



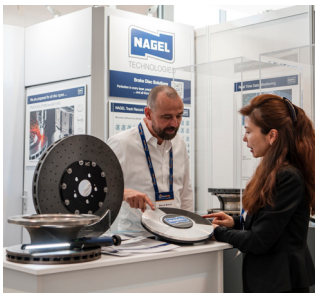
EuroBrake 2026 Review

Explore three days of expert insights, technical innovation and industry perspectives shaping the future of braking technology.



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Jan Münchhoff
Chair
EuroBrake 2026

Foreword

Every year, EuroBrake brings together one of the most knowledgeable and most committed communities in the global mobility sector. This community consists of engineers, researchers, innovators and industry leaders, all united by a shared purpose: to advance braking technology and ultimately improve safety for road users everywhere.

EuroBrake has always been more than a conference. It is a working forum for progress; a place where ideas are tested, challenged and refined; a place where collaboration happens not just across companies, but across disciplines, borders and generations.

And this matters more today than ever before. We are living through one of the most profound transformations in the history of mobility. Electrification, automation, connectivity and sustainability are reshaping how vehicles are designed, built and used.

Yet amid all this change, one thing remains constant: Braking systems are fundamental to safety. At the same time, they are evolving rapidly. We are seeing new demands on braking performance, electric vehicles, regenerative systems are changing duty cycles and expectations. We are addressing challenges around particulates and environmental impact, as society rightly demands cleaner and more sustainable solutions. And we are preparing for increasingly automated systems, where braking must integrate seamlessly with software, sensors and decision-making algorithms.

In this context, the role of our community becomes even more critical, because braking is no longer just a component; it is part of a complex, integrated system that must perform flawlessly in every possible scenario.

This is why EuroBrake exists – to provide a platform where we can collectively explore these challenges, share insights, data and experience, and ensure that as technology advances, safety advances with it.

The rich and diverse three-day programme for 2026 was complemented by over 110 exhibitors and approximately 1,100 delegates. The student programme is proving increasingly popular; this year saw the highest ever number of applications for the EuroBrake Student Opportunities Programme (ESOP), and the programme included a series of lunchtime student workshops, led by FISITA and supported by various industry experts.

The agenda also included the usual mix of technical sessions diving deep into the latest research and development, discussions on emerging regulations and environmental considerations, exhibitions showcasing cutting-edge solutions from across our industry, and countless opportunities for conversation and collaboration.

In addition to the conference programme, there's the networking; some of the most valuable moments at EuroBrake happen not only in the lecture halls, but in the discussions between sessions.

I would like to recognise the many people who make this event possible: the authors and presenters who contribute their work; the programme committee and reviewers who ensure the highest technical quality; our sponsors and exhibitors who support and enrich the event; and the FISITA team, whose dedication brings EuroBrake to life each year. Your contributions are what makes this conference truly exceptional.

Finally, I would like to reflect on the broader impact of EuroBrake. Every improvement in braking performance, every reduction in emissions, and every innovation in system integration is not an abstract achievement. It translates directly into safer roads, cleaner environments, and better outcomes for millions of people around the world – something of which we can all be proud.

EuroBrake 2026: Mainz, Germany

Electrification, automation and connectivity have ignited a drastic change in the way vehicles are designed and built. The brake can no longer be considered an isolated and independent mechanism, but instead must be viewed as an integral piece of the wider vehicle control system. This was the backdrop for EuroBrake 2026, FISITA's flagship annual conference and exhibition.

Modular platform concepts are the foundation for a complex network of integrated components, each of which must work seamlessly together to create a highly refined and optimised system. As such, development of the next generation of braking systems requires a new thought process. At EuroBrake 2026, exhibitors showcased their latest developments and offered a glimpse at their disruptive technologies, while a busy agenda of panel discussions and technical presentations provided room for debate and open discussion.





