

RRC REPORTER

RRC Update, Spring 2000

The Research Resources Center has experienced a number of administrative adjustments during FY 2000. The six-person Research Resources Center Executive Advisory Panel (EAP), consisting of faculty members from diverse campus science units, has met monthly. They are considering the five-year plans submitted by RRC facility directors; they will advise the Associate Vice Chancellor for Research regarding the overall long-term direction of the RRC. In the meantime, smaller individual advisory committees have been formed to advise the EAP regarding issues and directions pertaining to their individual RRC facility. There are committees for the Protein Lab, DNA Lab, Transgenic Production Service, Confocal Lab, Electron Microscopy Service, NMR service and the Flow Cytometry services. These committees are made up of funded faculty members who are also users of the facility which they advise. They will offer guidance with respect to ongoing activities and current and future needs of their respective facility with the intent being to assure that decisions about instrumentation and laboratory practices are made with faculty interests in mind.

A new finance officer, Marion Ostrega, has been hired to analyze the RRC's income and expenditure policies and review and update its accounting practices. Marion started work in January.

Growth

The RRC continues to grow at a considerable pace. In FY2000 it had served 358 investigators by the end of March (nine months of operation), the same number it served in all of FY1999. A small part of this growth is attributable to the addition of the Wavelength Dispersive Spectroscopy (east side), Raman Spectroscopy (east side) and Transgenic Mouse Production (west side) facilities to the RRC during FY2000. But the largest contributor to the growth in FY2000 came from facilities that were part of the RRC in previous years. After nine months of operation, electron microscopy on the east side of campus was operating at a rate 23 percent higher than it was the previous year. The Protein facility and the DNA facility, both on the west side had almost doubled last year's service through March, as had NMR on the west

side. The Confocal facility is operating considerably above normal capacity, 3.4 additional hours per day on average than in FY1999. The Scientific Computing service, whose primary duty is to serve internal (RRC) needs, has seen a 40 percent increase in requests for help from individuals outside the RRC. Even the Instrument Shop, whose supply of jobs is usually fairly constant (and high), has increased its workload by five percent this year.

Confocal Microscopy

In an attempt to meet the strong demand for time on the LSM510 confocal microscope, the RRC has requisitioned a new PASCAL microscope. Assuming it receives the necessary approval from the Board of Trustees at the May 31 meeting, the PASCAL will be ordered to arrive in sync with the renovation of room E12, MSB, probably in the autumn. This project will permit the location of both confocal scopes in the same area, away from its present space in the Electron Microscopy suite. The PASCAL is the "little brother" of the LSM510. It will require no extra training to use for those who already know how to operate the LSM510, and will have parts interchangeable with the 510. It will be lacking the UV laser and it is anticipated that many of the investigators who presently use the LSM510, but who don't use the UV capability, will be able to migrate readily to the PASCAL. The PASCAL can be upgraded to a full-fledged 510 in the future.

A live cell system from Bioprotech, Inc. was purchased in FY 2000, and has been applied to several projects (e.g., a study of the distribution and recycling of G protein in cells, the detection of changes in mitochondrial membrane potential during the early stages of apoptosis in macrophages, the measurement of the pH of a prostate cancer cell line).

An automatic microinjection system is in demand and will be considered in FY2001, funds permitting.

DNA Laboratory

In all aspects the DNA Core facility has grown greatly during the past year. The facility handled DNA samples for sequencing from over 100 principal investigators and

275 users within UIC during the past year. Since July 1999, the facility added a new full time person, Alvin Ayala (left) to its staff. In addition to providing DNA sequencing services the facility continues to provide enzymes and other reagents, including specialized columns for DNA purification at reduced prices to aid the investigators in their DNA sequencing efforts. Also, the facility acts as a central location for processing orders for DNA primers from IDT Inc. that provides extremely competitive prices for oligonucleotides. In order to handle the large demand for sequencing services, a second ABI 377 sequencing instrument and a robocycler for PCR have been added. In addition, the facility has introduced a new gel chemistry and the 64-lane format in the sequencing gels to obtain higher quality and long range reading capacity of the sequences. The service has reduced its prices for certain sequencing services offered to the faculty at UIC.



Dr. Amittha Wickrema, Director of the DNA lab, has begun a significant quality control program to reduce problems with sequencing reactions, and he plans to develop a technical manual to assist investigators in the preparation of high quality templates for sequencing. In the coming year the facility will attempt to reduce the turn-around time, a goal that everyone supports.

The RRC has been fortunate to be allowed to use space belonging to the Department of Hematology/Oncology for the DNA lab. It is important for the Hem/Onc department to have its space returned to it. Thus, finding new space in the Molecular Biology Research Building for the DNA lab is of paramount importance and high on the RRC's agenda. The use of the lab, its activities and its personnel will require that the lab be doubled in size over its present space. Finally, since Dr. Wickrema has been kind enough to loan lab equipment that belongs to his laboratory, in FY2001 we will be purchasing a number of lab equipment items to replace those of Dr. Wickrema.

