



DIGISPORT
GRADUATE SCHOOL

DIGISPORT, a unique Graduate School of international excellence.

The digital revolution in sports and exercise is already underway and creates a demand for skilled professionals able to bridge the gaps between the different scientific fields covered by DIGISPORT. Our objective is to train a new generation of highly-qualified students ready to take on these specific challenges.



RESEARCH ACTIVITIES

DIGISPORT's training program is strongly linked to research and innovation. The Rennes ecosystem is in fact particularly well suited to host DIGISPORT, as it incorporates world-class research units. In order to conduct interdisciplinary projects, students benefit from a unique access to dedicated cutting-edge technological platforms.

TRAINING PROGRAM

DIGISPORT offers a comprehensive, hybrid training program encompassing the specialties in both sport and digital sciences. At the masters and doctoral levels, students are offered the opportunity to build a study strategy suited to their professional goals and to the labor market.

BUSINESS NETWORK

DIGISPORT aims at strengthening partnerships between academic institutions, industry and society to boost employability and lifelong learning. By joining the DIGISPORT socio-economic network, companies have access to a multitude of partnership opportunities.

**EXCELLENCE IN
TRAINING AND
RESEARCH**

**MODULAR,
INNOVATIVE AND
HYBRID TRAINING**

**VERSATILE
GRADUATES**

**FLOURISHING
ECONOMIC
AND SOCIAL
ENVIRONMENT**

**INTERNATIONAL
STRATEGY**

**CUTTING-EDGE
TECHNOLOGICAL
PLATFORMS**

PROJECT HOLDERS



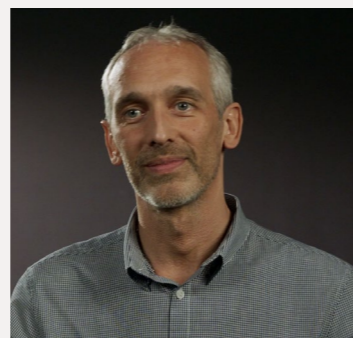
Benoit
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Managing Director



