2007.0035

Student Technology Fee
Funding Request From
Surplus Funds for Fiscal Year 2006-07
Northwestern State University of Louisiana

This document will not be accepted without complete information, detailed budget, specifications of each piece of equipment requested and pricing.

Prepared by: Zafer Hatahet For: Biology Department

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

Where will requested equipment be located/installed/housed: Bldg. 90 Room 107

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 4/17/2007

1. Describe target audience
   Students enrolled in BIOL3271 (Genetics Lab), and MBIO4191 (Immunology Lab).

2. Describe project/initiative for which you are requesting funds.
   BIOL3270 (Genetics) is a required course for all biology majors. Although it is common practice by all universities I am aware of to mandate a Genetics lab as part of the biology curriculum, NSU had not offered a lab in Genetics for almost 20 years. I have recently obtained CRC (Curriculum Review Committee) approval to reactivate BIOL3271 and make it mandatory for all biology majors. This course will be taught starting in the Fall of 2007. One major hurdle we need to overcome is the utter lack of equipment for this laboratory.
   MBIO4191 (Immunology lab) suffers from the same lack of modern scientific equipment. Although this course has been consistently taught in the Spring semester, the technology used dates back to the 1960s-1970s. In spite of the 4000 level designation, the students had no access to ANY modern equipment in course of lab.
   To remedy both situations, we plan to utilize the same lab space, room 107 in Bienvenu Hall, to teach BIOL3271 during the fall semester and MBIO4191 during the Spring semester. The syllabi for both courses have been prepared to take advantage of the same set of modern scientific equipment.

3. State measurable objectives that will be used to determine the impact/effectiveness of the project.
   a. Offer Genetics and Immunology labs commensurate with 3000 and 4000 level designations.
   b. Expose students to modern scientific equipment and provide them with the skills to use them.
   c. Utilize the hands-on experience acquired in these labs to reinforce and cement the theoretical knowledge students acquire in the lecture courses, BIOL3270 and MBIO4190.

4. Indicate how each objective will be evaluated.
   a. The syllabus for each of the lab courses will be reviewed to see if lab experiments reflect and complement the material taught in the lecture courses.
   b. Syllabi from peer universities will be reviewed to ensure that the NSU course content is of equal or superior quality.
   c. Review student evaluations of MBIO4191 "before" and "after" implementation of this project to

gauge its impact on the students' ability to comprehend and "enjoy" the course material.

d. Review student evaluations of BIOL3271 after implementation of this project to see whether the presence of a companion course helped improve understanding of material covered in the lecture course.
e. Survey NSU graduates who enroll in post-graduate programs and determine whether these two lab courses helped them in their post-graduate studies; i.e., did the skills acquired in these labs 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 earlier, BIOL3270 (and as of the 073 semester, BIOL3271) are required courses for all biology majors. This course is also frequently taken by Science Education (required), Psychology, and HP majors, as well students from Scholars College. Average annual enrollment is 80-90 students (88 are registered for the 073 session; 81 were enrolled in 2006 and 87 were enrolled in 2005).
   b. MBIO4190 is also a well-attended course, although it is not required. There are currently 68 students enrolled in it (the course was initially capped at 40).
   c. Both courses are highly recommended by professional schools, e.g., medical and dental schools, and allied health sciences graduate programs.

6. If funded, which NSTEP (http://www.nsula.edu/nstep/NSTEP.pdf) objective will this funding of this project advance. 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 and classical genetics and in immunology. These techniques are sorely lacking in the current curriculum.
   - *Objective 3: To upgrade student technology laboratories with modern technology.* As already mentioned, the immunology lab (currently located in Kyser Hall) has until recently offered 1960 and 1970s. Updating the curriculum to include standard modern techniques such as Southern, Northern and Western Blotting, ELISAs, and EMSAs would be an essential improvement.

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. The Genetics lab is taught by the applicant, Dr. Zafer Hatahet. I have had over 15 years of experience teaching undergraduate and graduate level courses. I also teach Molecular Biology labs (BIOL3301 and 4021) at NSU which are rated by the students very favorably in overall quality (e.g., BIOL4021 received a 4.87/5.0 score in overall instructional quality during the 063 semester).
   b. The Immunology lab is taught by Dr. Fran Lemoine who is also very qualified and has had significant success with the Immunology lecture course this semester.

