

Exhibition in Barcelona

CULTURAL AND CREATIVE
INDUSTRIES
EVENT



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SPY



Cooking Hair



ModuWool



UP2US

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The Circular Cities Challenge is a five-days project (July 3rd - July 7th, 2023) with 40+ hour programme that supported 23 young creative talents to ideate and prototype circular design strategies to waste material transformation challenges in four design contexts provided by key stakeholders in the city of Barcelona.

Interdisciplinary teams tackled challenges on food, energy, textiles, and natural waste. Each team produced a physical artefact in response to the design challenges provided by the local institutions, as well as a 1-minute video presentation of their process and final prototype. The Challenge was distributed, with prototyping occurring between two creative hubs: Fab Lab Barcelona and TransfoLAB.

The **Circular Cities Challenge** project was part of the **Cultural and Creative Industries event**, organised by **FECYT** and the **Ministry of Science and Innovation** in the framework of the Spanish Presidency of the Council of the EU. The conference provided an opportunity to showcase during one week the artefacts made by the young talents in an exhibition inaugurated at the CosmoCaixa Science Museum in Barcelona.



SPY

Challenge topic:

Transforming food waste

Challenge description:

Extending the lifespan of the fruit and vegetables on display at Mercabarna's Central Fruit and Vegetable Market stalls

Context:

Mercabarna is Europe's leading fresh food wholesale market in terms of market volume. It operates as a food city 24 hours a day with the aim of guaranteeing the supply of fresh food to citizens. It is home to 600 companies specialised in the distribution, processing, import and export of fresh and frozen products.

Mercabarna has a Central Fruit and Vegetable Market (MCFyH) that occupies an area of 170,000 m2, distributed in 7 warehouses, and is the one that generates the greatest commercial and human movement within the Food Unit. Within the MCFyH some 140 companies operate in 440 points of sale and between them they commercialise more than 1 million tons of fresh fruit and vegetables per year.

Many of these points of sale have cold storage facilities for the preservation of fruit and vegetables. However, some of these products are displayed in the display area of each stand, an open and therefore unrefrigerated space. To attract buyers, these products usually remain in this space during the time the market is open, from 9h to 17h.

Fruits and vegetables that remain in the exhibition area for a long time tend to spoil and, if they are not sold, end up generating food waste that we must avoid. It would be possible to refrigerate the entire pavilions, but this is not a viable solution due to the cost involved, both in terms of the economic investment required and the energy expenditure involved. On the other hand, it must be taken into account that the doors of the pavilions are open to facilitate the transit of people and goods.

The challenge is to find a solution to extend the shelf life of the fruits and vegetables on display to reduce food waste without having to refrigerate all the halls.

Context institution/s:



RESULTING PROJECT

Project title:

SPY

Project text:

SPY, a shelf life monitoring device for vendors, measures live data on temperature, humidity, pressure, and volatile organic compounds, all key factors in fresh food decay. Allowing vendors and fresh food markets to understand the storage conditions and adjust them depending on the needs of the produce.

SPY communicates through a user friendly application that converts complex live data into easy to understand alerts and information. SPY aims to bridge the gap in communication between humans and non-humans, giving fresh food the possibility to communicate its needs and improve its storage conditions. SPY is not restricted to shelf life monitoring at an industrial facility; it can be used by anyone who seeks insight into the environmental conditions of produce.





Team



Janine Leahy

Janine Leahy is a multidisciplinary Designer and Art Director originating from Ireland. Janine's work details a passion for colour, composition, and conversations. Her work often focuses on problem solving through innovative, connected thinking. Her work often takes the form of designing for social impact, research, and innovation.



Sara Reichert

Sara Reichert is currently pursuing her Ph.D. at the Technical University of Berlin in the field of electrical engineering. In the past, she established the workshop at CityLab Berlin and helped promote digital self-responsibility within civil society. Prior to that, she worked with students at the dEIn-Labor, with the goal of inspiring them to pursue studies in electrical engineering or computer science. She is engaged in the exploration of prototyping tools, with a focus on the development of open hardware that empowers a wider spectrum of individuals to embark upon the path of inventors.



Daniil Chechin

Based in Vienna, Daniil is a spatial designer with a background in architecture, educated at the Vienna University of Technology. From a young age, he was captivated by handwork, which guided him towards a career that fuses creativity with technical expertise. He has honed his skills in various architectural and design competitions, consistently pushing the boundaries of innovation. Currently, he is in the process of launching his own business, focusing on furniture design, with the aim of making a positive impact through my passion for design.

