

## As children's feet stretch, Decathlon and Carnot ARTS Institute rethink the way shoes are designed

*The strong technical collaboration has helped reduce the risk of injury among junior tennis players without altering performances.*

### Supporting Innovation

For 40 years, Decathlon R&D teams have been challenging many of the pre-conceived notions to create high-value products, whose guarantee of exclusiveness paves the way to their commercial success.

Based on the observations of its SportsLab, Decathlon innovates with a new type of 'tennis shoe' for kids.

Contrary to the competition's custom, which considers kid's shoes as mini adult shoes, Decathlon was, as a result, able to design a tennis shoe best suited to the kid's feet development.

In partnership with LAMIH\*, one of Carnot ARTS Institute's lab, and the ISM\*\*, a component of the STAR Carnot Institute, Decathlon has monitored 30 junior tennis players over an entire playing season.

The ideal footwear design could be established based on the behaviour, on the one hand, of the players fitted with the new shoes, and on the other hand, on the ground impact characteristics of the shoes during the play more particularly.

\* France-based Laboratory of Industrial and Human Automation control, Mechanical engineering and Computer Science (Laboratoire d'Automatique, Mécanique, Informatique, industrielles et Humaines)

\*\* Institute of Human Movement Sciences, (Institut des Sciences du Mouvement) based at Aix-Marseille University (AMU)



### The client needs

Decathlon has been built on its capacity to set itself apart from the competition through innovation. Its ambition is to allow the greatest number of players to pursue sport and physical activities in optimal safety conditions.

Decathlon R&D teams complement their studies built around high-level scientific inflows from external laboratories through partnerships.

On the basis of a CIFRE\*\*\* doctoral thesis, Decathlon has thus been able to study and model individual gestures and multiply modelling to their prototyping.

Measurements on the young players make it possible to validate physiological constraints and maximise convenience for users, without affecting their performances.

Such technological advance is crucial for Decathlon, which targets a market with high growth potential despite stiff competition, and reinforces its position as the preferred company for French customers ahead of Amazon.

In France, tennis is the most important individual sport with more than 524,000 regular licensed players aged 18 or younger\*\*\*\*.

\*\*\*CIFRE = Industrial Agreement of Training through Research (Doctoral fellowships program)

\*\*\*\* Source FFT <http://www.fft.fr/fft/missions/quelques-chiffres>

### Partnership

LAMIH aims at studying the relationship between humans and systems.

Fostering interactions and agents, laboratory of the ARTS Carnot Institute is also able to analyse, model and simulate human movements.

LAMIH has provided Decathlon a recognized expertise in data-processing and analysis of movement kinematics and dynamics.

Physiological readings have not been averaged using common practice. All specific cases, on the contrary, were examined to extend the statistical data subjects.

Installed at Valenciennes university's campus, geographically close to Decathlon SportsLab's teams, LAMIH has provided its foremost resources with a view to supporting the group's strategy for innovation.

With 80,000 employees in 2017, Decathlon operates globally and saw an 11% increase in sales.

Photo - Source Decathlon SportsLab