EuroBrake Strategy Panel: Reinventing braking

Kicking off the annual EuroBrake Strategy Panel, **Georg Ostermeyer, Professor at TU Braunschweig**, posed the question, "Are we still improving brakes as components, or are we beginning to reinvent braking as a system?" He referred to the impact of software on vehicle design, the benefits of leveraging big data and the increasing influence of AI, suggesting that each of these factors will likely play significant roles in shaping next-generation braking technology.

This triggered a philosophical debate within the panel. **Timo Schmidt, Manager for E-Drive System Design and Testing, Mercedes-Benz Cars**, emphasised the need to push ahead with the development of innovative solutions that greatly reduce non-exhaust particulate matter (PM) emissions to meet future regulatory standards. These solutions, he added, will feature integrated braking and propulsion components in an "encapsulated" system, all of which is highly optimised for performance in order to appeal to customers.

"When you come up with such disruptive technologies, I really think that in times of uncertainty and crisis people can better bear the ambiguity and not reject these ideas immediately," said Schmidt. "And if you ask the majority, they do not even know that they have the unconscious need for such innovation, because if it was conscious, they would tell you. That's the innovator's dilemma. When you are in the early phase you feel alone, because the majority has a different view of reality. In our team, we know that we have to be risk-taking, bold, and enthusiastic about our technical solutions."

Sticking to the theme of disruption, **Henrique de Carvalho Pinheiro, Co-Founder and CTO, Point Zero**, emphasised the fact that disruptive technologies typically require lengthy development times during which engineering teams are required to prove hypotheses and validate a large number of simulated and real-world tests. Like Schmidt, he also believes that innovation in braking technology is crucial to comply with future emissions requirements. But instead of adding components and complexity, Pinheiro advocated for a smarter approach to design, pointing to the possibilities of brake-by-wire (BBW) solutions. "Perfection in engineering is achieved not when you add everything that you need, but when you remove everything that you could from your product," he said. "Is it time for the brake sector to think about a new paradigm?"

BBW was also championed by both **Frank Beier, Development Actuation and Brake Components, Volkswagen**, and **Paul Linhoff, Head of Innovation Management, Aumovio**. While listing a host of benefits from enhanced stability control and vehicle performance to integration with automated systems, Beier was also keen to highlight the possibilities that are enabled through the decoupling of the brake pedal from the electromechanical brake, or EMB actuators. This separation provides far greater design flexibility, and could open up the potential for a new human-machine interface (HMI) that provides another avenue for brand differentiation. Linhoff, on the other hand, emphasised advantages in efficiency, packaging and weight.

Both referred to BBW as one of the most disruptive technologies that will soon have a ripple effect across the automotive industry.

Returning to the idea of reinventing braking as a system, **Andrea Cerutti, VP Virtual System Engineering, Brembo**, put more onus on the use of data. He warned against the idea of leaning on AI too heavily, but emphasised the importance of a system-level approach during the development of next-generation braking technology, with smart data playing a central role to enhance driver controls.

"The challenge today is not locally improving one component, but to globally optimise the entire system," said Cerutti. "So, how can we optimise braking in conjunction with tyres, with suspension, with steering? This is where AI can support us, because it can manage a huge number of variables and identify the optimum behaviour of the vehicle."

Another warning was voiced by **Christof Danner, Founder & Technical Expert Brake Systems, Austrian Center of Brake Competence**. Although he sees the benefit of leveraging AI for digital twins and virtual validation, Danner implied that development of new braking technology first and foremost must bring real-world functional benefits for road users.

"We have to take care because there is so much innovation taking place but in the end the customer has to buy the vehicle, so the industry has to fulfil customer expectations regarding performance and noise, vibration and harshness. We also have to always consider thermal requirements and thermal behaviour. So, what I want to emphasise is that brake system development will still be required for many years, and will primarily need to focus on meeting legislative and customer requirements."

Nico Wägerle, CEO and Co-Founder of Certivity, underlined the impact of regulations on the development of braking technology. He suggested that innovation has historically been driven by regulatory pressure, and that the global braking and friction community must be ahead of the curve with the design of new systems. However, he also described a tangled web of legislation around the world, and implied the difficulty that engineering teams face when developing solutions that could be rolled out across global vehicle platforms.

