THE CYBER UNIVERSITY

OUR
DNA

A
: COMMITTED
: AUDACIOUS
: COLLECTIVE
: CIVIC

UNIVERSITY

VIDEO
Cybersecurity, a strategic development for UBS (French version - English subtitles possible with YouTube)

THE PRESIDENT'S WORD

UBS started its Cybersecurity programs as soon as 2012

Cybersecurity is one of our four areas of excellence. A pioneer, UBS belongs to the few universities proposing such a comprehensive offer: the «Cyber Security Center» combines education, research and training against cyber threats.

During the 1960s, Brittany invested heavily in computers and telecommunications. Today it's a **truly interconnected ecosystem**, where UBS fits perfectly in. For example, UBS has been a member of the Cyber Pole of Excellency (PEC) since 2013, a Brittany-based and State-created hub.

Our Cybersecurity Center has experienced a particularly rapid growth as the team of faculty and researchers has increased tenfold in less than 10 years. We are determined to keep up this momentum and a **new infrastructure** should accommodate **600 cybersecurity and cyber defense students** per year starting in 2025.

This renewed ambition can be summed up in three words: **become the Cyber University**!

Virginie DUPONT,
UBS President.

Université Bretagne Sud

ubs:

PONTIVY

LORIENT

VANNES
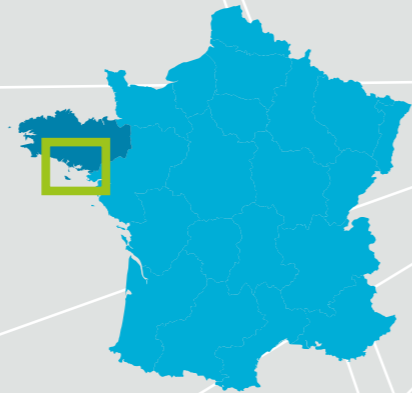
University on a truly human scale, **enterprising and committed**, UBS has four main priorities: Cyber, Sea and Coast, Materials and Data Science. Thanks to the commitment of its 900 staff (including 500 teachers and research professors), nearly 10,000 students are trained each year on the three campuses of Lorient, Vannes and Pontivy.

OUR VISION

OUR VISION

SAFETY RIGHT FROM THE START WITH PREVENTION AS A GOAL - « SECURE BY DESIGN »

Tomorrow the Internet will be billions of connected objects, all vulnerable to hacking.

The collective construction of cyberspace is becoming a major challenge in securing our daily lives.

**It's about seeing safety as an intrinsic property of a system and not just as one of its functionalities.
This property must be defined and verified from the beginning at the design stage and preserved during execution.**

UBS helps organize cyber defense of **Operators of Vital Importance** (health, water control, energy, etc.), find software vulnerabilities, secure connected objects and industrial installations. Its technical platforms allow simulations and real exercises by offering sophisticated detection, analysis, remediation and forensic tools, as well as proven methodologies for managing a cyber crisis.

