✓ 2006.0075

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Student Technology Fee
Funding Request From
Surplus Money Fiscal Year 2005-06
Northwestern State University of Louisiana

Prepared by: Zafer Hatahet For: Biological Sciences

College: Science and Technology Campus: Natchitoches Department: Biological Sciences

Where will requested equipment be located/installed/housed: Bldg. Bienvenu Room 226
Are property policies and procedures in place by the department for equipment requested. Yes
Delivery to the Student Technology office located in Watson Library, Room 113. Date: 04/05/06

1. Describe target audience

   This grant targets undergraduate students enrolled in many Biology Laboratory courses. Primary targets will BIOL4201 (Advanced Molecular Biology), BIOL3301 (Molecular Biology), MBIO4121 (Pathogenic Microbiology), MBIO4191 (Immunology and Serology), MBIO4211 (Applied Microbiology), ZOOL4211 (Comparative Vertebrate Physiology), and ZOOL3171 (Histology). Chemistry students enrolled in CHEM4041 would also be targeted.

2. Describe project/initiative for which you are requesting funds.

   Purchase of a Laser-based Molecular Imaging device. This is a multipurpose instrument that is critical for conducting advanced experiments in most fields of biological sciences and biochemistry. The instrument allows high resolution detection and analysis of biological samples labeled radioactively, fluorescently or colorimetrically. Currently, most of the 3000 and 4000 level "advanced" labs taught at NSU are significantly lacking in "state of the art" techniques due to absence of a molecular imager.

3. State measurable objectives that will be used to determine the impact/effectiveness of the project.
   a. The courses listed in item 1 will be "updated" to include more "state of the art" experiments. Currently, many of the laboratories taught at NSU use 1970s and 1980s technology primarily due to lack of modern instruments.
   b. Increase students' interest in the theoretical and applied aspects of the course material. This is best achieved by providing the maximum possible "hands on" experience in the laboratories.
   c. Provide NSU graduates with a strong set of technical skills necessary to pursue postgraduate education, careers in teaching, or careers in the biotechnology industry.

4. Indicate how each objective will be evaluated.
   a. The syllabus for each of the courses listed in item 1 will be reviewed to see if new "state of the art" experiments have been added, and/or existing experiments have been modified to take advantage of the Molecular Imager.
   b. Review student evaluations of the courses listed in item 1 "before" and "after" installation of the Molecular Imager to gauge its impact on the students' ability to comprehend and "enjoy" the course material.
   c. Survey NSU graduates who enroll in post-graduate programs and determine whether exposure to a Molecular Imager helped them in their post-graduate studies; i.e., did the availability of a molecular imager and the experiments that used it provide them with an advantage in their graduate studies, obtaining a job, etc.

5. Provide a justification for funding the project. Estimate the number of students that will be served per academic year and in what ways. Please indicate also any unique needs of the target group.
   a. As stated in items 1 and 3, this project should significantly improve the quality of instruction of at least eight 3000 and 4000 level courses. In certain cases, e.g., BIOL4021 and MBIO4191, essential experiments are currently not being taught or taught in theory but not in practice due to lack of a molecular imager.
   b. Considering that many of the courses listed in item 1 are required for graduation in the Biological Sciences program, enrollment averages ~ 200 students per year.

6. How will funding of the project advance the University and College/unit technology plan?

   This project will help fulfill at least three NSTEP objectives, namely,
   - *Objective 1: To improve access to technology by students, faculty, and staff at Northwestern State University*. This instrument would allow students and faculty to experience many modern techniques in molecular biology, biotechnology, and biochemistry. Many techniques are currently sorely lacking in the NSU biological sciences curriculum.
   - *Objective 3: To upgrade student technology laboratories with modern technology*. As already mentioned, several laboratories in biological sciences including molecular biology, microbiology, and histology operate on 1970s and 1980s technology. Updating the curriculum to include standard techniques such as Blotting, Microarrays, ELISAs, and EMSAs would require a high resolution molecular imager. No such instrument exists on campus at this time.
   - *Objective 8: To encourage innovation and research.* My lab currently has 4 JOVE students and 4 students enrolled in MBIO4950 (Problems in Microbiology, an independent research course). Similarly, most of my colleagues in the department have ongoing research. Although good progress is being made in our research, lack of a molecular imager has significantly impeded progress.

