

Why some of us don't have one true calling

WAPNICK – TED TALK



## EMANUELE ZARFATI

A BASIC Stamp™-powered educational robot sparked his passion for digital electronics at the age of 11. What started as a passionate hobby ended up as a career. He studied **electronics** and **automation** at high-school and pursued later university degrees in **control systems engineering**. Since his work experiences in the energy, automotive and space sectors, he can now design and implement **reliable embedded systems**.

Today, sustainable energy systems are one of his main interests and he wants to **contribute to the energy transition** by developing practical, economically viable and robust solutions. To this end, he has recently resumed his studies for an immersion in the world of AI/ML, investigating how **energy storage technologies** can benefit from the recent advances in the data science field. He also has interest in project management. For this reason, he joined a group of professionals to become a **fundraiser and project manager**, specialising in European and Italian funding schemes.

As we become increasingly aware of how quickly **we are depleting our resources**, sensing and control technologies, as a backbone of the digital society we live in, will play an ever increasing essential role in the sustainable future all of us (hopefully) envision.

### COMPETENCES

**Data science** The field of artificial intelligence was the late addition to his breadth of knowledge. His main interest lies at the intersection between explainable machine learning, scientific modelling and causal inference. This with a focus on the implementation aspects on low-power embedded devices.

**Embedded systems** He has extensive experience in product development life cycle, including requirements elicitation, architecture design, firmware/software development, quality control, and maintenance for large-scale projects. He specialises in real-time and low-power applications, and has skills in low-frequency analog and digital circuit design and prototyping.

**Control systems and energy** He has a background in classical and optimal control theory for analog and digital dynamical systems. This includes physics- and data-based modelling, as well as model identification techniques. While knowledgeable in various physical principles, he has specialised in electric power systems.

### PhD Student

Physics-Informed Machine Learning for Control and Maintenance of Electric Storage Systems

### Co-founder/CTO

ktquette

### Freelancer

Embedded Systems Engineer  
Project Manager  
Fundraiser

### BSc/MSc

Control Systems Engineering



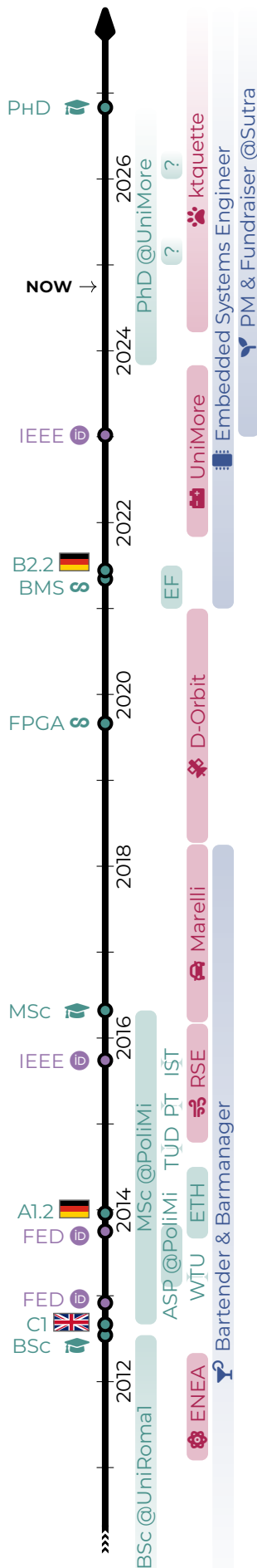
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## ACADEMIC, INDUSTRY & INTERSHIPS

work

**Co-founder** He has started a new adventure with **ktquette** (start-up). Stay tuned!

**AI/ML researcher** In **UniMore** (university), he was involved on European project *IPCEI on Batteries*, in collaboration with Flash Battery™. He used ML and causal inference techniques to investigate predictive maintenance strategies for lithium-ion batteries.

**Gap year** Like many, he took a break from work after the pandemic. He went in Munich, Germany, to study the language with **Education First** (EF).

**Firmware engineer** In **D-Orbit** (start-up) he was part of the software development team, supporting its leadership. He designed and developed firmware for satellites' avionics and software for ground stations. He operated also as ground station operator. As contractor in **Marelli** (multinational) he was responsible for the Board Support Package (BSP) of several worldwide Instrument Panel Clusters (IPC) projects for the FCA group.

**Control systems researcher** At **RSE** he studied the participation to the primary frequency control of offshore wind farms connected to the continental grids through HV-DC networks (MSc thesis). He also contributed to the deuterium control system of **ENEA's** fusion reactors, FTU, with signals preprocessing and systems identification (BSc thesis).

## FREELANCING

work

**Fundraiser & Project Management** In **Sustainable Transition** (Sutra) he contributes with technology advices, project planning and proposals writing to support consortiums, start-ups and researchers accessing funding opportunities for the energy transition.

