

Concept for strategic initiative: Enhancing imaging resources.

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Over the last 6 months, the Office of Research Development has worked with a group of 5-College faculty in Psychology, Biology, Neuroscience and Engineering to bring Magnetic Resonance Imaging (MRI) and functional Magnetic Resonance Imaging (fMRI) capacity to the 5-Colleges. MRI allows researchers to view the internal structural and anatomical features of living (or deceased) organisms. fMRI allows researchers to view "activity" in anatomical regions of the brain as subjects engage in experimental tasks. It is safe to say that these capabilities have fundamentally revolutionized the research agenda of many branches of the biological and behavioral sciences. On attending a recent national conference for Personality and Social Psychology, I attended poster sessions where roughly 1 in every 3 posters reported results of fMRI research (note, this is not a Neuroscience conference). Indeed, some of the most exciting work and thinking in Psychology relies on these techniques to explore the interface of social and behavioral science findings with modern approaches to Neuroscience.

Sadly, fMRI work is sorely underrepresented at Smith, and the 5-Colleges more generally. A recent survey of faculty identified only a handful of researchers actively using these techniques in the 5-Colleges, and only one at Smith. These researchers typically have grant funding from federal agencies and travel to Dartmouth, Yale, or MIT, where they lease time to conduct their research. These researchers, along with their students, take day-long excursions throughout the semester to gather sufficient data to complete a single research project. The lack of the ability to conduct research locally leads to dramatically inefficiencies in the conduct of this work.

More significantly, the lack of local fMRI resources stifles the ability of new researchers to get started using the technique and sorely limits our ability to expose and train students with this valuable resource. The same survey of faculty tells us that there are as many as 40 faculty in the 5-Colleges (6 currently at Smith) that are interested in incorporating fMRI techniques into their research, and many others that would like access to this technology for teaching purposes. Testimonials are abundant for the power of this technique to stimulate student research pursuits once they witness the brain "lighting up" in response to experimental stimuli. Access to fMRI resources will prove to be a significant plus for many students pursuing graduate school admissions, and will be an increasingly important recruiting tool for several departments.

The primary reason that MRI and fMRI capacity is absent in the 5-Colleges is cost. The going price for a 1.5 Tesla magnet (which is commonly used for clinical purposes) is over one million dollars. A state of the art 3.0 Tesla magnet (increasingly common for research purposes) currently costs 2.5 million dollars. Moreover, ballpark estimates suggest that it will cost between \$250,000 and \$500,000 to staff and maintain the magnet.

Recognizing these cost barriers, I discussed the possibility of obtaining funding for the acquisition of a magnet with a number of officials at the National Science Foundation. While they invited an application for support from their Major Research Initiatives program suggesting that a successful application typically yields about \$1.5 million dollars, they also indicated that the success of the application would depend upon having a cohort of researchers actively engaged in quality science on the magnet. A "chicken and egg" scenario was rapidly unfolding.

In an attempt to resolve this problem, I initiated discussions with Cooley-Dickinson hospital to explore a joint venture in MRI/fMRI use. These discussions have been remarkably productive and have resulted in a tentative plan for the hospital to purchase a new 1.5 Tesla magnet to be installed at their University Drive facility in Amherst starting as early as January, 2007. Smith and 5-College researchers will have full access to the magnet at least one day each week on a fee per hour basis. We do not know what the actual fee will be, but similar facilities typically charge from between \$400 - \$500 per hour for access.

The purpose of the current initiative, which will actively "promote a culture of research, inquiry, and discovery", is to obtain a commitment from the College to support this endeavor and to flag the potential costs. Most particularly, this effort will require an initial commitment of perhaps \$50,000 to help outfit the magnet so that it will be able to perform "functional" scans. More importantly, we will require an undetermined amount of seed money to obtain training for interested researchers and their students and then to conduct their initial research studies. If we can assemble a sufficient group of researchers to approach NSF for support of a 3.0 Tesla upgrade, we are likely to face a funding shortfall of nearly one million dollars. Smith, of course, is not alone in this pursuit. UMASS is actively supporting the project, and will likely make major contributions. Researchers and chairs at Mt. Holyoke and Hampshire are also actively pursuing support.

Beyond the clear research and curricular benefits of this pursuit, the project has laid the groundwork for what might be a fruitful cooperative venture between the colleges and Cooley-Dickinson Hospital. Hospital officials are excited about the prospects of the shared use of the magnet beyond the sharing of costs and have expressed interest in exploring ways that hospital patients, staff, and physicians might profit from this new relationship with the colleges.