PRO flextronics

Media Hub for Organic, Flexible and Printed Electronics

Smart Living & Mobility

Henkel, NanoPaper, SnapWatch, CeNTI, Bayflex Solutions, OET, COPE-Nano, Alper, ChasingLight, BST, Silicon Austria Labs

Events

LOPEC 2026



Trade Fair Special from page 32

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No 6 - Feb 2026





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From AI believer to sceptic?



Dear Readers,

Recently, my business partner Nadine was quite shocked. Originally, she wanted to buy a new work laptop before the Christmas break, but due to some unforeseen circumstances, she postponed the purchase to January. In the meantime, the price for the computer had skyrocketed significantly. You guessed it: She became a victim of the "RAM crisis"! According to techradar.com, DDR5 is now 4.4 times pricier than half a year ago, and there is no end in sight. *(https://www.techradar.com/computing/memory/ram-price-crisis-gets-worse-again-as-ddr5-hits-a-new-painful-high-and-a-worrying-trend-is-creeping-in)*

The reason for this is no secret either: The massive computing power required by increasingly sophisticated LLMs (Large Language Models) must be generated somehow – and it affects the entire market for home computer hardware but also various other segments, including automotive. On top of that, AI is mind-bogglingly expensive and consumes vast amounts of energy. According to MIT Technology Review, "AI alone could consume as much electricity annually as 22% of all US households." *(https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/)*

When the first LLMs and image generation tools like Midjourney came out about five years ago, I was enthusiastic. A new world of digital collaboration with smart artificial entities seemed possible. However, over the years, my scepticism grew. We have no answer to the challenge imposed by AI's energy hunger. We are being flooded with "AI slop" in social networks, often mistaken for real-world content, even by business leaders on LinkedIn. And when nobody can tell a fake from a real photo or video – what does that mean for the world of media and our society in general?

Obviously, AI will never go away. And I will also continue to use it whenever I believe it can be truly beneficial. However, the issues related to this new technology require a quick response by society, governments and regulating bodies.

In this issue, we will discuss the topics of Smart Living & Mobility, as well as provide an extensive preview of LOPEC 2026. And we asked Bayflex Solutions' Eisuke Tsuyuzaki to share his viewpoint on AI in flexible electronics. A must-read for sure!

Enjoy reading!

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LOPEC

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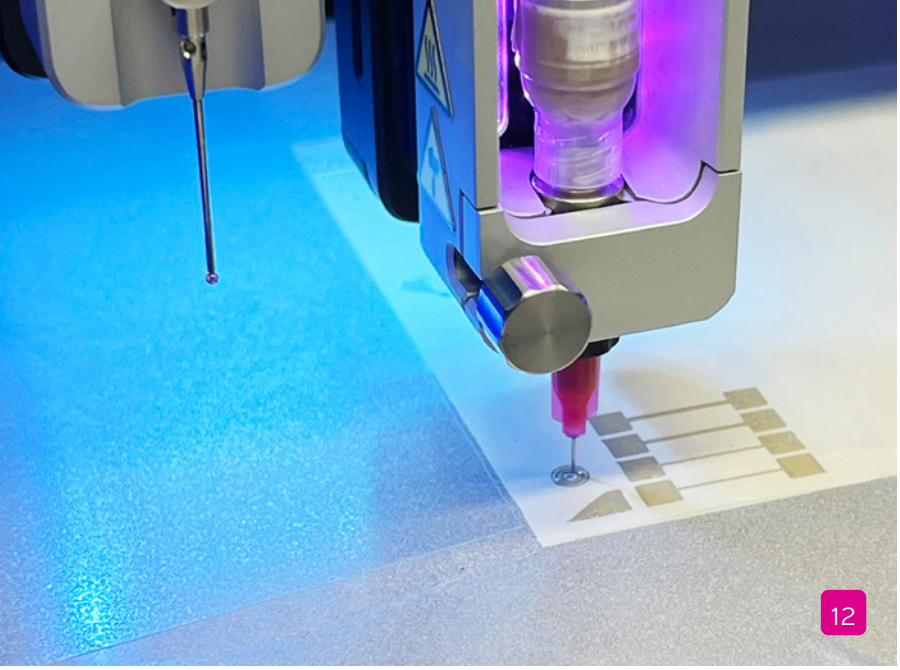
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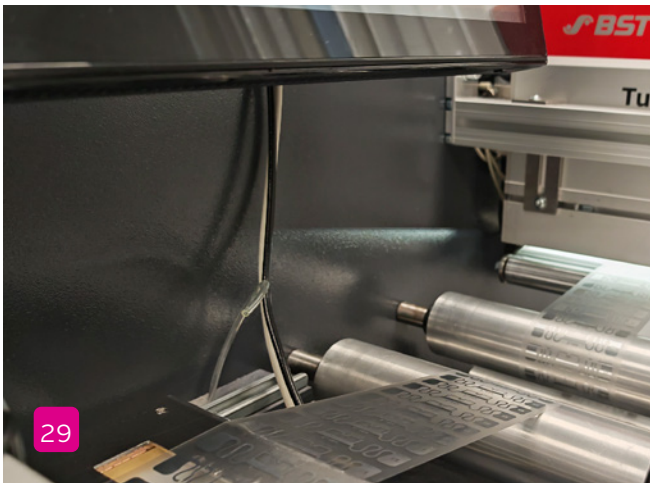
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MEDIA HUB FOR ORGANIC, FLEXIBLE AND PRINTED ELECTRONICS















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CES 2026 – The highlights

CES 2026, the leading consumer technology event in the world, has wrapped up four days of innovators showing up. The largest post-pandemic CES welcomed more than 148,000 attendees from around the globe, including some 6900 media. More than 55% of CES attendees were senior-level executives, reinforcing the event's status as a premier gathering for industry leaders and decision-makers. CES 2026 moved from theory to the practical application of how technology is integrating seamlessly into our lives. With more than 4100 exhibitors, including some 1200 startups, CES 2026 highlights technology that is solving some of the world's greatest challenges. The future is no longer arriving; it is here – and CES 2026 is where it was deployed across 2.6 million net square feet of exhibit space. "CES is the world's most powerful proving ground for innovation," said Gary Shapiro, Executive Chair and CEO, Consumer Technology Association (CTA), owner and producer of CES. "CES is more than a showcase; it's where technology meets community, business, and policy. Global leaders, startups, and policymakers came together to highlight technologies that will define the next decade of economic growth and competitiveness."

CES 2026 by the numbers

» 2.6M+ net square feet of exhibit space
» 4100+ exhibitors, including some 1200 startups
» 148,000+ attendees, including more than 55,000 international attendees



Impressions from CES 2026

» Some 6900 global media, content creators, and industry analysts
» Over 60% of Fortune 500 companies
» More than 55% of CES attendees were senior-level executives
» 400+ conference sessions with 1300+ speakers
» 200+ government attendees
» 37,000+ news stories and content

"The energy at CES 2026 was extraordinary," said Kinsey Fabrizio, President, CTA. "CES brings the global tech ecosystem together for an unmatched volume of deal-making, partnerships, and idea-sharing. The innovation unveiled this week, spanning AI, quantum, mobility, robotics, health, and so much more, underscores CES as the global stage where bold ideas move from vision to reality."

www.ces.tech
Image source: CTA

Beontag and Temera level up the retail experience at NRF 2026

At NRF 2026: Retail's Big Show, which took place from 11-13 January in Manhattan, Beontag, the global leader in graphic and label materials, smart tags such as RFID, NFC, IoT technologies and end-to-end traceability solutions, returned alongside Temera, a Beontag company, to unveil the next generation of retail experiences.



This year, Beontag demonstrated its unwavering commitment to helping retailers elevate every aspect of their operations, empowering them to embrace a future shaped by RFID and IoT innovation. By delivering reliable, scalable solutions for end-to-end traceability, Beontag ensures partners can meet the demands of today's dynamic market while seizing tomorrow's opportunities. The centrepiece of Beontag and Temera's 2026 showcase was an immersive and fully interactive demo that brought to life the complete traceability journey of a product within an ultra-connected retail environment. Powered by Beontag and Temera's next-generation IoT and RFID solutions – combining advanced hardware and intelligent software – visitors could experience firsthand how each product's story, from sourcing and logistics to in-store engagement, is seamlessly tracked, visualised, and optimised in near real-time.

www.beontag.com | www.temera.com
Image source: Martin Hirschmann/Leonardo AI

Paragon ID and Dracula Technologies – Sustainable traceability

Paragon ID, a global leading provider of secure identification and traceability solutions, and Dracula Technologies, a pioneer in enabling battery-free IoT through energy harvesting from ambient indoor light, are reinforcing their long-standing partnership to accelerate the deployment of XgenTag-L, the first battery-free, light-powered Bluetooth Low Energy (BLE) smart tags. This milestone marks the transition from pilot to large-scale industrial deployment, supported by a multi-year product order representing several hundred thousand of LAYER organic photovoltaic (OPV) modules per year. Together, the two companies are joining forces to expand adoption in key sectors worldwide and to drive the development of sustainable, maintenance-free IoT solutions that eliminate batteries, reduce environmental impact, and enable high-volume scalability for global logistics and industrial applications. The objective is to reduce production costs, enable high-volume scale-up, and support more granular traceability in demanding supply chains.
“The success of XgenTag-L demonstrates that sustainable IoT is not a future vision, it’s happening now and delivering value,” said Eric Cariou, VP of New Product Development at Paragon ID. “By strengthening our collaboration with Dracula Technologies, we’re making this breakthrough technology accessible at global scale across logistics, transport, aviation, healthcare, and retail, with a cost structure that makes large-scale deployment viable.”
“We are proud to deepen our collaboration with Paragon ID, a partner that shares our vision of sustainable and scalable IoT, ”added Brice Cruchon, CEO and Founder of Dracula Technologies. “Our LAYER energy-harvesting modules deliver the energy autonomy required for truly maintenance-free connected devices. Together, we’re proving that sustainability and industrial performance can go hand in hand globally.”

www.paragon-id.com | www.dracula-technologies.com
Image source: Dracula Technologies/Paragon ID



Battery-free, light-powered BLE smart tags

Pragmatic marks 15 years of flexible electronics innovation



Cleanroom at Pragmatic Semiconductor

Pragmatic Semiconductor is celebrating its 15th anniversary, marking a significant milestone in the development and commercialisation of flexible integrated circuits (FlexICs). Founded in 2010 with the goal of rethinking what is possible in flexible electronics, the company has grown from a small deep-tech start-up into one of the sector’s most prominent pioneers.
Pragmatic set out to develop an alternative to conventional silicon semiconductors: ultra-thin, bendable, cost-optimised chips that can be produced quickly and integrated into applications where rigid silicon is impractical. Fifteen years later, the company’s FlexIC technology is deployed across packaging, logistics, wearable devices, healthcare and emerging smart-infrastructure concepts.
CTO and co-founder Dr Richard Price says the company’s culture has played a crucial role in its progress. “In the early years, with a small team and limited resources, we had no choice but to work efficiently and think outside the box. That spirit of teamwork and openness extended to partners and collaborators, and we’ve worked hard to preserve those values as we’ve grown.”
www.pragmaticsemi.com

www.pragmaticsemi.com
Image source: Pragmatic Semiconductor


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productronica 2025

Warm-up session for LOPEC

At productronica, the flexible and printed electronics community showed up in great numbers. There was much to see for key players from our sector – including a dedicated Printed Electronics Pavilion powered by LOPEC, and two seminar sessions organised and hosted by OE-A. PRO Flextronics covered the event on-site – and we were once again impressed by the ingenuity and passion of the industry!

Image source: Martin Hirschmann
www.productronica.com





Henkel Printed Electronics

Material innovation at the core

At LOPEC 2026 in Munich, Henkel Printed Electronics will place materials firmly at the centre of printed electronics innovation. As a leading material and ink supplier, Henkel is using this year's event to clearly refocus its message on what it delivers to customers: advanced material formulation, high-performance inks, and the expertise required to turn material innovation into scalable, real-world applications.

The booth concept at LOPEC 2026 reflects this material-first approach. Structured around key industry focus areas, Henkel demonstrates how functional inks and coatings enable applications across smart surfaces, smart healthcare, and smart connectivity. Rather than showcasing finished systems alone, each area features dedicated demo pieces that highlight the role of materials in performance, reliability, and manufacturability. These demonstrations underline how Henkel's ink technologies, combined with a strong ecosystem of partners, help bridge the gap between innovation and industrialisation.

Deep material expertise

According to Stijn Gillissen, Head of Printed Electronics at Henkel, the 2026 presence is designed to showcase Henkel's deep material expertise, with particular emphasis on new material concepts that address both technical and market-driven requirements.
A key highlight is Henkel's latest sustainability initiative, which includes the use of recycled silver as a raw material and the development of highly cost-efficient silver inks. These innovations demonstrate how sustainability and performance can go hand in hand when material design is approached holistically.
In response to record-high silver prices observed throughout 2025 and early 2026, Henkel will present its latest developments in silver-plated copper ink technologies. These materials maintain strong technical performance while offering reduced material costs and lower price volatility. In addition, highly conductive, low-temperature sintering silver inks introduced in 2025 contribute to more energy- and cost-efficient manufacturing processes for printed electronics.

Sustainability as a guiding framework

Sustainability remains a central theme of Henkel's presence at LOPEC 2026. Building on concepts introduced in previous years, Henkel will highlight its latest sustainability initiatives, including the use of recycled silver as a raw material and the development of highly cost-efficient silver inks. These initiatives demonstrate how sustainability and performance can be aligned through holistic material design.
At the booth, sustainability is presented through carefully selected demonstration parts and proof points that illustrate how eco-conscious material choices can support regulatory compliance, sustainability targets, and future market expectations – without compromising functionality or scalability. By integrating environmental responsibility directly into material innovation, Henkel aims to contribute to a more sustainable printed electronics ecosystem.

Expanding material portfolio for connectivity, mobility and healthcare

LOPEC 2026 will also highlight Henkel's growing material portfolio for connectivity, mobility, and healthcare applications. Exhibits will include solutions for wearables, self-regulating PTC heater technologies, smart healthcare components, and advanced antenna solutions. In the PTC segment, Henkel will introduce new self-regulating inks for both low- and high-voltage applications, featuring self-regulation at 40 °C – an unusually low temperature enabled by Henkel's proprietary PTC technology. These materials are particularly relevant for applications such as battery pre-conditioning.
Special attention will be given to antenna technologies enabled by different printing processes, including pad printing and 3D printing. These developments reflect Henkel's ongoing efforts to support emerging connectivity requirements and next-generation communication technologies through tailored material solutions.
Adding to the technical depth of the event, Anna Ryzhova from Henkel Printed Electronics will host a presentation titled "Henkel Printed Electronics Material Technology Enables Pad-Printed Antenna" on Thursday, 24 February 2026, at 14:20. Her talk will focus on how tailored ink formulations and material technologies enable reliable, high-performance antenna structures using pad-printing processes, opening new possibilities for design flexibility and industrial-scale manufacturing.

Henkel Printed Electronics will showcase its deep material expertise at LOPEC 2026



Comprehensive portfolio of conductive inks and coatings

With more than 45 years of experience in printed electronics, Henkel Adhesives Technologies offers one of the industry's most comprehensive portfolios of conductive inks and coatings. This breadth reflects the wide range of applications Henkel supports and its belief that successful printed electronics solutions start with the right material. Henkel's experts work closely with customers to identify the optimal ink technology for their specific requirements and connect them with trusted partners across the value chain. Visitors are invited to engage with Henkel's printed electronics specialists at Booth 607 at LOPEC 2026 or reach out via printed.electronics@henkel.com to learn more about Henkel's material innovations and application-driven ink solutions.

https://next.henkel-adhesives.com/de/en/applications/printed-electronics-material-solutions.html
Image source: Henkel

NanoPaper

Advancing sustainable substrates for flexible and printed electronics

Flexible and printed electronics are now an industrial toolkit: smart packaging and interactive labels, wearable sensors, disposable diagnostics, human–machine interfaces, and embedded sensing for logistics and infrastructure. Yet the substrate stack beneath these devices remains stubbornly conventional. Most printed electronics still rely on petroleum-based films whose trade-offs are familiar: PET is cost-effective but thermally limited; polyimide is high performance but expensive and persistent.

NanoPaper is Tangho's answer to this substrate bottleneck: a compostable, cellulose-nanofiber-based film engineered specifically for printed electronics. The ambition is not "paper electronics" in the traditional sense, but a film-like platform that fits established printing workflows while offering a more sustainable end-of-life pathway for short-lifetime devices.



From left: Dr Leonardo Simon (University of Waterloo), Dr Andrew Finkle (Tangho), Dr Ayako Yoshida (Yamagata University) and Nazanin Yasoubi (Tangho)

From headline demo to manufacturable platform

In January 2026, PRO Flextronics reported online on what it described as the world's first printed force sensor fabricated on compostable NanoPaper – an electronic-skin style demonstration developed with Yamagata University's INOEL and the University of Waterloo's Waterloo Institute for Nanotechnology [1]. The device uses a 4×4 force sensor array with screen-printed silver electrodes and a carbon-based sensing layer; as users press the array, a real-time force map is displayed, you can see the video of it working here [2]. This kind of demonstration matters because it exercises the failure modes that actually kill adoption: ink wetting and registration on a non-plastic surface, adhesion under repeated handling and bending, and the practicalities of integrating printed conductors, sensors, and interconnects on a substrate intended for products. In 2026, the NanoPaper programme is focused on translating these results into a scalable materials platform defined by repeatability: tight thickness control, smooth printable surfaces, and predictable ink/substrate interactions across batches.

What NanoPaper is – and what it is not

NanoPaper is made from cellulose nanofibres assembled into a dense, controlled fibre network. Unlike commodity paper, the nanofibre structure can be engineered for thickness uniformity, smoothness, and mechanical robustness – traits that determine yield in printed electronics manufacturing. The result behaves as a film-like substrate rather than a porous sheet. For a flexible electronics engineer, the substrate is not background scenery. It defines the manufacturing process window (drying, curing, sintering), influences line resolution and defect rates, and shapes device reliability under bending and folding. A substrate that is "nearly good enough" often creates intermittent yield loss that cannot be debugged. NanoPaper is therefore being developed with quality and repeatability as first-order requirements.

Where NanoPaper wins vs incumbent films

NanoPaper is positioned for applications where printed electronics already offers its strongest economic advantage: low-cost patterning over large areas, rapid design iteration, and integration into packaging-like form factors. In that regime, four substrate attributes dominate:
Thermal tolerance and process flexibility. Many inks and post-process steps are constrained by PET's thermal ceiling. NanoPaper is designed to open that window, enabling higher-temperature curing and low-temperature sintering regimes that improve conductivity and reliability. Internally, NanoPaper has demonstrated survival at 225°C for at least 30 minutes without degradation, with thermal breakdown onset around 285°C. This range is particularly relevant for copper-forward process flows, where higher-temperature curing can translate into lower resistivity and improved reliability, and can reduce reliance on expensive noble-metal inks.
Surface engineering for printing. Printed electronics is an interface problem: ink rheology meets surface energy, drying dynamics meet roughness, and adhesion meets mechanical strain. NanoPaper's surface

chemistry can be tuned for wetting and adhesion with common conductive and functional inks, supporting both sensor stacks and fine-line interconnects.
Mechanical robustness in thin gauges. Many use cases in packaging and wearables demand repeated bending and handling, not extreme stretch. NanoPaper targets film-like durability and foldability in thin formats, supporting printed traces and multilayer stacks without brittle fracture.
Designing for end-of-life. Most electronics substrates are designed for "never degrade". For smart labels, temporary monitors, and other short-lifetime devices, that philosophy is upside down. NanoPaper enables simpler material systems that reduce persistent plastic content and support composting or controlled degradation pathways, depending on the remainder of the device stack.

