

Innovation Council Funded by the European Union

DREAM NEWS

NEWSLETTER OF THE HORIZON EUROPE PROJECT DREAM

NEWSLETTER Nº3, SPRING 2025

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DREAM PROJECT:

PROCESSING COMPLEX MATRICES: DESCRIPTION, REACTION-SEPARATION, MODELLING

Transforming complex matrices for the future chemical industry

The use of new feedstocks derived from renewable or waste resources is essential for the future of the chemical industry. There is a need for a better understanding of these materials and their transformation from a chemical and engineering point of view.

Funded by the European Innovation Council (EIC), the DREAM project aims to address the transformation of complex matrices in the chemical industry. It will use Kraft black liquor as a case study to develop new processes that combine reaction and separation in parallel and sequential mode to produce valuable products. Online monitoring coupled with the design of original modelling and simulations will be elaborated. Interdisciplinarity, as the core of the project, will be explored with approaches borrowed from philosophy and social science.

The Horizon Europe DREAM project (Processing Complex Matrices: Description, Reaction-Separation, Modelling) is a project composed of 7 European partners and funded by the European Union for the EIC Pathfinder Open call for proposals, under the grant agreement N°101130523.

Writer: Sivane Mosenego (CNRS)





<u>One year of the DREAM project</u>

April 2025 marks one year anniversary of the DREAM project. Since the launch of the DREAM project with its Kick off meeting in April 2024, the DREAM project is progressing with fruitful cooperation and exchanges between all partners.





<u>4TU. Energy Community Day 2025</u>

On April 3rd 2025, Henk-Jan van den Brink (University of Twente) participated in the 4TU. Energy Community Day. 4TU. Energy Community Day is an event about energy and materials transition, organized by four technical universities in the Netherlands.

Henk-Jan van den Brink, PhD student at the University of Twente working in the framework of the DREAM project, presented his philosophical research and the methodology behind this research. Henk-Jan is studying philosophy of science and investigating interdisciplinarity in the DREAM project for his PhD. During 4TU. Energy Community Day, Henk-Jan van den Brink presented the DREAM project during a poster session and discussed his research in a presentation.

More information on the event: <u>4TU. Energy Community Day 2025</u>





Our young researchers

About me: Nour Labaky, PhD student at the reactions and process engineering laboratory (LRGP), Nancy, France

This is me regulating the gas flow — a small but essential part of a much bigger mission: giving value to what's often considered waste. I'm a PhD candidate at the reactions and process engineering laboratory (LRGP) in Nancy (France), working on the separation and valorization of lignin from kraft black liquor, a major byproduct of the pulp and paper industry. While traditionally burned for energy recovery, lignin represents a vastly underutilized component of biomass. By extracting and transforming it into value-added materials, we open doors to greener alternatives in chemicals, materials, and fuels — moving closer to a circular bioeconomy.

I'm driven by curiosity, coffee, and the belief that innovation in renewable resources is key to a greener future. In my work, I study how process conditions — such as pressure, temperature, and pH — affect lignin precipitation and separation. By understanding these parameters, I aim to



Nour Labaky at the LRGP laboratory

optimize the recovery of lignin from kraft black liquor in a way that is both efficient and environmentally sustainable. One particularly promising avenue involves using CO2, a byproduct of the kraft process itself, to trigger lignin precipitation.

Outside the lab, I'm actively involved in scouting, where I design and lead training programs that focus on personal growth and community building. I also enjoy playing the guitar, sketching, and spending time in nature — activities that help me stay grounded, creative, and connected. These experiences inspire the way I approach research, blending curiosity, discipline, and a strong sense of purpose in everything I do.





About me: Marcell Gyurkač, PhD candidate at University of Maribor and Research Assistant at National Institute of Chemistry in Ljubljana, Slovenia



I'm currently working in the field of green chemistry, where I focus on using different ionic liquids to extract lignin from a variety of biomass sources—both woody and herbaceous biomass. What excites me most about this work is the opportunity to develop cleaner, more sustainable alternatives to traditional chemical processes. Ionic liquids offer a unique and versatile platform for selective lignin extraction, and I'm particularly interested in how we can optimize these systems for better efficiency and lower environmental impact.

A big part of my work involves designing processes that prioritize solvent recovery and reuse, which is key to making biomass processing more sustainable on a larger scale. I'm also exploring how different process parameters affect lignin quality and how we can tailor the extraction for downstream applications like biopolymers, fuels, or specialty chemicals.

Beyond the lab, I enjoy spending my free time outdoors and staying creative. I love hiking and cycling, especially as a way to unwind and get inspired by nature. I also play the guitar and enjoy going to concerts whenever I can—music is a big part of how I recharge and stay balanced.



About me: Margherita Gallinella, Phd candidate at the Research Insitute for Catalysis and Environment (IRCELYON), in Villeurbanne, France



Margherita Gallinella in IRCELYON laboratory

This is me next to the equipment I use the most: the autoclave.

In the DREAM project, my role is to identify the best reaction conditions, focusing especially on the most efficient catalyst to synthesize value-added products particularly aromatic compounds—from lignin oligomers. This task presents many challenges due to the complexity and stability of this type of biomass, but I'm passionate and persistent, so it feels like the perfect role for me!

Outside of work, I love spending time with friends and enjoying a good glass of wine. I'm very attached to my family, so I visit Italy as often as I can. I'm also passionate about art and history, but what I adore the most is music. I took singing lessons throughout most of my teenage years, and music remains a big part of my life.

