DESIRE 4EU

DESIgning & REcycling sustainable Electronic boards for EUropean circular economy

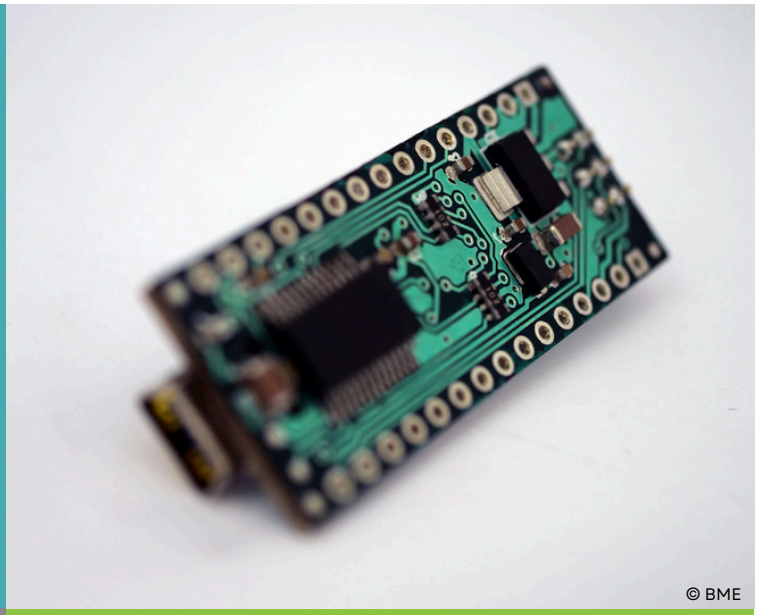
Newsletter Issue #1

March 2025

DESIRE4EU - TOWARDS A SUSTAINABLE GREENER ELECTRONICS

DESIRE4EU Project & Consortium Highlights

In this edition, first, discover the vision behind DESIRE4EU and our commitment to sustainable electronics. Then, we highlight our consortium meetings, including our inspiring visits to ARDUINO and ALBA PCB in Italy, as well as our participation in the *"Responsible Electronics"* Portfolio meeting in Eindhoven.



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News & Events

Celebrating International Women's Day, we feature an interview with Dr. Ferial Guidom on the role of women in research. Stay tuned with our "News & Events" for the latest happenings and future initiatives.

DESIRE4EU: Shaping a Circular Future for Electronics

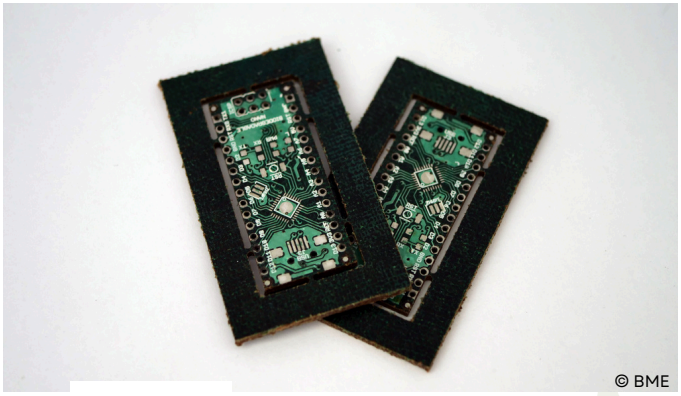
DESIRE4EU is revolutionizing the electronics ecosystem by creating fully circular, bio-based printed circuit boards that combine high performance with environmental responsibility

Breaking new ground in Sustainable PCB Design

In an era of rapid technological evolution, sustainable innovation is imperative. **DESIRE4EU** is at the forefront of this movement, redefining the entire lifecycle of **printed circuit boards (PCBs)** to drastically reduce waste and pollution. Bringing together eight academic and industrial partners from five European countries, each with diverse expertise, the project creates a powerful synergy. Coordinated by GINP and **Professor Pascal Xavier**, the project unites experts in electronics, chemistry, recycling, and eco-design to develop more environmentally friendly and recyclable PCBs, paving the way for a more circular electronics industry.

