



Graduate Research Assistantships

Graduate Research Assistantships are available to pursue a PhD in Bioengineering at the Volgenau School of Engineering at George Mason University, Fairfax, Virginia, USA under the supervision of Prof. Juan R. Cebal.

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 improve patient evaluation (better assess the rupture risk of a given aneurysm) and personalize 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 numerical 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 and biological investigations.

This research is supported by grants from the National Institutes of Health (NIH) – National Institute of Neurological Disorders and Stroke (NINDS). These projects are carried out in collaboration with clinical and biomedical research centers, including the Interventional Neuroradiology Unit of Inova Fairfax Hospital, Neuroradiology at the Mayo Clinic, the Department of Bioengineering at the University of Pittsburgh, the Department of Neurosurgery of Kuopio University Hospital in Finland and others.

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. Cebal by email: jcebral@gmu.edu
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