

Rúben André Letra Barreiro
Computer Science Engineer & IT/IS Programmer/Technician

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PROFESSIONAL PROFILE Hard-working and passionate Computer Scientist and Engineer with huge dreams, as well as having a deep passion for IT and technology areas, especially when focused on R&D activities. An engineer with a huge eagerness to learn and improve himself every day, professionally and personally. Strongly skilled in Informatics, with great competencies in several areas, being able to work with a variety of technologies, frameworks, and tools. Strongly motivated by his goals and ambitions, never gives up on them, and is easy to get along with.

LANGUAGES SKILLS *Portuguese* (Native Proficiency), *English* (Fluent Proficiency), *Spanish* (Elementary Proficiency), *French* (Elementary Proficiency), and *German* (Elementary Proficiency).

HARD SKILLS **Note:** For more details on technological and programming skills, see the annex.

PROFESSIONAL EXPERIENCE IT Consultant January 2023 - Present
(Outsourcing as Information Security Officer)
PrimeIT Consulting / SIBS (Lisbon, Portugal)

Key Points: External outsourcing collaborator for SIBS, as Information Security, Officer in the Cryptographic Solutions and Systems Team.

Main Activities:

- Audit of security standards and policies, to ensure the correct use of cryptographic primitives for banking applications in Legacy, Actual, and Future contexts, already considering quantum-resistant cryptographic algorithms.
- Reviewing and writing of documents about security standards adopted by the company, regarding Cryptography, TLS (Transport Layer Security), and SSH (Secure SHell) frameworks/tools.

PROFESSIONAL EXPERIENCE Software/Project Engineer April 2022 - December 2022
Deimos Engenharia, Elecnor Group (Lisbon, Portugal)

Key Points: Participation in the DISCRETION (DIsruptive sdn SeCuRE communicaTIONs for european defence) project, in collaboration with:

- Portugal: IT (Instituto de Telecomunicações), IST (Instituto Superior Técnico), Altice Labs, and Adyta.
- Spain: Telefónica I+D, and UPM (Universidad Politécnica de Madrid).
- Austria: AIT (Austrian Institute of Technology).
- Italy: Nextworks.

Integration and combination of SDN (Software Defined Network) and QKD (Quantum Key Distribution) technologies on top of legacy optical networks to build a highly secure, scalable, and resilient network control architecture for advanced military tactical operation services.

Main Activities:

- Development of Classical Post-Processing Algorithms in Python, C++, OpenMP, and CUDA, for CV-QKD (Continuous-Variable QKD), such as Parameter Estimation, Information Reconciliation, and Privacy Amplification, aiming High-Performance Computing (i.e., using accelerators in CPU and GPU).
- R&D on Quantum Cryptography and Quantum Communications.
- Writing of Scientific Research documents.

Scientific Research & Developer October 2020 - March 2022
IT (Instituto de Telecomunicações) at
IST (Instituto Superior Técnico), University of Lisbon, and
LASIGE (Laboratório de Sistemas Informáticos de Grande Escala) at
Faculty of Sciences, University of Lisbon (Lisbon, Portugal)

Key Points: R&D project, regarding a collaboration during the Master in NOVA School of Science and Technology, as a component of the Master's Thesis.

R&D project in the context of Quantum Cryptography.

Main Activities:

- Development of a prototype for the Master's Thesis titled "A Cryptographic Protocol of Key Agreement for Multiple Parties, in a Semi-Quantum Context", under the supervision of Prof. André Souto (LASIGE, IT, and Faculty of Sciences, University of Lisbon) and Prof. António Ravara (NOVA School of Science and Technology, NOVA University of Lisbon, and NOVA LINCS).
- Development of a prototype in Python and IBM's QISKit called Qis|krypt).
- Publication of a scientific research article in INForum 2021:
 - "Simpósio de Informática", pp. 252 - 263.

PROFESSIONAL EXPERIENCE App Designer & Developer
U.Porto MIL (Media Innovation Labs),
University of Porto (Porto, Portugal)

October 2020 - March 2022

Key Points: Serious/Health Game Project in collaboration with:

- Faculty of Engineering, University of Porto, Bright Digital,
and Acreditar.

Designing and development of the interface of the “Everyone Is a Hero” app for Android and iOS operative systems for mobile devices, aiming to offer interactive support and information to families, educators, and volunteers of children who suffer from cancer diseases, to be linked to a video game app called “Hope” (developed by Bright Digital).

