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RESEARCH

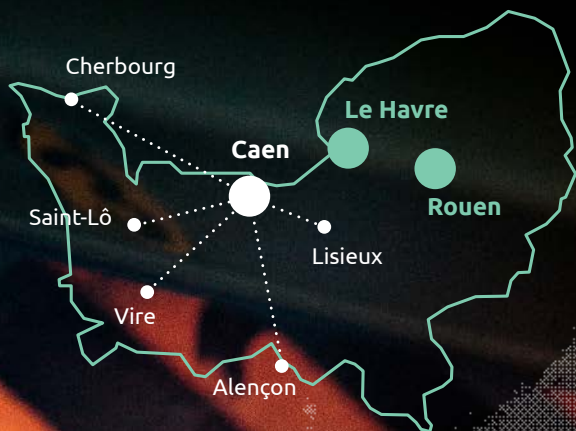
UNIVERSITY OF CAEN NORMANDY

TOGETHER WE INNOVATE

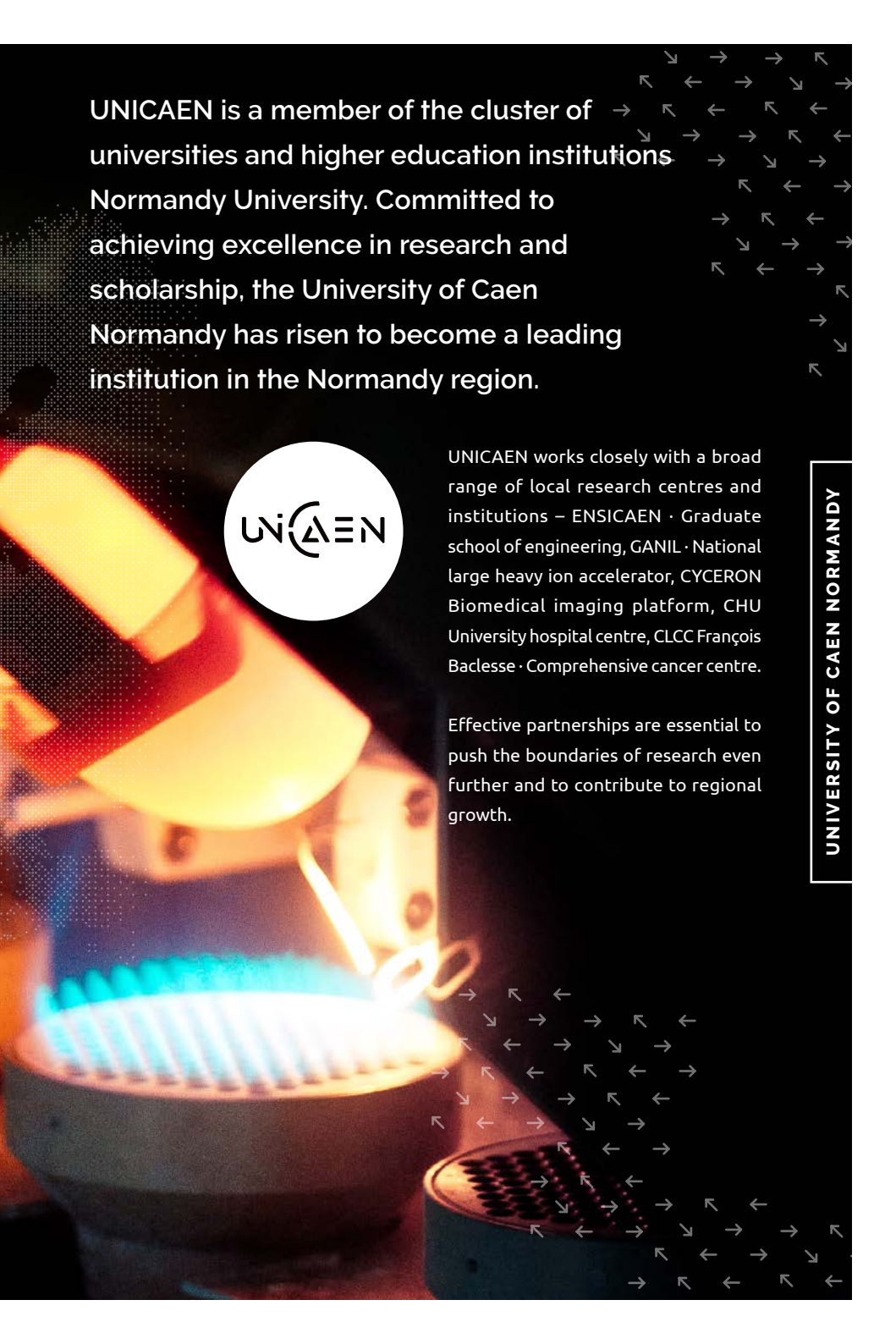




AN ASSET FOR THE TERRITORY



UNICAEN IS A MEMBER OF
8 COMPETITIVENESS
CLUSTERS



UNICAEN is a member of the cluster of universities and higher education institutions Normandy University. Committed to achieving excellence in research and scholarship, the University of Caen Normandy has risen to become a leading institution in the Normandy region.



UNICAEN works closely with a broad range of local research centres and institutions – ENSICAEN · Graduate school of engineering, GANIL · National large heavy ion accelerator, CYCERON Biomedical imaging platform, CHU University hospital centre, CLCC François Baclesse · Comprehensive cancer centre.

Effective partnerships are essential to push the boundaries of research even further and to contribute to regional growth.

A MULTIDISCIPLINARY APPROACH

45 RESEARCH
UNITS

21 OF THEM
RECOGNIZED
BY A NATIONAL
RESEARCH INSTITUTION

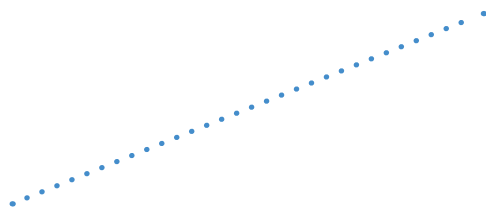
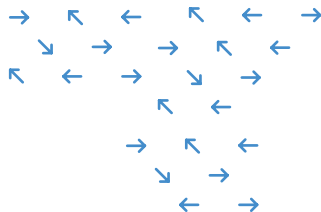
7 FEDERATIVE
RESEARCH STRUCTURES

950 TENURED
ACADEMICS

265 TECHNICIANS
ENGINEERS &
ADMINISTRATIVE STAFF

75 RESEARCHERS
FROM NATIONAL
RESEARCH INSTITUTIONS

6 INTERNATIONAL
ASSOCIATED LABORATORIES



Our research is distinctive in its multidisciplinary approach and breadth.

Three core research areas have been established to maximize the quality and impact of our research.

BI²SE INTEGRATIVE BIOLOGY, IMAGING, HEALTH, ENVIRONMENT

SHS HUMANITIES & SOCIAL SCIENCES

ST SCIENCE & TECHNOLOGY



Our research units can rely on state-of-the-art research labs and facilities. Most of them have received a national certification.

BI²SE

