



translate

waste heat to electricity

newsletter

ISSUE 4 – NOVEMBER 2025

[Welcome from Prof Justin D. Holmes](#)

[About TRANSLATE](#)

[Innovation in Waste Heat Recovery](#)

[Nanowood: A Simple Approach
to a Complex Nanomaterial](#)

[Insight & Impact: Final TRANSLATE
General Assembly in Cork](#)

[Exploring Innovative Energy Harvesting](#)

[Harvesting Electricity from Wood](#)

[Powering the Future: A Q&A with
Rupa Ranjani Palanisamy](#)

[TRANSLATE Recognised for
Sustainable Lab Practices](#)

[Unlocking the Power of Waste Heat:
A Conversation with PhD Researcher
Anjali Ashokan](#)

[TRANSLATE Factsheet](#)

[Research Resources](#)

[Conferences, Outreach Events & Campaigns](#)

[Get Involved in our Future Plans](#)

Welcome Professor Justin Holmes, TRANSLATE Coordinator, University College Cork



Professor Justin D. Holmes

As TRANSLATE approaches its final stage, this edition reviews key milestones and outlines future steps. Over the last four years, our consortium has improved low-grade waste heat conversion, built a vibrant cross-border research community, and integrated sustainability into daily operations.

These pages highlight this progress:

A Deepsync feature examines how collaborative efforts from theory to practice boost impact;

UCC's Green Lab certification celebrates eco-friendly laboratory choices;

and PhD spotlights showcase our researchers' creativity and precision, both in the lab and through publications.

TRANSLATE has further strengthened its collaborations by connecting cellulose-based nanofluidics with NXTGENWOOD's forest-to-materials pipeline and demonstrating how our efforts complement INFERNO's high-temperature recovery.

Collectively, these initiatives provide a comprehensive temperature-spectrum strategy for cleaner energy, spanning from ambient gradients to industrial applications.

Inside, you'll find a short wrap-up of our final General Assembly in Cork, plus clear explainers on everything from nanowood to ionic transport. We've also included links to open resources, datasets, tools, events, and

conference outputs, so our results stay easy to find and use.

Thanks to all the partners, students, advisors, and supporters who helped shape TRANSLATE. We hope this edition not only captures what we've achieved but also sparks the next wave of projects and real-world applications.

All TRANSLATE publications, conference proceedings and other research results are Open Access and available on our TRANSLATE project repository on [Zenodo](#).

While the TRANSLATE officially ends November 2025, this is not adieu. Both the project website [translate-energy.eu](#) and email address [translate@ucc.ie](#) will continue to be live for a few years.

You can also contact me directly using the details on my university profile page ([Prof. Justin D. Holmes](#)).

Slán go fóill,

Justin Holmes,

TRANSLATE Coordinator and Professor of Nanochemistry at University College Cork

About TRANSLATE

TRANSLATE is a European Union-funded research project that's turning a big problem - waste heat - into a powerful solution.

Every day, nearly 70% of the energy we produce in homes, offices, and factories escapes in the form of heat. TRANSLATE aims to capture that lost energy and convert it into electricity, using a revolutionary new approach.

Led by University College Cork (UCC) and funded by the EU's Horizon 2020 programme, TRANSLATE brings together scientists from Ireland, Germany, Latvia, and Spain. The team is developing a nanofluidic device that uses tiny channels filled with salt solutions. When one end of the channel is hotter than the other, ions move and create an electric field - producing electricity from heat. As Professor Steffen Hardt from the Technical University of Darmstadt says:

"The principle is based on nano-scale channels filled with a salt solution. When the end of one channel is hotter than the other, the difference in temperature causes the ions to redistribute inside the channel, which in turn creates an electric field along the channel. This field causes an electric current to flow, which can be harvested, and thus, heat is converted into electric energy."

Unlike traditional thermoelectric generators, TRANSLATE's technology uses low-cost, non-toxic materials, making it sustainable and scalable. The goal is to build a device that can efficiently harvest low-grade waste heat (below 100°C) and power things

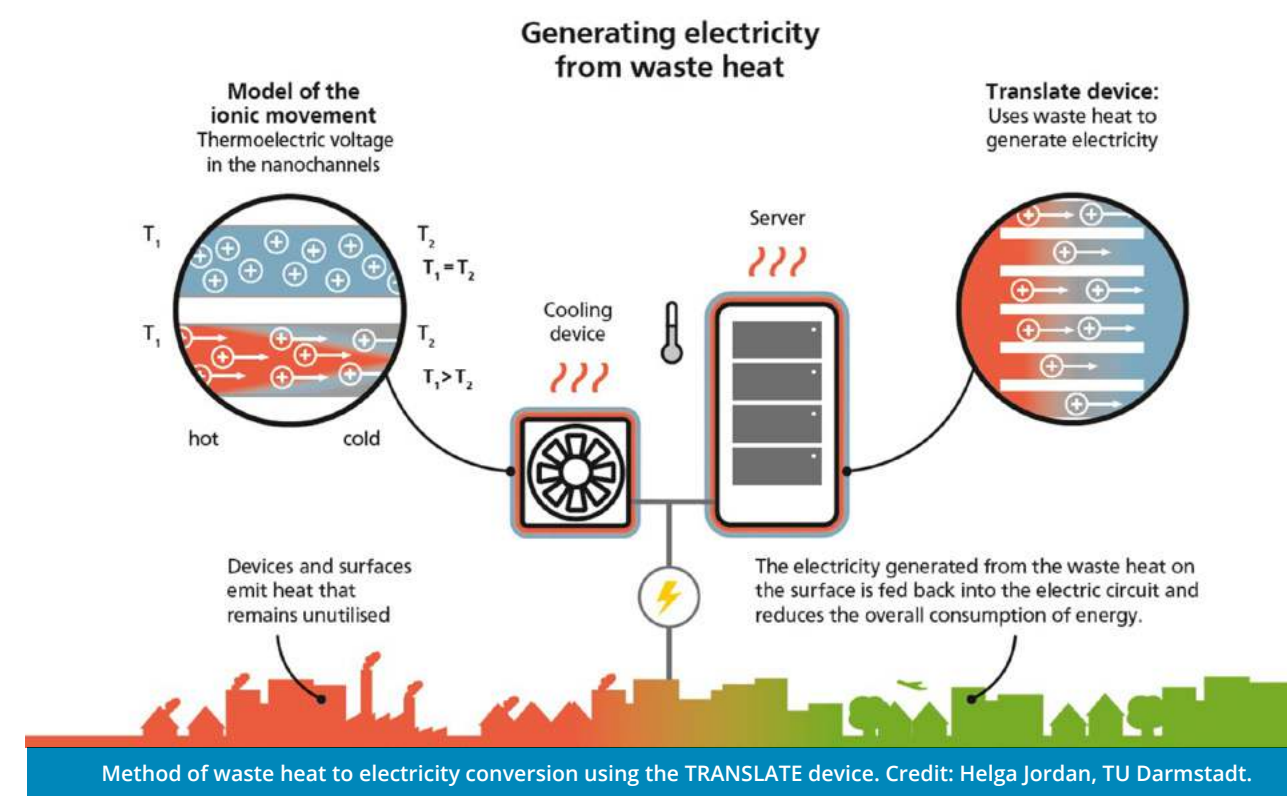
like wearable tech, wireless sensors, and Internet of Things (IoT) devices.

If successful, TRANSLATE could unlock one of the largest untapped sources of clean energy - bringing us closer to a greener, more energy-efficient future. Dr Kafil M. Razeed leads the Advanced Energy Materials Group at Tyndall comments:

It is really exciting to be part of TRANSLATE. We will apply Darmstadt's cutting-edge theoretical understanding of how ions move through nanochannels, and develop this into a complete prototype device that can efficiently convert any wasted heat below 100°C into usable electricity.

We will build this using only low-cost and non-toxic materials in order to create a sustainable device that can power the future generation of wireless sensors and wearable tech.

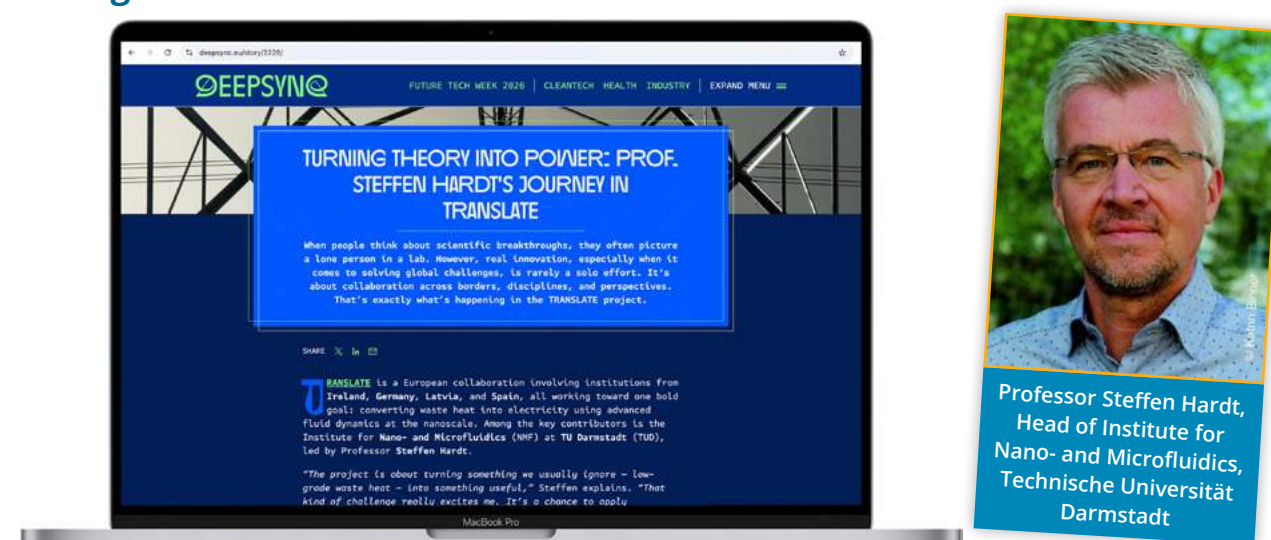
Watch our latest videos on the [TRANSLATE technology](#) and [the team behind the project](#) to get a comprehensive overview of the project.



Innovation in Waste Heat Recovery

Prof. Steffen Hardt's Story in TRANSLATE

We are excited to share an inspiring story from the TRANSLATE project, featuring [Professor Steffen Hardt](#) in Deepsync. Deepsync is a collaborative platform designed to amplify the impact of projects funded by the European Innovation Council (EIC). It connects stakeholders across deep tech sectors – Health, Industry, and Cleantech – by showcasing innovations and fostering communication. TRANSLATE is featured in the Cleantech community, which focuses on sustainable technologies and ecological innovation.