The hard problem: humidity, dimensional stability, and real-world production

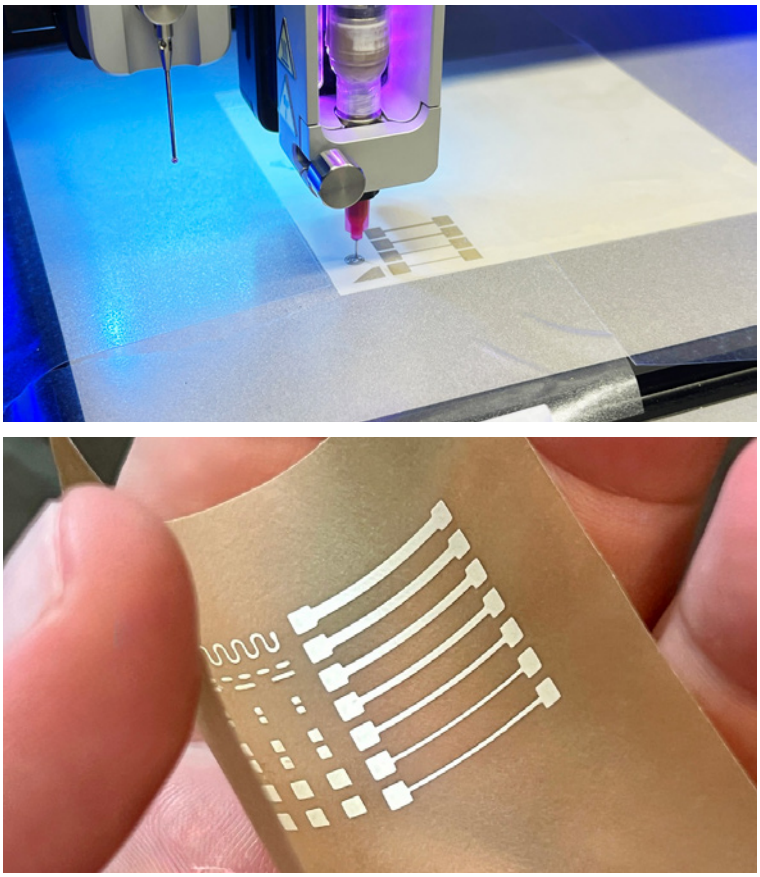
Any cellulose-based substrate invites a sceptical (and reasonable) question: what about moisture uptake, dimensional stability, and curl? These are not academic concerns. They affect registration in multi-pass printing, antenna tuning, and sensor drift. NanoPaper development therefore targets what manufacturing teams actually measure: dimensional stability under practical humidity swings, roll-to-roll handling, and compatibility with barrier layers or encapsulants where required. The goal is not to claim that one substrate "solves everything", but to provide a platform that can be paired with the right coatings and device architectures to meet target reliability – without defaulting back to fossil-based films as the only safe option.

Manufacturing compatibility and scale-up strategy

NanoPaper is being developed with industrial manufacturing in mind. The core unit operations—nanofibre preparation, wet-laid sheet forming, and controlled drying—map onto established papermaking and roll-to-roll infrastructure. This lowers capital barriers for scale-up and enables the learning loops needed for quality control. Substrates win when they can be produced repeatably, not when they are "best in class" in a single lab test. Tangho's near-term strategy is pilot-scale production and customer validation with printed electronics partners, followed by staged scale-up as demand and specifications stabilize.

See NanoPaper at LOPEC 2026

NanoPaper has been selected as a finalist for the LOPEC Startup Competition. The finalists will present on **Wednesday, 25 February 2026,**



Silver printing on a NanoPaper substrate

11:00–12:15 in the LOPEC Forum (ICM Foyer). The **LOPEC Startup Awards** will be presented the same day from **18:30** at the **LOPEC Get-Together** in the **LOPEC Forum.**
Tangho has begun limited commercial availability of NanoPaper evaluation sheets for printed electronics testing, with a focus on thin film gauges suitable for screen printing and related deposition methods. If you are exploring sustainable substrates, copper-forward process flows, or end-of-life strategies for short-lifetime electronics, NanoPaper is intended to be a material you can put on press, not a science project.
The printed electronics industry has never lacked ingenuity. What it has lacked is substrate optionality. NanoPaper is one attempt to widen that design space – so that the next generation of flexible electronics can be engineered for performance and for reality, including the messy business of what happens after the product is thrown away.

https://nanopaper.io
Image source: NanoPaper

References:
[1] Pro Flextronics story (force sensor on compostable NanoPaper):https://m2n-converting.com/flextronics/worlds-first-printed-force-sensor-on-compostable-nanopaper/
[2] Tangho Blog Post including video of e-skin (force sensor on compostable NanoPaper): https://docs.nanopaper.io/blog/inside-tanghos-nanopaper-force-sensor-demo-a-technical-deep-dive

SnapWatch

Wearables designed for kids

Incorporating truly flexible display technology, SnapWatch is the first wearable platform which can be slapped around the wrist and also viewed straight. The first application is specifically targeted to a young audience, as creator Vincent Douglas explains in an exclusive interview with PRO Flextronics.

PRO Flextronics: Mr Douglas, what is the idea behind SnapWatch?

Vincent Douglas: SnapWatch is a new category of wraparound wearable designed around safety, comfort, and expressive digital interaction. Unlike traditional smartwatches with small, confined displays, SnapWatch features a long, continuous display surface that runs along the entire band.

The platform has two simple but powerful form factors:
1. Straight and rigid, functioning like a slim digital device.
2. Wrapped around the wrist, body, or objects, using a hinge-free bi-stable mechanical structure.

The idea began with a simple question: What if a snap band could incorporate a truly flexible display – one that delivers digital information seamlessly as it transitions from straight to wrapped in a single motion? SnapWatch achieves this through LED pixels embedded onto a flexible PCB housed inside a silicone tube. The display "floats," allowing the entire device to bend, twist, and snap comfortably around the wrist.
The project brings together expertise in system integration, flexible electronics, mechanical engineering, and wearable design. Our aim is to create a new class of safe, durable, expressive wearable hardware. Our first-generation pilot – a simple children's watch prioritising comfort, robustness, and simplicity – proved the concept, selling 3,000 units in just two months.



SnapWatch is a children-friendly wearable with a highly flexible form factor

PRO Flextronics: In your opinion, what do wearables need in order to be successful in today's world?

V. Douglas: Wearables today need three things above all:
1. Comfort and unobtrusiveness: If a device isn't pleasant to wear all day, it simply won't be used.
2. Clear purpose and simplicity: Consumers are overwhelmed by multifunction devices. The most successful wearables solve a small number of problems extremely well. Yet they all share one limitation: tiny display surface areas.
3. Emotional connection and personal expression: This is the next frontier. Users want devices that feel integrated with their body and lifestyle – visually expressive, customisable, fun, and fashion-forward.

Displays capable of showing animations, colours, moods, and messages – combined with flexible sensors – will define the next milestone in wearables. SnapWatch is ahead of this curve and is being designed around these principles from day one.

PRO Flextronics: SnapWatch is marketed for children in particular. Why did you target this age group first?

V. Douglas: Yes – the first version of SnapWatch was designed specifically for children as a pilot to introduce the new form factor. Children are an ideal audience for testing new product categories: if they respond with excitement and delight, you've cleared one of the biggest hurdles in consumer adoption.

PRO Flextronics: Will stretchable and bendable innovations fully replace rigid wearables in the foreseeable future? Are you planning to extend the scope of SnapWatch's technology to an adult audience?

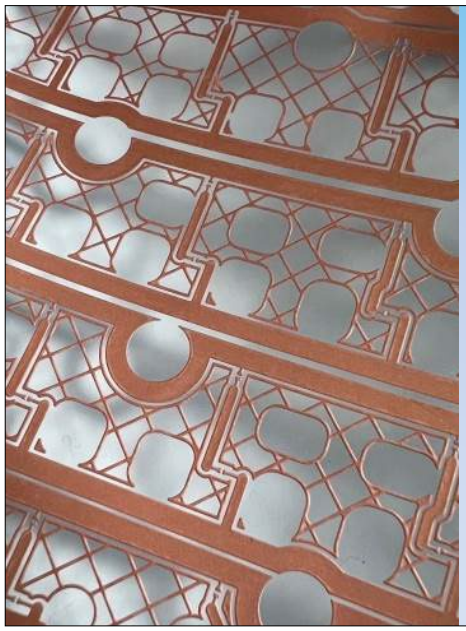
V. Douglas: Stretchable and bendable technologies won't replace rigid wearables overnight, but they will increasingly reshape where and how digital information lives on the body. Rigid devices will continue to serve certain functions well, yet flexible





formats open entirely new categories of interaction – surfaces that conform to the body, adapt to movement, and feel more like part of you than something you strap on. As for SnapWatch, the children's version was simply to validate the form factor. The underlying technology is absolutely intended to scale into adult products – from fitness and lifestyle devices to expressive fashion-driven wearables. The platform is versatile; and expanding into adult-focused applications is very much part of our roadmap. As we look ahead, we're exploring how flexible electronics can move beyond simple displays and become a new form of emotional expression. One concept we're developing is what we call emotional morphing – a display that subtly shifts colour, texture, or animation in response to mood, environment, or personal preference. It's not about notifications; it's about creating a wearable which feels alive, intuitive, and emotionally in sync with its wearer. Imagine a band that warms in tone when you're calm, becomes vibrant when you're active, or gently pulses with colour during moments of focus. This is where flexible technology becomes more than hardware – it becomes a personal, expressive interface that blends into your lifestyle. We're not announcing a product today, but this direction reflects our long-term vision. SnapWatch is the first step toward a future where wearables are softer, more adaptive, and emotionally intelligent. The next generation of our platform will build on this idea, and we're excited to share more when the time is right.

www.snapwatch.co.uk
Image source: SnapWatch



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CeNTI

Printed moisture sensors for smart packaging

A printed sensing solution has been developed with CeNTI know-how within the From Fossil to Forest Innovation Pact for the continuous monitoring of moisture content in paper-based dry-food packaging.

The From Fossil to Forest Innovation Pact focuses on the development of high-value products through the valorisation of Portuguese Eucalyptus Globulus forest resources, aiming to create cellulose-based alternatives to replace fossil-based plastics. This work presents a case study addressing the printing of a moisture sensor integrated into paper-based packaging solutions, targeting a critical property that influences both organoleptic characteristics and the products shelf life of products. By focusing on a specific dry-food application, the sensor is designed to detect when the moisture content exceeds the 6% threshold, while ensuring food-contact compatibility and alignment with recyclable and recoverable packaging solutions. This research is being developed by a well-established Portuguese consortium with recognised expertise in paper-based solutions, printed sensors, and scaling-up of printing technologies. This consortium brings together the Centre for Nanotechnology and Advanced Materials (CeNTI), Forest and Paper Research Institute (RAIZ), The Navigator Company, Imprensa Nacional and Casa da Moeda (INCM), and Grupo Nabeiro.

Materials and formulation of functional pastes

To address the sensor integration requirements, a three-layer configuration was considered, comprising (i) an electrode layer printed with a commercial silver paste, (ii) a sensitive layer composed of materials whose electrical properties depend on the surrounding moisture content, and (iii) a protective layer acting as a non-conductive barrier between the conductive layers and the food product, whilst enabling moisture absorption. Aligned with this approach, the development involved the formulation of customised, moisture-sensitive printable pastes to ensure sensor reliability for food contact – selecting food-grade materials whenever possible – and to support recyclability and material recovery through aqueous-based formulations.
Based on the state-of-the-art, the electrical resistance of carbon-based materials is known to be affected by the ambient humidity levels. Therefore, a moisture-dependent formulation incorporating organic biopolymer binders with carbon fillers was developed, with properties tuned to the targeted detection range. Through multiple iterations, various compositions were produced, characterised, and optimised to attain a formulation balancing printability and sensor performance for the intended application. Regarding the protective membrane, a hygroscopic, food-grade biopolymer was exploited as the main constituent of the formulation, exhibiting properties compatible with screen-printing.



CeNTI's printed moisture sensor

Sensors' fabrication and performance evaluation

During the development stage, sensors were produced via screen-printing at laboratory scale and subsequently transferred to a pilot printing line at INCM facilities, using a sheet-to-sheet printing approach in both cases. This transition provided insights into the requirements for scaling-up formulations production, as well as necessary adaptations to printing and curing conditions.
At laboratory scale, tests were conducted to evaluate the (i) printing and performance effect of kraft papers (end-substrate) with different grammages, (ii) configuration and dimensions of each sensor layer, and (iii) curing conditions and other thermal treatments required for stabilisation. After fabrication of the sensors under each set of variables, the devices were characterised following an experimental methodology defined in accordance with the requirements of the intended application briefly described below.
Initially, the sensors were oven-dried to remove any retained moisture, while the food product was dried using a thermogravimetric analyser. Thereafter, both the sensors and the food product, in direct contact, were placed in a climatic chamber and subjected to



a controlled humidification process. During this stage, the sensors' electrical resistance was continuously monitored, while the moisture content of the food product was measured at defined time intervals through sampling and analysis using the thermogravimetric analyser. Correlating electrical resistance with moisture content over time enabled the establishment of the sensor calibration curve. Based on the evaluation of the different variables, higher paper grammages were found to enhance the stability of the printed sensors, which is particularly advantageous for applications requiring robust paper-based packaging. The sensor design was optimised to ensure reliable performance within the target detection range, while maintaining a compact solution with minimal impact on packaging structure and aesthetics. Moreover, curing conditions were extensively assessed to ensure proper sensor stabilisation, especially for the sensitive layer. This feature proved especially important during the transition from laboratory to pilot-scale, due to differences between curing systems. Once the optimal sensor configuration was established, and considering the moisture content limits of the end product, the sensor was validated for a detection range up to 10% moisture content (MC) exhibiting a sensitivity of 0.5 ± 0.1 Ω/% and reliably detecting the target threshold value of 6% MC.

End-of-life and materials' recovery

The sensor's end-of-life and disposal are being addressed through a twofold strategy. From a conventional perspective, both the sensor and the kraft-paper substrate are being evaluated using standard methodologies for paper recyclability and compostability , with the support of the University of Beira Interior (UBI), Portugal. In parallel, the recovery and reuse of the sensor's constituent materials are being explored. Specifically, physical processes are under investigation to recover carbon-based materials from the sensitive layer and silver substances from the electrodes. The results obtained so far demonstrate that the recovered carbon materials can be reused in the production of new formulations for the sensitive layer, although blending with virgin materials is required. In particular, a 1:1 virgin-to-recycled formulation, combined with minor adjustments to the printed sensitive layer thickness, enabled the production of sensors with sensitivities comparable to those obtained with sensors produced exclusively from virgin materials.

Migration tests for food contact

In collaboration with the Biotechnology School of the Portuguese Catholic University (UCP), an initial assessment of food-contact compliance was conducted through the analysis of the sensor composition and relevant regulatory frameworks. Most substances considered in sensor production are included in positive lists of food-contact materials regulations; however, specific restrictions apply and must be fulfilled to demonstrate compliance, for instance through assessment of specific migration limits. Accordingly, as part of the validation of the sensor's reliability for dry food applications, migration tests are currently being conducted.

Integration with electronics

Regarding final system integration, a printed RFID-based solution is being implemented to enable the acquisition and registration of relevant information associated with each packaging unit, providing a practical tool for inventory management and traceability. Initially, a rigid solution combining product design and material selection is being adopted to ensure seamless integration into paper-based packaging and compliance with food-contact requirements. To advance towards a fully printed solution, the development of printing electronic circuits integrated with the sensor is also underway.

The present study was developed within the framework of the Portuguese Agenda "From Fossil to Forest – Sustainable packaging and products to replace fossil plastic" [C644920945-00000036| Project No. 8], financed by the Recovery and Resilience Plan (RRP) under the European Union's NextGenerationEU programme.

www.centi.pt
Image source: CeNTI

ALPER S.R.L.

Printed heaters for clear ADAS – Thin and lightweight anti-fog heating through printed electronics

Condensation is a small physical effect with an outsized impact in automotive sensing. As a cover lens becomes damp, a camera may lose definition and become more prone to glare; for lidar and radar, surface water can introduce unwanted reflections and reduce signal quality. The result may be reduced perception confidence at the very moments when driver assistance is most important, such as after a heavy rain or when leaving a humid underground car park. Printed heaters offer a practical way to manage fogging directly where it forms. Alper's printed electronics approach supports perfect integration into optical modules, while demanding disciplined design choices around materials, manufacturing and production control.

Why condensation is a problem for ADAS, lidar and radar

Condensation forms when moisture in the air meets a surface that allows water to settle as a film or micro-droplets. To the human eye this may look like a mild haze; to a camera-based ADAS, it can behave like an optical filter that changes rapidly and unpredictably. Fine details soften in ways that complicate image processing. Perception depends on stable texture, colour and sharpness to classify objects and estimate distance.
Lidar and radar are not immune. Moisture on a protective window can introduce a water layer or irregular droplet pattern that alters transmission. Even when the sensor keeps operating, the returned signal can look "different" from what the algorithms expect, increasing uncertainty or forcing a conservative mode.
Automotive scenarios make the problem frequent. Rain and spray can leave a moisture layer that transitions into fogging as the vehicle stops and airflow reduces. Sudden changes in ambient conditions can create misting on outer covers. Even routine events such as vehicle washing can create a short but impactful period where the module "sees" the world through a fogged interface. In each case, the trouble is visibility and sensor reliability in the moments when the driver and the system are most exposed to uncertainty.

Why printed electronics enters the picture

Printed electronics could be a product of screen-printing manufacturing. It consists in deposit functional inks onto flexible substrates, features in thin, lightweight constructions. The attraction in automotive is about integration. A printed element can be developed to fit a housing, wrap around a curvature without forcing a mechanical redesign. Where traditional heating parts may demand more space or additional fixtures, a printed heater can become part of the module architecture itself.
This means that printed electronics can simplify assembly, but it also shifts attention toward materials, interfaces and process discipline.
Another reason printed electronics is being considered around ADAS is the broader move toward multifunctional surfaces. Once a platform is comfortable integrating printed functional layers, it becomes easier to explore adjacent functions, such as printed conductors for connectivity features or sensor-related patterns.

The concept of printed heaters

A printed heater is a thin and lightweight heating element on a thin, foil-like substrate, mostly made from PET. Instead of a wire or etched foil, the heating element is created by printing tracks that convert electrical energy into gentle distributed warmth. The heating element is not meant to heat the whole module but protect the sensing surfaces from conditions where fogging persists and to do so in a way that suits compact housings.
In Alper's typical construction approach, the heater is built as a layered flexible element. A PET substrate acts as the base film. On this, resistive and conductive tracks are printed using inks selected for the required electrical behaviour, commonly involving carbon-based and silver-based ink pastes. Further PET layers contribute electrical insulation and mechanical protection, helping the heater behave as a stable laminated component. An adhesive layer is then used to make the heater easy to apply to the target surface also supporting stable placement during assembly.

Where they are applied in ADAS systems

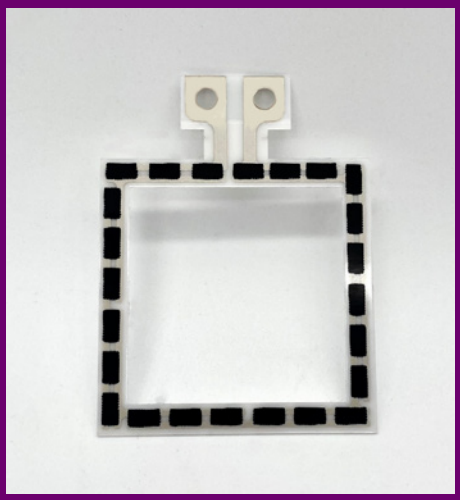
In camera modules, printed heaters are often positioned so they support a clear optical aperture without introducing visual artefacts. Integration typically focuses on the periphery of the viewing area. The aim is to manage the surface where fogging would otherwise sit in the line of sight, while keeping printed heaters away from regions that would be visible to the imager.
For LIDAR units, the heater concept is similar, but the integration priorities can differ. Designers treat the active scanning region as untouchable and look for heating strategies that stabilise the window's

surface conditions without intruding into the path. Depending on the architecture, the heater may be applied to a carrier or to a cover element designed to work with the system's optical layout.

Main benefits

Printed heaters are attractive in ADAS contexts because they can follow complex geometries. Curved covers and tight housings are common in modern sensor; a flexible printed layer can conform to these shapes in a way that rigid components may struggle to match. They are also valued for their discreet presence. A thin laminated element can often be incorporated with minimal visual impact, supporting designs where the sensor must blend into bodywork or where space is limited inside the module.
Another advantage is the ability to focus heating where it matters. Fogging is a surface phenomenon; the most effective intervention is often close to the surface that must remain clear. A printed element can be designed to favour specific regions supporting a purposeful approach.
Finally, printed electronics is naturally aligned with industrial repeatability. Once a prototype is designed and duly tested, production can be scaled with consistent outputs, supporting the needs of automotive supply chains.