INTEGRATIVE BIOLOGY, IMAGING, HEALTH, ENVIRONMENT

The Research federative structure ICORE brings together 17 research units around a common strategy and promotes the development of cross-disciplinary projects in biology/health and biology/environment. ICORE provides access to cutting-edge technology equipment and knowledge. UNICAEN is a founding

member of CYCERON, a unique biomedical imaging platform in France and Europe. The Research centre for coastal and marine environment · CREC provides logistical and administrative support to the research units addressing the sustainable development of our coasts, seas and related resources.

SHS

HUMANITIES & SOCIAL SCIENCES

The Humanities research centre · MRSH has been promoting cross-disciplinary collaboration for more than 20 years. It brings together 18 research units spanning areas of archaeology, literature, language and linguistics, arts, geography, history, economics, sociology, psychology, philosophy and law. A unique feature is the breadth of expertise in digital humanities. It also has an unrivalled expertise and insight on Norman studies that ranges from the Vikings and medieval Normandy, to the Mont-Saint-Michel and the Bayeux Tapestry.

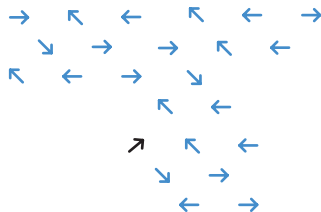
The Humanities research centre · MRSH

17 RESEARCH UNITS CYCERON · BIOMEDICAL IMAGING PLATFORM

provides access to technology and research services. It is home to the Virtual reality centre which promotes the use of virtual reality in enhancing interdisciplinary research. The Caen University Data Platform provides support with statistics and data management. It is part of the national large infrastructure PROGEDO "Production & management of the data in social sciences", whose mission is the development of facilities for the archive, the documentation and the availability of data.

