

ice-Link News Letter 3 & 4 (Jan 2025 to Oct. 2025)



H2020-MSCA-RISE – [ice-Link](#) (101130406)

Marie Skłodowska-Curie Actions (MSCA)

HORIZON-MSCA-2022-SE-01-01 - MSCA Staff Exchanges 2022

ice-Link, Grant agreement ID: 101130406

Members:

- ✓ CONSIGLIO NAZIONALE DELLE RICERCHE (Institute of Science, Technology and Sustainability for Ceramics (ISSMC) (Italy)(CNR)
- ✓ CERCA TROVA (Bulgaria) (CERCA TROVA LTD)
- ✓ ACCENT PRO 2000 SRL (Romania) (AP2K)
- ✓ DIETHNES PANEPISTIMIO ELLADOS (Greece) (IHU)
- ✓ YILDIZ TECHNICAL UNIVERSITY (Türkiye) (YTU)
- ✓ UNIVERSITY OF PHAYAO (Thailand) (UNIPHO)
- ✓ UNIVERSITY OF MALAYA (Malaysia) (UOM)
- ✓ THE UNIVERSITY OF LIVERPOOL (UK) (UNILIVERPOOL)
- ✓ LIVERPOOL JOHN MOORES UNIVERSITY(UK) (LJMU)

Grant reference: 101130406; Project acronym: ice-Link

Period: January 2024 to December 2027

The logo of the University of Liverpool, featuring a shield with a lion and the text "UNIVERSITY OF LIVERPOOL".	The logo of CNR ISSMC, featuring a stylized blue cube and the text "CNR ISSMC" and "Istituto di Scienza, Tecnologia e Sostenibilità per lo Sviluppo dei Materiali Ceramici".	The logo of ΔΙΕΘΝΕΣ ΠΑΝΕΠΙΣΤΗΜΙΟ ΤΗΣ ΕΛΛΑΔΟΣ, featuring a stylized blue and white emblem and the text "ΔΙΕΘΝΕΣ ΠΑΝΕΠΙΣΤΗΜΙΟ ΤΗΣ ΕΛΛΑΔΟΣ".
The logo of CERCA TROVA, featuring a blue and yellow flower-like emblem and the text "CERCA TROVA".	The logo of ACCENT PRO 2000, featuring a blue and white oval emblem with a checkmark and the text "ACCENT PRO 2000".	The logo of LIVERPOOL JOHN MOORES UNIVERSITY, featuring a stylized blue and white emblem and the text "LIVERPOOL JOHN MOORES UNIVERSITY".
The logo of the University of Phayao, featuring a purple and white emblem with a crown and the text "UNIVERSITY OF PHAYAO".	The logo of YTU YILDIZ TEKNİK UNIVERSİTESİ, featuring a stylized blue and white emblem and the text "YTU YILDIZ TEKNİK UNIVERSİTESİ".	The logo of the University of Malaya, featuring a blue and white emblem with a lion and the text "UNIVERSITY OF MALAYA".