"We are seeing more and more regulations coming up, and they're not only coming up in Europe but also globally," Wägerle noted. "For engineers, it's becoming increasingly difficult to keep track of all those requirements and understand how they interact. The challenge is not only solving one specific technical problem but understanding the complete context of regulations, requirements and engineering decisions that are connected to it."

Standardisation Session

During the Standardisation Session, **Richard Kaatz, Vice President and General Manager of KBAutoSys America and Interim Chairman of the SAE Brake Steering Committee** provided an update on SAE International activities. A recent merger of the Foundation Brake and Hydraulic Brake and Actuation Steering Committees, the Brake Steering Committee is an oversight group reporting to the Motor Vehicle Council.

Masaki Hayakawa of Akebono Brake Industry updated EuroBrake on JSAE activities. Commissioned by the Japanese Industrial Standards Committee (JISC), JSAE serves as Japan's mirror committee for ISO TC22, coordinating national standards and supporting TC22 leadership and working groups. It also drafts Japanese Industrial Standards (JIS) and develops Japan's JASO standards.

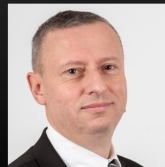
The latest developments at an ISO level were shared by **Dr Sebastian Gramstat of Audi AG**, whose session was held as a meeting of ISO Working Group 10 – "Brake Linings and Friction Materials" – which, he explained, is focussed on relevant test standards for brake discs and brake lining materials for disc brakes and drum brakes.

"The challenge today is not locally improving one component, but to globally optimise the entire system. So, how can we optimise braking in conjunction with tyres, with suspension, with steering? This is where AI can support us, because it can manage a huge number of variables and identify the optimum behaviour of the vehicle" – Andrea Cerutti, Brembo



Beyond the Car - a FISITA podcast

Braking point: How brake tech shapes the future of mobility - feat. Brembo and IDIADA



 **brembo**

Olivier Coppin
VP Innovation
Brembo



Applus®
IDIADA

Fabio Squadrani
Senior Manager, Braking Systems
Applus+ IDIADA



OEM Panel: Shaping the future

Customer need and expectation was also at the forefront of discussion during the annual OEM Panel. Bringing the perspective of a Chinese OEM, **Thomas Sprengel, Senior Expert Chassis, NIO**, deliberated over the continued development of friction-based solutions versus the incoming flux of BBW solutions.

"We are now in a situation where new brake systems can potentially provide new functions," he observed. "But the question we need to ask is, does the customer need these new functions, or is the system we already have with hydraulic brakes good enough to answer all the questions from the customer? One of the lessons I have learnt from China is that the focus of development is moving away from the system itself, and how to develop the best braking or steering system, to what is the best for the customer, independent of the technology."

Sprengel also referred to the ability of Chinese companies like NIO to move quickly during development, leveraging software and AI to speed up processes while simultaneously making sure customer needs are met. From a European perspective, **Ulrich Kuhn, Head of Department, Driving Experience – Braking Systems, BMW Group**, believes there is room for improvement.

"We have to learn how we can develop without hardware," he said. "I think we can do it if the concepts are well-proven. We need construction kits which work, and we need interfaces which are very clearly described so that we are not discussing making a component or system that is OEM-specific, but have a common standard."

Software-driven design and development can open up new possibilities for engineering teams and speed up processes, but as **Emmanuel Pynthe, Foundation Brake Engineer, Stellantis** explained, open communication across departments within carmakers is one of the initial challenges that must be tackled. "What we see, especially with electrification, is that there is more software inside the vehicles," he said. "We need to have a close working relationship with our powertrain department to understand how we can use software to help with energy regeneration, for example, and we also need to understand how the customer is using our car. Big data and AI can help us."

The discussion moved a step further with the implication that brakes are no longer a mechanical component but are becoming wholly defined by software. This is particularly the case with BBW solutions that will hit the market in the near future, as well as the increasingly close relationship between advanced driver assistance systems (ADAS) and braking technology.

