



*Twinning Innovation Hub for Microbial Platforms in Plastic Upcycling*



National Technical  
University of Athens



## D6.2 TwInn4MicroUp FUNCTIONAL WEBSITE

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# TwInn4MicroUp

Twinning Innovation Hub for Microbial Platforms in Plastic Upcycling



National Technical  
University of Athens



**TUS**



UNIVERSITÀ  
DEGLI STUDI DI BARI  
ALDO MORO

Grant Agreement No.	101159570
Project acronym	<b>TwInn4MicroUp</b>
Project name	Twinning Innovation Hub for Microbial Platforms in Plastic Upcycling
Start Date/Duration	September 2024 /36 Months
Call	HORIZON-WIDERA-2023-ACCESS-02
Type of Action	HORIZON-CSA
Deliverable No. & Title	<b>D6.2 Functional Twinn4MicroUp website</b>
Due month	February 2025 (M6)
Responsible Partner	IMGGI
Delivery month	M5

## Type of Document (Dissemination Level)

Public	X
Sensitive	
EU Classified	

## History of Changes

VERSION	DATE	DESCRIPTION
<b>v1.0</b>	15/01/2025	Functional project website



Funded by

the European Union

TwInn4MicroUp is funded by the Horizon Europe call  
HORIZON-WIDERA-2023-ACCESS-02 under Grant Agreement No. 101159570

Document Control			
VERSION	DATE	AUTHOR	ORGANISATION
v0.1	10/01/2025	Christina Ferousi	NTUA
v0.2	13/01/2025	Jasmina Nikodinovic-Runic	IMGGE
v0.3	13/01/2025	Gennaro Agrimi	UNIBA
v0.4	14/01/2025	Evangelos Topakas	NTUA
v1.0	15/01/2025	<b>Approval by all participants</b>	

## Partners

**NTUA:** Ethnicon Metsovion Polytechnion (National Technical University of Athens)

**TUS:** Technological University of the Shannon: Midlands Midwest

**IMGGE:** Institute of Molecular Genetics and Genetic Engineering, University of Belgrade

**UNIBA:** Università Degli Studi Di Bari Aldo Moro

## Abbreviation List

Completely Automated Public Turing test to tell  
 Computers and Humans Apart: reCAPTCHA, 14  
 Cumulative Layout Shift: CLS, 15  
 Dissemination, Exploitation, Communication: DEC, 6  
 Interaction to Next Paint: INP, 15

Largest Contentful Paint: LCP, 15  
 Open Researcher and Contributor Identifier: ORCID, 12  
 Uniform Resource Locator: URL, 6  
 Work Package: WP, 5

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## 1. Executive Summary

The present document reports on the establishment of the initial content of the TwInn4MicroUp website. It describes the objectives that the website intends to address, its structure and its functionalities. The actual deliverable is available at <http://twinn4microup.eu>. The official TwInn4MicroUp website, launched in October 2024 (M2), serves as the primary source of information about the project's identity, goals, and progress. Created and managed by NTUA, while supported and guided by IMGG as Work Package (WP) 6 leader, the website will be regularly updated throughout the project's duration and for two additional years post-completion. It is designed to be user-friendly and aligns with the project's visual identity, ensuring comprehensive and transparent data access. Visitors can find up-to-date information about the project's partners, structure, activities, and achievements. The website targets a diverse audience, including scientific and commercial researchers, relevant industries, and the general public. Key features of the TwInn4MicroUp website include a newsletter subscription and a contact form. Additionally, it offers downloadable documents such as flyers, bookmarks, roll-ups, and posters, which are prepared and distributed or presented at in-person events. The styling, language, and tools used on the website are carefully selected to meet the communication objectives and target audiences of the project.

