

REMAP

MICROFABRICATION • SOLAR ENERGY

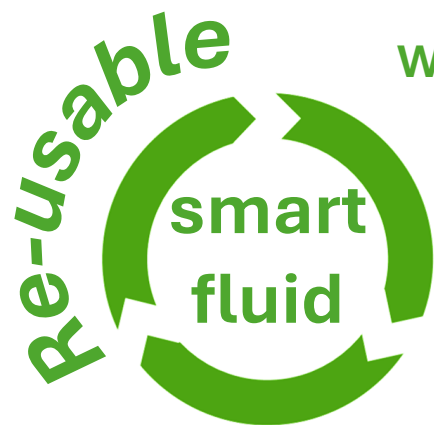
Edited by: Davide Carrea
July 26 / 2024

WHAT IS REMAP?

The REMAP project aims to **revolutionize the field of surface patterning** by developing an **eco-friendly** and efficient method **based on magnetic masks**.

This novelty should enable high-quality patterning at scale useful for **green technologies like photovoltaics and lab-on-a-chip biomedicine**, with a goal to introduce a **new paradigm in microfabrication**.

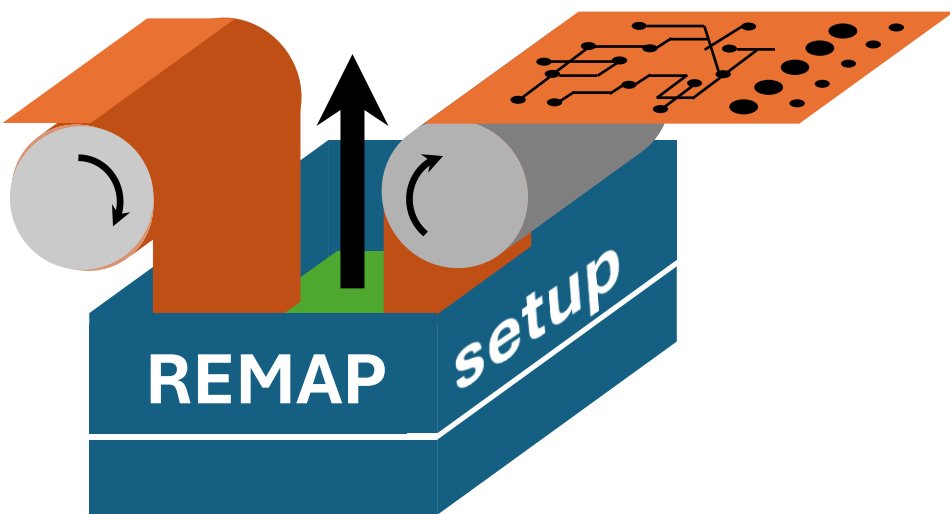
Our research moves on **three experimental Work Packages**:



WP1: Chemical formulation

WP2: Microfabrication

WP3: Proof of Concept



REUSABLE MASK PATTERNING

project funded by the European Commission

2022 - 2026

TAKE A LOOK AT OUR WEBSITE:

<https://re-map.eu/>

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Progress	Indicator	REMAP
✓	Resolution	70μm
!	Material efficiency	95%
✓	Masking efficiency	95%
!	Energy efficiency	x/7
!	PV efficiency	18%

THE ACTIVITIES

REMAP is achieving its goals through a close interaction between **experts belonging to very diverse disciplines**.

Our key ingredients are what we call *magnetorheological electrolytes* (MREs), which require **profound knowledge spanning from pure and applied chemistry** (organic functionalization, click-chemistry, inorganic magnetic nanoparticles synthesis, ionic liquids, chemical non-linearity), to **soft matter physics** (colloidal science, rheology and magnetic fluids).

We manipulate the MREs with a remote controller.

To fabricate the controller, we need state-of-the-art facilities and expertise in micro-fabrication, solid state magnetism, and electrical engineering.

We are building a micropatterned photovoltaics proof of concept, which involves know-how in mechanical engineering, electroplating, reactive annealing and semiconductor PV technology.

Lastly, to ensure an effective pathway to impact **we deploy in-depth knowledge in IP, economics, business and policy, as well as soft skills on inclusive innovation and teaching strategies**.

Content of REMAP's work packages:

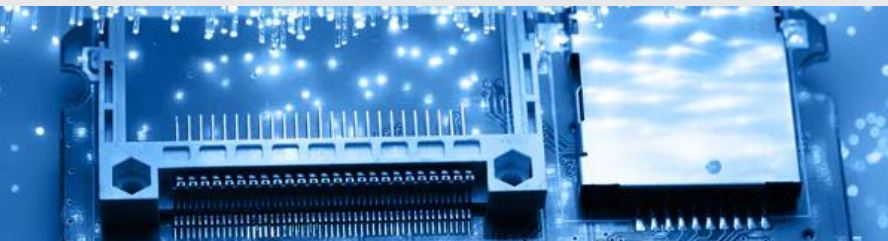
WP1 Chemical formulation of magnetorheological electrolytes (MREs)

WP2 Microfabrication of the device that manipulates remotely the MREs

WP3 Demonstration of reusable mask patterning

WP4 Valorization of REMAP's intellectual property and outreach activities

WP5 Overall management of REMAP and scientific dissemination of research output

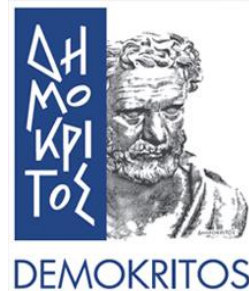


THE PARTNERS:

REMAP draws on the extensive experience and knowledge of **seven partner entities** across five European Union countries (IT, FR, PT, GR, LU):



Università
di Genova



Funded by
the European Union



REMAP

REMAP has received funding from the European Commission Pathfinder Open programme under grant agreement No. 101046909. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Innovation Council and SME Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.