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- LJMU PhD (N. Outterside) visited UM in March-April for 1 month. The team worked on modelling of complex shapes and features in porous materials, development of low temperature technologies, testing and analysis of nanofluids and simulation of the interaction between solid porous media and fluids in different products. Nathan presented his research work and key results to the team in the Centre of Advanced Manufacturing and Material Processing (AMMP Centre).
- Prof. Ren Visited CNR (Italy) and IHU (Greece) in April 2025. At CNR, the team discussed the progress of the ice-link project, key issues and main focuses. The team shared their experiences in managing different types of projects and collaborations with partners in different countries including USA and China. Prof Ren visited the key facilities at CNR including advanced integrated ice-templating system and other in-house manufacturing facilities for advanced layered and porous materials. The team discussed the applications of porous materials in different industries including energy, sensors for machining tools. The differences in the ice-templating systems used in different labs is analysed. Prof. Ren also visited the Department of Mechanical Engineering, Politecnico di Milano. During his secondment to IHU, Prof. Ren visited several labs in engineering, sensors, energy systems, use of advanced materials, remote sensing in marine systems. The team also exchanged knowledge in international internships and placement-based training on sustainability. The team jointly worked on modelling with ANSYS, discussed the design of process control for ice-templating in different approaches (liquid nitrogen, dry ice and used of thermos-electric systems) including using energy monitors and use of Arduino system in remote data logging.
- Nathan Outterside visited CNR between 12/05/2025 to 08/06/2025. Nathan obtained detailed training on ice-templating, 3D printing of porous ceramics and structure analysis. Nathan shared his work on featured based modelling and coding for complex structures at different scales. The team jointly worked on the modelling of porous materials, 3D lattices, ice-templated structures and layer systems.
- UNILIVERPOOL Team (Dr Haifei Zhang, Dr Xin Deng and PhD student Binhang Zhao) and LJMU team (Kuan Aeng Ng, Tammam. Kaid, Yi Da, Prof. James Ren,) visited YTU between March and August 2025. Prior to the visit, the UNILIVERPOOL team and YTU team discussed the application of ice-templating in nanocomposites. During the secondment, the team hold a joint workshop on porous and functional materials and modelling. The UNILIVERPOOL and LJMU team worked in the materials and thermal fluid labs with prof. Bedri Onur KÜÇÜKYILDIRIM and Prof. Ahmet Selim DALKILIÇ. During the secondments, the team visited several other groups and universities in chemical engineering, medical engineering in Istanbul. The team explored collaboration with Faculty of Dentistry, Bezmialem Vakıf University with Prof. Evrim Dalkilic and other clinical groups. The team also developed links with some industrial partners including Ermetal and Yıldız Kalıp ve Teknoloji A.S. (Mr Resul Önder TEMİZ). The team also met the executive team of the innovation

centre of YTU and discussed different EU projects, national funding schemes, new student startup and future collaborations.

- IHU team conducted one month secondment at CERCA TROVA (Bulgaria) between 30/07/2025 to 9/08/2025. The team jointly worked on process monitoring, energy and use of modelling in thermal process including sensor and mould design. The team jointly developed the workshop on “Innovation, Materials and Sustainability” and presented their recent works at the meeting. The IHU team met the UM team from UM and joined the online discussion with other ice-link partners including Accent Pro 200 SRL and LJMU.
- UM team (Kazi Md Salim Newaz (Professor), Khan Wajahat Ahmed (PhD researcher), Mahaboob Patel (PhD researcher), Nilufa Parveen (Researcher)) visited CERCA TROVA in August 2025. The main joint work during the secondment was focused on cooling technologies, liquid in porous structure, cooling with nanofluids. The UM attended the workshop on “Innovation, Materials and Sustainability” chaired by Dr George Katranas and shared their work to a large group of partners from different EU projects. The UM team conducted knowledge exchange and collaboration development with several institutes including: • the Faculty of Mechanical Engineering and Faculty of Forest Industry, Technical University of Sofia; • Department of Chemical Engineering, University of Chemical Technology and Metallurgy, • Space Research and Technology Institute, Bulgarian Academy of Sciences (BAS). The UM team also visited Technical University of Gabrovo, Gabrovo. The team met the vice rector of Science & Scientific Research and vice rector of International Cooperation and Public Relations in the university and discussed potential research collaborations.
- UM team (Kazi Md Salim Newaz (Professor), Khan Wajahat Ahmed (PhD researcher), Mahaboob Patel (PhD researcher), Nilufa Parveen (Researcher)) visited CNR in September 2025. The team jointly work on full characterization of materials for heat exchange application considering also the use of activated carbon nanoparticles produced by pyrolyzing wheat straw.
- Prof. Kazi from the University of Malaya delivered an invited seminar titled " Heat Transfer, Drag Reduction, and Applications of Natural Fibers, Polymers, and Green Nanomaterials" to the entire CNR-ISSMC Institute on September 29th.
- CNR team (Filippo Suzzi and Alberto Soccio) visited LJMU and UoL between July and September 2025. Th team shared knowledge and skills in a wide range of technical areas. The team jointly worked on advanced function materials, porous materials, in-situ materials tests and HPC simulation with ANSYS of complex liquid-solid interaction. The CNR team met staff from different research groups (materials, manufacturing, civil energy, technical support, etc.) as well as visitor form other international universities. Filippo helped the LJMU PhD in using modelling for complex systems with ANSYS, LJMU PhDs (Jesse, Kuan, Nathan) shared their research experience in using FE modelling packages Abaqus, First principle calculation and molecule dynamics simulations (LAMMPS). The CNR team also worked with UoL on analysing ice-templated porous materials including sample for XPS analysis. Albertos joined Prof James Ren at a formal lecture and delivered a talk final year engineering students sharing his experience as a PhD student at CNR, which has been well received by the students and inspired their interests for research.