## 2. Project Overview

TwInn4MicroUp is a 3-year project funded by the EU Horizon Europe HORIZON-WIDERA-2023-ACCESS-02, which started in September 2024. It involves four partners of which three from EU countries (Greece, Ireland and Italy) and one Associated Country (Serbia), all research institutions. The primary objective of the TwInn4MicroUp project is to significantly enhance the competitiveness and capabilities of NTUA in the areas of Project Management and Administration, Budget Acquisition, and Synthetic Microbial Biotechnology research. This enhancement aims to elevate NTUA's research profile, contributing to the advancement of European socioeconomic goals. TwInn4MicroUp aims to introduce an innovative approach to upcycling plastic waste by utilizing green biological/mechanical/chemical technologies to recover plastic monomers. This project will leverage modern molecular techniques to develop microbial cell factories that can produce bioactive compounds from plastic-derived feedstocks. This advancement has the potential

to transform industries related to bio-colorants, biotherapeutics, bio-nutraceuticals, biosurfactants, and biomaterials.

## 2.1 Introduction

To align with the Horizon Europe funding, TwInn4MicroUp is hosted on a “.eu” domain (<https://twinn4microup.eu>), that has been secured for the full duration of the project, plus an additional two years. The initial version of the website was launched two months after the project's commencement, in October 2024. Given its importance as an extension and communication interface for the project, the website will undergo continuous development, modifications, and updates throughout the project's lifecycle.

## 2.2 Objectives

The development of the TwInn4MicroUp website is part of WP6, focusing on the outreach, communication and dissemination of project results. Its goal is to communicate the project's achievements and benefits to relevant target groups, including the scientific and technical community, industry professionals, other research projects, and the general public.

# 3. The TwInn4MicroUp Website

## 3.1 General

The project website is the primary contact point for those interested in the project. It must be clear, comprehensive, and regularly updated with information on current challenges, recent presentations, and other project-related details, while ensuring confidentiality and data security. To ensure the website is easily updated throughout the duration of the project, we decided to use a well-known content management system which allows for quick generation of project-related news without the necessity of prior technical knowledge. Another technical requirement was the ability to extend the system with third-party plugins, which is especially important for newsletter subscription that should be seamlessly integrated in the technical platform. Based on these requirements, we decided to use WordPress<sup>1</sup> as a technical platform of the project website, as a

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<sup>1</sup> <https://wordpress.com/>

#### D6.2: TwInn4MicroUp Website

web-framework, and as blogging engine. WordPress is a flexible, user-friendly, and open-source content management system that can be installed on your own server. It offers an intuitive user interface for website administrators to create new blog posts and supports advanced user management with fine-grained access rights. There is high availability of third-party plugins to extend functionality, and there is established connection to the most popular social networks.

The TwInn4MicroUp project website has been designed and developed by the Computer Center Unit of the NTUA Chemical Engineering School and the Project Coordinator. The website together with all relevant files, is hosted at a server located at the NTUA School of Chemical Engineering premises. Google Analytics<sup>2</sup> is utilized for measuring website outreach and visits. Open Graph meta tags have been added for eye-catching & impactful Uniform Resource Locator (URL) display when shared on social media. The website's aesthetics and colour scheme adhere to the project's established visual identity (*see Deliverable 6.2 Dissemination, Exploitation, Communication (DEC)*), ensuring memorable features for visitors. Several open-license images have been added next to the text for enhanced communication and will be replaced by project-generated images once the latter become available. The header of the website (**Figure 1**) remains fixed at the top of the screen while scrolling within the page, featuring the project's logo on the left and easy navigation to the rest of the tabs of the website. The footer of the website (**Figure 2**) remains the same across the entire website and contains a brief overview of the project, together with the following:

- o Hyperlink to Cordis project profile<sup>3</sup>
- o EU funding acknowledgments
- o Email contact
- o Social media hyperlinks
- o Newsletter subscription form
- o Copyright disclaimer
- o Legal pages
- o Disclaimer mandated by the Grant Agreement (17.3)

