Antonio Pelusi

Ph.D. student in Computer Science and Mathematics of Computation

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Profile

Ph.D. researcher and software developer focused on Differential Privacy optimization using quantum random number generation, synthetic data generation, and privacy-preserving Machine Learning systems. Combines theoretical privacy research with practical system development, including production QRNG platforms and standardized entropy distribution APIs. Academic credentials include Master's with distinction, CERN research collaboration, and ongoing industry-academia partnership investigating true randomness impact on privacy mechanisms. Specialized in bridging fundamental research with enterprise-grade technological solutions.

Experience

Random Power · Startup
*may 2024 → **Ongoing***

Full Stack Developer — Remote

- Developed comprehensive Django-based web client (backend and frontend) for Random Power's 64x Multi-Generator Board quantum hardware platform, enabling secure access to true quantum randomness generation.
- Built secure user authentication and session management supporting multiple concurrent users.
- Built Palo Alto QRNG API-compliant Entropy-as-a-Service platform supporting 1Gbit/s quantum random bit distribution with automated quality assurance and real-time compliance monitoring.
- Collaborated on C-based scheduler and TEE components for secure random bit distribution.
- Designed and maintained communication interfaces between hardware and software components, ensuring reliable and secure data exchange.

A. Paradisi High School
sep. 2024 → jul. 2025

Computer Science High School Teacher — Vignola, Italy

- Introduced 75+ high school students to programming, algorithms, and fundamental computer concepts using practical exercises and projects.

University of Modena and Reggio Emilia
sep. 2024 → dec. 2024

Computer Science University Tutor — Modena, Italy

- Conducted laboratory sessions, guiding 50+ undergraduate students in programming, algorithms, and data structures.
- Provided hands-on support during labs, assisted with debugging, and facilitated practical understanding of theoretical concepts.

Liferay Inc.
may 2021 → jul. 2021

Junior Backend Developer — Remote

- Integrated Stripe payment functionality into the open-source Liferay Portal.

Education

Ph.D. in Computer Science and Mathematics of Computation
*nov. 2024 → **Ongoing***

University of Insubria · Random Power

- Researched Differential Privacy frameworks analyzing how quantum vs. pseudo-random number generation impacts privacy mechanism effectiveness.
- Investigated synthetic data generation algorithms with DP guarantees, optimizing the privacy-utility trade-off for machine learning applications on sensitive datasets.

Master's Degree in Computer Science
sep. 2022 → apr. 2024

University of Modena and Reggio Emilia — 110/110

- Big Data & Machine Learning: Focus on predictive modeling, large-scale data analysis, and advanced machine learning methods.
- Cybersecurity & Cryptography: Exploration of theoretical and applied aspects of data security and cryptographic protocols.

Post Graduate Degree CBI.Attract
feb. 2023 → jun. 2023

University of Bologna · CERN · AGH University — 30/30 with Honors

- Explored technological opportunities through Design Thinking–based prototyping and testing.
- Participated in research collaborations at CERN and AGH University, contributing to joint investigations on emerging technologies.

Bachelor's Degree in Computer Science
sep. 2018 → apr. 2022

University of Modena and Reggio Emilia

- Computer Science Foundations: Algorithms, data structures, programming languages, computer architecture, and operating systems.
- Mathematical Foundations: Discrete mathematics, calculus, statistics, and linear algebra.

Publications

Privacy Preservation in Data Sharing: A Study on Differential Privacy
Apr. 2024

https://doi.org/10.6084/m9.figshare.26411314 — Master's thesis

- An introductory and analytical study of differential privacy as a technique for preserving data confidentiality.

Projects

LDP-lib   *In development*

Local Differential Privacy Library

- Designed and implemented a library for applying Local Differential Privacy mechanisms to local databases.

Awards

Winner of Green & Digital Transformation Hackathon   *sep. 2023*

University of Modena and Reggio Emilia   Mantua, Italy

- Winner of a hackathon with a machine learning–based predictive model for water consumption optimization.

Skills

Back-end	C, C++, Java, Kotlin, Python · Django, Android SDK · SQL, NoSQL (MongoDB, Neo4j)
Front-end	HTML, CSS, JavaScript · ImGui, JavaFX
Libraries	Pytorch, Opacus, OpenDP, diffprivlib, OpenMP, CUDA, Socket, Pandas, Numpy, MatPlotLib, Seaborn, SKLearn, NLTK
Tools	Linux, Git, Docker, Make, Gradle, Maven
Certificates	De-Cifris Trends in Modern Cryptography, MasterZ Blockchain Training Program
Languages	Italian, English