THE UTILIZATION OF RESEARCH EQUIPMENT AND SPACE IN THE STATE UNIVERSITY SYSTEM

SUMMARY REPORT

Board of Governors
Research & Economic Development Committee

2007

Research Equipment and Space Utilization in the State University System

Overview

Research that occurs in a university setting has dramatically increased in recent years, in both volume and method. The State University System Vice Presidents for Research were queried in June 2007 regarding the utilization and sharing of research equipment and research laboratories in response to questions expressed by the Board of Governors Research and Economic Development Committee. Information was requested regarding specific policies and procedures that are in place at the universities for the sharing of research laboratories and research equipment among faculty at the university and with faculty at other institutions.

Survey Findings

All eleven state universities reported that there is regular and routine sharing of research laboratories and equipment among faculty and among institutions, although no explicit written policies exist. Examples are provided below.

Florida Atlantic University reports that resource sharing regularly occurs and is handled on an individual, case-by-case basis. While noting that cutting-edge research requires cutting-edge equipment and facilities, the wide geographic coverage of the university's campuses often make the sharing of equipment among centers and departments not feasible. FAU does actively discourage duplication and has developed several user facilities to share and recover costs for particularly large and expensive equipment.

Florida International University identified several instances of laboratory and equipment sharing in departments such as Physics, Chemistry, Biology, and Engineering. This utilization focuses on the university's core laboratories and includes activities by researchers and students from other institutions, as well as FIU researchers using laboratories and equipment from other institutions. There are also several NSF grants in Physics and Engineering that have this same reciprocal sharing. Department Chairs and the Office of Research sign off on a required Internal Clearance Form, which contains information on laboratory usage.

At **Florida State University**, research lab space is assigned to individuals by departments and programs on a need basis. Sharing of space occurs as the result of natural research collaborations that occur between principal investigators. Collaboration between researchers not at one's home institution is now a common method of conducting research in a global and technologically advanced environment. The increased cost of scientific equipment and its

maintenance means that most research units maintain core facilities which house big ticket items of equipment not typically found in the individual laboratories of principal investigators. Core facilities are available for use by all faculty, students and postdoctoral fellows, regardless of unit affiliation. The use of these facilities is governed by a Program Advisory Committee whose task it is to set priorities for their use based on scientific merit.

As a primary example, the FSU National High Magnetic Field Laboratory (NHMFL) is chartered by the US Government, has been designated by the National Science Foundation as a national user facility, and is open to all qualified experimenters. As such, external users (800 per year) visit the NHMFL to conduct research in world-class facilities. Formal policies for the acceptance of research inquiries are in place and the Program Advisory Committee is used to select experiments to be run.

New College of Florida reports that research space is extremely limited and that most all laboratory space is utilized for instructional purposes or independent faculty research. The Chair of the Natural Science Division approves all requests for use from external entities.

The **University of Central Florida** Office of Research and Commercialization encourages specific practices among researchers, including shared space and shared equipment. Researchers are encouraged to conduct an equipment inventory search prior to submitting proposals to minimize the duplication of equipment.

The **University of Florida** has approximately 160 approved Centers, Institutes and Bureaus that have been established for the purposes of research and/or education. The sharing of resources (e.g., equipment, labs, etc.) and collaboration is promoted among all centers across departmental and college boundaries. The University has won awards from sponsors like the National Institute of Health and the National Science Foundation that are specifically designed for shared instrumentation.

Each UF college or unit is responsible for access to its facilities and, in practice, often shares with faculty from other units. Further, many units provide access to their capabilities to other universities and external organizations. For example, the Biotechnology Development Incubator provides access to laboratory space to start-up companies, and the Interdisciplinary Center for Biotechnology Research provides laboratory equipment and services to all universities in the state and to other universities at reasonable cost (see below). The Major Analytical Instrumentation Center provides access to modern expensive scientific instruments for researchers at the University and outside entities, and the High

Performance Computing Center provides computational access to researchers both within and outside of the University.