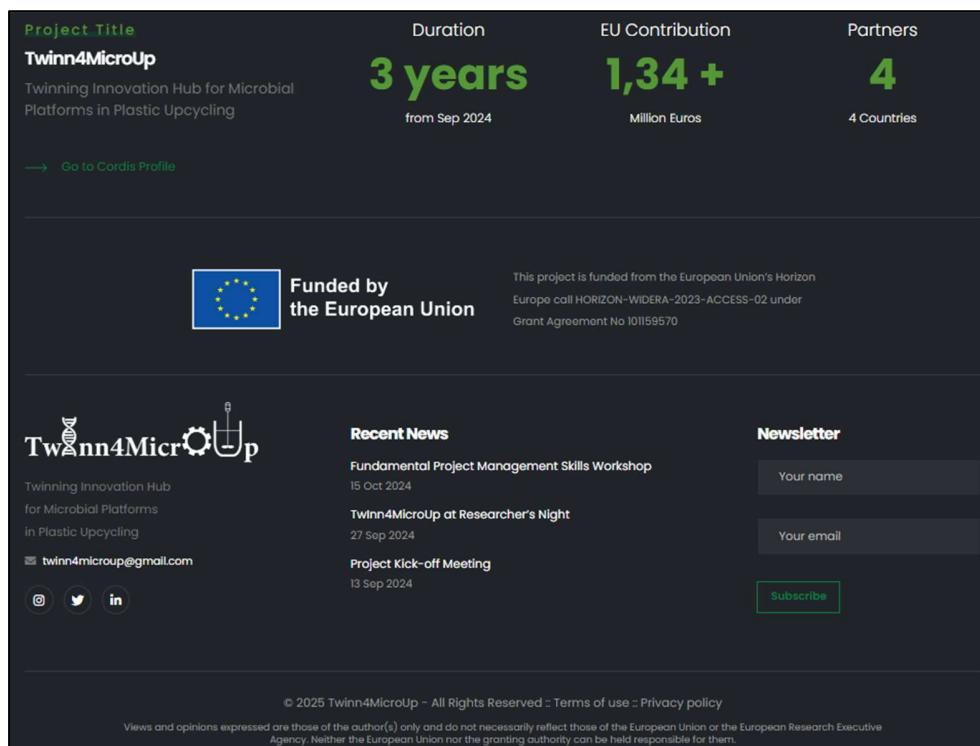
---

<sup>2</sup> <https://analytics.google.com>

<sup>3</sup> <https://cordis.europa.eu/project/id/101159570>



**Figure 1.** Website header



**Project Title**  
**TwInn4MicroUp**  
Twinning Innovation Hub for Microbial Platforms in Plastic Upcycling

**Duration**  
**3 years**  
from Sep 2024

**EU Contribution**  
**1,34 +**  
Million Euros

**Partners**  
**4**  
4 Countries

[Go to Cordis Profile](#)

 **Funded by the European Union**

This project is funded from the European Union's Horizon Europe call HORIZON-WIDERA-2023-ACCESS-02 under Grant Agreement No 101159570

**Recent News**

- Fundamental Project Management Skills Workshop  
15 Oct 2024
- TwInn4MicroUp at Researcher's Night  
27 Sep 2024
- Project Kick-off Meeting  
13 Sep 2024

**Newsletter**

Your name

Your email

[Subscribe](#)

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Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

