



AMPERE AND CENTRALE NANTES STRENGTHEN THEIR TECHNOLOGICAL PARTNERSHIP WITH THE LAUNCH OF THE 3RD PHASE OF THEIR JOINT RESEARCH CHAIR

- The first two phases of the chair led to major scientific breakthroughs. The research conducted enabled the development and validation of numerous control and optimization algorithms.
- This 3rd phase will focus on propulsion systems, energy management, and diagnostics for electric vehicles (EVs).
- It is structured around 3 strategic research areas: improving the autonomy, efficiency, and driving comfort of electric vehicles; making the vehicle an active player in the power grid; and finally, extending the lifespan of the vehicle's critical components through diagnostics, prognostics, and predictive optimization.

Nantes, November 13, 2025. Ampere, a Renault Group entity specialized in smart electric vehicles, and Centrale Nantes announce the launch of the third phase of their joint research chair, dedicated to propulsion systems, energy management, and diagnostics for electric vehicles (EVs). Initiated in 2016 with Renault Group, this strategic partnership has helped push the boundaries of electric mobility by improving the performance of electric vehicles while reducing their costs, making the technology more accessible without compromising safety, reliability, or customer experience.

The first two phases of the chair led to major scientific breakthroughs:

- 22 patents filed
- 19 scientific publications in international journals
- 26 presentations at international conferences

The research conducted enabled the development and validation of numerous control and optimization algorithms, several of which are already integrated into Renault vehicles currently in production. These tangible results illustrate the ability of academic research to have a direct impact on industrial competitiveness.

Jean-Baptiste Avrillier, Director of Centrale Nantes, emphasizes: *"This partnership with Ampere perfectly illustrates our commitment to making research a concrete lever for industrial competitiveness and energy transition."*

Nicolas Racquet, Head of Vehicle and Powertrain Engineering at Ampere, adds: *"This collaboration with Centrale Nantes through a prestigious chair allows us to explore cutting-edge technological solutions while accelerating their transfer into our products."*

The third phase of the chair (2025–2029), led by the LS2N laboratory (Centrale Nantes / CNRS), is structured around three strategic research areas:

- Improving the autonomy, efficiency, and driving comfort of electric vehicles through control and observation functions integrated from the design stage.

- Making the vehicle a key player in the power grid (Vehicle-to-Grid, Vehicle-to-Home...), through AI-based optimization and control algorithms.
- Extending the lifespan of the vehicle's critical components through diagnostics, prognostics, and predictive optimization.

Malek Ghanes, Professor at Centrale Nantes and chair lead, summarizes: *"With the third phase of our joint research chair with Ampere, we are entering an even more integrated approach, where control, energy management, and diagnostics are conceived as a whole."*

A European-level excellence training program

The chair is supported by an international educational ecosystem through the Erasmus Mundus Master E-PiCo+ (2025–2030), endorsed by the European Union. This program trains international master's students in electromobility each year, in partnership with:

- Centrale Nantes (France)
- Kiel University (Germany)
- UPB Bucharest (Romania)
- University of L'Aquila (Italy)
- CINVESTAV (Mexico)
- And 18 industrial partners (Renault Group, Airbus, Mercedes-Benz, Siemens, BT, Hella, Omega Trust, NxP, Infopro Digital Automotive, P2C, Tekne, Bluhub, Hipert, Jungheinrich Nüwiel, Semikron-Danfoss, TK marine systems, Modutram) and 7 associated academic partners (McMaster University, ETS Montreal, Wuhan University, University of Lagos-Unilag, Universidade Federal de Minas Gerais, Indian Institute of Technology Delhi, Instituto Tecnológico y de Estudios Superiores de Monterrey).

Unique technological platforms

The research is supported by several cutting-edge test benches and infrastructures, including:

- A 160 kW motor test bench – unique in France in the academic world, enabling validation of controllers and observers under real conditions
- A multi-energy hydrogen platform, developed as part of the regional CPER program, to develop hydrogen-based energy management architectures
- A 3 kW test bench simulating a series hybrid architecture in which the electric motor alone drives the vehicle, while the combustion engine recharges the battery via a generator
- Bidirectional charging benches to test Vehicle-to-Grid (V2G) and Vehicle-to-Home (V2H) strategies in semi-real environments

Key Figures

- 2016–2029 : 3 chair phases
- 22 patents, 19 publications, 26 international conferences
- Around twenty people involved in the 3rd chair phase
- 4 test benches

About Ampere

Ampere is Europe's specialist in smart electric vehicles. A Renault Group entity, Ampere designs, develops, manufactures, and markets cutting-edge electric vehicles that are accessible to the greatest number. Customer experience, environmental and social impact are integrated throughout the vehicle development process, reflecting its commitment: to its customers, to the planet, and to everyone living on it. For more information, visit ampere.cars or follow Ampere on LinkedIn.

About Centrale Nantes

Centrale Nantes is a leading engineering school founded in 1919. It ranks among the top French engineering schools (*L'Étudiant*) and in the global top 600 (*Times Higher Education*). It trains engineers, bachelor's, master's, and PhD students

through academic programs based on cutting-edge scientific and technological developments. Renowned for its academic excellence and commitment to energy transition, Centrale Nantes maintains strong ties with industry and benefits from a high level of international openness, with numerous partnerships worldwide. With research platforms ranging from digital simulation to full-scale prototype experimentation, and an incubator with 20 years of experience, the school offers major tools for innovation and collaboration with the business world. Through its research chairs and joint laboratories, Centrale Nantes actively contributes to reindustrialization efforts and to strengthening regional competitiveness. For more information: www.ec-nantes.fr - Media library: <https://phototheque.ec-nantes.fr> / @CentraleNantes

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