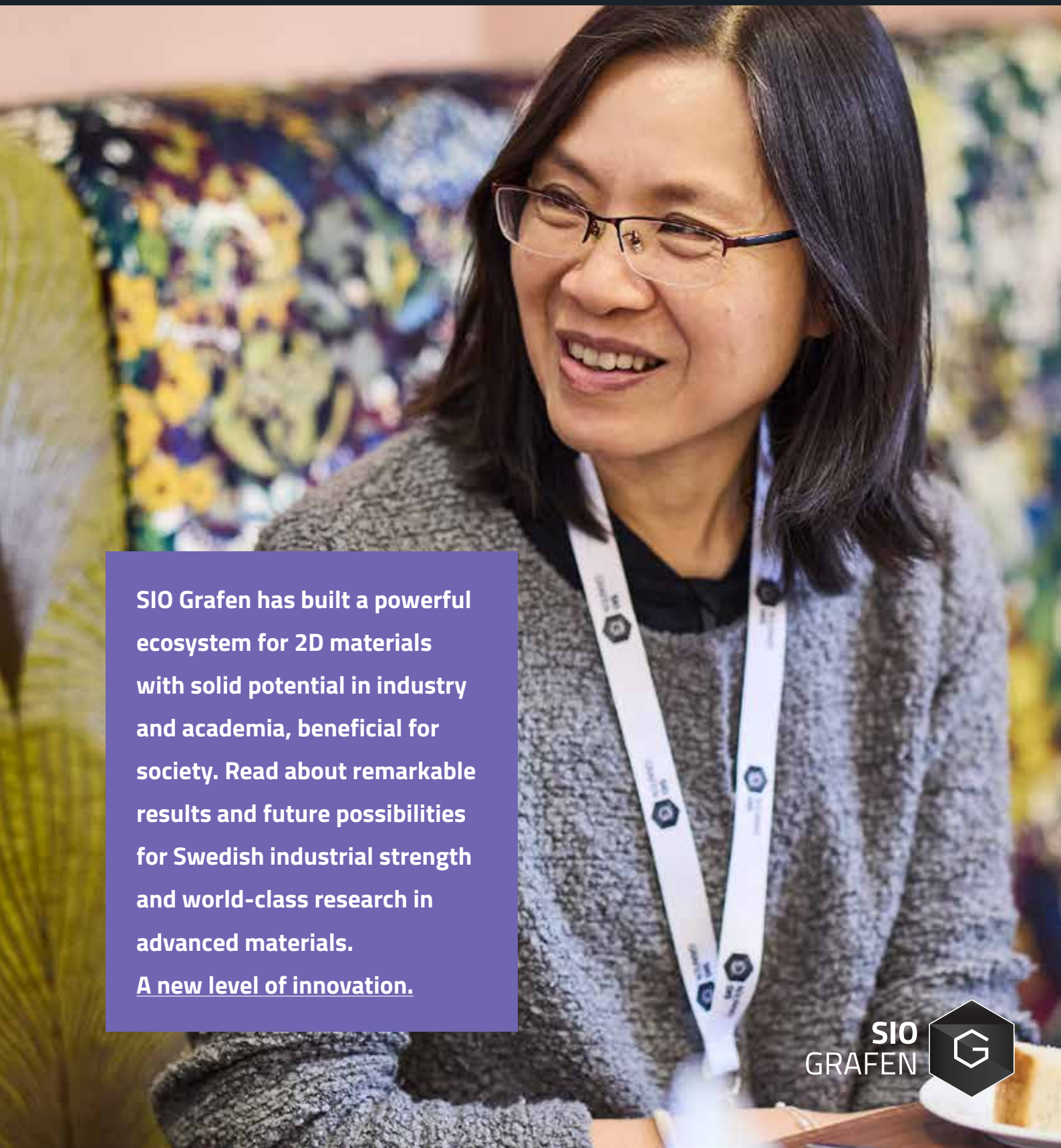
The magazine

Swedish Graphene Forum

2025



SIO Grafen has built a powerful ecosystem for 2D materials with solid potential in industry and academia, beneficial for society. Read about remarkable results and future possibilities for Swedish industrial strength and world-class research in advanced materials.

A new level of innovation.

SIO GRAFEN

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Front page: Lilei Ye from Chalmers Industriteknik, who presented a characterisation project that uses machine learning. Photo: Pia Nordlander.

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The 2D spectrum

The wide spectrum of use of 2D-materials were displayed at this year's Swedish Graphene Forum. Also, a deep-dive into the small and medium-sized enterprises (SMEs) where people continue to work hard all day, every day.

Västerås, the beautiful city by Lake Mälaren, hosted Sweden's largest annual graphene conference in October 2025. With SIO Grafen's chairman of the board Fredrik Sahlén living in the city and working at ABB, his opening speech made perfect sense.

– The Swedish Graphene Forum is the place where you get inspired to new ideas for industrial graphene applications. And a great place to meet old and new friends, he said.