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RANNOU BEKONO

Training Director

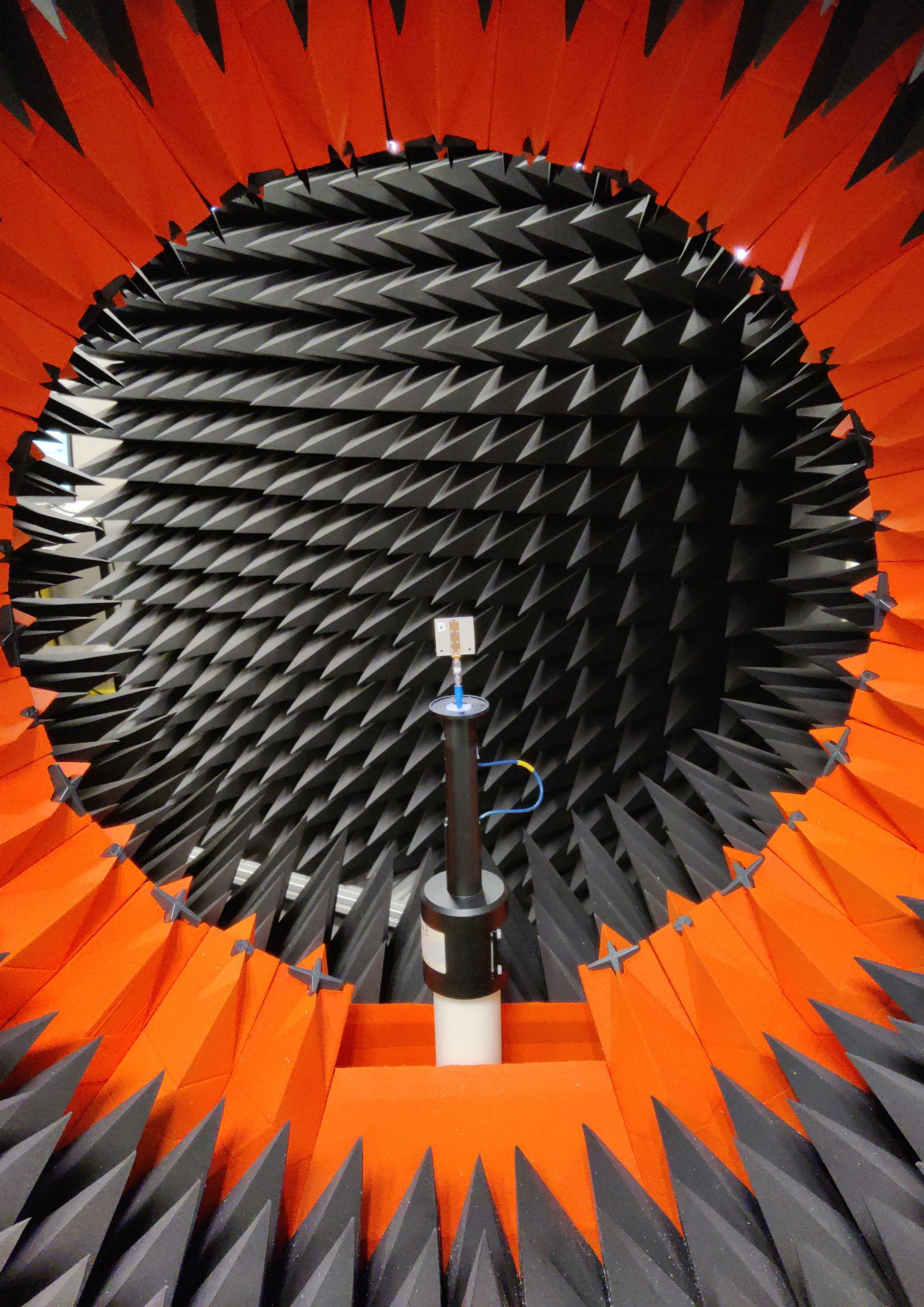


Richard
KULPA

Science Director

**THE DIGITAL REVOLUTION IN
SPORTS AND EXERCISE IS ALREADY
UNDERWAY, AT THE CONFLUENCE
OF THE FAST-GROWING MARKETS
OF SPORT, DIGITAL TECHNOLOGY
AND CONNECTED OBJECTS.**

**IT LEADS TO THE EMERGENCE
OF NEW PROFESSIONS AT THE
INTERFACE OF THESE DOMAINS
REQUIRING SKILLS IN SPORTS
SCIENCE, COMPUTER SCIENCE,
ELECTRONICS, DATA SCIENCE
AND HUMAN & SOCIAL SCIENCES.**



FIVE FIELDS
COVERED BY DIGISPORT

SPORT SCIENCE

ELECTRONICS

COMPUTER SCIENCE

DATA SCIENCE

**HUMAN & SOCIAL
SCIENCES**



OUR ACADEMIC & SCIENTIFIC PARTNERS

UNIVERSITIES

University of Rennes (Mathematics & ICT, Life & Health Sciences, Material Sciences, Humanities & Social Sciences)

University of Rennes 2 (Arts, Literature & Communication, Modern Languages, Human Sciences, Social Sciences, Sport Sciences)

GRANDES ÉCOLES

ENS Rennes (Economics-Law-Management, Computer Science, Mathematics, Mechatronics & Sport Sciences)

INSA Rennes (Information & Communication Science & Technologies, Materials-Structures-Mechanics)

ENSAI (Statistics & Data Science)

CentraleSupélec (Sciences & Engineering)

RESEARCH ORGANIZATIONS

CNRS (French National Center for Scientific Research)

Inria (National Institute for Research in Digital Science and Technology)



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RESEARCH- BASED TRAINING

SCIENTIFIC CHALLENGES

DIGISPORT brings together 26 research units in the fields of sport, computer, data, electronic, human and social sciences. They share a common scientific goal and cooperate to create a new training curriculum anchored in scientific and economic reality.

2 AXIS

How to create knowledge outside the laboratories, as close as possible to athletes or patients and on all performance factors (physiological, biomechanical, psychological)