**Figure 2.** Website footer

### 3.2 Structure and Content

#### 3.2.1 Home page

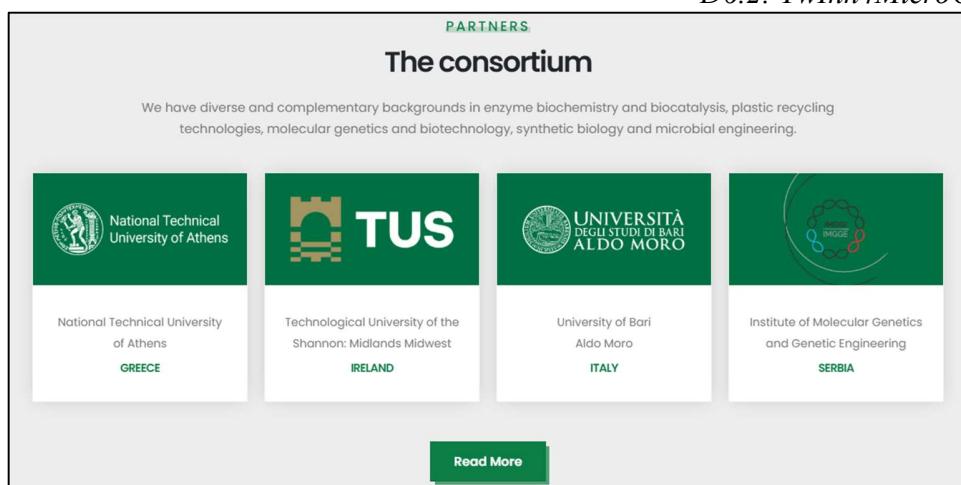
At the top of the Home page of the TwInn4MicroUp website, the project logo is depicted in front of a designed background that is part of our visual identity, together with an informative slogan and simple infographics presenting the general idea of the project (Figure 3). The Home page of the TwInn4MicroUp website states the mission of the project (Figure 4), briefly presents the consortium with hyperlinks to the Partners page (Figure 5), highlights the concept of Synthetic Microbial Platforms for Plastic Upcycling (Figure 6), and summarizes the three most recent records from the News page of the website with relevant hyperlinks (Figure 7). While scrolling within the Home page, the social media handles remain fixed at the top right side for easier accessibility.



**Figure 3.** Home page (top)



**Figure 4.** Home page (mission)



**PARTNERS**

## The consortium

We have diverse and complementary backgrounds in enzyme biochemistry and biocatalysis, plastic recycling technologies, molecular genetics and biotechnology, synthetic biology and microbial engineering.

National Technical University of Athens  
GREECE

TUS  
IRELAND

UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO  
ITALY

Institute of Molecular Genetics and Genetic Engineering  
SERBIA

[Read More](#)

**Figure 5.** Home page (consortium)



**THE CONCEPT**

## Synthetic Microbial Platforms for Plastic Upcycling

The creation of microbial cell factories, capable of producing significant quantities of valuable and innovative bioproducts through fermentation of plastic waste-derived feedstocks

- ✓ **Plastic Waste Pretreatment**  
Green bio/mechano/chemical technologies
- ✓ **Microbial Cell Factories**  
Bacterial and yeast strains, genome mining, metabolic engineering
- ✓ **Valuable and Innovative Bioproducts**
  - Fermentation of recovered plastic monomers
  - Production of next-generation bio-colorants, biotherapeutics, bio-nutraceuticals, biosurfactants, and biomaterials

**Figure 6.** Home page (concept)



**THE BLOG**

## Our Recent News

Stay updated with our latest innovations, research breakthroughs, sustainability initiatives, and upcoming events and outreach efforts.

**15 OCT** **Fundamental Project Management Skills Workshop**  
During our first workshop, 12 researchers from NTUA, IMGG, UNIBA, and TUS explored advanced project management techniques and collaborative research strategies under the guidance of Dr. Deasún Ó Conchúir

**27 SEP** **TwInn4MicroUp at Researcher's Night**  
The TwInn4MicroUp team had an incredible time connecting with science enthusiasts at the 2024 Researcher's Night in Athens, Bari, and Belgrade.

**13 SEP** **Project Kick-off Meeting**  
The TwInn4MicroUp project has officially commenced with a successful kick-off meeting. This event brought together partners to align on the project's goals and strategies, focusing on transforming plastic waste into valuable bioproducts.

