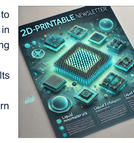
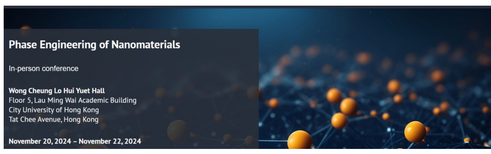
NEWSLETTER Spring 2025

Dear reader,

Welcome to the third edition of our 2D-PRINTABLE newsletter! We are excited to bring you the latest news on the 2D-PRINTABLE project, and its developments in novel 2D materials and heterostructures for printed digital devices using sustainable liquid exfoliation and deposition methods.
In this edition, we highlight significant advancements, publications, and results achieved by our partners in the last months.
Curious about the latest breakthroughs in 2D materials? Click on this link to learn more about 2D-PRINTABLE and subscribe to our newsletter.



Past events



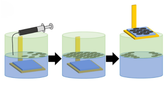
We're thrilled to share some events where 2D-PRINTABLE was represented and partners are actively involved in.

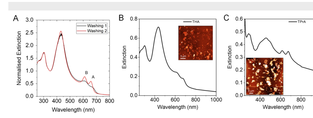
- 2D-PRINTABLE was represented by TCD during the Nature Conference on Phase Engineering of Nanomaterials. The conference was organized by City University of Hong Kong. Read more about this event here.
- We're proud to share that our 2D-PRINTABLE partner, UKa, is actively involved in inspiring the next generation through hands-on science outreach for children. During events like MINT Days and Girls' Day students explore everything from basic chemistry to nanomaterials. They exfoliate layered crystals, observe them under microscopes, and create nanoparticles in different sizes and colors – all while learning about the project's work on nanomaterial inks and their applications in electronics. Read more on our website here.

Project results

We're excited to share the latest results from our recent project efforts! This section highlights key milestones and impactful outcomes achieved by the team.

- 2D-PRINTABLE achieved significant progress by developing cutting-edge 2D materials for next-generation printed electronics by focusing on improving the quality and performance of materials. Read more about this achievement here on our website.
- Our 2D-PRINTABLE partners from UKa and TCD have made remarkable progress in characterizing available 2D materials and their printed networks and heterostacks. Find out more here.
- To fully realize the exceptional electronic properties of macroscale printed devices, it is crucial to first assess the characteristics of individual nanosheets. Read the full report here.
- The 2D-PRINTABLE partners have developed advanced protocols for producing nanosheet inks via ultrasonication-assisted liquid-phase exfoliation (LPE) and electrochemical exfoliation (EE), specifically tailored for Langmuir-Schaefer (LS) deposition and inkjet printing. Read more about the optimized ink-production protocols here.
- The 2D-PRINTABLE partners have achieved a significant milestone in nanosheet characterization: *Spectroscopic metrics for effectiveness and doping identified*, read more on our website.





The 2D-PRINTABLE publications are out!

We're thrilled to announce that we have 30 2D-PRINTABLE publications until now. Below you'll find some highlights:

- "*Orientation Dependent Interlayer Coupling in Organic-Inorganic Heterostructures*", published by UniBw M in *Advanced Functional Materials*. This study examines organic-inorganic 2D heterostructures that combine the strong optical absorption of organic molecules with the exciton-dominated optical properties of transition metal dichalcogenides such as MoS_2.
- "Next-Generation Self-Powered Photodetectors using 2D Bismuth Oxide Selenide Crystals", published by VSCHT in ACS Applied Nano Materials. The study focuses on the ultrasensitive photodetector platform based on photoelectrochemical (PEC) principles, which utilizes bismuth oxide selenide (Bi_2O_2Se), a material with a wide bandgap (~2 eV) and high absorption coefficient.
- "*Algorithm for Reproducible Analysis of Semiconducting 2D Nanomaterials Based on UV-Vis Spectroscopy*", by UKa in *Advanced Material Interfaces*. The article presents a new program that has been developed to improve the analysis of liquid dispersions of 2D materials.
- "*Covalent organic framework-based Li-S batteries: functional separators promoting Li^+ transport and polysulfide trapping*" by UNISTRA and BeD, featured in *Journal of Materials Chemistry A*. Lithium–sulfur batteries (LSBs) are a promising alternative to Li-ion batteries due to their high theoretical specific capacity, but their performance is hindered by the "shuttle effect" caused by soluble polysulfides.

For a full list of our publications, visit our website here

Upcoming Events

Join us at these exciting events, where 2D-PRINTABLE partners will showcase the latest project updates and engage with the wider community:

- 27-31 May – E-MRS Spring 2025 (France)
- 22-26 September – Graphene Week 2025 (Italy)
- 30 September-3 October – Chem2Dmat 2025 (Spain)

Project Partners

2D-PRINTABLE joins a multi-disciplinary consortium with 7 Universities and 2 SMEs, located in 7 European countries including Ireland, France, Italy, Germany, Czechia, Switzerland and the Netherlands, to advance the field of 2D materials and unlock the full technology's potential to play a significant role in the future of European digital electronics manufacturing.

Trinity College Dublin, Coláiste na Tríonóide, Baile Átha Cliath, The University of Dublin
Université de Strasbourg
UNIKASSEL VERSITÄT
BEDIMENSIONAL
TECHNISCHE UNIVERSITÄT DRESDEN
VYSOKÁ ŠKOLA CHEMICKO-TECHNOLOGICKÁ V PRAZE
UNIRESEARCH
Uniwe M
EPFL

Facts & Figures

Acronym: 2D-PRINTABLE
Duration: 36 months
Start date: 1st October 2023
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EC Funding: 3,999,996.00€

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