Talking with the attendees at SGF is always fun, it's a smart crowd. One did his first appearance: "very interesting event, gave a good overview in an exciting field", another had been there year after year: "great to see more focus on entrepreneurship".

In this magazine, you will read about results in areas such as healthcare, concrete, and work environment. Elisabeth Sagström-Bäck, Program Director of SIO Grafen, was pleased with the development.

– This was an important conference where we witnessed the progress made in the Swedish 2D sector. We saw impressive results from projects within SIO Grafen, several key examples of how companies are advancing, and not least our 2D Graduate Network, which secures the future with young, brilliant researchers at universities, she said.

The future of advanced materials, both in Sweden and internationally, was presented. IAM4Sweden and BAM – Bridging Advanced Materials, are two initiatives you will hear plenty more of. The upcoming Swedish roadmap for advanced materials points out the direction.

In 2026, Swedish Graphene Forum is held 13-14 October in Gothenburg, the twelfth conference in a row. Stay updated via www.siografen.se. Let's keep moving forward.

SIO Grafen
A strategic innovation program funded by Vinnova, Formas and The Swedish Energy Agency. Since 2014, 500 million SEK have been invested in 220 projects with 250 organisations of whom 120 are SMEs.

Jon Wingborg, SIO Grafen

Companies are ready for the next step.

Ready to expand

The growth of startups, scaleups and SMEs in the Swedish graphene-business have progressed steadily over the last decade. Several companies are now ready to expand.

The numbers of small companies based on 2D-material innovations in Sweden are impressive. There are various reasons behind the growth.

– It's partly because we have an existing ecosystem that provides researchers and entrepreneurs with good opportunities to start businesses. We have "lärarundantaget", where teachers own their research results, and also support functions such as innovation offices, entrepreneur schools, so on, says Jon Wingborg from SIO Grafen.

Collaboration required

SIO Grafen, funded by Vinnova, The Swedish Energy Agency and Formas, have been instrumental in giving these companies a possibility to grow.

– SIO Grafen has given them early funding opportunities via the open calls in the programme, so they could test their hypothesis and discard ideas that don't work and focus on those that do, says Jon Wingborg and continues:

– We have also required them to collaborate. By demanding at least two companies in SIO Grafen's call we have forced meetings with potential end-users that might not have happened otherwise.

Private financing

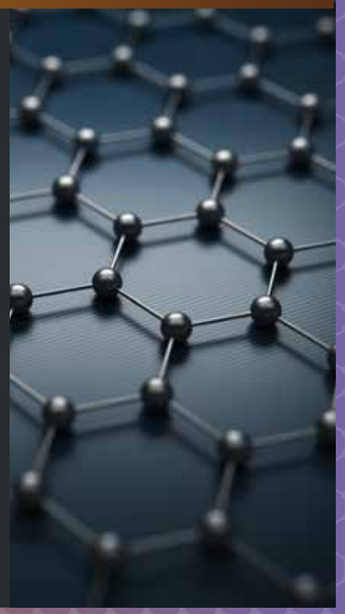
The companies within the landscape of 2D materials are built on very exciting innovations. One dilemma for new companies in this field is the difficulty to test ideas with end-customers. In addition, more private funding is needed.

– Many companies are on the verge of large-scale delivery; they have tested and verified their products and are ready to take the next step. They are standing on the threshold of expansion today, says Jon Wingborg.

FACTS!

SMEs are an important part of the Swedish graphene and 2D material ecosystem. 120 of the 250 organisations participating in SIO Grafen projects have been SMEs. Some of these have their business focus on 2D materials, such as:

- 2D fab (Sundsvall)
- Aninkco (Uppsala)
- Apexify (Göteborg)
- Bright Day Graphene (Stockholm)
- Energy Node (Göteborg)
- Glenntex (Göteborg)
- Grafoam (Sundsvall)
- Grafren (Linköping)
- Granode Materials (Stockholm)
- Graphensic (Stockholm)
- Graphmatech (Uppsala)
- In2Great materials (Stockholm)
- LayerLogic (Göteborg)
- SHT Smart High Tech (Göteborg)
- Smena Sense (Göteborg)
- Tenutec (Göteborg)



Mamoun Taher, Graphmatech.

Unlocking the industrial potential

Graphmatech from Uppsala is working hard on unlocking the industrial potential of graphene.

Mamoun Taher founded Graphmatech as a spin-off from Uppsala University and ABB Corporate Research Center in 2017. Back then he was unaware of the jagged track in front of him.

– I took the leap and it has been a lot of ups and downs. Starting a company means challenges and you need to pair your expectations with plenty of agility, he says.

To upscale successfully you need to seize the opportunity when it occurs, but also a cool and positive mindset.

– Don't focus before you know what to focus on, it will end up in missed opportunities. Wait until you are surer, benchmark and select areas where you can make impact and financial success, then accelerate towards killer applications, says Mamoun Taher.

Metals and polymers

Today, Graphmatech is navigating the industrialization landscape with its graphene enhancing materials, both in polymers, advanced coatings and in metals where the company has developed unique industrial processes for graphene integration.

