



Andrea Panebianco

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ABOUT MYSELF

I received my Bachelor's degree in Electronic Engineering on March 20, 2019, and my Master's degree in Telecommunication Engineering on October 26, 2022, both from the University of Catania, Italy. I am currently pursuing a Ph.D. in Information and Communication Technologies at the University of Palermo, Italy. My research focuses on underwater acoustic communications, with a particular emphasis on adaptive transmission strategies and intelligent network protocols. From January to July 2025, I completed a six-month research stay as a *Visiting Research Scholar* at Auburn University, AL, USA, where I collaborated with the Department of Electrical and Computer Engineering on learning-based communication systems.

WORK EXPERIENCE

Auburn University – Auburn, United States

City: Auburn | **Country:** United States | **Website:** <https://www.auburn.edu/> | **Name of unit/department:** Department of Electrical and Computer Engineering - **Business/sector:** Education

Visiting Ph.D. Student

[15/01/2025 – 14/07/2025]

Visiting Ph.D. Student for the research task entitled "Age of Channel State Information for Adaptive Power Control and Modulation in Underwater Acoustic Communications".

University of Catania – Catania, Italy

Address: Piazza Università 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it> | **Email:** protocollo@unict.it | **Name of unit/department:** Department of Electrical electronic and computer engineering - **Business/sector:** Education

Academic tutor

[01/03/2024 – 01/06/2024]

Course: "IoT and Big Data Sensing, Compression, and Communication"

Provided academic support and guidance to students, including:

- Delivering assistance during lectures and addressing student inquiries.
- Leading practical and laboratory sessions to reinforce theoretical concepts.
- Offering personalized advice to help students better understand course materials.

University of Catania – Catania, Italy

Address: Piazza Università 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it> | **Email:** protocollo@unict.it | **Name of unit/department:** Department of Electrical electronic and computer engineering - **Business/sector:** Education

Academic tutor

[15/03/2023 – 15/12/2023]

Course: "IoT and Big Data Sensing, Compression, and Communication"

Provided academic support and guidance to students, including:

- Delivering assistance during lectures and addressing student inquiries.
- Leading practical and laboratory sessions to reinforce theoretical concepts.
- Offering personalized advice to help students better understand course materials.

University of Catania – Catania, Italy

Address: Piazza Università 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it> | **Email:** protocollo@unict.it | **Business/sector:** Education

Research intern

[08/03/2021 – 11/06/2021]

Project: "Development of an integrated system for underwater infrastructure monitoring"

Conducted a research internship focused on designing and implementing a system that integrates:

- A web application (HTML, CSS, PHP) supporting user registration, control dashboards, and data storage in a dedicated database.
- A simulated Wake-Up Radio system using two Raspberry Pi 3B+ devices communicating via MQTT: the Low Radio managed user commands, while the High Radio collected and transmitted sensor data.
- A Digital Twin module to ensure system reliability, which monitored incoming messages from the High Radio and stored them in a separate database, with a second database managing user data.

 **University of Catania** – Catania, Italy

Address: Piazza Università 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it> | **Email:** protocollo@unict.it | **Name of unit/department:** Department of Electrical electronic and computer engineering - **Business/sector:** Education

Research intern

[01/09/2020 – 28/02/2021]

Project: "Secure and Efficient Wireless Communications – Intelligent Communication Algorithms and Integrated System Development for Underwater Wireless Communication Environments"

Conducted a research internship focused on the development of a multi-layered system for underwater infrastructure monitoring, which included:

- Designing an Android application using Android Studio to manage and collect sensor data from underwater nodes.
- Implementing MQTT-based communication to ensure lightweight and efficient data exchange.
- Developing a Digital Twin module to monitor messages from the underwater environment and securely store them in a dedicated database.
- Integrating LoRa technology to enable long-range data transmission, ensuring reliable communication and robust data storage.

