

Engineering the world's fastest swimsuit

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A highly specialised computer modelling technique developed at The University of Nottingham has been instrumental in the design of a revolutionary new swimsuit which is now being hailed as the fastest in the world.

Dr Herve Morvan, a lecturer in fluid mechanics in the School of Mechanical, Materials and Manufacturing Engineering, is working as an advisor to the AQUALAB, Speedo's competition research and development department, responsible for the development of Speedo's new LZR Racer swimsuit.

Within a week of its launch athletes wearing the new swimsuit had broken three world records.

Speedo harnessed the expertise of NASA and a number of international research institutes and industrial partners such as ANSYS, one of the world's leading engineering simulation software providers, to create the new suit.

The team at Nottingham specialises in Computational Fluid Dynamics (CFD), the computer modelling of fluid flow. The technique is rapidly developing in its technology and applications and can cut design times, increase productivity and give significant insight to fluid flows.

CFD is commonly used for analysis, for example, in the Rolls Royce University Technology Centre which specialises in research for the aeronautics industry, and for many other applications relating to the

energy, biomedical and sports sectors. As well as engineers, experts in the School of Mathematical Sciences and the School of Physics and Astronomy develop and use numerical modelling techniques of fluid flow to provide insight in fluid problems ranging from the atomic scale to that of the universe.

Speedo AQUALAB scanned over 400 athletes and obtained the scan for a series of top athletes. Using CFD analysis Dr Morvan and his team were able to pin-point areas of high friction on the athlete's body. With this information designers were able to position low friction fabric, exclusively developed by Speedo, in the right locations.

Dr Morvan, a lecturer in fluid mechanics, said: "CFD enabled us to use the compressive property of the suit to shape the body as ideally as possible, taking into account the physiological and bio-mechanical requirements of the athlete."

The new suit has 5 per cent less drag than Speedo's 2007 suit, the FS Pro, which saw swimmers break 21 world records.

Analysis by Dr Morvan and his team at The University of Nottingham was carried out in collaboration with flume work at the University of Otago, in New Zealand and fabric tests by NASA.

Dr Morvan who is now working with Speedo towards the 2012 Olympics in London said: "We are now building up toward active drag which accounts for the athlete motion and its interaction with the free surface. This should further validate the suit design as we move to the 2012 Olympics."

Source: University of Nottingham

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