However, **Michael Lingg, Director of Brake Systems, Volkswagen AG**, quickly pushed back on the idea. "I do not entirely agree with the idea that the brake system is now a software product," he said. "We have an opportunity with brake-by-wire and steer-by-wire systems, and the integration possibilities that these systems bring. But, in my opinion, the brake system still has important mechanical parts that must be extremely reliable and that we still need to continue to develop."

As the development of braking and friction technology progresses, Lingg implied that the racing sector could offer valuable insight and experience. His colleague **Albert Schlecht, Head of Development, Brake System, Audi**, explained that there may be some influence from the racing sector on passenger vehicles, but returned to the complexities of customer needs and expectations.

"From my point of view, functionality in normal passenger cars is far more complex than in motorsport," he said. "For example, in motorsport you don't need auto hold or a soft stop, so the braking systems are simpler and based almost entirely on performance and safety. However, the speed of the team and how they adapt and work together could have an impact on the passenger vehicle sector."

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– Emmanuel Pynthe, Stellantis

Keynotes and technical sessions

Presenting the latest in BBW technology, **Niels Schreuders, Project Lead, In-Drive Brake, Mercedes-Benz** offered an exclusive first look into the latest developments of the company's 'in-drive' technology. Unveiled back in 2024, the design took the rear brake units that were attached to the wheels and integrated them inside the central electric drive unit on the rear axle. This enabled a significant reduction in non-exhaust PMs.

"We wanted to push the boundaries further," Schreuders recalled. "With the second iteration we have used an innovative design with wet lamella technology and a superior cooling system. We can also incorporate a torque vectoring system to improve agility and create a more predictable driving feel. And we are now looking at having an integrated multi-pack lamella brake on each of the front wheels. This is very early research, but we now have a fully integrated hardware system that allows for more intelligent and robust control."



From road and track to rail and truck

The agenda for EuroBrake 2026 included the commercial vehicle and rail sectors. **Jiliang Mo, Professor of Tribology and Dynamics at Southwest Jiaotong University**, presented a fascinating insight into the challenges of two high-speed rail lines running from Chengdu, China. With extreme weather conditions and drastic geological changes, the braking systems on the two lines are subject to many different stresses, from freezing temperatures and icy conditions at high altitude, to long descents resulting in consistent braking and very high temperatures. Furthermore, both lines are capable of reaching speeds up to 400 kph (249 mph).

Mo explained that the development of next-generation braking systems for rail must take all of these conditions into account. He predicted a future in which new friction materials can withstand high temperatures while also emitting low levels of PM. He pointed to the growing use of AI to help speed up research and development, and he emphasised the need for new maintenance models that "guarantee lifecycle safety."

High speeds and extreme conditions are also prominent issues for brake developers working on motorbikes. **Sandra Bueno, R&D engineer at Galfer Motorbike Brake Pads**, explained that many of the trends in brake development are consistent across sectors, though she emphasised the importance of lightweighting for motorbikes.

"Of course, everyone wants the same performance with less wear, and to eliminate copper and other heavy metals," she acknowledged. "For motorbikes, we need to decrease non-suspended mass, which is not a new trend. We also need ultra hard coatings on rotors to decrease wear and particle emissions, and smart sensors to monitor thermal properties and wear. We expect a higher presence of carbon-ceramic rotors, but right now they are not used on the streets because they are very expensive." EuroBrake 2026 covered a rich variety of topics, but one that kept returning to the surface was the need for brake development teams to work closely with other departments, ensuring that the next generation of braking technology fits seamlessly into the wider vehicle control system. Within this, the relationship between the brakes and the tyres is arguably the most integral.

Ludovic Greverie, Vice President Technical Operations, Passenger Car and Light Truck Tires, Michelin, explained how tyre makers must consider the impact of braking when developing and producing new products, making sure they can withstand a large variety of braking scenarios. He called for closer collaboration between tyre and brake specialists, with both departments aiming for the same goal: to maximise driving pleasure and control while always maintaining safety.



