

# VAY AVIR ! DU SPORT !

Xperium saison 5



## MANAGING DIABETES FOR ATHLETES

—  
An exercise in anticipation

Already an everyday constraint, adapting insulin doses because a real challenge for patients with type 1 diabetes who practise a sport.

The nature of the sport, diet and stress are all factors that have an impact on blood sugar levels; they interact and can lead to episodes of hyper- and hypoglycemia potentially harmful to one's health.

Ongoing studies aim to better understand the impact of the characteristics of exercise on blood sugar level variations, with a focus on the physiological adaptations and inter-organ communication (pancreas, liver, intestines, muscles) they trigger.

The challenge is to come up with personalised recommendations for diabetic athletes so as to limit the glycemic variability brought on by exercise and optimise the benefits of sport.

Multidisciplinary research unit - sport, healthcare and society (URePSSS - ULR 7369)



## SMART T-SHIRT TO BOOST SPORT AND HEALTH

—  
Comfort, performance and interactivity

Smart clothing has been around for a few years and is contributing to the renewal of the textile industry. Sensors play an essential role in monitoring physical activities and the health of the wearer, but often these "embedded" systems in the form of a rigid patch do not offer user comfort, are difficult to install and are unable to measure many physiological parameters.

Researchers have therefore designed ways to integrate these systems into flexible materials with textile electrodes. Using these flexible circuits, which cover a large part of the torso, it is possible to monitor body temperature, breathing, heart rate and accelerations in the body. The physiological data can then be immediately transferred to a cloud for remote interactions between the wearer and experts, who can make the right decisions in terms of training or the patient's medical protocol.

Researchers have also developed polymers/metallic threads to directly weave the printed circuit into the fabric. This opens up the possibility of integrating electronic components with greater flexibility and multiple uses, maintaining the suppleness of the textile structures.

Textile engineering and materials laboratory (GEMTEX)

## Welcome to Xperium !

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Visits are free subject to reservation.

Contact  
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Visit :  
<http://lilliad.univ-lille.fr/xperium>

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LILLIAD Learning Center Innovation is one of the Learning Centers in the network initiated by the Hauts-de-France region.



## What research teaches us

—  
Sport is truly a societal phenomenon and one that offers the different branches of science a vast field for research and experimentation.

In celebration of the 2024 Olympic and Paralympic Games in Paris, Xperium will showcase the dynamism of the University of Lille's research teams in this area.

With an original concept presenting "research in action" at the laboratories of the University of Lille, Xperium is one of three units in the LILLIAD Learning Center Innovation, located at the heart of the Cité Scientifique campus.



## E-SPORT AND AMBUSH MARKETING

—  
What's the legal framework ?

Researchers in law are working to identify, critique and suggest rules to govern new practices. Their work is illustrated in two examples: e-sport and ambush marketing.

e-sport, which involves practising a sport via a video game interface, whether competitively or not, has in recent years seen astonishing growth. It now resembles traditional sport, with competitions, rules, clubs, teams, professional players, etc. In France and elsewhere, questions are being asked about whether this activity can be considered a sport and should therefore be subjected to the rules that apply to other sports. In other words, can or should e-sport be considered legally as a sport ?

Ambush marketing is where an economic player, without spending any money and often with a great amount of ingenuity, benefits from the notoriety and positive image of sports competitions and athletes to promote its products and services. Keen to preserve their economic interests, sports institutions are now looking to prevent and sanction such strategies. What are the possibilities and limitations when it comes to preventing and sanctioning ambush marketing in sport ?

Research centre - law and legal perspectives (CRDP, ULR 4487)



## SENSORS TO SWIM MORE EFFICIENTLY

—  
Data-enhanced performance

Analysis of swimming strokes can be used to evaluate the performance of swimmers and para swimmers and improve the efficiency of their movements. This analysis is generally done using video footage taken of the swimmer in action. Experts then manually break down the phases in the stroke and determine the most efficient part. However, this process presents several difficulties: the acquisition system is costly to put in place and the manual analysis is time-consuming, fastidious and subject to variations from one expert to another.

The project being carried out in collaboration with the swimming and parasport federations involves positioning sensors on the arms, pelvis and legs of the swimmer and developing automated tools to analyse and break down the swimming strokes based on data provided by the sensors

Coaches can then quickly analyse a swimmer's technique and maximise its effectiveness, efficiency or economy.