ENSURING THE PERMANENT SECURITY OF VITAL OPERATORS AND COMPANIES SYSTEMS IS THE CORE CHALLENGE OF CYBER DEFENSE
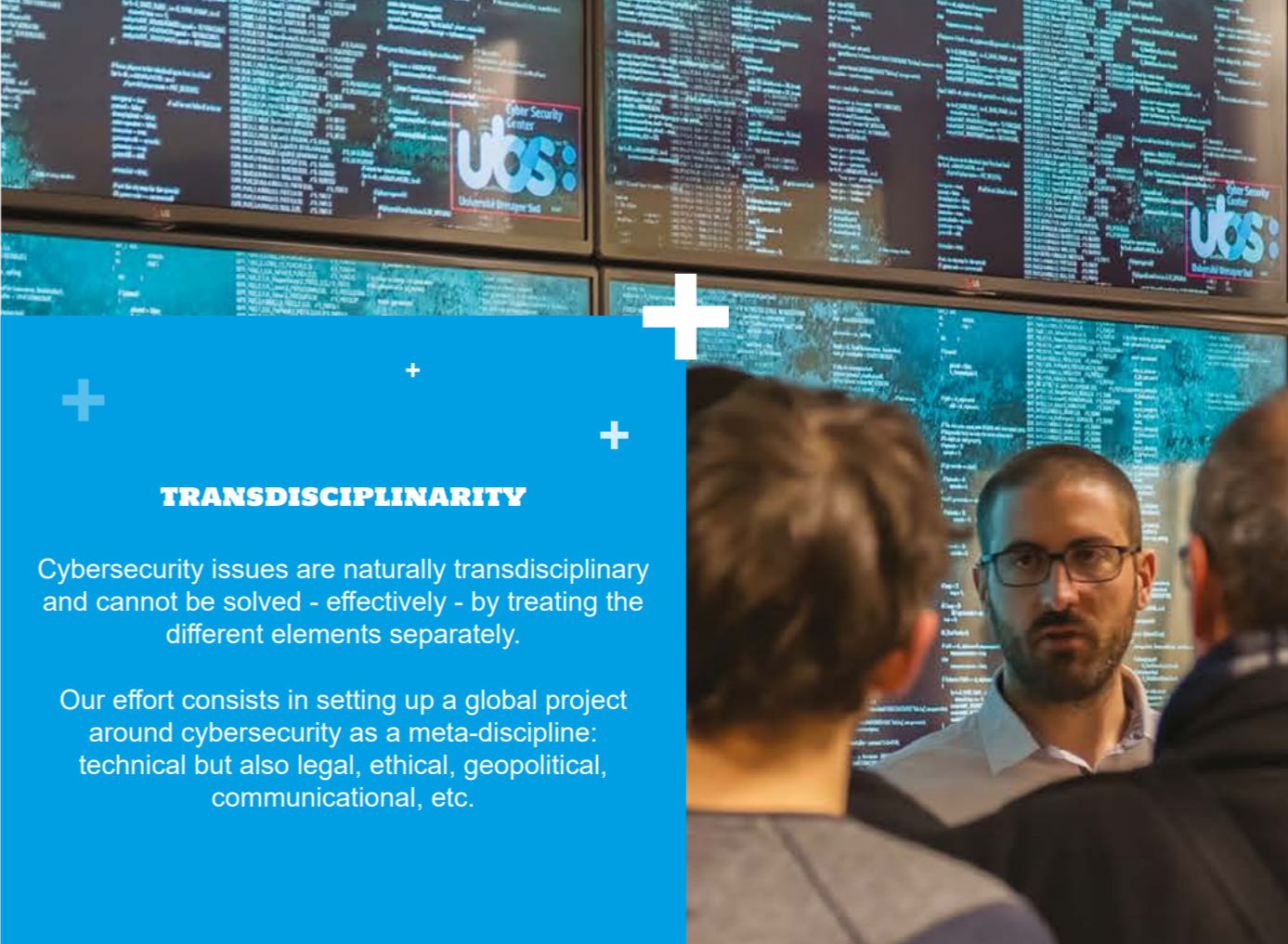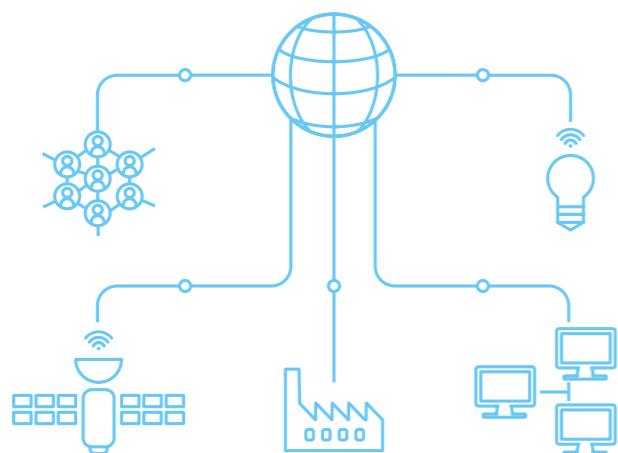
TRANSDISCIPLINARITY

Cybersecurity issues are naturally transdisciplinary and cannot be solved - effectively - by treating the different elements separately.

Our effort consists in setting up a global project around cybersecurity as a meta-discipline: technical but also legal, ethical, geopolitical, communicational, etc.

VIDEO
Cyber defense
and cybersecurity
at UBS

TRIPARTITE PARTNERSHIPS

To adapt research and education to the reality and the evolution of the threat, we have built strong links with numerous state organizations and businesses in a permanent logic of co-training and co-evaluation.

BASIC
CONCEPTS

● BASIC
● CONCEPTS

Cybersecurity refers to all means of protecting people, states and organizations' assets against hacking.

