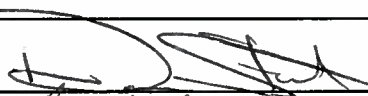



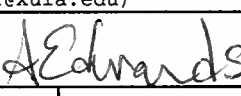
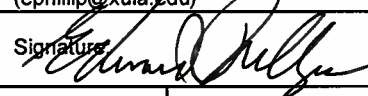


**COVER PAGE FOR TRADITIONAL AND UNDERGRADUATE ENHANCEMENT PROPOSALS  
BOARD OF REGENTS SUPPORT FUND, FY 2007-08**

1. This Proposal Involves: <input checked="" type="checkbox"/> One Institution <input type="checkbox"/> More Than One Institution		2. Enhancement Subprogram: (check one) <input type="checkbox"/> TRADITIONAL ENH Program (Includes all multidisciplinary proposals) <input checked="" type="checkbox"/> UNDERGRADUATE ENH Program			
3. This Proposal Is: (check one) <input checked="" type="checkbox"/> Primarily an Equipment Request <input type="checkbox"/> Not Primarily an Equipment Request					
4. Name(s) of Submitting Institution(s) of Higher Education <u>Xavier University of Louisiana</u> (Include Branch/Campus/Other Components)					
5. Address of Institution of Higher Education (Include Dept/Unit, Street Address/P.O. Box Number, City, State, Zip Code)		Mathematics Department 1 Drexel Dr. P.O. Box 62 New Orleans, LA 70125			
6. Title of Proposed Project <u>Computer Based Mathematics Teaching Labs</u>					
7. First-Year Support Fund Money Requested <u>\$ 88,627.96</u>	8. Second-Year Support Fund Money Requested (if applicable) \$N/A	9. Proposed Duration (Circle # of Yrs.) <u>1</u> 2			
10. Category In Which Proposal Is Being Submitted (check one only) <input type="checkbox"/> BUSINESS <input checked="" type="checkbox"/> MATHEMATICS <input type="checkbox"/> CHEMISTRY <input type="checkbox"/> PHYSICS/ASTRONOMY <input type="checkbox"/> EDUCATION <input type="checkbox"/> Special Multidisciplinary (See Section III.B.2.c of the RFP.) NOTE: If you check this category, you must also check at least one other eligible discipline.)		11. Using the Taxonomy in Appendix A of the RFP, Identify All Specific Subcategories of the General Category That Apply to This Proposal and Provide Taxonomy Numbers:  Subcategory(ies): Taxonomy Number(s):  Mathematics 0703			
12. This Proposal Is a: <input checked="" type="checkbox"/> New Request <input type="checkbox"/> Request for Continuation of a Previously-Funded Support Fund Project (check one) Provide previous contract number:					
By signing and submitting this proposal, the signators are certifying that: (1) the proposed project has not already been funded/is not currently being funded/has not been promised funding; (2) this proposal has been reviewed and approved by an Institutional Screening Committee; and (3) the institution and the proposed project are in compliance with all applicable Federal and State laws and regulations, including, but not limited to, the required certifications set forth in: (a) Grants for Research and Education in Science and Engineering NSF Grant Proposals Guide (GPG), NSF 03-2, effective 10/1/02, and (b) 45CFR 620, Subpart F (Requirements for a Drug-Free Workplace).					
Name/Title/email (type or print) Institution (if different from Item #5 above)		Dept./Telephone No.	Degree/Year	Signature	
PI/PD <u>Dr. Donna Stutson (dstutson@xula.edu)</u> Associate Professor		Mathematics 520-5308	Ph.D. 1995		
Co-PI/PD Dr. Gurdial Arora (gdial@xula.edu) Professor of Mathematics, Chair		Mathematics 520-5312	Ph.D. 1976		
Co-PI/PD Dr. Vljako Kocic (vkocic@xula.edu) Professor of Mathematics		Mathematics 520-5309	Ph.D. 1981		
Co-PI/PD					
Co-PI/PD					
Campus Head or Authorized Institutional Representative		Dean		Authorized Fiscal Agent	
Name/Title/email: (type or print) Calvin Tregre Senior VP of Admin (ctregre@xula.edu)		Name/Title/email: (type or print) Sr. Monica Loughlin, SBS/Dean of CAS (mloughli@xula.edu)		Name/Title/email: (type or print) Mr. Edward Phillips/ VP Fiscal Affairs (ephillip@xula.edu)	
Signature: 		Signature: 		Signature: 	
Date: 10/23/07	Telephone Number: (504)520-7904	Date: 10/23/07	Telephone Number: (504)520-7652	Date: 10/23/07	Telephone Number: (504)520-7667