A screenshot of the Deepsync article featuring TRANSLATE from the Deepsync website

The Deepsync article titled [“Turning Theory into Power: Prof. Steffen Hardt's Journey in TRANSLATE”](#) explores the collaborative efforts of the TRANSLATE project, which aims to convert waste heat into electricity using advanced fluid dynamics at the nanoscale.

Here are some key highlights:

- **Collaboration across borders:** The TRANSLATE project involves institutions from Ireland, Germany, Latvia, and Spain, working together to tackle global challenges.
- **The confinement effect:** Steffen Hardt and his team published a theoretical paper nearly a decade ago on generating electricity from temperature differences using electrolytes in nanochannels. This concept has the potential to significantly enhance thermoelectric energy conversion.
- **Overcoming challenges:** The journey has been marked by challenges, including initial experiments that did not align with theoretical models. This led to deeper investigations and refinements, showcasing the power of persistence and collaboration.
- **Recent achievements:** The team has developed promising ideas to enhance thermoelectric energy conversion, including the use of ionic liquids and weak electrolytes. Their work has shown the potential to improve thermal voltage significantly.

Wrapping up

Professor Steffen Hardt's journey with the TRANSLATE project is a testament to the transformative power of scientific curiosity and teamwork.

We invite you to read the [full article](#) to gain deeper insights into this remarkable story and the innovative work being done. Stay tuned for more updates and breakthroughs from the TRANSLATE team!

Related read: [In the nanochannel, heat is converted into electricity](#)

Nanowood: A Simple Approach to a Complex Nanomaterial

This article is a layman adaptation of the TRANSLATE publication [“Nanowood: A Unique Natural Nanomaterial That Can Be Obtained Using Household Chemicals”](#), from the UCC TRANSLATE team.

Nedrygailov, I., O'Brien, D., Monaghan, S., Hurley, P., Biswas, S., & Holmes, J. D. (2024). Nanowood: A Unique Natural Nanomaterial That Can Be Obtained Using Household Chemicals. *Journal of Chemical Education*. DOI: 10.1021/acs.jchemed.4c00166

Why Fluids Behave Differently at the Nanoscale

At the nanoscale, fluids do not behave as they do in bulk form. Their electrical conductivity, viscosity, and even their ionic composition can shift dramatically when confined within nanochannels. These effects are largely due to interactions between the fluid and the walls of the nanostructure. In particular, due to the formation of an electric double layer (EDL)—a charged interface that can influence ion transport. The study of such confined fluids falls under the emerging field of nanofluidics, which has applications in energy harvesting, bioanalysis, and lab-on-a-chip devices.

One of the main challenges in studying nanofluidics, however, is that fabricating nanofluidic structures usually requires highly specialised equipment and cleanroom conditions. This limits its accessibility, particularly in teaching environments.

Related read: [In the nanochannel, heat is converted into electricity](#)

A Natural Alternative: Turning Wood into a Nanofluidic Membrane

This research introduces ‘nanowood’, a natural material containing a network of nanochannels which can be produced from a simple chemical treatment.

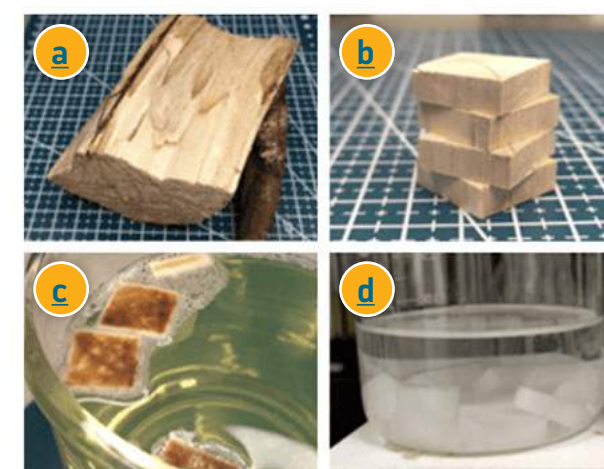


Figure from Nedrygailov et al. (2024). Source: DOI: 10.1021/acs.jchemed.4c00166.

(a) A log of natural wood, used as a raw material for the manufacturing of nanowood membranes. (b) Wood blocks measuring 20×20×6 mm, after cutting the log with a saw. (c) Wood blocks on the first day after being placed in the household bleach solution. (d) Delignified wood blocks (nanowood membranes) in DI water.

By removing lignin—the glue-like component that holds wood fibres together—the researchers create a membrane consisting mostly of cellulose fibres, leaving behind well-aligned nanochannels.

This study demonstrates that this delignification process can be performed using common household bleach, making nanowood an accessible platform for nanofluidics research and education.

Testing Nanowood's Nanofluidic Properties

To confirm that nanowood exhibits nanofluidic behaviour, the researchers investigated its ionic conductance in different concentrations of sodium chloride (NaCl) solution. Conductance measurements were carried out using electrochemical impedance spectroscopy (EIS)—a technique that examines how ions move through a material by applying an AC voltage and measuring the response.

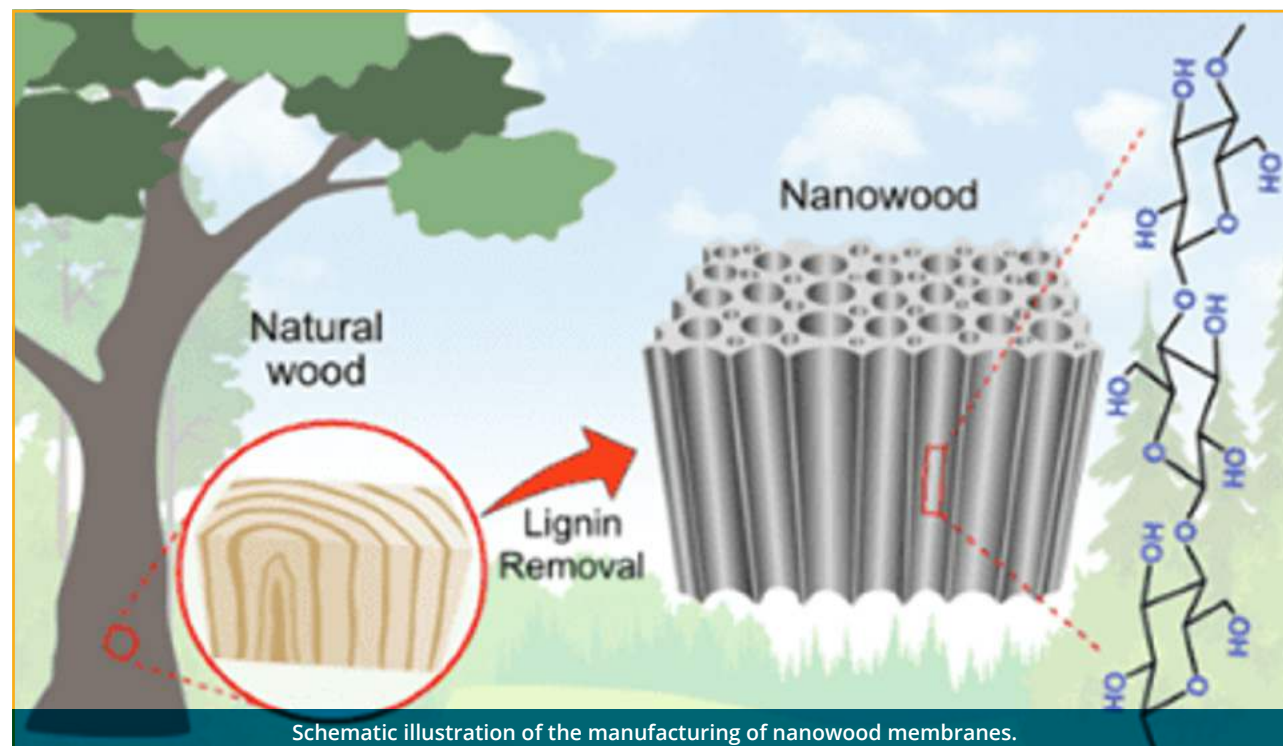
Key Findings: Conductance Changes at Low Ion Concentrations

At high NaCl concentrations, the conductance of nanowood behaves similarly to a bulk electrolyte solution—following classical models where more ions lead to higher conductance.

At low NaCl concentrations, however, conductance stops depending on bulk ion concentration and instead becomes governed by surface charge effects in the nanochannels. This suggests that the nanochannels selectively influence ion transport, a hallmark of nanofluidic behaviour.

Implications and Future Applications

- **Educational potential:** Nanowood provides a low-cost way to study nanofluidics in university labs, helping students visualise nanoscale fluid behaviour without expensive fabrication methods.
- **Sustainable nanomaterials:** The ability to create functional nanomaterials from wood, a renewable resource, opens pathways for eco-friendly applications in filtration, sensing, and energy harvesting.
- **Further research:** The study paves the way for more advanced research into modifying nanowood's properties for specific applications, such as ion-selective membranes or bio-inspired nanofluidic devices.



After lignin is removed, a nanowood is formed, which is a matrix of cellulose fibres forming a system of well-aligned nanofluidic channels.

Figure from Nedrygailov et al. (2024). Source: DOI: 10.1021/acs.jchemed.4c00166.

Conclusion: A Simple Yet Powerful Nanomaterial

This study highlights nanowood as a practical and sustainable nanofluidic material. By leveraging the natural structure of wood and applying basic chemical treatment, the researchers have created a platform that enables further exploration of nanoscale ion transport.

This work not only deepens our understanding of nanofluidics but also provides an innovative approach to making nanoscience more accessible to students and researchers alike.