● **Cybersecurity finds a direct and fundamental application with the companies' digital transformation and the rise of connected objects (50 billion expected in 2030, compared to 10 billion in 2015).**

In addition to computer, Internet or network security, cybersecurity encompasses the **digital security and sovereignty** of each **nation state**. Cybersecurity is a **cross-cutting discipline**, involving IT, automation and industrial tools, embedded systems and connected objects in addition to the whole human factor («The weakest link is between the keyboard and the computer»).


● KEY
● FIGURES

KEY FIGURES

Credit card scam represents **92%** of fraudulent transactions with **439** million euros embezzled from French bank accounts in 2018 according to the National Observatory for Crime and Criminal Responses (ONDRP).

One or more cyber-attacks targeted **80%** of organizations during the last twelve months according to an OpinionWay survey published in 2019 for the CESIN (Club of Information Security and Digital Experts).
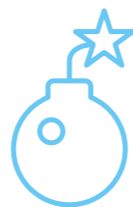
The average cost of a cyberattack for a business is **1.3** million euros.

(*NetExplorer - Cybersecurity: 2019 in figures*)

Cyber-attacks striking connected objects were **9** times more impactful in 2019 than in 2018 according to a Kaspersky study.

A COMPREHENSIVE EDUCATION PROGRAM

A COMPREHENSIVE
EDUCATION PROGRAM

A university close to the socio-economic world and a champion in the integration of its graduates

UBS is a young university, founded in 1995 to meet the needs of its territory and with the objective of giving work opportunities through education. It collaborates closely with businesses and sets up various forms of rapprochement between academia and the economic world.

The theoretical knowledge received at the University is put in practice by experience through a job, either thanks to internships (strongly encouraged from the first year) or through the fifty or so diplomas offered on a work-study basis.

At UBS, performance is linked with competence. Here, academic learning and soft skills development combine. According to the ranking published by the newspaper Le Monde and based on 2012 student promotions, UBS ranks first among French universities: more than Eighty Percent professional integration for Master's graduates.

Our cybersecurity education courses contribute largely to this dynamic

Continuing education: a customized offer for professionals

The continuing education offer is expanding to allow people already engaged in the professional world to increase their skills or to consider retraining.

Distance Learning for Everyone

UBS provides a MOOC (Massive Open Online Course) - «challenges and issues of cybersecurity» - on the France Université Numérique (FUN) platform. This free training leads to an attendance certificate.

LINK
to the MOOC page on FUN (please note that this MOOC is in French)

Labeling by the National Cybersecurity Agency (ANSSI)

All student education courses are labeled SecNumedu by ANSSI.

A COMPREHENSIVE EDUCATION PROGRAM

Initial training: from baccalaureate to postdoctoral studies at Vannes & Lorient campuses, including our University Technological Institutes (IUT), our Engineering School (ENSIBS) and our Faculty of Sciences and Engineering Sciences (SSI).