– We have a great team of 16 people and currently deploying around 200 tonnes manufacturing capacity of polymer-graphene composites for applications in packaging, PEFAS-free and defense.

Portfolio of products

He points out Graphmatech's future in, for instance, polymers for 3D printing, conductivity, packaging, PEFAS-free materials and defense.

– This gives us a portfolio of products that provides significant value for our customers, says Mamoun Taher.

Mamoun's entrepreneurial advice

- Build a diverse winning team.
- Don't scale too early, validate product-market first.
- Adoption first: run pilots to prove demand and refine the product.
- Collect feedback to optimize designs, cost and production flow.
- Scale enough to prove scalability.
- Show technical, operational, and economic readiness for full rollout.
- Partner with your customers on clear roadmaps from technology to deployment and gain market access through them

Upscaling graphene

With over ten years of research and more than ten tonnes of graphene production capacity, 2D fab in Sundsvall is ready to roll.

2D fab started out in a basement of Mid Sweden University over a decade ago. The company established a pilot-scale production and in 2022 moved into a 2600 square meter factory facility in Sundsvall.

Today 2D fab has a team of experts with backgrounds in materials development, chemistry, industrial production, and business development.

– It has been a long and bumpy journey with hardly any applications in the beginning, but 2D fab has grown with customer feedback. Now, we focus on advanced adhesives and sustainable concrete, says Jan Nordin, technical business developer.

Lifespan of concrete

Industries worldwide want to reduce their carbon footprint while maintaining performance and cost efficiency. Graphene can be a solution, but customers need scalable, cost-effective, and consistent supply. 2D fab is scaling up graphene production in Sweden, with a target of 100 tons per year in 2030. They see graphene not as a lab material but an industrial solution.

– Working with concrete, results from our industry partners shows that an addition of our graphene solution reduce crack propagation, increase flexural and compression strength, improve wear resistance and reduce water absorption. It extends material lifespan with less CO_2 emissions, says Jan Nordin.

Fast drying glue

Among the SIO Grafen-projects 2D fab has been involved in, several have been regarding bio-based adhesives with graphene. In one project, involving 2D fab, BIM Kemi, DS Smith, Ikea, SCA, Swedish University of Agricultural Sciences and Tetra Pak, they approached the challenge from three different angels: wood panels, corrugated board and paper straws.

– These are giant markets where graphene increases production speed, the glue dries around 30 percent faster with lower process temperatures. It is substantial improvements and shows promise of an exciting future, says Jan Nordin.

Jan Nordin, 2D fab.

Erik Khranovskyy, Grafren.

Grafren verified applications

- In defence: Composites, camouflage textiles.
- In aerospace: Composites with de-icing function, electromagnetic interference shielding and electric charge dissipating textiles.
- Other areas: Electrically Heatable Textiles for thermal comfort for batteries, electronics, and patients of medical care; Smart textiles for Future Digitalization.

The commercial journey

Grafren from Linköping, with their special know-how of nanocoating fibres, translates graphene's fantastic properties into other products and materials.

The company was founded 2018, based on 15 years of research on 2D-materials at Linköping University. Today they have a fully equipped laboratory, and pilot ink and coating production of 50 000+ square meters annually.

– Our technology allows to create a "shell" around every fibre, where each individual fibre is coated by graphene on a nanoscale level. This changes the properties of the whole system, says Erik Khranovskyy, founder and CEO of Grafren.

A process of failures

Grafren has the technology to integrate graphene into other materials and uppgrading them in the process, to become electrically, thermally conductive as well as corrosion or flame-resistant. Important is that the ammount of graphene and respectively the functions efficiency can be precisely controlled. Still, the graphene business is not the easiest path to walk along, and the journey towards end-use products is long.

– We have tested 100+ different ideas with graphene based products. And ca 94 of them failed - either being not technically proved or too costly economically. However, the remaining six are proved to be a viable products and are now a core of Grafren products portfolio. Today 40+ percent of our income is coming through graphene enabled products sales -and it rises as the market matures, says Erik Khranovskyy.

Defense camouflage

Among the SIO Grafen-projects Grafen has been involved in, one is in the growing market of defense applications. Together with Saab Barracuda and Engtex, Grafren have made a graphene-based military camouflage net. It is lighter, stronger, more environmentally friendly and offers higher performance than the alternatives.

– It's a long and bumpy road from the laboratory to industry, and we're glad we made it! This project opens up new opportunities for collaboration, says Erik Khranovskyy.

A well-measured success

Graphene makes electrical measurements better and rules the setting of resistance standards.

– Here, graphene is a success story, says Hans He, researcher at RISE.

Metrology is the art of measurement, with key words as "reliable", "accurate" and "traceable". In the world's most widely used system of measurement, the International System of Units (SI), graphene is an essential ingredient via, i.e., the quantum hall effect.

– The value for electrical resistance is now defined by the properties of graphene, and it can be measured with extreme accuracy. Thanks to a lot of pioneer work made in Sweden, graphene is now used for everyday measurements, says Hans He.

