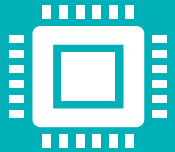
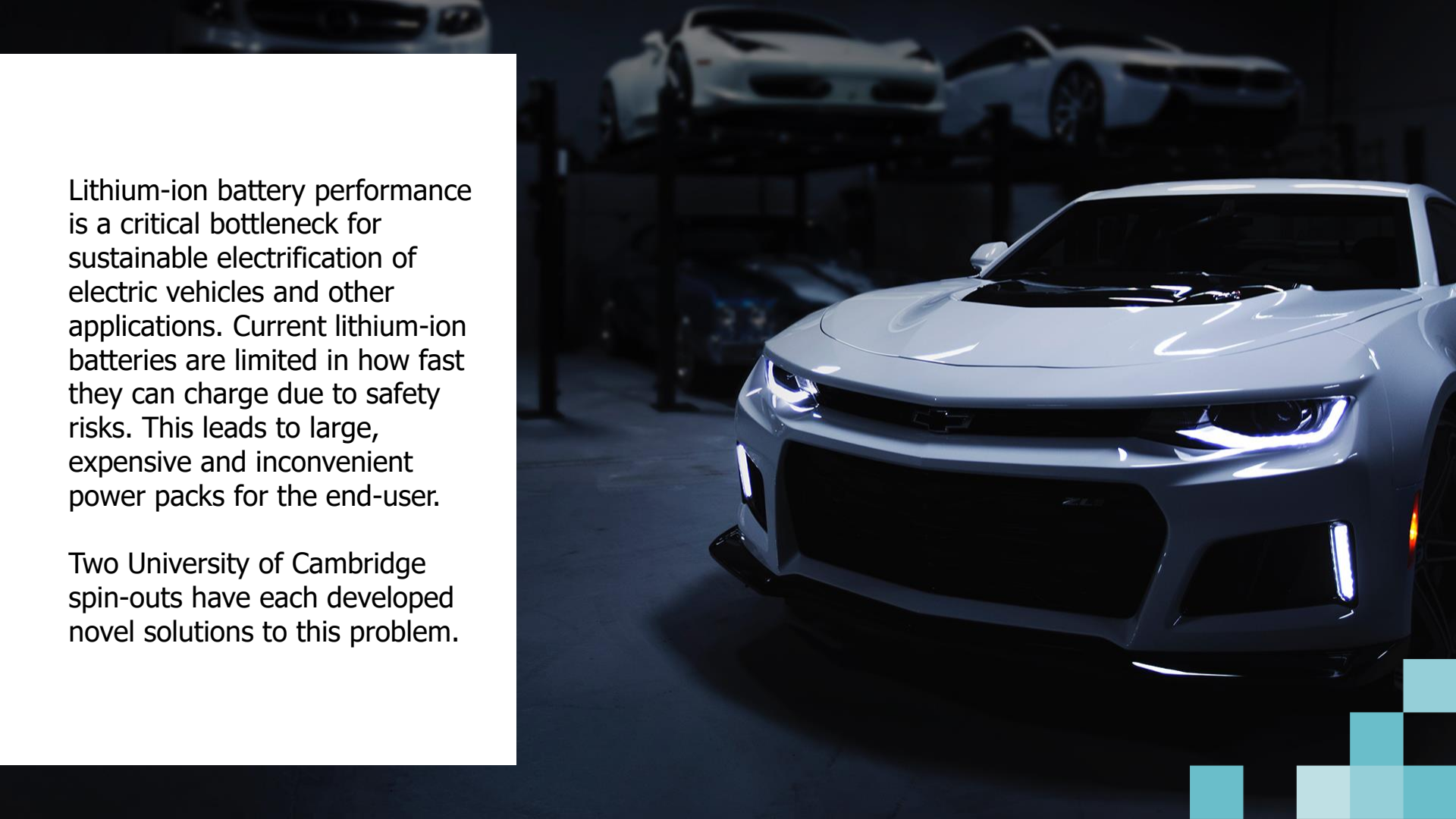
Sustainable solutions



UNIVERSITY OF CAMBRIDGE
enterprise

Lithium-ion battery performance is a critical bottleneck for sustainable electrification of electric vehicles and other applications. Current lithium-ion batteries are limited in how fast they can charge due to safety risks. This leads to large, expensive and inconvenient power packs for the end-user.