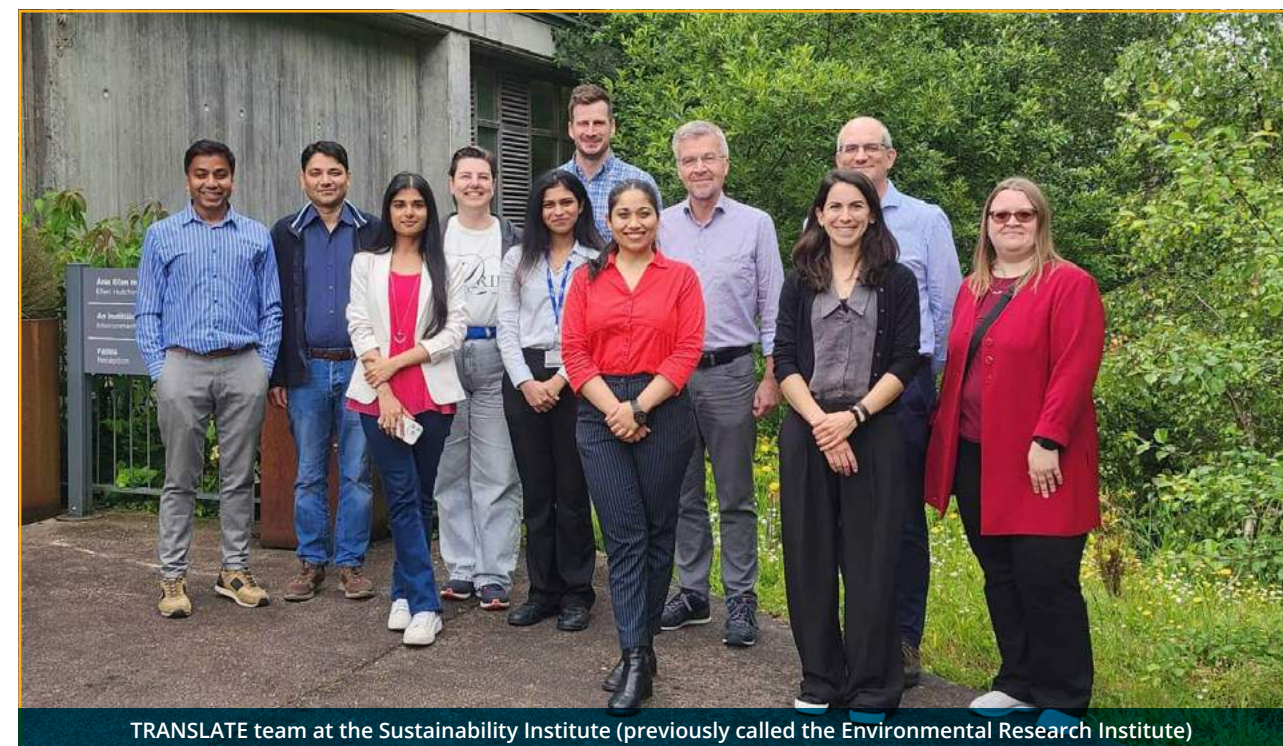
Insight & Impact: Final TRANSLATE General Assembly in Cork

The TRANSLATE project held its final General Assembly on 4-5 June 2025, at the [Sustainability Institute](#) (previously called the Environmental Research Institute), University College Cork. With [team members](#) joining in person and online from Ireland, Latvia, and Germany, the two-day event marked a meaningful close to four years of cross-border research collaboration.

Funded by the European Union, TRANSLATE has brought together experts in nanofluidic modelling, nanofabrication, and optimisation to develop next-generation energy materials — aiming to convert waste heat into usable, clean electricity. This final gathering was not only a celebration of what's been achieved, but also a moment of reflection, learning, and legacy-building.

A Look Back — and Ahead

As is tradition in TRANSLATE assemblies, each partner shared updates on scientific progress. But this final assembly also included a unique opportunity: a dedicated feedback session where team members could candidly discuss what worked well — and what could be improved.



The session served as a valuable knowledge-sharing exercise. Teams spoke about the challenges of aligning theoretical design with experimental implementation, lessons from managing complex international logistics, and suggestions for even more effective collaboration in future projects. Documenting these insights will support not only TRANSLATE's legacy but also the success of future research consortia.

An insightful aspect of the General Assembly came from the PhD researchers. These early-career scientists shared what it was like to work within a large, international research project — from learning new techniques across disciplines to navigating virtual collaboration during key phases of the project.

Their reflections provided a fresh, honest perspective on how EU-funded projects can shape research careers and foster real growth, especially when mentorship, communication, and structured support are prioritised.

Capturing the Moment: Filming and Final Reflections

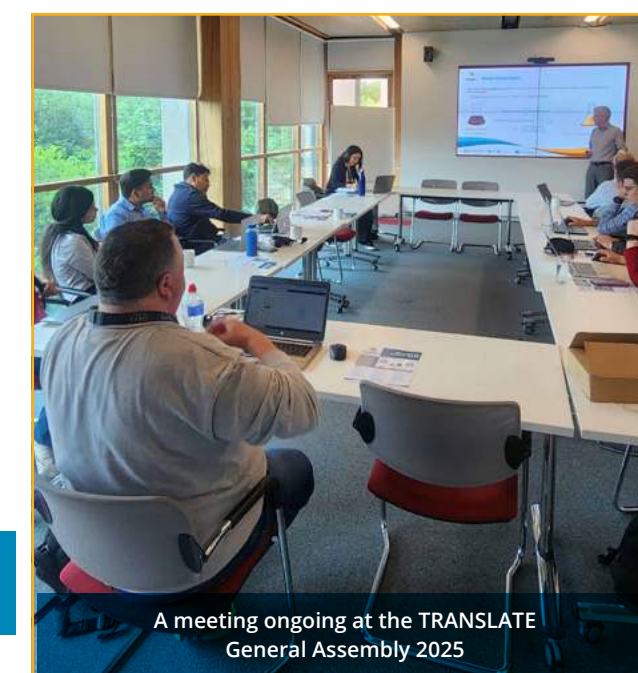
Throughout the event, we captured behind-the-scenes video content — including interviews, lab footage, and candid moments of the consortium reconnecting in person. These materials will form part of TRANSLATE's final communication outputs and highlight the human and scientific stories behind the research.

[You can watch the final video here](#)

Closing on a High Note

More than a formal meeting, the final General Assembly reminded everyone involved of the strength of collaboration. Over coffees, shared meals, and team discussions, the event created space not just for conclusions — but for connection.

As TRANSLATE approaches the final months of delivery, the ideas exchanged in Cork will help shape final outputs and reinforce the project's impact long after it ends.



From Forests to Furnaces: Innovations to Power a Greener Energy Future

As the TRANSLATE project continues to pioneer sustainable energy harvesting from low-grade waste heat, its collaborative spirit and interdisciplinary approach are reflected in two exciting overlaps with other UCC projects: NXTGENWOOD and INFERNO.

NXTGENWOOD x TRANSLATE: From Forest to Nanofluidics

The NXTGENWOOD project, supported by Ireland's Department of Agriculture, Food, and the Marine, is transforming forestry resources into high-value sustainable materials. Among its innovations is the extraction of cellulose from wood – a material that has proven to be a game-changer for TRANSLATE's nanofluidic energy harvesting devices.

TRANSLATE researchers discovered that cellulose's naturally aligned nanochannels and negative charge make it ideal for converting thermal gradients into electricity. This synergy eliminates the need for synthetic alternatives like anodised aluminium oxide, aligning with EU Green Deal goals and promoting



circular economy principles.

The collaboration was brought to life at the Thesis in Trees event, where UCC PhD researcher Anjali Ashokan demonstrated how body heat could be converted into electricity using cellulose-based devices. Her engaging presentation under a eucalyptus tree at the National Botanic Gardens showcased the real-world potential of merging forestry and nanotechnology.

INFERNO x TRANSLATE: Tackling Waste Heat Across the Temperature Spectrum

While TRANSLATE focuses on low-grade waste heat (below 100°C), the INFERNO project - also led

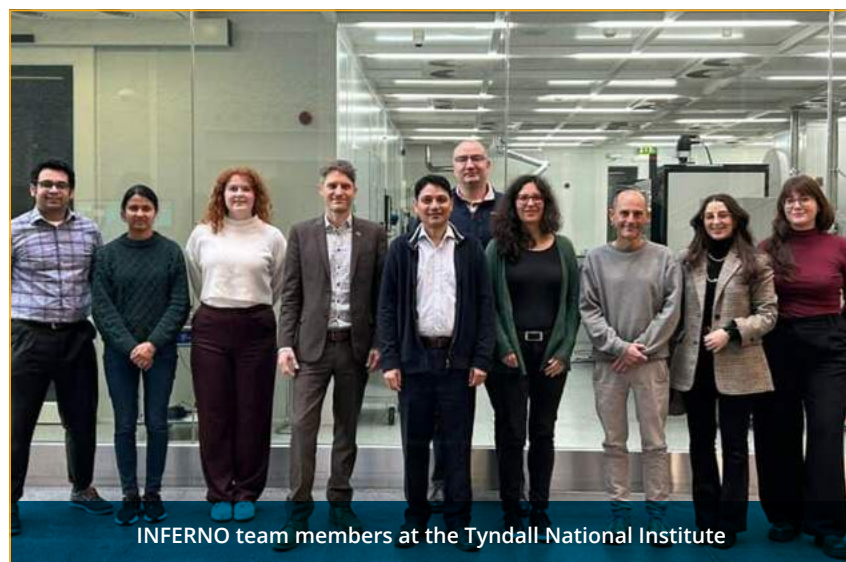
by Dr. Kafil M. Razeeb at Tyndall National Institute - targets high-temperature industrial waste heat (400–800°C). Funded by Horizon Europe, INFERNO is developing a hybrid system integrating thermophotovoltaic cells, photonic metamaterials, and thermoelectric generators to recover energy from sectors like cement, steel, and glass.

Together, TRANSLATE and INFERNO represent a comprehensive strategy to reclaim energy across the full temperature spectrum. While TRANSLATE's nanofluidic platform is ideal for wearables and domestic systems, INFERNO's modular, solid-state system is designed for retrofitting into energy-intensive industrial setups - both contributing to reduced greenhouse gas emissions and enhanced energy efficiency.

A Unified Vision for Sustainable Energy

These overlaps highlight TRANSLATE's commitment to interdisciplinary innovation—whether through bio-based materials or industrial-scale recovery systems.

By collaborating with projects like NXTGENWOOD and INFERNO, TRANSLATE is not only advancing its own mission but also contributing to a broader ecosystem of sustainable energy solutions.



INFERNO team members at the Tyndall National Institute

Powering the Future:

A Q&A with Rupa Ranjani Palanisamy on Green Energy, Resilience, and Supercapacitors

As part of the EU-funded TRANSLATE project, PhD researcher Rupa Ranjani Palanisamy is working at the intersection of electrochemistry, sustainability, and innovation. From overcoming setbacks in the lab to designing electrodes that both convert and store energy, her journey is a masterclass in scientific creativity and resilience.

We sat down with Rupa to learn more about her research, inspirations, and vision for a battery-powered future.

Q: Tell us a bit about your journey - from India to Ireland, and into the TRANSLATE project.

Rupa: I started applying for PhD positions during the COVID pandemic. Travel restrictions made things tricky, but Ireland had relaxed some measures just in time. I found that the TRANSLATE project aligned closely with my master's research on supercapacitors, and with two publications under my belt, I was fortunate to be selected.

When I joined, I connected with researchers at Tyndall National Institute, who had great facilities for electrochemical analysis. That's how my focus shifted to electrode fabrication for both energy storage and thermal energy conversion.