## PROJECT SUMMARY

Name of Institution (Include Branch/Campus and School or Division) Xavier University of Louisiana Department of Mathematics	
Address (Include Department)	Department of Mathematics 1 Drexel Dr. P.O. Box 62 New Orleans, La 70125
Principal Investigator(s)	PI: Dr. Donna Stutson CO-PI: Dr. Gurdial Arora CO-PI: Dr. Vljako Kocic
Title of Project Computer Based Mathematics Teaching Lab	
<p>Abstract (DO NOT EXCEED 250 WORDS)*</p> <p>Xavier University is successfully introducing technology in the classrooms in disciplines such as science, engineering and mathematics. However, to meet the challenges of the new work force it is imperative that we acquire more and better educational tools in order to maintain the current excellence. Although the department currently has somewhat outdated computer labs and many of the software packages needed, it is still lacking some software and enough fully functional Computer Based Mathematics Teaching Labs. To get our department up to date and to keep it there, we must upgrade our hardware and software resources as well as new and innovative teaching styles. There is an urgent need to upgrade the classrooms by installing new powerful computers, projection systems, and to furnish them with computer desks and chairs. In other words, the department needs state-of-the-art Computer Based Mathematics Teaching Labs to provide our students with a learning environment that appropriately meets today's highest standards.</p>	

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## Narrative and Bibliography

### A. The Current Situation

#### a.1 Institutional description

As the nation's only institution of higher learning that is historically Black and Catholic, Xavier University's ultimate purpose is to help create a more just and humane society. Reaffirming its Black heritage and its Catholic tradition, Xavier offers opportunities in education and leadership development to those historically denied the liberation of learning. Already leading the nation in placing African Americans in medical school and in graduating African American students in the physical sciences, physics; and pharmacy, Xavier is building on its success and progress in science education, and is well recognized by its selection for the National Science Foundation Model Institutions for Excellence (MIE) programs. The main goal of MIE was to place more African American science students into graduate school. Xavier is furthering its goals in science, engineering and mathematics (SEM), and in a highly technological society, preparing African American science students for advanced degrees and careers requiring state-of-the-art computing equipment. Xavier currently enrolls 3,012 students, of whom 2,362 are enrolled in undergraduate programs through the College of Arts and Sciences.

**Xavier's student body is predominantly African American (72%), but the University welcomes all races and nationalities and religions:**

<b>White</b>	<b>4%</b>
<b>Asian/Asian American</b>	<b>10.2%</b>
<b>Hispanic</b>	<b>0.7%</b>
<b>Other including international students</b>	<b>13.2%</b>
<b>Catholic</b>	<b>25.7%</b>
<b>Baptists</b>	<b>24.7%</b>
<b>Other affiliations</b>	<b>49.6%</b>

**Approximately 56% of Xavier's student body is from Louisiana while the other 44% are from 37 other states or 30 other countries.**

The Mathematics Department at Xavier offers three majors that lead to a Bachelor of Science degree: Mathematics, Mathematics Education, and Statistics. The statistics degree is offered in cooperation with Louisiana State University Medical Center (L.S.U.M.C.) in New Orleans, and students have the opportunity to obtain a Bachelor of Science degree from Xavier and a Master of Science degree in Biometry from the L.S.U.H.S.C. in five years. The Mathematics Department currently has 14 full-time faculty members, all of whom have **advanced degrees** in Mathematics, Statistics, or Mathematics Education, and 2 part-time employees.

Our mission is to:

1. Provide Xavier's students with the highest quality mathematical education at all levels. In particular, we strive to give our 6 mathematics, mathematics education, and statistics majors a strong mathematical background for placement in academic or non-academic jobs and graduate school.