Lille research centre for IT, signalling and automation (CRISAL, UMR CNRS 9189)



For season 5, Xperium boasts 8 spaces where visitors can discover all the richness of the disciplines and research programmes with sport as their central theme.

Researchers and PhD students are on hand to present various demonstrations or interactive pedagogic experiments which reflect their creativity and the excellence of research at the University of Lille.

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Visit :  
<http://lilliad.univ-lille.fr/xperium>



## DISCOVER THE PLEASURE OF PHYSICAL EXERTION

—  
Sensorial tips to enhance your motivation

How can we avoid the sedentary lifestyle that is becoming increasingly commonplace and stimulate people's desire to regularly engage in physical activity ?

Researchers in sports psychology and neuroscience are analysing the contribution of sensorial design (creating augmented olfactory, musical or visual environments) to increase motivation levels when it comes to sports activities, as well as the link between tolerance and pleasure during exertion, both in terms of the person's sensations and their physical mobilisation (heart rate, breathing, posture, etc.).

As well as making people active, this work considers how to optimize the experience of pleasure so they will stick with their chosen activity, and offer attractive, recreational and interactive urban facilities.

Cognitive and affective science laboratory - SCALab (UMR CNRS 9193)



## PREVENTING CONCUSSIONS AMONG RUGBY PLAYERS

—  
New tools to detect and anticipate serious injury

In contact sports like rugby, detecting the seriousness of a concussion can help make a decision that will limit the behavioural impact of these "incidents".

The detection process involves a protocol based on analytical tools that combine both kinetic and physical criteria (sensors placed on a reinforced scrum cap, chin guard and gum guard) and cognitive criteria (tests based on reaction times and the speed of information processing).

Two biases in this protocol are also the subject of additional research: how best to take into account any previous concussions? And how to ensure that all players can carry out the tests regardless of their culture or native language ?

As well as the immediate utility in terms of decision making for the health of the player, all of the data collected must be used to raise awareness and train those involved in prevention and protection. But also and above all to determine the predictors of concussions using artificial intelligence.

Psychology laboratory: interactions, time, emotions, cognition (PSITEC - ULR 4072)  
Multidisciplinary research unit - sport, healthcare and society (URePSSS - ULR 7369)



## START SPORT YOUNG TO MAKE IT A LIFELONG HABIT

—  
Making the right choice for lasting health

The scientific literature has shown that physical activity during childhood closely determines whether one continues to be active throughout one's life, although it is possible to take up sport at a later age. However, most young people are not sufficiently physically active, which carries the risk that they will abandon sport in adulthood. Understanding the obstacles and ways to encourage lasting engagement in sports activities, while seeking to identify the benefits for our health are key to promoting active and healthy lifestyles.

Research has demonstrated that getting young people involved in a long-term physical and beneficial activity depends on three indispensable and indissociable factors: varied motor skills, good physical condition and a positive relationship with the practise of a physical sports activity.

It is essential for the individual to identify these so that, by measuring their activity, physical condition and motor creativity, they can engage and progress in sports activities in the long term.

Multidisciplinary research unit - sport, healthcare and society (URePSSS - ULR 7369)



## PROMOTING FEMALE PARTICIPATION IN WORKING-CLASS NEIGHBOURHOODS

—  
A path towards equality ?

Access to sport for girls and women developed slowly and gradually throughout the 20th century. However, inequality persists. Despite proactive public policies, a majority of girls, especially in working class urban areas, continue to be removed from the world of sport.

Sociologists are endeavouring to explain how the social, family and institutional environments contribute to the perpetuity of this de facto exclusion.

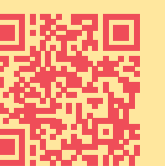
Highlighting the mechanisms that generate inequalities - unsuitable infrastructure, stereotypes linked to sports and gender, the approach of coaches, interactions between youths, whether mixed or not - can lead to more targeted public policies and better management of mixed-gender participation in sports facilities and associations.

Removing these obstacles from the world of sport is a way to combat gender-based and social discrimination more broadly, which can have a knock-on effect in other social and professional contexts.

Research centre "Individuals, challenges, societies" (CeRIES - ULR 3589)

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