**CREATE IN-SITU
KNOWLEDGE**

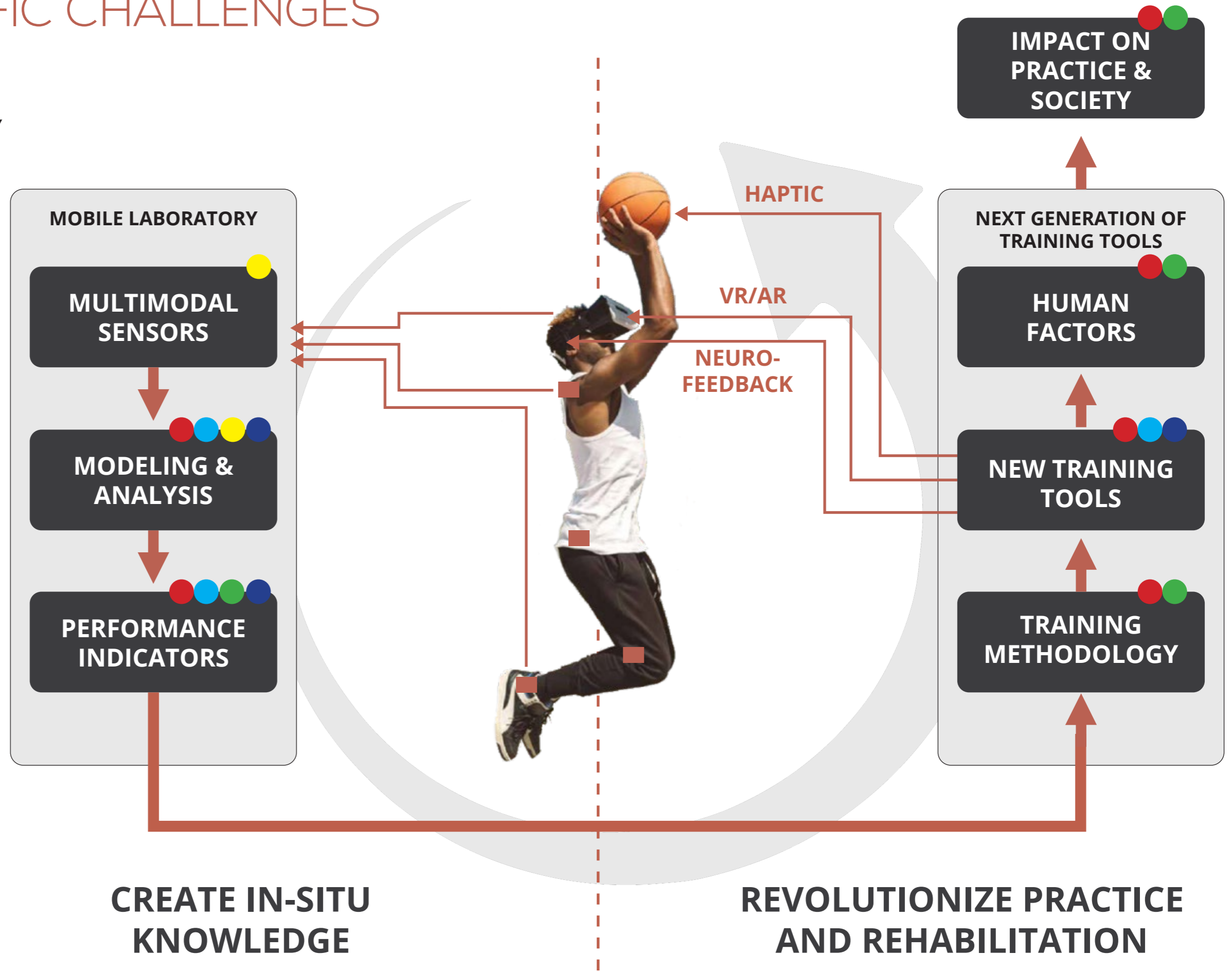
How to use this knowledge to revolutionize the practice of physical activity for both athletes (to improve their performance and management of complex gambling situations, prevent injury, and accelerate rehabilitation)

**REVOLUTIONIZE
PRACTISE &
REHABILITATION**

SCIENTIFIC CHALLENGES

INTERDISCIPLINARITY

- Sport sciences
- Data Science
- Computer science
- Electronics
- Human & social sciences



CREATE IN-SITU KNOWLEDGE

Sport and exercise performance is eminently complex and multifactorial. While laboratory-based scientific studies are typically associated with increased measurement precision and enhanced quality control, studies involving quantification of field-based measures are increasingly popular in the sport sciences as they increase our understanding of this complexity. Opportunities to continue bridging the gap between practice and research are possible by creating and improving precision systems for the measure and interpretation of performance in the field. Creating such mobile laboratories is necessary to move forward and collect reliable data from realistic situations. This involves addressing a large number of scientific challenges in various topics:

- **Multimodal sensors** (extreme conditions, energy capacity, sustainability, transmission...)
- **Signal processing and modeling** (complex structures, confidence indices, game strategies...)
- **Analysis / Performance indicators** (high-level information, segmentation-recognition-evaluation...)