Graphene is very practical för metrology, which also attracts interest from industry. In a SIO Grafen-project RISE collaborated with Graphensic, a Swedish company that produces high-quality graphene material, and Measurements International, a Canadian company renowned for precision measurement instruments and systems.

– It has been a rapid progress where graphene has fulfilled its promise in a niche market. This is very attractive for the industry, says Hans He.

▪ Quantum Hall Effect

Exactly defined resistance in new SI (International System of Units).

Requires: 2D-system. Low temperature, strong magnetic field (here, graphene helps out).

Used since 1980s in metrology.

▪ Benefits of Graphene

Graphene is truly 2D – unique properties.

Better performance compared to conventional materials.

More practical in use (relaxed conditions).

▪ Commercialization

Combine graphene arrays with commercial cryogenic systems and electronics.

Improves resistance measurements for industry.

Unique end-product.

Hans He, RISE.

David Lindell, ABB.

Per Hallander, Saab.

Hannes Eder, KTH Innovation.

Malin Alpsten,
Bright Day Graphene.

Jenny Fagerland, Swedish Institute for Standards.

Christian Werdinius, Provexa Technology.

Karin Danielsson,
Sahlgrenska University Hospital.

Helena Theander, AI Sweden.

The new level of innovation

2026 is SIO Grafens final year as a strategic innovation program. We have built a powerful ecosystem for 2D materials and see a strong potential for industry and academia. It is time to reach a new level of innovation.

Many positive things happened 2025 in the Swedish world of graphene and other 2D materials. Elisabeth Sagström-Bäck, SIO Grafen, went to Almedalen in the summer together with political, academic and business authorities for determined discussions.

At the same time Helena Henke from 2D fab, Olivia Nestius and Mamoun Taher from Graphmatech, and Malin Alpsten from Bright Day Graphene were selected by Teknikföretagen and Impact Loop as tech-leaders with significant sustainable impact.

SIO Grafen have seen 500 million SEK invested since 2014, in 220 projects with 250 organisations. It is a 2D movement that need to keep growing to secure national industrial strenght and world-class research. We have to do this together.

It all starts with cooperation. From 2026 and beyond we see new and remarkable possibilities for national and european collaborations in innovative advanced materials, where 2D materials plays a crucial part. Sweden must take part, let's lead the way.

The collaborative touch.

Graphene characterisation

Optical microscopy and machine learning is in focus in a characterisation project.

Most graphene that is produced today is manufactured using methods that yield flakes with a distribution of thicknesses. These can then be separated into different sizes depending on the application. However, there is a need for industrially relevant characterisation methods of the graphene.

– We are developing a high-throughput, low-cost, general imaging technique that allows accurate and quantitative evaluation of graphene layers. The method can even be extended to other 2D materials, says Lilei Ye from Chalmers Industriteknik.

The project partners 2D fab, Chalmers, Chalmers Industriteknik, Glenntex, Graphmatech, LayerOne and TenuTec have involved to combine optical microscopy and machine learning to optimize the quality control of graphene and graphene related 2D materials.

Spot welding longevity

Restistance spot welding is an established and highly automated technique for joining components, for example in the automotive industry. Now, a project adds graphene to the mix.

Oscar Andersson from RISE entered the stage, explaining the background and ongoing project.

– There are thousands of spot welds in each car or truck. The high electrical currents, forces and temperatures over so many cycles however lead to degradation of the welding electrodes, says Oscar Andersson.

Graphene-based electrodes

This degradation results in a larger variation and lower quality of the welds. The project is therefore investigating how graphene can be added to the electrodes and how this influences both the performance of the welds and the degradation of the electrodes.

– The electrodes used today are cheap, but a lot can be won if this project can lead to shorter downtimes in the production plant, says Oscar Andersson.

Value chain

The project is a collaboration between ABB, BM Svets, Corema and Luvata, Graphmatech, MTC Powder Solutions, RISE, Scania and Swerim.

– We have covered pretty much the whole value chain of this product.

Strong effect in concrete

Using 2D-materials in concrete increases strength, reduces crack formations, improves wear resistance – and frost resistance is guaranteed.

In the SIO Grafen-project "Sustainable concrete floors", the project partners mixes graphene into concrete to build durable and sustainable industrial concrete floors.

– Today these floors usually last less than a year when heavy trucks with studded tires drive upon them. It is the definitive test for wear resistant concrete, says Jan Nordin, project leader from Grafoam and 2D fab.

Frost resistant

The project will lay industrial concrete floors with ultra-low-CO_2 cement binders from Cemvision, reinforced with 2D-nanotechnology developed by Grafoam. The nanomaterials will help make the cement in the concrete crack- and wear resistant.

– We see more than 25 percent increase of compression strength and over 200 percent improved wear resistance compared to regular concrete. And frost resistance is guaranteed, says Jan Nordin.

Nordic countries

The project is a collaboration with Grafoam, Cemvision, 2D fab, Swerock, PEAB and SCA Wood.

– I think it will be a product for Nordic countries first. It's a niche market but with a large volume product, says Jan Nordin.