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 equipment can be purchased and installed within 4-8 weeks, in time for the 073 semester.
      ii. Syllabus updates. The syllabus for BIOL3270 has already been approved and it includes a modern molecular genetics lab focusing on bacteria and yeast as model systems. The MBIO4191 syllabus will be will be modified in time for the 081 semester.
   b. Evaluation.
      i. Syllabus evaluations will be performed at the end of each semester in the three academic years following purchase of the equipment.
      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. I currently have pieces of equipment in my research lab that have been in perfect working order for over 10 years.
    b. No software is involved.

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.

12. Attach a detailed budget, including: specs., description, cost, state contract 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. **All of the information requested must be attached or the request will not be accepted**.

    See attached document.

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).

List of requested equipment, with cost and justification

Item	Units Requested	Unit Cost	Total cost	Proposed Vendor	Vendor catalog #
Chromatography Refrigerator	1	$3,761.00	$3,761.00	VWR	82009-778
-20°C freezer, 20.7 cu. Ft.	1	$1,285.90	$1,285.90	VWR	55703-430
Sorvall Legend 23R fixed angle rotor, 8X50 mL	1	$780	$780	Fisher	00470
UVP CX-2000 crosslinker	1	$1,220.21	1,220.21	Fisher	UVP95 0339 01
Sorvall Legend 23R refrigerated centrifuge	1	$6,500	$6,500	Fisher	00554
Sorvall Legend 23R fixed angle rotor, 6X100 mL	1	$780	$762	Fisher	00471
Thermo IEC Micromax centrifuge, non-refrigerated	2	$2,798.00	$5,596.00	Fisher	05-112-114
Automatic pipettes, 0.5-10 µL	10	$269.10	2,691.00	Rainin	PR-10
Automatic pipettes, 10-100 µL	10	$269.10	2,691.00	Rainin	PR-100
Automatic pipettes, Classic Starter Kit (2-20, 20-200, and 100-1000 µL)	10	$699.00	6,990.00	Rainin	PR-START
Vertical electrophoresis systems	10	$555.00	$5,550.00	Fisher/CBS Scientific	ASG-250-02
Semi Dry Electroblotter	5	$669.60	$3,348	Fisher	OWHEP1

Justification.

$41,175.11

Notes:

A. Many of the equipment are requested in sets of 10. It is the desire of the applicant to have each lab section capped at 20 students. Each section will have 10 teams of 2 students, allowing each student to acquire significant hands-on experience. Some of the equipment are requested in lower numbers as sharing is possible by a larger number of students.

B. Most of the items are on State Contract from either Fisher of VWR. The specific brands and models were selected based on

- Price competitiveness and availability on state contract
- Durability (specifically the Rainin pipettes).
- The applicant prior familiarity
- Availability of similar models in the department allowing for exchange of parts when needed.
- Suitability for undergraduate laboratories and user friendliness.

Below is an itemized justification for each item. It should be noted that, without exception, all of

these instruments would have the added benefit of stimulating research activity by the PIs and other faculty in the department.

1. **Vertical Electrophoresis Apparatus.** Electrophoretic mobility shift assays are some of the most popular, engaging and feasible experiments in molecular genetics labs. They are frequently used to identify protein-DNA interactions such as recognition of gene promoters by transcription factors. The technique requires vertical electrophoresis apparatus, only one of which is currently available in the private laboratory of the PI. 10 sets are requested with the intent of using one set per team of two students.

2. **Chromatography refrigerator/-20 freezer.** Almost all of the experiments proposed for BIOL3271 and MBIO4191 require refrigeration. For example, stability of protein-DNA complexes during electrophoresis requires carrying out the experiment in the cold. Similarly, column affinity chromatography must be carried out at 4°C to purify a viable recombinant proteins. In both cases, the most cost effective and practical solution would be a chromatography refrigerator. Samples generated by the students, and more importantly commercial reagents such as enzymes and chemicals need to be stored at -20°C.

3. **Semi-dry blotter, and UV crosslinker.** Collectively, these items are critical for carrying out Southern and Northern blotting experiments. Five blotters for 10 teams of students are requested since each blotter cannot accommodate more than 2 blots simultaneously. The UV crosslinker is required to fix DNA and RNA on transfer membranes.

4. **Automatic pipettors.** These represent the most essential pieces of equipment in any modern biology lab. A complete set capable of making measurements from 0.5 to 1,000 µL is needed per team. Each set consists of 5 pipettes. 10 complete sets are requested.