NEWS

22-23/06/2023: project coordinator **Diego Colombara** showcased the REMAP paradigm at Bicocca university in Milan, at the first [Conference of the "Italian Network on Photovoltaics"](#).

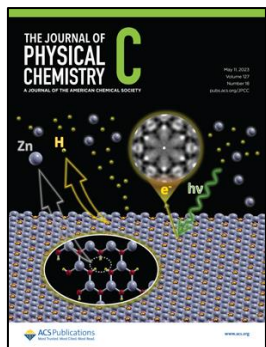
24/05/2023: REMAP's highlights and engineering were also shown at the [CoffeeTech Event](#) at Digital Innovation Hub Liguria by **Andrea Toscano**.

13/12/2023: **Diego Colombara** has been invited to École nationale supérieure de Chimie in Paris to showcase REMAP's novelty on micropatterned CIGS and extrinsic alkali doping.

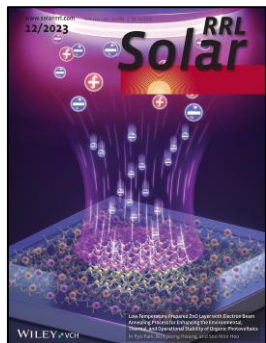


23/04/2024: Head of Unit **Phillip Dale** was interviewed at the [European Innovation Council](#). During the panel event, he answered questions from the moderator and the audience about the REMAP project and the EIC pathfinder grant process.

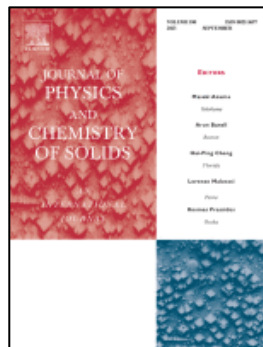
PUBLICATIONS IN 2023



[1] [S. Slimani et al., Morpho-Structural and Magnetic Properties of \$\text{CoFe}_2\text{O}_4/\text{SiO}_2\$ Nanocomposites: The Effect of the Molecular Coating](#)



[2] [D. A. Garzon et al., Chemical Bath Deposition of \$\text{Zn}_{1-x}\text{Sn}_x\text{O}_y\$ Films as Buffer Layers for \$\text{Cu}\(\text{In,Ga}\)\text{Se}_2\$ Solar Cells](#)



[3] [M. Vasilakaki et al., Tuning the magnetic properties of oleic-acid-coated cobalt ferrite nanoparticles by varying the surfactant coverage](#)

BRAINSTORMING

11-12/09/2023: REMAP's [4th General Meeting](#) took place in Luxembourg (LU). The participants received hands-on Science Communication training to boost their engagement proficiency with the public.

28/06/2024: REMAP joined the first workshop of the e-APP project that took place in the charming city of Iglesias, Sardinia.

06/05/2024: [Gender+ in Nanotech](#). **Rita Bencivenga** illustrates our take on the topic at the "Critical Issues in Science, Technology, and Society Studies" conference in Graz on the 6th of May 2024.

SCIENCE IS FOR EVERYONE!

29/10/2023-05/11/2023 (Genova): For the first time, the REMAP paradigm was **shown to the public! We managed to get a stand** in the "Footprints" edition of "**Festival della Scienza**". Within this event, we illustrated the principles behind REMAP's idea to greenify the status quo through an **experimental demonstration**.

<https://www.youtube.com/watch?v=r2eqymdD1vo>

17/04/2024: **Sawssen Slimani** joined with **Diego Colombara** the 6th Edition of the Festival "**Scienza sotto la cupola**" in Novara. Within this event, they explained **the story of patterning**, ranging **from ancient times** to these days, up **to the REMAP novelty!**



Festival della Scienza



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and stay updated on progress!

SOME OF OUR LATEST CONFERENCES AND TALKS

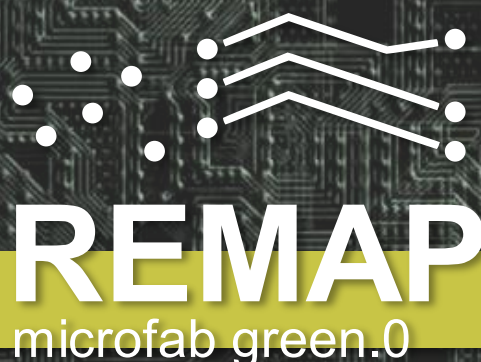
18-21/09/2023: [37° PCSSPMS](#). Within WP1&2, **Marianna Vasilakaki**, **Popi Trohidou** and **Nikolaos Ntallis** from NCSR D present their results on magnetic behaviours of nanoparticles, and masking power.

04-05/04/2024: [GIFC in Turin](#). **Davide Carrea** presents a poster on Cu electrolyte formulation and deposition (WP1&3), and **Andrea Messina** shows his results of nanoparticles functionalization (WP1).

03/07/2024: [Nanotexnology](#). **Nikolaos Ntallis** shows optimized current lines to manipulate magnetic masks.

10/07/2024: [NANOSMAT2024](#), **Nikolaos Ntallis** shows the DFT magnetic behaviour of Co@Fe nanoparticles.

17/09/2024: [50° IMNE](#). In the framework of WP2, **Clàudia Coelho** illustrates the fabrication process and characterization of REMAP's current lines, aiming to manipulate MREs at the microscale.



Are you interested to work with us?
Check-out our opening positions...
We're (still) hiring!

<https://re-map.eu/open-positions/>