesis Project:'Three-dimensional Surface Reconstruction of Lenses through Fourier Domain Analysis of Interferograms'**
  This project was done along with the internship at Koshin Philippines Corporation to improve one of their quality control processes. The project deals with interferogram analysis using Fourier transform for phase recovery, phase unwrapping in C.
- **BSc. Project:'Numeric Recognition using Boltzmann Machine'**
  Boltzmann Machine Neural Network implementation in C for handwritten character recognition.

Patents

1. **F. Diorico**, O. Hosten, and IST-Austria Method for monitoring an optical signal extracted from an optical cavity US Patent App. 18/723,604: US20250070534A1, Jan 2025, claimed patent from PCT
   `https://patents.google.com/patent/US20250070534A1/en`

2. **F. Diorico**, O. Hosten, and IST-Austria PCT - International Patent, WO2023118305, 2023, Worldwide Claim: WO, KR, EP, JP, CN, US
   `https://patentscope.wipo.int/search/en/WO2023118305`
   `https://patents.google.com/patent/WO2023118305A1/en`

3. **F. Diorico**, O. Hosten, and IST Austria A closed loop method and a system for controlling an injection-locked laser, European Patent: EP4336684A1, 2022
   https://patents.google.com/patent/EP4336684A1/en

4. **F. Diorico**, O. Hosten, A robust modulation-free locking of a laser-cavity system,
   European Patent: EP4203206A1, 2021
   https://patents.google.com/patent/EP4203206A1/en

Publications

H-index: 6, Citations: 145
Based off Google Scholar as of March-2026:
ORCID: https://orcid.org/0000-0002-4947-8924
Selected peer-reviewed publications (full list via Google Scholar):
https://scholar.google.com/citations?hl=en&user=bLh5Ur4AAAAJ&view_op=list_works

1. S. Agafonova, U. Mishra, **F. Diorico**, O. Hosten Zigzag optical cavity for sensing and controlling torsional motion Physical Review Research 6 (1), 013141, Feb 2024
   https://doi.org/10.1103/PhysRevResearch.6.013141

2. **F. Diorico**, A. Zhutov, O. Hosten Laser-cavity locking utilizing beam ellipticity: accessing the 10^{-7} instability scale relative to cavity linewidth, Optica 11 (1), 26-31, Jan 2024
   https://doi.org/10.1364/OPTICA.507451

3. U. Mishra, V. Li, S. Wald, S. Agafonova, **F. Diorico**, O. Hosten Monitoring and active stabilization of laser injection locking using beam ellipticity, Optics Letters 48 (15), 3973-3976, 2023
   https://doi.org/10.1364/OL.495553

4. S. Wald, **F. Diorico**, and O. Hosten, Analog Stabilization of an Electro-Optic I/Q Modulator with an Auxiliary Modulation Tone, arXiv:2208.11591v1 [physics.optics] , Applied Optics 62, 1, Jan 2023
   https://doi.org/10.1364/AO.474118

5. V. Li, **F. Diorico**, and O. Hosten, Laser frequency offset locking at 10-Hz-level instability using hybrid electronic filters, arXiv:2111.13194v1 [physics.optics] , Phys. Rev. Applied 17, 054031, May 2022
   https://doi.org/10.1103/PhysRevApplied.17.054031

6. C. Lévêque, **F. Diorico**, J. Schmiedmayer J., and A. Lode Many-body density and coherence of trapped cold bosons, arXiv:2006.10755 [cond-mat.quant-gas], SciPost Phys. under review (2021)
   https://arxiv.org/abs/2006.10755

7. A. U. J. Lode, **F. Diorico**, R. Wu, P. Molignini, L. Papariello, R. Lin, C. Lévêque, L. Exl, M. Tsatsos, R. Chitra, N. Mauser, Many-body physics in two-component Bose-Einstein condensates in a cavity: fragmented superradiance and polarization,
   arXiv:1801.09448, New Journal of Physics Vol. 20, May 2018
   https://doi.org/10.1088/1367-2630/aabc3a