EDUCATION AND TRAINING

PhD in Information and Communication Technologies

University of Palermo [01/11/2022 – Current]

Address: Piazza Marina, 61, 90133 Palermo (Italy) | **Website:** <https://www.unipa.it>

Master's Degree in Telecommunications Engineering

University of Catania [02/10/2019 – 26/10/2022]

Address: Piazza Università, 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it/> | **Field(s) of study:** Information and Communication Technologies (ICTs): • Inter-disciplinary programmes and qualifications involving Information and Communication Technologies (ICTs) | **Final grade:** 104/110 | **Level in EQF:** EQF level 6 | **National classification:** Master degree | **Type of credits:** ECTS | **Number of credits:** 120 | **Thesis:** Characterization of underwater communication channels in shallow water environments: from on-field measurements to Markov-based models

- Telecommunication Networks
- Signal processing for multimedia applications
- Multimedia Forensics
- Antennas and Radiopropagation
- Electronic for Telecommunications
- Programming Techniques for distributed systems
- Mobile Radio Networks
- Internet
- Microwave engineering
- Design of telecommunications networks and systems
- Protocols and architectures for the Internet of Things

Bachelor Degree in Electronic Engineering

University of Catania [28/09/2015 – 20/03/2020]

Address: Piazza Università, 2, 95131 Catania (Italy) | **Website:** <https://www.unict.it/> | **Field(s) of study:** Information and Communication Technologies (ICTs): • Inter-disciplinary programmes and qualifications involving Information and Communication Technologies (ICTs) | **Final grade:** 96/110 | **Level in EQF:** EQF level 6 | **National classification:** Bachelor

- Mathematical analysis 1, 2, 3
- Linear algebra and geometry
- Technical physics
- Physics 1, 2
- Inorganic chemistry
- Economics applied to engineering
- Business startups and business models
- Electrical engineering
- Electronics 1, 2
- Systems theory
- Automation controls
- Signal theory
- Telecommunications Fundamentals
- Foundations of Informatics
- Electronic calculators
- Electronic measurements

Scientific high school diploma

Liceo Ginnasio Statale "Giovanni Verga" [16/09/2010 – 07/07/2015]

Address: Via Salvo D'Acquisto, 95031 Adrano (Italy) | **Website:** <https://www.liceovergadrano.edu.it/> | **Final grade:** 110/110 with Laude | **Level in EQF:** EQF level 4 | **National classification:** High School Diploma

- Language and literature (Italian, English, Latin)
- Philosophy
- History
- Natural sciences and chemistry
- Physics
- Mathematics
- Drawing and art history
- Geography

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user

SKILLS

Programming

Java language / IntelliJ IDEA CE / Python language / JavaScript language / PHP language / Message Queue technology (MQTT) / CSS language / Android Studio / C language / Matlab/SIMULINK / Relational databases (MySQL)

Mobile Forensics

Ares / Cellebrite / Nuance Forensics

Computer essentials

Windows / MacOS / Microsoft Office

Mobile

Android / iOS

[2025]

POSEIDON: A multi-armed bandit framework for Power and mOdulation SchEme adaptatlon in unDerwater acOustic Networks In this paper we propose POSEIDON, a framework for transmission power and modulation scheme adaptation based on Multi-Armed Bandit (MAB), a lightweight, stateless alternative to stateful RL and DRL. We evaluate POSEIDON on DESERT, a powerful framework for realistic simulations of UW networks, and compare its performance against two Deep Reinforcement Learning (DRL) baselines. The results show that, in spite of the lightweight nature of POSEIDON, our framework is able to outperform the DRL baselines by achieving an improvement of up to 72.49% in the network throughput, and up to 77.16% in energy consumption. Moreover, POSEIDON generally exhibits a significantly more stable performance, with fewer oscillations despite the high variability of the UW channel conditions.

Journal Name: 2025 IEEE International Conference on Communications Workshops (ICC Workshops) (Accepted) | **Publisher:** IEEE

[2025]

MERMAID: A multi-armed bandit approach for optimal carrier selection in OFDM-based underwater acoustic networks In this paper, we present MERMAID, the first framework that leverages a Combinatorial Multi-Armed Bandit (CMAB) approach for adaptive subcarrier selection in Underwater Acoustic Networks (UANs). MERMAID dynamically adjusts the number of active subcarriers based on real-time Packet Delivery Ratio (PDR) feedback, aiming to maximize PDR while minimizing energy consumption. Unlike Deep Reinforcement Learning (DRL) methods—which require extensive training and incur high computational overhead—MERMAID is designed for resource-constrained UW nodes, enabling fast adaptation and lightweight operation. We implement MERMAID in the DESERT simulator and benchmark its performance against state-of-the-art baselines. Simulation results show that MERMAID improves PDR by up to 21.15% and reduces energy consumption by up to 45.40%. These results confirm MERMAID as a lightweight, scalable, and high-performance solution for real-world Internet of Underwater Things (IoUT) deployments.