Laboratory assignments at the **University of South Florida** are centered in the departments with oversight by the colleges in order to maximize the use of very limited space. The University reports that most research laboratories are overtaxed and cannot accommodate additional use. Specifically, when USF provides matching funds on a major equipment grant, there is the understanding of both the sponsoring agency and the principal investigators that the equipment will be made available to other USF researchers. USF also has research support services for all faculty that include NMR, electron microscopy, machine shops, and computer laboratories, on a fee-for-service basis.

Formal agreements with hospital affiliates and other institutions also exist that promote collaboration. These memos of understanding include guidelines for services, associated fees, liability assignment, and other specific terms. Additionally, fee structures are in place at USF that allow researchers at other state universities access to instrumentation facilities as a reduced cost.

Testimony from SUS Vice Presidents for Research

The State University System Vice Presidents for Research convened as a group on this topic in November 2007. The Vice Presidents verified that major research universities operate and maintain a wide variety of research equipment and space. At most universities, there are core research facilities that are available for use by all faculty and students, regardless of department or college. Many laboratories in the SUS are national and global resources that continue to evolve, and are not solely university or state facilities.

The Vice Presidents reported that a research initiative rarely consists of a single equipment purchase, and often involves the establishment of a full laboratory, with equipment and staffing, that is implemented through a variety of funding sources. At a number of state universities, equipment and space utilization is determined by a university-wide committee of faculty and administrators that sets priorities for usage. Prior to major equipment purchases, universities conduct an internal review to determine need and utility, and there is always an expectation of collaboration within the university research community.

There are research instruments and space that are routinely and easily utilized by researchers within the university and across the SUS and beyond. Additionally, there are laboratories and equipment that are highly technical and require specialized, trained staff and materials to support their use. In this case, sharing and collaboration of equipment and space must be well-planned, narrowly focused, and cost-effective.

A number of state universities maintain web sites that list specialized equipment in college, department, and faculty laboratories. Such facilities are often in the charge of individual faculty and are purchased with contract and grant funds or faculty startup funds. Faculty members are often willing to either share such equipment or make some specialized measurements with the equipment as a courtesy to their colleagues. Often times, a direct E-mail from an investigator to colleagues that seeks information on research equipment availability produces quick and detailed responses from the research community, both within the SUS and beyond.

The Vice Presidents provided examples below of various research equipment and utility:

Materials Characterization Facility
The University of Central Florida Materials Characterization Facility (MCF) in the Advanced Materials Processing and Analysis Center is a "user facility" that is available to all university faculty, faculty at other universities, and for commercial users. This facility is used mostly by "others", i.e., people other then the faculty that oversee its operation. The MCF has a formal fee structure (different fees for university and commercial users) and operates more or less like an auxiliary enterprise of the University. This facility is marketed by the University and special classes are offered to provide instruction on usage. Details for this facility can be found at:
http://pegasus.cc.ucf.edu/%7Eampac/userfac.html.

NanoScience Technology Center
The NanoScience Technology Center at the University of Central Florida is an example of a "shared facility." At this Center, there is a broad range of specialized instruments and facilities that is set up for use by a department, center or institute. Often, faculty pool resources to develop these facilities. Some instruments are partially underwritten by the unit and they are available for use by all members of the unit (department, center, institute, etc.) Faculty in other units may gain access to these facilities by the individual or group charged with the management of the facilities. There may or may not be a cost to users. Details may be found at this web site:
http://www.nanoscience.ucf.edu/equipment_index.php.

College of Optics and Photonics
The University of Central Florida College of Optics and Photonics provides highly specialized research laboratories, as an example of a facility that may be unique to Florida and/or the world. See the web site:
http://nlo.optics.ucf.edu/Labs/nlo_new_labs.htm . The highly specialized laser systems and other instruments in the College's five laboratories are under

constant development and refinement and require a team of highly trained experts to operate and to analyze the data taken with the equipment. These facilities are primarily utilized via a formal collaboration among research colleagues, or through a research contract with an industry or agency sponsor.

