

Editorial

Lit Logos In Focus



While I was in Tokyo, I stopped at Ginza to visit the Nissan Crossing. Ginza is one of the best areas for shopping and seeing Tokyo city lights. It was my first time to see one of the latest Nissan show cars, the Hyper Force. Instead of the usual lit front logo, there's a red-and-white one that looks like a heartbeat. This is exactly what I think when I see a lit logo on a car: it makes the car look alive.



We see more and more lit logos in Japan. Toyota, Nissan, Honda, and Mazda have more and more cars with lit logos, as do most car brands in the world. This week I bring you a detailed report about my visit at Zanini in Spain, who develop and produce radar-transparent lit logos. They will be speaking at the DVN Tokyo conference tomorrow, so watch for more information soon. Theirs is really interesting technology which generates a lot of new possibilities



Sincerely yours,

Paul-Henri Matha
DVN Chief Executive Officer and Lighting General Editor

In Depth Lighting Technology

DVN Visit: Zanini Barcelona, a Family Story



It was a pleasure to visit Zanini's R&D office and plant in Barcelona. Finally, I got to see where their magic happens, after they joined DVN two years ago. I've known of their work since 2003; one of my first developments with Hervé Sanchez from Renault — and not the easiest one — was to develop a support for the licence plate for the Mégane cabriolet in Japan, and only Zanini had interest in developing it. For all lighting engineers involved in implementation of licence plate lamps with all possible configurations (Mexico, Egypt, Japan, etc...), I think you can image the issue. Thanks to that I kept in good contact with them during my whole career.

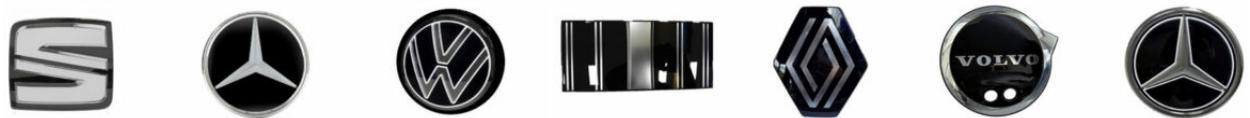


Zanini are a family-owned company created 55 years ago in Barcelona, now with more than 1,800 employees in 10 different countries, including 13 factories in Europe, China, Mexico, the USA, India, and more. They are well known for wheel trim, with 100

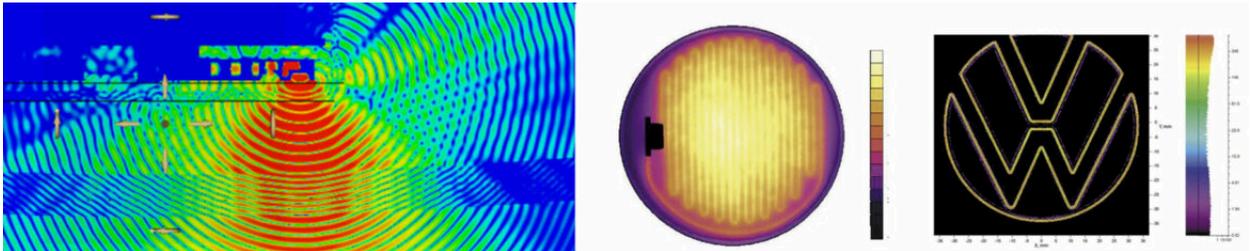
million wheel deco parts produced per year for over 60 brands. Zanini developed their own primerless painting process, as well as Zanichrome, their new technology which allows electromagnetic transparency and backlighting. It's done with PVD sputtering to produce metallic finishes.

August Mayer, Head of Advanced R&D and Innovation, joined Zanini in 1999. He brought a lot of knowledge in radar, and got the idea to develop radar-transparent, metal-looking components to be placed in front of radar sensors.

Zanini started their first radome project (radar behind a chrome logo) with a Cadillac prototype in 2009, and then the first Zanini radome to enter mass production was on the SEAT Ateca in 2016. Then came heated radomes (Mercedes 2019), lit logo radomes (VW 2021– world's first), invisibly-heated radomes (BMW 2021), radomes without any air gap (Renault 2023), smart radomes (Volvo ex90 2024) including a sensor to detect overheating, and first lit, heated radome on the Mercedes CLA in 2025.



Zanini have developed complete skills for this kind of development, including electromagnetic full-wave simulations and thermal and optical simulations.