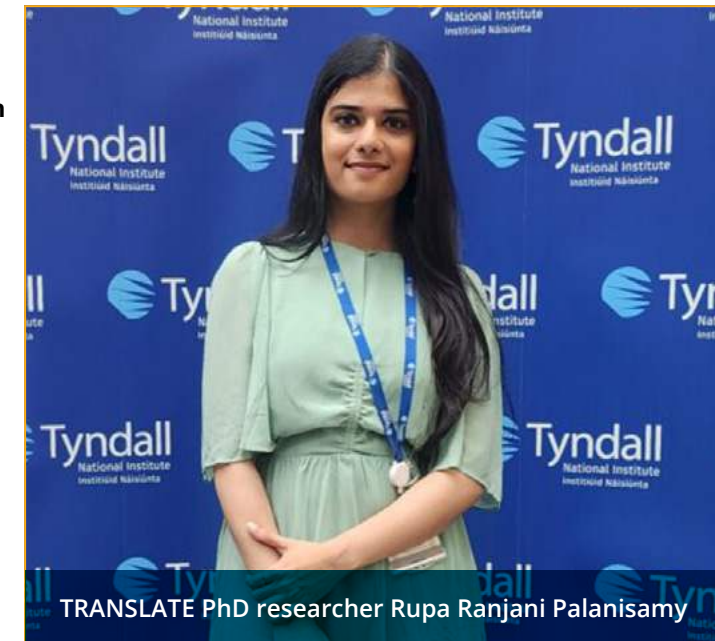
Q: What exactly is your role within the TRANSLATE project?

Rupa: My research explores materials that can do two things: convert heat into electricity, and store that electricity for later use. That dual functionality is the heart of my PhD thesis.

TRANSLATE is all about making thermal energy useful—so I thought, why not store it too? By designing electrodes that act as both converters and supercapacitors, we reduce the need for separate systems. It's more efficient, more compact, and more sustainable.

Q: Were there any major challenges in your PhD journey?

Rupa: Absolutely. In my first year, I was working with a fragile material called anodised aluminium oxide (AAO) membranes. These were central to my initial



TRANSLATE PhD researcher Rupa Ranjani Palanisamy

thesis plan, but they kept breaking during experiments—even after a year of trying to optimise them.

Eventually, we had to pivot. We moved to commercial membranes and focused more on the electrodes. That shift taught me an important lesson: sometimes, letting go of a plan is necessary for progress.

Q: Can you tell us about your latest research and publications?

Rupa: We've recently published a paper on the dual functionality of nickel cobalt selenide electrodes. They showed strong performance in both energy storage and thermal conversion. However, cobalt and selenide aren't ideal—they're toxic and not very sustainable.

So we're now working with layered double hydroxides (LDHs), which are greener and have a unique layered structure that boosts ion storage and electrochemical activity. Early results are promising, and we're preparing a new manuscript comparing our findings to existing literature.

Q: You mentioned combining battery and capacitor technologies—what's that about?

Rupa: I'm working on what's called a supercapattery—a hybrid device that combines the best of both batteries and supercapacitors. Supercapacitors charge in seconds but discharge quickly. Batteries take longer to charge but last longer.

Imagine a device that charges in seconds and lasts for days—that's the goal. It could transform how we power everything from smartphones to electric vehicles.

Q: Why the focus on green and sustainable materials?

Rupa: At first, I was simply fascinated by electrochemistry. But then I learned more about



Rupa (2nd from left) with the TRANSLATE team at the project's first General Assembly in UCC, Ireland.

the environmental impact of materials like cobalt. For example, children in poor countries are exposed to harmful mining conditions to extract cobalt for batteries.

Also, growing up in India, I've seen climate change firsthand—temperatures are rising rapidly. It became clear to me that if we want a sustainable future, we need to start with sustainable materials. As researchers, we have a responsibility to think beyond performance and consider ethics and impact.

Q: What are your future plans after TRANSLATE and your PhD?

Rupa: I'd like to move into industry, particularly battery or energy storage companies. Academic research is important, but I want to see the real-world impact of my work—products that people can use, that improve lives, and that reduce environmental harm.

I'm also interested in emerging areas like battery recycling. Imagine recovering and reusing the nickel and cobalt from old batteries—it would massively cut down on e-waste.

Q: With so much automation and wireless tech, do you think your work aligns with the future of energy?

Rupa: Definitely. Everything is becoming battery-dependent—cars, devices, even homes. In Ireland, for

example, people are switching to automatic electric cars. In the near future, fossil fuels will be gone.

But that means the pressure is on: batteries must become faster, cleaner, and more efficient. Our work on dual-function materials and hybrid devices fits perfectly into this vision of sustainable innovation.

Q: What was it like working in a collaborative, multi-country project like TRANSLATE?

Rupa: At first, it was overwhelming—especially the theoretical discussions with our partners at Technische Universität Darmstadt! But over time, I started understanding their models, and we found ways to match their simulations with my lab results.

I've also worked closely with University of Latvia. They're testing my LDH electrodes for sodium-ion batteries, which are even more sustainable than lithium-based ones. It's been amazing to see how my materials have potential across multiple applications.

Q: Any final thoughts?

Rupa: Yes—heat is one of the cheapest and most wasted forms of energy. If we can harness it efficiently and pair it with sustainable storage, we can make a big difference. I believe the future will rely heavily on electrochemists, machine learning, and interdisciplinary collaboration to make that happen.

TRANSLATE Recognised for Sustainable Lab

Practices – Joins Ireland's Green Lab Leaders

The Irish Minister for Further and Higher Education, Research, Innovation and Science, James Lawless TD has announced 72 sustainable laboratory certifications to research spaces in 12 higher education institutions across Ireland, under a Research Ireland-led programme. TRANSLATE laboratories are proud to be named among the sustainable research spaces.

The certification is part of the Sustainable Laboratory Certification Pilot Programme, launched in October 2023 by Research Ireland in partnership with Impact Laboratories and My Green Lab.

The initiative aims to bring world-class, environmentally conscious research practices into Irish labs—promoting energy efficiency, safety, and waste reduction.



Professor Justin Holmes

“In the laboratories we use for TRANSLATE, straightforward yet effective changes have been made to boost environmental sustainability.”

said Justin D. Holmes, Professor of Nanochemistry at University College Cork and TRANSLATE Coordinator.

“We have optimised fume hood use to save energy and improved inventory management to avoid over-purchasing supplies. These actions have decreased energy use and waste, while also enhancing safety and efficiency in our labs.”

Sustainability is a core principle of TRANSLATE —not only in lab practices but in the technology itself. The project focuses on using earth-abundant raw materials to capture low-grade waste heat (below 100°C) and convert it into storable electricity.

This novel approach has the potential to radically improve the energy efficiency of everyday devices and systems while providing a new, zero-emission power source.



PhD student Vaishali Vardhan running experiments in the lab. Credit: Photo By Tomas Tyner, UCC.



Senior Research Fellow Dr Subhajit Biswas photographed using lab equipment

After discovering the [My Green Lab programme](#) online, Prof. Holmes nominated two of his research labs at University College Cork's [Sustainability Institute](#) (previously called Environmental Research Institute) for the certification process.

My Green Lab is an internationally recognised initiative supporting scientists in reducing their labs' carbon footprints through practical, lasting improvements. With over 2,000 labs certified globally, it is considered the gold standard in lab sustainability.

You can read the full press release [here](#)

Unlocking the Power of Waste Heat:

A Conversation with PhD Researcher Anjali Ashokan

How do we turn wasted heat - from our devices, homes, and even our bodies - into usable electricity? That's exactly what PhD researcher Anjali Ashokan has been working on as part of the TRANSLATE project. Her recent publication, [Ion-Selective Transport in Surface-Modified Cellulose Membranes for Aqueous Ionic Thermoelectrics](#) ⁷, demonstrates how sustainable cellulose membranes can be engineered to significantly enhance ionic thermoelectric performance.



We sat down with Anjali to learn more about her research journey, the breakthroughs behind this work, and what it could mean for the future of sustainable energy.

What inspired you to explore surface charge engineering in cellulose membranes for ionic thermoelectrics?

I was motivated by a simple problem: salty water on its own doesn't generate much voltage from a temperature difference, so it's hard to turn low-temperature "waste" heat into valuable electricity. The idea was that if we gave a soft, sponge-like membrane a controlled electric charge, we could guide ion movement and dramatically boost the effect. Cellulose was a natural platform for this because it's renewable, already widely used in filters, and its surface charge can be tuned using straightforward, water-based chemistry.

You worked with two types of functional groups: TEMPO and CHMAC. Why those?

I chose TEMPO and CHMAC because they let us "dial in" opposite charges on the same cellulose platform using simple, water-based chemistry. TEMPO turns some of the cellulose into negatively charged sites, while CHMAC adds permanent positive charges. Together, they provide a clear side-by-side comparison of how

negative vs. positive surface charge affects how ions move and how much thermal voltage we can generate from a temperature difference.

And the results were striking - a tenfold increase in the Seebeck coefficient and a 950-fold increase in conductivity. How did CHMAC membranes achieve this?

CHMAC gives the cellulose membrane a strong, permanent positive charge, so it starts acting like a tiny ion "filter." It pulls in and channels negatively charged ions much more efficiently than in plain salty water. At low salt levels, this surface effect dominates, so instead of ions wandering randomly, they flow in a highly directed way through the charged pores. That's what leads to both the ~tenfold jump in voltage per degree and the huge boost in conductivity.

What challenges did you face?

One big challenge was measuring the effect we were interested in. We had to build a custom setup that could hold flexible, wet membranes, apply a tiny temperature

Unlocking the Power of Waste Heat: A Conversation with PhD Researcher Anjali Ashokan

difference, and still reliably detect tiny voltages and currents without interference. On top of that, we had to tweak the surface chemistry, so we added charge without damaging the cellulose structure — there was a lot of trial and error and rebuilding along the way.

Sounds like there was a lot of trial and error involved. How scalable is this surface modification process? Could industry adopt it?

It's still early-stage research, so we're thinking more about small-scale applications than giant factory lines. The chemistry is water-based and straightforward, and we start from commercial cellulose filter membranes, so making more of these modified membranes in modest batches is very realistic. The most likely first targets are small-area devices — such as sensors, test strips, or patch-style modules — that only require centimetres of material. Still, you need it to be reliable and reproducible.

Where do you see this technology being applied?

In the near term, I see this technology in small, low-power devices rather than anything large-scale - think skin-worn patches, smart bandages, or environmental sensors that quietly harvest a bit of energy from temperature differences. Because the membranes are soft, water-processed, and made from cellulose, they're well-suited to gentle contact with people, liquids, or delicate surfaces. Longer term, the same ideas could help power distributed sensors in buildings or on equipment by tapping into the low-grade heat we usually ignore.

What's next for your research?