Manufacturing control matters for the same reason. Printed electronics rewards disciplined process windows including track definition and heater's behaviour. For automotive programmes, this is where production quality planning becomes part of the engineering solution. Traceability, in-process checks and clear acceptance criteria of the supplier support confidence.
Integration ownership is the final attention point. A heater benefits from cross-functional between the supplier and the installer for the specific application, because its success depends on being invisible to the sensor while being effective at the surface. When those stakeholders align early, printed heaters become a performing architectural and functional elements.
Printed heaters address condensation by working at the surface where visibility is lost, which makes them particularly relevant for camera, lidar and radar modules that must remain reliable across changing environments. They fit naturally into the automotive push for compact and integrated designs. They reward careful engineering around materials, interfaces and production discipline, because stability and consistency are part of



Polyester flexible heaters



Silver ink heaters



Polyester flexible heaters

From material selection to integration. The key requirements for printed anti-fog heaters

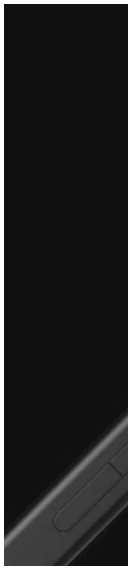
The anti-fog printed heater is at the intersection of the production of an electrical design and the application for which it is intended, in this case optics. Any small variations can matter because the heater is physically close to the sensor's "view" and must remain stable throughout life conditions that include moisture and repeated environmental swings.
Material selection is central. Substrate choice, ink systems and insulation layers. The adhesives must be compatible with the surfaces they touch in the module. The contact must be maintained to avoid trapped air, because uneven attaching can translate into uneven thermal behaviour.

the functional requirement. They also illustrate a broader direction of travel, functional layers that are printed and integrated as standard module elements, potentially alongside other printed features such as conductive routing or connectivity elements. The outlook is using printed heaters where they simplify integration and support sensing performance in everyday automotive vehicles, enabling simpler assembly, fewer components, and more consistent sensing performance at scale.

www.alper.it
Image source: Alper

ChasingLight

Powering everyday devices: The rise of organic photovoltaics for indoor energy harvesting



Guangzhou ChasingLight Technology Co., Ltd., founded in 2020, is dedicated to the research and commercialisation of organic photovoltaics (OPV), an emerging third-generation solar technology. While the established crystalline silicon industry dominates large-scale power generation, the continuous expansion of application scenarios is driving demand for photovoltaic solutions with specific characteristics such as lightweight design, flexibility, and high performance in low-light conditions. These diverse needs are fostering the development of new PV technologies for more vertical and specialised fields.

Background: A new player in the photovoltaic landscape

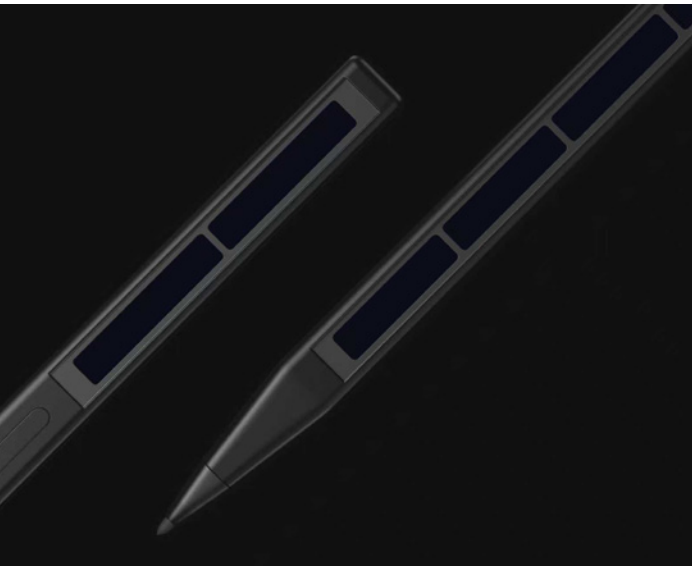
ChasingLight Technology positions itself not as a competitor to traditional solar, but as a pioneer addressing untapped, incremental markets. „OPV technology does not need to compete directly with conventional solar in existing markets," explains Yang Xi, founder of ChasingLight. „Beyond the established applications, there are numerous areas where clean energy supply is not yet utilised."
The company initially focuses on indoor energy harvesting scenarios, with plans to later expand into deeper integration with mobility, buildings, and infrastructure. Backed by prominent investors including Sequoia Capital China, State Power Investment Corporation, Global Logistics Properties, BOE, etc., the company is scaling its vision for low-carbon, integrated, discreet power.





OPV material development: The core of sustainable innovation

OPV technology utilises high-performance organic semiconductor materials, including various conjugated polymers and small molecules. The molecular structure of these materials confers advantages in lightweight flexibility, solution processability, and cost-effectiveness while delivering suitable optoelectronic properties. Crucially, OPV demonstrates a significantly lower carbon footprint over its lifecycle compared to conventional inorganic PV, aligning with sustainable development principles.
ChasingLight Technology brings over a decade of specialised expertise in organic semiconductor R&D. Through strategic collaborations with leading fundamental research teams, the company has developed deep insights into material science. By integrating computational modelling with machine learning, it has established a proprietary materials design platform, accelerating development cycles and enabling continuous breakthroughs.
Building on extensive industrialisation experience, ChasingLight has successfully iterated its proprietary material systems, achieving scale-up, cost reduction, and performance improvements.
The company has capabilities in the large-scale production and purification of core materials. Its production facilities operate under strict management systems, ensuring a high-quality, stable supply.
This material science foundation is supported by a robust intellectual property portfolio, with over 120+ patent applications filed, 40+ patent issued.



OPV module manufacturing: Scaling a customised power solution

Leveraging its material expertise, ChasingLight has established mass-production capabilities for OPV modules. The company has built an automated production line for modules sized up to 650mm x 550mm, which is operational and delivering products. ChasingLight's core offering for consumer electronics is its ambient light energy harvesting OPV modules. OPV offers unique benefits ideally suited for powering devices: exceptional flexibility, tuneable colour and transparency, superior performance in low-light indoor environments, and a lifespan matching that of many electronic products. For instance, the ambient light around shelves in a large retail store is sufficient for OPV modules to continuously power electronic shelf labels, even supporting higher refresh rates. This capability opens a new market for indoor photovoltaic applications. ChasingLight OPV modules have achieved a certified laboratory efficiency of 19.92%. In May 2025, ChasingLight launched its iLux OPV module, engineered for low-light indoor environments. Under 1,000 Lux LED illumination, it provides a power density of 100.71μW/cm². It operates efficiently within a light spectrum of 400nm to 750nm and is designed for a 10-year lifespan. The modules operate within a temperature range of -20°C to 50°C. ChasingLight also offers iLux+ OPV solution, an integrated system combining the OPV module with energy storage and power management circuitry for stable output.

OPV applications: Building an ecosystem for integrated energy

ChasingLight is systematically building a complete OPV application ecosystem targeting consumer electronics, indoor IoT, and mobile power scenarios. Its products have been widely adopted in smart office equipment, smart home devices, and smart retail, powering items such as electronic price tags, digital pens, advertising displays, and smart locks. Notable partnerships demonstrate this practical integration. In collaboration with Wacom, ChasingLight developed an OPV-powered module for the Wacom digital pen, enabling a cordless, eco-friendly design that harvests energy from indoor light. Another project with East Japan Railway Company saw OPV modules integrated into train advertisement displays, eliminating the need for wired power or battery replacement and reducing maintenance costs. Future target applications include retail shelf labels, remote controls, sensors, and asset trackers. Looking ahead, the company intends to pursue larger module markets, such as vehicle-integrated photovoltaics (VIPV) and building-integrated photovoltaics (BIPV). The company's mission is "Let Organic Photovoltaics become a way of life for everyone, every family, and every social group." To make organic photovoltaics a viable part of daily life, starting by empowering personal electronics with safe, aesthetically pleasing, and environmentally friendly power, before expanding into larger integrated solutions for a broader sustainable future.

www.chasinglight.cn
Image source: ChasingLight





OET

OPV as a key enabler for Smart Living and Mobility applications

Evangelos Mekeridis, CTO, OET Energy Technologies discusses the manufacturing of integrated organic photovoltaics as enablers of energy harvesting, shading and thermal management in smart living, mobility and other applications.

The rapid transition toward Smart Living and Mobility requires energy solutions that are not only efficient, but also lightweight, adaptable, and seamlessly integrated into everyday conditions and environments. Organic Photovoltaics (OPVs) have evolved precisely in this direction. Over the last decade, OPVs have moved beyond laboratory demonstrations and are now entering an industrial phase, enabling energy generation to be embedded directly into surfaces, products, and infrastructures where conventional Si-based photovoltaics cannot be applied. At OET Energy Technologies (OET), we see OPVs not simply as solar modules, but as functional materials that redefine how and where energy can be harvested.

World's first fully automated roll-to-roll manufacturing line for integrated OPVs

A key milestone in this transition is the deployment of the world's first fully automated roll-to-roll manufacturing line for integrated OPVs. This industrial-scale facility in Thessaloniki, Greece represents a shift from pilot production to large-scale, low-cost manufacturing of energy-active surfaces. By combining roll-to-roll printing of functional nanolayers, in-line laser processing, and real-time metrologies and quality control with high-precision automated assembly, OET is bridging the gap between research excellence and commercial viability. This approach allows OPVs to be produced with minimal material usage, low energy input, and high throughput, creating a strong foundation for sustainable and scalable energy solutions.

OPVs offer a unique combination of properties that make them particularly relevant for Smart Living applications. Their ultra-lightweight and flexible nature drastically reduces structural loads, while their semi-transparent and colour-tuneable characteristics allow them to blend into architectural and product designs without compromising aesthetics. Unlike rigid silicon panels, OPVs can be integrated into curved, flexible, or lightweight surfaces, enabling energy generation in places previously considered impossible. This freedom of design is essential for the next generation of smart environments, where energy, sensing, and communication must coexist within the same physical elements.

Applications in Agrivoltaics

One of the most mature application areas is Agrivoltaics, where OPVs enable multi land use, energy generation, enhance crop cultivation, reduce water use, and protection from heat and UV radiation. At the OET AgroHub, AgroOPV systems are demonstrated both in hydroponic greenhouses and in open-field cultivation under semi-transparent OPV shading structures. The tuneable optical transmission of OPVs allows precise control of light spectra reaching the plants, reducing excess radiation, lowering evapotranspiration, and improving water efficiency. At the same time, the lightweight nature of OPVs eliminates the need for heavy supporting structures, enabling direct integration onto lightweight aluminium frames. The result is a dual-benefit system that produces renewable energy while enhancing agricultural productivity, a critical advantage under increasing climate pressure.
In Smart Living environments, OET's solutions with Building Integrated OPVs (BIPVs) open new possibilities for energy-autonomous buildings and interiors minimising the landscape impact. Semi-transparent OPVs integrated into façades or windows can function as energy windows, contributing to on-site power generation while maintaining daylight and visual comfort. At the same time, by providing effective shading and lowering temperatures due to IR absorption, especially in hot climate regions, BIPVs and urban infrastructures significantly reduce cooling demand and energy costs. While their nature allows bifacial energy harvesting, even with artificial lighting at the same time. Indoors, OPVs optimised for artificial lighting can harvest energy from ambient light to power sensors, and IoT devices. When combined with energy storage solutions such as supercapacitors and ultra-low-power electronics, OPVs enable battery-free systems for monitoring air quality, temperature, lighting, and occupancy. This approach reduces maintenance needs, eliminates battery waste, and supports scalable deployment of smart building infrastructures.

Smart logistics, smart packaging and supply chains

Beyond buildings and urban infrastructures, OPVs play a growing role in smart logistics, smart packaging and supply chains. OPV-powered smart packaging applications patented by OET, combine different printed electronics products from OLEDs to sensors, offer new opportunities for traceability, authenticity verification and product condition monitoring, aligning sustainability with digitalisation. In a similar context, OPVs can be combined with trackers and sensors integrated into containers, pallets, and packaging where they can operate autonomously under indoor or diffuse lighting conditions. Such systems enable real-time monitoring of location, temperature, humidity and even handling conditions without reliance on disposable batteries.
Mobility represents another key domain where Integrated OPVs provide distinct advantages. In electric vehicles, buses (Vehicle Integrated OPVs – VIPVs) and solar carports, OPVs can supply energy to batteries, sensors, ventilation, and monitoring systems without adding significant weight on the construction. Their flexibility and semi-transparency allow integration into vehicle roofs, windows, or body panels while preserving design, aesthetic and functionality.
Beyond vehicles, OPVs can support e-bikes, scooters and drones by powering onboard electronics and sensing systems. Marine applications, including sailboats, represent a particularly strong use case: OPVs integrated into sails or canopies provide lightweight, and space-efficient energy generation, enabling off-grid autonomy without compromising performance or aesthetics. OPVs enable a new paradigm where energy is distributed, adaptive, and seamlessly integrated into everyday life.
In OET our main guide is in all these applications is sustainability. OPVs are manufactured in ambient, using solution-based, low-temperature processes and primarily carbon-based, non-toxic materials. Their energy and carbon payback times are measured in months compared to the conventional technologies that are in the scale of years, and their recyclability supports circular manufacturing concepts. Combined with significantly lower CAPEX compared to conventional PV technologies, OPVs offer a pathway toward localized, environmentally responsible energy production.

Outlook

Looking ahead, the role of Integrated OPVs in Smart Living and Mobility will continue to expand as manufacturing scales, materials mature, and new applications are rising. OPVs are revolutionising solar energy by providing more adaptable versatile and sustainable solutions. From agriculture to architecture and transportation and even everyday products. The future of solar is not just in rooftops and field, its everywhere and in OET we believe that we're one step closer to making it a part of everyday life.

www.oe-technologies.com
Image source: OET

COPE-Nano Center of Excellence

Innovation driver for organic, printed and flexible electronics manufacturing

Organic and Printed Electronics (OEs) are evolving rapidly globally, with strong advancements ranging from the state-of-the-art laboratory research of novel material and device concepts, up to scaling to pilot scale fabrication, and to deployment in large scale roll-to-roll (R2R) manufacturing and industrial production.

For several years, Europe has invested and strongly supported R&D developments in all aspects of OEs to strengthen its innovation, research and production capacities, and to exploit the unprecedented advantages of OEs in revolutionising high-value commercial applications, such as energy, transportation, food and agriculture, buildings, healthcare, electronics and digital technologies, security, etc. However, a prerequisite to create synergies and enable the fast technology transfer is to establish strong innovation ecosystems that connect innovators with industries. COPE-Nano is the Center of Excellence (CoE) for Organic, Printed Electronics & Nanotechnologies that stands out as an innovation driver to advance Greece's and Europe's excellence, research and innovation potential in OEs, ranging from novel functional materials and device engineering to pilot-line validation, R2R manufacturing and technology transfer to Industry. Based in Thessaloniki, COPE-Nano is the evolution of the internationally acknowledged Nanotechnology Lab LTFN, founded in 1991 by Prof Stergios Logothetidis, which for more than 35 years, has coordinated advances in OEs and photonics, thin films, nanomaterials and nanoengineering, nanomedicine, 3D printing and 3D bioprinting, nanometrology, inline precision metrology, quality control of processes, automation, additive and digital manufacturing. Its rapidly expanding team consists of more than 35 experts from numerous disciplines (physics, chemistry, materials science, engineering, medicine, agriculture, biology, informatics, digital technology as well as from project management.

A strategic European initiative

COPE-Nano has started as a flagship project under the Horizon Europe Programme: WIDERA Teaming for Excellence (HORIZON-WIDERA-2022-ACCESS-01-two-stage). Its main aim is to upgrade the Nanotechnology Lab LTFN and to establish a new, autonomous, and sustainable CoE in OEs, bioelectronics and advanced nanomaterials, and it is Europe's first CoE focused on this rapidly emerging field. Its duration spans 72 months (May 2023 – April 2029), and its total budget reaches €30 million, funded by 50% from the EU and by 50% from the Greek General Secretariat for Research and Innovation, reflecting the strong national commitment.

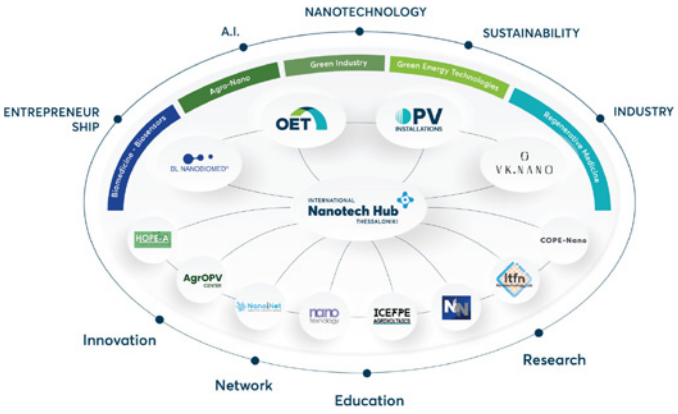


Team photo of COPE-Nano

COPE-Nano benefits from intensive collaboration and know-how exchange with its globally recognised advanced partners in the area of OEs, that include the University of Bordeaux, France (ELORPrintTec, group of Prof Georges Hadziioannou) and University of Cambridge, UK (Bioelectronics Laboratory, group of Prof George Malliaras). COPE-Nano will bridge the gap between academia and industry in Europe by building collaboration links with businesses and industry through the Technology Transfer Office and the HOPE-A Association, to strengthen collaborations and industry/business in Greece (as AUTh). Already it has established collaborations with 30 acknowledged organisations (16 universities, two research institutes and 12 industries) from Greece and Europe.

From vision to impact

COPE-Nano aims to become a European leader in basic, applied, and industrial research, bridging academic breakthroughs with tangible industrial impact across Energy, ICT, Healthcare, Agriculture and beyond. Specifically, it will a) boost research and innovation performance through state-of-the-art research and industrial laboratories and infrastructure, and advanced pilot-to-production lines, b) build strong collaborations with national, European and global organisations from academic institutions, industry partners, and international associations (such as OE-A, HOPE-A, NanoNet), c) support systemic reforms that stimulate R&I investment and strengthen Greece's role in European Science and Technology, and d) facilitate technology transfer and innovation



management, including the commercialisation of OE products and solutions, and engage with industrial stakeholders.

COPE-Nano departments driving innovation

COPE-Nano's organisational structure is comprised of four specialised Institutes, which are:

1. **Institute of Flexible Organic & Printed Electronics and Energy:** Focuses on technologies including printed organic photovoltaics, Perovskite PVs, OLEDs for lighting and displays, photonics, flexible sensors, printed batteries, and applications for IoT, metrology & digital technologies, zero-defect manufacturing by printing methods (lab, pilot, large scale), functional inks, printing process optimisation, encapsulation, vacuum technologies (PVD, CVD, OVPD), and in-line ultra-fast laser processes.

2. **Institute of Bioelectronics & Nanomedicine:** Focuses on technologies in the medicine and healthcare sectors, including diagnostics, printed biosensors and wearable health devices, as well as bioelectronics, advanced biomaterials, clinical nanomedicine, regenerative medicine, nanomedicine for longevity, drug delivery systems, and implantable devices.

3. **Institute of Advanced Nanomaterials, Nanoengineering & Nanosystems:** Focuses on advanced materials (nanoparticles, thin films, 2D materials, ICT, quantum computing), nano-energy, photonics, plasmonics and next-generation nanostructures and nanosystems for ICT, batteries, fuel cells, hydrogen, photonics, plasmonics, electronics, manufacturing, food, water, safety, and security.

4. **Institute of Agro-Nano:** It develops and implements OE-based solutions systems in agriculture for energy generation (Agrivoltaics), improvement of crop yield using OLEDs and digitalisation and optimisation of the efficiency of close-field/greenhouse and open-field cultivations by sensors and artificial intelligence methods.

Beyond these core research units, COPE-Nano also embeds a strong Technology Transfer & Innovation Office to streamline collaboration with industry and assist in translating innovation results into commercial ventures.

Manufacturing the future

One of the core activities of COPE-Nano is to bridge the gap from lab to fab and develop advanced manufacturing processes, tools and methodologies for the large-scale production of OEs by printing (sheet-to-sheet, R2R), and vacuum based methods. This mission is realised by its close connection with the Horizon Europe flagship Project Flex-2Energy led by OET, that develops the world first automated R2R manufacturing line for large area flexible Integrated Photovoltaics (IPVs) for buildings, agriculture and automotive applications. This synergy will accelerate the translation from cutting-edge research to scalable industrial processes for BIPVs, ensuring that innovations in materials, device design, and processing are rapidly integrated into pilot and industrial production. At the same time, insights and data from the manufacturing challenges encountered in Flex2Energy provide its researchers with real-world feedback to develop novel technologies and update its training programmes.