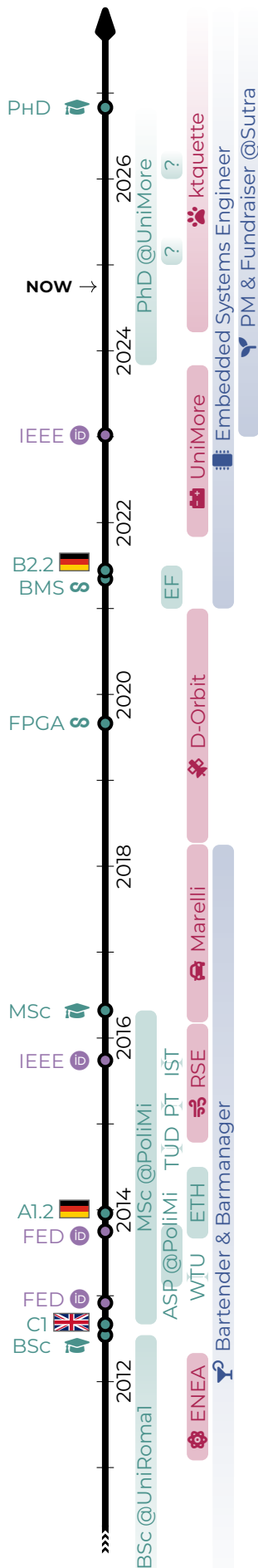
**Embedded developer** He enjoys working on personal and collaborative projects, often to **realise ideas** with professionals in other fields, such as artists and musicians. He can bring ideas into production.

**Professional bartender** Making cocktails did not just paid his university tuition. He is passionate about the world of mixology and has worked as a **bartender** and **bar-manager** in a variety of private and public locations.

## ACADEMIC & CONTINUOUS

education

**University** He is a PhD Student in Computer and Data Science at **University of Modena and Reggio Emilia** (UniMore), doing research in scientific machine learning. He obtained his Bachelor's (<sup>110</sup>/<sub>110</sub> with honor) and Master's (<sup>107</sup>/<sub>110</sub>) degrees in control systems engineering respectively from the **Sapienza University of Rome** (UniRoma1) and **Polytechnic University of Milan** (PoliMi). While at PoliMi, he joined the **Alta Scuola Politecnica** (ASP) programme, which selects *150 exceptionally talented students* for further multidisciplinary training in project management, product design and social innovation (a programme he did not complete).



**Erasmus & Athens** He participated to the Erasmus exchange programme at **ETH** (Zürich). He also participated in other intensive exchange sessions: ethics in research and engineering (**WTU**, Warsaw), product and process design (**TUD**, Delft), non-linear computational mechanics (**PT**, Paris) and quality control (**IST**, Lisbon).

**Lifelong learning** He keeps up with advances in technology and collaboration methods, for example, exploring **online courses**, research publications and special interest groups.

### CONTRIBUTIONS

### publications

- IEEE 2023** E. Zarfati et al., **Automated Battery Power Fade Estimation for Fast Charge and Discharge Operations**, in 3rd International Workshop on Communication and Networking for Swarms Robotics.
- IEEE 2015** F. Augugliaro et al., **Knot-tying with flying machines for aerial construction**, in 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems.
- FED 2013** L. Boncagni et al., **A control approach for plasma density in tokamak machines**, Fusion Engineering and Design, vol. 88, no. 6–8.
- FED 2012** L. Boncagni et al., **MARTE at FTU: The new feedback control**, Fusion Engineering and Design, vol. 87, no. 12.

### SKILLS

At some point, for some new project, he became proficient in something new.

- Programming** Ada, Assembly, Bash, C, C#, C++, Java, Julia, MatLab/Octave, Perl, Python, R ...
- Simulation** Comsol, Power factory, Pspice, Simulink, SystemC ...
- Development** Analyzer, Confluence, Cunit, Enterprise architect, gcc, gdb, git, googletest, GreenHills, IBM synergy/doors, Jenkins, Jira, Kicad, Kubeflow, Kubernetes, Polyspace ...
- Methodologies** Agile, CI/CD, design patterns, DevOps, ECSS, MISRA, modularity, scrum, traceability, UML, version control ...

### WORK ATTITUDE

To avoid *saving hours of design with weeks of development* he promotes adopting a **systems engineering approach** to first build the understanding required for the generation of **maintainable and reusable solutions**. He embraces the agile manifesto, in which **iterative and continuous improvement** is sought in both products and processes. **Quality shall built in** rather than added on. He values (healthy) work environments where ideas sharing, active participation, **constructive criticism**, leadership development and conflict management are encouraged. He respects roles rather than hierarchies. He is open to new experiences and embraces a *just be honest* lifestyle. During its gap year he got leadership and interpersonal communication trainings, also taking the Discovering Natural Latent Abilities (DNLA) assessment.