Electrically conductive polymers

A SIO Grafen project adds graphene to polyamide and finds some good results.

A range of polymers can be used to create many products by additive manufacturing.

– We have developed a conductive material for Selective Laser Sintering Additive Manufacturing by adding graphene to polyamide, PA, says Henrik Andersson from Mid Sweden University.

The project partners 2D fab, Laser Nova, Mid Sweden University and Wematter (now part of 3D Systems) showed that the material has good flowability and melt mixing characteristics.

– The conductance is high enough for EMC applications and low power electrical signals. We could also manufacture it in kg-sized batches, concludes Henrik Andersson.

A playbook on innovation

Graphene innovations need to come out of Swedish laboratories faster than they are today. To help out, a playbook with a new method is released.

– It's a completely new way of scouting talent in academia, says co-author Hannes Eder, coach at KTH Innovation.

In almost 200 pages and with over 150 researcher interviews, 'The Prenovation Playbook' presents a new method for the Swedish innovation system.

The methodology uses data analysis and university libraries to find those who have published articles in a specific domain, in this pilot-case graphene. The researchers are then contacted to discuss development and commercialisation.

– The innovation system must move in this direction, become more strategically proactive and not just wait for someone to knock on the door, says Hannes Eder from KTH Innovation.

Supporting innovators

'The Prenovation Playbook' is a collaboration between KTH, Uppsala University and Linköping University, all made in a strategic SIO Grafen-project.

– This has been a broad and exciting dialogue with lots of researchers, while at the same time we have been very data-driven and left our gut feelings at home. Here we work upstream, before ideas become projects, which opens doors to future Swedish inventions, says Hannes Eder.

Focus on graphene

A survey of Swedish research on graphene has also been conducted. The results is presented in the book.

– Innovation requires new ways of working, and there is plenty of that in graphene research. There are also many researchers working in isolation in their labs, which makes this kind of scouting especially important. What we are proposing is a shift from a pull-based innovation system to a more proactive, push-oriented one – actively seeking out ideas before they announce themselves, says Hannes Eder.

Scan QR to read the book.

High-performance RF electronics

Graphene can improve the resilience and Q-factor in RF ceramic devices.

High-performance Radio-Frequency (RF) ceramic devices rely on rather complicated 3D structures. These unfortunately often have large surface roughness, which reduces the Q-factor.

– We showed in a feasibility study that graphene can improve the resilience and the Q-factor by about 10%. We developed this proof-of-principle and simplified the production method in this project, says Jiantong Li from KTH.

The project partners Bright Day Graphene, Huawei and KTH showed that graphene can smoothen the surface of the 3D ceramic surfaces and prevent large cracks leading to an enhanced Q-factor.

Jiantong Li, KTH.

Sensor for wound monitoring

A graphene based sensor for real time wound monitoring is being developed in an exciting SIO Grafen-project.

Project members Chalmers, Sahlgrenska University Hospital and Mölnlycke Health Care are investigating a graphene based sensor that could monitor wounds and sense infections in real time.

– This enables live monitoring of wound status and helps early detection of infection. We are designing and testing the sensor, which is aptamer specific to detect alpha toxin, says Santosh Pandit, senior researcher at Chalmers.

Project members are building a biosensor using a graphene sheet. The graphene is functionalized with receptors to monitor the biomarkers in wound like environment. They are optimizing the sensor to detect already known wound biomarkers in ultra-low concentrations and currently analysing the transcriptomics data to find other specific biomarkers from the wound model. The project is also investigating a PH-sensor to monitor the pH changes in wound environment.

– We would like to build a multichannel sensing device to detect multiple analytes in one go, says Santosh Pandit.

Safe handling of graphene

The potential exposure of graphene in the work-environment, with the addition of toxicological studies, is now being measured and studied.

It is obviously very important to handle all materials in a safe fashion, regardless of toxicity.

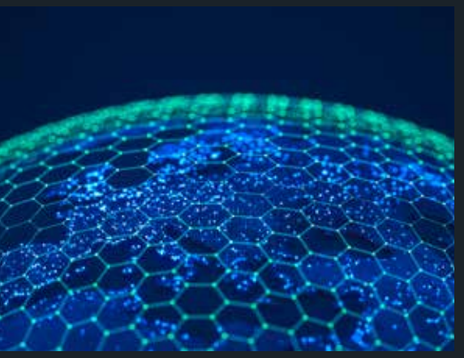
– The overall aim of our research is the safe handling of all 2D-materials in future industrial applications, says Håkan Tinnerberg who is an occupational hygienist at Västra Götalandsregionen.

There are generally two aspects that are important for risk assessment of materials; the toxicity and the exposure. Håkan Tinnerberg and his group are experienced on the exposure side and are now collaborating with Bengt Fadeel at Karolinska Institutet, with expertise on toxicology.

– We have a great collaboration that gives us a more complete understanding. In contrast to many published studies, we are also collecting samples at industrial sites and thereby assess the risk of more realistic samples.