18 RESEARCH UNITS

1 HUMANITIES RESEARCH CENTRE

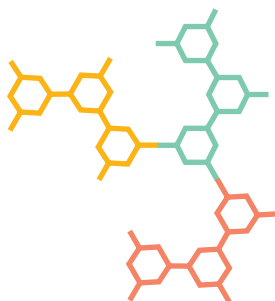


SCIENCE & TECHNOLOGY



Science & Technology at UNICAEN spans a wide range of areas of both fundamental and technological interest. Our research is founded on a strong collaboration with the ENSICAEN · Graduate school of engineering. UNICAEN is a member of 6 research federations which bring together regional institutions working in the areas of materials, mathematics, chemistry, energy, information and communication technologies.

UNICAEN works closely with the National large heavy ion accelerator · GANIL on the development of devices for the SPIRAL2 project — this new instrument which will enable scientists to delve further into the mysteries of the atom.



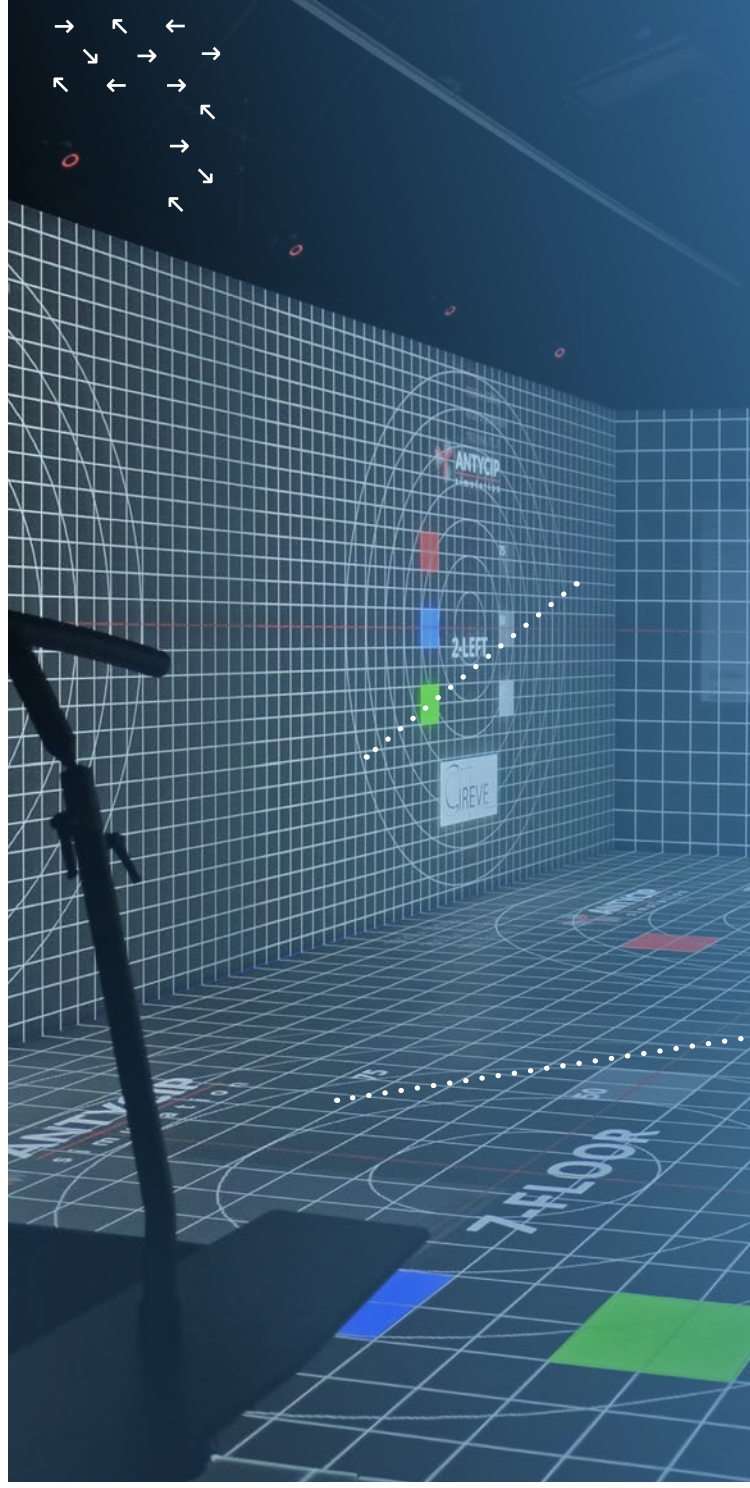
UNIVERSITY OF CAEN NORMANDY

10 RESEARCH
UNITS

**1 JOINT LABORATORY
FOR INDUSTRY & RESEARCH**

**1 NATIONAL CENTRE FOR
TECHNOLOGICAL RESEARCH
ON MATERIALS**

ENHANCING TRANS- DISCIPLINARY RESEARCH



Transdisciplinary research
is essential to understand the complexities
of a common problem.

Thanks to its broad spectrum
of academic fields, UNICAEN
has great potential for innovative
research.

4

to address 4 main issues.

We encourage
the development
of cross-disciplinary
approaches

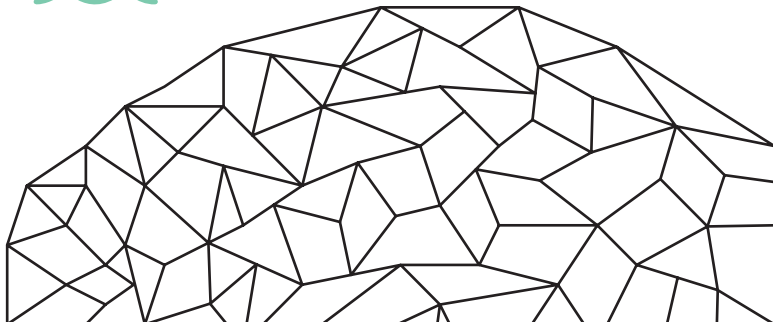
UNICAEN



OFFSHORE RENEWABLE ENERGY

ENERGY STORAGE

Energy storage is an industrial challenge that needs to be tackled, as we seek to further increase the use of renewable sources of power. Our research in energy storage spans from modelling battery aging conditions to integration of power generation systems. The LUSAC research unit brings its expertise in marine energy within the ITEG project (funded by Interreg North West) to develop an advanced energy management system for tidal generators in grid operating mode. We also carry out research on hydrogen as a future renewable energy storage medium and an energy carrier. The LUSAC research unit is involved in the development of hydrogen-powered fishing boats.



2 MEMORY