7. List those individuals who will be responsible for the implementation of the project/initiative and indicate their demonstrated abilities to accomplish the objectives of the project?
   a. I, Zafer Hatahet, will be the person responsible for purchase, installation and upkeep of the instrument. I have purchased two molecular imagers in the past, one in 1994 at the University of Vermont and another in 1999 at the University of Texas Health Center at Tyler. I have extensive experience in its use and maintenance and will be able to provide technical support to other professor who will use it in their courses. I currently teach BIOL3301 and BIOL4021 which would take advantage of this instrument.
   b. Dr. Ahmad Darvish also has prior experience in using a molecular imaging. He currently teaches ZOOL4210.
   c. Dr. Michael Land, currently teaches MBIO4121, MBIO4191, MBIO4211, and ZOOL3171.

8. Describe any personnel (technical or otherwise) required to support the project/initiative.

Other than the faculty members listed in item 7, no further personnel would be needed.

9. Provide a schedule for implementation and evaluation.

a. Implementation.
   i. Purchase. Pending availability of funds, the instruments can be purchased and installed with 3-4 weeks; ideally before September 2006.
   ii. Syllabus update. New experiments will be added and/or existing experiments will be modified as soon as the instrument is available for use. Updates should be implemented no later than the Spring of 2008.

b. Evaluation.
   i. Syllabus evaluations will be performed at the end of each semester in the three academic years following purchase of the instrument.
   ii. Student evaluations will be surveyed for three academic years following update of the course syllabus.
   iii. Surveys of NSU graduates will be performed for three years following graduation of the students who used the instruments in laboratory courses.

10. Estimate the expected life of hardware and software. Explain any anticipated equipment/software upgrades during the next five years.

a. Based on my experience, the hardware should easily last >10 years. In addition, a prepaid maintenance and repair contact will be negotiated with the vendor prior to purchase; i.e., the no extra cost will be needed to keep the instrument for the next 3 years.
b. The software will need updating within 3-5 years, but I will negotiate a prepaid upgrade policy with vendor prior to purchase of the instrument, i.e., we should be able to get free software upgrades for the next 3 years.

11. Explain in detail a plan and policy that will be in place to ensure property security/controls for any equipment received through a Student Tech Fee grant

All equipment in the biology building are housed in secured laboratories which are kept under lock and key all the time. In addition, this instrument is of significant size and weight (approximately 36 in X 36 in X 16 in, and > 100 lb) making difficult to remove from the premises without attracting attention.

12. Attach a detailed budget, including: specs., description, cost, state contract and number, and vendor for each item; cost of outside support personnel; and a description of how the proposal will support University/College/unit resources (i.e., cash match, funds from other sources, or reallocation of existing hardware/software or other equipment.
    a. Specifications. Molecular imager capable of radioactive, fluorescent and colorimetric detection and analysis using laser excitation.
        i. Lasers: 495 nm, 535 nm and 635 nm
        ii. Resolution <50 μm.
        iii. Sample format: must be able to analyze blots, gels, microtiter plates and microscope slides
        iv. Software: must include analysis software.
        v. Phosphor imaging screens must be included
    b. Vendor: BioRad Laboratories, model Molecular Imager FX.
    c. Cost: List price without service contract is $97,000. Recent preliminary negotiation with the vendor has resulted in agreement to lower the price to ~$70,000. From my personal experience with this and other vendors, we should be able to obtain this instrument with 3 year service contract for $70,000 (the last model I purchased in 1999 was list priced at $111,000 including service contract; following negotiation and bidding I was able to purchase it for $67,000 including the service contract on hardware and software).
    d. Cost of outside support personnel: zero.
    e. Other resources: No other resources are currently available to purchase this instrument.