Key Innovations:

- **Circular-by-Design PCBs:** Fully circular, bio-based, and biodegradable electronic boards that meet rigorous industrial standards.
- **Innovative Bioleaching Process:** A low-energy, low-pollution method for maximizing critical metals recovery like copper by 2030.
- **Holistic Eco-Design:** Integrating sustainable production and recycling processes from the initial design phase.



"Advancing Together Towards a Greener Electronics Industry"

A New Era in Eco-Design

DESIRE4EU's holistic approach redefines eco-design in electronics. By focusing on a **"Just Enough"** mindset, the project advocates for incorporating only essential functionalities and computing power, ensuring that every design minimizes environmental impact while maximizing performance.
This innovative approach not only aims to reduce electronic waste but also minimizes the consumption of fresh raw materials. The project challenges conventional design methods by integrating alternative, low-cost bio-based substrates that promise to transform the production and recycling processes of PCBs.

DESIRE4EU: Shaping a Circular Future for Electronics

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"Creating a sustainable electronics ecosystem isn't just a technical challenge–it's a systemic change in how we understand and design our products."

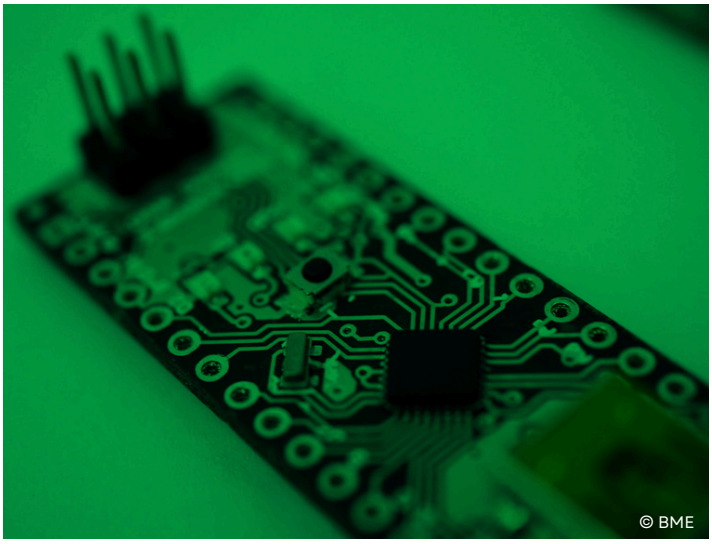
– David Cuartielles, ARDUINO

Systemic Change for a Greener Industry

DESIRE4EU's vision is clear: to make sustainable electronics achievable in everyday life by providing the market with industrially credible, environmentally friendly bio-based rigid PCBs by 2030. The project is driving systemic change by:

- **Rethinking Materials:** Utilizing sustainable alternatives like PLA and flax, even if they initially offer lower integration levels compared to conventional materials.
- **Optimizing Functionality:** Embracing the "Just Enough" philosophy by focusing on essential computing functions to reduce power consumption.
- **Transforming the Value Chain:** Setting new guidelines for production and recycling that could reshape the entire electronics industry.

"The interdisciplinary synergy of the DESIRE4EU consortium drives sustainable innovation in PCB design and recycling."



Driving Collaboration and Strategic Engagement

DESIRE4EU thrives on the collective expertise of a dynamic consortium–bringing together specialists in materials science, green chemistry, electronics, and environmental microbiology. This collaborative network is crucial to rethinking the lifecycle of printed circuit boards, from design to recycling, and forms one of the core pillars of our innovative approach. Additionally, DESIRE4EU is strategically positioned within the broader "Responsible Electronics" portfolio, reinforcing our commitment to sustainable innovation while complementing other forward-thinking initiatives. This dual framework of deep consortium collaboration and targeted portfolio engagement ensures that DESIRE4EU sets new benchmarks in eco-design and production.

