# Virtual swimmer to speed up athletes

March 30 2006

CSIRO and the Australian Institute of Sport are using mathematics in a bid to speed up our top swimmers by testing changes to swimming strokes. The research will make use of the same software CSIRO uses for other fluid simulations such as animating water for movies and modelling volcanoes and tsunamis. Researchers are hoping to see some practical results in time to implement improvements for the London Olympics in 2012.

'Firstly we need to understand how water interacts with the human body during competitive swimming,' CSIRO researcher Chris Glendenning says.

'We are building a virtual model of a swimmer and are using mathematical techniques known as Smoothed Particle Hydrodynamics or SPH to run simulations of the virtual model swimming in a pool.

'In contrast to traditional methods, SPH describes fluid flow as the motion of individual particles. Using this technique means we will be able to more accurately simulate the interactions of water with a swimmer, which is particularly complex at the water's surface.'

To start with, the researchers will scan the skin surface of a swimmer with a laser body scanner and use motion capture information to discover how they move through the water. By combining the skin surface and motion capture information, they will be able to simulate the skin surface for all the poses the swimmer adopts while swimming.

'Once we've built the virtual swimmer, we'll need to validate the simulations to find out whether what's happening in our computer matches what happens in reality,' Mr Glendenning says.

'Then we can sit down in front of our animation and ask our questions. By making slight changes to the swimming stroke and by re-running our simulations, we'll be able to find out whether the swimmer goes faster or not.

'We'll also be able to compare swimming styles between different swimmers to gain scientific insight into how each swimmer is moving through the water and even look into the effects of superimposing the techniques from different swimmers onto one another.'

Mr Glendenning is working on this joint project between Monash University, the Australian Institute of Sport and CSIRO Mathematical and Information Sciences.

Source: CSIRO

Citation: Virtual swimmer to speed up athletes (2006, March 30) retrieved 20 March 2024 from https://phys.org/news/2006-03-virtual-swimmer-athletes.html