A catalyst for regional and European growth

COPE-Nano is not only a scientific milestone for Greece but also a strategic asset for European competitiveness. By fostering investments, attracting top talent, and nurturing deep industry connections, the CoE enhances the R&I landscape and helps align national and EU priorities, particularly in energy transition and digital transformation. COPE-Nano is one of the major pillars of the International Nanotech Hub Thessaloniki , which is a dynamic ecosystem that integrates expert research institutions, pilot to production manufacturing lines, technology developers, green industry partners (OET, BL NanoBioMed, VK Nano, OPV Installations), and international industrial networks (HOPE-A, NanoNet) with global coverage. This synergy has several strategic advantages, which include access to the whole value and innovation chain, providing services, infrastructure and expertise to industries support entrepreneurship, and establish international visibility and partnerships. Through its global network and flagship events (e.g., NANOTEXNOLOGY multi-events), COPE-Nano aims to become a pan-European ecosystem attracting talent and young scientists, facilitate innovations in OEs and establish successful industrial collaborations and investments.

www.cope-nano.eu
Image source: COPE-Nano

Bayflex Solutions

AI-driven flexible electronics: From CES trends to LOPEC implementation

The recent Consumer Electronics Show (CES) 2026 in Las Vegas served as a critical juncture, showcasing a clear shift: flexible electronics technology has moved decisively from a promising concept to a tangible market reality with deployable solutions across diverse industries, argues Bayflex Solutions' CEO Eisuke Tsuyuzaki in this article.

While innovations like rollable displays in laptops and advanced health wearables powered by AI took the spotlight, the core message from the event aligns with the industry's most profound need, a need that LOPEC 2026 in Munich is set to address: a collective, urgent focus on establishing foundations for global commercialisation by reducing variable costs and, crucially, robust reliability and testing protocols.

Observations from CES 2026

CES 2026 demonstrated that artificial intelligence is becoming everywhere and seamlessly integrated into our environments, a trend heavily reliant on flexible and hybrid electronics (FHE).

» **Display innovations:** Transparent and flexible displays moved beyond prototypes into practical applications, including automotive displays, retail showcases, and consumer-ready foldable tablets and curved gaming monitors. This momentum is validated by major brands investing heavily in robust, military-grade durable folding screens, signalling that mass consumer adoption is imminent.

» **HealthTech and Wearables:** The health and wellness sector expanded dramatically, showcasing medical-grade consumer devices like advanced ECG smartwatches and smart rings. The integration of these devices with healthcare systems for preventive care relies on conformal, patient-friendly, continuous monitoring devices, a prime application for flexible electronics.

» **Mobility and industrial:** Vehicle interiors are becoming lighter and more conformable with integrated sensor arrays for autonomous systems. In the industrial sector, AI-powered robotics and advanced sensing solutions for structural health monitoring are moving from labs to real-world deployment, requiring rugged, reliable, and integrated systems.

The impact on the flexible electronics industry

The innovations at CES underscore a vital need for the flexible electronics community to move beyond siloed, custom engineering and prioritise partnership and collaboration to build the necessary building blocks. The shift from novelty to necessity across AI integration and sustainability in product design creates a substantial market opportunity, but current challenges – including durability concerns, and supply chain fragmentation – must be addressed. The market for rigid-flexible electronics is projected to hold the highest market share in 2026 due to its accessibility and cost-effectiveness, while flexible printed circuits are expected to see rapid growth in wearables and IoT. However, a key barrier to sustained growth remains the lack of qualification methodologies, which leads most manufacturers to rely on ‚home-built' testing solutions. LOPEC 2026 is fostering this essential dialogue, with its focus on materials, manufacturing, and application areas such as smart living and sustainable mobility.



Implementation of AI for enhanced productivity

Artificial Intelligence (AI) is the foundation of all emerging flexible electronics applications and is critical for bridging the „chasm" from innovation to high-volume manufacturing. AI enables systems to collect data, interpret context, and make autonomous decisions, which enhances productivity and performance. Specific examples today of enhanced productivity through AI implementation include:



Impressions from CES 2026

» **Automated endurance testing:** AI systems automate workflows for material, component, and device qualification testing, improving operational efficiency in test operations by as much as 70% and mechanical design and bio/chemical engineering operations by 30%.
» **Anomaly detection:** Machine learning (ML) and computer vision are used to automate failure prediction and detect anomalies such as bubbles, fissures, creases, and cracks before failure occurs This real-time quality control leads to significant defect reductions, increase yield and fewer product recalls.
» **Predictive maintenance:** By analysing sensor data from manufacturing equipment, AI can predict potential failures before they occur, minimising unexpected downtime and maintenance costs. This proactive approach ensures operations run smoothly and reliably.
» **Optimised design and prototyping:** AI-powered design tools can generate and simulate countless possible PCB layouts in minutes, a process that might take human engineers weeks, leading to optimal designs that enhance performance and minimise production costs.
» **Smart knowledge retrieval:** Knowledge modules use Large Language Models (LLMs) to store authorised standards, best practices, and testing documentation, providing “assistant-like” step-by-step guidance and augmenting employee skills.
» **Predictive modelling:** AI can anticipate potential failures through comprehensive data analysis across the product lifecycle (R&D to manufacturing), including reflecting running changes, enhancing overall device reliability and allowing for faster supply chain adjustments.









Recommendations on reliability and testing

To enable true global commercial acceleration, the industry must focus on design efficiencies and ensuring product reliability under real-world operating conditions. This is a key focus for industry bodies like the OE-A, who will be presenting their 10th edition roadmap at LOPEC 2026.

Examples of standardisation of design rules

» **Avoid stress points:** Design rules should mandate avoiding placement of vias, components, or solder joints in high-stress bend areas.
» **Optimise layouts:** Traces should be routed perpendicular to the bend line, and gradual curves should be used instead of sharp bends to distribute stress evenly.
» **Bend radius:** A general rule of thumb of maintaining a bend radius of at least 10 times the thickness for dynamic applications (repeated bending) and 6 times for static applications should be formalised.

Examples of implementation of robust testing protocols

» **Mechanical resilience:** All products require rigorous mechanical testing, including both static and dynamic bend testing, thermal cycling, and shock testing to assess failure modes under expected performance levels. The LOPEC roundtable will discuss aerospace-grade reliability requirements, highlighting the ‚mission-critical' standards needed.
» **Electrical integrity:** Testing must go beyond simple continuity checks to include insulation resistance, uniform impedance verification, and functional tests that simulate actual hostile conditions.
» **Accelerated degradation testing (ADT):** For highly reliable products, ADT is necessary to measure performance changes over time and extrapolate failure conditions, allowing the industry to move past the current lack of failure data during standard testing.
» **Visual and automated inspection:** A combination of manual and AI-powered automated inspections can detect surface and internal issues such as cracks, delamination, and soldering issues before they impact performance.

Over time, Bayflex Solutions anticipates further productivity enhancements by automating operational workflows, and self-certification to elevate the workforce, and combined, these innovations contribute to faster product development, more rapid performance validation, and streamlined compliance procedures. By taking these observations from CES 2026 and channelling them into a focused, collaborative effort to standardise and verify reliability, with the practical use of AI, the flexible electronics industry must successfully transition from an innovative niche to a ubiquitous market reality.

www.bayflexsolutions.com
Image source: Eisuke Tsuyuzaki, Bayflex Solutions, LLC

BST GmbH

Integrated quality assurance for RFID labels

Functional testing and visual 100% inspection of RFID labels provide manufacturers and converters with decisive advantages: higher yield, less waste, and reliable data and quality documentation for every single tag. This is exactly where BST comes in at LOPEC 2026 – with the TubeScan 100% print inspection system and a new cooperation with Voyantic, presented publicly for the first time at the trade fair.

New developments for smart labels: Voyantic Tagsurance 3 X BST TubeScan

The TubeScan 100% inspection system is the trade fair highlight. New from 2026 is the collaboration with Voyantic, enabling an integrated solution that combines visual 100% inspection with RFID testing. BST TubeScan for print image and inlay inspection is combined with the Voyantic Tagsurance 3 system for testing RFID quality, data encoding, and data verification. The jont setup will be shown live for the first time at LOPEC 2026 at the BST booth, installed on a SMAG converting machine.



BST's TubeScan

The combined system enables:

RFID quality control with Voyantic Tagsurance 3

» Complete visibility into the performance of RFID tags
» Data encoding
» Data verification

Visual 100% inspection with BST TubeScan

» Presence and position inspection of RFID inlays
» Verification of printed variable data (e.g. QR codes), even with multiple labels per repeat

Users receive a roll report that combines the results of both systems, making doctoring significantly easier. Through this comprehensive quality control, manufacturers reduce complaint rates and increase customer satisfaction.

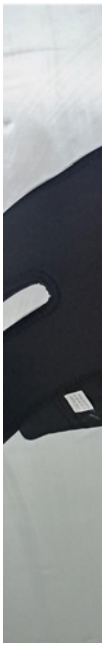
Web guiding with newly developed sensor

With the new camera-based CLS CAM 200 sensor, BST presents an innovation at LOPEC that combines precision and sustainability. The system controls directly based on contrast features, thereby increasing quality and efficiency. CLS CAM 200 features automatically controlled LED illumination and supports both bright-field and dark-field operation for reflective surfaces and materials. Operation is handled centrally together with the controller via the BST SMART COM 100 Commander, complemented by an optical positioning aid and automatic job and setup memory.
In addition, BST impressively demonstrates with the installation of the FRAMEGuide web guiding system how the lowest possible installation height can be combined with maximum guiding precision. At BST booth B0.406, specialists from BST and Voyantic will be available for expert discussions on integrated quality inspection.

www.bst.elexis.group
Image source: BST GmbH

Silicon Austria Labs GmbH & Mimotype Technologies

Smart Living starts on the body: How Printed Electronics enable truly wearable technology



By joining forces, the Austrian research institute Silicon Austria Labs (SAL) and the German startup Mimotype Technologies show how printed electronics can turn textiles into smart, body adaptive systems for everyday life. Using multilayer printed circuits, hybrid integration and textile transfer technology, they realised a wearable light therapy strap that is soft, flexible and unobtrusive. The result is a textile that feels like clothing but delivers targeted light directly to muscles where it is needed.

Why wearability becomes a bottleneck in Smart Living

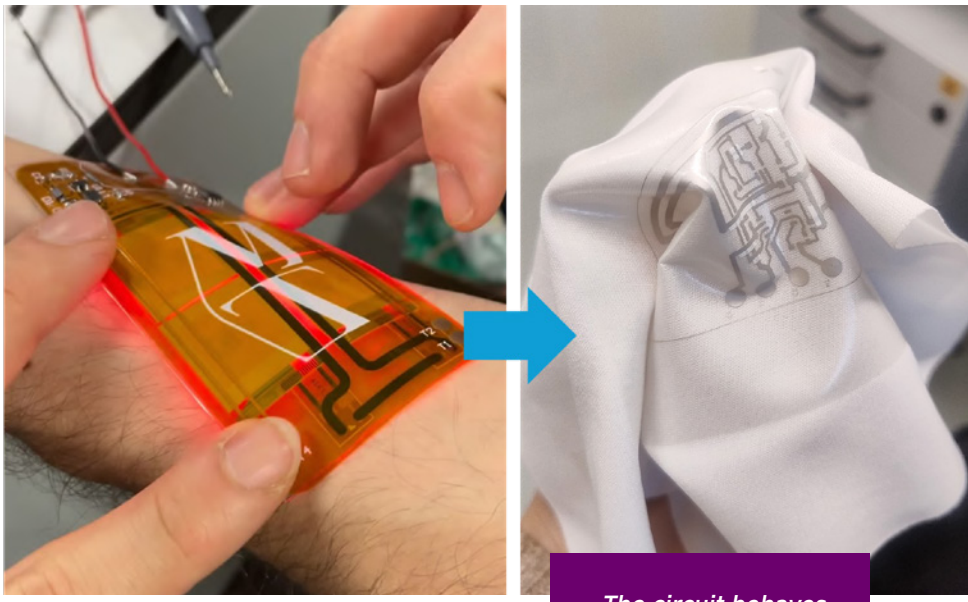
Smart Living is often associated with connected homes, intelligent appliances and responsive environments. As these systems mature, the central challenge shifts to how technology can interface with the human body. Wearables are the natural bridge between digital systems and users, especially in sports, physiotherapy and occupational health. To reach high acceptance, wearables must be comfortable, unobtrusive and compatible with natural movement. Yet, existing wearables still rely on rigid or semi flexible electronics that are acceptable on the wrist, but not when worn directly on muscles or integrated into garments for longer periods.

Where Flex-PCBs reach their limits

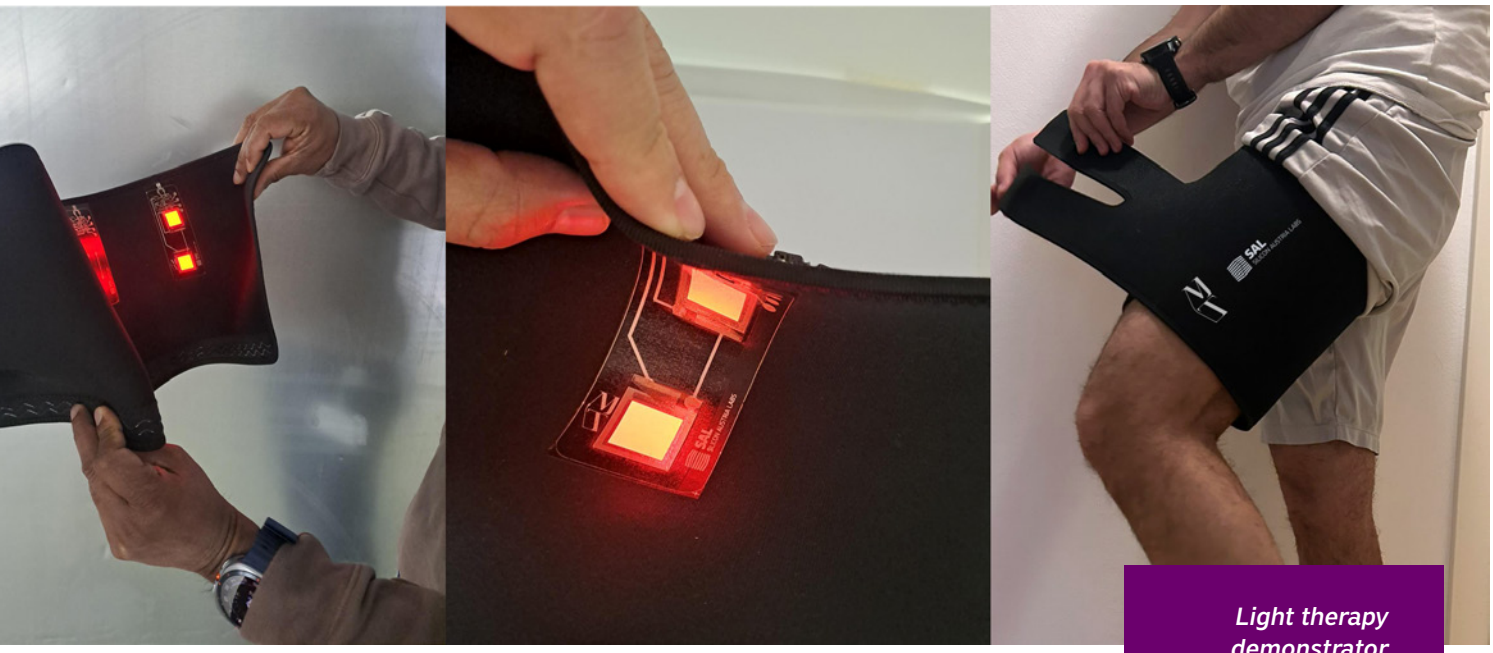
Flexible PCBs were an important step toward wearable electronics, but they reach their limits when full body conformity and repeated deformation are required. They remain laminate systems with locally rigid regions, limited stretch and predefined bending radii. During running, lifting or rehabilitation exercises, twisting and stretching can concentrate mechanical stress at interfaces and component areas. This affects long term reliability and user comfort and restricts how far light sources or sensors can be embedded into wearables themselves.

Printed Electronics as an enabler of true wearability

Printed Electronics offer a different approach. Instead of rigid etched copper circuit boards, the electronic function is created as thin, stretchable layers directly on soft substrates. At SAL, conductive and insulating layers are screen printed onto a thermoplastic polyurethane foil, forming a multilayer circuit that remains mechanically compliant under bending and moderate stretch. Using a heat press step, the complete printed circuit is then transferred into a textile strap or bandage. The circuit behaves like part of the fabric, enabling wearables that feel like a normal garment while carrying full electronic functionality. This level of integration is essential for smart living concepts that must support users during training, recovery or daily routines without feeling like a device.



The circuit behaves like part of the fabric



Light therapy demonstrator

Red light for muscle recovery and sports

The demonstrator focuses on light therapy based specific photo biomodulation wavelengths associated in clinical studies with increased ATP production, improved microcirculation and reduced oxidative stress. In muscles this can support faster regeneration after intense exercise, reduce soreness and contribute to injury prevention when recovery is optimised. The strap demonstrates that large area organic light emitting diode (OLED) soft photonic skins can be directly integrated onto a stretchable and flexible, highly biocompatible, and ultra-conformable substrate sand can be fabricated at scale. These thin film devices deliver a uniform light dose over the target muscle group while the flexible strap follows the body contour. The device is aimed at use before and after sports sessions, in sports therapy, during recovery after physically demanding work or in guided rehabilitation programmes. Users can wear it at home, in the gym or while relaxing, which removes a typical barrier of clinic bound light systems and matches smart living principles of autonomy and prevention in familiar environments. The demonstrator will be shown at LOPEC 2026 at the OE-A booth and participates in the OE-A Demonstrator Competition

Beyond therapy: Platforms for Smart Living and Care

While light therapy serves as a demonstrator, the underlying technology platform extends far beyond this application. The same design and process concept can support health monitoring, assisted living and mobility related applications, including integration into bedding, blankets or upholstered furniture. Examples range from unobtrusive motion or temperature monitoring in infants to activity and well-being tracking for elderly people living independently, all without cameras or intrusive sensors. Printed electronics enable rapid adaptation of the layout to different body regions, sports disciplines and user groups, and support large area production at competitive cost. Devices can be tailored to individual requirements, making smart living solutions more inclusive and acceptable.

Further information

The work was carried out at SAL, Austria's largest non-university research centre for electronics-based systems, in collaboration with Mimotype Technologies. SAL conducts applied research in printed electronics, sensor systems, and flexible hybrid integration, focusing on the transfer of scientific results into practical applications.

www.silicon-austria-labs.com
Image source: Silicon Austria Labs GmbH

LOPEC 2026

Flexible and printed electronics – everything you need to know before LOPEC

From indoor solar cells and green electronics to sensor systems for agriculture: At LOPEC in Munich, the world's leading trade fair with accompanying conference for flexible, organic and printed electronics, visitors will gain valuable insight into the latest technological developments from 24-26 February 2026. More than 160 international exhibitors will be presenting new materials, manufacturing technologies, and actual applications, bringing the diversity of printed electronics to life.





Impressions from the previous LOPEC edition



Sustainability as a key success factor

In times when sustainability is becoming a key success factor, more and more sectors such as the automotive industry, consumer electronics, and MedTech are recognising the benefits of printed electronics.
The thin, lightweight and flexible components meet sustainability criteria and can be integrated into a wide range of products. LOPEC 2026 will showcase fascinating new products in the Innovation Showcase. They include Google's energy autonomous TV remote control, which is equipped with printed indoor solar cells from LOPEC exhibitor Epishine. German automotive supplier Marquardt, in turn, is cooperating with the US company E Ink, the inventor of electronic ink for e-readers. In Munich, Marquardt and E Ink will be presenting vehicle interior trim that can change its colour and pattern with a single touch, depending on the mood and preferences of the occupants.
"Printed electronics opens up a wide range of new opportunities for numerous industries," says Wolfgang Mildner, General Chair of LOPEC and CEO of the German consulting and technology company MSWtech. This is reflected, among other things, in the strong presence of startups: Six of them will be exhibiting this year. In addition, with 15 participants, more young companies than ever before took part in the LOPEC Startup Competition. The five best ideas are nominated for the Startup Award and will give a pitch at LOPEC. This underscores the technological momentum of printed electronics.
At the same time, LOPEC will offer both experts and beginners valuable insights into current developments and practical applications. The application sessions on mobility (25 February, 11:30) and smart living (26 February, 11:20) will make an important contribution to that. Both sessions are part of the LOPEC Conference and can be attended with a half-day ticket.
The all-day workshop Design@LOPEC, taking place on 24 February and sponsored by E Ink, is aimed at industrial and fashion designers from a wide range of sectors. After last year's successful premiere, Dutch designer Marina Toeters is once again organising the workshop, this time with the support of Jean-Charles Flores, co-founder of Flexoo in Heidelberg. The best results will be presented in the LOPEC Innovation Showcase.