IT PROTECTION   THREATS

NETWORK SECURITY   JOB OPPORTUNITIES

DEFENSE   CYBERCRIME

I want to train in cybersecurity
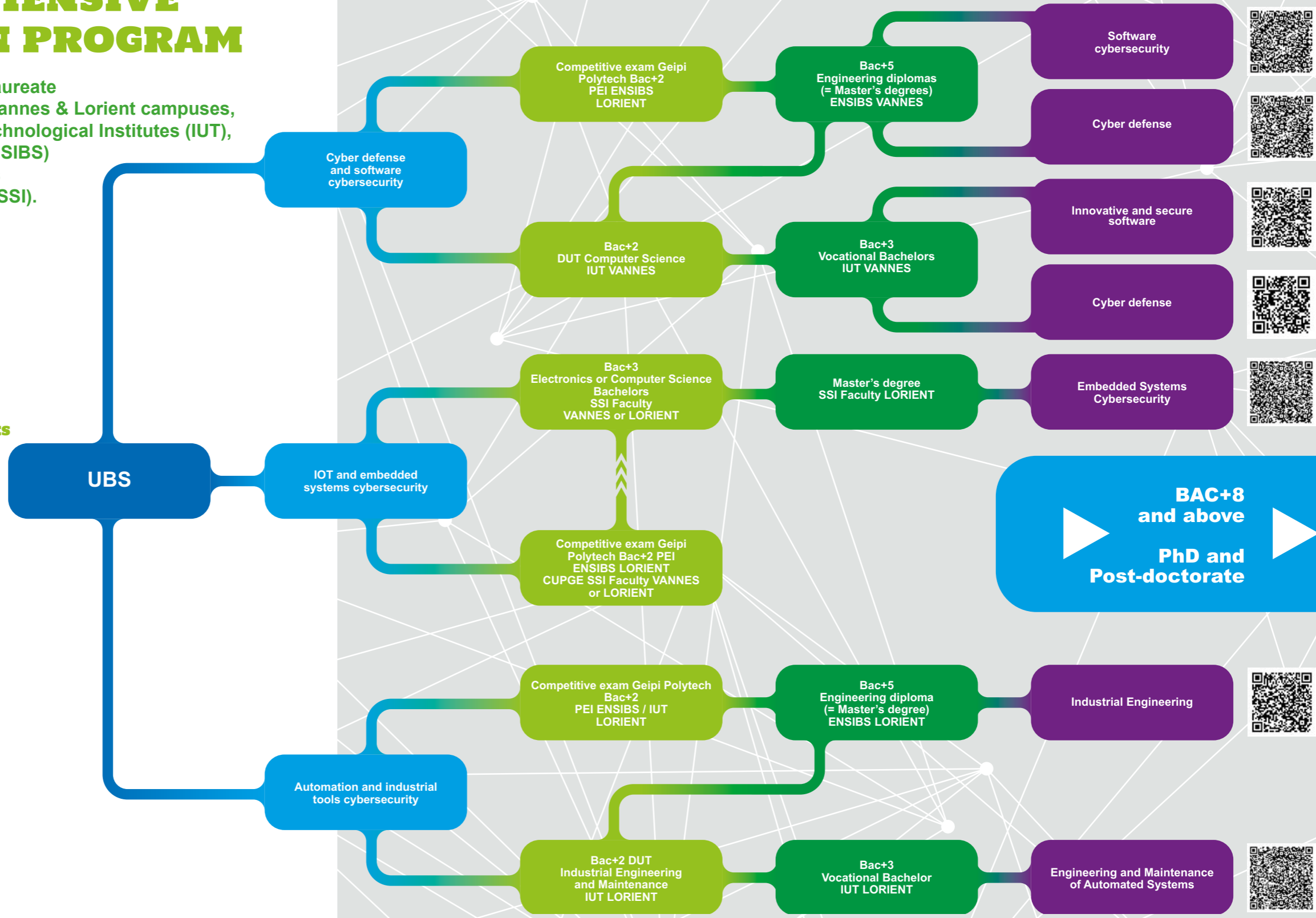
LINK
to the video gallery describing our education programs (French versions - English subtitles possible with YouTube). Please note that some of our courses can be delivered in English.

Bac: baccalaureate (completion of High School)
DUT: technical university degree
PEI: prep-school engineering course
GEIPI: group of public engineering schools with integrated preparation
CUPGE: preparatory university cycle for engineering schools ("Grandes Ecoles")

UBS

Cyber defense and software cybersecurity
- Competitive exam Geipi Polytech Bac+2 PEI ENSIBS LORIENT
  - Bac+5 Engineering diplomas (= Master's degrees) ENSIBS VANNES
    - Software cybersecurity
    - Cyber defense
- Bac+2 DUT Computer Science IUT VANNES
  - Bac+3 Vocational Bachelors IUT VANNES
    - Innovative and secure software
    - Cyber defense

IOT and embedded systems cybersecurity
- Bac+3 Electronics or Computer Science Bachelors SSI Faculty VANNES or LORIENT
  - Master's degree SSI Faculty LORIENT
    - Embedded Systems Cybersecurity
- Competitive exam Geipi Polytech Bac+2 PEI ENSIBS LORIENT CUPGE SSI Faculty VANNES or LORIENT

BAC+8 and above
PhD and Post-doctorate

Automation and industrial tools cybersecurity
- Competitive exam Geipi Polytech Bac+2 PEI ENSIBS / IUT LORIENT
  - Bac+5 Engineering diploma (= Master's degree) ENSIBS LORIENT
    - Industrial Engineering
- Bac+2 DUT Industrial Engineering and Maintenance IUT LORIENT
  - Bac+3 Vocational Bachelor IUT LORIENT
    - Engineering and Maintenance of Automated Systems

A COMPREHENSIVE EDUCATION PROGRAM

One hundred percent of UBS cybersecurity students find employment after graduation. Cybersecurity faces a constant shortage of talent, which drives salaries up year after year.