Supporting expert: **Secil Afsar**



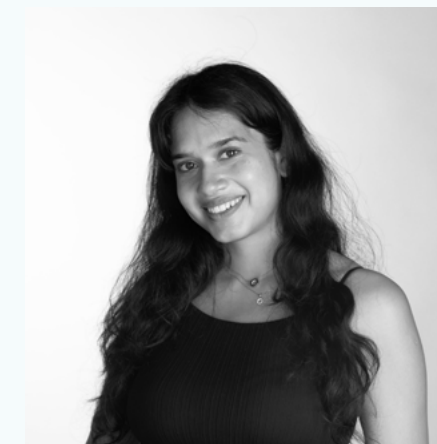
Mathias Charles

As a community-based initiative, Mathias creates Live Love Recycle (LLR), which aims to promote waste reduction, recycling and a sustainable lifestyle, while contributing to the reduction of waste mismanagement, the increase of recycling accessibility, citizen awareness raising relating to environmental protection, and the provision of employment opportunities to vulnerable populations, including women and youth, both Lebanese and refugees. Mathias has been awarded the Goalkeepers prize by the Bill & Melinda Gates Foundation and is involved in several labs aimed at improving waste management, particularly in emerging countries.



Monica Pinto Sanz

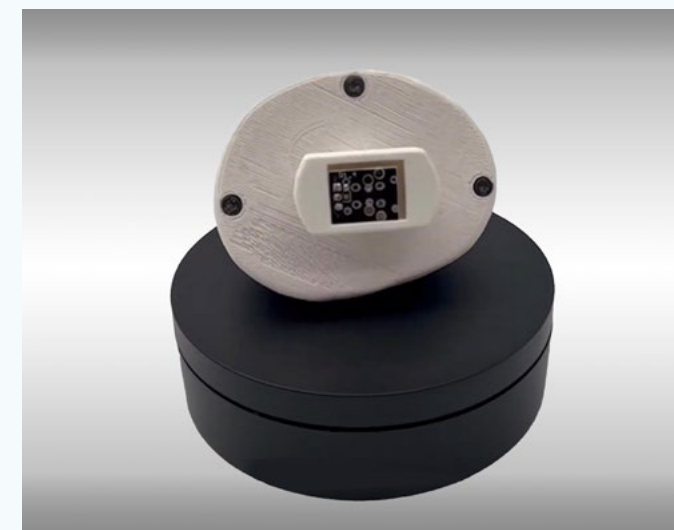
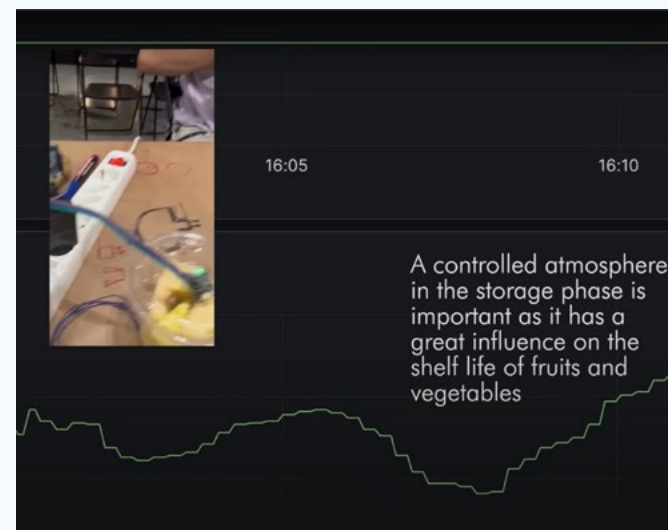
Monica is a creative based in Eindhoven, Netherlands. Currently in her third year at the Design Academy. Her varied work is centred around curiosity, encouraging serendipity, and an intuitive approach to making. From social design to craft, she uses her practice as a tool to engage with people through mutual learning. Fantasy and world-building are explored as ways of generating new ideas. She enjoys making as well. Textiles and ceramics are inspired by the worlds she creates. Her aim as a creative is to share the joy of making with others and wonder together in other worlds.



Alysha Vergis

Alysha is an Indian-Swedish designer currently based in Barcelona. She is an emotional, curious, and communicative designer, who enjoys exploring the emotional relationship between humans and objects. With colour and culture as her tools, she seeks to tell stories by creating meaning and identity in her projects, showing the interplay of her Swedish and Indian cultural heritages. Although she is engaged in all areas of product design, her current focus lies in colours, materials, and future design strategies. All while exploring how design can become more regenerative without sacrificing aesthetics, emotions, or identity.