REVOLUTIONIZE PRACTISE & REHABILITATION

Predicated on an improved knowledge of data acquired in realistic situations, the next step consists of developing tools to translate this knowledge into understandable and helpful information for users, whether they are athletes hoping to improve their performance or monitor their progress in rehabilitation, or people suffering various acute or chronic pathologies wanting to monitor their health. It is therefore necessary to propose the next generation of innovative training/rehabilitation methodologies and tools.

- **Training methodology** (efficient, understandable & interpretable feedback, adaptive and individualized learning processes, digital coach...)
- **New training tools** (ecological approach, multimodal feedback, transfer of skills to real situations...)
- **Human factors** (pertinence of innovation, assessment of design choices...)
- **Impact on practice and society** (digital social comparison, user communities...)

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INTER DISCIPLINARITY

In September 2022, a new master degree program in Digital Sport Sciences was created, structured around interdisciplinary academic major and minor fields of study. This «Digital sport sciences» master degree aims at training students with a strong competence relevant to two disciplines including at least one in the sport sciences field.

The majors are composed of mandatory and elective courses to deepen the knowledge of each student's initial field of study (e.g. sport sciences, digital or electronic sciences).

Minors will enable the acquisition of complementary skills in another field (e.g. digital science for sport sciences students and conversely) and will allow students to build a unique profile tailored to their aspirations and competences.

OBJECTIVES

The Digital Sport Sciences master degree is based on research and innovation to train professionals able to :

- Apprehend the challenges of the digital transformation of sport regarding performance, health and physical activity
- Develop a cohesive vision of the principal scientific and technical issues that arise from the integration of new technologies in sport and exercise, from their use to the structuring changes and innovations they bring
- Master the concepts, methods, tools, and technological know-how supporting the current development of this field

The Digital sport sciences master degree is built on a competency-based approach. These competencies can be grouped into **4 different interdisciplinary profiles**

METROLOGY OF HUMAN MOVEMENT & INNOVATIVE SENSORS

The «Metrology of human movement & innovative sensors» major focuses on developing new generations of sensors to overcome sport and exercise constraints.

ANALYSIS, MODELING & SIMULATION OF HUMAN MOVEMENT

The «Data science applied to sport» major is particularly suited for students wanting to analyze, model and simulate the human movement in order to comprehend and optimize sport performance.