In response to a general lack of appreciation of the intricacies of the Genetics Computer Group (GCG) software that is available to UIC investigators through the RRC Scientific Computer Service, in mid June Dr. Wickrema and Dr. Randy Jaffe, Department of Physiology and Biophysics, will attend a workshop in Madison, WI, on the GCG "Wisconsin Package" of DNA software tools. When they return they will make their expertise available to users of this popular software. An announcement will be forthcoming regarding a seminar that Dr. Jaffe will present on this subject.

Electron Microscopy Service

John Roth (below) joined the EM lab on the east campus in February. John has spent many years at McCrone Associates in Westmont carrying out contract research and technical support for commercial organizations using TEM, SEM, XRD and Mass Spectroscopy. His main responsibilities in EMS-E will be Raman spectroscopy, materials TEM specimen preparation and the microscopes.



The Board of Trustees has approved the purchase of a new microscope with a delivery scheduled for early fall this year. It is a Hitachi S-3000N Low Vacuum SEM, and will be located in the EM suite of rooms on the west side. Details of this instrument are posted on the notice boards in EMS-West and at the main entrance of RRC-East. The EMS staff will be pleased to answer any questions you have on our new acquisition.

The JEOL JXA-733 electron microprobe is up and operational on the east campus. Dr. Art Anderson manages it. One useful feature of this instrument is the ability to look at much larger specimens than is possible in our other SEMs. Low to medium resolution SEM service will be provided by the microprobe during the 4 to 6 weeks anticipated to remove the Jeol 35C scope on the west side, install the new S-3000N and train staff in its use. During this period we will charge existing qualified 35C users \$30/hr for assisted help on the JXA-733 (i.e., the same as unassisted use of the 35C). We shall try to give everyone as much notice as possible about the dates for the switch off of the 35C.

We have received heating and cooling stages from Gatan for the JEOL JEM-2010F and JEOL-JEM 3010. The cooling stage is liquid nitrogen cooled and operates as low as -170 deg C. The heating stage will provide as much as 1000 deg C. Nigel Browning (Dept of Physics) purchased both of these stages.

Installation of keypad locks on the individual microscope lab doors has been completed in EMS-West. Installation of an I-Card card reader at the hallway entrance to the EM suite also has been ordered. When the installation is completed, qualified users will have access to EMS-W 24hrs a day, 365 days a year. EMS staff will give qualified users the codes for the instruments they will be using off-hours.

Scheduling sheets for the microscopes on the East Side have been available on the doors of the labs for some time. This has been extended to all the microscopes on

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the West side. The scheduling sheets are located outside the EMS-West office, on the notice board. Bookings can be made by phoning Kristina or Linda (6-7603) or, in the case of qualified users, directly on the sheets.

Plans are being finalized for the refurbishment of EMS-West. Work will not affect any of the rooms that contain working microscopes. Renovation will be limited to installation of a door from the SPM room (E5E) into the Sectioning Room (E5B) to allow us to move the microtomes into E5E. A new darkroom will be set up in the current 100S room (E5F) which, when in use, will allow us to turn off the water to the unreliable leaking pipes in the current darkroom. We also hope to be able to install new lab benches in the current sectioning room for the prep equipment from E5C; however, this may have to wait until next year.

Flow Cytometry Service

The "Flow Lab" continues to operate two sorting flow cytometers (Coulter EPICS Elite ESP and EPICS 751) for instruction, data acquisition and full service. Since our newer instrument, the EPICS Elite, will be five years old and the older EPICS 753 is no longer supported by Coulter, we were pleased to have been asked to become party to an instrumentation grant for a new cytometer submitted by Dr. B. Prabhakar, Head, Department of Microbiology and Immunology, and his colleagues.

In the past sorting comprised only 10-12% of the total instrument hours (analysis the remainder). FY1998 and FY1999, this demand for sorting jumped to 25%, and so far in FY2000 the percentage of sort hours has increased further, to almost 50%. Most of the sorts involve separating transfected cells from untransfected tissue culture cells.

Several labs have had a need recently for a large number of sorted cells. The lab was able to accommodate some of these users by the acquisition in FY2000 of a new magnetic bead cell separator (AutoMACS) with which one can enrich the desired cells before sorting them on the flow cytometer. Depending on the rarity of the desired cell, this prepurification decreases sorting time from 50% to 85%. Unfortunately, the AutoMACS does not work for every sorting situation.

We anticipate that requests for fast sorting, four-way sorting and mixed-mode sorting (sort for high yield and high purity simultaneously) will continue to increase as researchers need more pure cells for genomic microarrays, expression arrays and other assays.

Mass Spectrometry Service

Soobong Park finished work with the RRC Mass Spec lab recently and is putting finishing touches on his thesis. We thank him for his excellent work and wish him well in his new job in South Korea. Dr. John (Art) Anderson has taken over responsibility for the Finnigan LCQ electrospray ion trap. Dr. Stuart Scheppele is running samples on the Kratos Concept high-resolution mass spectrometer. In addition, Art is providing mass spec support from the University of Minnesota. Contact Art (355-2124 or art@uic.edu) for details and submission of samples. A weekly status report has been initiated to provide timely information regarding instrument availability and sample backlog.