**Figure 7.** Home page (recent news)

### 3.2.2 About page

The About page of the TwInn4MicroUp website provides more information about the challenge and our vision (Figure 8), the specific objectives (Figure 9), the WP structure of the project (Figure 10), as well as the expected impact (Figure 11).



**CHALLENGE & VISION**

Plastics pervade many industries, with production soaring from 1.5 Mt in 1950 to 359 Mt in 2019, and virgin plastics reaching 8,000 Mt in 2020. The result? A surge in plastic waste and environmental threats, with 20 Mt entering aquatic ecosystems annually—dubbed the “7th continent of plastic.” Traditional waste management is failing, driving the need for sustainable solutions.

TwInn4MicroUp leads with an innovative approach, transforming plastic monomers, derived from green plastic depolymerization technologies, into high-value biomaterials and bioactive compounds via Synthetic Microbial Biotechnology.

This project aims to build an EU value chain, converting single-use and hard-to-recycle plastics into next-generation bioactive compounds and biomaterials, ensuring high environmental and economic value.

**Figure 8.** About page (challenge and vision)

**OBJECTIVES**

Establishment of a high-performance Research and Innovation Hub for Synthetic Microbial Biotechnology, elevating NTUA’s profile, addressing the innovation gap between the European countries while delivering impactful socio-enviro-economic outputs via new circular petro- and bio- plastics lifecycles.

- ✓ Force strategic partnerships
- ✓ Enhance NTUA’s capacity for Horizon Europe participation
- ✓ Strengthen NTUA’s scientific, innovation, and technical excellence in Synthetic Microbial Biotechnology
- ✓ Consolidate expertise and foster entrepreneurship and innovation



**Figure 9.** About page (objectives)

**Work Package 1**  
**Project Management and Coordination**

WP1 ensures effective project operation by meeting goals within defined timelines and budgets. Results will be shared via Intellectual Property Rights and Exploitation Board (IPREB) and Dissemination and Exploitation Board (DEB), with clear communication channels established through periodic meetings, emails, teleconferences, and a file repository platform. Additionally, a mobile app will be developed for real-time project monitoring, fostering remote collaboration and improving efficiency. This initiative aims to enhance productivity and alignment with project objectives.

NTUA

**Work Package 4**  
**Enhancement of research management and administrative skills of NTUA**

WP4 focuses on enhancing NTUA's research management by assessing current capabilities, identifying areas for improvement, and aligning with the institution's mission. Expertise from TUS and IMGGE will help establish a dedicated research office. Administrative processes will be streamlined, including grant applications and project reporting. Workshops, seminars, and staff exchanges will be organized to enhance skills. A dedicated RMA Office for EU projects will be established at NTUA, collaborating with TUS to improve project management and administration.

TUS

**Work Package 2**  
**Cross-pollination Activities: Networking and Training**

To enhance NTUA's research and innovation, the proposal includes seven short-term staff exchanges and three workshops and training schools. Workshops will showcase state-of-the-art achievements, mainly for NTUA researchers, while training schools will offer broader, presentation-style lectures on Modern Synthetic Biology. Three annual training schools will continue post-project to sustain the TwInn4MicroUp Hub, offering travel grants for early-stage researchers. The initiative aims to foster sustainable partnerships and collaborative efforts, contributing to NTUA's long-term scientific agenda and promoting resource sharing and best practices.

UNIBA

**Work Package 5**  
**Synergistic Industrial Engagement for Incubation of Innovation**

WP5 will establish the TwInn4MicroUp Hub by leveraging networking activities among Consortium members and the IIE network. This initiative will focus on developing microbial strains for valorizing industrial side streams. To attract diverse stakeholders, events like the Academy-Industry Forum and Circular Economy and Bioeconomy Festival will be organized, covering the latest achievements and fostering networking opportunities. Connections with organizations like Hellenic Federation of Enterprises (SEV) and Research and Entrepreneurship Unit (REU) at NTUA will be established. An online innovation competition, the 'MicroUp Challenge', will incubate innovative ideas in Synthetic Microbial Biotechnology.

