EnerHarv 2024

PSMA International Workshop | 26-28 June, 2024 | Perugia, Italy

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# EnerHarv 2024 Workshop:

## *Ecosystems Panel - **UBIGIOT**: Ultra-Low Design-Effort, Energy-Efficient and Battery-Indifferent Sensor Node for the Green Internet of Things*

*(this one!)*

**Presented By –**


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Thursday, June 27, 2024

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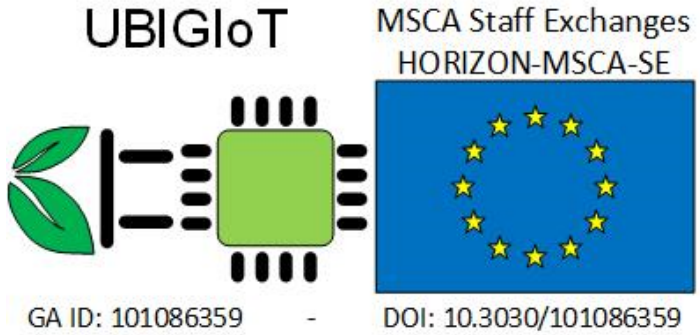
# OVERVIEW

- **What is UBIGIoT?**
- **What do we do?**
- **How do we do it?**
- **How can you collaborate with our ecosystem?**



# What is UBIGIoT?

**Ultra-Low Design-Effort, Energy-Efficient, and Battery-Indifferent Sensor Node for the Green Internet of Things (UBIGIoT): an EU MSCA Staff Exchange program**
**ID: 10101086359 – 48 months project: December 2022 – November 2026**

- MISSON:

  *“substantially enhance the energy efficiency of an IoT sensor node by a synergetic approach targeting both multisource harvesters and System-on-Chip (SoC) design.*

  *The latter aims for a comprehensive approach in which macroblocks of different natures are designed by exploiting at most an automated (digital) design flow.”*

- Add value for members/stakeholders as outlined by our purpose:
  - Improve members’ knowledge and educate the entire consortium/[ecosystem] on the importance of co-design on energy harvesting to power sensor nodes operating under power constraints from energy harvesting to IC design strategies.
  - Relay less and less by bulky batteries: ideally moving from battery indifferent IC building block prioritizing low-power consumption instead of performance in most applications where the state-of-art performance is not strictly required (actually most of the applications!).
  - Dissemination action among the project partners and beyond: world-wide invited Seminars, Tutorials, and Keynotes at International conferences of the IEEE Circuits and System Society (CASS) to address academic and industrial challenges in the Internet of Things sensor node: develop collaborative, pragmatic, application-specific insights to drive solutions.
  - The project targets to be innovative, interdisciplinary, and inter-sectoral across academics, an EU-based semiconductor company, and partners mostly from the ASEAN (East Asia) region.

# What is UBIGIoT?

- **Consortium of Institutions devoted to the design of low-power IC building blocks that rely less and less on bulky batteries**

