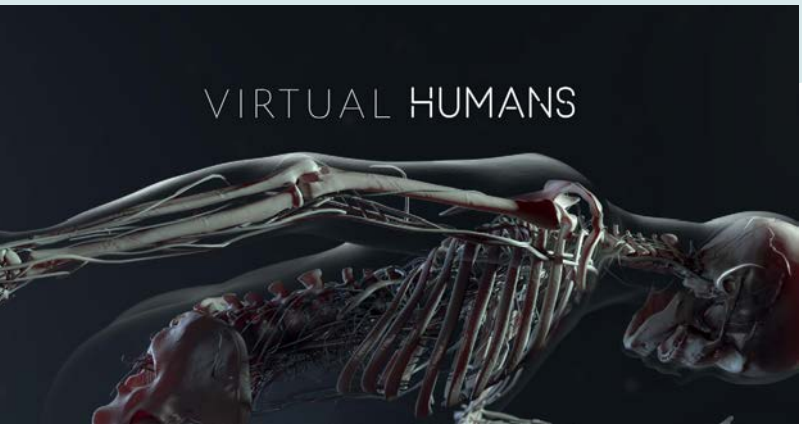
CompBioMed

A Centre of Excellence in Computational Biomedicine

CompBioMed is a European Commission Horizon 2020 funded Centre of Excellence, based at University College London, focused on the development of computational methods for biomedical applications.

Institution: University College London
Research project: CompBioMed
Funding: European Commission Horizon 2020



CompBioMed, a Horizon 2020 funded Centre of Excellence, aims to develop the use of high performance computing for biomedical applications. Computational modelling and simulation are well established methods within physics and the chemical sciences, but are currently underused in medicinal fields.

The potential applications are wide-ranging. In drug discovery, high performance computing can identify molecules most likely to make effective drugs, which would cut the time and cost of developing new medicines. Modelling could also be used to predict how certain drugs or procedures will affect a patient's body, enabling doctors to personalise treatment.

Professor Peter Coveney, Director of the Centre for Computational Science at University College London – the project's lead institution – explains the possibilities: "For things like strokes and aneurisms, instead of making lots of measurements, you have access to patient data on things like their arteries and veins that are in the brain, and you can run flow simulations of the blood inside that patient's brain and determine the best form of intervention before you carry it out."

Bringing disciplines together

The centre brings together partners from across industry, academia and medicine, with access to some of the best facilities in the world. Modelling human organs, or even a full human body, requires incredibly powerful supercomputers and these facilities are currently unavailable in the UK. With EU funding, Peter's team are able to access computers with the speed and memory needed for this work – most of which are found in Germany.

"This type of work is important due to its scale and the way it brings together the disciplines," says Peter. "These EU projects are set up in a different way to those in the UK. To solve this problem, you might not need to focus simply on chemistry, physics or biology – you might need to incorporate all of these disciplines and bring the right people together.

"The metaphor I have used here before is that I may be happy playing in the English Premier League but really, I want to be part of the UEFA Champion's League. We need to be able to work alongside the best."

Impact on industry

As well as enabling access to world-leading facilities, **EU funding encourages industry collaboration at a much earlier stage than many current UK funding programmes**. For CompBioMed, this meant Janssen, a large Belgian pharmaceuticals company, could be an equal partner in the project, bringing different expertise. There is also considerable support available for working with small and medium-sized enterprises (SMEs), as well as developing spinouts and start-ups from the project.