Two University of Cambridge spin-outs have each developed novel solutions to this problem.



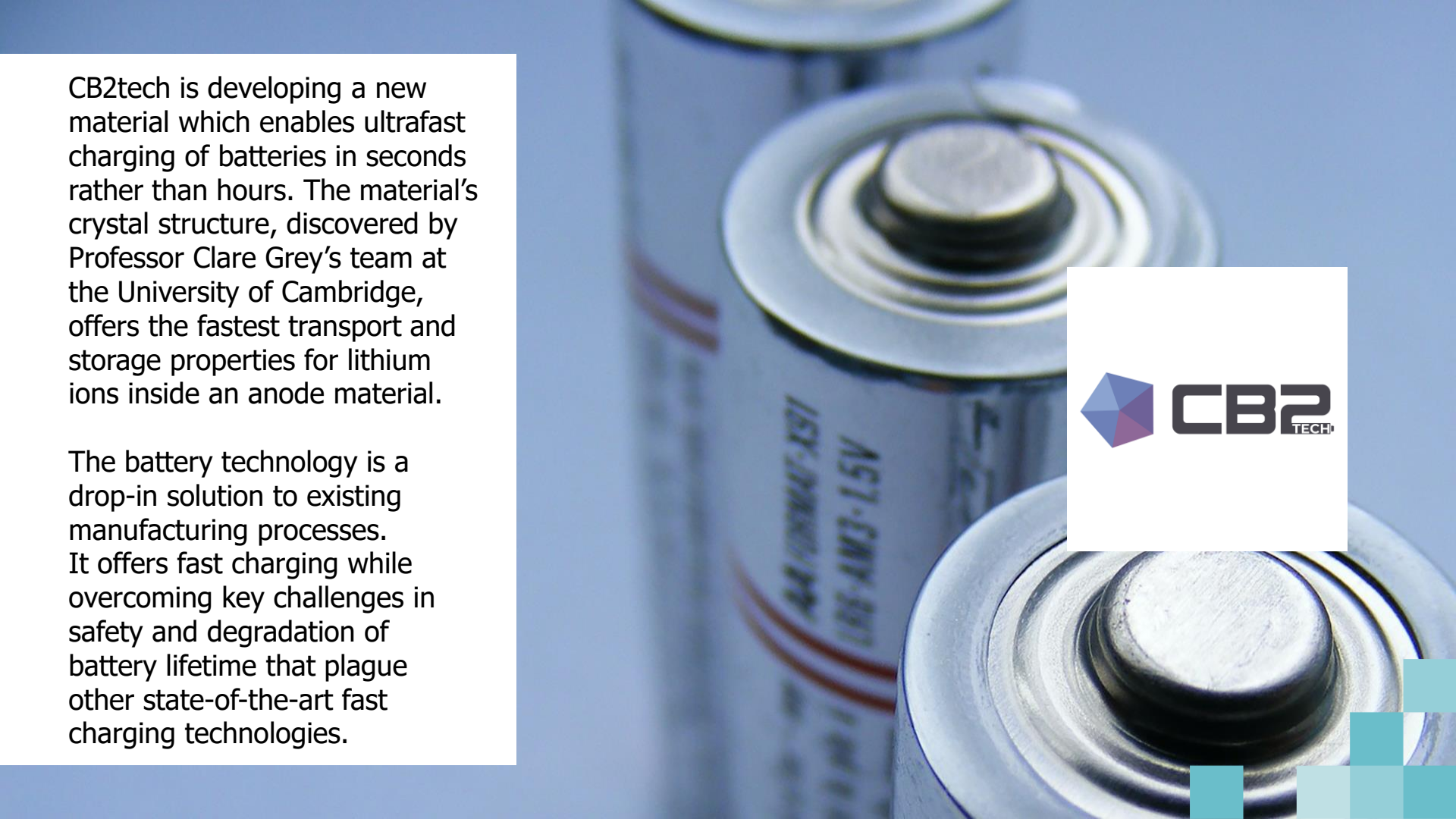
Founded by the Boies and De Volder research groups, Echion Technologies have developed a portfolio of advanced battery active materials.