NTUA

**Work Package 3**  
**Synthetic Microbial Biotechnology for Plastic Waste Upcycling**

WP3 focuses on developing yeast and bacterial strains to produce bio-products from depolymerized plastic waste. Leveraging advanced synthetic biology and strain engineering, TUS will utilize green methodologies for plastic degradation. NTUA, a leader in enzymatic plastic degradation, will provide pretreated materials for microbial valorization. IMGGE will enhance bacterial strains using CRISPR/Cas9 and Adaptive Laboratory Evolution, while UNIBA will engineer yeast strains to increase lipid accumulation. Improved strains will be cultivated in bioreactors for large-scale production of bio-products.

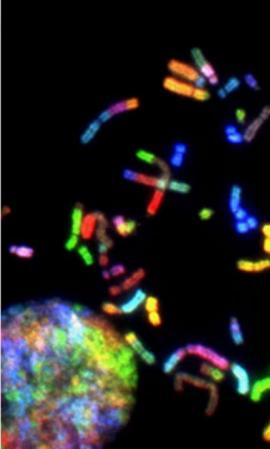
NTUA

**Work Package 6**  
**Outreach, Communication and Dissemination**

WP6 focuses on dissemination, exploitation, and communication (DEC) to ensure long-term sustainability. A comprehensive DEC plan will promote project activities and engage various stakeholders, including the public, students, industry professionals, and policymakers. Project outcomes will be disseminated through scientific publications. To sustain the TwInn4MicroUp Hub, applications for Joint Research Projects under H2020 programs, and Greek national funds will be pursued.

IMGGE

**Figure 10.** About page (structure)







**IMPACT**

TwInn4MicroUp is set to redefine our approach to plastic waste management by harnessing the power of Synthetic Microbial Biotechnology, turning plastic waste into valuable resources, aligning with the principles of a circular and sustainable economy. The innovative solutions within this project hold the potential to mitigate the environmental impact of plastic waste while creating economic value and fostering new avenues of research and development.

- ✓ Stronger linkages between academia and businesses leading to technology transfer and multiplying effects on the economy
- ✓ Enhanced global outreach for all partners
- ✓ Higher participation and success rate in EU funded projects and more consortium leadership roles
- ✓ Improved creativity supported by development of new approaches in Research and Innovation
- ✓ Reformed R&I systems and institutions leading to increased attractiveness and retention of talents
- ✓ Promotion of innovative solutions for plastic circularity, public education, and engagement

**Figure 11.** About page (impact)

### 3.2.3 Partners page

Each partner is presented within a separate section that follows the same structure (**Figure 12**). On the left, there is the institution's information with logo, name, address, country, and website. In the middle of the section, there is a short description of the research group(s) participating in the

### D6.2: TwInn4MicroUp Website

TwInn4MicroUp project along with a link to each respective group. On the right, there is a photo of the group leader (and the project partner in case these are different people), that holds a hyperlink to their Open Researcher and Contributor Identifier (ORCID)<sup>4</sup> profile. Clear labels in each partner section specify the WP(s) they lead.



National Technical University of Athens

**NATIONAL TECHNICAL UNIVERSITY OF ATHENS**

Zografou Campus  
9, Iroon Polytechniou str  
15772 Zografou

<https://www.ntua.gr/en>

**GREECE**

[Work Package 1](#)  
[Work Package 3](#)  
[Work Package 5](#)

**INDBIOCAT – INDUSTRIAL BIOTECHNOLOGY & BIOCATALYSIS GROUP**

The IndBioCat group advances biotech tools to valorize food, agroindustrial, and post-consumer plastic waste. Initiatives range from extracting high-value products to producing second-gen biofuels and upcycling synthetic polymers. Our sustainability agenda is centered on the creation of efficient and scalable bioprocesses that contribute to waste reduction, optimized resource utilization, and the alleviation of environmental pollution.