Radome technology is really interesting, integrating multiple technologies including injected components, films, hot stamping, painting, metallization, and full radar transparency control at the end of the assembly line.

Classical aluminium metallization cannot be used for radar. Mercedes developed a special metallization technology with indium, and Zanini later developed their own with silicium and germanium for radar transparency.

To increase efficiency of the radar, one must minimize any air gap between the radar and the A-surface of the vehicle body. How can you also include light and heating in this case? We took time to analyze in detail the VW lit radome they have in production at the Barcelona plant.

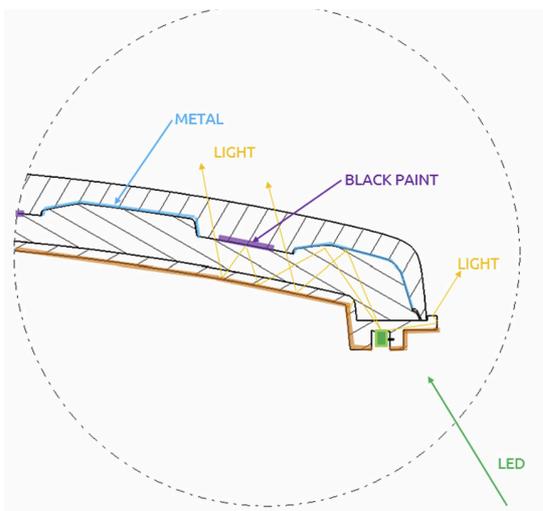


Lens, housing, PCB, and light guide with white painting by hot stamping the VW logo

First, the outer lens. It's done in 2K crystal black, on which Zanini apply a UV hardcoat to protect from the sun and scratches on the A-surface, and metallization as well as laser etching on the B-surface. Thanks to metallization removal, light will go through the lens.

The housing is in ABS-PC, on which is assembled the PCB including LEDs. In between there's the light guide. an injection of transparent PC with white paint hot-stamped on. Light from the LED, all around the round shape, is refracted using total internal reflection on both light guide surfaces, and reflects on the white paint of the light guide to be outcoupled.

These four components are assembled and affixed together by laser welding on the lens/housing contour, and in some central areas to control the two air gap layers (between light guide and housing, and between the front lens and light guide). This is key to keep a good radar transparency.



Concept presented at DVN Detroit 2024 by Zanini's August Mayer

During final assembly, light homogeneity is fully checked with a luminance camera, and radar transparency is likewise checked.

Efficiency is quite good: 8-cd light intensity, luminance about 5,000 cd/m², and power consumption of 7.7W.

On the Mercedes CLA, there is an additional complexity: the need of a heated and lit radome. Heated film is used as the A-surface. It's overmoulded on the 2K black crystal outer lens, and a UV hardcoat is added.



Zanini are making, for the Mercedes CLA, their first lit and heated radome. Two versions exist, to meet different requirements: there's no size limitation in the USA or China, so the complete star + ring is lit, while to comply with the ECE lit-logo size limitation of 100 cm², only the star illuminates.

As Zanini are leaders in wheel trim and experts in lit logos, discussion came up about a lit logo in wheel trim. I wrote an article about this topic last March, and it was interesting to exchange thoughts. For sure they are working on it.



Zanini's idea is to work on a lit floating emblem.