2. Assist faculty in producing the highest quality teaching and research.
3. Stay professionally active by being informed of and participating in the progress being made in our ever-changing profession: calculus reform, technology in the classroom, industrial mathematics, and employment issues in the mathematical sciences.

#### a.2 Rationale for the project.

Xavier has already started successfully introducing technology in the SEM discipline classrooms, but the challenges of the new workplace requires the acquisition of more and better educational tools to maintain excellence and expand quality:

*"Mathematics teaching should keep in mind that students must be taught in conditions that favour their integration into larger society. Such an acknowledgement leads one to consider the characteristics of today's society and in particular the characteristics involving recent technological advances, which continue at such a frenetic pace that it is difficult to predict what kind of knowledge mankind will need tomorrow. As a consequence, it is essential for mathematics education to be as complete as possible: it must help students "learn how to learn", keep an open-minded attitude and acquire a certain level of confidence in their own thinking capabilities. Such adaptation to social changes can only be accomplished by teaching students to skillfully use information technologies."* ("Computer Algebra Systems: A basic tool for teaching Mathematics in Engineering" by J.L. Galán García\*, M.A. Galán García, A. Gálvez Galiano, A.J. Jiménez Prieto, Y. Padilla Domínguez and P. Rodríguez Cielos Universidad de Málaga, E.T.S.I. Telecomunicación, Campus de Teatinos s/n, 29071, Málaga, Spain.).

In this technological society, many institutions have moved toward the implementation of technology in the mathematics curricula: University of Louisiana in Lafayette, Louisiana State University, Tulane and others. Through the help of previous BOR Undergraduate Enhancement Grants, the Xavier Mathematics Department *has begun moving towards that direction*. The department has begun to implement technology. SPSS and internet data are being used in our statistics courses; the Calculus I, II and III courses are now being taught using the TI-92 calculator along with Scientific WorkPlace, DPGraph; and some instructors are using the web based software MyMathLab to assign online homework. Scientific WorkPlace is also being used in Ordinary Differential Equations and the Colloquium course. All sections of Algebra Review (2<sup>nd</sup> developmental course) and Pre-Calculus are using MyMathLab to assign daily online homework.

Scientific WorkPlace, Scientific Notebook and Scientific Word have been around since before 1995. Scientific Notebook is supplied with the built-in computer algebra engine MuPAD® 3.1. Students can solve equations right in their documents. They don't have to master complex syntax to be able to evaluate, simplify, solve, or plot mathematical expressions. Full computer algebra capabilities are available. The student can compute symbolically or numerically, integrate, differentiate, and solve algebraic and differential equations and import data from graphing calculators.

A computer algebra system, or CAS, is a mathematics engine that performs the symbolic computations fundamental to algebra, trigonometry, and calculus. With Scientific WorkPlace or Notebook, students can evaluate, factor, combine, expand, and simplify terms and expressions that contain integers, fractions, and real and complex numbers. They can also evaluate integrals and derivatives, perform matrix and vector operations, find standard deviations, and perform

many other more complex computations involved in calculus, linear algebra, differential equations, and statistics. There is evidence that Computer Algebra Systems (CAS) make a difference in student learning when used in the classroom:

*"This study involving 78 subjects compared the performance of university students taught calculus using a computer algebra system to the performance of students using paper and pencil computations. Students who were taught calculus using a CAS had higher scores on a test of conceptual knowledge of calculus than the students taught by traditional methods. Students in the computer class also had higher scores on a calculus computational exam using the CAS than students in the traditional class using paper and pencil." ("Journal for Research in Mathematics Education", by Jeanette Palmiter, Portland State University).*

The Xavier University Mathematics Department is currently using a CAS in one form or another. Dr. Donna Stutson and Dr. Paul McCreary have developed some Scientific WorkPlace worksheets for Precalculus; Mrs. Raquel Mesa has developed Calculus II Labs for her students scheduled in one of the Computer Based Mathematics Teaching Labs; Dr. Stutson uses Scientific WorkPlace in the Introductory Differential Equations course; and Dr. Tony DuRapau uses the software in the senior colloquium course where math majors are required to present a research article read over two semesters. The TI-89 and Voyage 200 are being used in Calculus I, II and III and Linear Algebra. The software DPGraph is being used by Dr. Vljako Kocic; he developed labs for the Calculus III students to work once a week when the class is scheduled in one of the Computer Based Mathematics Teaching Labs: *"Quality: Excellent. Value: Excellent." ... "DPGraph is one of the most exciting Windows-PC programs I've ever seen for creating beautiful, even stunning, mathematical graphics."* (Dr. Michael W. Ecker, *Recreational & Educational Computing*.)

