

Improvement of Cerebral Aneurysms Treatment and Implantable Device Design

@neurIST is a major multidisciplinary European initiative within the Sixth Framework Programme. The project brings together neurosurgeons, neuroradiologists, epidemiologists, engineers, biologists and computer scientists from 30 European institutions. The aim of the project is to develop a usable interface for personalised risk assessment and treatment of patients with cerebral aneurysms.

The volume of data describing human disease processes, including our understanding, diagnosis, and management of them, is growing exponentially. While this increased information allows diseases to be better understood and better treated, it presents a data-management challenge. It is often impossible for an individual – whether a clinician responsible for patient management, or a physicist or engineer developing new imaging or interventional devices – to understand and assimilate this knowledge. It has become increasingly evident that new methods are required to manage, integrate and search data so that it becomes accessible to the end user. The @neurIST project was designed to address this issue. TechNet Alliance member IDAC Ireland was chosen as a partner because of its experience in simulation of implantable medical device and its pedigree in successful delivery of stent simulation applications to device manufacturers such as Abbott Vascular and Boston Scientific.

The project, which in 2008 is in its third year of four, will deliver several integrated modules. These are:

@neuLink

... will create an IT environment for the identification of candidate genes associated with the disease phenotype and for the integrated analysis of genetic epidemiology and clinical data.

@neuFuse

... will provide an open source environment to fuse diagnostic data and modelling data into a coherent representation of the patient's condition. It will allow the medical professional to interactively visualise all these data, using multiple display modalities and data types. Finally, this application will allow simulation and data steering from/to

other suites in order to obtain predictive simulations using all available patient- and domain-specific data. Underlying technologies will be state-of-the-art image segmentation, multimodal registration, and advanced visualisation.

@neuRisk

... will produce a personalised risk assessment by integrating all available information to produce a quantitative score. This score will be used as a guideline to help determine whether or not a clinical intervention is required.

@neuEndo

... will build upon the technology of @neuFuse to deliver an innovative IT system for supporting the design of implantable devices and intervention planning by simula-

tion of the structural, haemodynamic and biological response to intervention.

@neuCompute/Info

... will provide an infrastructure to support the integration of data and computing resources

The @neurIST infrastructure will not only support computationally demanding tasks, such as complex modelling and simulation, but will also enable access to public and protected health databases all over the world. This should promote the development of corresponding systems for other disease processes.

IDAC Ireland is responsible for the development and delivery of @neuEndo. This module will have 2 distinct end-users. The

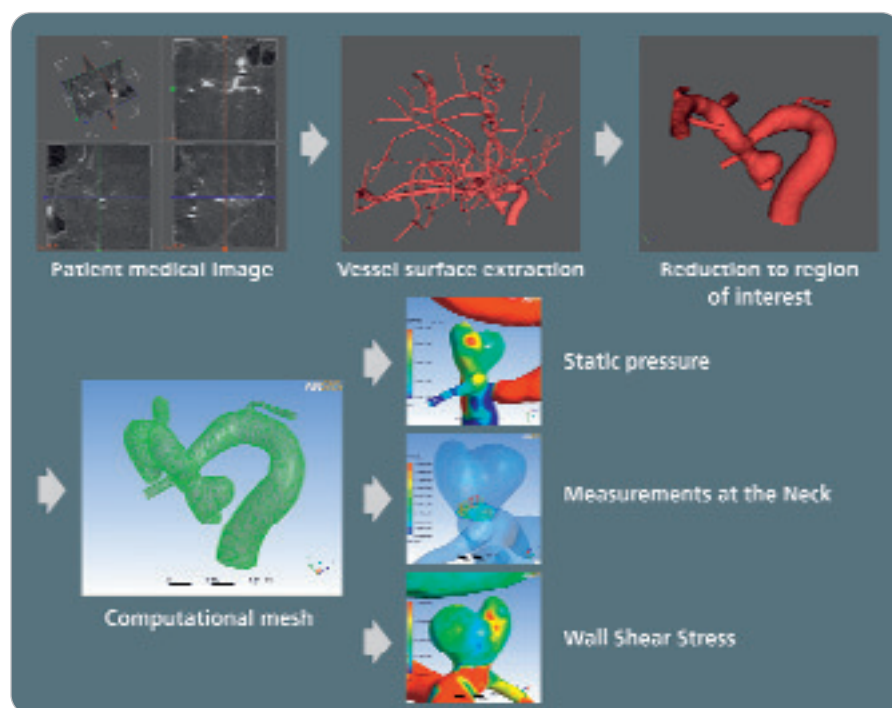


Fig. 1: Workflow for Clinical End User

IDAC Ireland and the TechNet Alliance



IDAC Ireland has been an active Charter Member of the TechNet Alliance and a Member of the Board of Technology Network Alliance AG since 1999.