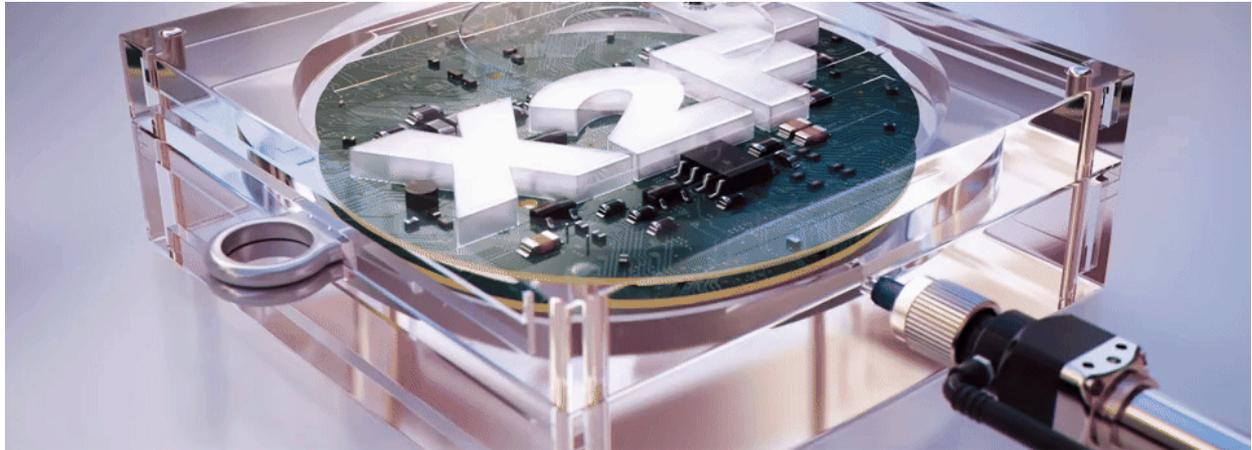


One challenge is the need of power to light the emblem on the rotating wheel. Zanini are working on a self-sustaining power system: the emblem generates its own energy through the rotation of the wheel, eliminating the need for external wiring or batteries. The system activates the lighting feature once the vehicle reaches a speed of 20 km/h, ensuring visibility and aesthetic appeal even while in motion. The illumination remains stable and consistent up to speeds of approximately 125 km/h, maintaining the emblem's horizontal position and enhancing its visual impact without compromising performance or safety.

Lighting News

DVN Field Trip: X2F's Innovation Hub

LIGHTING NEWS



By Felipe Melhado



As the demands on vehicle lighting systems evolve, driven by design complexity, thermal performance, and increasing functionality, the way we mould lighting components must also evolve. Conventional injection moulding, with its high pressures, limited open-gate times, and long cooling cycles, struggles to meet the rigorous requirements of thick optical lenses and

embedded electronics.

Recently, I had the opportunity to visit X2F's facility in Loveland, Colorado, USA, where I saw a breakthrough called controlled viscosity moulding (CVM). This proprietary, low-pressure, extrusion-based process unlocks new possibilities in moulding thick-wall optics and embedded electronics, including thermally-conductive lighting components.

In conventional injection moulding, material is plasticized under intense shear forces, then rapidly injected into the mould. For thick parts like a 25-mm-thick PMMA or PC lens, this approach presents challenges:

- **Extended cycle times:** single-cavity thick lenses can need 7 - 10 minutes per cycle due to gradual cooling and limited packing capability after gate freeze.

- **Material degradation:** high shear leads to molecular chain scission, diminishing optical clarity and mechanical integrity.
- **Stress and sink:** conventional moulds must endure pressures 10 - 20 times higher than cavity fill pressure, yet sometimes the moulded parts still show sink marks, warping, and anisotropic shrinkage (that is, shrinkage with different magnitudes in different directions).

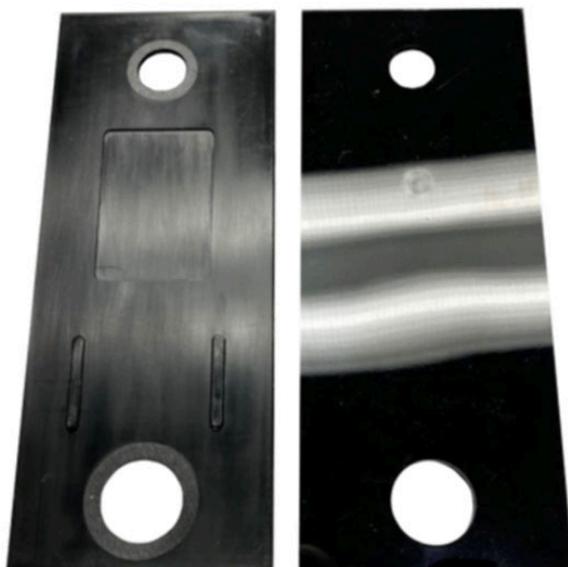
X2F's CVM technology inverts the traditional process: rather than relying on shear to heat and move polymers, CVM uses precisely-controlled conduction heating and extrusion to bring plastic to a known viscosity before moulding. The polymer chains remain entangled throughout the process, preserving clarity, strength, and dimensional stability.