5. **Refrigerated and non-refrigerated centrifuges.** Most lab procedures require centrifugation at either room temperature or 4°C, e.g., preparation of competent cells, plasmid purification, and expression and purification of recombinant proteins, immunoprecipitation, etc.

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- Production Supplies
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VWR® Chromatography Refrigerators with Glass Doors, 3 to 5°C

Supplier: VWR International

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- Oversized, Energy-Efficient Refrigeration Systems
- Self-Closing, Triple-Pane Doors
- Five-Year Compressor Warranty
- VWR Two-Year Limited Parts and Labor Warranty

Chromatography refrigerators feature self-closing, high-efficiency low-E (low-emissivity) glass doors in sliding or swinging styles. All models have one interior electrical outlet. Single-door models are equipped with one 5.1cm (2") access port with cover. Two- and three-door units are equipped with two 5.1cm (2") access ports with covers. Refrigerators require a dedicated circuit.

UL listed, CSA certified, and NSF approved.

Note: Units are designed to operate in the 3 to 5°C temperature range. For applications requiring warmer or colder temperatures, use optional electronic temperature control (**55702-534**), which allows for a temperature range of 1 to 8°C.

Temperature Range:	3 to 5°C
Compressor,	
Single-Door Models:	1/3 hp
Double- and Triple-Door Models:	1/2 hp

Ordering Information: Supplied with chromatography mast and four full adjustable shelves behind each door, except where noted. Also supplied with a hanging thermometer. Other accessories are factory-installed and must be specified when ordering; contact your VWR sales representative for details.

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Capacity L (cu. ft.)	Door Type	Interior Dimensions, H x W x D, cm (in.)	Exterior Dimensions, H x W x D, cm (in.)	Electrical	Shipping Weight, kg (lbs.)	VWR Catalog #	Unit	Your Price	Qty
651 (23)*	Single, Swinging	156 x 61 x 68.5 (61 1/2 x 24 x 27)	199 x 68.5 x 75 (78 1/4 x 27 x 29 1/2)	115V, 60Hz, 8A	141.5 (312)	55702-480	Each	$2,749.67	0
651 (23) †	Single, Swinging	156 x 61 x 68.5 (61 1/2 x 24 x 27)	199 x 68.5 x 75 (78 1/4 x 27 x 29 1/2)	115V, 60Hz, 8A	141.5 (312)	55702-520	Each	$2,650.24	0
1161 (41)	Double, Sliding	145 x 111 x 63 (57 x 43 5/8 x 24 3/4)	199 x 120 x 75 (78 1/4 x 47 x 29 1/2)	115V, 60Hz, 9A	200.5 (442)	*82009-778*	Each	$3,989.14	0
1331 (47)	Double, Sliding	156 x 129.5 x 62 (61 1/2 x 51 x 24 1/2)	199 x 137 x 75 (78 1/4 x 54 x 29 1/2)	115V, 60Hz, 10A	217 (478)	82009-780	Each	$4,214.98	0
1387 (49)	Double, Swinging	155.5 x 129 x 62 (61 1/4 x 50 3/4 x 24 1/2)	199 x 137 x 75 (78 1/4 x 54 x 29 1/2)	115V, 60Hz, 10A	214 (472)	82009-782	Each	$4,242.87	0
2038 (72)	Triple, Swinging	156 x 190.5 x 68.5 (61 1/2 x 75 x 27)	101 x 198 x 75 (79 1/4 x 78 x 29 1/2)	115V, 60Hz, 15A	299 (660)	82009-784	Each	$5,433.95	0
Additional Full Shelves									
For 651 L (23 cu. ft.) Models		—	—	—	—	55702-484	Each	$54.67	0
For 1161 L (41 cu.						55702-	Each	$54.67	0

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- Healthcare/Clinical
- Lab Animal Science
- Leasing Program
- Life Science
- Site Services
- New Lab Set Up
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VWR® General-Purpose Laboratory Freezers, –20 to –12°C

Supplier: VWR International

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RefineBySupplier: VWR International

Supplier: VWR International

GO

- VWR Two-Year Limited Parts and Labor Warranty

This premium line of upright general-purpose laboratory freezers combines cost-effective performance with VWR quality construction. All models feature adjustable temperature control and quiet, hermetically-sealed refrigeration compressors. Industrial-grade cabinets feature high-density, foamed-in-place urethane insulation, which minimizes operating costs by maintaining temperature stability. A durable, white acrylic exterior finish is matched with a corrosion-resistant seamless interior to simplify cleaning and maintenance.