Furthermore, the Mathematics Department in conjunction with the Chemistry Department at Xavier and researchers at Tulane has secured a "Research Commercialization and Educational Enhancement Program (RC/EEP)" grant to increase the retention and success rates of Chemistry majors. On the average, 372 Freshmen STEM majors are not prepared to enroll in their first credit-bearing math course. They are therefore required to take one or two developmental math courses, depending on their placement. About 50% of these students fail these courses, and many of those drop out of college in the first year. Among those who pass, the success rate in the next math course, typically Precalculus, is 34%. Consequently, the Mathematics Department is redesigning and restructuring the developmental mathematics program. The RC/EEP grant will provide funds for faculty to redesign these courses and their content, the implementation of a new and better placement exam, the creation of a "Mathematics Support Center" for students enrolled in one of the two developmental math courses, tutors to assist students seeking tutoring at the center, and the purchase of the software "LifetimeLearning". As a result of this grant, the revised developmental program will benefit students planning on majoring in all STEM areas, but also those planning to major in the Arts and Humanities.

As a result of the redesigning of the developmental courses and the desire of faculty to teach all of the statistics, pre-calculus, calculus, differential equations and linear algebra courses in a computer lab, the two existing labs created through two previous BOR grants (33 computer desks and 20 computer desks with computers) are insufficient. Currently, these rooms are used hourly on a weekly basis, only allowing for approximately 12 sections to fully implement advanced technology into the curriculum. (The developmental, pre-calculus and calculus I are 4

credit hour courses, with the developmental courses moving towards 6 contact hours a week.). In addition, since the developmental courses are being redesigned to become self-paced computer based courses, the current Mathematics labs are insufficient to address the needs of the department. Also, one of these computer classrooms needs more powerful computers, and a new projection system (the RC/EEP will provide new computers for this room), while the other requires more computers, but also more student-friendly computer desks, chairs, a more powerful projection system, and a new dry-erase board. The department also has a classroom with an instructors' console, computer and projection system. This room does not have student computers, but it is used heavily by our instructors using PC tablets and the document camera. It is in need of a new console, which was destroyed while the building was open for repairs after Hurricane Katrina, a new projection system and a new computer.

The department currently has many of the software packages needed, but is lacking enough fully functioning Computer Based Mathematics Teaching Labs to implement the software in all of the desired courses. The Computer Science Department of Xavier University has offered the Mathematics Department the use of one of its electronic classrooms; however, this room will need to be furnished with new, more powerful computers. To get our department up to date and to keep it there, we must continue to be aware of hardware and software developments as well as new and innovative teaching styles; failing to do so puts boundaries around our growth.

### a.3 Impact on existing resources

Currently, the Mathematics Department has the following facilities: a Mathematics Tutoring Lab, a Mathematics Support Center, two computer labs and a lecture-type electronic classroom. The Mathematics Tutoring Lab and Mathematics Support Center are key components to providing the necessary assistance to students with deficiencies in mathematics. During the **1999/2000** academic year there were more than **5000** visits to the lab. The lab is headed by a director, Mr. Daniel Watson, who is a staff member of the department. Mr. Daniel Watson has a Masters Degree in Mathematics. Most of the tutors are mathematics majors (junior and seniors). The tutoring lab is equipped with ten newer computers which are currently used by students to complete computing assignments, to enhance their knowledge, and for self-testing. The Mathematics Support Center is also under the direction of Mr. Daniel Watson and also equipped with ten newer computers. The computers in both rooms are connected to a server; this prolongs the use of the computers, and guarantees the availability of software outside of the computer classrooms.