Extending the lifespan of the fruit and vegetables on display at Mercabarna's Central Fruit and Vegetable Market stalls





COOKING HAIR

Challenge topic:

Transforming natural material waste

Challenge description:

Combatting cultural taboos by developing creative and open applications of a renewable and abundant but unjustly ignored resource: humxn hair

Context:

The Barcelona Materials Centre is created and driven by FAD, Fostering Arts and Design. MATERFAD is an observatory of the future, conducting technological research and surveillance focused on innovation, sustainability and creativity through materials. The MATERFAD database showcases thousands of innovative, commercially available materials, processes and technologies, globally facilitating technological knowledge transfer between widely differing sectors such as biotechnology, construction, transport or textiles. MATERFAD has taken part in exhibitions, projects, workshops, and talks that explore materials from humxn and animal biology, like hair, that can become future dyes, fibres, leather or ceramics.

Clic Recycle is a community startup passionate about creating a plastic-free world. They are the first closed-loop hair recycling management system in the Iberian Peninsula, collecting and recycling waste to make new materials. They work with like-minded organisations and hairdressers and are also local partners of Hairstylists for the Future by L'Oréal.

French statistics indicate that 10T of hair are cut each year... extrapolating this data, we can imagine that 7T are available each year in Spain and around 1,200T worldwide! However, materials are not only physical components applied in any

creative or practical construction; they also have a collective imagery in which value judgments are made. Materials like hair have been questioned on the basis of morality which leads to it being unfairly misused and discarded. Letting go of our belief system is essential for innovation in sustainability and circular processes. Why are natural materials from humxn and animal biology considered to be ethically wrong? Can we leave prejudices aside and explore hair to help us solve a natural resource problem?

Humxn hair is an excellent candidate to replace synthetic products given its characteristics: resistant, filtering, and adsorbent fibres, among others, combined with the increasing availability derived from exponential demographic growth. It is urgent to overcome cultural, religious, and other taboos in order to drive innovative, creative, and disruptive applications of this precious waste.

How can we combat cultural taboos through creative and open applications of humxn hair?

Context institution/s:

Materfad
Materials centre
Barcelona



RESULTING PROJECT

Project title:

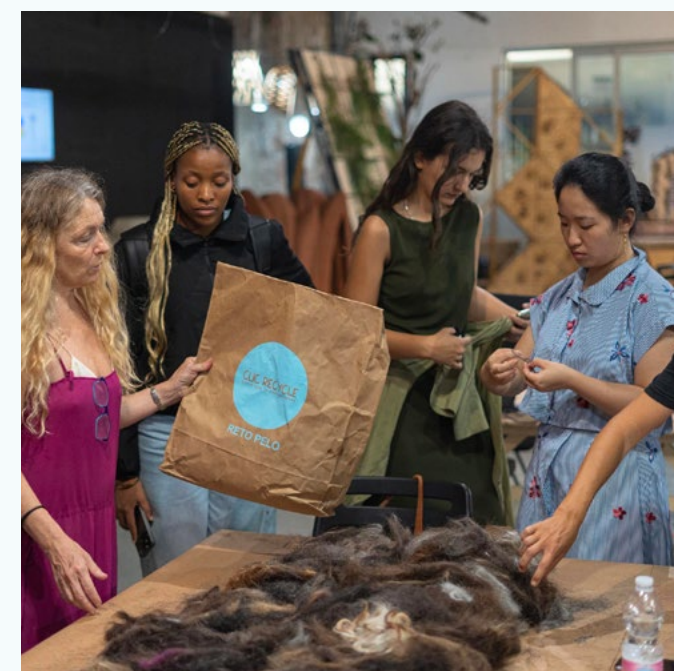
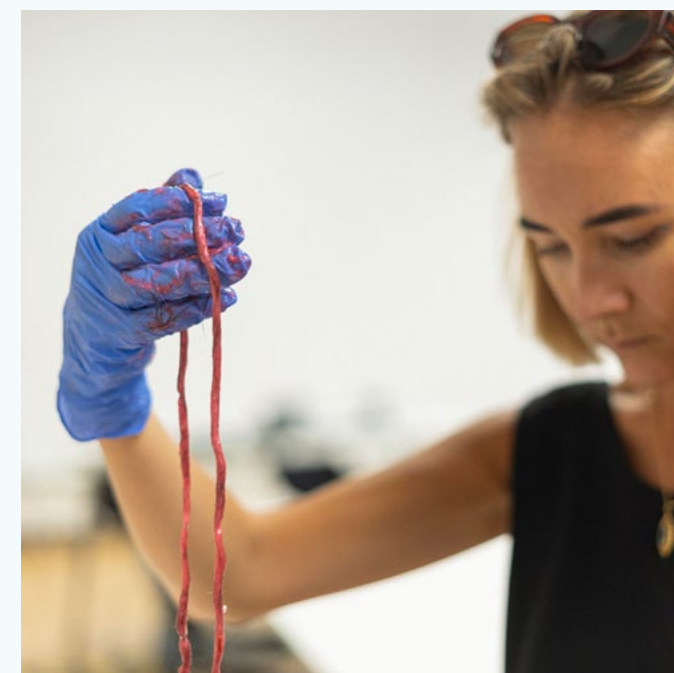
Cooking Hair