Our neuroscience research has gained international recognition, focusing on how memory is affected by aging, trauma and neurodegenerative diseases. The biomedical imaging platform CYCERON provides a stimulating research environment as it groups several research units and multimodal imaging devices.

The 13-November research program investigates how the traumatic events of the terrorist attacks in Paris will evolve in people's memories, whether collective or individual. 1,000 volunteers will be interviewed four times over ten years and their individual accounts will be analysed. A biomedical study will be conducted alongside the interviews to help shed light on the impact of traumatic stress on memory as well as on the markers associated with resilience.

The fortunes of UNICAEN and the wider region are inextricably linked. The city of Caen was ravaged in July 1944 during the Battle of Normandy and our research today investigates the memory of the Second World War and the massacres of the 20th century. The HISTEME research unit has developed the database *Écrits de guerre et d'occupation* keeping track of testimonies written during the Second World War, and the database *Mémorial des victimes civiles* listing the people from the Normandy region who lost their lives in 1944. UNICAEN is associated with the Caen Memorial museum for the organisation of conferences and seminars.

3 DIGITAL TECHNOLOGY & APPLICATIONS

The equipment available at The Virtual reality centre · CIREVE remains unequalled at university level. The 45 square metre immersive room enables research activities to be carried out in a closed environment. Virtual reality models are currently being used for research projects related to memory, mobility disorders and biomechanics.

The Humanities research centre · MRSH has a unique expertise in digital humanities. Well over 60 projects connecting the humanities to computing are currently being pursued. Among these projects, METOPES focuses on the strategy of single source publishing — allowing the same source content to be used across different forms of media.