Interdisciplinary Center for Biotechnology Research

The University of Florida operates the Interdisciplinary Center for Biotechnology Research (ICBR) to support life sciences research programs throughout the State. The Center provides a centrally operated core facility with leading edge biological, analytical, and molecular services that enhances research and teaching in cost effective ways. The ICBR research laboratories operate in four scientific divisions: proteomics, genomics, bioinformatics, and cellomics that promote a synergy across all of the biotechnologies. Numerous services are offered at the labs that smaller research units and individual researchers would be unable to purchase, service, staff, and maintain, like: Hybridoma Laboratory capabilities, mass spectrometers for highly specialized analysis, and 454 genome sequencers that are a part of a major metagenomics initiative at the Center.

The ICBR has reaffirmed that the large capital expense and the staff needed to build capacity for these research activities are difficult to justify for an individual investigator or even a single academic department. The Center annually serves over 700 investigators on the UF campus and 250 researchers from other Florida universities and universities around the world, as well as investigators in federal research labs, non-profit institutions, and private companies. The ICBR is able to provide a practical and cost-effective structure to support research. More details can be found at: http://www.biotech.ufl.edu/

Electron Microscope

Florida State University, as many universities, maintains a scanning electron microscope. This microscope is a common use facility that is used to characterize materials. The instrument is operated and maintained by a university technician and is open to anyone who has a need for a detailed analysis of a material sample. There is a fixed charge for usage that pays for the materials used in the running of the instrument and the technician's salary. Examples of such instruments can be found at the website for FSU's MarTech Analytic and Fabrication Facilities: http://www.martech.fsu.edu/Facilities/

Advanced Magnetic Resonance Imaging and Spectroscopy Facility

The University of Florida's Advanced Magnetic Resonance Imaging and Spectroscopy Facility (AMRIS) provides state-of-the-art instrumentation for biological imaging and chemical analysis to hundreds of users at UF, the State of Florida, the U.S., and the world. The AMRIS has seven specialized magnetic resonance imaging (MRI) and nuclear magnetic resonance (NMR) instruments for studies in key areas of biological and biomedical science. The AMRIS is part

of the National High Magnetic Field Laboratory and is responsible for providing an external user program in biological magnetic resonance to qualified users throughout the world. http://www.mbi.ufl.edu/facilities/amris/

Most of the AMRIS instruments are too expensive, too large, and in many cases, too technical for either individual investigators or even academic departments to maintain. Technical staff members assist users in data collection, processing, and analysis. In many cases, expert faculty members will also form collaborations with users to assist them with technically challenging problems. The AMRIS has served many investigators throughout Florida including Scripps-Fl., University of Miami, USF, UCF, FAU, FSU, Smithsonian Marine Station, Invivo Corp., and Oragenics.

Nuclear Accelerator Laboratory

Florida State University maintains a Nuclear Accelerator Laboratory, a highly specialized system that has been developed over the past 40 years with state and federal funds, including the National Science Foundation. The laboratory is available for any qualified experimenter, but requires a team to carry out experiments due to the many components that are required for its operation. This laboratory has a number of long-time users, and users of the facilities typically operate in collaboration with local faculty. The website for this facility is: http://www.physics.fsu.edu/nuclear/nuclear-foxlab.html

Conclusions

- The research enterprise remains a priority commitment in the State University System.
- Due to continuing technological advances, research collaboration is global in nature, and does not occur solely within a university or within the State University System.
- Increased collaboration on research projects has been driven by the need to bring together experts with many different areas of expertise to solve problems, in addition to the increased cost of frontier equipment.
- Researchers most often function within their specific discipline, on similar projects. Accordingly, professional communication is open and ongoing, as researchers are continually informed of the specific equipment that is available at their university, within the SUS, and nationally.
- Investigators often consult the professional literature within their discipline prior to a major research initiative, in order to learn of research equipment and space availability within the SUS and nationally.
- State universities report that sharing and collaboration is a research reality among faculty, departments, and colleges, primarily due to the

inadequate amount of research space. Many research laboratories in the SUS are in use seven days a week, 24 hours a day.

- Much research in the SUS is guided by federal grants that involve reciprocal sharing among the research team. A research team often consists of faculty within a discipline and involves a number of partnering institutions.
- Many of the research universities have formal agreements with commercial users and other external entities for research partnerships.
- Collaboration is now the way research is carried out in the State University System and, although no formal policies exist at the state universities, core research facilities at each of the universities are used extensively by state university, national and international researchers.