Our alumni currently hold positions listed below, in alphabetical order:

- "Cyber architect" engineer
- Cyber-secure software system architect
- Cybersecurity expert engineer
- Developer (developer-designer)
- Digital systems integrator engineer
- Director of information and communication system
- Expert software engineer
- IS integrator (Information Systems)
- IT consultant
- IT project manager
- IT quality-methods engineer
- Operational cybersecurity center manager
- Operations analyst
- Operations manager
- Pentester
- Security administrator
- Security integrator
- Security management project manager
- Security technician
- SOC (Security Operation Center) analyst
- Study and development engineer
- Systems maintenance technician (information system evolution management)
- Threat analyst
- Website designer and integrator

Building new courses

In the coming years, the goal is to create new courses around cybersecurity in various disciplines, including law, humanities, etc.

The aeronautics, automotive, shipbuilding, telecommunications, IT, electronics, robotics and digital sectors are hiring the most cybersecurity engineers.
A professional sector of the future, cybersecurity offers prospects throughout a whole career.

A COMPLETE EDUCATION PROGRAM

Fresh graduates career paths

NANDING

Nanding did her apprenticeship at Orange (OBS) in Rennes. She then joined EDF, as an **R&D Engineer**, in the Paris region. Her missions: technical design of security solutions, support and management of R&D projects in cybersecurity, realization of risk and surveillance studies, standardization studies…

LOUIS

Louis MILCENT completed his apprenticeship at Securiview in Saint Ouen, where he is now a **Security Engineer**. His different missions: create and develop a technical and commercial offer to secure the cloud and conduct digital investigations to correct vulnerabilities at various customers.

DYLAN

Dylan TROLES completed his apprenticeship at Amossys in Rennes where he's now a **cyber security auditor**. His missions for various customers, from the world of defense through industry or health: web or internal information systems intrusion tests, code or configuration audits.

A COMPLETE EDUCATION PROGRAM

Large companies sponsor student promotions

> *Orange Cyberdefense has been a partner of UBS Cyber training since its creation, notably through ENSIBS. This school is one of the few to provide numerous integrated cyber skills for engineers dedicated to cybersecurity. They will thus be able to deploy their passions and commitments across the entire lifecycle of projects and systems, from security governance to operational security.*
> *The work-study program and the ethical component enable these engineers to be rapidly projected at the heart of sensitive operative defenses*

Eric DUPUIS
Orange Cyberdefense
Western France Director

More than one-third of the courses are taught by industry and government professionals.

Internship and apprenticeship students are also evaluated by their host structures, which allows training to evolve according to needs, as the threat changes constantly. Companies and the State thus take part in UBS's cybersecurity co-training and co-evaluation.

# A COMPLETE EDUCATION PROGRAM

The Cyber Range

On the Vannes campus, UBS operates a "Cyber Range": 150 square meters of high-tech space where students practice cyber crisis management.

This Cyber Range is the first cyber training center to be created within a French public university.

This advanced installation enables simulations and real-life exercises, offering sophisticated detection, analysis, remediation and forensic tools, as well as proven incident governance methodologies.

It thus places students, organizations and businesses in concrete scenarios, including cyber-attacks against :

• A railway company
• A hospital
• An electricity supplier
• A local authority
• Maritime facilities
• Major public events
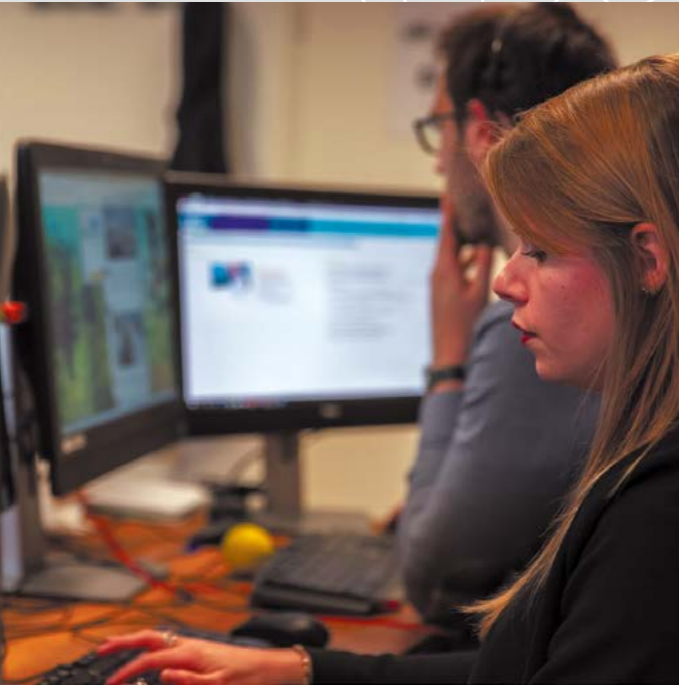
The platforms

The Lorient campus is equipped with technical platforms for embedded and industrial systems.