Project text:

Human hair grows approximately 1.7 cm per month. In Europe alone, around 150 million kg of waste human hair is discarded in landfills annually. Considering the regenerative nature of hair, there is potential to transform it into valuable material. Hair possesses natural properties such as strength, resistance, absorbency, and nourishing qualities, making it a suitable replacement or supplement to synthetic fibers in various applications.

The project seeks to explore the potential of using hair by experimenting with open source recipes for bio materials.

It aims to inspire other designers, makers, and material R&D professionals to further research the potential and possibilities of working with human hair.





Team



Paola Zanchetta

Paola (She/Her) is an Amsterdam-based designer and researcher, striving for regenerative practices through her work with waste materials and open-source hardware. In a context where the need for decentralized thinking has never been more profound, Paola is dedicated to reshaping production and consumption paradigms. With a background in Industrial Design Engineering from UPM, Madrid, and FabAcademy training at Waag, Amsterdam. Her portfolio includes projects like "PET Waste into Value" (icw. Metabolic Foundation, Aruba); "Tamaragua" (icw. Estudio Disolvente, Precious Plastic GC). She currently collaborates on open-source initiatives "Inter Matter" and "Found Objects" (icw. Circu Leren, Fiction Factory) redefining sustainable interior design materials.



Siyu Liu

Siyu is a Barcelona-based architect and artist. She was born in Guizhou, China, a typical aboriginal and hilly area near the Himalayas. She focuses on intercultural research by discovering and explaining slight differences in different cultures under the same physical element with craft works. She creates to preserve and integrate the unique memory and identity of the two regions in this age of material excess. Sewing the huge cultural differences to weaken the increasingly fierce misunderstanding is the final target. Creating for fun is her attitude all the time.



Suwapat Rodprasert

With over 5 years of experience in residential and commercial architecture in Thailand and Spain, Suwapat combines her passion for sustainable design with practical insights. Her pursuit of ecological building and self-sufficiency led her to pursue a Master's in Advanced Ecological Buildings and Biocities at IAAC, Barcelona. Surrounded by woods, she hones her skills in working with sustainable materials, including Food Waste Biomaterials, alongside cutting-edge technologies like 3D printing, laser cutting, and CNC at Green Fablab. Suwapat seeks to bridge the gap between architecture, sustainability, and innovation.

Combatting cultural taboos by developing creative and open applications of a renewable and abundant but unjustly ignored resource: human hair



Supporting expert: Dihue Miguens



Josephine Bourghardt

Josephine is an interdisciplinary designer with a hybrid profile on a mission to improve everyday life for people and the planet, with a blend of physical and digital technologies to empower through artefacts and storytelling. With a background in product design and a Master's in Design for Emergent Futures she works hands on with a natural engagement in visualisation and form focusing on social and environmental issues. With interests in research, psychology, well-being, and function to create balance in the relationship between humans and nature and all that is in-between.



Veronika Róza Háló

Veronika is a Budapest-based architectural designer who works with the boundaries of architecture, exhibition, and product design. She graduated from Moholy-Nagy University of Art and Design in 2021 in Architectural Design. Collecting experiences from studios during and after her studies in Lisbon, Barcelona and Budapest formed her vision deeply and allowed her to get an insight by experiencing and understanding the shades and depth of her craft, which inspired her to find her own role and obligation in it. She has started to visualise and phrase a direction based on her commitments and devotion for circular design while persistently studying the context surrounding us nowadays. Currently she is a freelancer collaborating with artists, designing sets and exhibition spaces, interiors and developing furnitures.