In one striking example at the X2F lab, I observed a thick PMMA lens, over 25mm deep, moulded in just three minutes. The part exhibited virtually no sink (<50 microns), no stress under cross-polarized light, and retained high optical quality. This was accomplished with a fraction of the pressure and energy used by traditional systems.

Vehicle lighting engineers will recognize the implications immediately:

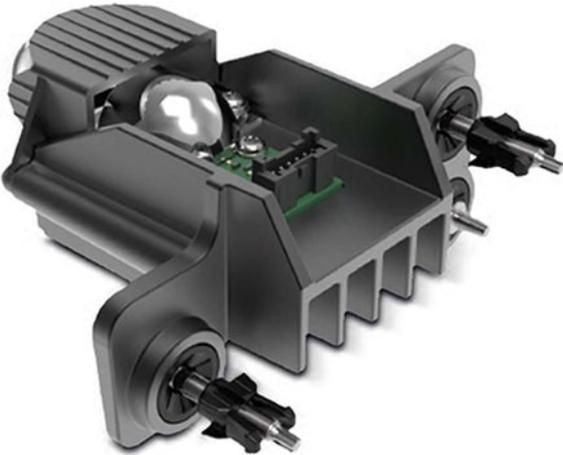
- **Faster cycle times:** reducing lens moulding time to three minutes increases throughput while cutting machine and labour costs.
- **Optical precision:** CVM eliminates knit lines and optical distortion, making it ideal for headlamp lenses, signal covers, and lighting optics.
- **Thermal management:** CVM can mould thermoplastic materials with high filler-load, such as 60-per-cent carbon fibre-filled PEEK, or thermally-conductive PC blends, enabling lighter, more capable alternatives to aluminium for LED heat sinks.
- **Embedded electronics:** The low-pressure, low-shear process makes X2F's technology uniquely suited for moulding around circuit boards, sensors, and LEDs. That comports well with new kinds of adaptive lighting and multifunctional modules.



CVM is highly scalable and accessible. X2F's systems require up to 80 per cent less clamp force and electrical energy, meaning the machinery is lighter, more mobile, and easier to install. X2F moulds can be aluminium, or even 3D-printed for prototypes or short runs. This dramatically reduces cost and iteration time for lighting product development.



Because the CVM process uses an output-based algorithm, monitoring actual resistance to flow and cavity pressure, operators can tune the system with a few intuitive settings, rather than having to train up in the black art of screw speeds and back pressures.



Xpeng Enable AD Indicator Light

LIGHTING NEWS



This past March, Xpeng announced an OTA upgrade to enable a turquoise automated-driving indicator light for their P7, P7i, G6, G9, and X9 models, priced at C¥899 (€110, \$125). The hardware was factory-installed in these cars starting in November 2024: a turquoise LED in the optical system of the mirror-integrated side turn signal repeater.

The currently published GB standards do not include requirements for ADS marker lamps, so they aren't allowed across China. But some regions have released local regulations.

Beijing's are called the Beijing Autonomous Vehicle Regulations, and Shenzhen's are the Shenzhen Special Economic Zone Intelligent and Connected Vehicle Management Regulations.

These regulations primarily apply to autonomous vehicles involved in pilot road applications or road testing, limited to administrative areas for technological innovation and testing activities. Usage requires registration and filing.

Additionally, Shenzhen has issued local standard DB4403/T 359.1-2023, "Technical Requirements for Intelligent and Connected Vehicle Autonomous Driving Systems – Part 1: Highway and Expressway Autonomous Driving". This technical standard specifies that the use of ADS marker lamps must comply with local regulations.

In Beijing and Shenzhen, vehicles meeting the local regulations are permitted to have ADS marker lamps after filing. Vehicles not meeting the local regulations must still comply with GB standards, as in other regions of China.

On 20 May 2025, during the first working meeting of the Automotive Lighting Standards Research Group in Changzhou, experts discussed the inclusion of ADS marker lamps in the draft revision of GB 4785. The standard is expected to be officially released by the end of 2026.



