



## Graduate Research Assistantships

Graduate research assistantships are available to pursue a PhD in Computational Sciences at the Center for Computational Fluid Dynamics (CFD), George Mason University, Fairfax, Virginia, USA under the supervision of Prof. Juan R. Cebral.

The candidate will conduct research in Computational Hemodynamics (blood flows) applied to cerebral aneurysms. The aim of this research is to better understand the mechanisms responsible for the initiation, evolution and rupture of brain aneurysms, which is a devastating disease affecting a substantial portion of the population. Better understanding of these processes will help medical doctors to improve patient evaluation (better assess the rupture risk of a given aneurysm) and personalizing treatment plans (select the best therapeutic options available to treat a given aneurysm). For these purposes, we develop and use advanced computational methods to construct patient-specific models of the blood flow in brain aneurysms from three-dimensional medical images. Then, we relate the hemodynamics variables such as the wall shear stress derived from these models to clinical observations indicative of aneurysm wall weakness such as wall pulsation, aneurysm growth, bleb formation, rupture, etc.

This highly multidisciplinary research involves medical image processing, geometry modeling, meshing, computational fluid dynamics, visualization and computer graphics, high performance computing as well as clinical investigation.

This research is supported by grants from the National Institutes of Health (NIH) – National Institute of Neurological Disorders and Stroke (NINDS), the American Heart Association (AHA), and medical industry companies such as Philips Medical Systems and Boston Scientific. These projects are carried out in the context of close collaborations with clinical centers, universities and national laboratories including the Interventional Neuroradiology Unit of Inova Fairfax Hospital in Virginia, Interventional Neuroradiology at University of California Los Angeles, the Department of Technology of the Pompeu Fabra University in Barcelona, and the Laboratory for Computational Physics at the Naval Research Laboratory in Washington DC.

The successful candidate should be highly motivated, be able to work independently, be comfortable working in multidisciplinary teams, be able to collaborate with researchers and clinicians from a number of institutions, and possess excellent communication skills. He/she should have strong background in mathematics, sciences, and computing.

For more information contact Dr. Juan R. Cebral by email: [jcebral@gmu.edu](mailto:jcebral@gmu.edu)  
(web page: <http://www.cos.gmu.edu/~jcebral>)