8. **F. Diorico**, S. Minniberger, B. Gerstenecker, T. Weigner, N. Shokrani, Z. Kurpias, J. Schmiedmayer, Current-induced magnetization hysteresis defines atom trapping in a superconducting atomchip,
   arXiv:1803.08115 [physics.atom-ph], SciPost Phys. 4, 036 (2018)
   https://doi.org/10.21468/SciPostPhys.4.6.036

9. O. E. Alon, V. S. Bagnato, R. Beinke, S. Basu, L. S. Cederbaum, B. Chakrabarti, B. Chatterjee, R. Chitra, **F. Diorico**, S. Dutta, L. Exl, A. Gammal, S. K. Haldar, S. Klaiman, C. Lévêque, R. Lin, N. J. Mauser, P. Molignini, L. Papariello, R. Roy, K. Sakmann, A. I. Streltsov, G. D. Telles, M. C. Tsatsos, R. Wu, A. U. J. Lode, Exploring many-body physics with Bose-Einstein condensates, High Performance Computing in Science and Engineering 2018 Book Chapter, pp 89-110, Springer, Book
   https://doi.org/10.1007/978-3-030-13325-2_6

10. **F. Diorico**, Novel AtomChip Technologies with Superconductors
PhD. Dissertation, reposiTUm, Technische Universität Wien, 2016
https://doi.org/10.34726/hss.2016.21603

11. Minniberger*, S., **F. Diorico***, S. Haslinger, C. Hufnagel, C. Novotny, N. Lippok, J. Majer, C. Koller, S. Schneider, J. Schmiedmayer, Magnetic conveyor belt transport of ultracold atoms to a superconducting atomchip,
Applied Physics B, 116(4):p. 1017-1021, 2014
https://doi.org/10.1007/s00340-014-5790-5
These authors contributed equally to the publication of this paper.

Awards and Distinctions

- **FFG Spin-Off Fellowship Grant 2023**: (~ 500k€) Future Lasers, spin-off founder and project leader, [FFG: Austrian Research Promotion Agency].
- **IST-Austria TWIST Fellowship** (now xista Innovations fellow) 2022, (~ 120k€) innovation tech. transfer grant.
- **CoQuS alumni** Complex Quantum Systems Doctoral Fellowship, now VCQ. *Interviewed by a team led by 2022 Nobel laureate Anton Zeilinger to get admitted to the program.*
- **Erasmus Mundus Full Scholarship 2008-2010** Erasmus Mundus MSc. Photonics Program.
- **Erasmus Mundus MSc Photonics Innovation Competition Winner** Won the most innovative idea for a Photonics business contest at the Erasmus Mundus MSc Photonics Summer School, Heriot Watt University, Edinburgh, UK on 23-30 June 2010.
- **BPI-DOST Top 6 Bachelor thesis nation-wide** Co-authored a thesis/research project that was awarded Bank of the Philippine Islands – Department of Science and Technology Best Project of the Year Award nationwide. The research is one of the top 6 finalists out of 29 researches carried out by final year undergraduates all over the country in 2008.

