Overview:

The Molecular and Biological Imaging Center

Marshall University’s Imaging Core Research User Facility

Statement of Purpose:

The purpose of the Imaging Core User Facility is to provide the instrumentation infrastructure and learning environment required to support the research and teaching programs at Marshall. Working within the constraints of grant and user fee support, the Core seeks to recognize both current user hardware and training needs as well as emerging needs which are on the horizon. Due to the dynamic nature of research and the funding environment, early and constant feedback from users is a vital component of achieving this mission.

Statement of Philosophy:

Imaging tools are all in some ways related to photography. Although one can be taught how to snap a photo on any system, elements of an art remain components of this pursuit, and mastery and style develop and evolve in the user with practice and experience.

There are several pathways into using the Core facility, as described below.

History and Future:

Each of the imaging systems have been acquired through specific research grants. Although the systems currently reside in a variety of environments, selected systems will be moved to a central Imaging Core User Facility in the Byrd Biotechnology Research Center in early 2007.

How can the Core Assist me in my Research?

As soon as you recognize that imaging should be a component of your research, you should arrange a discussion with the Core Director to define the use of the core which makes most efficient and effective use of your resources.

There are three major ways in which researchers can interact with the Core Facility:

1. Technician Assisted User. There are situations where it is impractical for a faculty member or a student
to become a certified user. Some people just need a nice image or two of their samples, and we can help them with this. Examples include gaining preliminary data for a proposal, gaining preliminary data to determine the suitability of a particular imaging system for a particular project, or imaging studies which provide closure for a project which will not be repeated. Short term use of this mechanism (total of 4 or less hours per year) is encouraged, and has been found useful for assisting groups in defining new research directions.

2. User in training. Some groups have long term imaging needs. Since we lack the staff to conduct experiments for researchers, we expect researchers to work independently after completing a training sequence. In cases where agreement has been reached that imaging is a component of a research project or program, students begin the training program described in the next section.

3. Certified Users. These are fully independent academic users who have taken either a full semester course in a technique, or have completed a selected training program as described below. Such users are free to schedule instrument time on the imaging system they are certified to use, as described below.

4. Other modes. Arrangements can be made for users whose requirements do not fit in the descriptions 1 – 3 above.

What is the Process to become a Certified User?

While we do offer experimental assistance at an increased rate, these services are intended only for short-term arrangements. The majority of users are expected to become Certified Users.

Becoming a Certified User is a two stage process, initiated by contacting David Neff, our Imaging Core Technician, by email at dneff@marshall.edu.  

1. The user, most normally a graduate or undergraduate student with a long term project, arranges to meet with the Core Technician for a series of introductory sessions on the particular imaging system. There are manifold purposes for such an introduction. There are elements of concern for personal safety and for proper operation of the system to avoid operator induced damage to the system. Also of importance, however, is an understanding of operational variables which may produce artifacts in data, some of which may be obvious, many of which are not intrinsically obvious. Such an in depth introduction is not required in order to operate an imaging system, but is demanded by the instructional purpose of the Core, to develop the critical intellect in a developing scientist. As an example, alignment of a confocal system is a very technical operation, and is never performed by users except during training. In training, however, the user is introduced to the artifacts which can be introduced into so called “co-localization” experiments through a variety of factors, including, but not limited to alignment errors. The training process can be completed in less than two days (some homework reading is required) for the motivated learner. Students are welcome to bring samples of interest to the training sessions, so that the introduction to imaging can be made extremely relevant to their research. Upon successful
Completion of a comprehension test, students are termed Certified for use of a particular instrument.

2. The second step toward independent instrument use is then signing up for instrument time and filling out the associated account billing forms. It is strongly suggested that the novice user schedule instrument time which coincides with David’s schedule, so that students may readily be afforded technical assistance. Although certainly assistance from other students in the early days of your imaging experience is valuable, it is important that all users obtain Certification, and that technical questions should be directed to David or to the Core Director, if only to obtain a “second opinion”. It is also suggested that experimental design and data interpretation may benefit from early discussions involving the PI, the student and either the Core Director or the technician.

**What is the Process for Scheduling Time on an Instrument?**

The only instrument currently requiring a complex signup procedure is the Confocal Microscope. Due to the investments from the Physiology and Biology Departments, as well as the Norton and the COBRE Groups, users from these groups are given priority for signups, and are allowed to sign up for a maximum of 4 hours per person, two weeks in advance. Any researcher can sign up one week in advance. In general this arrangement has not caused problems since most facility users are flexible enough that scheduling conflicts are accommodated regardless of users’ affiliations. Please also note that special arrangements can be made for experiments that must be scheduled further in advance, such as with living tissues and cells. Longer experimental times may also be justified.

Users will be billed based on the hours they have reserved on the Sign-Up Page and the logbook records. Once signed, users are financially responsible for the assigned time and may cancel their reservation no later than 48 hours after making the reservation. After this time, users are released from their obligation only if they can find a replacement user. In addition, it is mandatory for all users to record their time of usage in the logbooks provided for each system. The fee structure is available upon request.

**Data Management**

In order to keep the imaging equipment performing well, users are not permitted to permanently store image data on the microscope computers. Image files will be removed from these systems periodically.

Images collected on the Bio-Rad confocal microscope can be viewed using free software Confocal Assistant which may be obtained from the website (HYPERLINK “http://www.nephrology.iupui.edu/imaging/software.htm” “http://nephrology.iupui.edu/imaging/software.htm”).

**Responsibilities of All Users of the Facility**

Keep excess oil off of the objectives.
Keep the microscope areas clean and removing all belongings after each session.
If you schedule to be the first or last scope user of the day, make sure that you know the procedure to startup or
shutdown the system.
Any observed problems with system performance should be reported to Center Staff. (All systems are supported with service contracts)

Acknowledgment of the Center

Published data obtained using facility equipment should include an acknowledgement of “The Marshall University Molecular and Biological Imaging Center”. Particular imaging assistance or experimental design assistance can be acknowledged by name or co-authorship, depending upon the level of collaborative assistance provided.

Text descriptions of the Core Facility are available for researchers writing descriptions of the Facility in grant applications, and Dr. Norton can provide letters of consultation, collaboration or support, as needed. The number of publications and grant applications involving the Core Facility are used to demonstrate productivity of the core in justifications to the entities that subsidize the Core Facility. We ask that users supply us with an updated list of publications and grant applications using the Core Facility every 6 months (January 10 and July 10th) in order to renew each laboratory’s access to the Core.

Communication

Facility news, including new equipment and personnel, significant changes or updates, and problems with equipment or user decorum will be posted on the facility website.

Core Director:

Dr. Norton is the Director of the Imaging Core User Facility at Marshall. Questions, complaints and/or comments can be directed to him via any of the avenues listed below:

Dr. Michael L. Norton
Department of Chemistry
1 John Marshall Drive
Marshall University
phone: 304-696-6627
fax: 304-696-3243
email: Norton@marshall.edu
web: www.Atomcrafters.com