Journal Name: PIRMC 2025 - IIU Workshop (Accepted) | **Publisher:** IEEE

[2025]

Adaptive Underwater Acoustic Communications with Limited Feedback: An AoI-Aware Hierarchical Bandit Approach Underwater Acoustic (UWA) networks are essential for remote sensing and ocean exploration but face limited bandwidth, high delays, and dynamic channels. These challenges hinder real-time communication and degrade performance. This paper proposes a bilevel Multi-Armed Bandit (MAB) framework to address these issues. The first level adopts a Contextual Delayed MAB (CD-MAB) to jointly optimize Adaptive Modulation (AM) and transmission power (P), maximizing throughput. The second level uses a Feedback Scheduling MAB to regulate the feedback interval, balancing throughput gains with feedback cost, indirectly shaping the Age of Information (AoI). The approach is computationally efficient and suited to resource-constrained UWA networks. Simulations with the DESERT UW network simulator show up to 20.61% higher throughput and up to 36.60% energy savings compared to state-of-the-art Deep Reinforcement Learning (DRL) benchmarks.

Journal Name: GLOBECOM 2025 - 2025 IEEE Global Communications Conference (Accepted) | **Publisher:** IEEE

[2025]

Bandits under the waves: a fully-distributed Multi-Armed Bandit framework for modulation adaptation in the Internet of Underwater Things In this work, we introduce a novel Multi-Player Multi-Armed Bandit (MP-MAB) framework for modulation adaptation in Multi-Hop Internet of Underwater Things (IoUT) Acoustic Networks. As opposed to widely used, computation-demanding Deep Reinforcement Learning (DRL) techniques, MP-MAB algorithms are simple and lightweight and allow to iteratively make decisions by selecting one among multiple choices, or arms. The framework is fully distributed and is able to dynamically select the best modulation technique at each IoUT node by leveraging on high-level statistics (e.g., network throughput), without the need to exploit hard-to-extract channel features (e.g., channel state). We evaluate the performance of the proposed framework using the DESERT simulator and compare it with state-of-the-art centralized solutions based on Deep Reinforcement Learning (DRL) for cognitive and heterogeneous networks, namely DRL-MCS, DRL-AM, PPO, and SAC. The results highlight that, despite its simplicity and fully distributed nature, the proposed framework achieves superior performance in UW networks in terms of throughput, convergence speed, and energy efficiency. Compared to DRL-MCS and DRL-AM, our approach improves network throughput by up to 33% and 20%, respectively, and reduces energy consumption by up to 18% and 16%. When compared to PPO and SAC, the proposed solution achieves up to 11% and 34% higher throughput, and up to 7% and 17% lower energy consumption, respectively.

Journal Name: IEEE Transactions on Communications (Submitted) | **Publisher:** IEEE

[2025]

Multi-Armed Bandit in the IoT realm: can it compete with stateful Reinforcement Learning solutions? In this work, we discuss solutions based on Multi-Armed Bandit (MAB) algorithms, a family of stateless RL algorithms, which are alternative to

stateful RL and DRL approaches. As opposed to RL and DRL, MAB algorithms are lightweight and simple, and can thus easily fit even extremely constrained IoT devices. We first briefly compare the operational principles underlying RL/DRL and MAB, highlighting the main reason why MAB can outperform RL-based solutions in IoT communication networks. We then review some results on the comparison between MAB and RL/DRL in several IoT applications, some derived from the literature and some others from original work by the authors. These results assess the superior performance and the faster convergence speed of MAB, as well as its versatility in facing the peculiar challenges of diverse IoT scenarios.

Journal Name: IEEE Vehicular Technology Magazine (Submitted) | **Publisher:** IEEE

[2025]

[A Distributed Multi-Armed Bandit Approach for Modulation Adaptation in Underwater Networks](#) In this work, we propose a Multi-Player Multi-Armed Bandit (MP-MAB) framework for smart modulation adaptation in UnderWater Acoustic (UWA) Networks. Our solution is specifically tailored to run on resource-constrained UW nodes, thanks to the simplicity and low-complexity of MAB. Our framework can leverage real-time throughput statistics to dynamically select the optimal modulation technique for multi-hop signal transmission in UW scenarios. Notably, this happens in a fully-distributed way on a per-node basis, as each UW node runs a local MAB agent to autonomously select the best modulation to use according to its own channel conditions. Using the DESERT UW simulator, we evaluate the performance of our proposed framework and compare it with alternative state-of-the-art learning approaches. Results demonstrate the higher efficiency and responsiveness of our algorithm compared to the alternatives, despite its simplicity and fully-decentralized nature.