As a relatively small Computer Aided Engineering consultancy firm, situated on the edge of Europe in Ireland's buzzing capital and favourable economic environment, IDAC benefits from a global and reliable Network of 2500 CAE experts and the availability of their expertise. At the bi-annual Member Meetings that traditionally serve as a forum to exchange latest news and developments in the CAE Market, IDAC took the opportunity on several occasions to present its strong expertise in the fields of medical devices and internet delivery of vertical applications. In this way, several valuable business relationships of mutual interest could be established through the years.

At a time when the CAE Market is growing with enormous speed, and in all sectors, IDAC wants to benefit from a global and well-informed community to secure its place on the edge of CAE!

www.technet-alliance.com

| Additional Information |

IDAC Ireland



IDAC Ireland Ltd is a Computer Aided Engineering consultancy based in Dublin. Since it was established in 1997, IDAC has supported companies involved in R&D and new product development by simulating design performance in an effort to produce better designs in less time. IDAC is a certified ANSYS channel partner and sells all ANSYS simulation software and provides training and implementation services. IDAC plans to use technologies and relationships developed in @neurIST to aid medical device manufacturers in the development of state of the art implantable devices.

www.idacireland.com

| Additional Information |

first is the Medical Device Manufacturer. @neuEndo will provide an expert, automated tool directly to stent designers to allow them to simulate the structural and fluid flow performance of proposed stent designs. New stent geometries can be uploaded and simulated for structural performance in a matter of hours, allowing the stent designer to assess many variations quickly and cost effectively. The effect on haemodynamics of new stent designs implanted in diseased vessels can also be assessed allowing the designers to choose stent pattern shapes which produce beneficial effects on blood flow.

The second is the clinical end-user. Typically this would be the neuroradiologist who is treating a patient who has already been diagnosed as having a cerebral aneurysm. The neuroradiologist must decide what treatment is most appropriate for the patient. This will depend on several factors – age, medical history, genetic profile, size and shape of the aneurysm. @neuEndo will allow the clinician to run simulations to better understand the haemodynamics of the diseased vessel. Simulations can also

be carried out with a stent implanted to determine its effect on critical measures such as pressure in the aneurysm, flow through the neck of the aneurysm, and shear stress on the wall of the aneurysm. This additional information should help the clinician to choose the best possible treatment plan for the patient. <<

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For further information on @neurIST, please visit www.aneurist.org

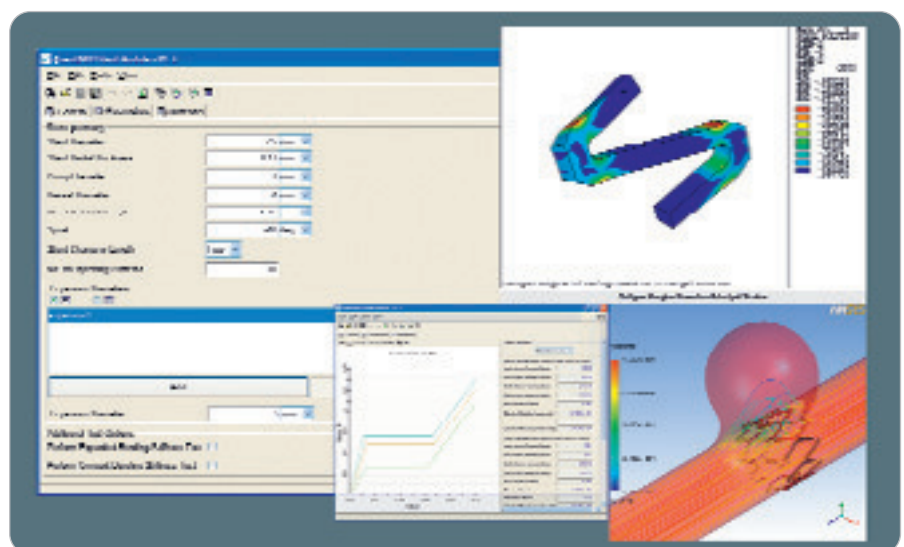


Fig. 2: Workflow for Medical Device Designer