Professional and Non-Professional Activities

- Co-founder and principal inventor of intellectual property for Tulon Photonics, an innovative laser technology startup currently in its foundational stages. In addition to my role as a key technology consultant, I contribute strategically as a board member, helping to steer the company's vision and advancing cutting-edge laser solutions in the field of photonics. www.tulonphotonics.com
- Peer Reviewer for Optica (formerly Journal of Optical Society of America, JOSA) https://www.optica.org/
  - Journals: Optics Letters, Optics Express, Applied Optics
- Visiting/Remote Consulting Physicist at Slovakian Academy of Sciences: Dusan Lorenc's ultracold atoms lab.
- Mentored a diverse group of students, including several interns and rotating PhD students, during my postdoctoral research with Onur Hosten at IST-Austria. I also supervised four PhD students, one of whom recently graduated.
  - Vyacheslav Li, PhD.: https://doi.org/10.15479/at:ista:17225
- Supervised the completion of four Bachelor's theses and three Master's theses during my doctoral research under the mentorship of Jörg Schmiedmayer at TU Vienna.
  - Naz Shokrani, MSc.: https://doi.org/10.34726/hss.2019.63488
  - Thomas Weigner, MSc.: https://doi.org/10.34726/hss.2018.58880
  - Benedikt Gerstenecker, MSc.: https://doi.org/10.34726/hss.2017.43723
- For over 30 years, I have played guitar and independently studied music theory and composition. This hobby complements my expertise in physics, offering insights into wave phenomena and harmonic analysis. On one occasion, it even contributed to advancing ultra-low-noise research.
- Resourceful experimental physicist with a strong DIY ethos—skilled in machining, analog and RF/microwave electronics, and instrumentation development. Comfortable building and refining complex experimental systems from the ground up.
- Analytical thinker with deep experience in experimental troubleshooting and extreme data analysis. Proven ability to accelerate progress through practical problem-solving, spanning electronics, physics experiments, and real-world engineering challenges.
- Pursue mountaineering and freediving as personal passions that reinforce focus and resilience.

Selected Engagements

- Invited Speaker, 5th International Conference on Optics, Photonics, and Lasers (OPL-2024))
25-26 November, 2024 — Valencia, Spain

https://optics.unitedscientificgroup.org/2024/home.php
- Career in entrepreneurship talk, IST-BRIDGE Postdoctoral Fellowship celebration
  21 November 2024 — Moonstone Building, IST-Austria
  https://postdoc.pages.ist.ac.at/2024/11/08/ist-bridge-postdoctoral-fellowship-celebration/
- Invited Speaker on entrepreneurship, Quantum Tech Sessions for Vienna Center for Quantum science and technology (VCQ)
  9 October 2023 — University of Vienna, Austria
  https://vcq.quantum.at/2023/10/03/quantum-tech-session/
- BigX 2023 event spin-off panel member
  17 October 2023 — Moonstone Building, IST-Austria
  https://ist.ac.at/en/news-events/event/?eid=4370
- Spin-off pitch presenter, Austria's FFG 2023 Demo Day
  10 May 2023 — FFG Building, Vienna, Austria
  https://brutkasten.com/artikel/diese-10-projekte-werden-im-spin-off-fellowship-programm-gefoerdert
- Atomtronics Benasque 2017 invited speaker, proxy for Joerg Schmiedmayer
  7-10 May, 2017 — Benasque, Spain
  https://benasque.org/2017atomtronics/

Languages

English – Fluent (working language for research and international collaboration)
Filipino – Native proficiency
Bisaya, Filipino dialect – Native proficiency
German – B2 Level (writing, reading and conversational)
Mandarin – Basic

References

- Prof.Dr. Onur Hosten, Postdoctoral adviser, innovation co-inventor
  Group Leader: Quantum Sensing with Atoms and Light, Institute of Science and Technology Austria
  Email: onur.hosten@ist.ac.at
  Webpage: https://hostenlab.pages.ist.ac.at/
- Dr. Thorsten Schumm, CoQuS PhD. Thesis Advisory Committee and FFG spin-off advisor
  Group Leader: Thorium Nuclear Clock, Atominstitut TU Wien, Austria.
  Email: thorsten.schumm@tuwien.ac.at
  Webpage: https://thoriumclock.eu/
- Univ.Prof. Dipl.-Ing. Dr.techn. Jörg Schmiedmayer, PhD Supervisor
  Professor and Group Leader, Atomchip group, Atominstitut TU Wien, Austria.
  Email: schmiedmayer@atomchip.org
  Phone: +43-1-58801-141201
  Webpage: http://atomchip.org/
- Dr. Maria Anagnosti, Deep-tech adviser and Silicon Valley mentor
  AMD, Principal Silicon Design Engineer (NPI), San Jose, California, United States
  Email: maria.anagnosti@gmail.com
  Webpage: https://www.linkedin.com/in/mariaanagnosti/