13. Attach a letter of support for the project signed by the requesting unit's Dean, the appropriate Vice President (for non-academic units), or the SGA President from the requesting campus (for student requests).

catalog index

Molecular Imager PharosFX Plus System

Molecular Imager PharosFX System

Molecular Imager VersaDoc Imaging Systems

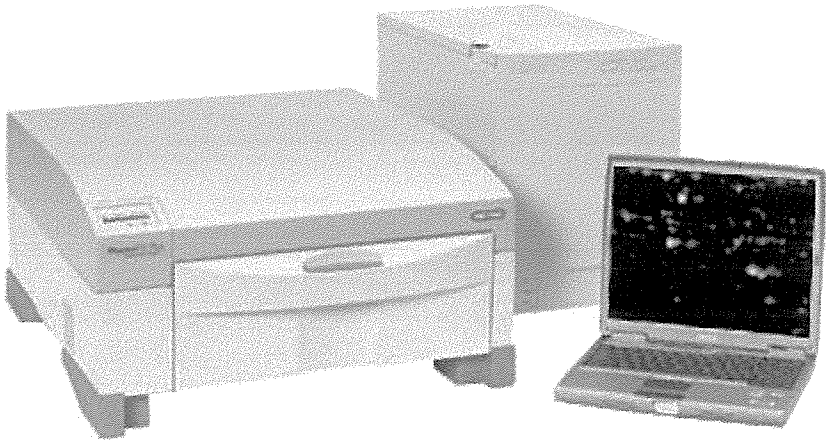
Molecular Imager ChemiDoc XRS System

Molecular Imager Gel Doc XR System

Molecular Imager GS-800 Calibrated Densitometer

Molecular Imager PharosFX Plus System

Click for: | **Ordering Information** | Specifications |

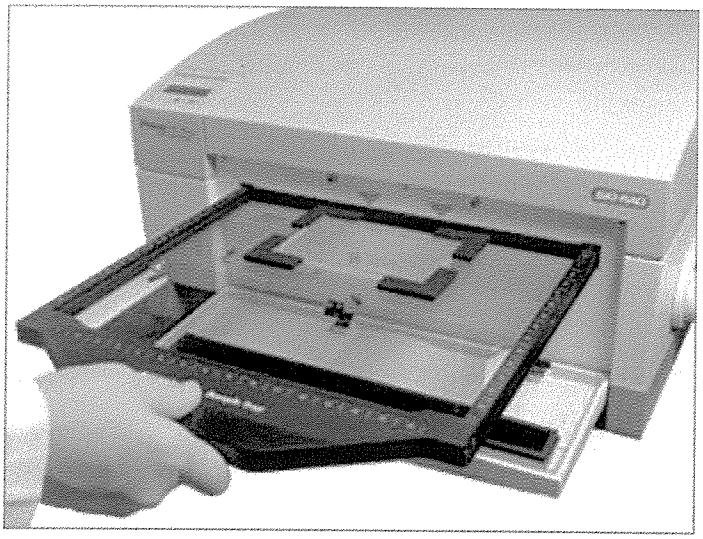


The Molecular Imager PharosFX Plus system is ideal for:

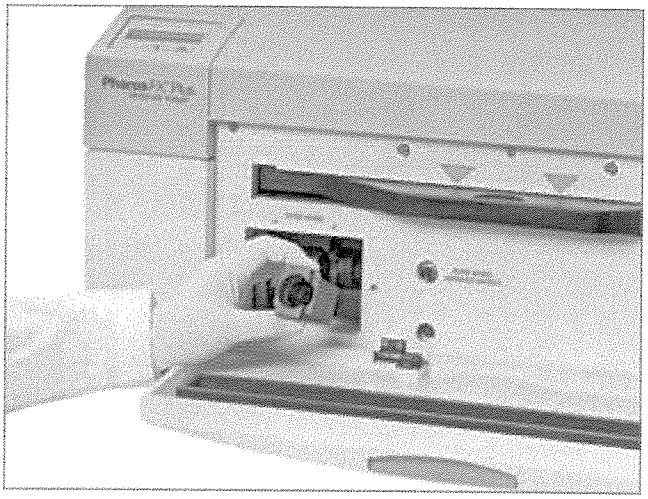
- Multiplex fluorescence and total protein detection
- Storage phosphor detection of radioisotope labels
- Gel documentation for colorimetric stains

This versatile system can be used for the detection and analysis of DNA, RNA, or protein samples in gels, blots, or microplates. The system provides application flexibility and is expandable — unlike other storage phosphor/fluorescent scanning systems. In the application-oriented software, simply select the type of sample being analyzed, and the optimal combination of lasers and filters will be automatically selected.