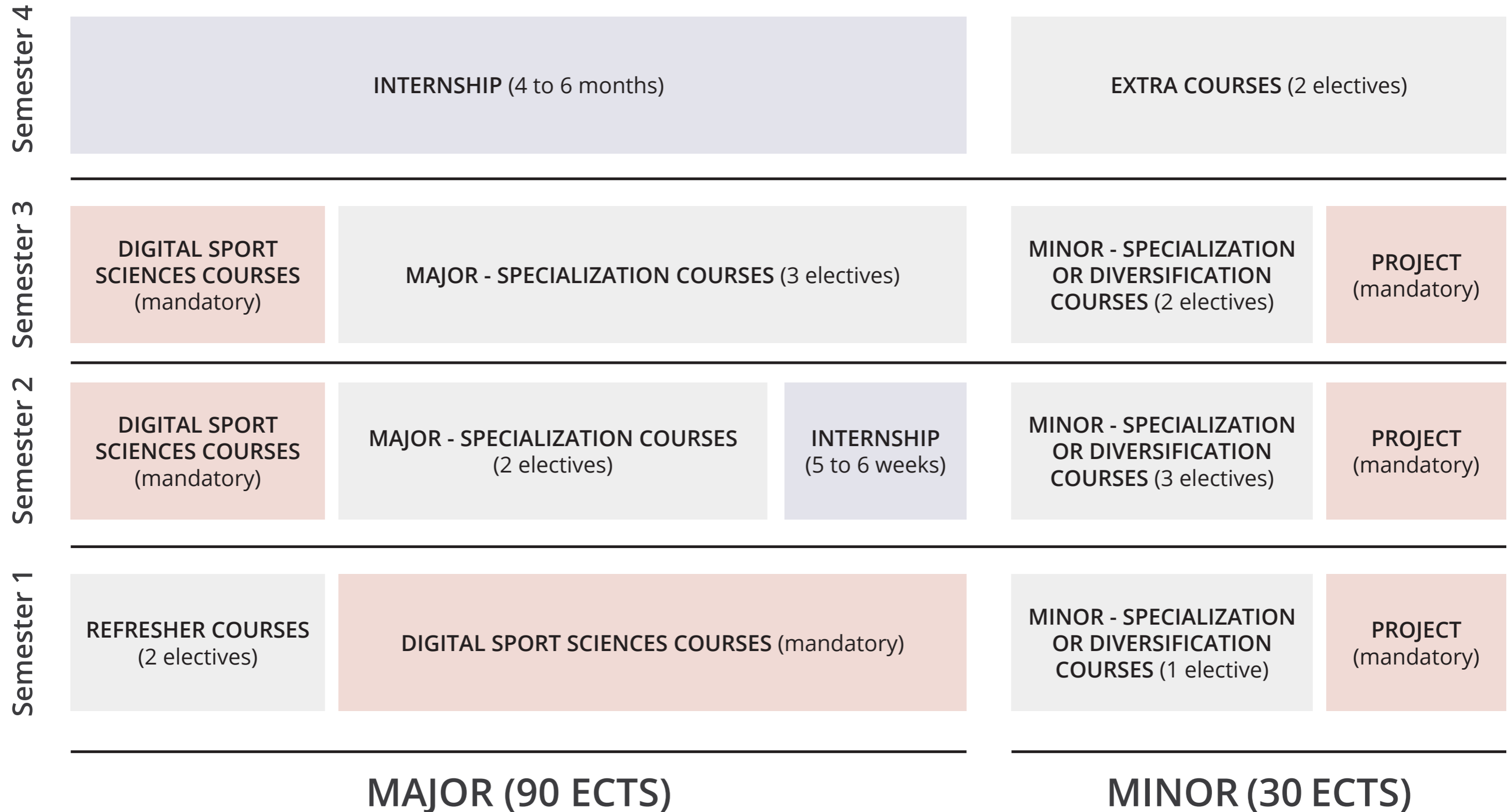
DATA SCIENCE APPLIED TO SPORT

The «Data science applied to sport» major focuses on exploiting digital data in sport using mathematical and statistical methodologies in order to extract indicators of performance and risk injury, among others.

DIGITAL SOLUTIONS FOR INTERACTION IN SPORT

The «Digital solutions for interaction in sport» major focuses on the latest scientific and technical methodologies of computer science coupled with the underlying processes of performance in order to develop new generations of tools to analyze and build better movement in sport.

MASTER - STRUCTURE



COURSES - SEMESTER 1

REFRESHER COURSES (2 electives)

- Statistical modeling
- Algorithms and programming
- Introduction to exercise physiology and biomechanics
- Scientific basis of physical preparation

CORE COURSES (mandatory)

- Biomechanics of human movement
- Integrative exercise physiology
- Databases management
- Data visualisation
- Sport in the digital age
- Professional interaction
- Language course

MINOR COURSES (1 elective)

- Methodology for the optimization of training
- Pairing of physiology and biomechanics for the athlete's analysis
- Psychosocial processes and physical behavior
- Sensors and evaluation of physical behavior
- Sensors and instrumentation
- Introduction to virtual reality
- Linear models
- Supervised learning

COURSES - SEMESTER 2

CORE COURSES (mandatory)

- Methods and instruments for the assessment of performance
- Modeling and simulation of movement
- Tutoring
- Professional interaction

MAJORS (1 major to elect)

Metrology of human movement and innovative sensors

- Sensors and instrumentation - Advanced
- Modeling and simulation of movement - Advanced

Digital solutions for interaction in sport

- C++ programming - Software engineering

Analysis, modeling and simulation of movement

- Modeling and simulation of movement - Advanced
- Biomechanics of human movement - Advanced

Data science applied to sport

- Data mining - Duration models

MINOR COURSES (3 electives)

- Courses from the majors not elected by the student, as well as :
- Methodology of training and physical preparation
- Training and movement efficiency
- Training engineering

COURSES - SEMESTER 3

CORE COURSES (mandatory)

- Digital tools and monitoring of training load
- Research methodology
- Seminars/workshops

MAJORS

Metrology of human movement and innovative sensors

- Emerging technologies for performance
- Sensors and instrumentation - Expert
- Design engineering

Digital solutions for interaction in sport

- Data mining and clustering
- Computer science complementary skills 1
- Computer science complementary skills 2

Analysis, modeling and simulation of movement

- Emerging technologies for performance
- Human-machine cosimulation
- Sensors and instrumentation - Expert

Data science applied to sport

- Data mining and clustering
- Statistical learning
- Deep learning

COURSES - SEMESTER 3

MINOR COURSES (2 electives)

- Courses from the majors not elected by the student, as well as :
- Fatigue and recovery strategies
- Minor courses from Semester 1

COURSES - SEMESTER 4

Semester 4 is dedicated to the end-of-studies internship that should be completed in a company or in a laboratory in France or abroad.