These include physical attack benches, emulators for motor vehicles on-board electronics, dedicated security software, frame analyzers, calculation servers, etc.

We can highlight the electronic components security bench test (at the Lab-STICC - Laboratory of Information, Communication and Knowledge Sciences and Techniques) and the industrial cybersecurity facility (at ENSIBS/ Industry of the Future), which corresponds to a «Cyber Range» applied to industry.

Decisive Equipment for research

All this very high-level equipment also contributes to research.
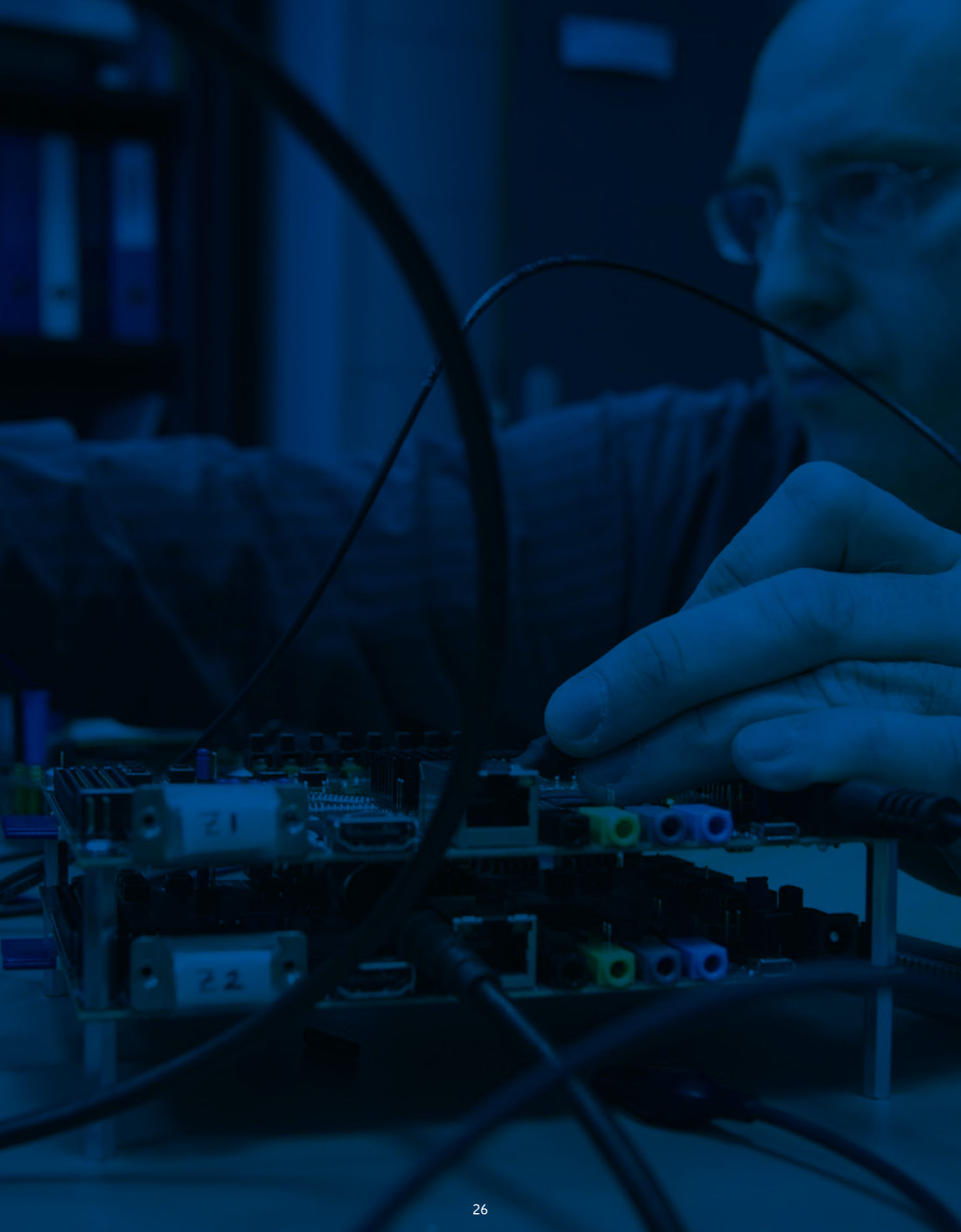
HIGH-LEVEL RESEARCH