Journal Name: 2025 IEEE Wireless Communications and Networking Conference (WCNC) | **Publisher:** IEEE

[2025]

[MAGELLAN: A distributed MAB-based algorithm for Energy-Fair and Reliable Routing in Multi-Hop LoRa networks](#) In this research, we introduce MAGELLAN, a novel routing algorithm for multi-hop LoRa networks based on Multi-Armed Bandit (MAB) learning. MAGELLAN aims to achieve efficient packet delivery while minimizing the number of hops and fairly distributing the energy consumption across the network. We have conducted an extensive numerical evaluation by using the LoRaEnergySim simulator, and compared MAGELLAN against various routing approaches, including Leenders Multi-Hop Protocol (LMHP), a state-of-the-art routing algorithm. The results show that MAGELLAN achieves a superior performance in terms of energy-fairness and Packet Delivery Ratio (PDR), therefore improving the network lifetime and performance. More in detail, MAGELLAN achieves a reduction of up to 10% in the energy consumption as compared to a the random approach, and of to 14% in the PDR as compared to LMHP approach.

Journal Name: GLOBECOM 2024 - 2024 IEEE Global Communications Conference | **Publisher:** IEEE

[2025]

[AMUSE: a Multi-Armed Bandit Framework for Energy-Efficient Modulation Adaptation in Underwater Acoustic Networks](#) In this paper, we present an enhanced version of AMUSE, a scalable and efficient framework designed to leverage the MAB approach for dynamic modulation selection, while enabling the optimization of various key performance metrics. Specifically, to illustrate the high level of flexibility of AMUSE in addressing multi-objective optimization, we here focus on the trade-off of Packet Error Rate (PER) and energy consumption across changing conditions, so as to make both reliability and energy efficiency the basis of the modulation adaptation decision-making process. Through extensive simulation in the DESERT simulator, we evaluate AMUSE performance against other state-of-the-art algorithms based on Deep Reinforcement Learning (DRL). Despite its simple design, AMUSE proves to be more efficient and responsive than the baselines, making it a powerful solution for improving UW communication performance. The results show that, in spite of the lightweight nature of AMUSE, our framework is able to outperform the DRL baselines by achieving an improvement of up to 23.64% in the network PER, and up to 80.65% in energy saving.

Journal Name: IEEE Open Journal of the Communications Society | **Publisher:** IEEE

[2024]

[Adaptive versus predictive techniques in underwater acoustic communication networks](#) Underwater communications face numerous challenges typically associated with strong signal attenuation, long propagation delays, limited bandwidth, and high error rates, all of which severely affect underwater transmission performance. Therefore, it is crucial to apply adaptive or predictive techniques to ensure the best possible performance and reliability in underwater communications, especially in rapidly changing environments. By using adaptive (i.e., reactive) or predictive (i.e., proactive) methods, it is possible to avoid data retransmissions, extend the lifespan of underwater nodes, reduce maintenance frequency, and minimize the need for equipment replacement and recharging, thus optimizing performance overall. In this regard, many works in the literature propose various adaptive or predictive techniques for underwater acoustic networks, which we classify and critically discuss in this qualitative survey.

[2024]

[Adaptive Modulation in Underwater Acoustic Networks \(AMUSE\): A Multi-Armed Bandit Approach](#) In this work, we propose AMUSE, the first Multi-Armed Bandit-based algorithm for intelligent modulation adaptation in underwater acoustic networks. AMUSE is specifically designed to adapt to underwater nodes with limited resources due to its simplicity and low complexity. In particular, AMUSE relies on the current Packet Delivery Ratio (PDR) statistics to select in real-time the best modulation technique to use for multihop signal transmission in the aforementioned underwater scenarios. Using the DESERT simulator, we compare the performance achieved with AMUSE to that of alternative state-of-the-art Deep Reinforcement Learning (DRL) approaches, namely DRL-MCS and DRL-AM. The results show that, despite its simplicity, our algorithm is more efficient and responsive than the other approaches considered.

Journal Name: ICC 2024 - IEEE International Conference on Communications | **Publisher:** IEEE

[2024]

[Balancing Optimization for Underwater Network Cost Effectiveness \(BOUNCE\): a Multi-Armed Bandit Solution](#) In this research, we propose BOUNCE, a new routing algorithm for underwater acoustic networks based on Multi-Armed Bandit. The main goal of BOUNCE is to efficiently route packets to ensure maximum transmission quality, minimal packet latency, all while considering a fair balance of network energy consumption. We conduct an extensive simulation campaign and test BOUNCE against two baselines, namely the RLOR algorithm and a random approach. The results demonstrate that BOUNCE outperforms these baselines in terms of energy consumption, packet latency, and Packet Delivery Rate. Specifically, BOUNCE achieves up to a 9.5% reduction in energy consumption, up to a 41% reduction in network latency, and up to a 27.5% improvement in Packet Delivery Ratio.