The PharosFX Plus system provides excellent sensitivity, uniformity, linearity, and dynamic range, ensuring quantitative accuracy. Each system comes complete with Quantity One 1-D acquisition and analysis software to allow rapid quantitation. The PharosFX Plus acquisition module also integrates seamlessly with PDQuest 2-D analysis software, which can be purchased separately.



Sample loading.



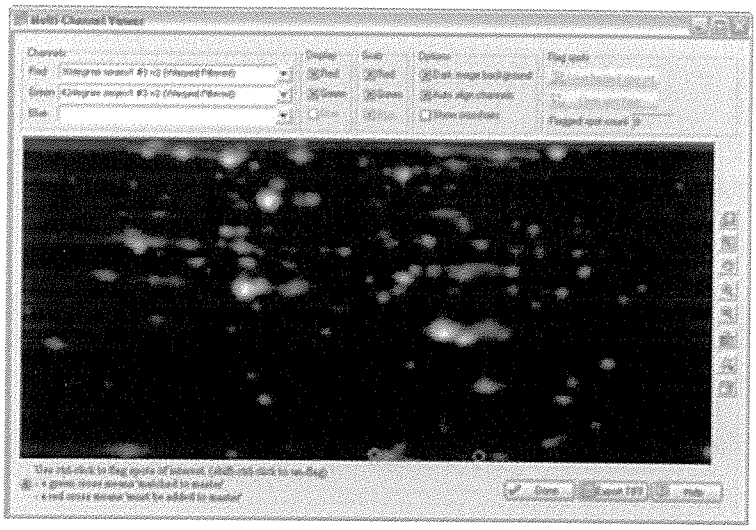
Replacing emission filters.

For gel documentation of colorimetric stains, a transillumination screen is offered as an accessory.

Optimized for Proteomics

Expression proteomics applications are what makes the PharosFX Plus the most desirable imager. High resolution, sensitivity, and scan speed are optimally selected for scanning the most complex 2-D gels for detection of low-abundance proteins with total protein stains.

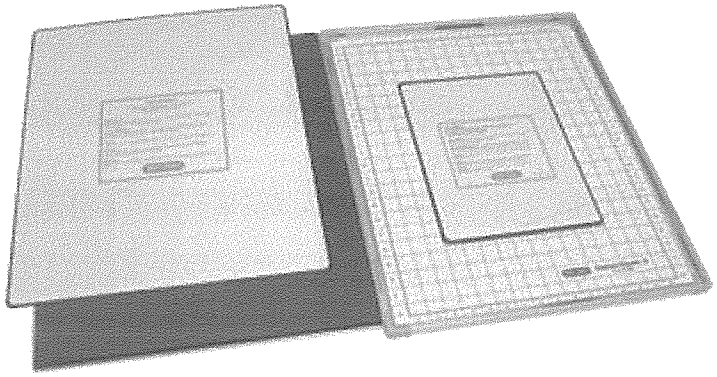
The PharosFX Plus system supports multiplex fluorescent applications, such as DIGE, and specific staining of phosphorylated and glycosylated proteins with Pro-Q dyes.



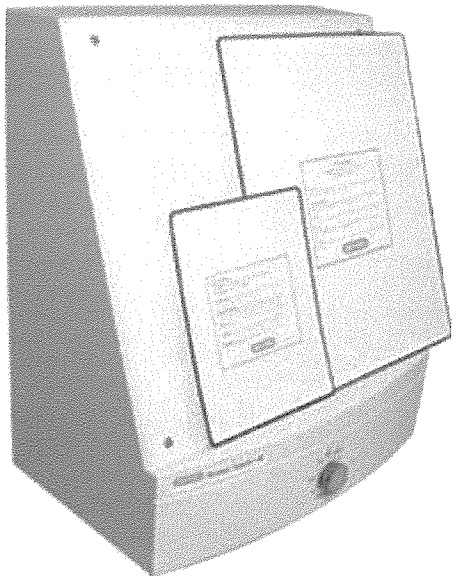
Multiplex fluorescence analysis with PDQuest 2-D image analysis software.