DESIRE4EU Consortium Explores Innovation at ARDUINO and ALBA PCB in Italy

From January 20 to 22, 2025, the DESIRE4EU project consortium traveled to **Turin** and **Mogliano Veneto** for a series of insightful visits to two key players in the electronics sector: ARDUINO and ALBA PCB. These three days provided a valuable opportunity to exchange ideas, discover innovations, and strengthen collaborations within the project.
Beyond the technical visits, this gathering was also a key moment for the consortium members to get to know each other better, define their common goals, and align their visions for the project's future. It fostered a strong spirit of collaboration and set the stage for fruitful discussions on how to integrate sustainable practices into the electronics industry.

Day 1: Immersion in the World of ARDUINO in Turin

Our first stop took us to the heart of ARDUINO's headquarters in Turin, a true pioneer of open source and collaborative technologies. We were warmly welcomed by **Fabio Violante**, CEO of ARDUINO Turin, as well as **David Cuartielles**, ARDUINO co-founder, and their dedicated team. Together, we delved into the company's rich history and its mission to make electronics accessible to all.

About ARDUINO

ARDUINO is known as a leader in open-source electronics, building a global community focused on creative and easy-to-use technology. In the DESIRE4EU project, ARDUINO plays a key role by driving the development of the first bio-based ARDUINO board. This work shows what sustainable innovation can achieve and sets a high standard for eco-friendly design in electronics. ARDUINO's focus on openness and collaboration makes it a vital partner in moving the project forward.

The day was marked by a comprehensive presentation of the ongoing initiatives, with a special focus on the development of the first bio-based ARDUINO board. Conversations turned around the technical challenges of the project, from the selection of sustainable materials to the optimization of performance. The goal is to reduce the carbon footprint while maintaining exceptional functionality. This flexibility is essential to create eco-friendly and adaptable solutions that meet the needs of users. Beyond technical discussions, consortium members shared their perspectives on the impact of sustainability in electronics and how collaborative efforts can drive meaningful change. This exchange of ideas reinforced the importance of integrating eco-design principles into future developments.

"Day 1 at ARDUINO's Turin headquarters: a dynamic fusion of open-source innovation and sustainable technology."

DESIRE4EU Consortium Explores Innovation at ARDUINO and ALBA PCB in Italy

Day 2: Exploring the Assembly Processes

On the second day, we visited the factory where ARDUINO boards are assembled. This visit allowed us to closely observe the various stages of production, including automated assembly and stringent quality controls that ensure high-performance products. Sara Dragone, Supply Chain Coordinator at ARDUINO, provided detailed insights into the technical requirements and innovations implemented to maintain ARDUINO's high standards of excellence.

"Day 2: Exploring automated assembly and rigorous quality controls at ARDUINO's production facility."

Day 3: Diving into Innovation at ALBA PCB

On the final day, we headed to ALBA PCB, an European leader in printed circuit board manufacturing, where we were welcomed by the management team, including directors **Antonello Pramaggiore**, **Guido Scarpa**, and **Alberto Bacchin**.
The visit gave us a detailed look at the PCB manufacturing process, with a particular focus on adapting the production chain to integrate biosourced materials. The Alba PCB team shared their expertise on the rigorous testing and quality assurance procedures required to ensure these materials meet industry standards.
Discussions were particularly stimulating, revolving around the technological challenges of these new materials and the long-term implications of transitioning towards more sustainable electronic components. The insights gained during this visit will help shape the consortium's approach to implementing greener solutions across the industry.

DESIRE4EU Consortium Explores Innovation at ARDUINO and Alba PCB in Italy

About ALBA PCB

ALBA PCB is a recognized world leader in printed circuit board production, celebrated for its advanced processes and rigorous quality controls. Within the framework of the DESIRE4EU project, ALBA PCB is exploring the integration of sustainable materials into its manufacturing practices. While sustainability hasn't traditionally been their core focus, their commitment to innovation and quality positions them as a forward-thinking partner in the pursuit of greener electronics solutions.

