Animation Script

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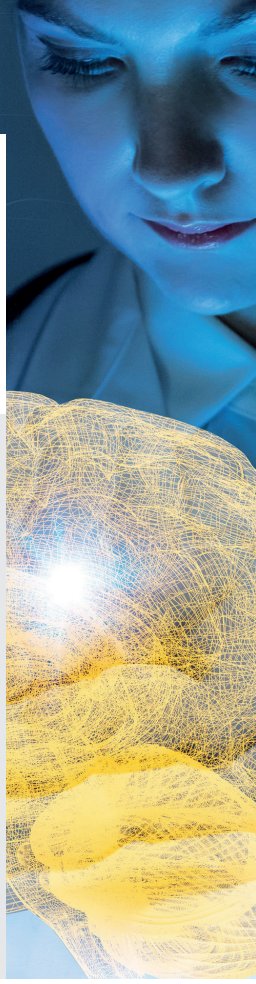
How can we detect and prevent brain injuries?
Professor Christian Franck



To make the most out of this script, you could:

- Stick it in your book as a record of watching Christian's animation
- Pause the animation and make notes as you go
- Add your own illustrations to the sheet
- Create your own animation to accompany it
- Add notes from classroom discussions
- Make notes of areas you will investigate further
- Make notes of key words and definitions
- Add questions you would like answered – you can message Christian through the comments box at the bottom of his article:

www.futurumcareers.com/how-can-we-detect-and-prevent-brain-injuries

SCRIPT:

Your brain is an intricate network of roughly 86 billion neurons. It is an incredible computer that controls everything you do.

The skull does its best to protect the brain from injury, but, sometimes, it is not enough, and even mild brain injuries can cause long-term problems. Detecting brain injuries early can help to lower the risk of a patient experiencing complications or developing a neurodegenerative disease. However, this is not always easy, especially as brain injuries can be asymptomatic, showing no obvious signs that any damage has been done.

Professor Christian Franck, from the Department of Mechanical Engineering at the University of Wisconsin-Madison in the US, is leading the PANTHER programme, which aims to improve the prevention and detection of traumatic brain injuries (TBIs).

There are more than 30 researchers working on the PANTHER programme, with expertise ranging from mechanical engineering to cell biology and neuroscience.

This innovative programme includes three main branches: biomechanics, sensing and motion, and the mechanics of materials.

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For the biomechanics element, Christian and his team use ultra-precision devices that subject brain cells to the kinds of forces they would experience during a TBI.

These devices are integrated into state-of-the-art 3D microscopes, through which Christian can track the impact of these forces at a molecular and cellular scale.

The sensing and motion researchers use computational models to simulate what happens inside the head during an impact event. In their studies, participants wear cutting-edge, flexible sensors which track how their heads move in different situations.

Computational models can then use these data to reveal the extent to which brain tissues deform and how neurons in the brain might become damaged.

Researchers focusing on the mechanics of materials are developing new protective materials. These materials are designed based on detailed understanding of the physical stresses that can damage brain tissue, such as the amount and speed of tissue stretching.

The new materials can be tailored specifically to reduce the impact of these stresses and integrated into new helmet designs.

Christian hopes that PANTHER will get its first 'brain-protective' helmets onto the market by 2025, helping, in particular, people in the military and those who play contact sports.

In addition to creating new safety equipment, Christian's team also hopes to prevent brain injuries through the development of better safety guidelines.

The collaborative and interdisciplinary PANTHER team is committed to making people's lives safer.

What would you investigate as a researcher?

What could you contribute to the field of mechanical engineering?