Journal Name: 2024 IEEE International Conference on Communications Workshops (ICC Workshops) | **Publisher:** IEEE

[2024]

[A comparative analysis of predictive channel models for real shallow water environments](#) In this paper, we compare the performance of different types of predictive models based on SNR (including Markov models and Hidden Markov models) in terms of the balance between accuracy and complexity. We also provide an SNR value prediction using a Kalman filter and compare this prediction with the performance obtained from the aforementioned Markov models. The models we considered for the comparative analysis were developed based on real shallow-water traces recorded in the Tyrrhenian Sea, Italy, provided by NATO CMRE.

Journal Name: Computer Networks | **Publisher:** Elsevier

[2025]

[POSEIDON: A multi-armed bandit framework for Power and mOdulation SchEme adaptatlion in unDerwater acOustic Networks](#) In this paper we propose POSEIDON, a framework for transmission power and modulation scheme adaptation based on Multi-Armed Bandit (MAB), a lightweight, stateless alternative to stateful RL and DRL. We evaluate POSEIDON on DESERT, a powerful framework for realistic simulations of UW networks, and compare its performance against two DRL baselines. The results show that, in spite of the lightweight nature of POSEIDON, our framework is able to outperform the DRL baselines by achieving an improvement of up to 72.49% in the network throughput, and up to 77.16% in energy consumption. Moreover, POSEIDON generally exhibits a significantly more stable performance, with fewer oscillations despite the high variability of the UW channel conditions.

2025 IEEE International Conference on Communications Workshops (ICC Workshops)

[2023]

[Network intelligence vs. jamming in underwater networks: how learning can cope with misbehavior](#) In this research, we propose a Reinforcement Learning approach to counter jamming attacks in underwater networks. This is particularly important in security applications where sensor nodes are placed in critical locations, such as for national border surveillance or identifying unauthorized intrusions. To address this, we introduce a multi-hop routing protocol, based on the use of a Q-learning methodology, with the aim of increasing data communication reliability and network lifespan. Performance results evaluate the effectiveness of the proposed solution compared to other state-of-the-art efficient approaches.

Journal Name: Frontiers in Communications and Networks | **Publisher:** Frontiers

[2023]

[Underwater Acoustic Channel Models for SNR Prediction in a Real Shallow Water Environment](#) In this work, we develop an underwater acoustic channel model based on field measurement data collected in the Tyrrhenian Sea. Specifically, we obtain two models: one based on a Markov channel model with multiple possible states, and the other based on the design of a Kalman filter. We compare their accuracy in predicting the channel state and demonstrate that, depending on the specific channel setup

and application scenario, it is possible to choose different channel models to strike a balance between good prediction accuracy and manageable complexity.

Journal Name: 2023 IEEE International Conference on Communications Workshops (ICC Workshops) | **Publisher:** IEEE

[2022]

[An integrated acoustic/LoRa system for transmission of multimedia sensor data over an Internet of Underwater Things](#)

In this paper, we present the design and development of an integrated acoustic/LoRa system for the transmission of multimedia sensor data in an Internet of Underwater Things. The system components are described in detail, and field test results are provided, evaluating the possibility of transmitting multimedia data, in addition to control data, for the real-time reconfiguration of system parameters through specifically designed Android or Web applications.

Journal Name: Computer Communications | **Publisher:** Elsevier

PROJECTS

[01/11/2022 – Current]

AQUASMARTT Designed the intelligent-networking components of AQUASMARTT, a research project for sustainable, accessible coastal-environment sensing, consisting of:

- Real-time data ingestion from surface buoys and underwater acoustic sensor nodes, combining environmental and link-quality metrics.
- Machine-learning predictors that forecast channel conditions and environmental dynamics in shallow water.
- Adaptive modulation-and-power controller that reconfigures UWAN parameters on the fly to maximise reliability and minimise energy consumption.
- Energy-aware scheduling engine that balances battery life with sensing fidelity using Age-of-Information and throughput constraints.
- Evaluation toolkit to measure gains in packet-delivery ratio, latency, and energy efficiency under realistic coastal scenarios.