[Group Website](#)

**LIEE – LABORATORY OF INDUSTRIAL AND ENERGY ECONOMICS**

LIEE is an academic and research unit at NTUA that offers high-level economic and managerial studies. LIEE's research activities focus on innovation economics and management, industrial economics and policy, research networks, firm's dynamic capabilities and resources, knowledge-intensive entrepreneurship, public procurement, ICTs, as well as sustainability, energy, and environmental policy.

[Group Website](#)

**TEAM LEADERS**



**Dr. Evangelos Topakas**

IndBioCat Principal Investigator – Professor



**Dr. Aggelos Tsakanikas**

LIEE Director – Professor

**Figure 12.** Partners page (NTUA)

#### 3.2.4 News page

The News page includes posts about diverse project activities, including meetings, workshops, seminars, public outreach participation, press releases, as well as news from other ongoing activities relevant to the scientific fields of the TwInn4MicroUp project. Each post includes a cover image, a category label, a title, a date, a brief informative excerpt, and a link to the full post (**Figure 13**). The full post is comprised of a short article describing the activity, photos from the event, and other pertinent information, e.g., conference website (**Figure 14**).

<sup>4</sup> <https://orcid.org/>



**Event**

## TwInn4MicroUp at Researcher's Night

September 27, 2024

The TwInn4MicroUp team had an incredible time connecting with science enthusiasts at the 2024 Researcher's Night in Athens, Bari, and Belgrade.

[View More →](#)

**Figure 13.** News page (post overview)



**Event**

## TwInn4MicroUp at Researcher's Night

September 27, 2024

The European Researchers' Night is the largest annual science outreach event in Europe, celebrating scientific achievements across the continent. Each year, universities and research institutes open their doors to the public, showcasing their work through presentations, experiments, games, discussions, and other interactive activities. In 2024, the TwInn4MicroUp project was featured in Athens (Greece), Bari (Italy), and Belgrade (Serbia).

This year's event focused on the following areas:

- Tackling the climate crisis with social participation and innovation
- Green, blue and digital transition
- Sustainability – circular economy – sustainable mobility – health – accessibility– quality of life

We had an incredible time on this year's Researchers' Night! It was a fantastic opportunity to connect with the public and share our passion for biotechnology and sustainability. Visitors explored our mission to tackle plastic pollution through microbial innovations, sparking inspiring conversations.

Our interactive stands showcased the TwInn4MicroUp project, which transforms plastic waste into valuable bioproducts using innovative microbial technologies. Visitors got a glimpse of our cutting-edge research and learned how biotechnology can help address environmental challenges like plastic pollution and promote a circular economy.

We were thrilled to see so many curious minds eager to engage with our work! The thought-provoking questions and meaningful discussions about the future of sustainability were truly inspiring. It was especially rewarding to see the enthusiasm of young participants, whose excitement for science reminds us why events like Researchers' Night are so important.

A heartfelt thank you to everyone who visited our stand. Your interest and support energize our commitment to creating impactful solutions for a greener, more sustainable future. Events like this highlight the power of connecting science with society and encourage collective action toward addressing global challenges.

*Stay tuned as we continue this journey of discovery and innovation. Together, we can build a future where science and sustainability go hand in hand.*

**LATEST NEWS**

[Fundamental Project Management Skills Workshop](#)  
15 October 2024

[TwInn4MicroUp at Researcher's Night](#)  
27 September 2024

[Project Kick-off Meeting](#)  
13 September 2024



**Figure 14.** News page (full post)

### 3.2.5 Downloads page

The Downloads page contains freely available materials, ranging from communication kit documents to scientific publications, newsletters, and public reports (**Figure 15**).

