

Talking Points for @neurIST Tool Chain Press Release
PATIENT-SPECIFIC SIMULATION TO IMPROVE UNDERSTANDING OF CEREBRAL ANEURYSMS

BACKGROUND

- The European Commission is funding the project “@neurIST: Integrated Biomedical Informatics for the Management of Cerebral Aneurysm.” It has been in progress for more than two years.
- ANSYS UK (formerly ANSYS Europe) is one of the participating companies in this project.
- The personal effect of aneurysm rupture is devastating: morbidity (incidence rate or prevalence) and mortality are high, affecting two-thirds of afflicted patients. The aim of @neurIST is to transform the management of cerebral aneurysm by providing new insight, personalized risk assessment and methods for the design of improved medical devices and treatment protocols. @neurIST is developing an IT infrastructure for the management and processing of heterogeneous data associated with the diagnosis and treatment of cerebral aneurysm and subarachnoid hemorrhage, in order to minimize the economic and societal impact of the disease in Europe. Personalized risk assessment alone could reduce unnecessary treatment by 50 percent or more, with concomitant savings estimated in the order of thousands of millions euros per annum. Furthermore the approach will be extendable to other disease processes and scalable to a large number of clinical centers and public databases.
- The European Commission (EC) has funded the project @neurIST for a period of 4 years. @neurIST is an Integrated Project that will be developed in the context of the Sixth Framework Programme of the EC, specifically with a priority of integrating and strengthening the European Research Area of Information Society Technologies.
- The @neurIST project is being carried out by a consortium integrated by 29 public organizations and private firms of 12 European countries and several organizations from the United States, New Zealand and Japan, as external collaborators.

CURRENT DEVELOPMENTS

- ANSYS UK has contributed to the @neurIST effort by:
 - Working with the partners in the project to enable analyses of different therapies and devices to be evaluated and to integrate the different software packages which form the toolchain.
 - Providing engineering analysis packages from ANSYS (ANSYS ICEM CFD, ANSYS CFX, ANSYS CFX-Post) within the integrated information processing chain, taking patient image data from medical scans, to enable analyses of different therapies and devices to be evaluated.
 - The project has successfully developed its “toolchain,” the set of computer programs and tools that will be used as the backbone for project, making it efficient for end users to input and link information for evaluation (for example, a qualitative comparison between numerical and in vitro simulation under steady conditions with and without a stent).
 - A simple software development toolchain consists of a [text editor](#) for editing [source code](#), a [compiler](#) and [linker](#) to transform the source code into an [executable program](#), and [libraries](#) to provide interfaces to the [operating system](#). A complex product such as a [video game](#) needs tools for preparing [sound effects](#), music, [textures](#), [3-dimensional models](#), and [animations](#), and further tools for combining these resources into the finished product.
 - The successful demonstration of the toolchain means that partners can now analyze the aneurysm data that is being collected by clinical centers and incorporated into the project databases.

- The technical services group within ANSYS UK has contributed to a number of projects in the biomedical field including:
 - GEMSS (IST-2001-37153): a project to demonstrate the use of the GRID for medical simulation services. (www.GEMSS.de)
 - COPHIT (IST-1999-14004): an IST simulation and visualization project for the modeling of inhaled drug therapies. This required the development of meshing techniques that use medical images to define the original geometries and related simulations. (Sales Portal: http://www1.ansys.com/teamansys/mediabank_details.asp?FILE_ID=6645)
 - BloodSim (Esprit 28350): a high-performance computing and networking (HPCN) project for the simulation of cardiovascular and other biomedical flow problems. The project has developed techniques to handle fluid structure interactions between blood flow and medical devices. (Sales Portal: http://www1.ansys.com/teamansys/mediabank_details.asp?FILE_ID=6477)
 - ANSYS UK also collaborates with universities, government agencies and commercial companies throughout Europe to extend the use of engineering simulation in key applications.
 - ANSYS France is participating in the European VPHOP Integrated Project, which aims to reduce the risk of osteoporotic fracture.
- Specific contributions of the ANSYS software packages:
 - ANSYS ICEM CFD meshing tools are being used to take the processed image data and create meshes that can be used by the simulation tools. The technology also is being used for cases where stents are present in the geometry.
 - ANSYS CFX software is being used to analyze flow in the aneurysms, both for patient-specific simulations and in vitro demonstration and validation cases.
 - ANSYS CFD-Post is being used to extract relevant clinical information from the simulations.
 - ANSYS Mechanical is being used to simulate the effects of inserting stents into aneurysms to determine the stresses within the stent (for example, to analyze fatigue) and the artery wall, in order to see how the geometry will change as a result of stent deployment. This is incorporated into the @neuENDO software suite, being developed by an ANSYS Channel Partner, IDAC Ireland. @neuENDO also enables users to study the effect of the flow on the artery by incorporating the fluid structure interactions.

Web Links for More Information

[European Commission New Framework Programme
@neurIST
http://www.vphop.eu/](http://www.vphop.eu/)

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