Collaborate to succeed

Fabio Squadrani, Chair of FISITA's Advanced Chassis Technology Expert Group, urged attendees to communicate and share information. It is no longer possible for teams and companies to work in isolated silos, he said, championing the cross-pollination of talent and ideas fostered at EuroBrake 2026 and in FISITA Expert Groups.

"This Expert Group was born because we have a clear understanding that everything we care about in mobility comes down to this interface: the chassis, the interface where the vehicle meets the road," he said. "This interface is currently under very high pressure, possibly higher than at any other time in the history of vehicle development. That is why this Advanced Chassis Technology Expert Group exists – we want to help shape and lead discussion, research and development."



Innovation at the heart of development

Braking is evolving from a friction product to an intelligent electronic system at the heart of next generation vehicle development. With much of the groundwork for Euro 7 completed in recent years, EuroBrake 2026 saw a deeper focus on next-generation brake technology innovations, with software, artificial intelligence and electronics gaining increasing importance in an area once dominated by hydraulics and friction. Brake-by-wire, widely agreed by delegates and speakers at EuroBrake 2026 as the biggest change coming to braking and vehicle architecture development, will be accompanied by innovative solutions that could even take braking away from the corners entirely, integrating braking into the electric motor and transmission unit.

Clearly, though, much work is being done, and still needs to be done, on friction brake systems for current platforms, and vehicles that will be launched in the next few years at least.



Harald Abendroth Award

The Harald Abendroth Award was presented at EuroBrake 2026 for the best written paper presented at EuroBrake 2025.

The winning paper, *"Measurement and characterization of brake particle emissions of a passenger car in extended range of driving conditions"* (EB2025-TSD-017) was submitted by **Dr. Athanasios Dimaratos, Dr. Elias Saltas, Georgios Tsakonas, Anastasios Raptopoulos-Chatzistefanou, Dr. Dimitrios Katsaounis and Dr. Zissis of Samaras Aristotle University of Thessaloniki.**



Harald Abendroth,
founder of EuroBrake

Outstanding Paper Awards

Three entries were recognised for EuroBrake 2026 Outstanding Paper Awards:

- The Outstanding Paper Award for Introducing Virtual Test Markets was presented to **Hector Garces, Applus IDIADA** for a paper titled, *"Navigating the Braking Paradigm Shift: Challenges and Opportunities in Commercial Vehicle Conversions from ICE to Fuel Cell EV"* (EB2025-CMV-005).
- **Dr. Farhad Nazarpour, Audi AG** was recognised for an Outstanding Paper Award for Digital Innovation and Simulation, for a submission titled, *"Brake Cooling Optimization using AI: A Case Study on Audi SUVs"* (EB2025-MDS-017).
- The Outstanding Paper Award for Regulatory and Sustainability Impact went to **Nikoletta Batsalia, EMISIA** for *"How effective is the collection of particles for reducing the non-exhaust emission footprint of road transport? An LCA and CBA analysis for EU light-duty vehicles and fleets"* (EB2025-EFA-020).



EuroBrake 2026 poster winners

The authors of the top three EuroBrake 2026 posters were recognised at the event, and are listed below:

- **Hajime Mifuka, Senior Researcher, Sumitomo Bakelite Co., Ltd.** took third place for *“Development of Silicone-Modified Phenolic Resin with High heat resistance in Water Repellency and Corrosion resistance Properties”* (EB2026-COM-007).
- Second place was awarded to **Selina Wassermann, University of the Bundeswehr München** for *“Data-Driven Modelling of Brake Particle Emissions under UN Regulation No. 179”*
- The winner was **Bassent Dridi, PhD candidate, Lund University**, with *“Integrating Dynamic WLTP-B Cycle Loading into Tribometer Material Testing: A Comparative Study of Tribological Performance and Emissions”* (EB2026-TSS-016).

EuroBrake and FISITA would like to congratulate the top three poster authors and thank everyone who submitted posters for EuroBrake 2026.



ESOP Awards

The EuroBrake Student Opportunities Programme (ESOP) is supported by the EuroBrake Steering Committee and a dedicated ESOP Working Group, made up of young industry and academic professionals.