[01/07/2023 – 31/10/2023]

4Frailty Developed an integrated remote-care platform to improve the quality of life of frail individuals, consisting of:

- An Android application, built in Android Studio, that lets healthcare providers select patients, view real-time vital signs, and receive alerts.
- Wearable and environmental sensors that non-invasively measure oxygen saturation, heart rate, and body temperature.
- MQTT-based communication for reliable data exchange between sensors, gateway, and medical staff.
- A LoRa backbone that ensures long-range transmission and efficient storage of health data in a dedicated database.

[01/05/2022 – 11/10/2022]

Characterization of underwater communication channels in shallow water environments: from on-field measurements to Markov-based models Master's thesis project carried out using real-world data from NATO CMRE. The work focused on developing and validating an acoustic channel model for shallow water environments, characterized by limited bandwidth, multipath propagation, and Doppler effects. Recorded traces from the La Spezia port area were analyzed using finite-state Markov models to estimate packet error rates. The entire system and simulations were implemented in MATLAB.

[01/04/2021 – 18/05/2021]

Development of an integrated system for underwater infrastructure monitoring Developed a comprehensive system to monitor underwater infrastructure sensor data, consisting of:

- A web application with user registration and control dashboard, built using HTML, CSS, PHP on Visual Studio Code.
- A simulated Wake-Up Radio system leveraging two Raspberry Pi 3B+ devices connected via serial port, with distinct roles as Low Radio (user requests) and High Radio (sensor data collection and transmission).
- MQTT protocol managing communication between components.
- A Digital Twin module to monitor sensor messages, ensure system reliability, and manage data storage in dedicated databases.

[01/09/2020 – 01/02/2021]

Secure and Efficient Wireless Communications - Intelligent Communication Algorithms and Integrated System

Development for Underwater Wireless Communication Environments Designed and implemented a custom Android application using Android Studio to manage and collect sensor data from underwater infrastructure. The system leverages:

- MQTT protocol for lightweight and reliable communication.

- LoRa technology for long-range data transmission and robust connectivity.
- A Digital Twin module to monitor incoming messages and store environmental data in a structured database.

The project aimed to create a reliable and energy-efficient solution for underwater sensor networks with real-time supervision and extended communication range.

[01/06/2020 – 16/07/2020]

GitFlock, the java-based social network Designed and implemented a terminal-based chat system inspired by mailbox-style communication, written entirely in Java. The system allows users to:

- Connect to a server via IP and port.
- Authenticate by providing name, age (minimum 14), and username.
- Interact with a live ConcurrentHashMap of online users for message exchange.
- View incoming messages, send messages to available users, and manage sessions.
- Gracefully disconnect and reconnect with different credentials without terminating the application.

Includes session management, user availability logic, and a command-line interface with modular options and built-in user instructions.

Link: <https://github.com/andreapanebianco/GitFlock>

[01/06/2019 – 30/09/2020]

An haptic interface for Tactile Internet scenario in 5G Networks Bachelor's thesis project carried out in collaboration with Saint Louis University. The work involved building and testing a Hapkit haptic device controlled over a 5G network and an external user interface. A virtual environment was simulated using Mininet, allowing the study of the device's behavior under different physical interaction scenarios. The project included detailed analysis of instruction reception speed, response time, and induced latency, with the aim of evaluating the device's suitability for Tactile Internet applications.

[01/09/2013 – 07/07/2015]

The Multilateral Comenius Project Erasmus Lifelong Learning Programme | Project ID: 2013-1-DE3-COM06-35867-3 Took part in an international educational project aimed at fostering intercultural collaboration and comparative research across Europe. Conducted fieldwork in Estonia, developing a joint study comparing cultural and educational systems between Italy and Estonia, in partnership with students from multiple European countries.

HONOURS AND AWARDS

[12/09/2023] GTTI Association - Telecommunications and Information Technologies Group

Francesco Carassa Award – GTTI Annual Meeting 2023 Granted in recognition of outstanding research in telecommunications for the poster presentation "*Characterization of Underwater Acoustic Channel Models for SNR Prediction in Real Shallow Water Environments*". Presented during the 2023 edition of the national GTTI (Gruppo Telecomunicazioni e Tecnologie dell'Informazione) Annual Meeting.

[18/12/2019] University of Catania

Student Award "TLC for a Better World" – Innovative Prototype Category *TLC for a Better World – TelcomDay 2019* Received in recognition of the project "*An Haptic Interface for Tactile Internet Scenarios in 5G Networks*", a prototype exploring haptic interaction within emerging 5G-enabled Tactile Internet applications. Selected for its innovative contribution to smart scenarios and next-generation communication technologies.