These new materials provide: ultra-fast charging, high energy with no need to sacrifice energy for power, a sustainable solution, safe charging without dangerous lithium dendrites, and a cost-effective solution, which will accelerate the mass-market electrification movement. They are engaging with chemical and battery cell manufacturers to integrate the new material solutions into the manufacturers' next-generation products.

Jean de La Verpillière

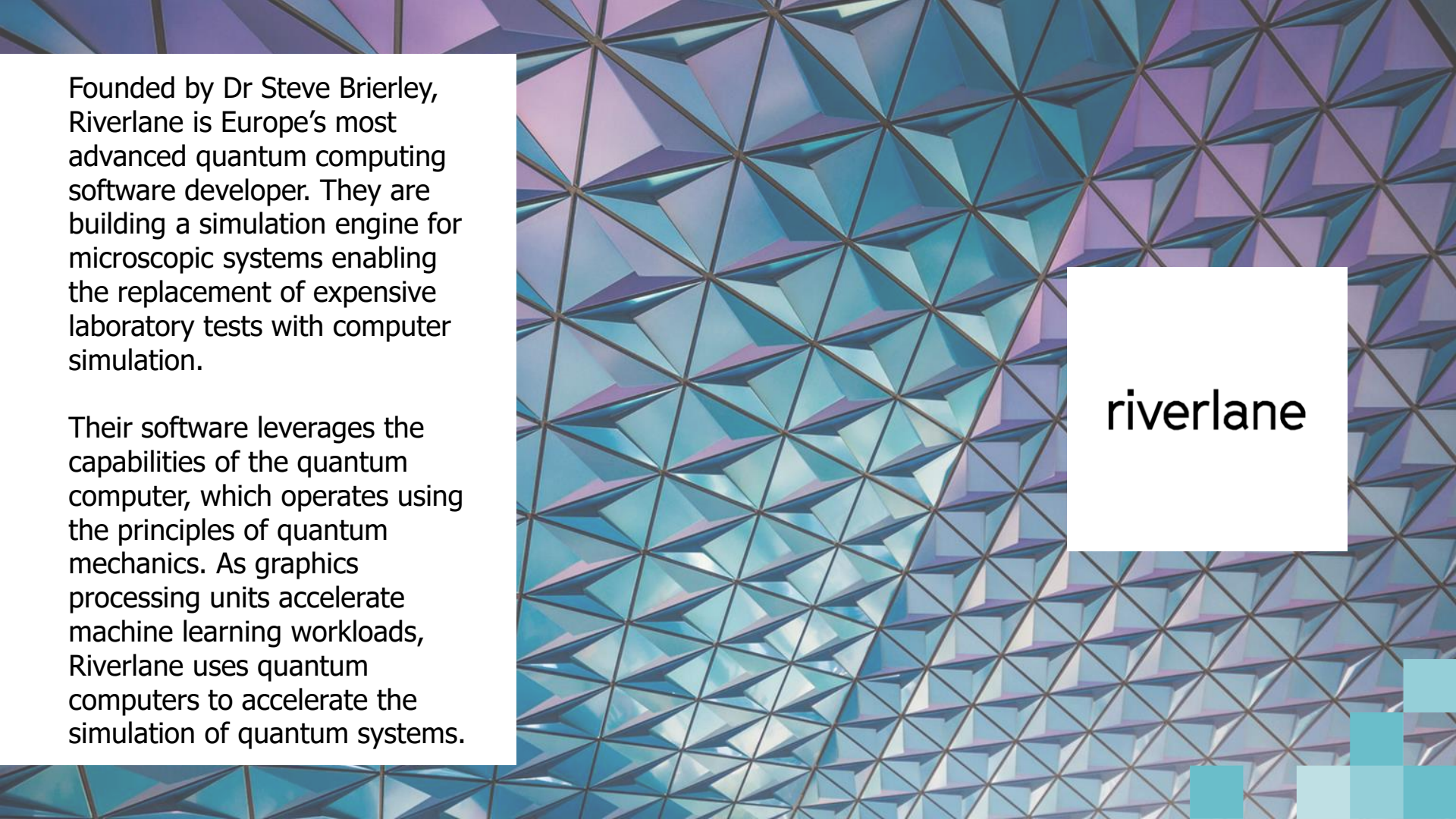
CB2tech is developing a new material which enables ultrafast charging of batteries in seconds rather than hours. The material's crystal structure, discovered by Professor Clare Grey's team at the University of Cambridge, offers the fastest transport and storage properties for lithium ions inside an anode material.