Defence, AI and sustainability – current topics in printed electronics

The LOPEC Roundtable on 25 February at 15:00 is dedicated to current challenges in the defence, aerospace and aviation sectors. Under the title "Aerospace and Defense – What Role for Flexible and Printed Technologies?", experts will discuss how printed electronics meets the high demands of these industries and what new opportunities this opens up for embedding printed sensors and intelligent systems.







Sustainability is also high on the agenda of the LOPEC Conference with short courses on “Bio-based Materials” (24 February, 9:45) and “Sustainable Printed Electronics” (24 February, 16:15), as well as sessions on “Circular Economy and Green Electronics” (25 February, 14:30) and “Sustainable Processes, Materials and Sensors” (26 February, 14:20). Plenary sessions will kick off each day of the conference, highlighting the latest trends and groundbreaking developments in the flexible and printed electronics industry. The scope ranges from electronics made from carbon nanotubes to printed sensors that record the microclimate on leaves and fruit, so that irrigation can be optimised and agriculture made more sustainable. New to the conference programme are the “Business Insights” on promising business models on 24 February at 15:40 and the Poster Pitch on 25 February, the first day of the trade fair, at 16:30 with short presentations on the highlights of the poster session. There will be a presentation on “kirigami electronics”, which transforms flat printed electronics into 3D systems by cutting and folding. “Printed electronics impresses with its flexibility—and LOPEC also keeps on adapting to the requirements of the market,” says Wolfgang Mildner, summing up. With its combination of international trade fair, conference and a diverse supporting programme, LOPEC presents the entire spectrum of printed electronics—from research to production and application.

www.lopec.com
Image source: Messe München

PRO flextronics
We are official media partner of LOPEC.
Visit us at booth FOE 01

Startups, innovation and the path to market

For our Podcast, The Voice of Flextronics, we sat down for an interview with John Fahlteich, CEO of KETMarket, and LOPEC Exhibition Director Armin Wittmann. Startups are receiving a "red carpet" treatment at the leading printed electronics event – and the LOPEC Startup Award is one of the highlights in the programme.

PRO Flextronics: Mr Wittmann, LOPEC 2026 is just around the corner. How are the final preparations progressing from your perspective as Exhibition Director?

Armin Wittmann: As always shortly before the event, anticipation is rising noticeably. Many things that have been planned over a long period are now coming together, and most importantly, they are working as intended. LOPEC is held annually, so there is a certain level of routine, but the tension before the show never really disappears. At this stage, everything is running according to plan.

PRO Flextronics: Mr Fahlteich, you are closely connected to LOPEC both personally and professionally. Could you briefly outline your background and your role at the event?

John Fahlteich: I have been connected to LOPEC for more than 15 years, initially as a researcher at Fraunhofer, where I worked on encapsulation for flexible electronics and transparent electrodes. Three years ago, I co-founded KETMarket, a company that supports SMEs and research institutions in cooperation, technology transfer and commercialisation. At LOPEC, I am responsible for the Startup Award and the Startup Forum – and I also chair the jury.

PRO Flextronics: KETMarket operates as a digital marketplace for open innovation. How does this concept align with LOPEC?

J. Fahlteich: The fit is very natural. KETMarket connects technology providers with companies, service providers and funding opportunities across industries. Technologies are listed on the platform and can be discovered by potential partners, similar in principle to a classified marketplace. What goes beyond that is the direct implementation: we initiate projects, acquire funding, and support the technical and commercial realisation. LOPEC, on the other hand, provides the physical meeting point where these connections often originate.

PRO Flextronics: Can you give an example of how such collaborations develop in practice?

J. Fahlteich: One example involved a company producing thermal insulation materials from bio-waste such as coffee grounds. Through our platform, they identified a laboratory for fire safety testing, which led to a collaboration with a university in Greece. Over time, the project evolved further and eventually incorporated flexible electronics, for example in the context of electrochromic windows. This shows how cross-industry innovation paths can develop.

PRO Flextronics: Mr Wittmann, the LOPEC Startup Award has become an established element of the event. What role does it play for the exhibition as a whole?

A. Wittmann: The Startup Award is extremely important for LOPEC. Startups demonstrate the dynamism of the market and the innovative power of printed electronics. Compared to other industries, printed electronics continues to attract a high number of young companies, often driven by sustainability, lightweight design and new functionality. Supporting these startups aligns perfectly with LOPEC's mission to promote the technology and its ecosystem.



The LOPEC Startup Award ceremony last year

Listen to our Podcast with Armin Wittmann and John Fahlteich here!

PRO Flextronics: How does the selection process for the Startup Award work?

A. Wittmann: The call for applications typically starts in autumn and is promoted both via LOPEC channels and through the startup networks of our partners, including KETMarket. This is essential, as the startup landscape is highly dynamic. After the application phase, experts select five finalists from around 15 candidates. This selection is completed before Christmas to allow sufficient preparation time.

J. Fahlteich: In addition, we actively support the finalists. Together with other community members, we coach them on how to present their technology and business model in a way that is understandable and attractive for investors. The goal is not only a good pitch, but a realistic path towards commercial success.



PRO Flextronics: What criteria are decisive for the jury when selecting the finalists and winners?

J. Fahlteich: First, there must be a clear link to flexible or printed electronics. This does not necessarily mean a finished device – it can also be a material, a manufacturing process, equipment or metrology. Secondly, the business perspective is crucial: the maturity of the business plan, market understanding, defined unique selling propositions, existing customers or revenues, and the IP situation. We also introduced a dedicated mentoring session ahead of the competition to support teams that are technically strong but less experienced in business development.

PRO Flextronics: The Startup Award includes two categories. What distinguishes them?

J. Fahlteich: One award focuses on Highest Business Impact Potential, evaluating how close a startup is to market success. The second recognises the Most Impactful Technology, regardless of immediate commercial scale. This allows us to acknowledge breakthrough technologies that significantly advance printed electronics, even if their market impact will unfold over a longer time horizon.

PRO Flextronics: How do you assess the availability of young talent in printed electronics today?

A. Wittmann: The number of startups has remained quite stable over the years, which indicates a healthy level of interest. What matters most is inspiring people by showing what is already possible and what could be achieved in the future. It is also important for founders to adopt the perspective of investors and customers and clearly communicate the value of their technology.

J. Fahlteich: I would add that the diversity of applications plays a key role. Flexible electronics is relevant in construction, logistics, smart packaging, medical technology and many other fields. This cross-industry relevance attracts both experienced entrepreneurs and younger founders and creates a unique mix that defines the character of the Startup Award.

PRO Flextronics: Finally, what are you personally most looking forward to at LOPEC 2026?

A. Wittmann: The startups are always a major source of inspiration. In addition, I am particularly interested in this year's roundtable on aerospace and defence and in the new application-oriented partnerships within the conference programme.

J. Fahlteich: For me, the Startup Forum is the highlight, but I also value the exhibition itself. LOPEC is large enough to offer diversity, yet still allows for in-depth technical discussions directly with experts at the booths. That combination makes the event unique.

Image source: Martin Hirschmann

Marquardt & E Ink

Redefining automotive interiors with smart materials


Felix Hake

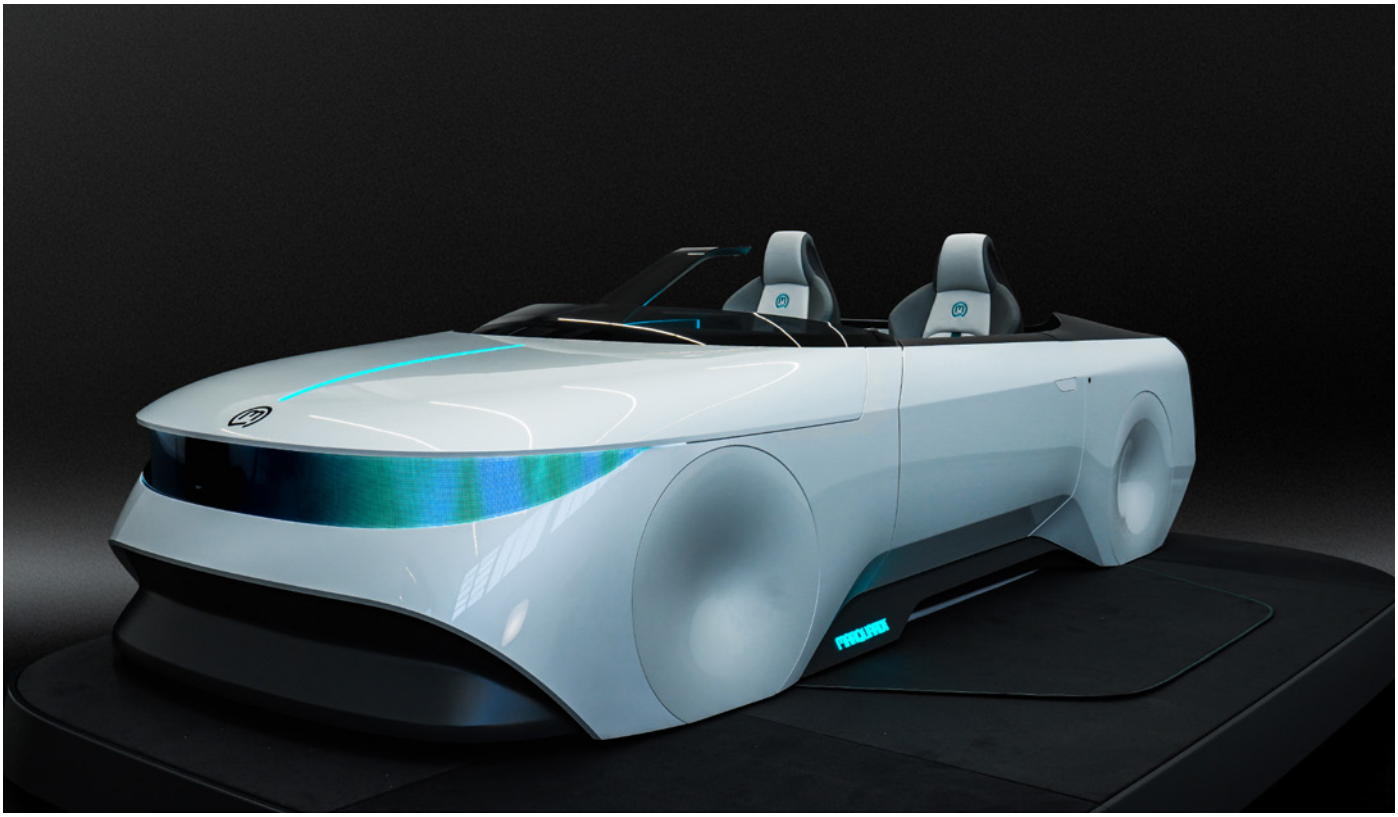
Marquardt and E Ink will showcase a shared vision for the automotive interior at LOPEC 2026. We talked to Felix Hake, Head of Innovation at Marquardt, and Pete Valianatos, Senior Director, Strategic Initiatives, at E Ink.

PRO Flextronics: Mr Hake, Mr Valianatos, you will jointly present at the LOPEC Conference in Munich. How did this collaboration between Marquardt and E Ink come about?

Felix Hake: The starting point was Marquardt's 100th anniversary, which we marked with a concept car called Centum. It was designed as a showcase for our engineering heritage and, more importantly, for our vision of future automotive interiors. We looked at key trends such as digitalisation, software-defined vehicles, autonomous driving and the resulting changes in how people will experience the car interior. One central question was: if users will spend much more time in the vehicle, how can materials contribute to trust, wellbeing and individualisation? That led us to the idea of going beyond lighting by enabling colour-changing interior trim. This is when we approached E Ink.

PRO Flextronics: What role does E Ink technology play in this vision?

F. Hake: Our goal was to combine premium haptics with digital flexibility. We had already developed transparent artificial leather concepts with Backlighting together with Covestro, but combing these with E Ink offered a completely new dimension. By integrating colour-changing E Ink films behind a leather-like surface, we can create real trim parts that still look and feel premium, but can change colour over time. This fits perfectly with the idea of software-defined vehicles, where customers can upgrade features, functions – and potentially even interior colours – over the lifetime of the car.



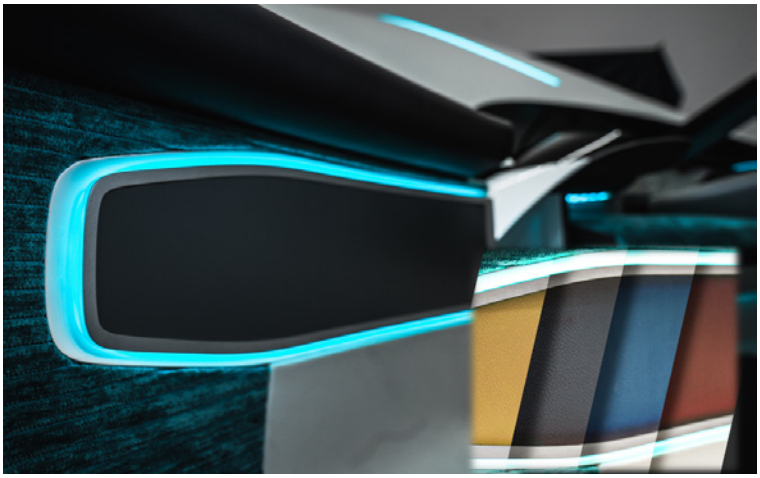

Pete Valianatos

PRO Flextronics: Mr Valianatos, what made this application interesting for E Ink?

Pete Valianatos: As E Ink moved into colour technologies, new markets opened up beyond classic displays. One strategic question for us was how E Ink could be used as a design material, not just a display. People are already overloaded with illuminated screens, especially in cars. E Ink offers colour change without light emission. Once the colour is set, it remains stable without power consumption. That makes it energy-efficient, heat-free and visually calm – and when combined with Marquardt's material expertise, it no longer feels like a display, but like a tangible surface.

PRO Flextronics: From a manufacturing perspective, how flexible is the technology?

P. Valianatos: The films are produced roll-to-roll on plastic substrates, which gives a lot of design freedom. They can be laser-cut, shaped, perforated or combined with negative space for buttons or handles. Today, the showcased component is largely two-dimensional with a slight curvature, but the roadmap clearly includes thermoforming and moulding into three-dimensional shapes. This opens up a wide design space for interior applications.



PRO Flextronics: Beyond aesthetics, do you see functional benefits?

P. Valianatos: Absolutely. Colour can support functionality and comfort. For example, interior surfaces could become lighter to improve readability or darker to create a calmer atmosphere. There is also potential for thermal effects: darker colours absorb more light; lighter colours reflect it. Combined with sensors, such systems could contribute to thermal management without consuming significant energy. This is where smart materials start to interact with the vehicle environment.

PRO Flextronics: Automotive requirements are particularly demanding. What were the main technical challenges?

P. Valianatos: Temperature stability was a key topic. Traditional colour E Ink films operate in a limited range, but automotive applications require much more robustness. We have been working on extending the operational window to roughly –25°C to +75°C. High temperatures are particularly challenging due to material expansion and adhesive stability. We are leveraging long-term data from outdoor signage installations worldwide to redesign material stacks and improve durability, including UV resistance and impact protection.

PRO Flextronics: What can the LOPEC audience expect from your keynote session?

P. Valianatos: Printed electronics is often associated with what sits behind the substrate – electrodes, inks, processes. This example shows what happens when printed electronics meets design. It demonstrates that colour change does not have to rely on LEDs or OLEDs and that printed technologies can directly shape visible, tactile surfaces.

F. Hake: From an automotive perspective, we will show how technology and market needs come together. Individualisation, personalisation and software-driven upgrades are becoming key differentiators. Our collaboration illustrates what future interior products could look like – and how a "wow effect" can be created through smart materials rather than screens alone.

PRO Flextronics: A glimpse into the next generation of automotive interiors?

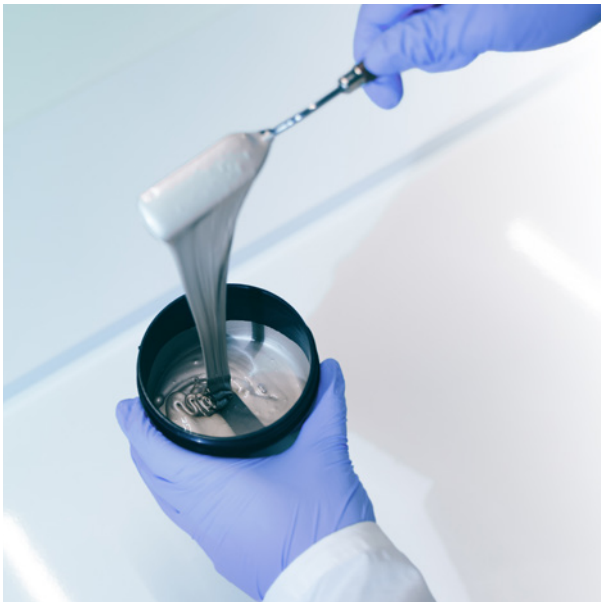
F. Hake: Exactly. It is about showing what is technically possible, why it makes sense from a market perspective, and how materials can actively shape the user experience in future vehicles.

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Henkel Printed Electronics
Henkel Printed Electronics is a leading supplier of functional materials and inks for printed electronics applications. With more than 45 years of experience, Henkel supports customers across the value chain with advanced material formulation, high-performance conductive inks, and application-focused expertise.

Lopec booth no: B0.607
www.henkel.com



At LOPEC 2026, Henkel highlights material innovations for smart surfaces, smart healthcare, and smart connectivity, including solutions for wearables, self-regulating PTC heater technologies, smart healthcare components, and advanced antenna applications. A key focus is on cost-efficient and sustainable material concepts, such as recycled silver inks, silver-plated copper technologies, and low-temperature sintering conductive inks designed to support scalable manufacturing.

Henkel combines deep material expertise with a strong partner ecosystem to help bridge the gap between innovation and industrialisation in printed electronics.

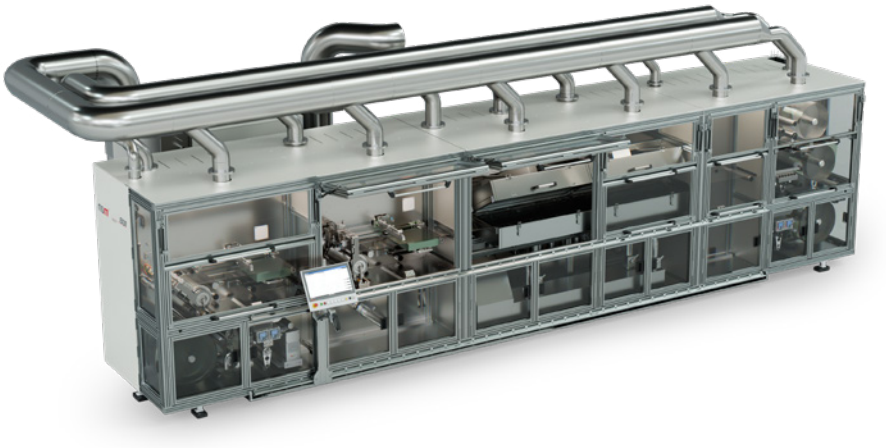
Contact: printed.electronics@henkel.com

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NSM Norbert Schläfli AG is a Swiss machinery manufacturer specializing in high-precision printing, coating and laminating systems for printed and flexible electronics. For many years, NSM has been supporting research institutes, universities and industrial partners worldwide with reliable lab and pilot-scale equipment. The company's portfolio ranges from compact benchtop R&D systems to modular roll-to-roll and sheet-based pilot lines. Multiple printing and coating technologies such as gravure, flexographic, rotary and flatbed screen printing, inkjet and slot-die coating can be combined within one platform, enabling flexible process development and scalable manufacturing concepts.

Lopec booth no: B0.602
www.nsmz.com

A strong focus lies on emerging energy technologies, including perovskite-based solar cell and thin-film photovoltaic applications, as well as printed electronics, functional materials and multilayer processes. NSM systems are designed for high reproducibility, precise process control and customer-specific configurations. Swiss engineering, modular platform concepts and close collaboration with research and industry partners characterize NSM's approach to machine development.



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Founded in 1984, **RKS** has established itself as a technology-driven specialist for industrial screen-printing solutions. With a clear emphasis on printed electronics and functional printing, **RKS** develops high-precision squeegee solutions for the deposition of conductive, dielectric, resistive, and functional layers. Close collaboration with customers ensures that ink rheology, substrate characteristics, and process parameters are considered from the earliest development stages.