Storage Phosphor Applications for Radioisotope Labels

The PharosFX Plus offers a variety of storage phosphor applications. All phosphor screens are reusable, unharmed by repeated exposure to radioactivity, and are sensitive to beta particles, X-rays, and gamma rays. All screens are flexible and easy to handle. Exposure takes place in standard X-ray cassettes. All phosphor screens require erasure prior to reexposure, and their lifetime is extended when they are cared for properly.



Storage phosphor screens are available in two sizes (20 x 25 cm and 35 x 43 cm).



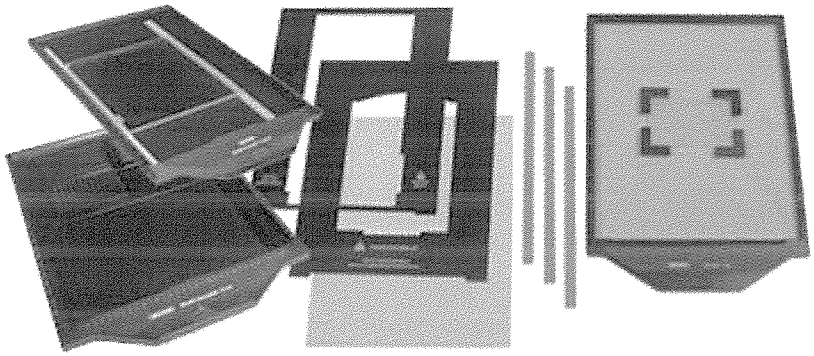
Storage phosphor screen eraser.

Imaging Screen-K

This is a general-purpose storage phosphor screen designed for all common radioisotopes, such as ^{32}P, ^{33}P, ^{35}S, and ^{14}C. Available in 35 x 43 cm and 20 x 25 cm formats, this screen is guaranteed for 1 year.

Imaging Screen-K/Tritium

This is a specialty imaging screen available for imaging ^{3}H. This screen requires special care and handling and is reusable if cared for properly. The screen is 29 x 24 cm and is covered by a 6-month warranty.



Accessories are available for a wide variety of samples.

Scanning of a Wide Variety of Samples

The PharosFX Plus system is equipped with accessories that allow optimal scanning of gels, blots, microplates, and storage phosphor screens. The glass sample tray included with the scanner is moisture-sealed and is ideal for scanning wet blots and gels. Black aluminum multi-sample trays are designed for different types of storage phosphor screens, polyacrylamide gels within the glass plates, and thick agarose gels with backing. For microplates, a special adaptor is provided to position the plates conveniently and securely during scanning.

Ordering Information

Click for: | Product Page | Specifications |

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Catalog #	Description
Molecular Imager PharosFX Plus System	
170-9460	**Molecular Imager PharosFX Plus System**, PC or Mac, 110/240 V, includes Quantity One software, sample tray set, 605DF50 and 640DF35 fluorescence and phosphor imaging filters, USB2 cable, instructions **Your Price: $65,900.00**
Catalog #	Description
Accessories	
170-7865	**Filter 695 nm BP**, for Cy5 and Alexa Fluor 635 dyes *Request a Quote*
170-7867	**Blank Filter Holder** *Request a Quote*
170-7893	**635 nm External Laser Upgrade**, for 170-7890 (external laser), includes filter 695 nm BP **Your Price: $15,450.00**
170-7806	**Eraser Screen-K**, 220/240 V *Request a Quote*
170-7809	**Eraser Screen-K**, 110/120 V **Your Price: $2,008.00**