We're now testing other kinds of cellulose membranes, from lab-made nanofibrillated films to thicker sheets, and exploring new ways to add charge, such as silane chemistry. All of this will feed into my PhD, where I'll compare how different membrane types and surface tweaks perform side by side.

Finally, how has being part of TRANSLATE shaped your journey?

TRANSLATE has been incredible for collaboration. I've had the chance to work with colleagues across Europe - from Germany, Latvia, Ireland and beyond. The feedback and ideas from so many perspectives have shaped my work and helped me grow as a researcher. It's been a great platform for both exposure and learning.

Takeaway

The takeaway is that a very familiar, sustainable material, cellulose, can be tuned to give a surprisingly strong electrical response from small temperature differences, simply by changing its surface charge. We're not talking about powering phones or cars, but about creating tiny "trickle power" sources for things

like sensors, skin patches, or smart labels that need only tiny amounts of energy. My work shows that with clever surface chemistry, cellulose membranes can deliver much higher thermal voltages and ion flow than before, making them a promising building block for the next generation of soft, low-power devices.



Waste Heat to Electricity:

Key Insights from the TRANSLATE Factsheet

The TRANSLATE project is making strides in the field of energy conversion with its cutting-edge nanofluidic technology. To capture our progress, we've launched a TRANSLATE factsheet. [Download the full factsheet ↗](#)

Here are key insights from TRANSLATE:

Technology Overview

- **Nanofluidic Membranes:** Utilising ion flux in nanochannels to convert thermal gradients into electrical energy.
- **Low-Temperature Operation:** Effective at temperatures below 100°C, ideal for harnessing waste heat.

Efficiency and Environmental Impact

- **High Conversion Efficiency:** Promising significant energy conversion efficiency at low temperatures.
- **Eco-Friendly Materials:** Employing Earth-abundant, environmentally benign materials and aqueous NaCl electrolyte.

Potential Applications

- **Wearable Technology:** Powering medical devices and fitness trackers.
- **Consumer Electronics:** Enabling self-charging devices.
- **IoT & Sensor Networks:** Providing energy for distributed IoT devices and environmental sensors.

Technical Specifications

- **Materials:** Earth-abundant, biocompatible nanofluidic membranes.
- **Power Output:** Suitable for ultra-low power systems.
- **Scalability:** Ideal for small-scale applications.

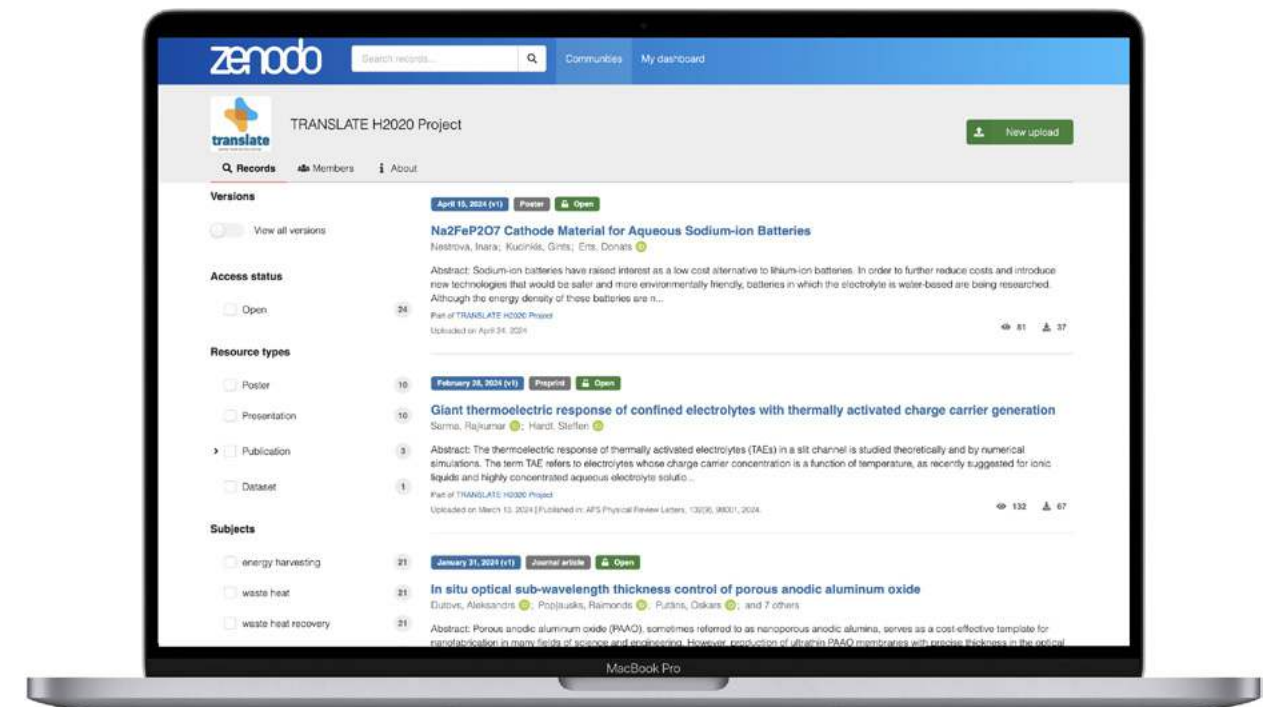
Future Directions

- **Energy Storage Integration:** Exploring compatibility with next-gen supercapacitors or batteries.
- **Ongoing R&D:** Focused on improving ion transport and membrane stability.

For more detailed information, download the full TRANSLATE factsheet, available on our [website ↗](#) or [Zenodo ↗](#)

Research Resources

TRANSLATE is committed to Open Access research and is taking part in a European Commission pilot on Open Access to Research Data. All publications from the TRANSLATE project are freely accessible and published as open access articles at either gold or green standard.



Our research publications and data are stored in an [open-access data repository on Zenodo ↗](#) to enable researchers to access, exploit, reproduce and disseminate our data in the future. This repository is validated as Open Access by OpenAIRE, with an associated [OpenAIRE project page ↗](#)

Here is a list of recent TRANSLATE resources and publications:

Publications:

- Amit Tanwar et. al, (2023). "A fully automated measurement system for the characterization of micro thermoelectric devices near room temperature". In Applied Thermal Engineering (Vol. 224) | [Zenodo ↗](#)
- Amit Tanwar et. al, (2023). "Data associated with the following publication: 'A fully automated measurement system for the characterization of micro thermoelectric devices near room temperature'". In Applied Thermal Engineering (Vol. 224) | [Zenodo ↗](#)
- Rajkumar Sarma et. al, (2024). "Giant thermoelectric response of confined electrolytes with thermally activated charge carrier generation". In APS Physical Review Letters (Vol. 132, Number 9) | [Zenodo ↗](#)
- Rajkumar Sarma et. al, (2024). "Data associated with the following publication: 'Giant thermoelectric response of confined electrolytes with thermally activated charge carrier generation'". In APS Physical Review Letters (Vol. 132, Number 9) | [Zenodo ↗](#)
- Aleksandrs Dutovs et. al, (2024). "In situ optical sub-wavelength thickness control of porous anodic aluminum oxide". In Beilstein Journal of Nanotechnology, (Vol. 15, p 126–133) | [Zenodo ↗](#)
- Aleksandrs Dutovs et. al, (2024). "Data associated with following publication: 'In situ optical sub-wavelength thickness control of porous anodic aluminum oxide'". In Beilstein Journal of Nanotechnology, (Vol. 15, p 126–133) | [Zenodo ↗](#)
- Ievgen Nedrygailov et. al, (2024). "Nanowood: A Unique Natural Nanomaterial That Can Be Obtained Using Household Chemicals". In ACS Journal of Chemical Education (Vol. 101, Number 10) | [Zenodo ↗](#)
- Ievgen Nedrygailov et. al, (2024). "Data associated with 'Nanowood: A Unique Natural Nanomaterial That Can Be Obtained Using Household Chemicals'". In ACS Journal of Chemical Education (Vol. 101, Number 10) | [Zenodo ↗](#)
- Rupa Ranjani Palanisamy et. al, (2025). "Dual-functionality of NiSe2-CoSe2 nanowires for electrochemical

Research Resources

charge storage and efficient thermal energy conversion". In Journal of Energy Storage (Vol. 122) | [Zenodo](#)

- Anjali Ashokan et. al, (2025). "Ion-Selective Transport in Surface-Modified Cellulose Membranes for Aqueous Ionic Thermoelectrics". In Journal of Materials Chemistry A (Number 34) | [Zenodo](#)

Conference presentations and posters:

- **Presentation:** "Overview of TRANSLATE and Results to Date at the 80th International Scientific Conference of the University of Latvia" (2022) at the 80th International Conference of the University of Latvia | [Zenodo](#)
- **Poster:** "Converting waste heat into electricity using cellulose membranes" (2022) at the Environ 2022 Conference | [Zenodo](#)
- **Presentation:** "Characteristics of ionic transport in highly ordered nanoporous aluminum oxide membranes" (2022) at the 80th International Conference of the University of Latvia | [Zenodo](#)
- **Poster:** "Functionalisation of nanochannels for the development of a sustainable and efficient low-grade waste heat harvester" (2022) at the European Materials Research Society Fall Meeting | [Zenodo](#)
- **Presentation:** "Ionic thermoelectric effect in nanofluidic membranes for efficient conversion of waste heat into electrical energy" (2022) at the European Materials Research Society Fall Meeting | [Zenodo](#)
- **Poster:** TRANSLATE poster (2022) at the European Researcher's Night in the University of Latvia | [Zenodo](#)
- **Presentation:** "Converting waste heat into electrical energy in ionic nanofluidic membranes" (2022) at the HZDR NanoNet+ Workshop | [Zenodo](#)
- **Presentation:** "Thermoelectric Energy Conversion in Nanochannels Filled with Ionic Liquids" (2022) at the 75th Annual Meeting of the Division of Fluid Dynamics (APS 2022) | [Zenodo](#)
- **Poster:** "Infiltration Control of Highly Ordered Nanoporous Aluminum Oxide Membranes with Aqueous Electrolytes" (2022) at the Joint International Scientific Conference "Functional Materials and Nanotechnologies" and "Nanotechnologies and Innovations in the Baltic Sea Region" (FM&NT – NIBS 2022) | [Zenodo](#)
- **Presentation:** "Preparation and Characterization of Electrodes for Na-ion batteries: Na₂FeP₂O₇ and Na_{0.67}MnO₂" (2022) at the Joint International Scientific Conference "Functional Materials and Nanotechnologies" and "Nanotechnologies and Innovations in the Baltic Sea Region" (FM&NT-NIBS 2022) | [Zenodo](#)
- **Presentation:** "Transport through nanochannels driven by electric fields and temperature gradients" (2023) at the Center for Enhanced Nanofluidic Transport (CENT), MIT | [Zenodo](#)
- **Presentation:** "Nanowood: Fully renewable, biodegradable, environmentally friendly, natural material for the next generation thermoelectrics" (2023) at the Environ 2023 Conference | [Zenodo](#)
- **Poster:** "NiSe₂ modified Carbon Fibre Cloth as the High-Performance electrode for Thermally Chargeable Super Capacitors" (2023) at the 74th Irish Universities Chemistry Research Colloquium, University of Galway | [Zenodo](#)
- **Poster:** "Comprehensive Comparison of Anodic Alumina Membrane Infiltration Methods: Electrolyte Selection, Membrane Stability and Flow Rate Characterization" (2023) at the Materials Today Conference | [Zenodo](#)
- **Poster:** TRANSLATE poster (2023) at the Researchers' Night Latvia in the University of Latvia | [Zenodo](#)
- **Presentation:** "Thermovoltage Generation with Thermally Activated Electrolytes²" (2023) at the International Workshop on Thermo-electrochemical Devices (IWT-ED 2023) | [Zenodo](#)
- **Poster:** "Optimization of Nanoporous Membranes for Ionic Thermoelectric Harvesters" (2023) at the 7th Green and Sustainable Chemistry Conference | [Zenodo](#)
- **Poster:** "Insitu grown metal selenides (MX; M=Ni, Co; X=Se) on carbon fibre cloth as novel electrodes for thermally chargeable supercapacitors" (2023) at the Tyndall Poster Presentation Competition/Event | [Zenodo](#)
- **Poster:** "Na₂FeP₂O₇ Cathode Material for Aqueous Sodium-ion Batteries" (2024) at the 8th Baltic Electrochemistry Conference: Finding New Inspiration 2 (BEChem 2024) | [Zenodo](#)
- **Poster:** "Electrochemical Performance of Na₂FeP₂O₇ for Aqueous Sodium-ion Batteries" (2024) at the 37th Topical Meeting of the International Society of Electrochemistry | [Zenodo](#)
- **Presentation:** "EIC Tech2Market Pitch" (2024) for the EIC Tech2Market programmes: Business Validation Programme and Pioneer Programme | [Zenodo](#)
- **Presentation:** "Different Approaches to Obtaining Nanoporous Anodic Alumina Membranes with AAO Layer Thickness Over 60 µm by Anodisation in Sulfuric Acid Electrolyte" (2024) at the 82nd International Scientific Conference of the University of Latvia | [Zenodo](#)
- **Presentation:** "Nano-wood membranes for Sustainable Conversion of Heat to Electricity" (2024) at the UCC School of Chemistry Postgraduate Research Day | [Zenodo](#)
- **Poster:** "Thermoelectric properties of aqueous electrolyte infiltrated in anodic aluminium oxide (AAO) nanochannels" (2024) at the IEEE Nanomaterials: Applications & Properties (IEEE NAP 2024) Conference | [Zenodo](#)

Research Resources

(2024) at the IEEE Nanomaterials: Applications & Properties (IEEE NAP 2024) Conference | [Zenodo](#)

- **Poster:** "Peculiarities of ion transport in aqueous electrolytes confined in anodic alumina (AAO) nanochannels" (2024) at the IEEE Nanomaterials: Applications & Properties (IEEE NAP 2024) | [Zenodo](#)
- **Poster:** "Redox electrodes for electrochemical energy storage and thermal energy conversion" (2024) at the Fall Meeting of the European Materials Research Society (E-MRS Fall Meeting 2024) | [Zenodo](#)
- **Presentation:** "Surface Optimisation of Regenerated Cellulose Membranes for development of a sustainable and efficient low-grade waste heat harvester" (2024) at the Fall Meeting of the European Materials Research Society (E-MRS Fall Meeting 2024) | [Zenodo](#)
- **Poster:** TRANSLATE poster (2024) at the Researchers' Night Latvia in the University of Latvia | [Zenodo](#)
- **Presentation:** "Transport processes in nanochannels induced by electric and temperature fields" (2024) at a Mathematics seminar organised by New Jersey Institute of Technology | [Zenodo](#)
- **Presentation:** "Electrode Engineering for Next-Gen Supercapacitors and Heat to Electricity Conversion Tech" (2024) at the University College Cork School of Chemistry Postgraduate Research Day | [Zenodo](#)
- **Presentation:** "NiSe₂-CoSe₂ Nanowires for Electrochemical Charge Storage and Heat to Electricity Conversion" (2025) at the 76th Irish Universities Chemistry Research Colloquium, held in Maynooth University | [Zenodo](#)
- **Presentation:** "Nanomaterials for a Sustainable Future: Sensors and Energy Harvesting" (2025) at Prof. Justin D. Holmes' Honorary Doctorate at the University of Latvia | [Zenodo](#)
- **Poster:** TRANSLATE poster (2025) at the Researchers' Night Latvia in the University of Latvia | [Zenodo](#)

Conferences, Outreach Events & Campaigns

8th Baltic Electrochemistry Conference: Finding New Inspiration 2 (BEChem 2024) 14th-17th April 2024



Held in Tartu, Estonia, and hosted by the University of Tartu's Institute of Chemistry and Elektrokeemia Selts, BEChem 2024 brought together leading minds in electrochemistry to explore sustainable energetics and cutting-edge interfacial methods. The event spotlighted innovative research and collaboration. University of Latvia PhD student Inara Nestrova earned the Best Student Poster award for poster presentation titled "[Na₂FeP₂O₇ cathode material for aqueous sodium-ion batteries](#)".

37th Topical Meeting of the International Society of Electrochemistry 9th-12th June 2024

University of Latvia PhD student Inara Nestrova presented her poster titled "[Electrochemical performance of Na₂FeP₂O₇ for aqueous sodium-ion batteries](#)" at the 8th Baltic Electrochemistry

Conference in Tartu, Estonia. Reflecting on the experience, she shared: "You could find out the latest research on lithium-ion batteries, sodium-ion batteries, and even hydrogen technologies. The stories of the scientists were very inspiring and it was a great pleasure to learn new things that I had not heard about before. After each presentation, many questions were asked in the audience, because the topics were really interesting and innovative."



IEEE 14th International Conference on "Nanomaterials: Applications & Properties" 8th-13th September 2024

University of Latvia's Dr. Irina Oliseveca presented her poster "[Peculiarities of ion transport in aqueous electrolytes confined in anodic alumina \(AAO\) nanochannels](#)" at the IEEE NAP'24, co-organised by the IEEE Nanotechnology Council and the University of Latvia. She shared: "We were excited to participate..."

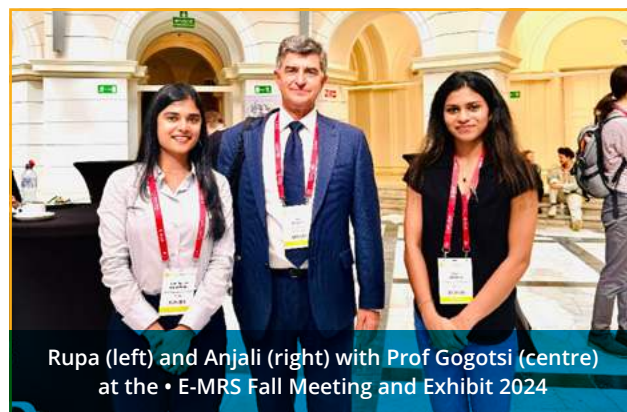
Conferences, Outreach Events & Campaigns

Inspired and full of new ideas, we are back to continue our final project year work!" University of Latvia PhD student Ilga Lauma Laimane also showcased her research with a poster titled ["Thermoelectric properties of aqueous electrolyte infiltrated in anodic alumina \(AAO\) nanochannels."](#)



Dr. Oliseveca (left) and Ilga (top right) in front of their respective posters at IEEE NAP'24

E-MRS Fall Meeting and Exhibit 16th-19th September 2024



Rupa (left) and Anjali (right) with Prof Gogotsi (centre) at the • E-MRS Fall Meeting and Exhibit 2024

University College Cork PhD student Rupa Ranjani Palanisamy won the Best Poster Award for her research on ["Redox electrodes for electrochemical energy storage and thermal energy conversion"](#).

Fellow University College Cork PhD student Anjali Ashokan delivered a well-received presentation titled ["Surface Optimisation of Regenerated Cellulose Membranes for development of a sustainable and efficient low-grade waste heat harvester"](#).

Both students had the opportunity to meet Professor Yury Gogotsi, a pioneer in MXene materials, adding a memorable highlight to their conference experience.

77th APS Fluid Dynamics Meeting (APS DFD) 2024 24th-26th November 2024

The DFD Annual Meeting, one of the largest gatherings in fluid dynamics, also featured cutting-edge research in Thermodynamics and Statistical Physics. Researchers from academia, government, and industry came together to share the latest developments.



Dr. Sarma presenting at APS DFD 2024

Representing the TRANSLATE project from Technische Universität Darmstadt, Professor Steffen Hardt and Postdoctoral Researcher Dr. Rajkumar Sarma participated, with Dr. Sarma presenting his work titled "Strong thermoelectric response of weak electrolytes."

E-MRS Spring Meeting 26th-30th May 2025



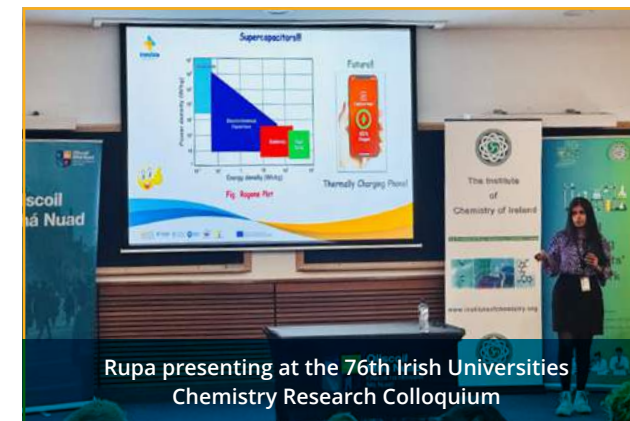
Held in Strasbourg from May 26–30, the European Materials Research Society (E-MRS) Spring Meeting featured 23 symposia and a vibrant exhibition, spotlighting breakthroughs in both fundamental and applied materials science. University College Cork PhD student Anjali Ashokan presented poster titled ["Functionalised Cellulose Membranes for Low-Grade Heat-to-Electricity Conversion"](#).

Conferences, Outreach Events & Campaigns

76th Irish Universities Chemistry Research Colloquium 16th-17th June 2025

University College Cork PhD student Rupa Ranjani Palanisamy participated in the conference held at Maynooth University, Co. Kildare, Dublin, where she delivered an oral presentation titled ["NiSe₂-CoSe₂ Nanowires for Electrochemical Charge Storage and Heat to Electricity Conversion"](#). Her talk was based on her publication, ["Dual-functionality of NiSe₂-CoSe₂ nanowires for electrochemical charge storage and efficient thermal energy conversion"](#).