The DIGISPORT program offers non-conventional teaching with online delivery, flipped classrooms, research teaching, pedagogy-by-doing and co-working, and relies heavily on interdisciplinary projects carried out in collaboration with scientific and economic actors to also encourage hybridization of student populations.

DOCTORATE

After completing their DIGISPORT master degree, students are given the opportunity to pursue doctoral activities in France or abroad.

DIGISPORT aims at delivering a cohesive doctoral training program to its PhD students in addition to the one delivered by doctoral schools. DIGISPORT also offers thesis grants and delivers PhD degrees in association with its partner doctoral schools.

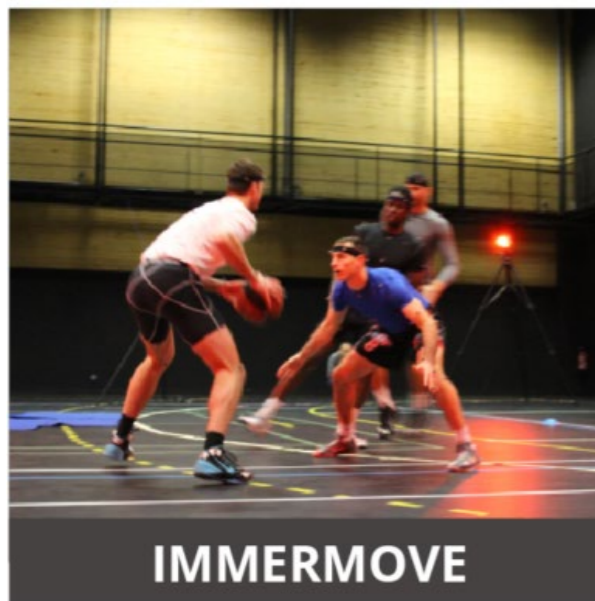
Examples of theses funded or labelled by DIGISPORT :

- Analysis of complex functional data in swimming (in association with the French Swimming Federation)
- Origins and consequences of fatigue during prolonged exercise of variable intensity (in association with the cycling team Sojasun Espoir ACNC)
- Sport & cancer in the digital age
- Development of autonomous sensors for the quantification of an athlete's movement in indoor sports

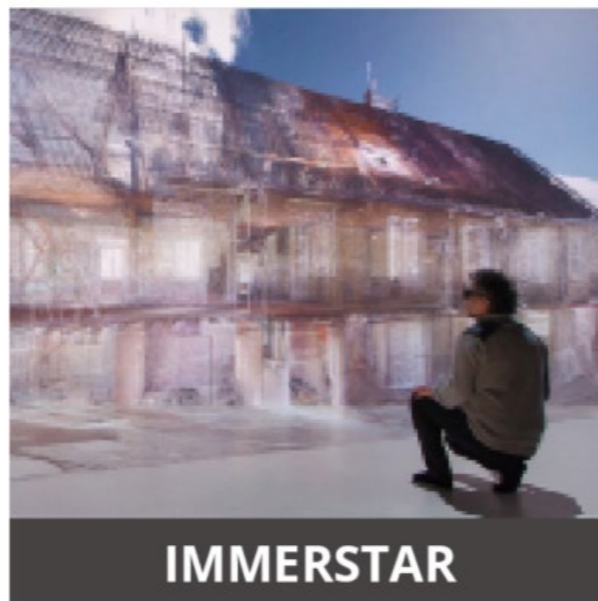


TECHNOLOGICAL PLATFORMS

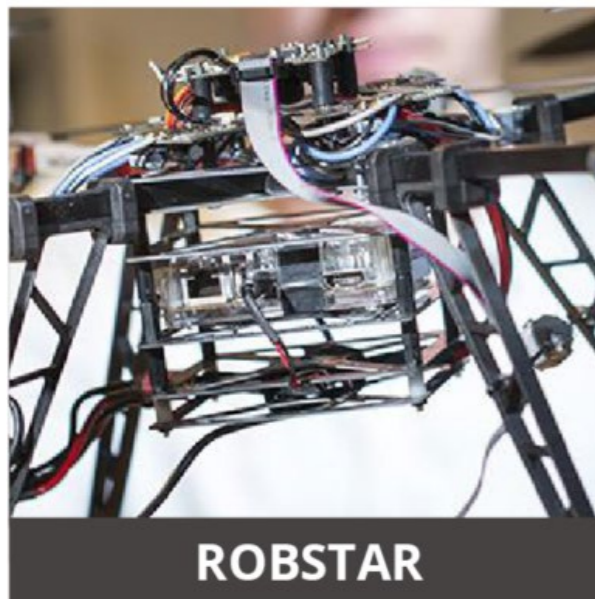
Throughout their studies, DIGISPORT students benefit from a unique access to dedicated cutting-edge technological platforms thanks to our partner laboratories.