Laura Subirats

Laura is a digital artist and designer. Her work revolves around the intersection of 3D printing, virtual objects, and the ever-present influence of the Internet on our lives. She is passionate about bridging the threshold between the digital and physical domains to create an interactive archive that questions conventional archival practices. Through mixed-media installations, she aims to construct a dynamic and chaotic pile of digital files, concepts, materials, artefacts, and objects, inviting viewers to engage with the dynamic and imperfect nature of our digital world.



EXPERT'S REVIEW

Daniel Van Lerberghe
Founder at Innogage.eu

The collaboration between the Barcelona Materials Centre (MATERFAD) and Clic Recycle, exemplified in their "Cooking Hair" project, is a commendable effort in combatting cultural taboos through innovation and creativity. The project addresses a pressing issue – the colossal waste of human hair, approximately 150 million kg in Europe alone, discarded annually into landfills. By recognizing the untapped potential of human hair as a natural biomaterial with attributes like strength, absorbency, and nourishment, the initiative paves the way for a synthetic-free future.

What sets this project apart is its dual focus on sustainability and cultural change. It not only seeks to replace synthetic materials with hair but also tackles the societal norms that have thus far hindered the utilization of this resource. By challenging cultural taboos and offering a sustainable alternative, "Cooking Hair" is a prime example of how creativity and innovation can drive solutions for our environmental and societal challenges. It exemplifies the transformative power of thinking outside the box.





MODUWOOL

Challenge topic:

Transforming textile waste

Challenge description:

Reimagining the value of Spanish wool waste into new, high value composite materials

Context:

Reimagine Textile in collaboration with Recuperación de Materiales Textiles S.A. (RMT) want to encourage you in the research and development of new materials created through the textile circularity. Eurecat is one of the driving forces behind Reimagine Textile, a business innovation program aimed at the textile sector. It is a strategic initiative reinventing the textile sector in Catalonia through innovation, technology, and sustainability. RMT, is a family company dedicated to the commercialization and manufacturing of wool since 1968. They are specialised in the standardisation and treatment of wool, as well as the research and development of new applications.

The wool industry in Spain is characterised by being a traditional sector with a long history. Although it has experienced ups and downs in recent decades, it remains a very important sector in our country. Spain has a large number of sheep breeds that produce high-quality wool, which is used for the creation of clothing, home textiles, and luxury items worldwide. However, the quantity of wool used is very small compared to the amount of material that our sheeps produce. Moreover, not all sheep breeds produce wool suitable for textile use, but this material has many other qualities that make it attractive for other applications, such as thermal and acoustic insulation, fire resistance, thermoregulator, and biodegradable.

Currently, even though the high performance of the wool for technical applications, due to various factors in particular the high cost of pretreatments, the use of this fibre alone is decreasing day after day and the wool industry is not going through its best moment. Producers continue to store tons of wool waste that has no market outlet and often ends up being incinerated.

Reimagine Textile wants to encourage you to use your creative skills and find new ways to unlock the value of Spanish wool waste, revitalising its market presence through creating new high value composite materials, maintaining the functional and sustainable properties of the wool and suitable for its application in several industries. Are you up for the challenge?

Context institution/s:



RESULTING PROJECT

Project title:

Moduwool

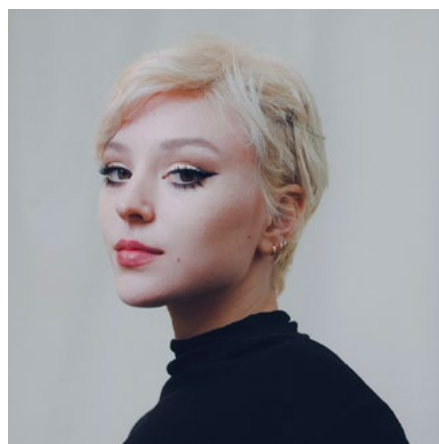
Project text:

Moduwool is a modular felted wall panel made from waste wool and left-over compostable grocery bags. From a simple rectangular shape with slits, the sections interlock and create a dynamic rolling texture, providing sound proofing and insulation to any space.

After experimenting making composites with different biodegradable additives and felting techniques, the final low-tech process includes: carding the wool by hand, wet felting it with detergent (simultaneously cleans it), needle felting by hand, heat pressing (or ironing) the bioplastic bags to the back and cutting out the shape. The felt was also starched with an essential oil solution to make the form more stable and resistant to pests like moths.