The battery technology is a drop-in solution to existing manufacturing processes.
It offers fast charging while overcoming key challenges in safety and degradation of battery lifetime that plague other state-of-the-art fast charging technologies.



Founded by Dr Steve Brierley, Riverlane is Europe's most advanced quantum computing software developer. They are building a simulation engine for microscopic systems enabling the replacement of expensive laboratory tests with computer simulation.

Their software leverages the capabilities of the quantum computer, which operates using the principles of quantum mechanics. As graphics processing units accelerate machine learning workloads, Riverlane uses quantum computers to accelerate the simulation of quantum systems.



Riverlane is working with leading academics and companies on critical early-use cases for its software, such as developing new battery materials and drug treatments.

Using their recent £3.25m seed funding, Riverlane are looking to demonstrate the technology across a range of quantum computing hardware platforms, focused on early adopters in materials design and drug discovery. Riverlane will also expand its team of quantum software researchers and computational physicists.

Ophelia Crawford, Dan Underwood, Steve Brierley, Tom Parks & Amy Flower

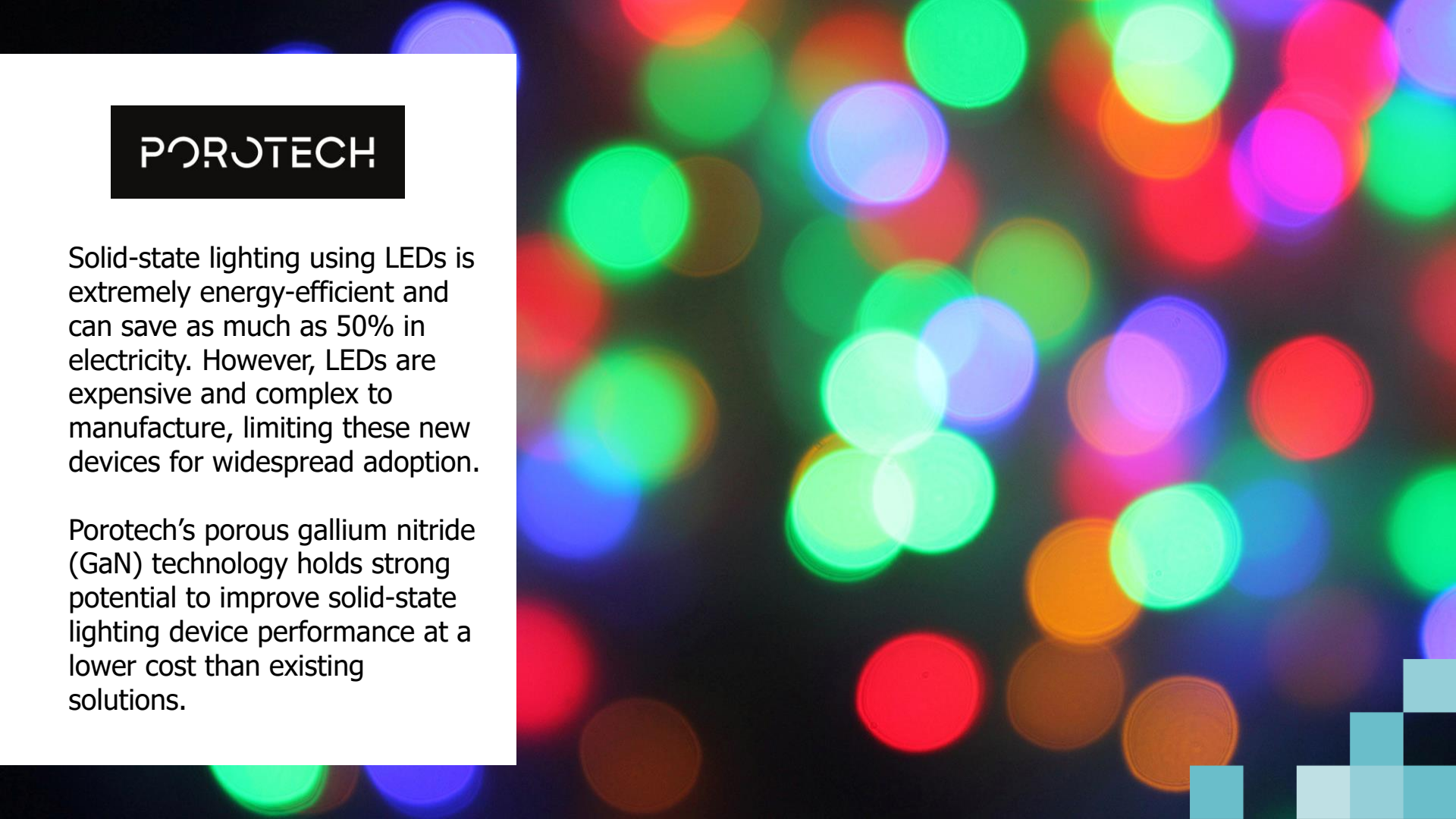
Co-founded by Dr Carmen Palacios-Berraquero and Dr Matthew Applegate, Nu Quantum is building high-performance, single-photon sources and detectors that work at room temperature. These devices are the building blocks that will enable a range of quantum technologies, the most near-term being quantum key distribution (QKD) systems. QKD systems enable communication links that are completely secure as end users are able to detect any disruption to the photons exchanged over quantum communications channel caused by an eavesdropper.