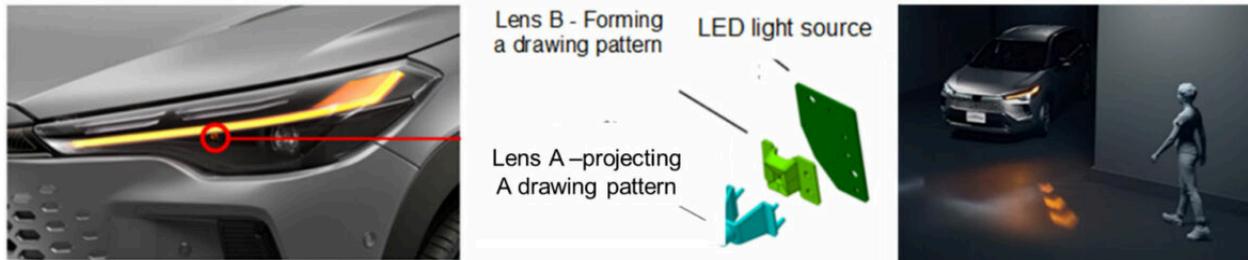
Toyota Corolla Cross: New Headlamps With New Tech

LIGHTING NEWS



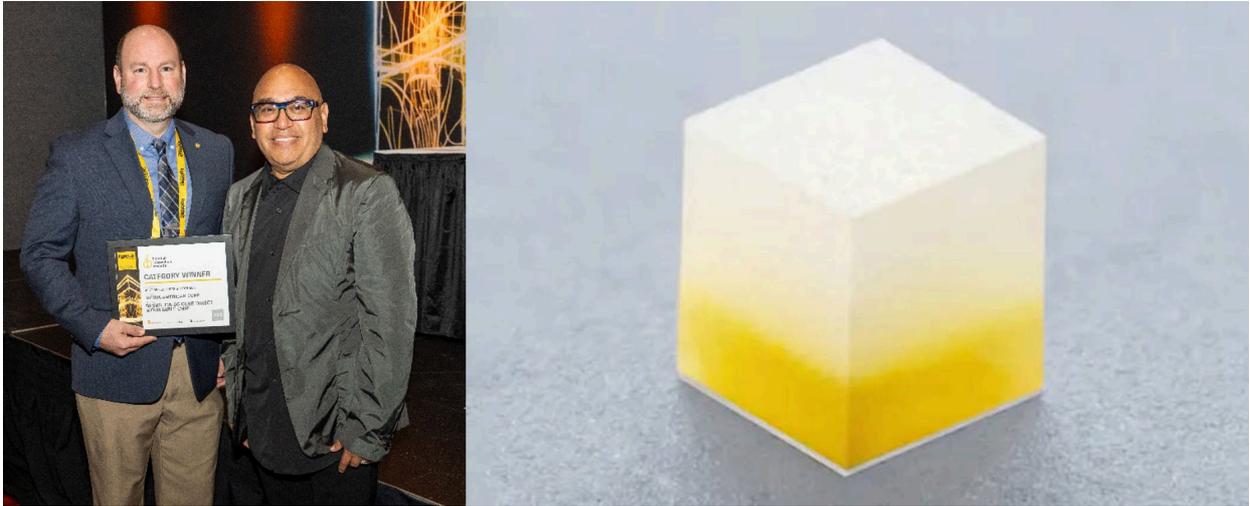
The new Toyota Corolla Cross, released on 23 May 2025, has new Koito headlamps. They have ADB, which isn't exactly news anymore, but something else about them is: they are the first ones in Japan to make life easier and safer for pedestrians and nearby other road users. The new Corolla Cross is the first vehicle in Japan to be equipped with signal road projection (SRP). When the turn signals or hazard lights are operating, the headlamps project a chevron shape onto the road surface to indicate the direction of travel, making it easy for pedestrians and surrounding drivers to see the vehicle and where its driver intends to turn. The function is done with a simple structure: one LED and two lenses. It projects a uniform sign despite its compact size that can be flexibly installed inside the headlamp.

This feature is standard equipment on the GR Sport and Z trims.



Nichia Direct-Mount Chip Wins Innovation Award at LightFair

LIGHTING NEWS



Nichia's Cube Direct Mountable Chip has won the Innovation Award at LightFair, in the LED Chips & Modules category.

The Innovation Awards committee choose innovative technologies and outstanding achievements in the lighting industry, and present the awards at LightFair, the premier biennial architectural and commercial lighting trade show and conference.

Cube Direct Mountable Chip is an LED that realizes a horizontal light distribution by combining Nichia's expertise and technology in phosphors and LEDs cultivated over many years. The strong horizontal light is effective to realize thinner and lighter weight fixtures, as well as to reduce building materials. It creates a soft, low-glare light.