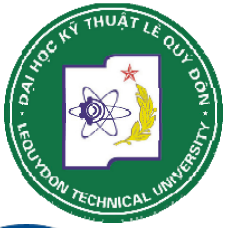
UBIGIoT Consurtium

UNIVERSITÀ DEGLI STUDI DI GENOVA

UPM
UNIVERSITI PUTRA MALAYSIA

VNU
ĐẠI HỌC QUỐC GIA HÀ NỘI
Vietnam National University, Hanoi

Tyndall National Institute



UNIVERSITÀ degli STUDI di CATANIA

UBFC
UNIVERSITÉ BOURGOGNE FRANCHE-COMTÉ

life.augmented

NUS National University of Singapore

LIU

https://cordis.europa.eu/project/id/101086359

# What is UBIGIoT?

## Consortium Representatives

### EU institutions

**University of Genova (UniGE, Italy)**
→**Orazio Aiello**

**University of Catania (UniCT, Italy)**
→ Dario Grasso

**Tyndall Institute (UCC, Ireland)**
→**Mike Hayes**

Institut FEMTO-ST (UBFC, France)
→Samuel Margueron

**STMicroelectronics**
→**Roberto La Rosa**

### Extra-EU institutions

**University Putra Malaysia (UPM)**
→**Fakhrul Zaman Rokhani**

**Vietnam National University (VNU)**
→Xuan Tu TRAN and **Hieu BUi**

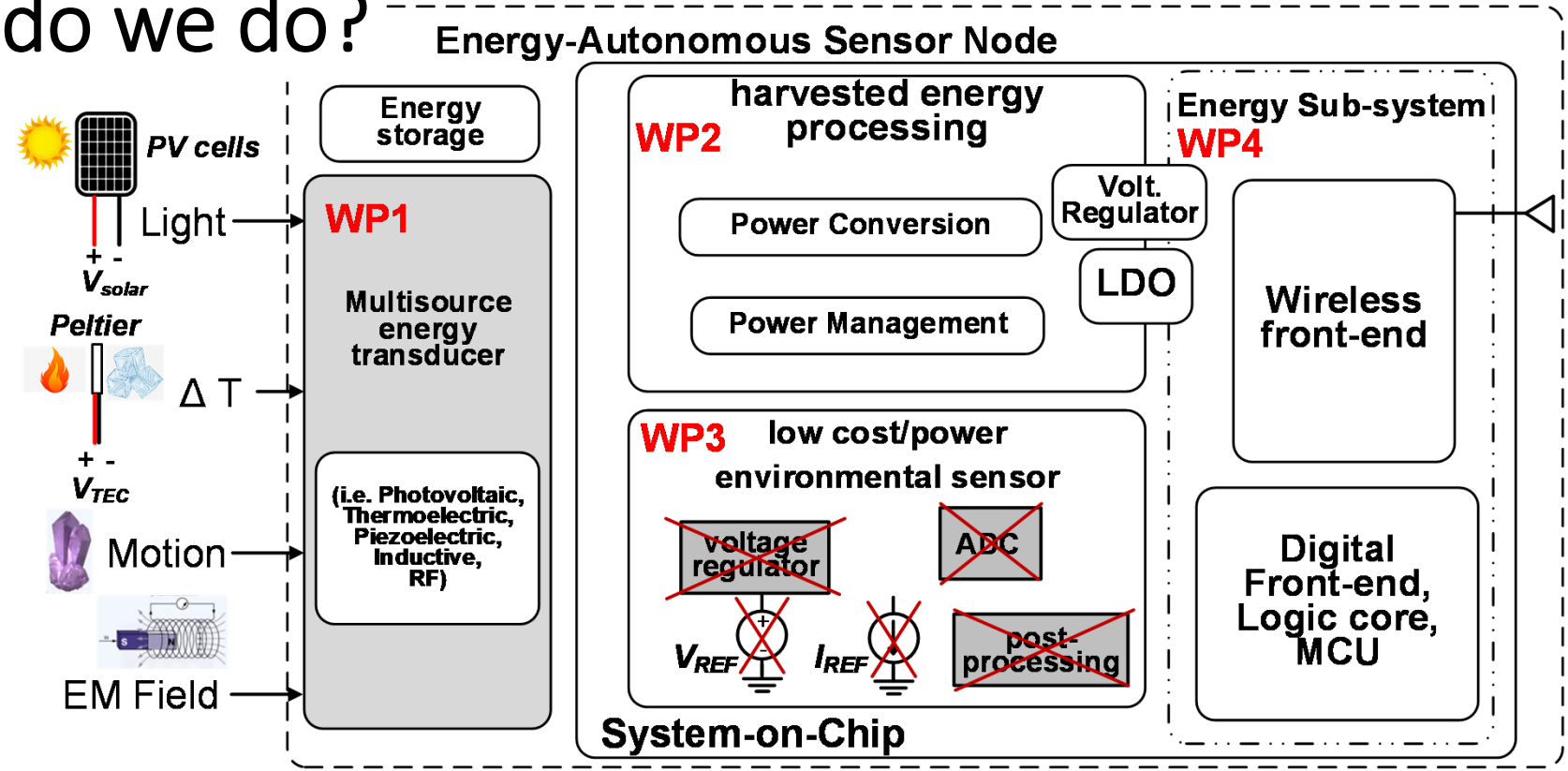
Le Quy Don Technical University (LQDTU)
→Hoang Van Phuc

**Lebanese International University (LIU)**
→Ali Ibrahim

National University of Singapore (NUS)
→Massimo Alioto

**In bold the institutions and the attendees you can meet at EnerHarv2024 ☺**

# What do we do?




**WP1: Multisource harvested power for energy-autonomous sensor node**
**WP2: Ultra-low Power Management IC**
**WP3: Ultra-Low-Voltage and Ultra-low-power environmental IC sensors and interface**
**WP4: Wireless front-end and overall validation of the energy-autonomous IoT sensor node**

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# How do we do it?

- **The Four Pillars for an effective sensor node co-design:**
  - Co-design among different blocks of any sensor nodes
    - harvested source of energy,
    - power management,
    - Sensing interface,
    - data processing, and RX-TX communication

- **In other words, UBIGIoT focuses on:**
  - Merge the best harvested source (type/shape/efficiency/sustainability) to the specific IC solutions (i.e. environmental monitoring, implanted IC device)
  - Ultra-low-power by Near-subthreshold operation and /or bulk driven
  - Comprehensive approach in which macroblocks of different natures are designed by exploiting at most an automated (digital) design flow
  - Novel design paradigm: from voltage domain to time to domain → regulator-less approach to save more and more power
  - Engage more with stakeholders to solve the Internet of things challenges

# How do we do it?

## Delivering Impactful Outputs

- **Conferences & Workshops**
  - Presentation of the results at international conferences
  - Seminars, Tutorial, Keynotes
  - Getting part to EnervHarv2024 ☺ with demos (i.e. Pietro Firpo, Filippo Nicora, Hieu Bui), posters (i.e. Marco Privitera) and talks (i.e. Andrea Ballo, Corrado Boragno)
- **Technical Documents**
  - Conference proceedings
  - Journal papers
- **Applications**
  - Battery-less applications, Energy efficiency, reliability, energy harvesting





UBIGIoT
MSCA Staff Exchanges
HORIZON-MSCA-SE
GA ID: 101086359
DOI: 10.3030/101086359

# How can you become part of our ecosystem?

## UBIGIoT… toward next collaborations..

- **Any support both from universities and companies is appreciated (from the harvesters to the innovative IC solution approaches): Let's brainstorm together**

→ next grant call together? ☺ Let's have a chat: orazio.aiello@unige.it

- **You are welcome to join our next EU project for networking/mobility and research**
- **The more we are, the better ☺**

***https://cordis.europa.eu/project/id/101086359***

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# Q & A

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## Thanks very much for your time and attention!

## Questions/comments???

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