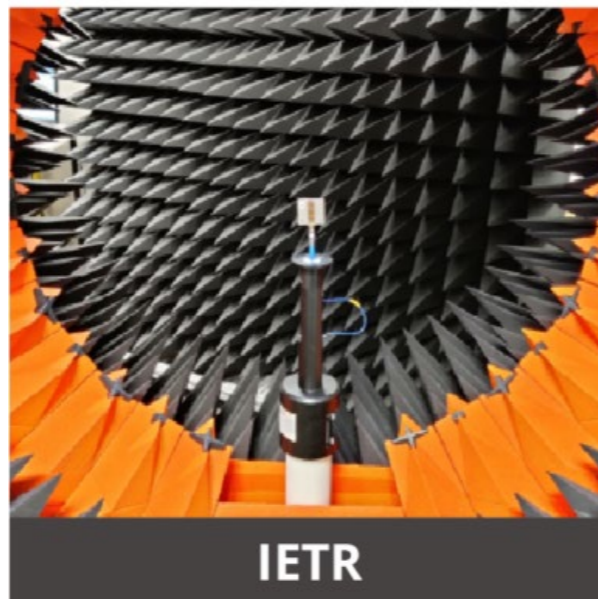
IMMERMIVE



IMMERSTAR



ROBSTAR



IETR

DIGISPORT FACILITIES

One of DIGISPORT's flagship measure was the creation of an interdisciplinary lab for young researchers. The PhD Lab aims to bring together PhD students from the project's research teams and to take advantage of methodological and theoretical exchanges between the different disciplines of the graduate school around a common thematic axis.

Installed on the Villejean Campus (University Rennes 2), the PhD Lab is a space where PhD students can gather together and exchange about their research activities.

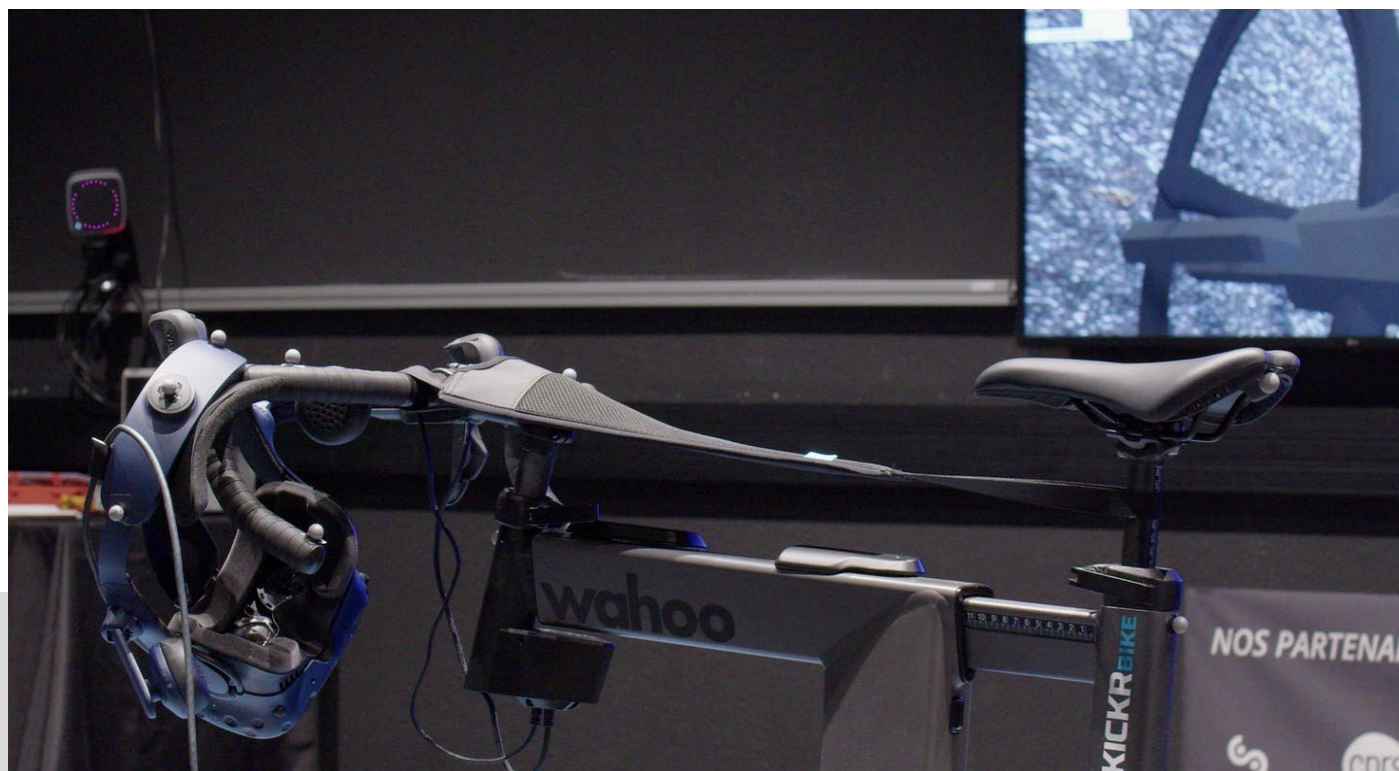
The objective of this laboratory is to foster the creation of an interdisciplinary community by bringing together students working in different research partner teams in order to encourage methodological and theoretical synergies between the various fields covered by DIGISPORT.

