

Matteo Orlando

Trofarello, TO, Italia

matteo.orlando.1993@gmail.com

matteodev.netlify.app



I received B.Sc Degree in Physics Engineering in 2015 and a M.Sc. degree in ICT for Smart Societies in 2018 with a thesis focused on designing and development of a self-configuring IoT smart-meter for monitoring the power grids and enabling novel services. Since October 2018, I joined the EDA group as a research assistant. I started my PhD in November 2019 focusing my research in the optimization of the placement of PV modules in the context of Renewable Energy Community.

CAREER

2012–2015

Politecnico di Torino

Bachelor degree in Physics Engineering

2015–2018

Politecnico di Torino

Master degree in ICT for Smart Societies with the thesis "Design and development of a novel smart-meter for improved Smart Grid management"

2018–2019

Politecnico di Torino

Assistant researcher for EDA group

I was involved into an H2020 project called RURITAGE – Heritage for Rural Regeneration (2018–2022). RURITAGE aims at creating an innovative rural regeneration paradigm based on Cultural and Natural Heritage, contributing to economic growth,

social inclusion and environmental sustainability in rural areas. Within RURITAGE, I was in charge of designing and developing a distributed software platform to collect heterogeneous information about cultural heritage in rural areas. It provides: Key Performance Indicators (KPIs) to foster the regeneration process of such rural areas; Decision Support System to analyze textual data and provide possible solutions according to KPIs and user needs; Web GIS tool to visualize and interrogate geo-referenced data; Social app to post relevant photos taken by users in rural areas. I was also involved on another research activity focused on developing a next generation 3-phase smart meter for advanced smart grid management. This work started during my MSc thesis and has been published on paper titled "A Novel Internet-of-Things Infrastructure to Support Self-Healing Distribution Systems" and presented at the IEEE International Conference on Smart Energy Systems and Technologies (SEST 2018), Sevilla, Spain, 10-12 September 2018. This work aims at designing and developing a novel 3-phase smart meter, with the corresponding distributed software infrastructure, to support self-healing and self-configuration of power distribution networks allowing State Estimation, Network Reconfiguration and Fault Detection Isolation and Restoration. To test its features and functionality in a realistic test-bed environment, I exploited distributed both Hardware- and Software-In-the-Loop co-simulation approaches including a real-time simulator (OPAL-RT) to realistically replicate a portion of a real-world power network in Torino.

2019-ongoing

Politecnico di Torino

PhD student in Computer and Control Engineering

Assistant teacher for the Master Degree Course *Programming for IoT*

These 3-year activities allowed us to study the needs and the opportunities for the future of the Smart Grids. Among the wide set of topics offered by the Smart Grid paradigm, the research of the PhD activity focused on Smart Metering and Renewable Energy Communities. Regarding the first topic, the effort was directed toward the development of a 3-phase smart meter which included a set of functionalities targeted to the operator of the energy distribution system. This meter comes together with a communication infrastructure that enables the self-configuration and the auto-updated of the device. Moreover, the meter is capable of running non-trivial algorithms, both local and distributed, to increase the reliability and resilience of the grid, such as Fault-Location and State Estimation. The resulting smart meter is an extremely flexible and modular device that uses open source hardware and software but can be easily modified to include additional features, according to the necessities. Regarding the Renewable Energy Communities (REC), the focus of the activity resulted in the creation of a framework for the optimal placement of PV panels for an REC. This framework uses GIS technologies to identify an optimal configuration of PV modules by also taking into account the constraints and the advantages of the REC paradigm. Moreover, it also includes a realistic simulation of the yearly consumption of the inhabitants of the REC obtained by interpolating demographic data with energy

consumption data. By using this tool, a group of citizens can perform a preemptive economic analysis to investigate the expected benefit of a potential creation of a Renewable Energy Community.

PROJECTS

2018–2021

Ruritage

The RURITAGE project turns rural areas into laboratories to demonstrate natural and cultural heritage as an engine for regeneration. I was in charge of the development of the first version of the Ruritage Resource Ecosystem. This tool consisted in a full stack application that stored geographical data and metadata about the participants of the project and make it available to the public for visualization.

More info ruritage-ecosystem.eu

2021

Development of a wearable IoT device for Covid-19 early diagnosis. di Torino

Cotutor of the thesis.

More info [here](#)

2021

Development of a wearable device for monitoring vital parameters: SpO2, heart rate and temperature.

Cotutor of the thesis.

More info [here](#)

2019–ongoing

Design and development of distributed software platform to gather, manage and visualize multimedia clinical files

Cotutor of the thesis.

More info [here](#)

2021-2022

Parellelization of algorithms for solar radiation prediction by Hadoop and RasterFrames

Cotutor of the thesis.

More info [here](#)

TECHNICAL SKILLS

Main

Python

REST API

MQTT

Microservices

IoT

Smart-Grid

Others

Javascript

Astro

Vue

HTML &
CSS

MongoDB

Docker

Git

PUBLICATIONS

A novel Internet-of-Things infrastructure to support self-healing distribution systems

Published in 2018 International Conference on Smart Energy Systems and Technologies (SEST)

[Read the full paper](#)

Engaging Users in Resource Ecosystem Building for Local Heritage-Led Knowledge

Published in Sustainability-MDPI

[Read the full paper](#)

Optimal configuration and placement of PV systems in building roofs with cost analysis novel Internet-of-Things infrastructure to support self-healing distribution systems

Published in 2020 IEEE 44th Annual Computers, Software, and Applications Conference (COMPSAC) 018 International Conference on Smart Energy Systems and Technologies (SEST)

[Read the full paper](#)

Design of District-level Photovoltaic Installations for Optimal Power Production and Economic Benefit

Published in 2021 IEEE 45th Annual Computers, Software, and Applications Conference (COMPSAC)

[Read the full paper](#)

A Smart Meter Infrastructure for Smart Grid IoT Applications

Published in IEEE Internet of Things Journal

[Read the full paper](#)

A Resources Ecosystem for digital and heritage-led holistic knowledge in rural regeneration

Published in Journal of Cultural Heritage

[Read the full paper](#)