HIGH-LEVEL RESEARCH

Transdisciplinarity

Digital security must be considered in an integrated and systemic way, because it combines human factors, installations, connected objects, etc.

Such a perspective must intermix computer programs, electronic components, automatons and processes, designed and used by and for people: there is therefore a software - hardware - human triptych on which to lay the foundations for cybersecurity thinking.

The scientific expertise of five laboratories - university research to attain the best level

The overall dynamic is supported by the federation of several research units with renowned expertise in the field ranging from the study of the behavioral factors to the securing of crypto-processors:

- Lab-STICC - Laboratory of Sciences and Techniques of Communication Information and Knowledge in Lorient
- IRISA - Research Institute in Computer Science and Random Systems in Vannes
- LMBA - Brittany Atlantic Mathematics Laboratory in Vannes
- LEGO - Western France Laboratory of Economics and Management
- LABLEX - Law research laboratory in Vannes

Five main lines of research

UBS's research areas are diverse and complementary:

- Embedded systems and IoT (Internet of Things)
- Industrial cybersecurity
- Socio-technical systems of systems
- Big data and intrusion detection in massive data flows
- Cybersecurity and the individual

Dedicated teams

Around 30 researchers and doctoral students work in the field of cybersecurity at UBS.

VIDEO
Cybersecurity research at UBS
(French version – English subtitles possible with YouTube)
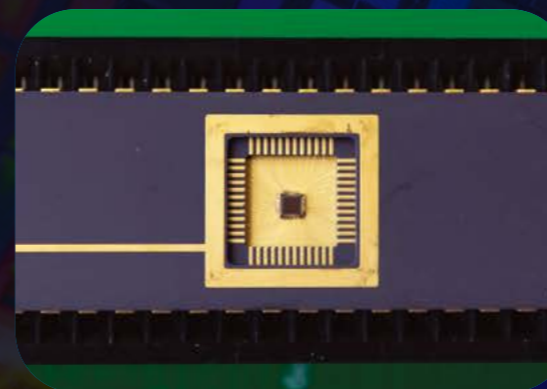
Crypto-Processor

A dedicated CPU for cryptographic applications: this is a 256-bit elliptical curve crypto-processor with hardware and algorithmic protections against specific physical attacks. This integrated circuit was designed by researchers from the CNRS in Brittany and produced in France.
UMR Lab-STICC - Laboratory of Information, Communication and Knowledge Sciences and Techniques.

HIGH-LEVEL RESEARCH

An innovative University Chair specializing in cybersecurity for major public events

Testimony of ENGIE partner of the chair

"

The UBS Foundation's Cybersecurity for Major Public Events Chair project is part of a strategic vision linked to several key international events, including the Paris Olympics in 2024.

This initiative deserves to be supported and it seemed valuable for us to be present from the chair beginning by bringing our reflection on these issues together with UBS laboratories and other partners who will join us.

"

The Chair: an essential link - business-oriented applied research

The research proposed under the Chair is designed to be fertile and easily exploitable. This makes it possible to go beyond current cybersecurity research results and be of immediate benefit to companies and organizations.

A crucial issue

The massive digitalization of all major national and international public events creates new vulnerabilities, potentially exploitable by hackers, with possible financial losses and physical risks for spectators.