Conclusion: Promising Prospects for the Future

These three days of intensive discussions have strengthened synergies among DESIRE4EU project partners and paved the way for new collaborations. This gathering not only allowed members to deepen their understanding of key technological advancements but also served as a crucial step in defining the project's next objectives.
We extend our sincere thanks to ARDUINO, and ALBA PCB for their hospitality and commitment to sustainable practices. Their openness to innovation and collaboration has been invaluable in advancing our shared vision for a more responsible electronics industry.
The DESIRE4EU project continues its mission with concrete actions to promote sustainable practices and drive meaningful change.

Stay tuned for our next advancements!

“DESIRE4EU is built on collaboration:bringing together industry leaders, researchers, and innovators to shape a more sustainable future for electronics.”

First In-Person Meeting of the "Responsible Electronics" Portfolio in Eindhoven

On February 18-19, 2025, Eindhoven hosted the first in-person meeting of the **"Responsible Electronics"** portfolio under the EIC Pathfinder program. This event marked an important moment in the collaboration between **nine innovative projects**, all united by a common goal: creating solutions for a more sustainable electronics industry.

Objectives and Challenges of the Portfolio

The **"Responsible Electronics"** portfolio is part of the **EIC Pathfinder Challenges 2023**, aiming to develop new environmentally friendly electronic materials. The goal is to reduce environmental impact and dependence on critical raw materials. Each project tackles these challenges with unique approaches, ranging from bio-based printed circuit boards (PCBs) to light-based technologies for sustainable electronics applications. These innovations pave the way for a revolution in the design of electronic components, making them more durable and responsible.

Day 1: Collaboration and Synergies Between Projects

The first day started with a poster session and oral presentations, where each project showcased its objectives, progress, and the technical challenges it faces. These interactive exchanges facilitated a deeper understanding of each other's approaches and helped identify promising synergies, particularly in areas such as sustainability, manufacturing, and life cycle assessment of materials.
To structure these collective efforts and encourage collaboration, the portfolio partners are organized into four working groups:

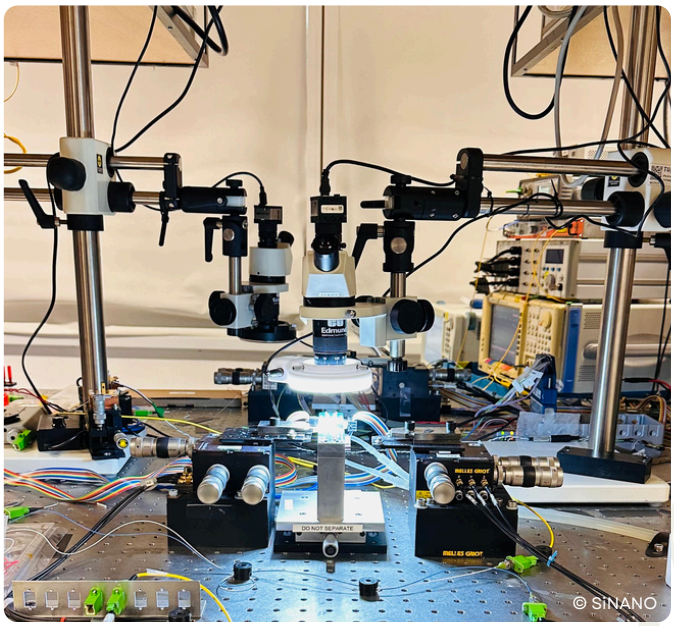
- **WG1: Technological Synergies**
- **WG2: Outreach Events and Awareness Practices**
- **WG3: Metrics and LCA Activities**
- **WG4: Protection and Exploitation**

Discussions within these groups helped define short- and medium-term objectives while emphasizing the importance of close coordination to maximize the collective impact. Each group is committed to working on tangible actions to advance the projects and strengthen collaboration between the different partners.