DOWNLOADABLE DOCUMENTS			
<a href="#">SHOW ALL</a>	<a href="#">NEWSLETTER</a>	<a href="#">PROMOTIONAL MATERIAL</a>	<a href="#">PUBLICATION</a>
07/01/2025	Promotional material	 Flyer 4	Flyer (two-sided)
07/01/2025	Promotional material	 Flyer 3	Flyer (two-sided)
07/01/2025	Promotional material	 Flyer 2	Flyer (one-sided)
07/01/2025	Promotional material	 Flyer 1	Flyer (one-sided)
07/01/2025	Promotional material	 Brochure	Infographics brochure
17/10/2024	Promotional material	 Bookmark 1	Bookmark
17/10/2024	Promotional material	 Bookmark 2	Bookmark
17/10/2024	Promotional material	 Roll Up Banner 1	Roll Up Banner
10/10/2024	Promotional material	 Roll Up Banner 2	Roll Up Banner
10/10/2024	Promotional material	 Visual Identity	color codes

**Figure 15.** Downloads page

### 3.2.6 Hub page

The TwInn4MicroUp project aims to establish an advanced research and innovation hub in Synthetic Microbial Biotechnology. This hub will unite diverse stakeholders, including academia, industry professionals, journalists, educational institutions, and public sector entities, all committed to a shared vision. The Hub page of the TwInn4MicroUp website will list these members to underscore the importance of collaboration and synergy in promoting a sustainable future.

### 3.2.7 Contact page

The Contact page offers newsletter subscription and a built-in contact form, with a Completely Automated Public Turing test to tell Computers and Humans Apart (reCAPTCHA) integration module for spam protection. Additionally, it lists one contact person per participating research group with their full contact details (**Figure 16**).

**GET IN TOUCH**

If our work strikes a chord with you, feel free to reach out for any questions, comments, or collaborative opportunities.

**Join our newsletter**

Your name

Your email

**Subscribe**

**Send us a message**

Your name

Your email

Subject

Your message (optional)

**Submit**

**Contact us**

**INDBIOCAT**

**Project Manager**  
Dr. Christina Ferousi  
Senior Researcher  
[cferousi@chemeng.ntua.gr](mailto:cferousi@chemeng.ntua.gr)

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**LIEE**

Dr. Aggelos Tsakanikas  
Associate Professor  
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**Figure 16.** Contact page

### 3.3 Performance Tracking

To evaluate the TwInn4MicroUp website performance, we utilize Open Chrome DevTools<sup>5</sup>—a set of web developer tools built directly into the Google Chrome browser—measuring the core web vitals metrics, i.e., Largest Contentful Paint (LCP), Cumulative Layout Shift (CLS), and Interaction to Next Paint (INP). LCP measures the time taken for the largest content element to become visible within the viewport, indicating loading performance. CLS evaluates visual stability by tracking unexpected layout shifts, ensuring a smooth visual experience for users. INP gauges the responsiveness of the site by measuring the time taken for the next paint after user interaction, providing insights into the website's interactivity. To classify the overall performance of the

<sup>5</sup> <https://developer.chrome.com/docs/devtools>

*D6.2: TwInn4MicroUp Website*

TwInn4MicroUp website, we use the 75<sup>th</sup> percentile value of all page views, and the thresholds indicated in **Table 1 (Appendix)**. Essentially, if at least 75 percent of page views meet the "good" threshold, the site is classified as having "good" performance for that metric<sup>6</sup>.

**Table 1.** Core web vitals metrics thresholds.

Metric	Performance Classification	
	Good	Poor
Largest Contentful Paint	$\leq 2,500$ ms	$> 4,000$ ms
Cumulative Layout Shift	$\leq 0.1$	$> 0.25$
Interaction to Next Paint	$\leq 200$ ms	$> 500$ ms

<sup>6</sup> <https://web.dev/articles/defining-core-web-vitals-thresholds>

## Annex