[12/12/2014] Sicily Region

Sicilian Regional Award – "The Positive Values in Movement" Received for demonstrating a productive approach to study across all subjects, active and constructive participation in educational discourse, responsible conduct, and strong analytical skills throughout the academic journey.

[23/05/2011] University of Catania

Etniade Mathematics Competition Ranked in the mathematics competition *Etniadi*, organized by the University of Catania for high school students.

LICENSES AND CERTIFICATIONS

[25/03/2025]

DigComp 2.2 Certificate for Qualified Computer User

Official certification issued by AICA and accredited by Accredia, in accordance with the European *Digital Competence Framework* (DigComp 2.2).

Assesses and certifies the candidate's skills in the following areas:

- Information and data literacy.
- Communication and collaboration.
- Digital content creation.
- Safety and cybersecurity awareness.
- Problem solving in digital environments.

[23/11/2023]

Professional License – Information Engineering

Issued by the University of Catania | Passed the Italian national qualification exam for Information Engineers with a score of 96/100.

[07/05/2022]

ESOL International – Level C2 Certificate

Issued by BI English Board | Certificate ID: BIEB-0104082

Attests full professional proficiency in English (CEFR Level C2), including advanced reading, writing, listening, and speaking skills in academic and professional contexts.

[17/04/2020 – 30/04/2020]

Introduction to the Internet of Everything – Cisco Networking Academy

Issued by Cisco Networking Academy

Covers:

- Impact, benefits, and challenges of the Internet of Everything.
- Interaction models between people, data, processes, and things.
- Communication strategies for IP and non-IP objects in IoE networks.
- Development of basic IoE models and prototypes.

[01/04/2020 – 16/04/2020]

Introduction to Cybersecurity Certificate – Cisco Networking Academy

Issued by Cisco Networking Academy

Covers:

- Global impact and implications of cyber threats.
- Network vulnerabilities and common types of attacks.
- Industrial consequences of cybersecurity breaches.
- Cisco's approach to threat detection and defense strategies.
- Career opportunities and certification pathways in cybersecurity.

[01/04/2020 – 14/04/2020]

Get Connected Certificate – Cisco Networking Academy

Issued by Cisco Networking Academy

Covers essential digital literacy topics:

Computer systems, components, and peripheral devices.

File and folder management in Windows environments.

Internet use: browsing, email, and online search.

Social media platforms: creating and managing Facebook, LinkedIn, and YouTube accounts.

Basic troubleshooting for hardware, software, and networking issues.

[01/12/2016 – 08/12/2016]

Fundamentals of Digital Marketing

Issued by Google Digital Training

Covers the core principles of digital marketing, including:

- Online advertising techniques for businesses.
- Effective use of social media and digital communication channels.
- Strategies for improving online presence and customer engagement.

[12/01/2015]

ECDL Certificate - Full Standard

Issued by AICA | Certificate ID: IT2056857

Certifies complete digital competence across the following areas:

- ICT concepts, computer and device operation.
- File and folder management.
- Microsoft Office applications (Word, Excel, PowerPoint).
- Internet and email use.
- IT-Security, data protection, backup strategies.
- Network fundamentals, storage media, file compression tools.
- Green computing, accessibility, and digital ergonomics.

[04/02/2015]

Cambridge English Level 1 Certificate in ESOL International (First)

Issued by Cambridge Assessment English | Certificate ID: 14CIT0060020

Attests to English language proficiency at Level B2 (CEFR), covering reading, writing, listening, and speaking skills.

[10/11/2014]

ECDL IT-Security Certificate - Specialised level

Issued by AICA | Certificate ID: IT2056857

Covers proficiency in:

- Internet security principles and safe browsing practices.
- Browser configuration, bookmarks, and web page printing.
- Critical evaluation of online content and information retrieval.
- Data protection, copyright, and privacy awareness.
- Use of social media, email communication, and email software configuration.
- Email organization and scheduling via calendar tools.

[30/09/2014]

Tõend Certificate – Multilateral Comenius Project

Issued by Tallinn Technical Secondary School, Estonia

Confirmed participation in the European educational project *“The Multilateral Comenius Project”* (24–30 September 2014). Worked collaboratively with international teams of students on research activities, promoting intercultural exchange and cross-border cooperation.

[15/10/2010]

ECDL Certificate – European Computer Driving Licence

Issued by AICA | Certificate ID: MED003134

Covers proficiency in:

- Basic concepts of ICT, computer architecture, and software.
- Desktop operations, file and folder management, system configuration.
- Document editing and printing, file compression/extraction.