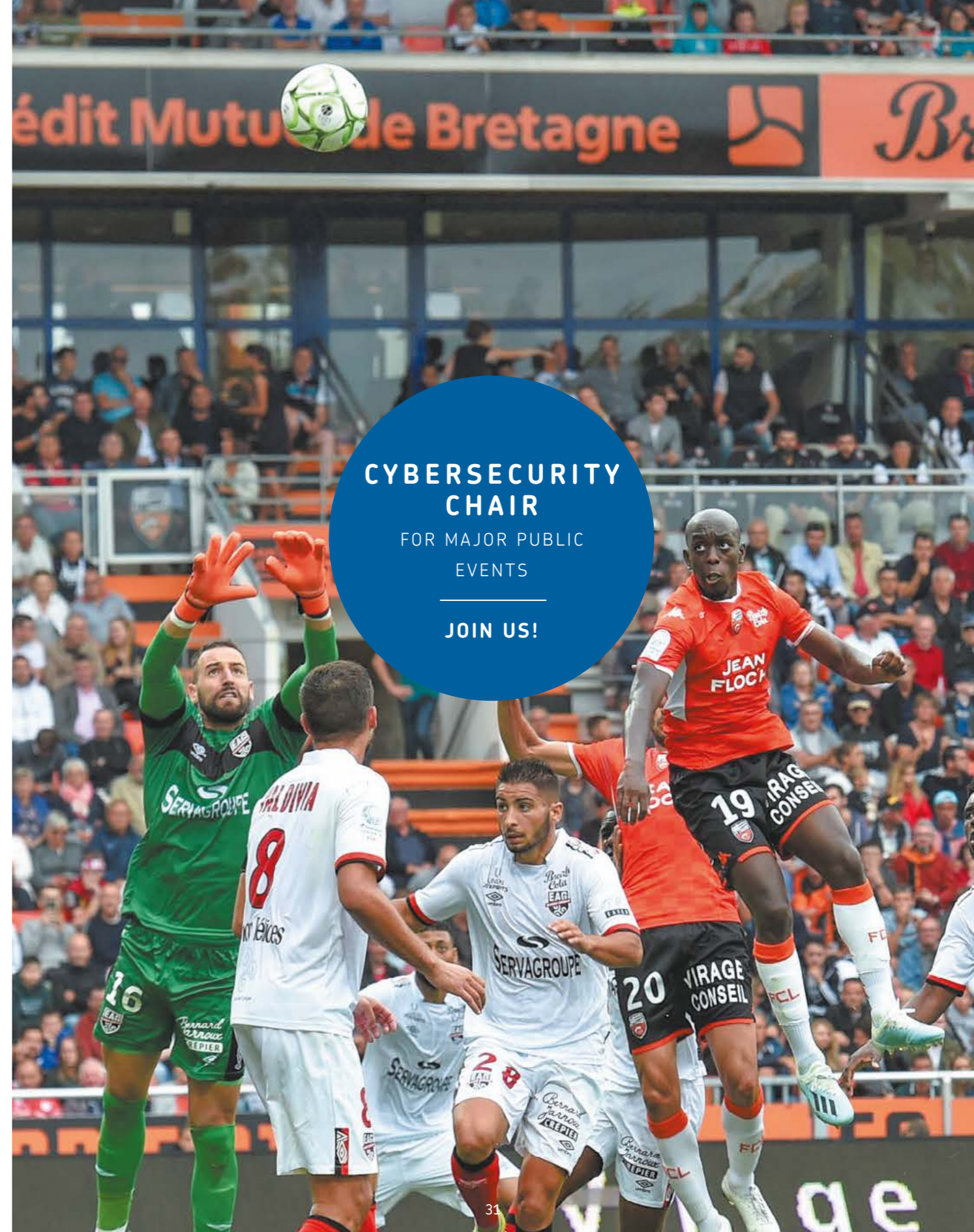## A little-explored field - an innovative and original approach

Within this theme, the project's main thrust is to consider these events as «systems of social-technical systems» because they combine human factors, installations, connected objects, etc.

CYBERSECURITY CHAIR
FOR MAJOR PUBLIC EVENTS

JOIN US!

INTERNATIONAL

INTERNATIONAL

Cybersecurity at UBS has a wide national and international outreach, something that the size of our university does not suggest at first glance.

Cybersecurity students have access to **partnerships** (joint courses, exchange semesters) **with many universities**, particularly within the European Union (Estonia, Belgium, Luxembourg, etc.) but also all over the world (for example, the University of Qatar).

Students regularly participate in **competitions and challenges**, such as the Cyber Security Awareness Week (CSAW) organized by New York University (the UBS student team ranked third in 2019), the Barcelona Cybersecurity Congress and the International Forum of Cybersecurity (FIC) in Lille.

THEY SUPPORT US

PEDAGOGICAL AND RESEARCH ACTORS

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