Lopec booth no: B0.611
www.rk-siebdruck.de

Decades of practical experience have resulted in a high-performance portfolio designed for maximum print accuracy, process stability, and reproducibility—key requirements for scalable printed electronics manufacturing. Complemented by precisely matched peripheral equipment, **RKS** supports standardized, robust, and sustainable screen-printing processes, accompanying customers from research and prototyping through pilot lines to high-volume industrial production worldwide, across emerging applications and future-oriented electronic manufacturing sectors. “At LOPEC, showcasing the latest innovations: the Carbon BW, HT1, and HT3 high-performance squeegees.”





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TSE Troller AG, CH

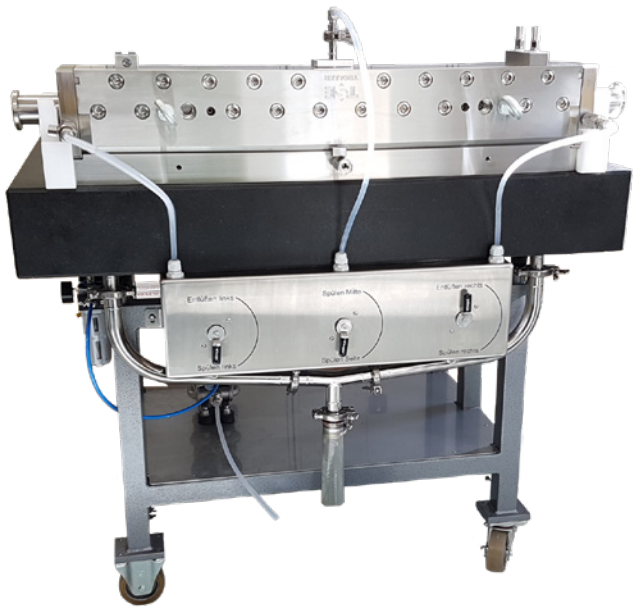
Keep it clean with our latest innovation -
TSE Troller AG’s Cleaning Station for Slot Dies
Join us at LOPEC and experience our latest innovation: the cleaning station for slot dies – designed for maximum efficiency and operational safety.

As a leading expert in slot die solutions, TSE Troller AG sets new benchmarks in coating technology. Our cleaning station enables fast, thorough, and gentle cleaning of your slot dies – ensuring consistent high product quality with minimal downtime.

Your benefits at a glance:
» Residue-free, efficient cleaning
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» Less maintenance, more productivity
» Eco-friendly and user-friendly design

Beside our latest innovation, please take the chance to speak to our coating specialists. The standard, we set ourselves: We support you in every phase of your project, from the initial idea to commissioning. This is based on decades of experience which you can benefit from.
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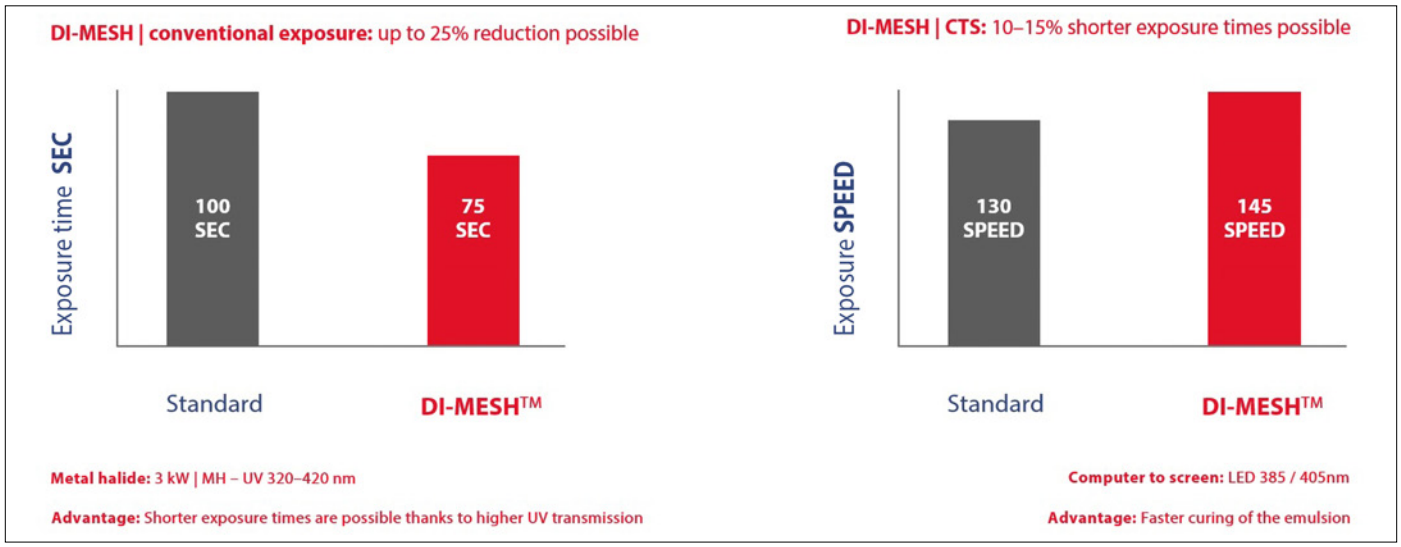
Lopec booth no: B0.115
ww.tse-coating.ch



PVF Mesh & Screen Technology GmbH

A new standard in screen printing mesh

When technological innovation becomes visible, it is not expressed in grand words, but in clearly measurable results. With DI-Mesh, NBC/PVF presents a mesh development that has the potential to sustainably transform key processes in screen printing.



Comparison of exposure time

Transparency that creates new possibilities

At the core of this development is a novel, exceptionally transparent filament material that allows UV light to pass through with previously unattainable efficiency. The consequences are immediately noticeable:

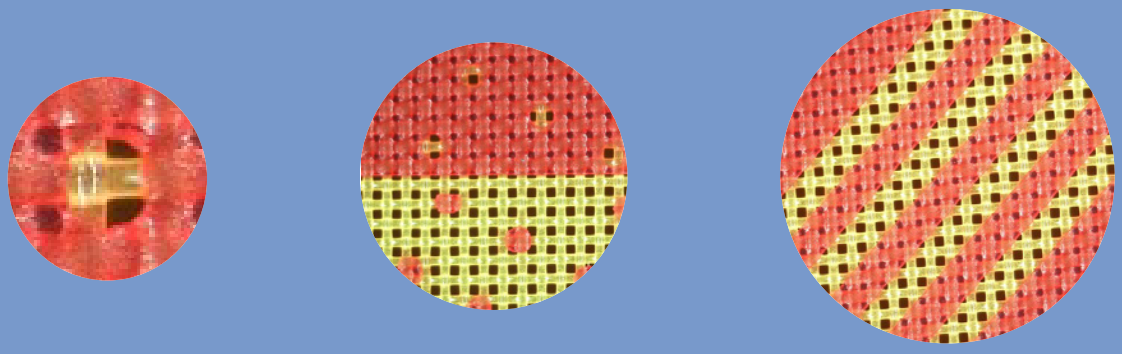
» Significantly higher light transmission
» Up to 25% shorter exposure times
» More precise contours and improved sharpness, even for the finest structures

This enhanced utilisation of light reduces energy consumption while simultaneously lowering process costs – an advantage that proves effective both in industrial mass production and in demanding specialised applications.

Technology that connects practice and sustainability

DI-Mesh is not just a material, but the expression of a fundamentally new approach to screen printing: processes become more predictable, more reproducible, and more sustainable.

www.pvfgmh.de
Image source: PVF Mesh & Screen Technology GmbH



Resolution of a 100µm line on the newly-developed polyester mesh DI-120-035

Heraeus Electronics

Driving PriElex forward as the go-to solution for Printed and Flexible Hybrid Electronics



Ryan Banfield

PRO Flextronics sat down for an interview with Ryan Banfield, Global Product Manager, PriElex, at Heraeus Electronics. The company will showcase its polymer thickfilm portfolio at the upcoming LOPEC 2026 tradeshow.

PRO Flextronics: Mr Banfield, the flexible and printed electronics industry is entering 2026 with cautious optimism, as reflected in the latest OE-A Business Climate Survey. What are the main goals and considerations for Heraeus Electronics this year?

Ryan Banfield: Entering 2026, Heraeus Electronics shares the industry's cautious optimism, paired with a clear focus on disciplined, application-driven growth. After several years of strong innovation across flexible and printed electronics, this year is about assisting customers in moving from technical possibility to scalable, reliable manufacturing for next-generation applications. Our priorities centre on delivering materials that perform consistently in real production environments – supporting customers as applications transition from pilots into volume production with clear expectations around quality, yield, and long-term reliability. A key consideration for us in 2026 is ensuring portfolio relevance and strong value-chain collaboration. Through our PriElex polymer thick-film materials, we are concentrating on solutions that address concrete manufacturing challenges, rather than chasing broad experimentation. At the same time, we are deepening engagement with customers, equipment partners, and integrators to align materials, processes, and end-use requirements early in development. Combined with a continued focus on supply reliability and sustainability, this approach allows us to help customers confidently integrate printed electronics into next-generation products.

PRO Flextronics: You will return to LOPEC as exhibitors once again. What are your expectations for the event – and what can visitors experience at your booth?

R. Banfield: At LOPEC, one of our key highlights is the strong material and process compatibility across Heraeus, particularly between Heraeus Electronics and Heraeus Epurio for touchscreen and film applications. By aligning polymer thick-film inks with complementary conductive materials, we're able to offer customers more integrated, application-ready solutions rather than isolated products. This system-level approach reduces development risk, shortens time to market, and enables more robust designs for printed and flexible electronics. We're also showcasing continued progress in high-growth application areas such as flexible heaters and medical devices, where reliability, consistency, and application know-how are just as critical as material performance. Beyond the materials themselves, a major differentiator for us is how we support customers globally – with the technical depth and infrastructure of a large organisation, combined with the responsiveness and agility of a small team. Our goal is to act as a true development partner, working closely with customers from early concept through scale-up, helping them solve challenges and bring printed electronics solutions to market with confidence.



Heraeus Electronics' PriElex paste



PRO Flextronics: Smart Living and Mobility are the focus topics of LOPEC – and applications in these areas are enabled by materials from Heraeus Electronics' portfolio, such as the PriElex product line. Can you describe the advantages of your products?

R. Banfield: In Smart Living and Mobility applications, the advantage of Heraeus Electronics lies not only in technical advantage from a product perspective, but also in how we support customers holistically. We combine a global technical and manufacturing footprint with highly responsive, locally embedded teams, allowing us to move with the speed and flexibility of a smaller company while offering the reliability and experience of a long-established industry partner. This structure enables close collaboration across regions, faster development cycles, and consistent support from early design through industrialisation. Equally important is our deep understanding of the end applications our customers are developing for. In polymer thick film technologies, performance is defined not just by the ink itself, but by how it interacts with substrates, printing processes, downstream assembly, and real-world operating conditions. Whether it's self-regulating printed heating elements for smart home comfort systems, functional interfaces in appliances, or flexible sensors used in mobility and interior applications, we work closely with customers to optimise material selection and design for the full system – not just the printed layer. This application-driven approach, backed by a proven track record in printed electronics allows us to act as a true development partner, helping OEMs create robust, scalable products that meet both technical and commercial requirements.

PRO Flextronics: One area that is gaining in importance, also at events like LOPEC, is stretchable and thermoformable solutions. How far are we in the development of these products – and what role does your company play here?

R. Banfield: Stretchable and thermoformable electronics are clearly moving from niche concepts toward meaningful, high-growth application spaces, and Heraeus Electronics sees this as one of the most important development areas within printed electronics. Applications in Smart Living, wearables, interior surfaces, and mobility are driving demand for electronics that can conform to complex geometries, withstand mechanical deformation, and still deliver reliable electrical performance. While these technologies are still progressing along the commercialisation curve, the pace of innovation and customer engagement signals that stretchable and thermoformable solutions will play a significant role in next-generation product designs. Our role in this evolution is to work closely and on an individual basis with customers to bridge the gap between material capability and real-world manufacturing. In the absence of fully established standards – for example, what defines "stretchable enough" or where thermoformability begins and ends – application success depends heavily on

process integration. We collaborate one-on-one with customers to ensure our broader polymer thick-film portfolio works seamlessly with their specific substrates, printing methods, forming processes, and end-use requirements. This close development partnership allows us to continuously refine and iterate materials alongside our customers, enabling both sides to evolve quickly as these applications move toward broader commercialisation.

PRO Flextronics: Can you share some insights into your current R&D efforts? How can customers profit from your capabilities?

R. Banfield: At Heraeus Electronics, our R&D efforts are firmly anchored at the intersection of long-term vision and near-term application needs. We are actively developing next-generation polymer thick-film materials that address where printed and flexible electronics are headed – often years before those applications reach full commercialisation. While we can't share specific details, our work spans emerging requirements such as advanced formability, mechanical durability, system integration, and compatibility with evolving manufacturing processes. Importantly, our innovation roadmap is shaped through continuous dialogue with customers and industry partners, giving us early insight into market trends, application challenges, and the performance expectations OEMs are hearing from their own customers. Customers profit from these capabilities not only through access to advanced materials, but through how we bring them to market. We collaborate closely with partners across Smart Living, Mobility, medical, and thermal applications to co-develop solutions that function reliably in real production environments. By combining a global R&D and support network with highly responsive local teams, we deliver the technical depth and reliability of a global organisation with the agility of a small company. This application-driven, partnership-based model reduces development risk, accelerates time to market, and enables customers to confidently capture emerging opportunities – supported by a long-term partner, not just a material supplier.

PRO Flextronics: Looking beyond LOPEC where will PriElex appear next in 2026?

R. Banfield: Following LOPEC, the remainder of 2026 is about turning collaboration and innovation into tangible progress for the printed electronics industry. We are preparing to introduce new materials targeted at both medical and consumer applications, reflecting continued demand for reliable, application-ready polymer thick-film solutions as printed electronics move into more widespread adoption in everyday products. In parallel, we remain focused on advancing our development pipeline alongside customers, ensuring that new materials align not only with performance requirements, but with real manufacturing and qualification needs. Equally important is how we engage with the industry. This year we are expanding hands-on customer workshops in the U.S. in late April and in China in late September, creating opportunities for direct collaboration, process learning, and application-level problem solving using PriElex materials. We will also continue active participation in key industry events, including TechBlick in both California and Berlin, where meaningful technical dialogue and cross-value-chain collaboration continue to drive the industry forward. Altogether, 2026 is shaping up to be a year of focused growth – strengthening partnerships, accelerating adoption, and reinforcing PriElex as a proven solution for printed and flexible hybrid electronics.

www.heraeus-electronics.com
Image source: Heraeus Electronics, Adobe Stock



Schobertechnologies GmbH

Rotary converting technologies for fuel cell manufacturing



Fuel cell technology is widely regarded as a key building block of future energy and mobility systems. From automotive applications to stationary power generation, fuel cells promise high efficiency and low emissions – provided that scalable, reliable manufacturing processes can be established. One of the critical challenges lies in the precise and gentle processing of thin, sensitive functional materials such as membranes and bipolar plates. This is where rotary converting technologies are increasingly gaining attention.

Schobertechnologies GmbH, headquartered in Eberdingen, Germany, has been developing rotary tools, modules and specialised converting machines for more than 75 years. While traditionally rooted in the paper, film and foil converting industries, the company has gradually expanded its portfolio into high-tech application fields, including medical technology, electronics, automotive engineering – and fuel cell manufacturing.

Meeting extremely tight tolerances

In fuel cell systems, particularly in proton exchange membrane (PEM) technology, components such as bipolar plates and membrane electrode assemblies (MEAs) must meet extremely tight tolerances. The catalyst-coated membrane (CCM), a core element of the MEA, is especially demanding to process. It is thin, flexible and highly sensitive to mechanical stress as well as environmental influences such as temperature and humidity. Conventional processing methods often reach their limits when handling these materials at industrial scale.
Rotary web-fed converting offers a different approach. Instead of intermittent, stroke-based operations, the material is processed continuously, significantly reducing mechanical load and improving process stability. According to Schobertechnologies, rotary die-cutting and punching technologies have proven particularly effective when integrated into fuel cell assembly lines, allowing sensitive membranes to be processed with high precision and repeatability
The company provides both inline and offline rotary solutions for finishing bipolar plates and membranes. These include embossing tools with customised pattern designs for bipolar plates, rotary die-cutting systems optimised for delicate membranes, and punching tools capable of producing dense hole patterns using exchangeable punches and dies. In addition, Schobertechnologies offers combined tool concepts that integrate embossing and die-cutting functions into a single rotary unit, reducing process steps and footprint.

Rotary systems for material handling

Another important aspect in fuel cell manufacturing is material handling. Rotary systems allow the web to remain under controlled tension throughout the process, minimising deformation and damage. Cut-and-place modules can separate individual components from the web and place them accurately onto a moving carrier substrate, either at fixed or variable distances. This is particularly relevant for high-volume production scenarios where automation and cycle time are critical.
Beyond individual tools, Schobertechnologies also supplies modular rotary converters that combine calendering, embossing, punching and die-cutting functions in a single machine architecture. Such modularity allows manufacturers to adapt production lines to different fuel cell designs or future product generations without completely redesigning the process.

Growing relevance of these technologies

From a market perspective, the relevance of these technologies is set to grow. Global investment in hydrogen and fuel cell technologies continues to increase, driven by decarbonisation targets in transport and industry. As pilot projects transition into serial production, manufacturers are under pressure



Fuell cell technologies are a growth market for Schobertechnologies

to scale up output while maintaining quality and cost efficiency. Continuous, web-based processes are seen as a key enabler for this transition.
To support development and industrialisation efforts, Schobertechnologies operates an R&D centre equipped with rotary test tools for embossing, punching and die-cutting patterns. This allows customers to evaluate process feasibility and optimise tool designs before moving into series production—an important factor in a market where materials and component architectures are still evolving rapidly.
As fuel cell technologies move closer to mass deployment, manufacturing expertise will become just as decisive as electrochemical performance. Rotary converting solutions offer a pathway to combine precision, scalability and gentle material handling—three requirements that are essential for turning fuel cell concepts into industrial reality.

www.schobertechnologies.com
Image source: Schobertechnologies GmbH



LOPEC, the meeting point for the flexible, organic and printed electronics industry.

Exhibition
February 24–26, 2026
Messe München, Germany

LOPEC

INO

Faster time-to-market for printed electronics industrialisation

Transitioning from a development environment to stable serial production of printed electronics requires systematic automation planning, process parameter validation, and production equipment integration. Many PE development projects encounter obstacles during scale-up, such as non-upgradable equipment, unstable processes, and complex multi-vendor integration. Modular approaches provide an effective solution to these challenges.

The scaling challenge in printed electronics

Printed electronics applications – from multi-layer automotive sensors to medical diagnostic devices such as biosensor strips or wearable health monitors – are moving from pilot projects to industrial production. Functional prototypes demonstrate technical feasibility, but industrial production demands repeatable, stable processes and a relatively fast transition to larger volumes.

Critical points in scale-up processes

Analysis of scale-up failures reveals three recurring patterns: equipment limitations, process instability during the transition from R&D to production, and the complexity of multi-vendor system integration. Early decisions regarding equipment, automation, and material handling ultimately determine the feasibility of successful industrialisation.

» **Non-upgradeable equipment:** R&D systems optimised for flexibility and rapid parameter iteration are often not upgradeable to production configurations. The consequence is full equipment replacement during scale-up, process re-validation, and loss of transferable R&D know-how.

» **Non-transferable parameters:** Parameters optimised in the R&D environment – such as paste deposition, squeegee pressure, and print speed – cannot be directly transferred to different equipment. Replacing an R&D machine with a production machine alters machine dynamics, requiring process re-optimisation and causing instability and delays during scale-up.

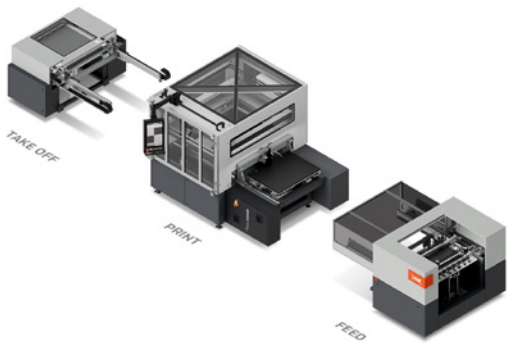
» **Multi-vendor integration:** Production lines built from components of different suppliers (feeding, printing, drying, stacking) require extensive integration engineering: mechanical interfaces, communication protocols, HMI systems, recipe management, and process synchronisation. Troubleshooting becomes complex due to unclear accountability between vendors. Multiple service contacts, fragmented spare parts logistics, and differing software interfaces increase operational overhead and extend downtime.