nu
QUANTUM

Nu Quantum are currently focusing on ways to improve cyber security by partnering existing technology with IP related to random number generation. The unpredictability at the heart of quantum-mechanical measurement can be used to create very secure encryption codes.

Nu Quantum aims to establish national and global capabilities for single photon components by first focussing on communication. Their vision is to work with telecoms companies, integrating their photonic technologies into the 5G communication infrastructure.

Dr Carmen Palacios-Berraquero & Dr Matthew Applegate



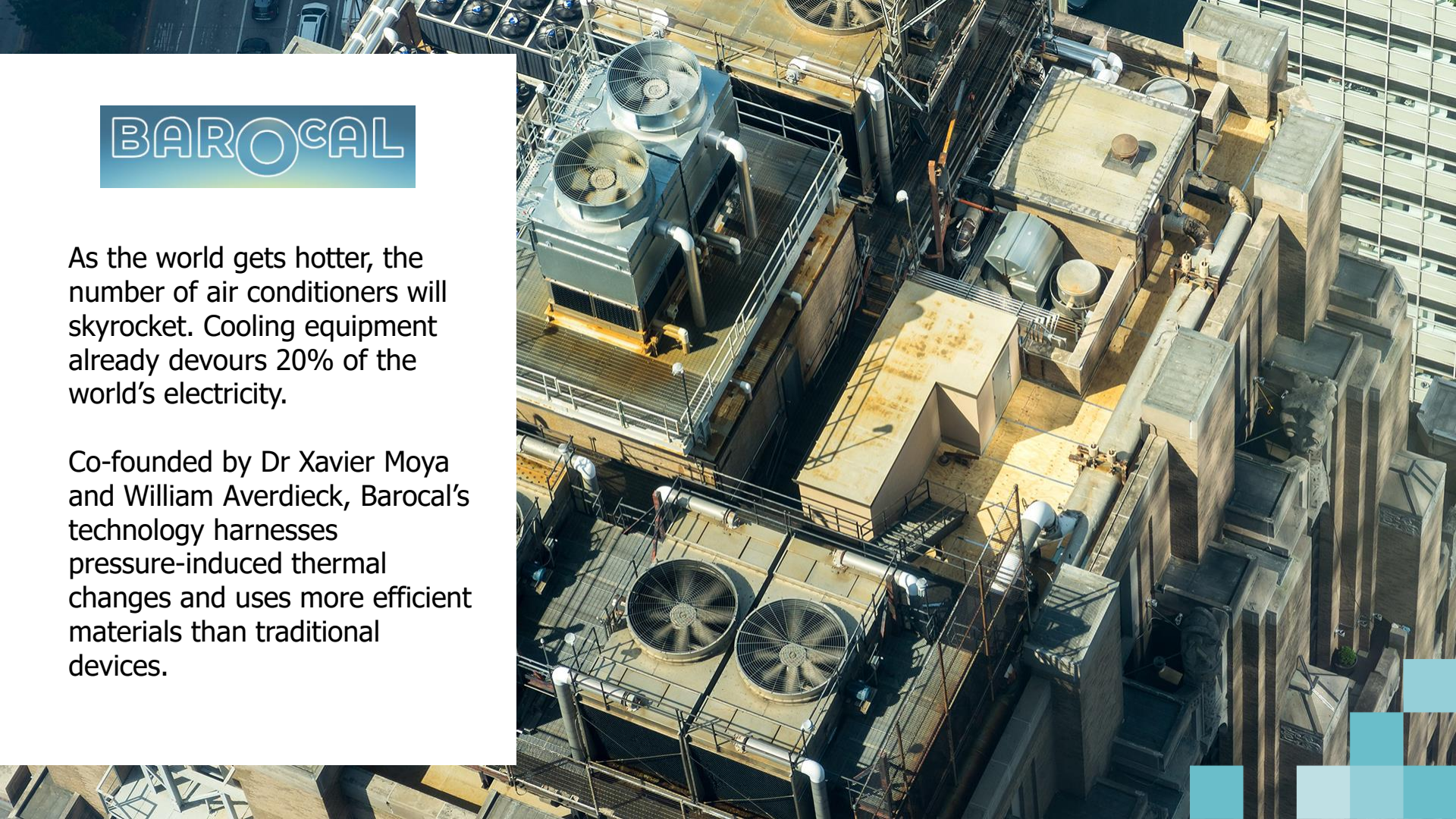
POROTECH

Solid-state lighting using LEDs is extremely energy-efficient and can save as much as 50% in electricity. However, LEDs are expensive and complex to manufacture, limiting these new devices for widespread adoption.

Porotech's porous gallium nitride (GaN) technology holds strong potential to improve solid-state lighting device performance at a lower cost than existing solutions.

Founded by Dr Tongtong Zhu, Dr Yingjun Liu and Professor Rachel Oliver, Porotech aims to provide semiconductor wafers and material solutions with sub-surface 3D porous nanostructures and tuneable properties for the semiconductor industry in a number of areas, from optoelectronics, power electronics and sensors.