Presentation in the TalkABit 2019 conference.

Main Activities:

- Development of the app’s front-end in Unity, and C#.
- Development of the app’s back-end in SQL, and JSON.
- Design of the app’s interface in Adobe Illustrator and Adobe Photoshop.

Scientific Research & Development Internship September 2018 - November 2018
LSTS (Laboratório de Sistemas e Tecnologia Subaquática),
University of Porto (Porto, Portugal)

Key Points: R&D internship in Endurance Project.

R&D project in the context of remote control of AUVs (Autonomous Underwater Vehicles) with a continuous operation duration of more than 48 hours, using the RIPPLES and NEPTUS tools, developed by LSTS.

Main Activities:

- Development of some features for RIPPLES and NEPTUS tools, using Java and Spring Boot Framework.
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PROFESSIONAL EXPERIENCE Scientific Researcher & Developer February 2017 - January 2018
NOVA LINC'S (NOVA Laboratory for computer science and INformatiCS),
NOVA University of Lisbon (Lisbon, Portugal)

Key Points: Participation in the Hyrax project, in collaboration with:

- Portugal: Faculty of Sciences, University of Porto, CRACS - INESC TEC (Centre for Research in Advanced Computing Systems from INstitutE for Systems and Computer engineering, TEChnology and science), IT (Instituto de Telecomunicações), Geolink, Wavecom, FCT (Fundação para a Ciência e Tecnologia), and CMU - Portugal (Carnegie Mellon University - Portugal Program).

- United States of America: Carnegie Mellon University, and Yinzcam.

R&D project in the context of Edge Computing.

Main Activities:

- Development of a prototype in Android and Java, called Hyrax - DiCE (Distributed Collaborative Computing at the Edge).

ACADEMIC EDUCATION Master in Computer Engineering January 2019 - March 2022
NOVA School of Science and Technology, NOVA University of Lisbon, Portugal

Final Global Points Average: 16 out of 20.

Core Courses: Blockchains, Classical Cryptography, Classical Post-Quantum Cryptography, Cloud Computing, Cluster's Computing, Computer Vision, Concurrent & Parallel Computing, CPU's Programming, Cryptography, Data Analysis & Mining, Deep Learning, Dependable & Reliable Distributed Systems, Edge & Fog Computing, Entrepreneurship, Games & Simulation, GPU's Programming, Intelligent Multi-Agent Systems, Intelligent Sensors & Actuators, Interpreters & Compilers, Knowledge & Reasoning Systems, Machine Learning, Mobile Application Development, Multimedia Computing, Neural Networks, Networks & Computer Systems Security, Operations Research, Ubiquitous & Pervasive Applications, Quantum Computing, Quantum Cryptography, Quantum Mechanics, Quantum Internet & Networks, Theory of Computational Games, Web Design & Development, and Web Servers.

Relevant Activities: Scientific Research at Instituto de Telecomunicações, and LASIGE (Laboratório de SIstemas de Grande Escala), in the scope of the Master's Thesis.

Master's Thesis: Semi-Quantum Conference Key Agreement (SQCKA)
- A Cryptographic Protocol of Key Agreement for Multiple Parties, in a Semi-Quantum Context (supervised by Prof. André Souto and Prof. António Ravara) - 19 out of 20.

**ACADEMIC
EDUCATION**

Bachelor in Computer Science and Engineering September 2013 - June 2018

NOVA School of Science and Technology, NOVA University of Lisbon, Portugal

Final Global Points Average: 15 out of 20.

Core Courses: Algebra, Artificial Intelligence, Calculus & Mathematics Analysis, Classical Physics, Computer Graphics & 3D Interfaces, Computer Network Protocols, Computer Networks, CPU's Programming, Data Structures, Databases, Digital Systems, Discrete Mathematics, Distributed Systems, Edge Computing, Functional Programming Graphs Theory, Genetic Algorithms, Introduction to Internet Security, Linear Programming, Logic, Logic Programming, Low-Level Programming, Modelling of Programming Languages, Multi-threading, Neural Networks, Object-oriented Programming, Operative Systems, Probability Calculus, Statistics, and Searching Algorithms.

Relevant Activities: Scientific Research at NOVA LINCS (NOVA Laboratory for computer science and INformatiCS), regarding the R&D Project.

R&D Project: A Producer/Consumer Work Queue Eventually Consistent in Android (supervised by Prof. Hervé Paulino) - 17 out of 20.