4 HADRONTHERAPY

UNICAEN is a member of the Rec-Hadron equipment project part of an innovative approach in cancer therapy. Hadrontherapy is a very promising technique for the treatment of cancer based on the use of accelerated heavy charged particles. Many research units in biology, physics, chemistry, oncology and matter are involved in this project which is exploited by ARCHADE, the first European research and development exclusively dedicated to hadrontherapy.

RESEARCH AT UNICAEN

UNIVERSITY OF CAEN NORMANDY

SCIENCE & TECHNOLOGY

- **10 research units**
- Partnership — ENSICAEN
Graduate school
of engineering
- 6 research federations
in materials, mathematics,
chemistry, energy,
information & communication
technologies
- CNRT Matériaux · National centre
for technological research
on materials

RENEWABLE & SUSTAINABLE ENERGY

DIGITAL TECH. & APPLICATIONS

HADRONTHERAPY

INTEGRATIVE BIOLOGY IMAGING, HEALTH, ENVIRONMENT

- **17 research units**
- ICORE · Research federative structure — Interactions, cells, organisms, environment
- CYCERON · Biomedical imaging platform
- CREC · Research centre for coastal environment
- CURB · University centre of biological resources

45 RESEARCH UNITS

21 of them recognized by a national research institution

— **CNRS** · National centre for scientific research — **INSERM** · National institute for health and medical research — **CEA** · French alternative energies and atomic energy commission — **INRA** · National institute for agricultural research

Partnerships — ENSICAEN · Graduate school of engineering — CHU · University hospital centre — GANIL · National large heavy ion accelerator — LABEO · Regional analysis and research centre — CLCC François Baclesse · Comprehensive cancer centre

HUMANITIES & SOCIAL SCIENCES

- **18 research units**
- MRSH · Humanities research centre
- CIREVE · Virtual reality centre
- OUEN · Norman studies centre
- PUDC · University data platform
- PUC · Caen university press

5 AREAS OF EXCELLENCE

- **cancer, cardiovascular science, neuroscience, aging**
- **matter, materials, energy**
- **digital science**
- **environment & resources**
- **equine research**





REGIONAL IMPACT & GLOBAL REACH

Building on our long tradition of excellence, we are committed to conducting research that tackles current societal and industrial challenges of local, national and international concern.

CANCER, CARDIOVASCULAR SCIENCE, NEUROSCIENCE, AGING

UNICAEN is a member of 3 university-hospital consortiums on head and neck regenerative surgery (SURFACE), cancer genomics and neurological disorders (NGP) and early markers of cardiovascular remodelling in valvulopathy and heart failure (REMODO-VHF). Some of our research units are involved in the IRON laboratory of excellence dedicated to the development of innovative radiopharmaceuticals in oncology and neurology, and in STOP-AS, a joint research project on the mechanisms of the aortic stenosis.

MATERIALS MATTER · ENERGY

Our research units work closely with local research institutions to support innovation for the chemistry, energy and environment sectors. We participate in the Chemistry Carnot Institute · I2C, the Energy & Propulsion Systems Carnot Institute · ESP, the Energy materials & clean combustion centre (Laboratory of excellence · EMC3), the Super Separator Spectrometer equipment of excellence (S3) for experiments in nuclear physics, the GENESIS equipment of excellence for the characterization of materials with very fine scale, the SYNORG laboratory of excellence dedicated to organic chemistry, and the DESIR equipment of excellence on nuclear physics.

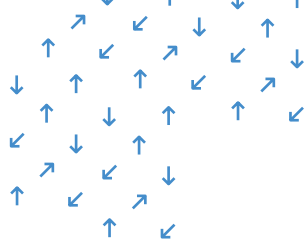
1 EUROPEAN RESEARCH COUNCIL GRANT

4 MEMBERS OF THE INSTITUT UNIVERSITAIRE DE FRANCE

2 CARNOT INSTITUTES

**RESEARCH INSTITUTES CARRYING OUT ACTIVITIES
IN PARTNERSHIP WITH BUSINESSES AND OTHER EXTERNAL
ORGANISATIONS**

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DIGITAL SCIENCE

Our research addresses data science, digital security, and structures & calculations. The GREYC unit is the largest research unit in Normandy, focusing on image processing, machine learning, artificial intelligence, computer security, fundamental computer science, Web science, and electronics.