The Swedish connection

Our Swedish efforts regarding advanced materials need to be significantly intensified. Today, three initiatives points out the direction.



▪ IAM4Sweden follows EU

Johan Ek Weis from SIO Grafen presented IAM4Sweden, who follows the footsteps of the European initiatives IAM4EU and IAM-I.

– We need to focus on innovative advanced materials and strengthen Sweden's position through national cooperation and international involvement, says Johan Ek Weis.

IAM4Sweden was initiated by SIO Grafen and Chalmers Industriteknik and currently has 12 organisations on board. Together they work on collaboration, influencing the EU and building Sweden's future advanced materials expertise. Read more on www.iam4sweden.se.

▪ BAM – cluster of excellence

As Sweden aims to become a global leader in advanced materials innovation, an exciting project called BAM – Bridging Advanced Materials is ongoing. This feasibility project, with partners RISE, KTH Ventures, THINGS and Chalmers Industriteknik plus a large group of stakeholders, is financed by Vinnova and targets to become a cluster of excellence in advanced materials.

– The cluster will facilitate the growth of small and medium-sized enterprises and scale-up companies, increase their collaboration with larger companies, reduce the time frame for innovation and development cycles, and work with policies and regulations, says Johan Ek Weis.

▪ Roadmap for advanced materials

Elisabeth Sagström-Bäck, programme director of SIO Grafen, outlined the work on Sweden's new roadmap för advanced materials. It is being made in a SIO Grafen-project with the support of ten other innovation programs and arenas. Circa 200 experts have contributed in several workshops.

– The final result will point out the direction for our future work in advanced materials. This area of industry and research is central for Sweden's competitiveness and sustainability, now more than ever, says Elisabeth Sagström-Bäck.

Roundtable discussions and survey responses was compiled in January 2026 into a preliminary draft roadmap. The final roadmap will be spread later this year.

Johan Ek Weis, SIO Grafen.

Focus on advanced materials.

ABB engages in graphene.

Xiangdong Xu from Chalmers and Anna Andersson from ABB.

In 2015 ABB had their first SIO Grafen-project. Today, the big company is still heavily engaged in graphene.

– We are in a good position and keep building on our successful graphene-projects, says Anna Andersson, Senior principal scientist at ABB.

From the stage at Swedish Graphene Forum in Västerås, Anna Andersson explained why ABB engages in graphene-related research and development. They have been working on this topic for over ten years, so it is a bit of an anniversary.

– ABB targets enhanced product durability and works on totally maintenance-free solutions. We have tried other materials to reach low friction, wear resistance, corrosion resistance and temperature insensitivity, but something always failed. Graphene was the first that could tick all the boxes, says Anna Andersson.

Graphene as additive

ABB is working on self-lubricating material concepts to replace grease lubrication. They have focused on graphene as friction-reducing additive in mechanical and electro-mechanical drive systems, in several projects and concepts.

– The aging of lubricating grease is a problem that some-time causes electrical switching apparatus to slow down and fail eventually. Therefore, solving these tribological issues would open up for more long-life products with stable and resilient operation, and would lower the need for frequent mainteneance cleaning and regreasing. Our customers love when we reduce service-need, says Anna Andersson.

Sustainable solutions

After several SIO Grafen-projects ABB also landed a successful 3-year spearhead project in the EU-funded Graphene Flagship. The graphene journey has opened up possibilities in several products and applications, and ABB collaborates with companies like Graphmatech and Nanesa to develop application-specific solutions.

– Graphene and related 2D-materials (GRMs) show great promise as low-friction, low-wear additives in sustainable material solutions for electrical switching, says Anna Andersson.

Sofia Öiseth, Chalmers Industriteknik.

European ecosystem for 2D materials.

International presence

The international presence was felt at Swedish Graphene Forum, with presentations about IAM-I and Graphene Flagship in Europe, and RIC2D in Abu Dhabi.

Sofia Öiseth from Chalmers Industriteknik presented the Graphene Flagship and the shift from academic research towards industrial applications in several fields.

Today the EU-funded Flagship contains 13 research and innovation actions that work to integrate 2D materials in a variety of areas. One project is the 2D pilot line (2D-PL) that aims to establish a European ecosystem for 2D material integration and prototype production in electronics, photonics and sensors.

– Graphene Flagship has been successful with 83 patents, 20 spin-offs and over 100 products on the market. We build on that foundation in a collaborative, sustainable way to secure the impact of 2D materials in academia and industry. See you 21-25 September 2026 in Porto for the next Graphene Week, says Sofia Öiseth.

300 members in IAM-I

Anna Andersson from ABB presented IAM4EU and IAM-I covering a broader scope of advanced materials.

IAM4EU, with a budget of 250 million euros per year 2025-2027 (ca 4-5 calls/year), is the Horizon Europe public private partnership for advanced material. IAM-I is the private-side partner association of IAM4EU, with over 300 member partners from 30 countries.

– Advanced materials have been identified by the EC as a key focus area in the coming years. Europe have lagged behind American and Chinese competition, so let's take back the European initiative. This is important to enable the green transition and to make Europe competitive and resilient in future years, says Anna Andersson, who is a board member of IAM-I.