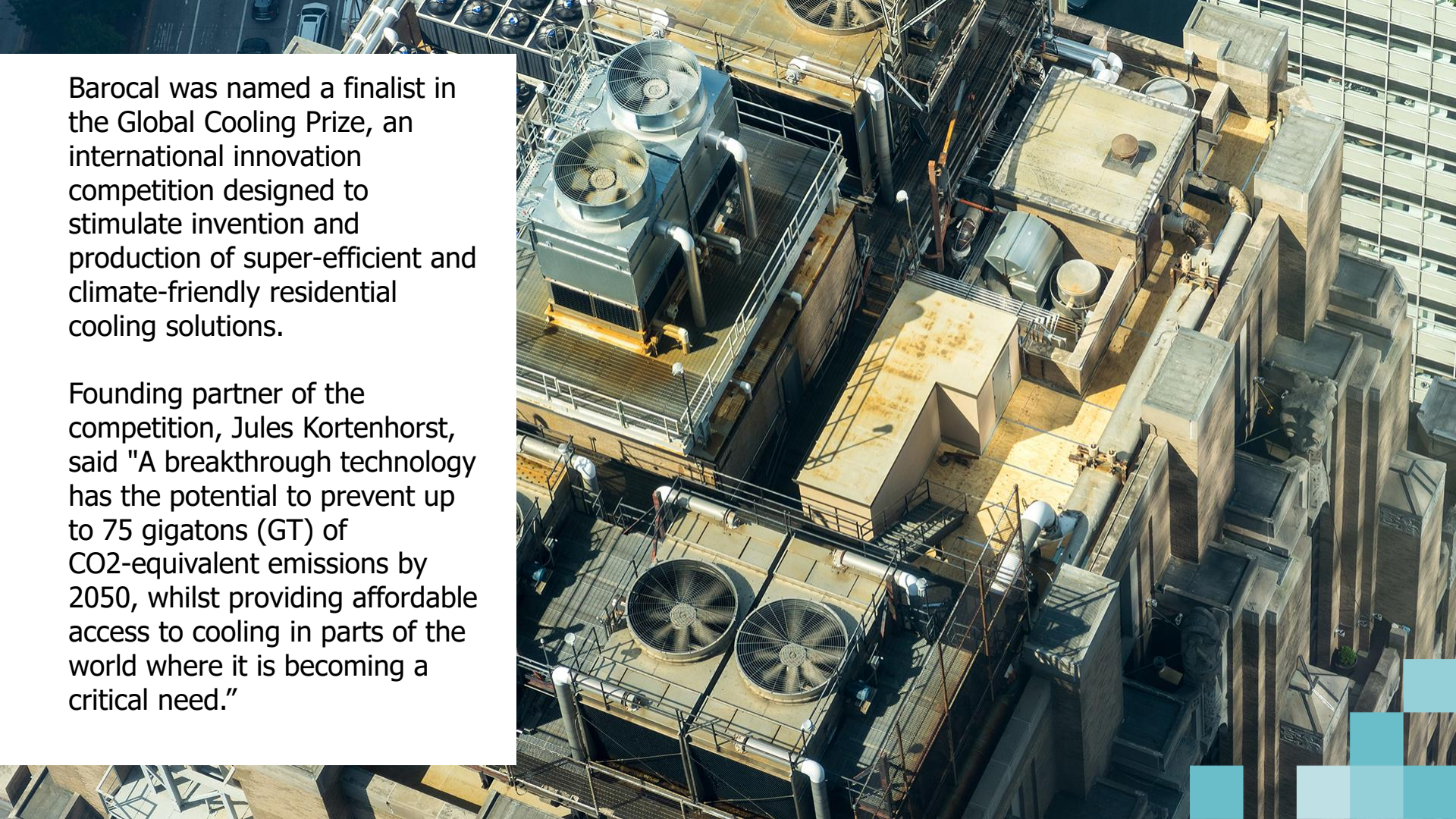
In their current research and development, the aim is to exploit their innovations through partnerships, outsourcing and licensing to enable porous GaN technology and materials to be taken up in real-world devices and applications.



BAROCAL

As the world gets hotter, the number of air conditioners will skyrocket. Cooling equipment already devours 20% of the world's electricity.

Co-founded by Dr Xavier Moya and William Averdieck, Barocal's technology harnesses pressure-induced thermal changes and uses more efficient materials than traditional devices.



Barocal was named a finalist in the Global Cooling Prize, an international innovation competition designed to stimulate invention and production of super-efficient and climate-friendly residential cooling solutions.

Founding partner of the competition, Jules Kortenhorst, said "A breakthrough technology has the potential to prevent up to 75 gigatons (GT) of CO2-equivalent emissions by 2050, whilst providing affordable access to cooling in parts of the world where it is becoming a critical need.”

Xampla

Plastic is choking the planet and a sustainable alternative needs to be found.

Founded by Professor Tuomas Knowles and Dr Marc Rodriguez-Garcia, Xampla has developed an entirely new material, made from peas. It's entirely natural, biodegradable and biocompatible. The team has developed innovative processes to create products and solutions based on Supramolecular Engineered Protein (SEP).

Xampla's products and solutions offer industry partners new sustainable choices for plastics in applications in food, cosmetics, household products, animal feed, packaging and medicine.

Useful Links:	
Echion	Echion Technologies website
CB2tech	CB2tech website
Riverlane	Riverlane website
NuQuantum	NuQuantum website
Porotech	Porotech website
Barocal	Barocal website
Xampla	Xampla website

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