First In-Person Meeting of the "Responsible Electronics" Portfolio in Eindhoven

Day 2: Discovering TU/e Laboratories

The second day featured a visit to some laboratories at Eindhoven University of Technology (TU/e), an innovation hub in fields such as nanotechnology, semiconductors, photonics, and integrated circuits.
Participants had the opportunity to explore cutting-edge equipment and research methods used to investigate new material properties and design more efficient, durable electronic devices.
A highlight of the visit was discovering the clean room, a controlled atmosphere facility where air is filtered to minimize particle presence, ensuring the purity of manufacturing processes at the nanometer scale. This environment offers a fascinating glimpse into the precision required to create high-quality electronic devices. The tour continued in specialized laboratories focused on materials, photonics, and integrated circuits, showcasing the advanced research taking place at TU/e.



A promising start of collaboration

This first in-person meeting was a key moment for the "***Responsible Electronics***" portfolio. It helped strengthen connections among partners and set the stage for future collaborations. The diverse range of expertise and the rich discussions allowed everyone to spot real opportunities for working together, especially within the working groups.
The next step will be to turn these conversations into concrete actions, with focused collaborations and the development of innovative solutions that meet market needs. This process will rely on the collective expertise of all the partners and the ongoing support of the EIC, whose commitment to collaborative research is essential in making these future technologies a reality.

A special thank you to the EIC for its support and to all participants for these fruitful discussions. We look forward to the next events to continue building the future of sustainable electronic materials together.

Women in Science: Advancing Innovation in Sustainable Electronics

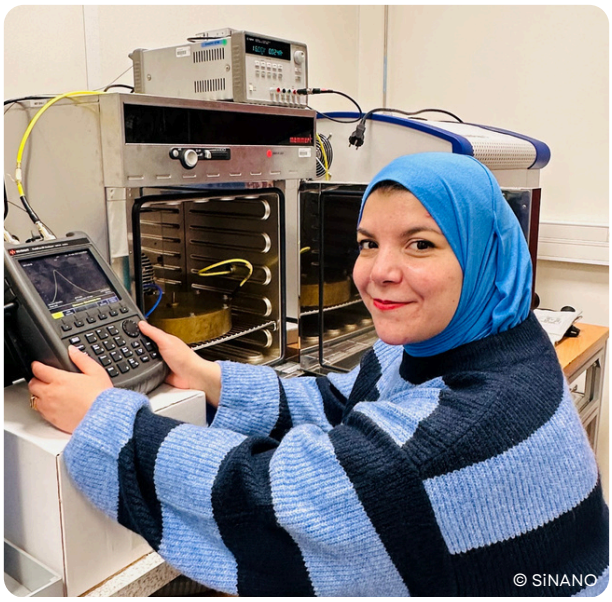
To celebrate International Women's Day, DESIRE4EU highlights the contribution of women in science and innovation. In this edition, we meet **Dr. Ferial Guidom**, a postdoctoral researcher working on sustainable materials for electronic applications. Here is what she shared with us.

Can you share about your academic background and what inspired you to pursue a career in research?

I earned a Bachelor's in Optical Instrumentation and Photonics, followed by a Master's in Applied Electronics and Photonics, combining optics and embedded electronics. I then completed a PhD on microwave circuit design using metamaterials with the CROMA lab, focusing on both theoretical and experimental aspects for antennas. After lecturing and researching for three years in Algeria and France, I became a postdoctoral researcher on the European project DESIRE4EU.
Since my first year at university, I've been passionate about research, driven by the challenge of exploring new concepts, solving complex problems, and advancing technology.

What is your role in the DESIRE4EU project, and what are you currently working on?

In the DESIRE4EU project, I am part of the RF team. I started by characterizing the radiofrequency properties of bio-based substrates provided by our Hungarian partners to assess their behavior at RF frequencies. This involves performing measurements and processing the results to extract the electromagnetic properties of these materials. Next, I will design an antenna for ARDUINO, ensuring that it meets the requirements set by our ARDUINO partners for integration into an ARDUINO Uno board.