ENVIRONMENT & RESOURCES

Our research focuses on the English Channel, one of the busiest marine areas in Europe. We undertake research to advance knowledge on marine resources, monitor the marine environment and ensure the sustainable management of fishing and aquaculture industries. Our marine station in Luc-sur-Mer supports research across the full breadth of marine and environmental science and engineering. A moored buoy equipped with physico-chemical and biological measuring devices is located 2 nautical miles north of our marine station to monitor various parameters with a high frequency resolution.

EQUINE RESEARCH

Normandy: the ultimate land of horses! Biomechanics, immunology and infectious diseases, epidemiology, genetics, reproduction... Our equine research is part of a strong regional dynamic. The research cluster CENTAURE brings together 4 groups with complementary skillsets – 62 scientists including PhD students, research supervisors, lecturers and assistants on two campuses equipped with state-of-the-art technological facilities. CENTAURE is headed by Romain Paillot, who held a Chair of excellence at UNICAEN between 2013 and 2015 – the first and only Chair of excellence dedicated to equine immunology in France.

**50 PROJECTS
CURRENTLY FUNDED BY THE
FRENCH NATIONAL RESEARCH
AGENCY**

**1 IDEX LABEL
INITIATIVE OF EXCELLENCE**

**6 EQUIPEX LABELS
EQUIPMENT OF EXCELLENCE**

**4 LABEX LABELS
LABORATORIES OF EXCELLENCE**

**1 UNIVERSITY-HOSPITAL
RESEARCH PROJECT IN HEALTH**

**3 UNIVERSITY-HOSPITAL
CONSORTIUMS**

TRANSFERRING

RESEARCH OUTCOMES

31 PATENTS

15 LICENSES

4 COMPANIES
CREATED IN 2016

We strive to transfer research outcomes to ensure positive impacts on culture and society, human health, the economy and environment, in ways that have regional, national and global impact. The Research and Innovation Office is the support hub for our research activities, alongside the regional institutes Normandie Valorisation & Normandie Incubation. The Research and Innovation Office provides researchers with





strategic information, resources and tools to succeed in their endeavours. They help researchers administer their research, prepare grant applications, and maximize the impact of research and innovation. They provide a single point of contact for companies seeking academic partners and for researchers seeking industrial partners.

Our Faculty of Health and Medicine maintains facilities available to researchers and industrial partners interested in having access to our expertise, equipment and technical support.



PHD STUDENTS — THE DRIVING FORCE

Eight doctoral schools bring together research units around scientific themes. These doctoral schools are run by the cluster of universities and higher education institutions Normandy University.

They support PhD students during their research training by offering a varied programme of activities to develop their professional skills – communication, research skills and personal development, project management, open access, dissemination of scientific culture.

700 postgraduates are currently studying for a PhD at the University of Caen Normandy.



Two offices responsible for central administrative processes have recently opened on campus 1 and campus 2.

UNICAEN is committed to a free and unrestricted online access to research outputs. The web app SYGAL has been developed by UNICAEN to upload, digitize and hold PhD theses.



700 PHD STUDENTS
INCLUDING
210 INTERNATIONAL STUDENTS

44 CIFRE
CONTRACTS —
INDUSTRIAL AGREEMENTS
FOR TRAINING THROUGH
RESEARCH

50 PHD THESES UNDER
INTERNATIONAL
JOINT SUPERVISION

87 POST-
DOCTORAL
RESEARCHERS

140 THESES
DEFENDED
EACH YEAR

8 DOCTORAL
SCHOOLS



UNIVERSITY OF CAEN-NORMANDY

MORE THAN

50 NATIONAL & INTERNATIONAL
CONFERENCES ORGANISED
EACH YEAR AT THE UNIVERSITY

KNOWLEDGE EXCHANGE

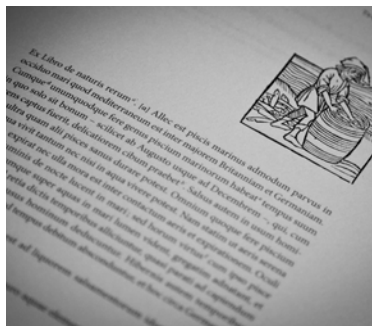
CAEN UNIVERSITY PRESS

Caen University Press is a publishing house specializing in academic monographs, scholarly journals and conference proceedings in literature, humanities and social sciences. The University Press acquires, edits, distributes and promotes scholarly works. Over the year the Press has published more than 880 titles, extending the reach and influence of our research.