Rupa shared: "The event was exciting and there were various programmes such as 2 Plenary talks, 39 Oral Presentations, 18 Flash Presentations, 1 ICI Postgraduate Award lecture and almost 90 posters! In addition to the formal sessions we also had an informal evening reception organised on campus."



Rupa presenting at the 76th Irish Universities Chemistry Research Colloquium

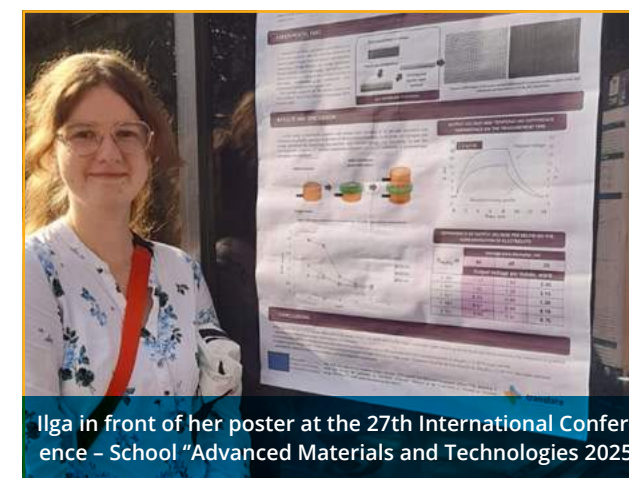
14th International Conference Microtechnology and Thermal Problems in Electronics (Microtherm 2025) 23rd-25th June 2025

Microtherm 2025 took place in Lodz, Poland, bringing together global experts in micro/nano electronics, optoelectronics, photovoltaics, and thermal technologies.

The event featured interdisciplinary sessions, a Best Paper competition for young scientists, and new "science-business" panels to foster collaboration between academia and industry. Professor Donats Erts from the University of Latvia attended and delivered an oral presentation titled "Aqueous Electrolyte Confined in Anodized Aluminium Oxide Nanochannels for Heat Conversation to Electricity"



27th International Conference - School "Advanced Materials and Technologies 2025 25th-29th August 2025



Ilga in front of her poster at the 27th International Conference – School "Advanced Materials and Technologies 2025

The 27th International Conference-School "Advanced Materials and Technologies 2025" was held in Palanga, Lithuania, gathering researchers, doctoral students, and young scientists from across Europe. Hosted by Kaunas University of Technology's Institute of Materials Science, the event featured 30 expert-led lectures on cutting-edge topics such as nanoparticles, 3D printing, quantum processors, and sustainable innovation.

Ilga Lauma Laimane, Engineer from University of Latvia, attended and presented on "Thermoelectric Properties and Applications of Aqueous Sodium Sulfate Electrolyte Infiltrated in Nanochannels for Energy Harvesting". The conference served as a valuable platform for developing research competencies and strengthening ties across leading institutions in materials science.

European Fluid Dynamics Conference (EFDC2)

26th-29th August 2025

EFDC2 was held at University College Dublin under the auspices of the EUROMECH Society. As a newly merged series combining EFMC and ETC, EFDC2 brought together leading researchers in fluid mechanics and turbulence to share cutting-edge developments across academia and industry.



The conference featured keynote talks, mini-symposia, and a "Visions of Fluid Dynamics" competition, fostering vibrant scientific exchange. Professor Steffen Hardt from Technische Universität Darmstadt attended, contributing to the dialogue on interdisciplinary applications of fluid dynamics in emerging technologies.

Outreach Events & Campaigns

UCC School of Chemistry Postgraduate Research Day

20th August 2025



The UCC School of Chemistry Postgraduate Research Day provided a valuable platform for postgraduate researchers to share their work and build connections within the academic community. University College Cork PhD students Rupa Ranjani Palanisamy and Anjali Ashokan delivered 12-minute presentations

followed by engaging 3-minute Q&A sessions. Rupa presented on ["Electrode Engineering for Next-Gen Supercapacitors and Heat to Electricity Conversion Tech"](#), highlighting innovations in electrode fabrication for energy storage and thermal conversion. Anjali's talk, titled ["Nanowood for Sustainable Conversion of Heat to Electricity"](#), explored membrane functionalization and thermoelectric properties. Their participation helped foster interdisciplinary dialogue and strengthen research networks within the School of Chemistry.

Session on consortium management

5th September 2024

Professor Justin Holmes, Principal Investigator, and former Project Manager Rebecca Buckley co-delivered a session on consortium building and management as part of the Research Skills Training series at University College Cork. The session aimed to equip researchers with practical insights into effective collaboration, project coordination, and strategic planning within multi-partner research initiatives.



Industrial Workshop on thermoelectrics by START project

26th September 2024

The [START project](#) hosted an Industrial Workshop on Thermoelectrics in Copenhagen, Denmark, aimed at restructuring the EU value chain for thermoelectric technologies. Co-organised with the [THERMOS](#) and [FLEX-TEG](#) projects, the workshop featured plenary talks from leading companies, research centers, and the European Energy Research Alliance, followed by breakout sessions on heat recovery, decentralised power supply, and supply chain development.

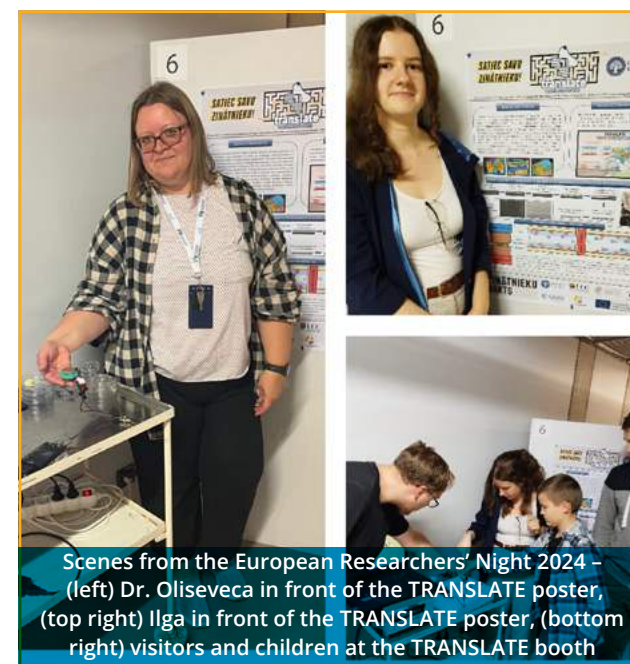
TRANSLATE researchers Dr. Ievgen Nedrygailov (University College Cork) and Dr. Kafil M. Razeeb

(Tyndall National Institute) attended on behalf of TRANSLATE, gaining valuable insights into the current industrial landscape of thermoelectrics.

European Researchers' Night 2024

27th September 2024

On September 27, the TRANSLATE team from the University of Latvia took part in European Researchers' Night 2024, held at the Academic Centre in Riga.



Scenes from the European Researchers' Night 2024 - (left) Dr. Oliseveca in front of the TRANSLATE poster, (top right) Ilga in front of the TRANSLATE poster, (bottom right) visitors and children at the TRANSLATE booth

2024's theme, "Get to Know Your Researcher!", invited hundreds of visitors to explore the most exciting scientific achievements in Latvia. The TRANSLATE team showcased how heat can be converted into electricity using electrolyte-infiltrated nanochannels, engaging curious minds of all ages. Through an interactive workshop, both children and adults had the chance to generate real electricity using the warmth of their hands - making science tangible, fun, and inspiring.

Expert tips on building research consortium

3rd October 2024

As part of University College Cork's September Research Skills Training webinar, Principal Investigator Professor Justin Holmes and former Project Manager Rebecca Buckley shared expert insights on building and managing successful research consortia. Drawing from their extensive experience leading multi-partner EU projects, they offered practical guidance on strategic planning, communication, and fostering collaboration across institutions.

Their session provided valuable tools for early-career researchers preparing to lead or join international research initiatives.

NXTGENWOOD Thesis in Trees

18th October 2025

As part of Bioeconomy Ireland Week, the TRANSLATE team participated in the Thesis in Trees event held at the National Botanic Gardens in Dublin.



Anjali (top) and Ievgen (bottom far left) demonstrating the project to visitors for the Thesis in Trees event

PhD researchers from the NXTGENWOOD project presented their work in a unique outdoor setting, engaging the public with three-minute thesis talks supported by creative physical props. TRANSLATE team members from University College Cork, Anjali Ashokan (PhD student) and Dr. Ievgen Nedrygailov (researcher) captivated audiences with their presentation titled "Wood You Believe? Turning Waste Heat into Electricity," demonstrating how heat can be converted into power using advanced nanomaterials. The event welcomed both adults and children, offering interactive experiences and a treasure hunt to make science accessible and fun for all ages.

NXTGENWOOD Lunchtime Webinar I

18th December 2024

As part of the NXTGENWOOD Lunchtime Webinar Series, TRANSLATE researcher from University College Cork Dr. Ievgen Nedrygailov delivered a presentation titled "Innovating with Nature: How Wood Can Generate Green Electricity from Waste Heat."

Conferences, Outreach Events & Campaigns

The talk explored how wood-based materials and nanotechnology can be harnessed to convert low-grade thermal energy into sustainable electricity, aligning with the project's mission to advance circular bioeconomy solutions. The webinar provided a platform for interdisciplinary exchange and highlighted innovative approaches to energy recovery using renewable resources.

STS Elionix Scientific Image Competition 21st February 2025



"Nickel Web" – Rupa's winning entry to the Q4 2024 STS Elionix Scientific image competition

University College Cork PhD student Rupa Ranjani Palanisamy won the Q4 2024 STS Elionix Scientific Image Competition with her entry titled "Nickel Web." The image, captured via scanning electron microscopy, reveals the intricate architecture of a nickel foam substrate, resembling a spider's web. Developed using a hydrothermal method, the structure supports the growth of metal chalcogenides directly onto the foam, enhancing adhesion and electrochemical performance.

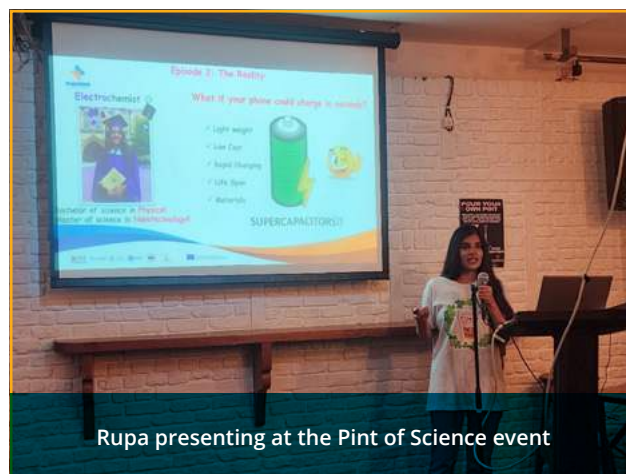
This electrode design is part of the TRANSLATE project's work on converting waste heat into electricity and holds promise for both supercapacitor applications and sustainable energy solutions. The competition, hosted by Tyndall and judged by senior researchers and directors, celebrates the artistic and technical excellence of scientific imaging.

