

## Media Release

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February 14, 2006

### FOR IMMEDIATE RELEASE

#### FIU Launches CyberBridges Program to Link Scientists with Cyberinfrastructure

**(Florida International University, Miami)** – At Florida International University (FIU), researchers are entering a new “Information Age” in which they will have the computational power to run faster simulations, crunch larger datasets, and store greater amounts of information.

With funding from the National Science Foundation, a new pilot program – called CyberBridges – will help connect FIU scientists with cyberinfrastructure (CI), or the computational-based framework that supports advanced data acquisition, synthesis, visualization, and storage. Cyberinfrastructure includes all the software, hardware, and human expertise that serve to advance research and technology.

“The goal of CyberBridges is to create a new generation of scientists and engineers who are capable of integrating CI into the whole educational, professional, and creative process of diverse disciplines,” said the project’s principal investigator Heidi Alvarez.

Alvarez, who is also Director of FIU’s Center for Internet Augmented Research and Assessment (CIARA) – the group that will manage CyberBridges – believes that the program will help faculty members to see how CI can be applied to their own investigations.

To achieve this goal, fellowships were awarded on a competitive basis to four FIU graduate students. CyberBridges will test the hypothesis that, through inquiry-based learning activities, these students will act as “bridges”, showing researchers how they can use CI to further their knowledge.

One of the fellows, Tom Milledge, is producing a protein pattern discovery method that is similar to BLAST, a widely used algorithm for rapid searching of nucleotide and protein databases.

The problem with the version of BLAST for proteins is that matches can only be made based on amino acid sequences. But in the world of proteins, shape is more important in determining a protein’s function than amino acid sequence. Therefore, the best way to understand a protein’s function is to compare it to similarly-shaped proteins for which the function is already known.

This is no easy task, though.

First, all possible 3-dimensional shapes must be determined and then screened against known configurations in a vast database. To sift through a nearly infinite number of patterns requires substantial computing power obtainable only through a high-performance grid, or cluster of networked computers.

“The high-performance computing resources provided by CyberBridges are essential to this project,” said Milledge.

Milledge’s faculty advisor, computer science professor, Giri Narsimhan, says that the work will benefit his own research. He and his students have pursued the project on a small scale for several years. Now, because of the CyberBridges program, Narsimhan believes the project will reach new heights.

“Interdisciplinary research needs to be encouraged and nurtured because it is the way of the future,” said Narasimhan. “The CyberBridges effort to foster an interdisciplinary climate at FIU is laudable,” he said.

Another CyberBridges fellow, Cassian D’Cunha, is studying the enzyme, chloroperoxidase (CPO), which participates in the synthesis of steroids, among other biochemical processes. D’Cunha hopes to fine-tune CPO’s activity so that these reactions will be more efficient for industrial uses.

“Understanding the mechanism of chloroperoxidase catalysis will help the pharmaceutical industry in efficient synthesis of steroids,” said D’Cunha.

This work, too, will require significant computing resources.

According to D’Cunha’s faculty advisor, chemistry and biochemistry professor, David Chatfield, modeling methods in the field of chemistry are sufficiently accurate that they are limited only by computational resources.

“It is clear already that what Cassian is learning through Cyberbridges will allow us to surmount our computing difficulties and move the research forward,” said Chatfield.

A pilot experiment itself, CyberBridges is already meeting the challenge of integrating CI into the academic community. But to formally document its success, it will be reviewed by an external committee. Paul Avery, a physics professor at the University of Florida, is one of the program’s reviewers.

“Part of what I have to do is ensure that the program makes a measurable impact on the scientific effort being studied,” said Avery. “What CyberBridges is doing is important because the use of computation- and data-intensive methods is rapidly moving into new disciplines, and researchers who can harness these tools to solve problems will move to the forefront of those disciplines.”

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