Microarray Service

This new service is still in gestation but ought to be born over the summer and fall. It is headed by Carol Westbrook, MD, of the Department of Hematology/Oncology. Personnel plans for the first year call for a full-time technician and a half-time postdoctoral level senior person who has experience in molecular biology. Major equipment has already been ordered. It includes a colony picker (BioRobotics), high-throughput PCR (MWG Biotech), micro/macro arrayer (BioRobotics) and an array reader (GSI Lumonics). It is anticipated that the lab will lease the Unigene human cDNA clone set and others as needed. Necessary ancillary equipment will be acquired as soon as possible.

This facility will be situated within the space belonging to Bioengineering on the west campus, in close proximity to its bioinformatics group.

NMR Spectroscopy

A new imaging/microscopy probe has arrived for the Bruker DRX 500 MHz NMR in RRC-West. Installation of this new equipment was delayed by damage during shipment, but replacements for the damaged parts have arrived. Installation of this equipment has begun.

An NMR Users' Committee has been established and held its first meeting. The first need under consideration is how to improve access to the Bruker DRX 500 in RRC-West for long-term experiments while also providing improved walk-up service for "routine" analyses.

Protein Research Laboratory

In FY 2000 the PRL grew to meet the demand for its basic services and to add new services. With the help of a new Symphony Multiple Peptide Synthesizer from Rainin (Protein Technology Inc), the lab increased its capacity to perform basic peptide synthesis, and continued to carry out protein sequencing, antibody

productions, amino acid analyses, mass spectrometry of peptides and proteins, 2D SDS-PAGE and primer syntheses. The lab acquired a new HPLC system (HP 1100) early in the year in order to strengthen its protein sequencing and purification services, as well as a PCR machine in preparation for recombinant protein production.



A Graduate Research Assistant, Danlin Cai (left), was recently brought on board, bringing to four the number of staff in the Protein Lab.

Demand also drove the initiation of a monoclonal antibody service to complement the polyclonal service, and a protein crystal screening service. Increased use

of the PRL together with the obvious facts that its present space is limited in size and structurally dismal were decisive in driving a search for new space for the lab. The result is that room E25 MSB is presently being remodeled for the Protein lab and will open for business as the lab's main operational area soon (photo below). It is anticipated that protein services will expand even more in the next few years, and we are hoping for further expansion of the space for the PRL, as funds permit. In the meantime, the old lab, room B50 CSN, will serve as a tissue room for monoclonal antibody and recombinant protein work.



Three long lab benches with extensive storage space, shown here waiting for move-in day, are the most obvious features of the newly renovated space that will enable expansion of the Protein Lab.

The Transgenic Production Service

This service began operation as an RRC unit in January, 2000. It was previously a service of the Cancer Center. It provides a resource for members of the UIC

community seeking to generate transgenic and gene-targeted (knockout) mice. Its services include (1) pronuclear microinjection of DNA construct (transgene) into mouse zygotes for the production of transgenic founders, (2) injection of targeted ES cell lines into blastocysts to produce chimeric mice, and (3) re-derivation by embryo transfer to remove murine pathogens from investigators' existing mouse strains. Investigators developing grant proposals that include the use of engineered animals are invited to contact the TPS Director, Roberta Franks (6-4971), for help with experimental design and for assistance in preparing proposed budgets for transgenic/knockout production and animal husbandry. The lab will be happy to provide you with a letter stating its readiness to make transgenic and/or chimeric mice for submission to funding agencies. For knockout projects, consultation is also available to assist you in the generation of your targeted ES cell lines. The TPS is located within a barrier facility (managed by the veterinary staff of the BRL) in the Molecular Biology Research Building (MBRB), 900 S. Ashland, room 2070.

X-Ray Diffraction

The Molecular Structure Corp/Bruker x-ray diffraction equipment for macromolecules has been moved from Room E-25 MSB to a new laboratory in Room 1111 MBRB. Reinstallation had just been completed when this report was prepared.

Plans for the future

In the fall a committee will begin a nationwide search for an individual to direct the operation of the RRC's campus-wide research support service functions. This individual will report to the Associate Vice Chancellor for Research Resources and will be supported internally by the appropriate administrative and financial staff. Given the increased demand for RRC services that fall under the general rubric of "biotechnology," the search will be targeting individuals with knowledge and experience in this area.

The Survey

On behalf of the RRCEAP we would like to thank those who responded to the user survey. Every comment that was received has been reviewed with the appropriate facility director. Some of you will be contacted to obtain additional input concerning your comments.

Please visit the RRC web page (www.rrc.uic.edu) for information about the staff, facility services, prices and news updates. If you don't find what you need on the web site, call the appropriate lab service director or Charlie Brown (east-side RRC, charlieb@uic.edu); or Gordon Humphrey (west-side RRC, gordo@uic.edu).