LIBRARY

RESEARCH SUPPORT

The University Library combines a rich and diverse collection of print and online resources, and provides off-campus access to many services. Dedicated research support staff provide advice and training on open access and research data management. They also provide guidance on the preparation and deposit of electronic copies of research theses.



FORGE NUMÉRIQUE

La Forge numérique is a digital multimedia production space that freely disseminates video and audio recordings showcasing our research projects in humanities.





BRINGING SCIENCE TO A WIDER AUDIENCE

UNICAEN has a commitment to demonstrating the contribution our research makes to society, culture and economy. Our researchers take a proactive approach to communicating their work, supporting public understanding of science so that each and every one can have the opportunity to reflect upon today's challenges.

UNIVERSITY OF CAEN NORMANDY

HIGH SCHOOL STUDENTS IN OUR LABS

High school students are invited every year in our research laboratories to carry out a project and learn about the scientific method.

SCIENCE FESTIVAL

Since 1993, the national science festival *Fête de la science* has encouraged the general public to engage in scientific reasoning and grasp the most important issues facing us today. At UNICAEN, it is an annual event not to be missed! Each year, our researchers present numerous workshops and interactive experiments to suit peoples of all ages and backgrounds. In October 2018, more than 3,000 people came to our campus to meet with our researchers.

NOCTURNES DU PLAN DE ROME CONFERENCES

Virtual reality is opening a new world of opportunities that can transform the ways we learn and engage with others. Since 2006, the *Nocturnes du Plan de Rome* conferences have provided a monthly opportunity to present the virtual restitution of the antique Rome.

SUSTAINABLE INNOVATION

UNICAEN is one of the founding members of the IRD2 · Regional Institute for Sustainable Development, whose mission is to bring together researchers and local stakeholders to share concerns, offer assistance in decision-making, and help ensure the success of local projects.



UNIVERSITY OF CAEN NORMANDY



MULTIDISCIPLINARY
RESEARCH

RESEARCH HIGHLIGHTS

STATE-OF-THE-ART
FACILITIES

CONFERENCES

WELCOME . UNICAEN . FR / RESEARCH /

EXPERIMENTS

INNOVATION

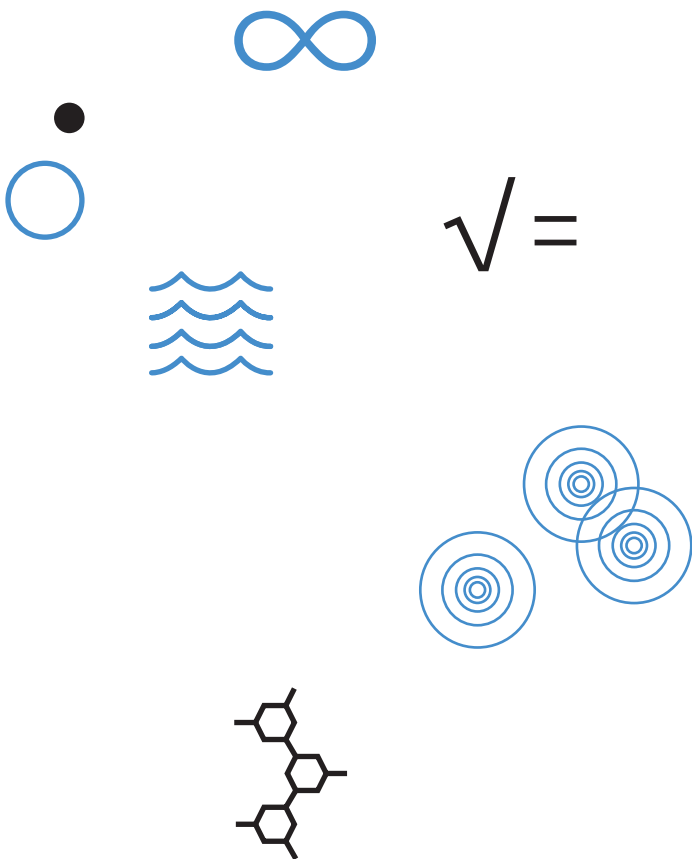
PRISME | OUR RESEARCH PAPER

INSTAGRAM | @ UNICAEN . RECHERCHE





UNIVERSITY OF CAEN NORMANDY



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