At EuroBrake 2026, it was decided that the following three submissions would share first place:

- *“Chemically Modified Natural Fibers for Sustainable Brake Pad Design”* by **Federica Di Stefano, Politecnico di Torino**
- *“In-Vehicle Measurement of Brake Pad Running Clearance and Disk Deflection for Low-Frequency Brake Noise Analysis”* by **Markus Sailer, Technical University of Munich**
- *“Environmental & Health Impacts of Brake Wear Particles from Heavy-Duty Vehicles”* by **Freja Wiren and Olga Schubert, Lund University**

We would like to congratulate the winners, and thank everyone who submitted entries for the 2026 ESOP awards.



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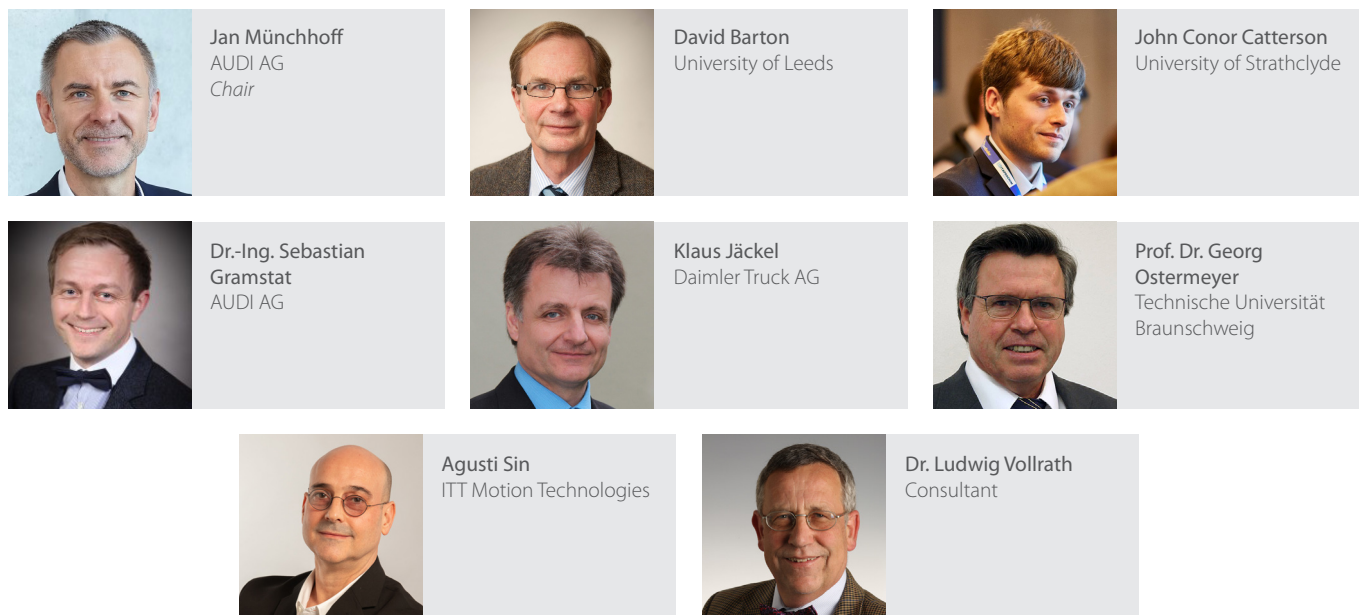
8-10 June 2027

Palau de Congressos de Catalunya,
Barcelona



Acknowledgements

We would like to thank the EuroBrake 2026 Steering Committee:



Thank you to the sponsors of EuroBrake 2026:



Contributors

Michael Nash - independent automotive industry writer and FISITA contributor

Livia Eckett - Events

To discuss future FISITA events, contact Livia Eckett
l.eckett@fisita.com

Kerry McDiarmid - Sales

For more information and to participate in EuroBrake 2027, contact Kerry McDiarmid
k.mcdiarmid@fisita.com



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