"Just go for it! Being a woman has never been a barrier to pursuing a career in science—your passion and skills define your success."

As a woman in STEM, what challenges have you faced, and how have you overcome them?

I must admit that since my time as a student in STEM, there have always been more men than women. In fact, during my PhD, while I was in Algeria, I was the only woman in my research lab. However, this was never a problem for me nor an obstacle. I found that, as a woman in STEM, my journey has been quite smooth.

What advice would you give to young women aspiring to careers in science and engineering?

Just go for it! Don't be afraid. Being a woman has never been an obstacle to pursuing a career in science, especially in engineering.

DESIRE4EU News & Events

Stay updated with DESIRE4EU's latest developments, events, and opportunities!

What's Already Happened?

DESIRE4EU was represented at various events by our consortium partners:

- **Attila Géczy (BME)** – IEEE ESTC (September 10-14, 2024, Berlin, Germany)
- **Pascal Xavier (GINP)** – MNE24 (September 16-19, 2024, Montpellier, France)
- Sébastien Toussaint (UCLouvain) – MNE24 (September 16-19, 2024, Montpellier, France)
- **David Cuartielles (ARDUINO)** – GRASP Conference (September 27, 2024, Roskilde, Denmark)
- **Pascal Xavier (GINP)** – EU-INDIA Joint Researchers Workshop on Semiconductors (October 9, 2024, Brussels, Belgium)
- **Attila Géczy & Oliver Krammer (BME)** – IEEE SIITME (October 16-19, 2024, Sibiu, Romania)
- **Antonello Pramaggiore (ALBA)** – Electronica 2024 (November 11-15, 2024, Munich, Germany)
- **Vincent Grennerat (GINP)** – ECPE Hybrid Workshop (November 26-27, 2024, Grenoble, France)
- **Vincent Grennerat (GINP)** – Symposium on Sustainable Electronics and Digital Technologies (December 12, 2024, Grenoble, France)
- **David Cuartielles (ARDUINO)** – Congreso Nacional STEAM (February 8, 2025, Spain)
- **David Cuartielles (ARDUINO)** – EDGEAI Conference 2025 (February 26, 2025, USA)
- **Attila Géczy (BME)** – BME Future Planner Conference Series | VIK (March 3, 2025, Budapest, Hungary)
- **David Cuartielles (ARDUINO)** – STEAMBRACE – Future of STEAM Education Congress (February 3-5, 2025, Sweden)
- **David Cuartielles (ARDUINO)** – Hackaday Berlin (March 15, 2025, Germany)

What's next?

DESIRE4EU will be presented at various events by consortium partners:

Workshop on TinyML for Sustainable Development
- Dates: March 24 - April 4, 2025
- Location: Malawi

Eco-ES Workshop at Design, Automation and Test in Europe:
- Dates: March 31 – April 2, 2025
- Location: Lyon, France

InnoElectro 2025
- Dates: April, 08–10
- Location:Budapest

48th International Spring Seminar on Electronics Technology (ISSE 2025):
- Dates: May 14–18, 2025
- Location: Budapest, Hungary

GreenTech 2025:
- Dates: June 10–12, 2025
- Location: Amsterdam, Netherlands

DESIRE4EU: Spotlight in the Press!

DESIRE4EU was recently featured in **ELETTRONICA AVs, Il Sole 24 Ore, Aziende24**


Aziende Territorio

DESIRE4EU rivoluziona in chiave sostenibile l'industria elettronica

ALBA PCB Group in prima linea, in sinergia con importanti aziende e università, con circuiti elettronici "green"

DESIRE4EU mette in campo nuove tecnologie innovative per sviluppare e produrre circuiti stampati (PCB) efficienti, sostenibili, circolari

Progetto promosso dall'Innovation Council, Comunità Europea

Towards a green and responsible electronics industry

Un impegno costante verso l'innovazione

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