The Swedish collaborative network on advanced materials, IAM4Sweden (read more about it on page 16), is a good opportunity to align with IAM4EU and to push a Swedish agenda.

– There is a lot going on in Europe regarding advanced materials. Getting involved in IAM-I and IAM4Sweden is a good way to influence what the future will look like, says Anna Andersson.

Possibilities in RIC2D

Mamoun Taher from Graphmatech presented the Research & Innovation Center for Graphene and 2D Materials (RIC2D) in Abu Dhabi, with a funding of 100 million dollars. They focus on areas such as water technology, energy storage, composites and sensors with a TRL sweet spot at 3-7.

– RIC2D is an ecosystem catalysing innovation, enabling commercialisation in graphene and other 2D materials. The United Arab Emirates (UAE) looks at Sweden as a role model for innovation, and I see great possibilities for collaborations with Swedish students, researchers and innovative organisations, says Mamoun Taher.

He showed examples of funded projects, for instance in super membranes and water-splitting 2DM catalyst, and also RIC2Ds impressive lab infrastructure.

Joyal Jain Palakulam, Chalmers, and Fredrik Sahlén, ABB and SIO Grafen.

Worthy winner

Big congratulations to Joyal Jain Palakulam for a well-written and highly relevant Master Thesis!

Joyal, who worked with Associate Professor Samuel Lara-Avila and PhD student Johanna Huhtasaari at Chalmers in the process, is a worthy winner of "SIO Grafen Best Master Thesis Award 2025".

Next-gen technology

His work focused on developing reliable techniques for transfer of large area monolayer graphene grown epitaxially on silicon carbide to arbitrary substrates for advanced electronic applications.

– The outcomes of my thesis represent a meaningful step towards enabling scalable, single crystalline graphene for next generation technologies, including twistronics, spintronics and neuromorphic computing, says Joyal Jain Palakulam.

Graphene electronics

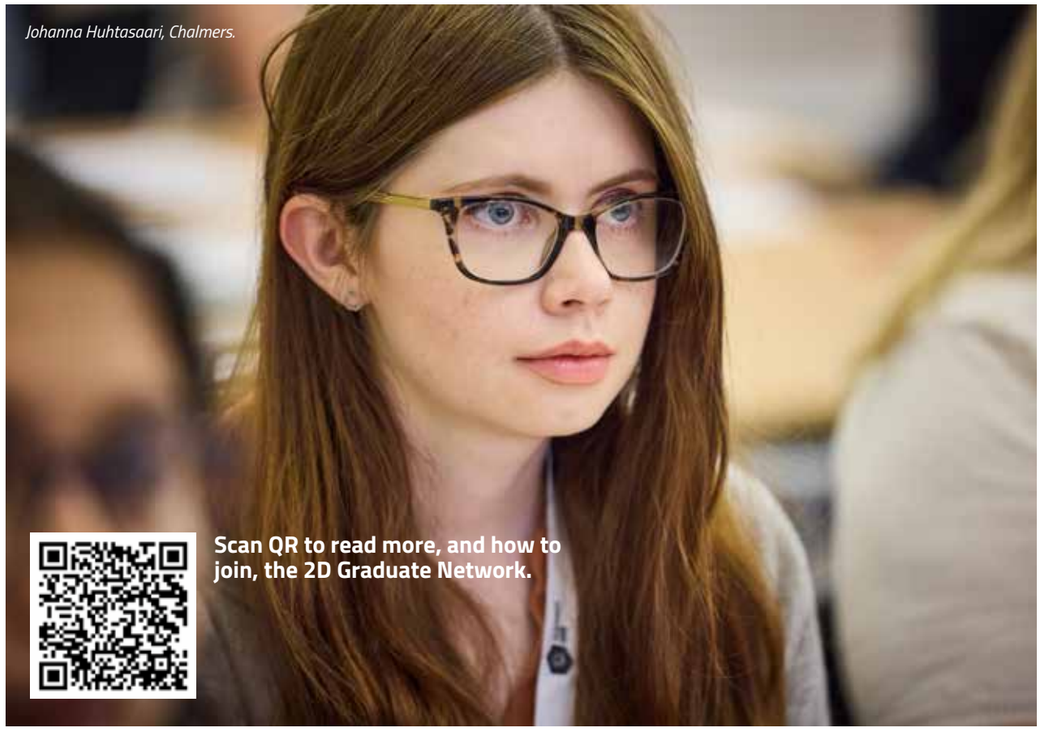
The young researcher was happy and grateful for the award. He viewed the recognition not only as an acknowledgment of his own work, but also as a validation of the growing potential of graphene-based electronics.

– For someone like me, who hopes to build a long-term career in academia, this award is both encouraging and motivating. It reinforces my commitment to continue contributing to the advancement of graphene research and its emerging technological applications.

Quantum devices

Micrometer-scale twisted bilayer and trilayer graphene devices are already at the forefront of condensed matter research, and Joyal Jain Palakulam looks ahead with confidence.