All models are built to UL and CSA specifications for safety and performance.

Temperature Range:	–20 to –12°C (–4 to 10°F)

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Volume, L (cu. ft.)	Interior Dimensions, H x W x D, cm (in.)	Exterior Dimensions, H x W x D, cm (in.)	Electrical	Shipping Weight, kg (lbs.)	VWR Catalog #	Unit	Your Price	Qty
410 (14.5)	131 x 69 x 55 (51 1/2 x 27 x 21 1/2)	166 x 81 x 71 (65 x 32 x 28)	115V, 60Hz, 1.8A	106.5 (235)	*55703-429*	Each	$1,117.50	0
586 (20.7)	145 x 69 x 60 (57 x 27 x 23 1/2)	178 x 81 x 77 (70 x 32 x 30)	115V, 60Hz, 1.8A	113 (250)	55703-430	Each	$1,285.90	0
861 (30.4)*	161 x 81 x 66 (63 1/2 x 32 x 26)	192 x 90 x 86 (75 1/2 x 35 1/2 x 34)	115V, 60Hz, 9A	158 (350)	55703-432	Each	$3,210.13	0

*Auto defrost.

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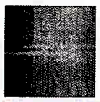

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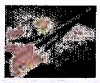

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Thermo Scientific Sorvall* Legend* 23R Microcentrifuge

High-capacity, high-performance refrigerated microcentrifuge. Ideal for high-RCF sample volume processing in microbiology, molecular biology, genetics and biochemistry.

Includes: Centrifuge only
Required Accessories: Rotor (sold separately)

00554

Product Listing | Details & Specs. | Images

- Capacity: 4 x 200mL
- Max. Speed/Force: 23,000rpm/36,668xG
- Menu driven controls with digital display
- Temperature range: -8° to +40°C
- Precise temperature control ensures no sample degradation and improved separations
- Refrigeration systemaintains samples at 4C even at maximum speed
- AutoLock 5-second rotor change
- Quiet running motor

Specifications & Ordering Information:
Optional rotors include fixed-angle, microliter, swinging bucket and drum styles. All rotors and tube adapters sold separately.

Capacity	800mL (4 x 200mL)
Display	Digital
Max. Speed	23,000rpm
Max. Force	36,668xG
Refrigerated	Yes
Temperature Range	-8° to +40°C
Dimensions	25L x 23W x 14.7H (63.5 x 58.4 x 37.3cm)
Net Weight	220.5 lb. (100kg)
Electrical Requirements	120V 60Hz

Description	Cat. No.	Qty.	Price
Legend 23R Microcentrifuge	00554		Each for $6,500.00

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UVP* CL-1000 and CX-2000 Crosslinkers

UV crosslinking in only seconds

UVP95 0174 01

Product Listing | Details & Specs. | Images

·Microprocessor-controlled UV sensor feedback system ensures maximum energy efficiency

·Preset or user-selected settings for UV energy and UV time exposure (preset exposure delivers 120,000 microjoules or five minutes of exposure)

·Maximum UV energy setting of 999,900 microjoules/cm^2

·Internal interlocking safety system; safety fused for automatic shutoff

·Large LED readout continuously displays remaining time or energy

·UV-blocking window on door (or drawer of CX-2000 model) for viewing samples during exposure

Choice of four models for applications requiring shortwave, midrange, or longwave UV energy.

The **CL-1000** and **CX-2000** models use shortwave UV energy to bond DNA to media. For UV curing, **CL-1000M** utilizes midrange UV and **CL-1000L** uses longwave UV energy.

Specifications & Ordering Information:

All CL-1000 series models feature a laydown-style door with a 12D x 10W x 5 in.H internal chamber. The CX-2000 model features a pull-out drawer with a 111/4D x 111/2W sample tray (31/2 in. from sample surface to lamp). All units supplied with five 8-watt UV tubes and removable power cord. Replacement tubes available separately.