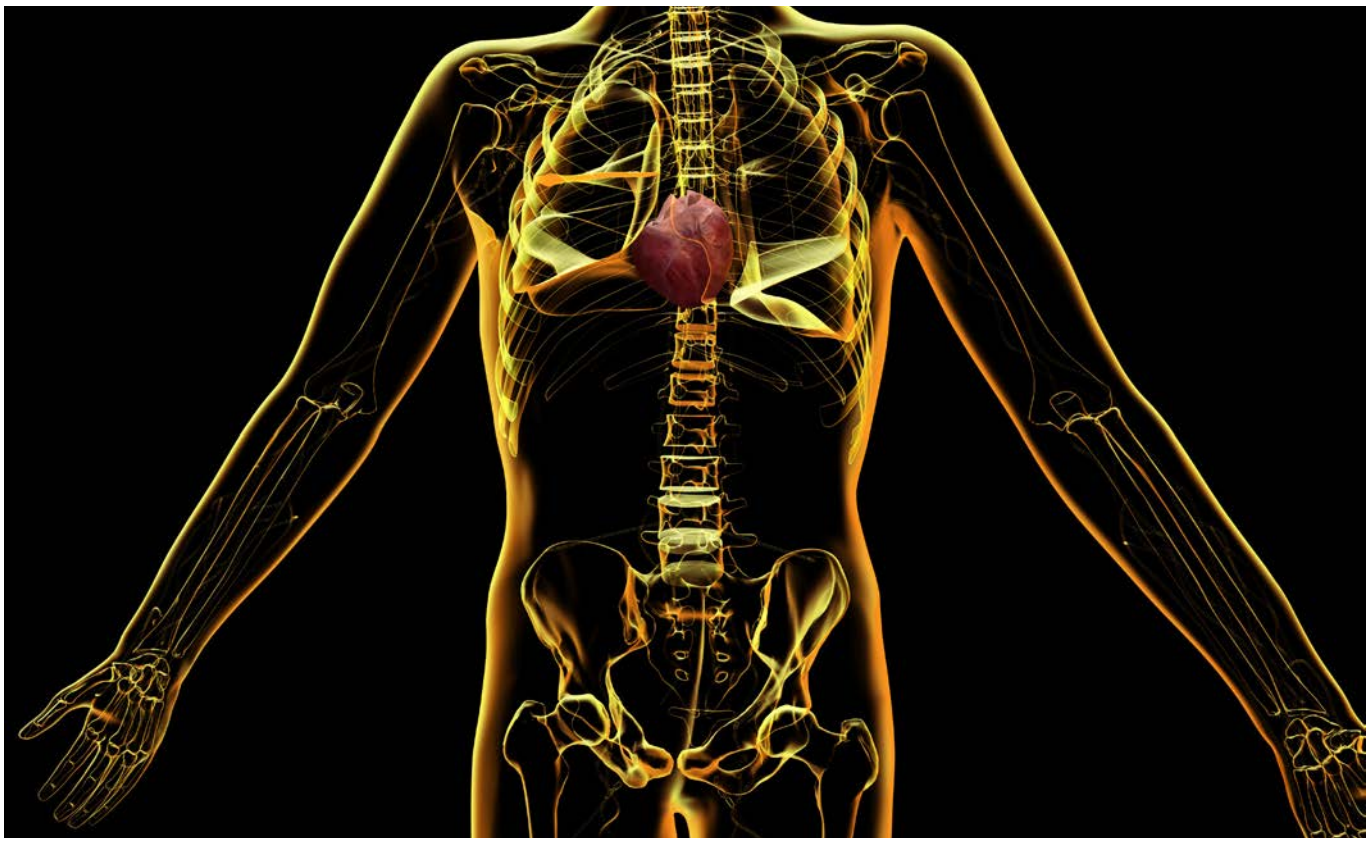
"We recently announced a couple of new start-up companies that are nurtured by the work we have been doing," says Peter. "EnsembleMD, a UK based company, and ELEM Biotech. It is very difficult for large industry to get access to computational science experts that they need for these projects, so this kind of SME can bridge that gap."

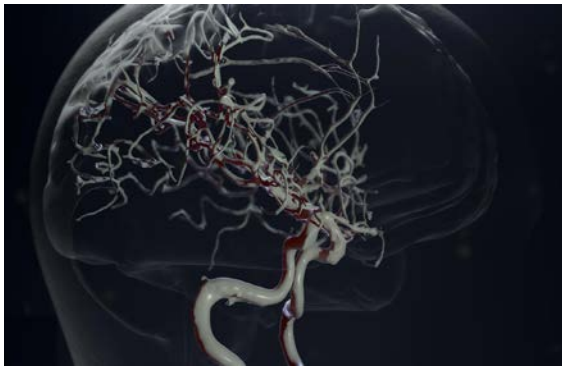
Supporting the next generation of doctors

The longer-term impact of CompBioMed's work has the potential to change the nature of clinical practice to the benefit of patients and medical professionals alike. Peter's team works closely with medical schools, and has developed and implemented a training module at UCL, which they intend to expand to teaching courses in other medical schools in the UK, Spain, Germany and the Netherlands.

"We are trying to get medics and biomedical scientists to have more direct hands-on experience of what difference super computers can make to their work – it's been very well received. We couldn't do this without EU funding, it's absolutely essential."

Virtual human, human brain vasculature and supercoiled DNA plasmid





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