170-7811	**Sample Tray** **Your Price: $489.00**	
170-7812	**Multi-Sample Tray I**, for small aluminum-mounted screens and microplates **Your Price: $406.00**	
170-7813	**Sample Holders**, for gels **Your Price: $87.00**	
170-7814	**Microplate Adaptor**, for multi-sample tray I **Your Price: $283.00**	
170-7819	**Multi-Sample Tray II**, for scanning gels mounted to glass plates; e.g., for differential display **Your Price: $489.00**	
170-7841	**Imaging Screen-K (Kodak)**, 35 x 43 cm **Your Price: $2,163.00**	
170-7843	**Imaging Screen-K (Kodak)**, 20 x 25 cm **Your Price: $1,030.00**	
170-7845	**Imaging Screen-K (Kodak)/Tritium**, 20 x 25 cm **Your Price: $1,030.00**	
170-7861	**Exposure Cassette-K**, for 20 x 25 cm Kodak screen **Your Price: $231.00**	
170-7862	**Exposure Cassette-K**, for 35 x 43 cm Kodak screen **Your Price: $303.00**	
170-7863	**Filter 555 nm LP**, for Texas Red dye *Request a Quote*	
170-7866	**Filter 605 nm BP**, for ethidium bromide, SYPRO Red, SYPRO Ruby, Alexa Fluor 532 and 546, and Cy3 dyes **Your Price: $360.00**	
170-7890	**External Laser**, 488 nm, includes filter 530 nm BP	

	Your Price: $25,647.00	
170-7892	**External Lasers**, 488 nm and 635 nm, includes filter 695 nm BP	
	Your Price: $29,870.00	
170-7896	**Filter 640 nm BP**, for Texas Red dye	
	Request a Quote	
170-9600	**Quantity One 1-D Analysis Software**	
	Your Price: $2,500.00	
170-9630	**PDQuest Advanced 2-D Analysis Software**	
	Your Price: $18,000.00	

submit

Jennifer Long

From: Sam Ropp [Sam_Ropp@BIO-RAD.COM]
Sent: Wednesday, April 05, 2006 3:56 PM
To: Jennifer Long
Subject: Pricing for Bio-Rad FX Pro Plus Molecular Imager

Hi Jennifer,

My name is Sam Ropp, and I am the Bio-Rad Instrumentation Specialist that is helping Dr. Zaf Hatahet acquire a new laser based fluorescent imaging system. He ask me to email you on the pricing on this type of system. We have concluded that the FX Pro Plus Molecular Imager is what best satisfies his research needs. The list price on this system is $95,770, but I have been able to work out some special considerations to get the system to Zaf for around $70,000. I hope this helps. If you need anything else, please let me know.

Best Regards,

Sam

Sam Ropp, Ph.D.
Instrument Specialist
Bio-Rad Laboratories
VM: 800-876-3425 Ext. 8308
sam_ropp@bio-rad.com
Technical Support/Orders 800-4BIORAD
http://www.discover.bio-rad.com

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www.nsula.edu/provost/

Northwestern State University
Natchitoches, Louisiana 71497

A Member of the University
of Louisiana System

April 4, 2006

NSU Student Technology Committee
Natchitoches, LA 71497

RE: Letter of Support – Biological Sciences Technology Request

I am please to support the request of the Department of Biological Sciences for funding of a Student Technology Fee Grant.

The grant will assure that students taking Biology classes will be provided with the resources needed to promote optimal learning. With the funding of the grant, the Department of Biological Sciences will enhance students' educational experiences, fulfilling the University Vision and Mission.

Sincerely,

Thomas Hanson

Dr. Thomas Hanson
Provost and Vice President
for Academic Affairs

TH/s

Cc: Dr. Austin Temple,
Dean, College of Science and Technology

COLLEGE OF SCIENCE & TECHNOLOGY
OFFICE OF THE DEAN

April 5, 2006

To Whom It May Concern:

The purpose of this letter is to add my support to the funding request made by Dr. Zafer Hatahet. The purchase of the Laser-based Molecular Imaging device will insure that our majors will receive up to date training. Furthermore, the device will enable the faculty to expand and conduct experiments that will prepare the students to enter professional school, graduate schools, or the job market. The impact of this device is huge and the faculty stands ready to utilize it to its fullest potential. During the course of a year, there should be at least 200 students who will use the device. Your careful consideration of this proposal is appreciated.

Very truly yours,

Austin L. Temple, Jr., Ph.D.
Dean, College of Science and Technology

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