Team



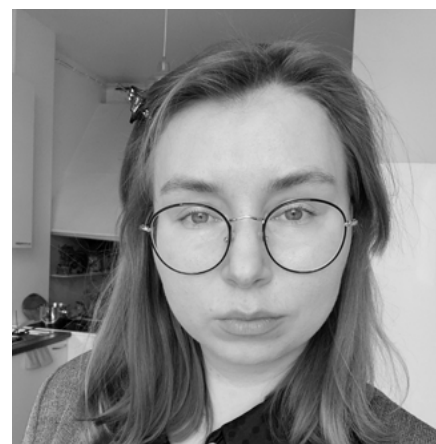
Anna Cain

Anna is an interdisciplinary textile artist from California with a focus on Biology, circularity and the farm to fashion systems. Her work aims to alchemize local “waste” materials into useful and beautiful items, while sparking excitement about the opportunities presented by the symbiosis of science and art. She is currently based in Barcelona.



Carla Molins

Carla is a creative technologist and educator working at the intersection of design, technology, and biology to bring a tangible instance to complex scientific concepts. Her domains are molecular and cell biology, thanks to her participation in a European research project called ChromDesign - Faculty & Researcher at the Image Processing and Multimedia Technology Center, UPC. She was a Marie Curie fellow researcher at ELISAVA (ChromDesign project), Barcelona School of Design & Engineering; doctoral researcher (GRECC & OCC) in science communication at Pompeu Fabra University (Spain); Design & Technology MFA '19 Parsons, The New School (USA).



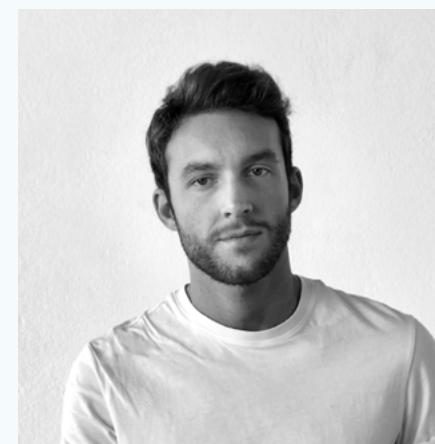
Carolina Forss

Carolina is a Finnish fashion and textile designer-maker, artist, and journalist. She holds a Bachelor's and Master's degree in Textile, Clothing and Fashion Design from Aalto University. Her work has been featured in magazines such as Vogue, Elle, and Document journal and showcased at H&M Design Award in London, at Copenhagen Fashion Week and Paris Fashion Week. She lives and works in Helsinki.

Exploring high value, biodegradable composite materials to address the wool waste issue in Spain

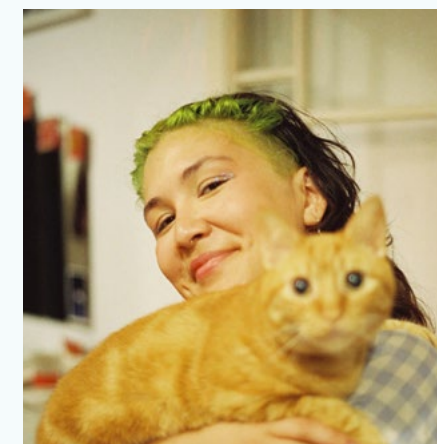


Supporting expert: **Petra Garajová**



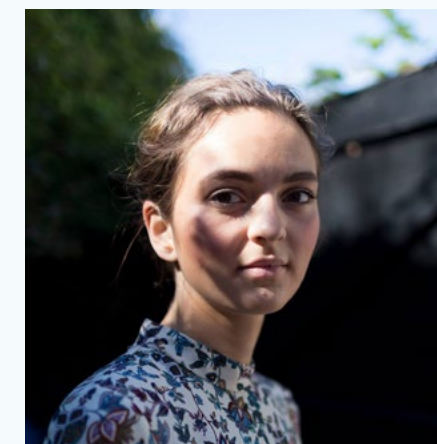
Davide Onestini

Davide, MA in Design at University of the Republic of San Marino, is a systemic designer whose work questions the role of design and local making in creating a non-linear, anti-alienation and post-consumerism economy. He is Head of Design at BY THE END OF MAY, a research and design practice based in Lisbon, working at the intersection of digital fabrication, biomaterials, and traditional crafts. The studio develops speculative projects for companies and public institutions aimed at challenging their way of working and inspiring them to become planet-centred, local-based, and self-sustaining. Davide collaborates with Politécnico de Lisboa in Distributed Design's local activities.