Marelli, OLEDWorks Win Award for Audi Tail Lamp

LIGHTING NEWS



Marelli and OLEDWorks have received the 2025 Collaborative Partnership of the Year award at AutoTech Awards 2025, for their collaboration on the Audi Q6 e-tron rear light project using the digital OLED 2.0 technology. The award recognizes outstanding achievements of individuals and companies driving the automotive industry forward.

Steve Muench, head of Marelli's North American lighting business, and OLEDWorks' global director of marketing Kathleen Miller accepted the award at the award ceremony on 3 June in Novi, Michigan. The Collaborative Partnership of the Year award recognizes automotive suppliers for collaborations that lead to innovative advancements. It underscores the remarkable collaboration between Marelli and OLEDWorks for Audi on the groundbreaking digital OLED 2.0 taillight, which stands as a benchmark for best practices in the global automotive industry, demonstrating how co-creation and close collaboration can result into pioneering solutions.

To go further ...

Newlab: Engineering the Future Through Deep Tech Collaboration

TO GO FURTHER ...



By Felipe Melhado

Ford Motor Company, Michigan Central, and Ford Pro are backing Newlab to fuel innovation. In an era marked by climate change, ageing infrastructure, and the need for sustainable mobility, Newlab is a beacon for deep tech solutions. The Brooklyn-based innovation platform is expanding into Detroit through a partnership with Ford and Michigan Central, and I had the opportunity to visit and see this firsthand.

Two innovation studios inside Michigan Central bring startups, engineers, and industry leaders together to solve real-world problems in connectivity, autonomy, and electrification. Supported by Ford Pro, these studios are test beds for scalable, pilot-ready solutions.

Newlab's headquarters, at the Brooklyn Navy Yard, is a 7,800-m² technological playground, featuring prototyping labs, clean rooms, and fabrication shops. With over 200 startups and 800+ technologists, it's a blend of cutting-edge tools and real-world pilot opportunities.

Newlab operates through multi-stakeholder studios: problem-solving ecosystems that unite startups, Fortune 500 listers, and public agencies. Engineers are supported by integrators, domain experts, test data, and rapid-iteration environments.

Some major project categories include last-mile EV fleet decarbonization, battery development, and bio-composite testing in urban infrastructure.



Newlab’s engineering focus includes energy systems – microgrids, hydrogen fuel, grid storage, mobility and autonomy – as well as EV platforms, V2X, autonomous navigation, materials (biofabrication, upcycled composites), sensors and robotics, perception stacks, embedded systems, AI & edge, industrial IoT, and control systems.

Unlike typical innovation hubs, Newlab emphasizes deployment. From autonomous shuttles in Detroit to robotic inspections in cities, their solutions move quickly from lab to street.

For engineers who want to do more than just design circuits or code models, who want to build systems that move the needle on global challenges, Newlab offers a rare opportunity: a place where technical excellence meets applied innovation.



Grounded RV: modular electric mobility

Grounded RVs, a Detroit-based startup, offer customizable, all-electric vans designed for both recreational and commercial use. Founded by a team of engineers and designers working out of Newlab Detroit, the company shifted from Ford’s Transit platform to GM’s BrightDrop vans, offering 435 km of range and modular lengths of 6 and 7.3 m.

Grounded serve two main customer types: commercial clients such as mobile clinics and pet food trucks, who collaborate with the team to design custom layouts using 3D renders and CAD files, and recreational users who can personalize their camper vans

through an intuitive drag-and-drop online configurator, with builds delivered in just 90 days.

To scale up, Grounded are moving from fully custom builds to predefined modular options, improving efficiency while retaining flexibility. Their builds range from Arctic expedition-ready vans to mobile dentist offices.

Challenges include managing high build variability and limited EV charging infrastructure. Solar panels support internal power but don't extend driving range, though deployable solar awnings are in development.

Newlab Detroit was critical to Grounded's early success, offering no-cost access to \$10m in manufacturing tools, including CNC machines and prototyping equipment. And while housed in a Ford-owned building, Grounded exclusively build on GM platforms.

As mobility tech accelerates, lighting remains an underexplored frontier at Newlab. Future-forward systems like adaptive headlamps, V2X signalling, and bio-responsive interiors could come to be considered essential for safety and user experience in EVs and AVs. Newlab's model of real-world deployment and rapid prototyping makes it an ideal stage for lighting breakthroughs.