European Innovation Council (EIC) Funding Information Session as part of UCC Innovation Week 8th February 2025

As part of UCC Innovation Week, researchers gathered for an insightful session on funding opportunities offered by the European Innovation Council (EIC). The event highlighted key grant schemes such as EIC Pathfinder, which supports visionary research with breakthrough potential, and EIC Transition, designed to help researchers bring innovations closer to market.

Speakers included Professor Justin Holmes (the Principle Investigator of the TRANSLATE project), Dr. Nóirín Uí Bhreithiúnaigh, and Dr. Richard Scriven, who shared practical advice on navigating the funding landscape and aligning research goals with EIC priorities. The session empowered attendees to better understand how to move their ideas from lab to real-world impact.

Pint of Science 20th May 2025



Rupa presenting at the Pint of Science event

As part of the global Pint of Science festival, University College Cork PhD student Rupa Ranjani Palanisamy took the stage at the Old Oak pub in Cork under the "Tech Me Out" theme. Her talk, titled "Metal to Magic," captivated the public with an accessible and engaging explanation of how advanced materials can transform waste heat into usable electricity.

The event brought science out of the lab and into the pub, creating a relaxed space for researchers to connect with curious minds over a pint.

AMBER Review Meeting 20th-21st May 2025

The TRANSLATE team participated in the AMBER Review Meeting held over two days, where University College Cork PhD student Anjali Ashokan presented key project results, highlighting recent progress and innovations.

Conferences, Outreach Events & Campaigns

Principal Investigator Professor Justin Holmes was also in attendance, contributing to discussions on future directions and collaborative opportunities within the AMBER research community. The meeting served as a valuable platform for sharing outcomes, aligning strategic goals, and strengthening ties across partner institutions.



Anjali in front of her poster

4th BASF Summer School for Teachers 18th June 2025

As part of BASF's ongoing commitment to science education, the 4th Summer School for Teachers brought together educators to explore the latest developments in materials science and nanotechnology.

Professor Justin Holmes (Principle Investigator) presented the TRANSLATE project, introducing teachers to the fascinating world of advanced materials and how they can convert waste heat into electricity. The session aimed to inspire educators with real-world applications of cutting-edge research and encourage the integration of contemporary science topics into classroom teaching.

The Advanced Materials Show 9th-10th July 2025

TRANSLATE team members PhD researcher Rupa Ranjani Palanisamy (University College Cork) and Project Officer Abhisweta Bhattacharjee (UCC Academy) attended The Advanced Materials Show in Birmingham, UK, a leading industry event showcasing cutting-edge materials science innovations.

Rupa presented her poster titled "High Performance of NiCoAl/NF Electrode for Scalable, Energy-Efficient Supercapattery Applications" as part of the MICG Poster Competition, drawing interest from both academic and industrial attendees. Throughout the

event, Rupa and Abhisweta actively networked with industry professionals and distributed TRANSLATE factsheets, raising awareness about the project's goals and potential applications in energy recovery and sustainable technologies.



(Left) Rupa in front of her poster (Right) Abhisweta and Rupa at the Advanced Materials Show

Research seminar talk on Professor Justin Holmes' honorary doctorate at the University of Latvia's 106th Anniversary



(Top) Prof. Holmes receiving his honorary doctorate from the University of Latvia, (Bottom) Prof. Holmes delivering the research seminar.

To mark the University of Latvia's 106th anniversary, Professor Justin Holmes was awarded an honorary doctorate in recognition of his outstanding

Conferences, Outreach Events & Campaigns

contributions to materials science and international research collaboration.

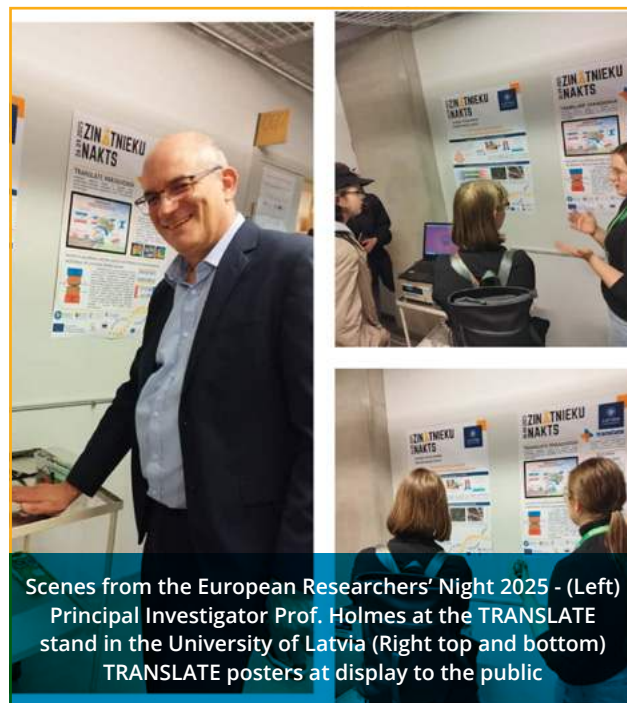
As part of the celebrations, he delivered a research seminar highlighting the TRANSLATE project, showcasing innovative approaches to converting waste heat into electricity using advanced nanomaterials. The talk offered attendees a glimpse into the project's scientific impact and its potential applications in sustainable energy technologies.

European Researchers' Night 2025 26th September 2025

For the fourth consecutive year, the University of Latvia's TRANSLATE team participated in European Researchers' Night, setting up an engaging public stall to showcase their work.

The event welcomed hundreds of children, parents, and teachers to explore the science behind ionic thermoelectrics. Visitors learned how simple, accessible materials can convert heat into electricity, and even measured how many millivolts could be generated using the temperature difference between their bodies and the surrounding environment.

Reflecting on the event, Irina shared: "Researchers' Night, as always, was an exciting event full of impressions and engaging conversations."



Scenes from the European Researchers' Night 2025 - (Left) Principal Investigator Prof. Holmes at the TRANSLATE stand in the University of Latvia (Right top and bottom) TRANSLATE posters at display to the public

STS-Elionix Scientific Image Competition of Q3 2025 9th October 2025

TRANSLATE PhD student Rupa Ranjani Palanisamy (University College Cork) won a place in the [Q3 2025 STS-Elionix Scientific Image Competition](#) hosted by Tyndall National Institute. Her winning entry, titled "Fluorescent Ice Cube," showcased a ZnCo_2S_4 material synthesised via hydrothermal methods.

Under a scanning electron microscope, the particle resembled a glowing block of ice, with vivid coloring and intricate surface textures. Beneath its artistic appeal lies a powerful scientific narrative: the material is an electrode developed within the TRANSLATE project, designed to convert heat into electricity through electrochemical processes.

The image beautifully illustrates how advanced nanomaterials can bridge the gap between science and everyday life, offering a glimpse into the future of sustainable energy technologies.

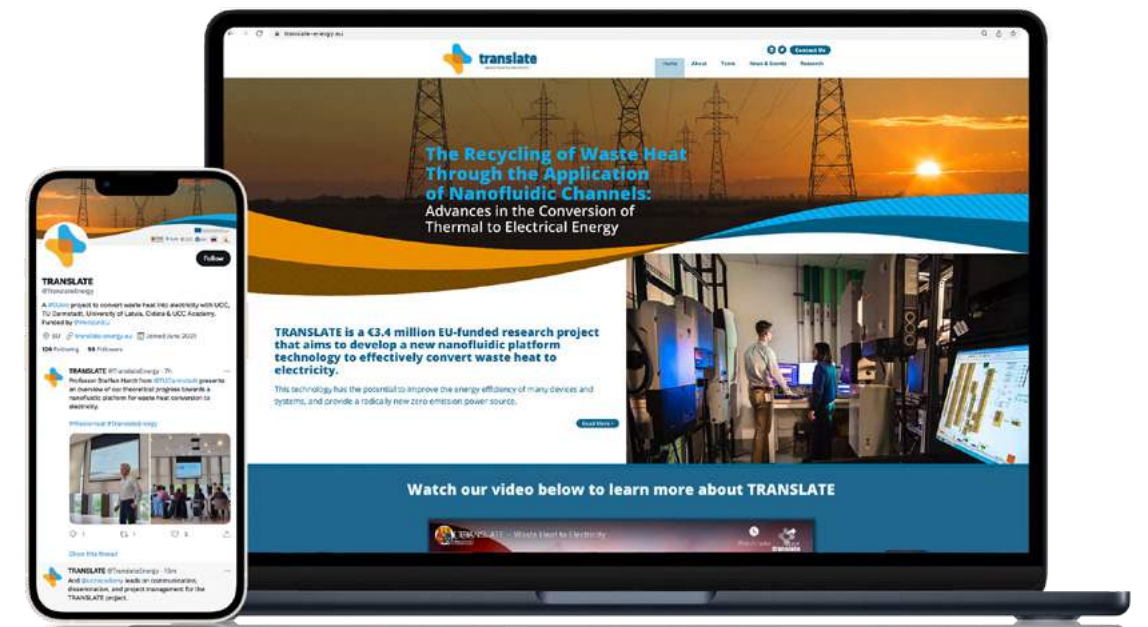


"Fluorescent Ice Cube" - Rupa's winning entry to the Q3 2025 STS Elionix Scientific image competition



Don't forget that all of our previous newsletters are available on the TRANSLATE project website: www.translate-energy.eu

Get Involved in our Future Plans



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www.translate-energy.eu

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As the TRANSLATE project approaches its conclusion on 30 November 2025, our mission to unlock the potential of low-grade waste heat as a clean energy source is only gaining momentum. The nanofluidic platform we've developed offers a radically new way to convert thermal energy into electricity - ideal for powering wearables, IoT devices, and low-power electronics using earth-abundant, non-toxic materials.

We are now exploring new collaborations, funding opportunities, and technology transfer pathways to bring this innovation beyond the lab. Whether you're working in energy systems, materials science, sustainable manufacturing, or environmental policy, we invite you to join us in shaping the next phase of TRANSLATE.

If you're interested in partnering on research, pilots, or commercialisation, we'd love to hear from you.

Reach out to us through our email, website (which will be live for a few years) or reach out directly to [Prof. Justin Holmes](#).