Selected Workshops and Conferences:

- Workshop: CERCA TROVA and IHU organised and hosted the workshop on Innovation, Materials & Sustainability (August 2025). The participants include partners from ice-Link and other EU projects.
- YTU, UNILIVERPOOL and LJMU jointly organised a workshop on functional materials and applications. During the workshop, the ECRs (PhDs and Postdocs) and ERs presented their research works and experiences. The team discussed different issues including critical thinking, availability of commercial and open-source software in quantum mechanics (First principles calculation, Molecule dynamics simulation), phase field modelling (COMSOL), engineering simulation (ANSYS, ABAQUS). The supervisors (prof. Ahmet Selim DALKILIC, Prof. Bedri Onur KÜÇÜKYILDIRIM and Dr Haifei Zhang) also shared their past career experience in research, academic and management.
- LJMU team presented their work on modelling complex materials systems at the Federation of European Materials Societies (FEMS) EUROMAT 2025 in September (Spain). FEMS EUROMAT is the premier conference for materials scientists, researchers and professionals. The presentation at the conference also helped the team to develop more interdisciplinary collaboration for wider impact.
- UM team presented their work at several conferences including “Latest Advancements in Science, Management, Commerce and Educational Research (LASMCER) (August 2025, Toronto, Canada) and “11th International Congress on Scientific research-XI- October 2025 Germany”.
- UNILIVERPOOL team presented their work on several conferences: including “Porous and nanostructured materials by ice templating: fundamental and applications” (September 2025, Henan University of Science and Technology, China); “Ice templating for porous and nanostructured materials and their applications” and “Higher education and study & research in the UK” (September 2025, Hubei University of Science and Technology, China).

Publications List (Updated Full List)

1. Sulfonated hierarchical ZSM-5 zeolite monoliths as solid acid catalyst for esterification of oleic acid. *Chem. Commun.* 60, 13356-13359(2024).
2. Protein Nanospheres and Nanofibers Prepared by Ice-Templating for Controlled Release of Hydrophobic Drugs. *ACS Applied Nano Materials* (2024).
3. Polydopamine-Coated Polymer Nanofibers for In Situ Protein Loading and Controlled Release. *ACS Omega* 9(12), 14465-14474 (2024).
4. Machine learning application with Bayesian regularization for predicting pressure drop in R134a's annular evaporation and condensation, *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, 47 (2025).
5. Environmental and economic benefits due to mitigation of calcium carbonate (CaCO₃) fouling on brass heat exchanger surface with Environmental and economic benefits due to mitigation of calcium carbonate (CaCO₃) fouling on brass heat exchanger surface with titanium oxide (TiO_x) coating, *Powder Technology* (2025)
6. Application of carbon nanofluids in non-concentrating solar thermal collectors: A critical review of experimental investigations, *Solar Energy Materials and Solar Cells* (2024).
7. An attention-based generative adversarial network architecture for heat transfer characteristics estimation in internally finned tube, *Journal of Thermal Analysis and Calorimetry*, 150, 14253–14269 (2025).
8. Performance improvement of heat transfer and drag reduction through pristine polymer and their hybrid in circular pipe flow, *Journal of Thermal Analysis and Calorimetry*, 150, 9965–9980 (2025)

9. Carbon nanomaterials in coatings: A review focusing thin film photovoltaic solar cells, Materials Science in Semiconductor Processing, 185 (2025)
10. Systematic Study of Preparing Porous CaCO₃ Vaterite Particles for Controlled Drug Release, Nanomaterials,15(16), 1227 (2025)

Other Items:

- PhD completions: Dr Tammam Kaid (LJMU); Dr Nan Zhang (UoL)
- UM is developing a new journal on International Journal of Advanced Manufacturing and Material Processing (IJAMMP). (Prof. James Ren is on the editorial panel).