CER Technology Fellowship Program –2008

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Project Title: Interactive Introduction to Computational Medicine

Audience: Initially the audience will be students in the *Introduction to Computational Medicine* course, and students in Applied Mathematics and Statistics and Biomedical Engineering courses. In the longer term, other departments, such as Electrical & Computer Engineering, Chemical & Biomolecular Engineering, and School of Medicine departments (Psychiatry, Neurology, Radiology, etc.), may wish to adopt the resource.

Pedagogical Issue: Due to software upgrades, it is no longer feasible to use previously developed online courses via the Internet. Installation of applications which only run on Windows is necessary in order to access the course material. This software limits the course accessibility to the wider community.

A new strategy is needed to expose this to more students. The crux is making the modules have a "textbook" feel rather than one page tutorials. That said, exposure to Computational Medicine will itself be unique especially at the undergraduate level.

A major technological hurdle is to seek and develop viable and reliable alternatives to the Mathwright platform successfully used in "Introduction to Metric Pattern Theory" online course (funded by a CER Technology Fellowship in 2004).

Solution: Our team plans to develop an online course to complement "Introduction to Computational Medicine" to be offered by the Dept of Applied Mathematics and Statistics fall 2008, spring 2009 and fall 2009. Mathematical concepts in Computational Anatomy, Biological Systems and Bioinformatics will be illustrated via interactive modules. This will allow us to develop a viable and reliable platform that can be used across different operating systems locally and remotely. Modules for Biological Systems and Bioinformatics will be developed on the same platform. The result will be a utility that can be used for the "Introduction to Computational Medicine" course offered by JHU, a refresher course for undergraduate summer interns doing research at ICM and finally tutorials on software applications developed by ICM.

Technologies Used: Animation, MathML, MatLab, ActiveX , C/C++ , HTML/Web Design, JAVA, JavaScript, Macromedia Flash

Project Abstract: Computational Medicine will emerge as an important discipline in the 21st century. The Institute of Computational Medicine (ICM) is the first of its kind anywhere in the world. JHU undergraduates should leverage the ICM to gain entry into the growing field of computational medicine. It is proposed to develop an online course to complement "Introduction to Computational Medicine" to be offered by the Department of Applied Mathematics and Statistics fall 2008, spring 2009 and fall 2009. Mathematical concepts in "Introduction to Computational Anatomy", Biological Systems and

Bioinformatics will be illustrated via interactive modules.

A major technological hurdle is to seek and develop viable and reliable alternatives to the Mathwright platform successfully used in "Introduction to Metric Pattern Theory" online course (funded by a CER Technology Fellowship in 2004).

We will first develop an "Introduction to Computational Anatomy" course that builds and extends the modules used in "Introduction to Metric Pattern Theory". This will allow us to develop a viable and reliable platform that can be used across different operating systems locally and remotely. Then modules for Biological Systems and Bioinformatics will be developed on the same platform.

The result will be a utility that can be used for the "Introduction to Computational Medicine" course offered by JHU, a refresher course for undergraduate summer interns doing research at ICM and finally tutorials on software applications developed by ICM.