

VISION

Global plastic production is expected to quadruple by 2050, creating unprecedented environmental and logistical challenges. It is evident that traditional recycling technologies are no longer sufficient, underscoring the need to develop collective and innovative pathways to transform waste into value. The workshop *From Waste to Worth: Design Strategies for Circular Plastic Materials* aims to spread understanding of plastic materials potential and challenges and foster innovative strategies to rethink plastic waste as a valuable resource for architecture and engineering. By bringing together diverse perspectives, expertise, and experiences, the workshop seeks to harness collective creativity and vision necessary to tackle the dual challenge of excessive waste generation and growing resource scarcity.

CIB SEBESTYÉN FUTURE LEADERS AWARD

The workshop proposal is winner of the CIB Sebestyén Future Leaders Award 2025, funded by the International Council for Research and Innovation in Building and Construction (CIB). The CIB's purpose is to provide a global network for international exchange and cooperation in building and construction research and innovation. The workshop aligns with the values of CIB: Global collaboration, People and the planet, Futures. The proposal is especially supported by commission CIB W115 - Achieving Circularity in the Built Environment.

WORKSHOP STRUCTURE

The workshop is structured to provide a progressive and comprehensive learning journey and include two modules:

MODULE 1 - October 2025: online lecture serie that explore plastic materials and plastic waste opportunities and challenges, industry and research case studies on plastic waste manufacturing.

MODULE 2 - May 2026: co-design and prototyping workshop to experiment with plastic waste using guided, low-tech fabrication techniques.

[The current flyer provide information and registration link for MODULE 1.](#)

ORGANIZING TEAM

The workshop is organized by Elena Casolari, PhD candidate, and Prof. Andrea Giovanni Mainini, from the Architecture Building and Construction Department at Politecnico di Milano. Please reach out for any interest to meet and collaborate with the organizing team or inquiry about the workshop.

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IN COLLABORATION WITH



REGISTRATION LINK

<https://www.polimi.it/en/education/specializing-masters-and-postgraduate-programmes/master-detail/520>

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From Waste to Worth: Design Strategies for Circular Plastic Materials

MODULE 1 - LECTURE SERIE



**POLITECNICO
MILANO 1863**

DIPARTIMENTO DI ARCHITETTURA
INGEGNERIA DELLE COSTRUZIONI
E AMBIENTE COSTRUITO

MODULE 1 - LECTURE SERIE

MODULE 1 consists of two online sessions featuring a panel of international speakers. The sessions will explore the theoretical background of plastic materials, supply chains, and end-of-life scenarios, complemented by case studies on material design and fabrication for engineering and architectural applications. They will also include interactive polls and surveys, Q&A segments, and roundtable discussions designed to foster dialogue, stimulate critical thinking, and encourage cross-disciplinary exchange.

MODULE 1 STRUCTURE

SESSION 1: Plastic materials and plastic waste - Webinar

Day: 14th of October 2025
Time: 16:00 CEST
Duration: 3.00 hours

SESSION 2: Design and fabrication strategies for plastic waste - Expert panel

Day: 15th of October 2025
Time: 16:00 CEST
Duration: 3.00 hours

DELIVERY AND PARTICIPATION MODE

The lecture series will be held entirely online with no limit on the number of participants. Each session is designed to enable direct interaction between speakers and the audience, and active participation is strongly encouraged. The participation is upon inscription using the link in the front page. Participants can enroll through the platform provided by Politecnico di Milano, instructions can be found in the additional resources.

A certificate of attendance will be issued at the end of the course upon completion of both sessions and the final survey. No additional examination is required.

ADDITIONAL RESOURCES

[Enrollment Instructions](#)

[Ansys Education Resources – Teaching Materials](#)

SESSION 1: Plastic materials and plastic waste - Webinar

The first session of MODULE 1 introduces participants to the complex world of plastic materials, providing a foundational understanding of their market, typologies, and sustainability challenges.

TALKS AND GUEST SPEAKERS

DATA TO DESIGN: CIRCULAR PLASTIC WITH GRANTA. **Mauricio Dwek, PhD**, EMEA Academic Program Manager, Simulation and Analysis, Synopsys Inc.

This lecture introduces Ansys Granta EduPack, a tool that supports material selection by linking properties, structure, processing, and performance through interactive and visual methods. Using real-world case studies, particularly on sustainable and circular plastic product design, the lecture will demonstrate how to access and compare data on thousands of materials and processes. Participants will also explore visualization tools and the Eco Audit function to assess product lifecycles and support informed decision-making.

CIRCULAR PLASTICS IN CONSTRUCTION: FROM DATA TO DIRECTIVE. **Julien van Liefferinge**, Technical Affairs Manager, End of life and Circularity, Plastics Europe

The construction industry plays a key role in Europe's move towards a circular economy. This Plastics Europe presentation shows how EU policies can help turn plastic waste into valuable resources, making the sector more sustainable and competitive. Using the latest data and insights, it explains ways to use more recycled materials, create simpler and fairer rules, and apply new recycling technologies.

MEASURE TO MANAGE: PLASTIC MATERIAL FLOWS IN BUILDING CONSTRUCTION. **Shuang Wang**, PhD Student, Sustainable Built Environments, Chalmers University of Technology

This presentation shows how plastic material flows in building construction are quantified at project level. Plastic material flows are further analyzed based on polymer types, product types, and building parts, which provides insights into plastic sorting and collection at construction sites.

SESSION 2: Design and fabrication strategies for plastic waste - Expert panel

The second session of MODULE 1 offers a comprehensive look at techniques and machinery for shaping plastics and plastic waste.

TALKS AND GUEST SPEAKERS

BUILDING WITH RECYCLED PLASTICS: PRODUCTION IN PRACTICE. **Federico Minaldo, Ing.**, Chief Engineering Officer, Geoplast S.p.A.ys Inc.

This lecture explores the potential of recycled plastic for construction products. Participants will gain insights into the production process with a focus on injection moulding. Real-world applications will be showcased to demonstrate how waste materials can become efficient, eco-friendly solutions for modern construction.

ALTERNATIVE PRODUCTION STRATEGIES FOR HIGH-VALUE PLASTIC WASTE. **Rory Dickens**, Founder and Director, Sustainable Design Studio

This presentation will explore how design can radically transform both the perception and the economic worth of plastic waste. Drawing on examples from Sustainable Design Studio, the talk will demonstrate how the right tools and approaches empower communities, educators, and entrepreneurs to turn waste into opportunity.

DIGITAL STRUCTURAL DESIGN FOR RECYCLED PLASTIC. **Francesco Laccone, PhD**, Researcher, Institute of Information Science and Technologies (ISTI) - National Research Council of Italy (CNR)

This talk explores the potential of recycled HDPE in architecture, highlighting its durability and ease of fabrication while addressing the design challenges posed by its limited structural performance.

LEMAA: RECYCLE TO REVALUE. **Carla Chacón Villanueva, MSc. Arch.**, PhD student, TU Delft, Researcher, Laboratorio de Exploración en Materiales Arquitectónicos Ambientales (LEMAA)

This talk will feature different research projects on plastic waste recycling/reuse/remanufacturing/repurposing for construction applications.