„The industry reports several months of integration time for multi-vendor configurations, compared to single-source systems, which take less than a week – including operator training," say experienced industry players.

Avoiding scale-up pitfalls

Single-source modular screen printing lines with a unified printing core

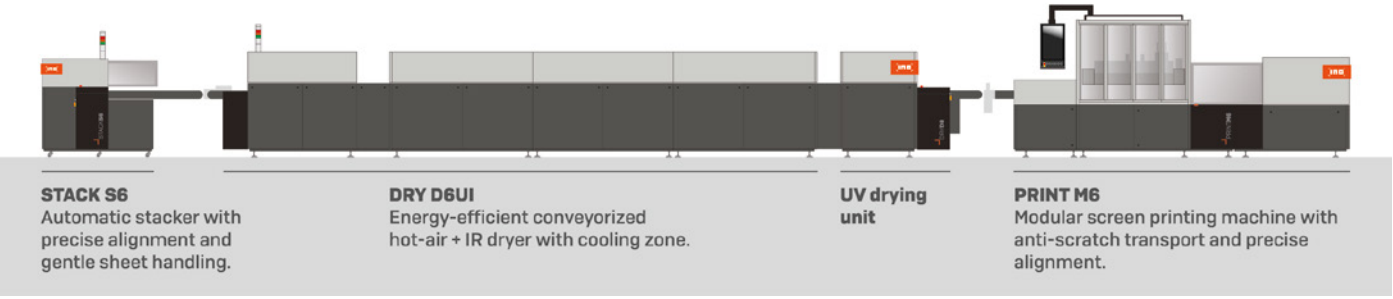
As a response to the challenges of the growing printed electronics industry, INO developed the PRINT M system. A key feature of this series of screen printing machines is modularity. PE manufacturers can start with a half- or three-quarter automated configuration (M4/M5) and gradually upgrade to a fully automated M6 without replacing the core printing unit. This approach reduces initial costs while maintaining R&D settings and significantly shortens the transition time to serial production.



PRINT M modular system – M4/M5/M6 configuration

» **R&D phase – ½ automatic (M4):** Focused on product development and functional validation while laying the foundation for future production. Repeatability, precise registration, and process stability must be defined early. Semi-automated systems allow close monitoring and frequent parameter adjustments.

» **Pilot production – ¾ automatic (M5):** Selective automation (e.g., automated sheet take-off) reduces operator workload, increases throughput, and preserves flexibility for fine process tuning. Process variability becomes measurable, stabilising operations and establishing initial standardisation.



Single source supply – automatic feeding, printing unit, drying system (IR, hot air with optional UV module), and stacking

» **Serial production – fully automatic (M6):** Continuous production with minimal human intervention, automated feeding, precise substrate positioning, and inline process monitoring. R&D parameters are directly transferable without re-validation. Stability, yield, and cost efficiency become decisive.

„Because the printing core is identical across all versions, R&D parameters are directly usable in production," explains Beno Šubic, Project Manager at INO. „This not only saves time but also mitigates risk."

Achieving high print quality from the start

Since the PRINT M printing core is identical regardless of automation level, high-quality printing can be achieved from the first samples. The system combines high precision, fast parameter adjustment, and careful pick-and-place handling, enabling printing on sensitive, ultra-thin, or thicker substrates. Automatic substrate and screen registration ensures consistent printing and repeatability even in the most demanding multi-layer applications. Quick Fit screen changeover significantly reduces setup time and minimises material waste.

Single source supply for faster scale-up

Most printed electronics production lines use equipment from multiple suppliers, resulting in lengthy and complex integration and hidden costs that only become apparent during ramp-up and operation. INO provides all key modules – automated feeding, PRINT M printing unit, drying system (IR, hot air with optional UV module), and stacking. A fully integrated line reduces total cost of ownership over the entire lifecycle. Purchasing the complete system eliminates the need for integration engineering and unforeseen compatibility fixes. Pre-validated plug-and-play processes shorten commissioning time, and customer processes validated at the INO test centre transfer directly to the production environment. Service and maintenance are simplified with a single point of contact and unified spare parts logistics, while a common software ecosystem ensures long-term compatibility. A consistent user experience further reduces operator training time and minimises operational errors.



PRINT M6 - Fully automatic flat-bed screen printing machine

„When everything comes from a single supplier, there's no finger-pointing," says a production manager at an EU membrane keyboard manufacturer. „If a question arises, we know exactly who to contact. It changes the dynamics."

Speed of transfer to serial production as a decisive factor

Industrialisation of printed electronics begins in the R&D phase with decisions on equipment architecture and process design. Modular approaches that preserve the printing core across all stages significantly reduce risk, costs, and time to serial production. For companies developing new PE applications, this can be the difference between successful industrialisation and repeated pilot projects without long-term production stability.
Highlights:

» Modular design enables transition from prototyping to serial production without replacing the core unit.
» A single supplier simplifies the supply chain, reduces errors, and accelerates line start-up.
» PRINT M supports all stages – from R&D to high-volume production – on a single platform.

Written by Katja Pirnat, Marketing and Print Technology at INO

www.ino.tech
Image source: INO

nsm Norbert Schläfli AG

Transfer of perovskite processes from laboratory scale to pilot production

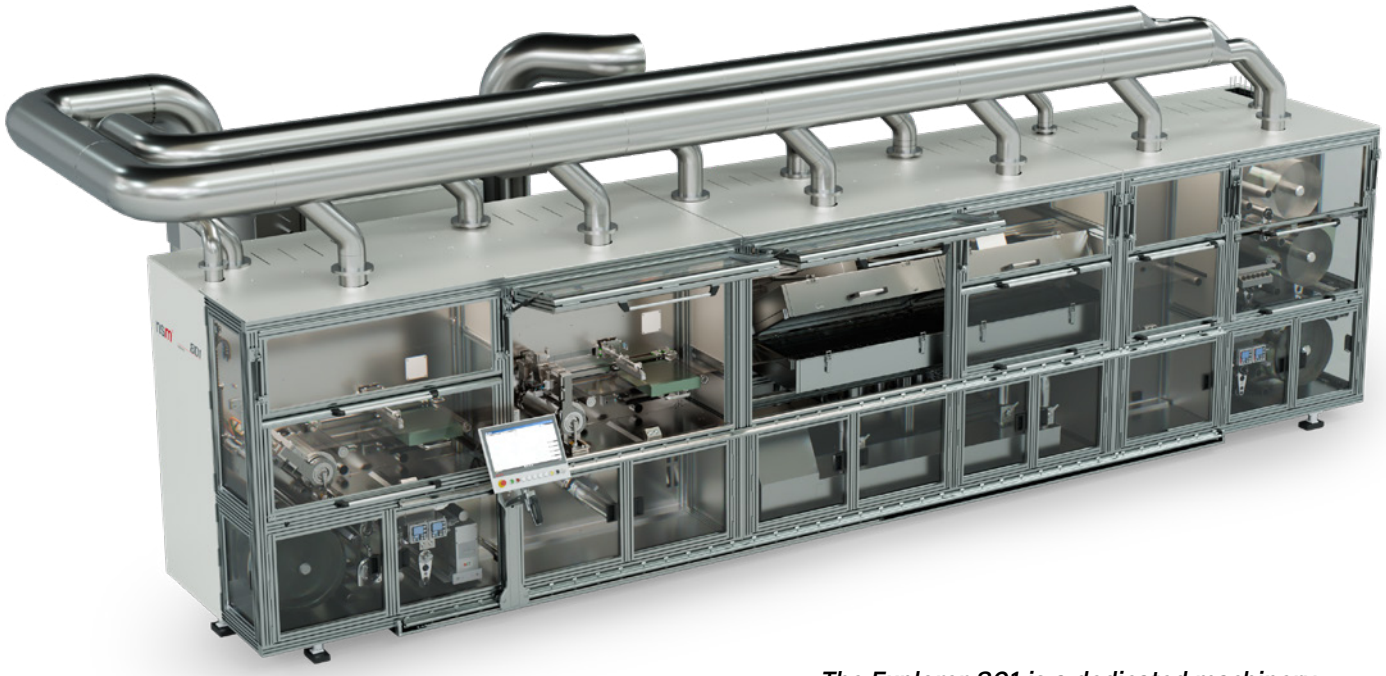
PRO Flextronics sat down for an interview with Michael Schläfli, CEO of nsm, which is based in Zofingen, Switzerland. His company offers an extensive portfolio of printing, coating and laminating equipment, with a special emphasis on pushing the boundaries of innovation in printed electronics.

PRO Flextronics: Mr Schläfli, your company nsm has been exhibiting at LOPEC for many years and is known as a leading machinery supplier for printed electronics. Please introduce us to your products and services – and provide us with an overview of your capabilities!

Michael Schläfli: NSM Norbert Schläfli AG is a Swiss machinery manufacturer specialising in printing, coating and laminating systems for printed and flexible electronics. For many years, we have been supporting research institutes, universities and industrial partners worldwide with highly precise lab and pilot-scale equipment. Our portfolio ranges from compact benchtop R&D systems to modular roll-to-roll and sheet-based pilot lines. Customers can combine multiple printing technologies such as gravure, flexographic, rotary and flatbed screen and coating processes within one platform, serving applications in printed electronics, functional materials and emerging energy technologies, including perovskites. Our strength lies in flexible, customer-specific solutions, high reproducibility and a deep understanding of functional materials and multilayer processes.

PRO Flextronics: Perovskites are a promising market segment for players in the flexible and printed electronics sector. What must be considered when dealing with these materials – and how are these considerations reflected in your machine designs?

M. Schläfli: Perovskite materials are highly sensitive to process parameters such as temperature, atmosphere, layer thickness and drying behaviour. Achieving stable and reproducible results therefore requires very precise control over coating, drying and handling steps. These requirements are directly reflected in our machine designs. NSM systems focus on controlled and reproducible process conditions, gentle material handling and accurate layer deposition. Modular machine concepts allow users to adapt coating, drying and curing steps to the specific needs of their perovskite material system. Our machines are designed to support systematic process development and to enable a reliable transfer of perovskite processes from laboratory scale to pilot production.



The Explorer 801 is a dedicated machinery solution for perovskite-based applications



Michael Schläfli (5th from left) with his father, Norbert Schläfli (6th from left) and staff members

PRO Flextronics: Speaking of Perovskites, nsm's explorer 801 is a dedicated machine concept for this segment. Please introduce us to the technological highlights of this machine!

M. Schläfli: The Explorer 801 is a dedicated machine concept specifically developed for perovskite-based applications. It is designed to enable precise and reproducible deposition of functional layers under well-controlled process conditions. Key technological highlights include its modular architecture, allowing the integration of different coating and printing technologies, as well as tailored drying and curing concepts. Stable substrate handling and accurate process control ensure excellent layer uniformity and reproducibility, which are essential for perovskite device development. With the Explorer 801, users can systematically develop perovskite processes and prepare them for scalable pilot production.

PRO Flextronics: The Challenger 650 is one of NSM's long-established sheet-based platforms for printed electronics and functional materials, complementing the roll-to-roll Explorer 801. What are the key characteristics of this system and where do customers typically use it?

M. Schläfli: The Challenger 650 is a modular, high-precision sheet-based platform that has been successfully used in printed electronics research and pilot production for more than ten years. It is designed for applications that require excellent layer accuracy, reproducibility and process flexibility. The system supports a wide range of printing and coating technologies, as well as drying, curing and lamination processes. An integrated camera alignment system enables accurate multilayer registration, which is essential for many printed electronics applications.
The Challenger 650 can process both flexible and rigid substrates up to 300 × 300mm. With process speeds reaching up to 90m/min, the system clearly moves toward production-relevant conditions. Customers typically use the platform in printed electronics, functional coatings and energy-related applications, including fuel cells, where reliable process development and scalable concepts are essential.

PRO Flextronics: In just a few days from now, we will meet you again as an exhibitor at LOPEC 2026. What are you going to showcase in Munich – and who should visit your booth?

M. Schläfli: At LOPEC 2026, we will present selected machine concepts and application examples related to printed electronics and energy-related technologies, with a focus on the Explorer 801 and the Challenger 650. Our booth is aimed at researchers, developers and industrial partners working on functional materials, perovskites and scalable manufacturing concepts.



The Challenger 650 from nsm

www.nsmz.com | Image source: nsm Norbert Schläfli AG

DP Patterning

The industry challenge: Etching and printed silver are holding us back

For decades, flexible electronics manufacturing has depended on wet chemical etching and silver-based printed electronics. Both methods helped the industry scale early applications, but today they face major limitations. Etching relies on water-intensive chemical processes that generate hazardous waste and consume significant energy. Printed silver, attractive for its simplicity, now suffers from high costs, supply volatility, and performance constraints – including lower conductivity and inconsistent electrical properties due to drying and curing variability.

As devices evolve – antennas for 5G/6G, lightweight EV systems, smart surfaces, heating elements, and high-density interconnects — the industry is running into bottlenecks around conductivity, scalability, environmental regulations, and material costs. With sustainability targets and electrification accelerating globally, manufacturers urgently need solutions that deliver higher performance at lower environmental and economic cost.

A new class of applications: High-performance, lightweight, sustainable – all in one process

DP Patterning's patented Dry Phase Patterning (DPP) technology addresses these challenges by replacing inks and chemicals with a clean, mechanical reel-to-reel process. DPP patterns pure metals such as aluminium and copper-clad aluminium with precision down to a line width of 300µm, enabling high-performance structures at industrial scale. Unlike printed inks, DPP produces continuous, high-conductivity metal structures – significantly outperforming printed interconnects in electronic conductivity, durability, and stability. This has immediate impact in key application groups:

- Antennas & RF Structures: Higher conductivity boosts antenna gain and efficiency and at the same time addressing sustainability and performance challenges highlighted by industry experts. DPP removes chemical waste entirely and reduces CO_2 emissions by up to 98% compared to chemical etching.
- Power & Signal Interconnects: Pure-metal conductors minimise voltage drop, enhance lifetime performance, and support high current loads – critical for EVs, industrial electronics, and aerospace compared to silver printing.
- Heaters & Thermal Elements: Uniform metal thickness and conductivity enable faster, more stable heating with lower energy loss compared to printed systems.

Across all these groups, the technology delivers a powerful combination: lightweight metal materials, flexible substrates that can adapt to and follow complex contours, high conductivity, sustainable production, and cost efficiency.

To learn more about DP Patterning, the company invites LOPEC visitors to

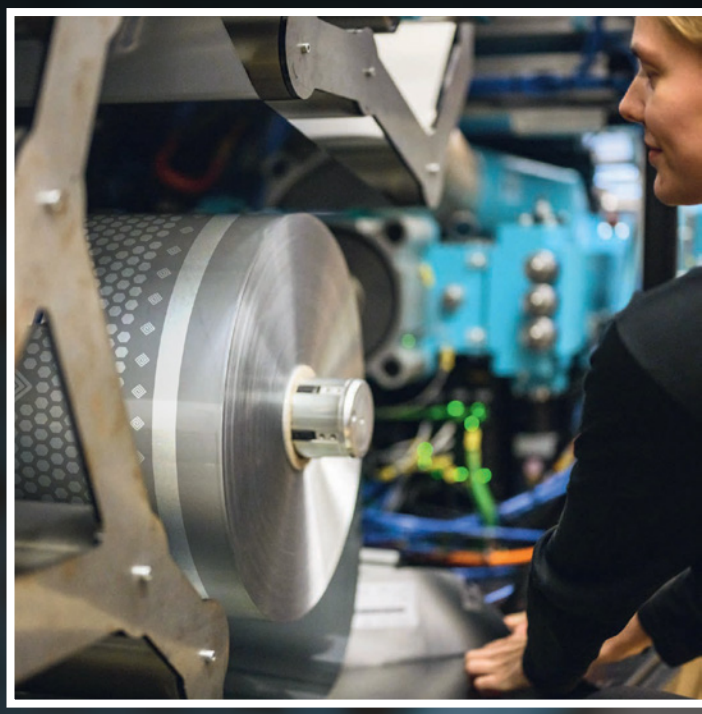
- Visit their booth B0/215
- Listen to CTO Dr Roman Armgarth speak at the LOPEC Forum (Title: Flex PCB Etching is Past its Prime – Dry Phase Patterning on Paper; Date & Time: 25.02.2026, 12:50 - 13:10; Room 3, ICM)
- Join the panel discussion featuring Global Sales and Marketing Manager Tommy Höglund. (Date & Time: 24.02.2026, 16:40; Room 5, ICM; Title: Recent Progress in the Evaluation and Realisation of Business Model Innovations)

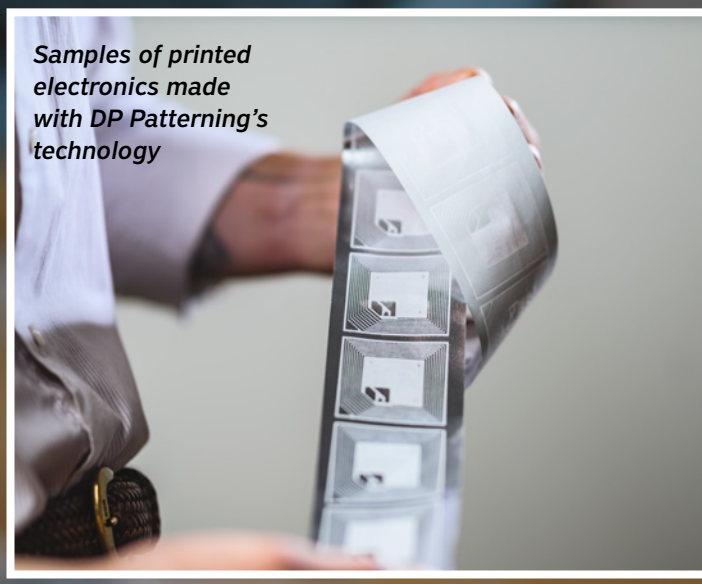
Building resilient supply chains: Micro-factories, regional production, and 10M+ m² capacity

Beyond technology, the industry is also demanding manufacturing resilience, localisation, and supply-chain security. DPP is prepared for exactly this future.
DP Patterning is scaling rapidly, with over 10 million square metres of annual production capacity and growing, introducing by regional production units (“micro plants”) engineered to bring manufacturing closer to customers. This model reduces logistics emissions, shortens lead times, strengthens supply-chain redundancy, and supports the trend toward local, sustainable electronics manufacturing.
Their micro-plants framework allows OEMs and system integrators to anchor manufacturing near their markets – whether in automotive, lighting, industrial electronics, or emerging flexible-electronics sectors – ensuring fast, secure, and predictable delivery.

As LOPEC 2026 highlights hands-on, future-ready innovations, Dry Phase Patterning stands out as a technology that delivers performance, sustainability, cost efficiency, and manufacturing resilience – in one unified platform. DP Patterning is ready to support global partners in building the next generation of high-performance flexible electronics.
Dry Phase Patterning is also highly compatible with printed electronics. For example, the DPP method can be used to manufacture the base layer — cost-efficient and with high conductivity — while printed electronics can be applied to deposit functional inks for sensors and fine structures, such as fanouts and other detailed structures.

www.dppatterning.com
Image source: DP Patterning





Samples of printed electronics made with DP Patterning’s technology

"3 Questions To..." – Voices from the OE-A Community

Welcome to our regular feature, where we highlight key voices from the OE-A community. In each issue, we'll share insights from members on the 3 questions about our community.



Paweł Czabak,
OE-A Board Member,
CEO, LC Elektronik,
Poland

1. What drives my engagement on the OE-A board?
I'm involved because OE-A is one of the few places where the whole value chain can sit at one table and actually move things forward. I enjoy helping turn "cool demos" into repeatable, industrial solutions—standards, reliability, manufacturability, and real business cases. It's also a chance to connect regions and voices that are sometimes underrepresented, especially from Eastern Europe. And honestly, I learn a lot from the people in the room—materials, equipment, integrators, brands—so it's a two-way street.

2. What does the PE industry need the most right now (globally / Eastern Europe)?
We need more industrial "muscle": standardization, better design rules, and clearer pathways from prototype to pilot to volume. The industry also needs more shared reference projects—real-life data on reliability, yield, and total cost, not just lab performance. For Eastern Europe specifically, access matters: easier entry into the ecosystem, more visibility, and stronger bridges to established hubs and supply chains. If we can combine local manufacturing strengths with know-how transfer and joint projects, adoption will accelerate fast.