**HIGH-SCHOOL
EDUCATION**

Professional Course of Technician of Computer Management and Programming September 2009 - July 2012

High School of Monte de Caparica, Portugal

Final Global Points Average: 14 out of 20.

Core Courses: Databases, Introduction to Computer Networks, Introduction to Programming, Operative Systems, Web Design, and Web Forms.

Relevant Activities: Internship at FNAC Chiado (FNAC Portugal) with a final approval grade of 17 out of 20.

Final Project: "Dynamic Web Platform for Scholar Auctions" with a final approval grade of 15 out of 20.

**OTHER
EDUCATION**

Online Course - "Quantum Machine Learning" January 2023
(OpenHPI, Germany and IBM Quantum Research, Switzerland):

- An Online Course for an introduction to Quantum Machine Learning (as well as Quantum Deep Learning), covering related algorithms, such as QSVMs (Quantum Support Vector Machines), VQCs (Variational Quantum Classifiers), QGANs (Quantum Generative Adversarial Networks), and Quantum Boltzmann Machines, including some demonstrations with IBM QISKit.

**OTHER
EDUCATION**

Online Course - “Introduction to Quantum Computing with Qiskit” October 2022
(OpenHPI, Germany and IBM Quantum Research, Switzerland):

- An Online Course for an introduction to Quantum Computing, covering demonstrations of IBM’s QISKit and Quantum Services, Quantum Circuits, Quantum Algorithms (Deutsch-Jozsa and Grover’s Algorithms), and Quantum Measurement Error Mitigation.
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Online Course - “Introduction to Quantum Computing” October 2022
(Cognitive Class and IBM, United States of America):

- An Online Course for an introduction to Quantum Computing, including some tutorials about Quantum Superposition and Quantum Entanglement.
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Online Course - “Future of Computing:
On the Road to Quantum”

September 2022

(OpenHPI, IBM, and Fraunhofer-Gesellschaft, Germany):

- An Online Course for an introduction to new technological trends (Artificial Intelligence, Coherent Interconnects, Energy-aware Computing), new systems architecture (Edge Computing and Hybrid Cloud), and Quantum Computing (Areas of Application, Quantum Programming, and Security Applications).
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Online Course - “Quantum Mechanics”

August 2022

(Coursera, and University of Colorado Boulder, United States of America):

- An Online Course for a theoretical introduction to Quantum Mechanics, including solutions for wave equations, as well as atomic and molecular behavior.
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Online Course - “Quantum Internet and Quantum Computers:
How Will They Change the World?”

June 2022

(edX, Technical University of Delft, and QuTech, Netherlands):

- An Online Course for an introduction to Quantum Communications, and Quantum Computing, covering topics such as Introductory Topics and Demonstrations for Quantum Computing, Quantum Internet, Quantum Factoring, Quantum Secure Communications, Quantum Chemistry, Blind Quantum Computing, Quantum Algorithms/Solvers for Linear Equations and Searching, Quantum Machine Learning, and Quantum Distributed Systems.
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Online Course - “Quantum Computing:
Less Formulas - More Understanding”

August 2021

(Coursera and Saint Petersburg State University, Russia):

- An Online Course for an introduction to quantum computing, covering topics such as Introductory Topics and Theorems for Quantum Computing, Quantum Mechanics, and Linear Algebra, Quantum Operators, Quantum Algorithms/Protocols, Quantum Teleportation, and Quantum Cryptography.
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Online Summer School on Quantum Computing 2020:
“Software for Near-Term Quantum Devices”

August 2020

(Universidad Internacional Menéndez Pelayo, Spain):

- An Online Summer School, covering topics such as Variational Quantum Computing, Quantum Optimization, and Quantum Machine Learning, as well as applications in Quantum Chemistry, Quantum Physics, and Quantum Finance.
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AWARDS AND ACTIVITIES

- Winner of the INNCYBER INNOVATION HUB - 3rd Edition (2022) contest on Cybersecurity on Students' category with the project: "BKMP22 Protocol (A New Semi-Quantum Conference Key Agreement)".
 - Organizer of "Desfile do Caloiro 2015" at NOVA School of Sciences and Technology, NOVA University of Lisbon.
 - Winner of "Desfile do Caloiro 2013" at NOVA School of Science and Technology, NOVA University of Lisbon.
 - Vice-winner of "Baile de Finalistas 2013" at High School of Monte de Caparica.
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