Wavelength	Applications
Shortwave (254nm)	·UV crosslinking of DNA/RNA to membranes after Northern or Southern blot or dot blottings and colony or plaque lifts ·Nicking ethidium bromide stained DNA in agarose gels ·Gene mapping for creating cleavage-inhibiting thymine dimers
Midrange (302nm)	·Phototherapy ·UV crosslinking and curing ·Gradient sampling
Longwave (365nm)	·Photochemistry ·UV curing ·Immunology research

Electrical Requirements

Model Wavelength 115V/60Hz 230V/50Hz

		Cat. No.	Each	Cat. No.	Qty.	Price	
With laydown door							
CL-1000	254nm	UVP95 0174 01		Each for $1,214.60	UVP95 0174 02		Each for $1,214.60
CL-1000L	365nm	UVP95 0228 01		Each for $1,219.29	UVP95 0228 02		Each for $1,219.29
CL-1000M	302nm	UVP95 0230 01		Each for $1,219.29	UVP95 0230 02		Each for $1,219.29
With pull-out drawer							
CX-2000	254nm	UVP95 0339 01		Each for $1,220.21	UVP95 0339 02		Each for $1,220.21

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Thermo Scientific Sorvall* Legend* 23R Fixed-Angle Rotors

Product Listing

Characteristics	Cat. No.	Qty.	Price
8 x 38mL	00469 Thermo Scientific No.:00469		Each for $762.00
8 x 50mL	00470 Thermo Scientific No.:00470		Each for $780.00
6 x 100mL	00471 Thermo Scientific No.:00471		Each for $762.00
6 x 50mL conical	00555 Thermo Scientific No.:00555		Each for $762.00

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Accessories for:
Thermo Scientific IEC* Micromax* and Microlite* Microcentrifuges * > Micromax; Nonrefrigerated

Thermo Scientific IEC* Micromax* Microcentrifuge Microtube Rotors, Rotor, 48 x 0.5mL

Each for $466.98

Qty: Add

Thermo Scientific IEC* Micromax* Microcentrifuge Microtube Rotors, Rotor, 40x.25ml/.4ml

Each for $466.98

Qty: Add

Thermo Scientific IEC* Micromax* Microcentrifuge Microtube Rotors, Rotor, 24 x 2mL Tube

Each for $547.01

Qty: Add

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Scientific > Equipment > Centrifugation > Microcentrifuges > Thermo Scientific IEC* Micromax* and Microlite* Microcentrifuges * > **Micromax; Nonrefrigerated**

Thermo Scientific IEC* Micromax* and Microlite* Microcentrifuges * > Micromax; Nonrefrigerated

Microcentrifuge; Thermo Scientific IEC Micromax; 48-place rotor (24 x 2mL outer row plus 24 PCR inner row); Nonrefrigerated; Speeds to 15,000rpm (21,000xG); Run time up to 1 min. in 1 sec. intervals; 110V 50/60Hz ....more

Includes: Centrifuge and rotor

Items | Details & Specs. | Accessories

CHARACTERISTICS	Cat. No.	Qty.	Units/Price
Micromax; Nonrefrigerated	05-112-114 Thermo Scientific No.:03590FF		Each for $2,798.00

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DEPARTMENT OF BIOLOGICAL SCIENCES
COLLEGE OF SCIENCE & TECHNOLOGY

April 19, 2007

TO: Jennifer L. Martin
Student Technology Specialist

FROM: Dr. Jack Pace, Interim Chairman
Department of Biology

I fully support Dr. Zafer Hatahet's student technology fee grant proposal to update and modernize the Immunology and Genetics labs (MBIO 4191 and BIOL3271). These labs are attended by a large number of students and funding of this grant would significantly improve their technology content.

Thank you,

Northwestern State University, Natchitoches, Louisiana 71497
A Member of the University of Louisiana System
Phone (318) 357-5323 • FAX (318) 357-4518

COLLEGE OF SCIENCE & TECHNOLOGY

OFFICE OF THE DEAN

April 20, 2007

To: Student Technology Fee Proposal Selection Committee

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

Subject: Proposal offered by Dr. Hatahet

I am pleased to offer my endorsement for the grant proposal written by Dr. Hatahet. The Department of Biological Sciences is continuing to revamp and modernize the curriculum, especially in the emphasis area of biomedical. The offering of a laboratory to accompany the genetics course is a necessary step towards this goal. Dr. Hatahet will equip the laboratory so that the equipment purchased will also be used in the senior level microbiology course. This is an added plus and point out how we prudently we use our resources in the College of Science and Technology.

Thank you for consideration of this proposal and for your effects in selecting worthy requests.

Northwestern State University, Natchitoches, Louisiana 71497
A Member of the University of Louisiana System
Phone (318) 357-6699 FAX (318) 357-5599