Marielle Wall

Marielle (they/them) is a service designer and maker based in Barcelona. They research design's role in social movements, accessible communication, and the power of radical love.



Lucy Bowen

Lucy is an educator in circular and regenerative design at the National College of Art & Design, Dublin. She works with brands, manufacturers and students in the fashion, textile, and creative industries to empower them to apply sustainable principles to their work. She is also Sustainability Program Manager at Leaders for Climate Action, a non-profit that supports practitioners to reach net zero in their companies. She is committed to accelerating a just and safe green transition through education, creativity, and community empowerment.



EXPERT'S REVIEW

Debora Domingo

Vice-rector for Sustainable Development of Campus

Moduwool proposes turning waste into a valuable outcome: wool not usable by the textile industry improves people's lives by insulating their homes. Furthermore, the business model uses a territorial resource and thus contributes to preserving a cultural heritage. The new product makes controlled energy use of local material, thus achieving high levels of circularity and having a low environmental impact.

The project then emerges as a contemporary response, sensitive to its environment and adapted to the objectives set by the Creative Europe Programme. This proposal demonstrates that the cultural and creative sectors are potential innovators positively impacting the social, environmental, and economic spheres through interdisciplinary knowledge.





UP2US

Challenge topic:

Transforming energy waste

Challenge description:

Matching energy generation with consumption in the context of communities inside the city

Context:

The challenge of self-balancing energy communities arises from the increasing focus on sustainable energy practices and the need to match energy generation with consumption within communities situated in urban areas.

CITCEA, as a research centre of the Polytechnic University of Catalonia (UPC), focuses on analysing solutions to facilitate the integration of renewable energies into the grid. In its educational branch, they offer several EIT InnoEnergy masters focused on renewable energies. Within its MSc Energy for Smart Cities programme, they have been offering the Moonshot Project course for 3 years, where major challenges in the field of energy are faced with bold solutions and breakthrough technologies.

Renewable energy sources, such as photovoltaic (PV) systems and wind energy, play a vital role in the energy transition. PV systems convert sunlight into electricity, while wind turbines harness wind power for energy generation. These sources offer clean and sustainable alternatives to traditional fossil fuel-based energy production.

However, both PV and wind energy systems offer intermittent and non-flexible power, compromising the required balance between generation and

consumption. In urban areas with high PV penetration, its impact is already noticeable with the “duck curve”. This concept represents the difference between energy demand and solar energy generation throughout the day. It illustrates a significant drop in demand during daylight hours due to PV systems’ output, followed by a rapid increase in demand during the evening peak hours when solar generation decreases. The rush for renewables is such that what was once a “duck

curve” has now become a “canyon curve”, putting the system at risk.

The system has shifted from flexible, continuous generation to intermittent, non-flexible generation. In this aspect, communities and their ecosystems can play an essential role in helping balance the grid. Hence, the challenge of self-balancing energy communities aims to obtain a solution for city communities (from building to neighbour-level) to help reduce the impact of integrating renewable and clean energy sources.

This challenge aims to promote sustainability, reduce reliance on fossil fuels, and contribute to a greener future.

Context institution/s:



RESULTING PROJECT

Project title:

UP2US

Project text:

When energy production is high and no one uses it, we waste renewable energy, and when consumption exceeds production, energy is overused. Normally, this imbalance is compensated by energy storage and the use of non-renewable energy sources.

UP2US aims to address the problem of unused hours at the community level. An installation in public space makes people aware of the Energy Mismatch. Corresponding colours and an accompanying digital interface translate data about the current availability of energy. Communities can independently adapt their behaviour to reduce the pressure on the energy grid during peak hours, working towards a more balanced energy system that can be supported by renewable energy sources.





Team



Chiara Scialdone

Chiara is a curious and creative marketing manager, specialised into systemic design thinking for climate adaptation. Her strong interest for enabling technologies applications for sustainable business drove me to work on different projects that unleash social value and protect natural capital. Equipped with a systemic thinking mindset, she is particularly motivated to identify interconnections and interdependencies between individuals and the context: she has been mainly working on topics at the intersection of food, urban innovation, and energy. She is a serial startup launcher and hackathon addicted.