A lecture-type electronic classroom equipped with an instructors' computer, SmartBoard, document camera, VCR and projection system has been configured and is currently in use. A substantial number of faculty members have already developed courses to be taught in the electronic classroom environment using modern technology. However, the instructors' console in this room has been damaged as a result of the building being open while repairs took place after Hurricane Katrina; cables have been ripped from the console and the wall. Also, the projection system and instructor's computer are outdated and need to be upgraded which is why we are requesting a new console, computer and projection system for this room. Unfortunately, this room is not large enough to accommodate desks with student computers; therefore, we are also requesting to purchase computers for the electronic classroom offered to the Mathematics Department by the Computer Science Department.

The two computer classrooms are equipped with student computers (one room with 33 and the other with 20), one instructors' computer, a SmartBoard, and projection system, and one room has a document camera. Classes are scheduled in these rooms every weekly school hour. Unfortunately, these are the only such classrooms available to our department on a regular basis. The computers in these classrooms are also connected to the server which houses the software being used by instructors in the classroom. Both of these classrooms need more powerful computers and new projection systems, while the smaller room also needs new student-friendly computer desks and a new dry-erase board. Since these are the only computer classrooms in which the mathematics department has access, not all of our students have the opportunity to learn with the aid of mathematical software. Unfortunately, these two rooms are not sufficient for all of the courses into which we would like to implement technology. The introduction of self-paced computer based learning in the developmental courses adds to the insufficient number of computer classrooms available to the department.

## B. The Enhancement Plan

### b1. Project Goals and Objectives

With the support of the BOR Undergraduate Enhancement Grant, the Mathematics Department of Xavier University would like to accomplish the goals:

1. **To continue to provide Xavier graduates with competitive skills in the workplace and/or graduate school.** The University has an office, GradStar, which tracks Xavier graduates into the workplace and/or graduate school. By the year 2008, jobs requiring science, technology, engineering and STEM training will increase four times faster than overall job growth.
2. **To continue to keep current with the local and national reforms in undergraduate education.** The proposed reformatting of the Xavier developmental math program follows the model being used at the University of Maryland at College Park. ULL and LSU are using computer based learning in the developmental math courses and have used technology in most of the math courses for a number of years. Northwestern State University in Natchitoches has used technology in its math courses for more than 10 years. Howard University uses technology in the math courses and Southern University uses technology in some of its math courses.
3. **To increase the number of majors in Mathematics; we lost a number of students since hurricane Katrina.** We must use all of the latest teaching tools and technology available to attract students to the Xavier Mathematics Department. African Americans are a minority in mathematics and other science disciplines; consequently, there are many universities recruiting Louisiana's young minds.
4. **To improve the retention rate for those freshmen entering in developmental mathematics by using as many approaches and learning tools available.** While 40% of Caucasian 4<sup>th</sup> and 8<sup>th</sup> graders scored proficient on the most recent NAEP math test, only 15% of African American and Hispanic students scored proficient. African American and Hispanic 12<sup>th</sup> graders, on average, perform at the same level in math as Caucasian 8<sup>th</sup> graders. In fact, many freshmen STEM majors at Xavier University are not prepared to enroll in their first credit-bearing math course. They are therefore required to take one or two developmental math



courses, depending on their placement. About 50% of these students fail these courses, and many of those drop out of college in the first year.

To obtain the above goals, the Mathematics Department will need better equipped Computer Based Mathematics Teaching Labs, and more of them.

#### b.2 Work Plan of Proposed Project

Equip one Computer Based Mathematics Lab with a new projection system, one with new computers, projection system, desks and dry-erase board, and one room with new computers for student and faculty use

February 2008

Plan for renovations (if necessary).

May 2008,

Beginning of renovations to prepare one of the rooms for new desks and dry-erase board.

June 2008,

Ordering and purchasing of equipment.

July/August 2008,

Installation of purchased equipment .

Fall Semester 2008

All 3 Computer Based Mathematics Labs will be ready for use by as many sections of mathematics as possible.

During the Fall 2008 wide spread training for faculty and staff will be provided. Use Spring pre-registration to schedule the optimum use of the laboratories by mathematics faculty and students.