- Network connection basics, data backup, and malware protection.
- Principles of green computing, accessibility, and digital ergonomics.

CONFERENCES & SEMINARS

[02/02/2024] University of Padua

A Multi-Armed Bandit approach in Underwater networks Seminar held at the Winter School on Underwater Network Simulations and Experimentation (UNWiS) of the University of Padua where I presented various artificial intelligence techniques, focusing on the Multi-Armed Bandit (MAB) applied to underwater networks, delving into a study I conducted in where MAB outperformed Deep Reinforcement Learning approaches, precisely in this context.

[28/05/2023 – 28/05/2023] Roma Convention Center "La Nuvola"

IEEE International Conference on Communications - WS-24: 1st Workshop on Underwater Communication, Access and Networking (UCAN) Presentation of my research work: "Underwater Acoustic Channel Models for Predicting Signal-to-Noise Ratio in a Real Shallow Water Environment".

Link: <https://icc2023.ieee-icc.org/program/workshops#ws-24>

[18/05/2021] Università degli Studi di Catania

Development and Applications of Innovative Materials and Processes for the Diagnostics and Restoration of Cultural Heritage Presented two research projects:

- Design and Experimentation of an Integrated Acoustic/LoRa System for Multimedia Sensor Data Transmission in an Internet of Underwater Things.
- Derivation of a Wake-Up Radio System for reliable underwater monitoring.

ATTENDED SEMINARS

[25/01/2024 – 08/03/2024]

Advanced modeling, design and protocol solutions for communication networks

Seminar series on stochastic modeling techniques and queueing theory, covering:

- Basics of stochastic and Markov processes.
- Discrete-Time and Continuous-Time Markov Chains (DTMC, CTMC).
- Kendall notation, arrival and service processes.
- Analysis of M/M/1 and M/M/m queues.
- Comparative evaluation of queueing models.

[14/11/2022 – 22/11/2022]

Emerging Network Technologies

Seminar on cutting-edge developments in networking, covering open architectures for beyond-5G systems, large-scale IoT solutions, zero-touch network methodologies, and introductory concepts in quantum information.

[04/11/2019 – 09/12/2019]

From soft skills to the job market

Seminar series focused on career readiness, including CV writing, job interview preparation, and the use of social media platforms for job searching.

[26/11/2019]

Digital Forensics - Computer forensics

Seminar on data extraction techniques from corrupted files, with a focus on recovery strategies and forensic analysis in compromised digital environments.

[20/11/2019]

Mobile Forensics - Analysis and processing of extracted data

Seminar on operational best practices, focusing on regulatory frameworks and investigative methodologies for handling extracted mobile data.

[19/11/2019]

Mobile Forensics - Procedures for Data Extraction

Specialized seminar on mobile device investigation techniques, focusing on data extraction methods such as Chip-Off, JTAG, and Cloud acquisition.

[18/04/2018 – 24/05/2018]

Electronics in cars

STMicroelectronics Seminar

Focused on intelligent vehicle safety systems, with an emphasis on the design and application of radar-based technologies.

MANAGEMENT AND LEADERSHIP SKILLS

Stress Management and Resilience

Demonstrated ability to perform effectively under pressure, both independently and as part of a team, especially in time-sensitive environments such as fiscal deadlines for project submissions. Strong commitment to punctuality and compliance with all required guidelines.

COMMUNICATION AND INTERPERSONAL SKILLS

Teamwork Skills

Experienced in team-based work across diverse contexts, including academic coursework, interdisciplinary research, and technical development projects.

DRIVING LICENCE

Driving Licence: AM

Driving Licence: B

HOBBIES AND INTERESTS

Technology Enthusiast Passionate about staying up to date with emerging technologies. I enjoy experimenting with new tools and systems, integrating them into my personal and academic projects to continuously expand my practical experience.

Nature Enthusiast I enjoy spending time outdoors, especially hiking and mountain biking. Whether alone or in good company, I find that excursions in nature help me recharge and maintain balance in both my personal and professional life.

Swimming Enthusiast I have practiced swimming for several years and consider it a complete and relaxing sport. It helps me maintain physical and mental balance, while training every part of the body.

According to law 679/2016 of the Regulation of the European Parliament of 27th April 2016, I hereby express my consent to process and use my data provided in this CV and application for recruiting purposes.

Catania, 25/09/2025



Andrea Panebianco