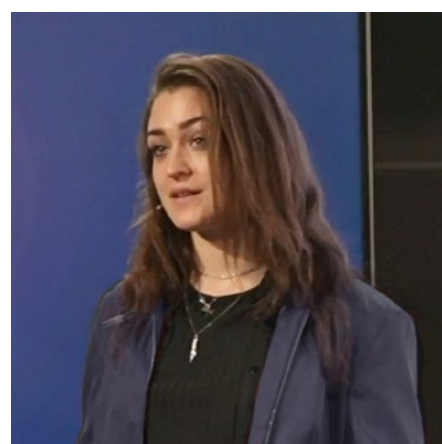
Stella Dikmans

Stella (she/her) is a transdisciplinary sociologist and artistic researcher from Berlin. She is interested in the intersection of technology, creative expression, and its interconnections with (social) spaces. Her practice aims to investigate transformation processes and facilitate spaces for collective (re) contextualisation of pasts, presents, and futures. She is convinced that the thorough study of how human and non-human structures learn and unlearn will feed into our understanding of how they are embedded in a global ever-changing environment – and how possible reactions to these changes could look like. She believes that exchange and discussion are key to opening up new possibilities for seeing and thinking and promoting heterogeneous coexistences.



Stella-Zoë Schmidtler

Stella is a landscape architect and sustainability strategist for sustainable development, eco-consulting, mediation and communication. After studying in Geisenheim and Barcelona, she worked in the private sector in Germany, Spain and Switzerland and eventually joined the European Commission in 2020, working on large-scale policy strategies (Scientific Development, New European Bauhaus). In 2021 she started supporting a ResearchLab as PM for Innovation, Consulting and EU-policy in Milan. She developed sustainability strategies and consulting projects, worked on HORIZON projects, and designed/performed urban tools and practices. She is currently promoting sustainable change for our built environment as an independent freelancer.

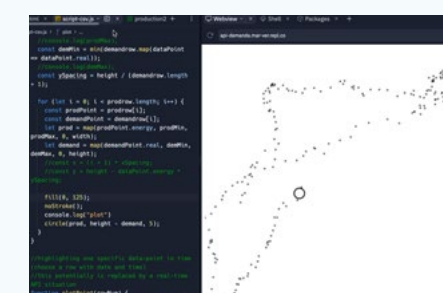
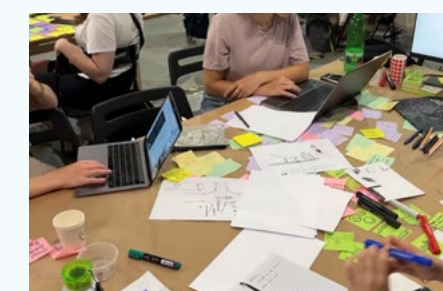


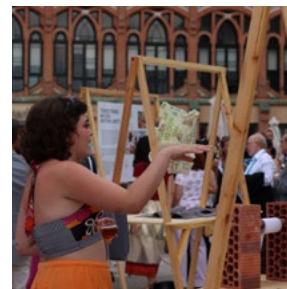
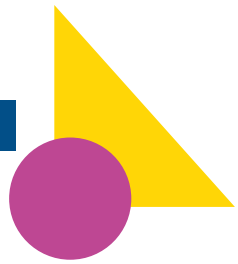
Alina A. Karl

Alina (she/her) is a Design Researcher and Interaction Designer, based in Barcelona, driven by a curiosity for products with social and environmental impact, the relationship between virtual-physical environments, and their influence on human beings. In the past she has been involved in tactical urbanism projects at TU Munich, interconnected products at FROLIC, a small Amsterdam-based design studio, and at frog Design for her bachelor thesis to create an inclusive product for seniors. Next, she will continue her Master's in Cognitive Systems to explore the effect of design on the human mind, while leveraging design as a catalyst for positive change.

Supporting expert: **Marie Verdeil**

A challenge in the transition to renewable energy systems is the question of how to deal with the time mismatch between energy consumption and energy production





Circular Cities Challenge Cultural and Creatives Industries event

The four artefacts were exhibited one week in the framework of the Cultural and Creatives event organized in Barcelona during the Spanish Presidency of the Council of the UE. The opening of the exhibition took place in the CosmoCaixa Science Museum on Wednesday July 13th. The project Moduwool was the winner in the popular vote organized during the conference of the Spanish Presidency event at the DHUB Museum.

Wednesday, July 12th, 2023

CosmoCaixa
Science Museum
Barcelona

Julio marchamalo
@juliomarchamalo

