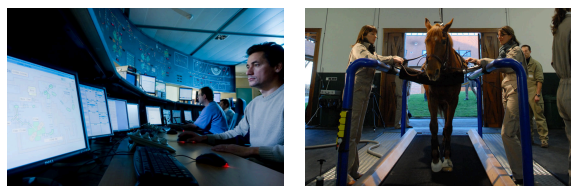




100% NORMANDIE

## ➤ Research



**Chemistry, energy, electronics, materials, mechanical engineering, health...**  
**Research and innovation employ over 16,000 people in Normandy.**

**Cancer research, eco-materials, mobility, contactless technology, etc. Normandy-born discoveries to serve quality of life.**

**Leading facilities: the National Heavy Ion Accelerator (GANIL) in Caen, the Vibro-acoustic test centre for vehicles (Ceva) in Saint-Étienne-du-Rouvray, the Dynamic test centre (CED) in Flers-Caligny.**

### Digital technologies

A comprehensive hub of fundamental and applied research devoted to digital technologies (GREYC, LITIS, IRSEEM, CIREVE, etc.).

Complementary public stakeholders (CNRS, ComUE Normandie-Université), engineering schools (ENSICAEN, INSA...), businesses and start-ups: semiconductors, NFC, virtual reality, digital documents, etc. The French Tech label.

Specialised sites: the North Plateau and the EffiScience science park in Caen, La Vatine and Seine Innopolis in Rouen. Cultural and scientific dissemination sites: the Dôme in Caen and the forthcoming Cité Numérique in Le Havre.

### Health

Several fields of excellence: oncology, neuroscience, nutrition, cardiology and biotechnology.

Cancer care centres (Baclesse in Caen and Becquerel in Rouen), the Cyceron biomedical imaging platform and Archade (hadrontherapy centre).

World premieres in the medical field: percutaneous aortic valve implantation (2002), discovery of a new gene involved in Alzheimer's disease (2012), development of an antibody to limit the effects of stroke, discovery of the Donecopicride molecule to treat Alzheimer's disease (2014).

### Pharmacy – Chemistry

Normandy is France's 2nd ranking region for pharmaceutical chemistry. Sixty R&D centres and laboratories, two universities, a teaching hospital (CHU) and INSA (National Institute of Applied Sciences), proposing engineering courses in fine chemistry in association with industrial partners (including Sanofi, GlaxoSmithKline (GSK), Janssen-Cilag, Aspen, etc.).

Collective dynamics: Cosmetic Valley (inter-regional competitiveness cluster focusing on beauty and well-being science) and Polepharma (French cluster in the field of pharmaceutical production reuniting all the required skills for the development and the production of medicinal products).

### Materials

Of natural or synthetic origin, increasingly intelligent, high-performance, lightweight, eco-friendly... materials improve the daily lives of their users. Among the major sites: GANIL, the leader in research into atoms and ion beams, the ComUE (Communities of universities and institutions) laboratories – CNRS, engineering schools and the five CNRT Materials laboratories. The only French laboratory of excellence (LabEx) focusing on the theme. Studied fields: atomic physics, thermoelectricity, nanoporous materials, plastics and composites, MRE, etc.

### Aeronautics and aerospace

Projects coordinated by NAE (Normandie AéroEspace), Normandy's network of stakeholders in the aeronautical, aerospace, defence and security field, have

positioned Normandy as a key stakeholder in RTI (Research, Technology and Innovation) at both national and international level.

These 36 projects represent a total investment of €158M and cover 4 main themes: Structure Weight Reduction and Material Performance, Systems Reliability and Electrification, Optimisation and New Propulsion Technologies, and the Industry of the Future.

### Automotive

Normandy's automotive industry reunites a total of 400 companies and several laboratories, research centres and higher education and training institutions, all references in the field of mobility. Coordinated by ARIA and organised via the Mov'éo Competitiveness Cluster (Normandy – Île-de-France with 70% of France's total automotive R&D), research focuses essentially on 5 technological themes: Intelligent Mobility Solutions, Road User Safety, Innovative Vehicles and Energy Storage, Powertrains and Energy and Material Management, Manufacturing and Systems.

### Agrifood industry

The region boasts research hubs in the field of dairy produce, vegetable and cider-based production, seafood, etc. : INRA (agricultural research institute), IFREMER: (marine resources), SILEBAN (vegetable production and horticulture), ACTALIA (dairy products), IFBA (microbiology and food safety). Private and public stakeholders share the same aim towards constant specialisation and innovation: increased agrifood safety, innovative processes, tomorrow's packaging solutions, new recipes.

### Discoveries

1981: world's 1st transaction by a debit card in Caen.  
 2002: 1st percutaneous aortic valve implantation in Rouen.  
 2005: 1st transaction via mobile phone (NFC) in Caen.  
 2012: discovery of a new gene involved in early onset hereditary forms of Alzheimer's disease.  
 2016: 1st solar-powered road in Orne.  
 2018: experimentation of autonomous electric vehicles in Rouen.

### Competitiveness clusters

MOV'EO: Automobile and Public Transport R&D (400 stakeholders in Normandy and Île-de-France).

TES: E-secure transactions (120 stakeholders).

HIPPOLIA: unique competitiveness cluster for the horse industry (140 stakeholders).

VALORIAL: tomorrow's food (270 stakeholders in Normandy, Brittany and Pays de la Loire).

NOVALOG: logistics (90 stakeholders in the Normandy and Île-de-France regions).

COSMETIC VALLEY: perfumery and cosmetics (300 stakeholders in Île-de-France, Centre and Normandy).