This PhD Lab is composed of two spaces on the Villejean Campus : a technological platform and a coworking room.

THE DIGISPORT EXPERIMENTAL PLATFORM

Equipped with motion capture cameras, force plates, ergocycles, electromyograms, VR headsets,...

- Analysis and modeling of the human movement
- Development of sensors
- Optimisation of performance
- Development of new data-processing tools



BUSINESS NETWORK

DIGISPORT wishes to strengthen the relation between its students and sport and technological companies through the creation of a DIGISPORT socio-economic network. Being part of this network allows companies to be a active actor of the training and research program of DIGISPORT through different types of collaboration.

Socio-economic actors involved in the DIGISPORT network can thus benefit from a pool of versatile and highly-skilled students able to tackle the new challenges companies face in the digital age of sport.

Students can, through this network, get a foothold in the business environment and discover the different career opportunities they will have once graduated from the DIGISPORT training program.

TYPES OF COLLABORATION

LEARN

Pedagogical interventions / Career opportunities

PRACTICE

Internships / Work-study contracts / Challenges

NETWORK

Presentation of the company / Forums / Conferences / Symposiums

RESEARCH

Thesis for a company / Research collaborations

INNOVATE

Student entrepreneurship / Licensing

CAREER OPPORTUNITIES

SPORT DATA SCIENTIST

RESEARCHER

R&D ENGINEER

SPORT DATA ANALYST

PERFORMANCE MONITORING MANAGER

ADVANCED SIMULATION ENGINEER

COMPUTER SCIENTIST IN E-SPORT

ENGINEER IN HEALTH CENTERS

PERFORMANCE ANALYSIS DIRECTOR

...

Non-exhaustive list

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**INTERNATIONAL
STRATEGY**

INTERNATIONAL STRATEGY

COMPETITIVE SCHOLARSHIPS

- Master
- Doctorate

STUDENT MOBILITY

- Inbound & Outbound student mobility

INTERNATIONAL NETWORK

- Researcher mobility
- International chairs

DIGISPORT promotes the enrolment of national and international students through competitive scholarships each year, language courses offered to foreign (French) or native (English) students and courses taught in English.

National and international PhD students are funded by academic PhD contracts - some of which co-supervised internationally - at the rate of competitive fellowships each year. Industrial PhD contracts will benefit from co-supervision between academic and industrial partners.

In addition, outgoing researcher fellowships will be funded to further develop an international network and to increase partnerships in research and training. The researchers will be mobilized to participate in our thematic schools, courses, student mentoring and student project evaluations.



EUR DIGISPORT

DIGITAL SPORT SCIENCES

To request any further information about **DIGISPORT**,
feel free to contact us at : digisport@univ-rennes.fr



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GRADUATE SCHOOL

digisport.univ-rennes.fr



**RENNES
MÉTROPOLE**

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