Hughes Institute Grants GW $1.7 Million for Bioinformatics Program

The Howard Hughes Medical Institute has awarded GW a four-year $1.7 million grant to develop innovative biological sciences programs in bioinformatics and computational molecular biology and to support a new partnership with The Institute for Genomic Research (TIGR). GW is one of only 44 research universities to be awarded this grant.

The grant will bring together SEAS, the Columbian College of Arts and Sciences, and the School of Medicine and Health Sciences to prepare biology and computer science students to work together as leaders in post-genomic science. Students from both disciplines will share classes and research projects. SEAS' Department of Computer Science will offer the first course in the sequence, Introduction to Bioinformatics (CS 177).

The grant will fund numerous student summer research assistantships and support a new interdisciplinary undergraduate research course for biology, biochemistry, and computer science students. Student teams will work together with researchers to solve analytic questions from TIGR's lab and from research facilities at Children's National Medical Center and Holland Laboratories.

In addition, the grant will fund faculty positions in the biology and computer science departments. Professor Rahul Simha of the Department of Computer Science and Professors Robert Donaldson and Randall Packer of the Department of Biological Science are co-directors of the grant. Professor Bhagirath Narahari of the Department of Computer Science and Professor Fatah Kashanchi of the Department of Biological Sciences are also involved in the program.

Professor Rajat Mittal Receives DoD Challenge Grant

SEAS professor Rajat Mittal and three collaborators from Stanford University have been awarded one of 39 high performance computing challenge grants that the U.S. Department of Defense (DoD) granted nationwide for fiscal year 2003. The DoD provides these grants to researchers in the hopes that their research will help address the Department's highest priority needs in science and technology and test and evaluation.

The grants that Mittal and his colleagues received will provide them with hundreds of thousands of CPU (computer processing unit) hours on some of the world's largest supercomputers. They are using the computing power to develop and test a large-eddy simulation (LES) code that has the potential to be a useful research and design tool for future DoD weapons systems.

Mittal explains that in liquid handling systems like turbomachinery pumps and propellers (see Figure A), low pressure fluctuations downstream of the rotor can induce cavitation, leading to acoustic noise, loss of performance, and structural damage. This complex, highly unsteady flow phenomenon is still poorly understood and cannot be predicted by traditional computational fluid dynamics (CFD) methods. However, Mittal and his colleagues are using LES to try to better understand, predict and eventually control cavitation.

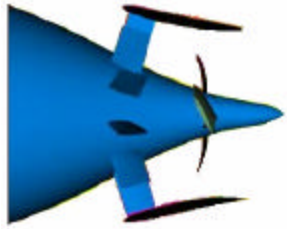

Figure A: Schematic of a ducted propeller on a submarine

Figure B shows the complex flow structures that are predicted by these simulations. These are some of the largest computations of this kind attempted to date and are possible only by use of the vast supercomputing resources provided by the challenge grant. This research project is also being supported by a separate grant from the Office of Naval Research.

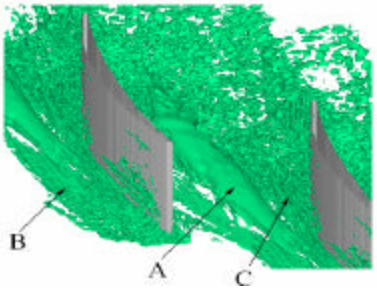

Figure B: Visualization of computed flow through rotor cascade

Professor Mittal is a member of the Department of Mechanical and Aerospace Engineering faculty.