– With our ability to produce and transfer wafer scale, single crystalline graphene, we hope to push this field even further by enabling larger, cleaner and more precisely engineered structures. Our goal is to contribute to the next wave of discoveries in graphene-based quantum devices, he says.



Johanna Huhtasaari, Chalmers.

Scan QR to read more, and how to join, the 2D Graduate Network.

2D Graduate Network keeps up good work

SIO Grafen's 2D Graduate Network gathers Masters, PhDs and Post-Docs actively working on 2D materials. The group met in Västerås, and afterwards we asked network member Johanna Huhtasari from Chalmers three questions.

1. How was the 2D Graduate Network Meeting in Västerås?
– It was excellent and very productive. Researchers from across Sweden came together to discuss the future of 2D materials and to formulate a shared long-term vision. The discussions were lively and engaging, and everyone contributed actively. In the end, we landed on a nice vision: "2D materials – redefining technology", says Johanna Huhtasari.

2. Why is the 2D Graduate Network an important group?
– Because it helps young researchers build connections, both with each other and with industry partners. These connections can be crucial when we later look for positions in Sweden. From a broader perspective, the network also contributes to Sweden's ability to retain talent in this strategically important field.

3. What are your hopes for young researchers in the field of 2D materials, looking forward?
– 2D materials have potential across many fields: electronics, materials science, biomedical, and more. I hope this will translate into a wide range of career opportunities for young researchers in Sweden's industry and academia. Ultimately, I hope that companies and funding agencies will recognize the transformative potential of 2D materials and invest in this area. That support is essential for turning scientific breakthroughs in the lab into real technology, says Johanna Huhtasari.

How would you describe Swedish Graphene Forum 2025?

Source: SGF Official Survey 2025

Enjoyable

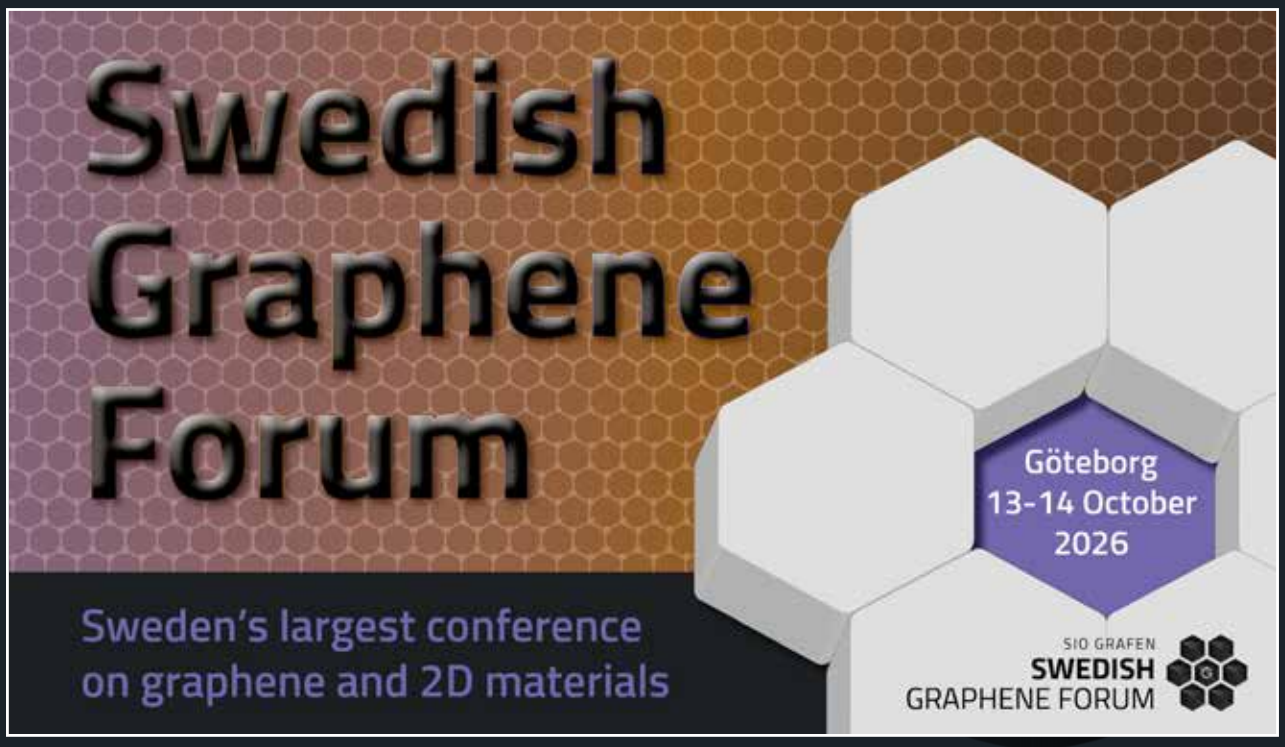
Uplifting

Community

Inspiring

Interesting

Excellent forum for networking and collaboration buildup



See you in Göteborg 2026!

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