3. What is the Printed Electronics superpower in your opinion?
Printed Electronics' superpower is turning almost any surface into a function—sensor, heater, antenna, lighting, or interface—without adding bulk. It's additive by nature, which means less material waste and a lot of freedom in shape, weight, and integration. It also enables fast iteration: you can test, tweak, and customize designs much quicker than with many traditional electronics processes. And when combined with silicon in hybrid systems, PE becomes a practical "multiplier" rather than a niche technology.

A New Chapter for the OE A Roadmap: What's Coming in 2026

The OE A Roadmap is entering its 10th edition, and the upcoming release marks one of the most significant updates in recent years. As flexible, organic, and printed electronics mature toward broad market adoption, the roadmap evolves to better reflect an industry that is rapidly scaling, diversifying, and innovating.

What's new?
One of the most notable additions is the brand new chapter on Sustainability & Green Electronics. This reflects a clear shift in the industry: environmental responsibility is no side topic but a central driver of innovation, investment, and customer expectations. Alongside this, the roadmap introduces new dedicated subchapters on Fuel Cells and Defense & Aerospace, two areas where printed electronics are gaining strategic importance.

What's in it?
It clusters content into Industrial Themes (from automotive to IoT and smart buildings) and Enabling Technologies (from device level innovations to functional materials, substrates, printing technologies, assembly, testing, and simulation). Each chapter includes product forecasts, TRLs, technology and application parameters, SWOT analyses, and key challenges giving companies a clear, market oriented guide for their strategic planning.

Want to know more?
Join the LOPEC Open Plenary "Flexible and Printed Electronics - The New Roadmap" at the LOPEC Forum on Wednesday morning, February 25. Dr. Klaus Hecker will talk about the new edition of the OE-A Roadmap for Flexible and Printed Electronics and provide a comprehensive overview of the development of this industry, also considering the latest business climate results and market forecasts. Like all other LOPEC Forum events, the Open Plenary Session is open to all visitors, conference participants and exhibitors of LOPEC.

Where to get it?
The 10th Edition OE A Roadmap will be launched at LOPEC 2026, giving a forward looking guide for navigating a fast evolving printed electronics market. OE A members can download it for free at oe a.org after LOPEC. Non members can purchase it via oe a.org/roadmap or by contacting **Raswanth Sendhil Sasikala at raswanth.sendhilsasikala@oe-a.org.**

See you at OE-A Meeting, Munich, February 23, 2026

One day before LOPEC opens its doors, we invite all OE-A members to join us for an exciting member meeting at the ICM Messe München. Look forward to inspiring talks, fresh insights into printed electronics, and the chance to reconnect with the PE community.

We have curated an agenda full of expert presentations and focused Working Group Meetings—rounded off with plenty of networking to exchange ideas, strengthen collaborations, and catch up on the latest business and technology developments.



OE A members and guests gather for collaborative exchange and networking in Munich, February 23, 2026.

Agenda – Monday, February 23

End-User Presentation: Eurofighter Long Term Evolution (LTE)The mid-life technology refresh
Heiko Brosinger, Programme Manager LTE, Eurofighter (DE)

New Members and Guests Session

Working Group Sustainability: Opportunities and Challenges for Integrating Sustainability
Moderation: Dr. Stephan Harkema, TNO Holst (NL)

» *Opportunities and Challenges for Integrating Sustainability and Safe and Sustainable by Design (SSbD) into Electronics Innovation Processes*
Kealie Vogel, Claudia Som, Empa (CH)

Report on OE-A Activities
Dr. Klaus Hecker, Managing Director, OE-A (DE)

» *OE-A Update*
» *OE-A Delegation India*
» *OE-A Business Climate Survey*

Working Group Hybrid Systems: Latest Interconnection & Soldering Technology
Moderation: Dr. Volker Zöllmer, Fraunhofer IFAM (DE) &
Dr. Björn Fechner, Folex Coating GmbH (DE)

» *Continuous Laser Assisted Deposition: 6 Sigma Stability and High Throughput Printing with Standard Industrial Materials*
Herve Javice, I-O-Tech (IL)
Stephane Etienne, I-O-Tech (IL)
» *Pushing the limit of miniaturization in printed electronics*
XTPL, N.N.

New OE-A Roadmap 10th Edition
Raswanth Sendhil Sasikala,
Project Manager, OE-A (DE)

Wrap-Up and Summary
Dr. Alain Schumacher,
Chairman OE-A Board (LU)
Dr. Klaus Hecker, OE-A (DE)

Networking Event
The day concludes with a networking event and dinner at **Kunsthalle München**—an ideal opportunity to continue discussions and build new connections in a relaxed atmosphere. We look forward to welcoming you in Munich—make sure to be part of it. The meeting is open exclusively to OE-A members. For questions, please contact **Patricia Seizer (patricia.seizer@oe-a.org).**

Register and join the OE-A community as we shape the next chapter of printed electronics together.

Image source: OE-A

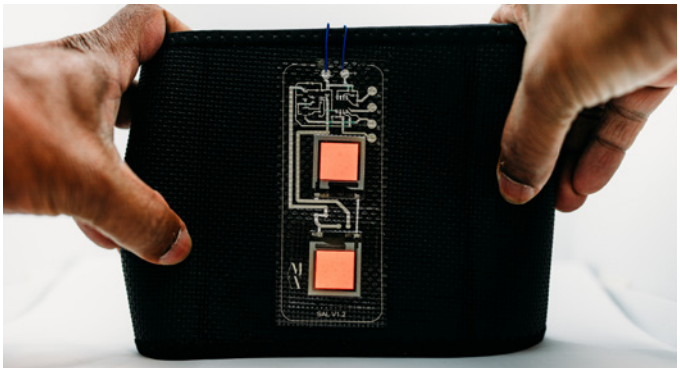


Networking is key at the regular OE-A Meetings

OE-A at LOPEC 2026: Hands-on innovations in printed electronics

From February 24 to 26, 2026, the OE-A will present the OE-A Competition with 18 innovative projects and products related to flexible and printed electronics at LOPEC in Munich. Another highlight: the premiere of the 10th edition of the OE-A Roadmap.

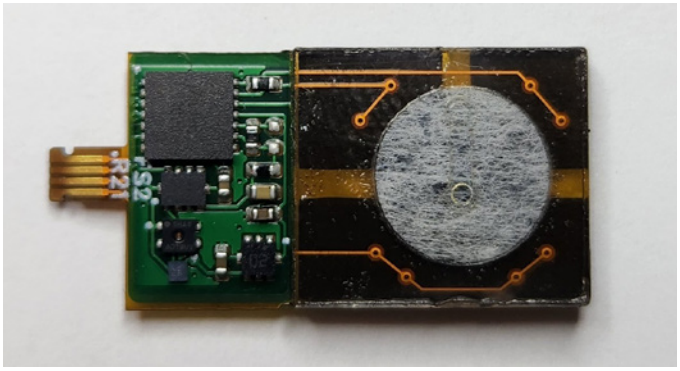
Frankfurt, January 13, 2026 – This year, 18 products and projects are in the running for the OE-A competition. The OE-A will present these to an international audience at LOPEC, expecting increased interest in the innovations submitted by companies, research institutions and universities from around the world. „This year, we are seeing some very interesting projects in the field of health. Wearables are taking on therapeutic tasks, such as infrared radiation. But the variety of design options which printed electronics enables in car interiors is also impressive,‘ says Dr Klaus Hecker, managing director of the OE-A, an international working group within the VDMA. OE-A is the leading international industry association for flexible and printed electronics and is organizing LOPEC 2026 together with Messe München at the ICM Munich from 24 to 26 February.



Wearable light therapy for muscle recovery © Silicon Austria Labs GmbH, Austria Mimotype Technologies GmbH, Germany

Sneak preview of exciting innovations

For the OE-A competition, Silicon Austria Labs, an Austrian research center, and its partner Mimotype from Berlin submitted a wearable sleeve with an integrated red light. The printed electronics are printed directly onto a soft TPU film, making the device comfortable, lightweight and easy to wear. In the field of workplace safety, Interlink from the USA has developed a portable gas detection system. This consists of a miniaturized, high-performance gas sensor integrated onto a flexible substrate. This gas sensor can detect any type of gas development at an early stage and can also be used to detect forest fire and air quality monitoring. Tactotek, based in Finland, and Tracxon, based in the Netherlands, have submitted two projects that open up new design possibilities in areas such as automotive interior. “Tactotek is competing with an illuminated emblem. The In-Mold Electronics process enables LEDs to be integrated directly into plastic surfaces. The result is an ultra-thin, lightweight and seamless construction that replaces bulky, multi-layer assemblies. Tracxon, on the other hand, is focusing on a high-resolution, semi-transparent display to be integrated into the front and side windows of vehicles. These displays can interact with the driver and provide warnings in dangerous situations,” explains Klaus Hecker.



Wearable gas sensing system for health and safety applications © Interlink Electronics Inc., USA

Public Choice Award – Your vote counts!

A jury of experts will evaluate the new concepts and products in three categories. There will also be the popular ‚Public Choice Award‘ again. LOPEC visitors can vote for their favorite on 25 February at the OE-A booth (FO.33, ICM). The winners of the OE-A Competition will be announced at the awards show on Wednesday evening and will present their ideas in detail at the OE-A web seminar ‚The Winners‘ on April 16, 2026.

The 10th edition of the OE-A Roadmap

The OE-A Roadmap provides detailed technology and application forecasts, supporting users, developers, researchers and policymakers in making strategic decisions. ‚Find out more about the new roadmap at the booth and attend the Open Plenary session on the morning of 26 February to learn about current developments and future opportunities for printed electronics in the target markets,‘ recommends Klaus Hecker.

Journalists can be accredited for LOPEC 2026. The LOPEC 2026 press conference including presentation of the latest OE-A Business Climate Survey will take place Wednesday, February 25 at 11:15.



Free OE-A Student Workshop: Print your ion sensor, February 24, Munich

Are you interested in printed electronics and sensor technology? Then don't miss this free hands-on workshop for students on February 24th, 2026, hosted by the OE-A Working Group Education at the Munich University of Applied Sciences – just one day before LOPEC 2026 kicks off (exhibition ticket for LOPEC is inclusive)!
In this intensive, one-day training, participants will:

» Screen print their own ion sensors,
» Analyze sensor performance, and
» Compare results with standard sensors

Important:
Date: February 24th, 2026
Venue: Munich University of Applied Sciences, Lothstr. 34, Room G 0.32
Registration deadline: February 14th, 2026
Registration contact: Prof. Dr. Ulrich Moosheimer – ulrich.moosheimer@hm.edu

You'll gain practical experience using both laboratory and industrial equipment under the guidance of renowned experts from academia and industry. The workshop features lectures and labs led by Prof. Dr. Jan Bernards from Fontys University, NL , Prof. Dr. Ulrich Moosheimer from HM Hochschule München University of Applied Sciences, Prof. Priscilla G. L. Baker from University of the Western Cape, Prof. Dr.-Ing. Ekaterina Nannen from Hochschule Niederrhein University of Applied Science, and Mr. Matjaz Finzgar, Ino, SI.

Participation is **free of charge**, including **lunch sponsored by Lohmann**, but places are **limited to 15 students** on a first come, first served basis. We provide all participating students with exhibition tickets for LOPEC!

Combine hands-on learning with your visit to LOPEC 2026 and gain unique insights into printed sensor technologies!

LOPEC

Lohmann
The Bonding Engineers

OE-A Delegation Trip to India, September 2026 – Register now

India's electronics industry is booming — and we want to explore the opportunities for flexible and printed electronics. From **13–18 September 2026**, OE-A members are invited to join a full service delegation trip to **New Delhi, Pune, and Bangalore,** organized by **VDMA India.** Join us.

The Indian electronics industry is entering a new phase of rapid expansion, driven by strong domestic demand, strategic government initiatives, and an increasingly innovation oriented ecosystem. For companies active in flexible, organic, and printed electronics, this development presents a unique window of opportunity. To support OE-A members in gaining first hand insights into this evolving landscape, OE-A is organizing an exclusive **delegation trip to India** in close cooperation with **VDMA India.**

» The delegation package is offered as a f**ull service program,** organized by VDMA India. It includes domestic flights, hotel accommodation, local transportation, meals, and the complete coordination of all visits and meetings.
» **Registration deadline: 31 March 2026 (a minimum of 10 confirmed participants wanted.)**
» **Locations: New Delhi, Pune, and Bangalore**

A central highlight of the trip will be the participation in the **OE-A Symposium on Flexible & Printed Electronics,** held during **electronica/productronica India South in Bangalore,** one of India's leading electronics trade shows. Delegation members will have the opportunity to present their expertise, engage in B2B discussions, and take part in an international dialogue on the latest trends shaping the industry.

For detailed information and registration documents, please check your inbox. Please contact the OE-A team for further questions.

OE-A looks forward to welcoming its members on this mission to one of the world's most promising and fast growing electronics markets.



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ICDT
International Conference on Display Technology

OE-A Invites Members to Participate in ICDT SID 2026 in Chongqing, China

OE-A members are invited to join one of the leading display technology events in Asia: the International Conference on Display Technology (ICDT), taking place March 31 – April 3, 2026 in Chongqing, China.

OE-A Session on Flexible and Printed Electronics, April 03

As an official partner of ICDT SID, OE-A will again host the "Flexible and Printed Electronics" session on April 03 bringing together global experts to highlight the latest innovations in our field. Members will present highlights of their latest technology findings. We will welcome experts from NOVA University, Zhejiang Brilliant Optoelectronic Technology, FlexEnable, Fraunhofer IPA and Guangdong Juhua Printed Display Technology Co., Ltd. The session will be chaired by OE-A Board Member, Dr. Luke Pan, Zhejiang Brilliant Optoelectronic Technology.



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OE-A Member Benefits

In addition, OE-A members benefit from exclusive exhibition discounts:

» 25% off for international exhibitors (plus free symposium registration & banquet ticket)
» 15% off for exhibitors from mainland China

ICDT is a key international platform for the display and printed electronics community—an excellent opportunity to showcase expertise, meet industry leaders, and strengthen global collaborations.
In case of any questions please contact Raswanth Sendhil Sasikala at raswanth.sendhilsasikala@oe-a.org

OE-A Events

OE-A Meeting
23 February 2026
Munich, DE
A day before LOPEC 2026

OE-A Meeting America
June 2026
Silicon Valley, US
Exact date and venue to be determined

OE-A Meeting Europe
13-14 October 2026
Düsseldorf, DE
Hosted by Henkel

OE-A Delegation India 2026
14-18 September 2026
Bangalore, IN
Delegation Trip India One week incl. company visits and symposium at electronica/ productronica India

Trade fairs and conferences where you can meet the OE-A

Members benefit from reduced fees at several conferences.

LOPEC 2026
24-26 February 2026
Munich, DE
Messe München and OE-A jointly host the leading international trade fair and conference. The event offers a high-quality platform to all manufacturers, industrial customers and research institutions engaged in the field of organic and printed electronics.
Messe München, Germany
lopec.de

FREE OE-A Student Workshop: Print your ion sensor
24 February 2026
Munich, DE
OE-A Working Group Education organizes free of charge hands-on workshop for students at Munich University of Applied Sciences

VDMA European Summit
12-13 March 2026
Rome, IT
Look forward to interesting topics and excellent networking opportunities and don't miss THE meeting of the European machinery and equipment manufacturing industry.

ICDT 2026
31 March-3 April 2026
Chongqing, CN
OE-A members are invited to present in the "Flexible and Printed Electronics" Session — a joint technical session between ICDT and OE-A

ICFPE 2026
26-28 August 2026
Jeju Island, KR
An OE-A session is planned.

OE-A Web-Seminars Printed Electronics

OE-A Web-Seminar | Printed Electronics Insights: OE-A Competition 2026 – The Winners
16 April 2026
As a part of OE-A's web-seminar series 'Printed Electronics Insights' this web-seminar introduces the winning demonstrators of the OE-A Competition 2026

The latest information regarding the events can be found at **https://oe-a.org/events**

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Munich Adhesives and Finishing Symposium

A proud anniversary

For 50 years, the Munich Adhesives and Finishing Symposium has been a fixture in the calendars of many key players in the converting industry. PRO Flextronics was on-site live at the anniversary edition – and met organiser Stephan Hinterwaldner for an exclusive interview.

PRO Flextronics: Mr Hinterwaldner, Munich Adhesives and Finishing Symposium celebrated its 50th anniversary. What are your thoughts on this impressive milestone?

Stephan Hinterwaldner: First of all, I think of the founding father and long-time organiser Prof Knut Nitzl. Even he could not have imagined what has become of what he started back in 1976 as a seminar for his students, among others. From a technical point of view, as I mentioned in my opening speech this year, I think of all the revolutionary achievements and changes that have taken place during this period. If you look at mechanical engineering in the converting industry in the 1970s and today, for example, it is fascinating to see how adaptable and innovative the industry had to be in order to keep pace with requirements. From paper and simple PP and PE films to today's complex and sustainable multilayer materials. Today, we see effective process optimisation via data models instead of trial and error or analogue measurements. We are also seeing enormous progress in terms of quality, reproduction and speed, to name just a few of the improvements. In my opinion, we are currently on the verge of a huge leap forward in terms of AI.

PRO Flextronics: And what does this mean for the future of this traditional event?

S. Hinterwaldner: The Munich Adhesives and Finishing Symposium has the task of accompanying this leap forward and ensuring a happy landing in the future. For me, this means, first of all, selecting the relevant topics when acquiring and selecting specialist lectures, presentations and posters. Secondly, I want to ensure a good interdisciplinary networking platform. So, remain objective and open to new ideas, discuss controversial topics and question existing assumptions. Because if you want to actively shape the future, you have to be prepared. Transformation is not a risk. It is an opportunity. And in addition to our consulting services, we can support the world of adhesives and converting with our two annual events, the in-adhesives symposium and the Munich Adhesives and Finishing Symposium.

PRO Flextronics: How would you sum up this year's event?

S. Hinterwaldner: 50 years is quite a milestone. Of course, I am proud of what is associated with the Munich Adhesives and Finishing Symposium – and of the many national and international congratulations from science, industry and associations. The feedback was consistently positive! I am grateful for the personal exchanges with all the interesting people. Once again, there were many new, young faces this year. This shows me that the next generation is coming through. I like that! And it reinforces my commitment to continuing both conferences consistently and sustainably in line with our motto 'by the industry, for the industry'.

www.mkvs.de
Image source: Nina Pirchmoser



Stephan Hinterwaldner at the lectern



Stephan Hinterwaldner (2nd from left) with Nina Pirchmoser (2nd from right) and his team

Preview PRO Flextronics No 7 - May 2026

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Flexible Displays, Smart Packaging & Energy Storage

In every issue, you will also find reports, company portraits and current topics from the industry.



SID Display Week, 03.-08.05.2026, Los Angeles

The Battery Show Europe, 09.-11.06.2026, Stuttgart

TechBlick, 10.-11.06.2026, Mountain View

Nanotexnology, 04.-11.07.2026, Thessaloníki

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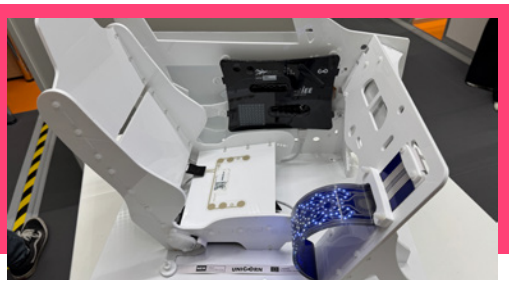
2026 UPCOMING EVENTS

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LOPEC 2026

24-26 Feb 2026
Messe München

lopec.com



embedded world

10-12 Mar 2026
Messe Nürnberg

www.embedded-world.de



Touch Taiwan

08-10 Apr 2026
Nangang Exhibition Center, Taipei

www.touchtaiwan.com



Techtextil

21-24 Apr 2026
Messe Frankfurt

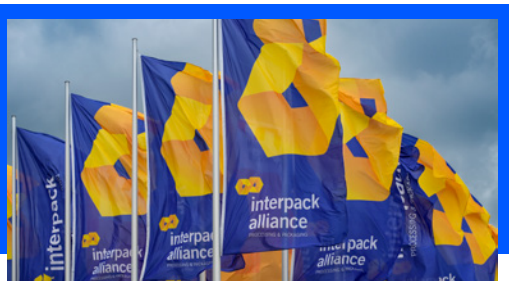
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Interpack

07-13 May 2026
Messe Düsseldorf

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TechBlick USA

11-12 Jun 2026
Mountain View, CA, USA

www.techblick.com