#### b3. Evidence of Potential to Achieve Recognized Eminence at the Regional, National or International Level Commensurate with Degree Offerings and/or Functions

It is vital for Xavier to keep in touch with the development of the computer industry if the university wants to continue to be recognized as a Model Institution for Excellence. To continue to attract and keep our quality African American students here in Louisiana it is important for the university to continue to keep its faculty and students abreast of the ever changing societal demands. If we do not offer the education the students will need for future employment and graduate work, we will no longer continue to attract the best of our African American students in Louisiana. In turn, Louisiana will continue to lose some of its brightest.

Xavier University's Mathematics Department has produced many fine outstanding individuals, and continues to do so. For the last 10 years Xavier math students have received prestigious scholarships from The David and Lucille Packard Foundation ( awarded for Ph.D. studies), The Harcourt , The STARS program, and The Army Research Lab. Many of our graduates have graduated from prestigious universities with graduate degrees: Emory, University of Maryland, Memphis State University, and others.

### **Mathematics majors**

The Mathematics Department offers its students a number of courses which infuse technology into the curriculum: Calculus I, II and III, Differential Equations, Linear Algebra and all of the Statistics courses. These courses are also taken by students in other areas such as computer science, physics and chemistry. All of these areas rely heavily upon high speed computing facilities and advanced software. Realistic problems involve mathematical models that go far beyond pen and pencil if one is to solve them. With the new Computer Based Mathematics Teaching Labs and the software that it can offer, we can take that vital step towards providing our students with real-life experiences in applied mathematics. As noted above, it is not only our mathematics students taking our applied math courses. The improvements made to our department will then have a campus wide impact.

### **Statistics majors**

At the undergraduate level we offer an introductory statistics course (Math 1020) every semester and sometimes during the summer. This course is important and useful for statistics majors, and they find it a useful tool in their later courses and professional careers. As in the applied mathematics courses, it is extremely important to show some real world applications. Currently, all basic statistics courses are being taught in our Computer Based Mathematics Teaching Labs where the statistical software package SPSS is being used. Our students need to be introduced to real tools to solve real statistical problems, and we are responsible for providing them with those tools. The familiarity with statistical computer packages is expected of more and more of our graduates as applications of statistics become more and more important to potential employers. We can not satisfy the demands of our students or the future demands of employers without the appropriate facilities.

### **Math Education majors**

With many schools moving towards having computers in the classroom, it is important that our department provide the students with the experience and training necessary and required to be successful teachers. The World Wide Web provides many educational benefits to schools which have severely limited funds, but valuable teachers know the limitations of the web as well. With the equipment funded by the grant, we could continue to train our future teachers to use the resources available on the World Wide Web responsibly. The mathematics studied by pre-service teachers must help them develop an understanding of the subject that goes beyond what they will be expected to teach; the use of technology is an essential part of that understanding. It is a fact that teachers tend to teach the way they were taught; if we want our future teachers to use technology in their classes, we have to model the appropriate use of technology in mathematics. Our preservice teachers will benefit using technology in our classes - they will be able to experience the technology as a learning tool to solve mathematical problems, to understand mathematical concepts, and to prepare their students to compete in a technological world.

#### **b.4 Impact on curriculum and instruction**

*The Mathematics Department Computer Based Mathematics Teaching Labs* will be used to provide classroom instruction inclusive of modeling activities, graphical analysis of data, and the solving of mathematical problems typically encountered in industry as opposed to constructive problems in textbooks generally used to develop basic computational skills. In this way students will be exposed to more applied problems and gain an increased conceptual understanding of the application of mathematics. The following table gives a list of courses

offered by the Mathematics Department which will be directly affected with the requested equipment.

Course	Approximate (Sections) Enrollment			Majors(mainly)
	Fall 2007	Spring 2007	Summer 2001	
Developmental	208(10)	125(5)		
Precalculus	300(10)	180(6)	90(3)	all science, math, pharmacy, business, engineering
Calculus I	210(7)	184(6)	120(4)	all science, math, pharmacy, business, engineering
Calculus II	10(1)	7(1)		comp.science,math.,phys., chemistry ACS, engineering
Calculus III	5(1)	3(1)		math,Physics, engineering
Basic Statistics	60(3)	40(2)		comp.science,math,physics, psychology, pharmacy
Differential Equations		8(1)		math., physics, engineering
Linear Algebra		9(1)		comp.science,math,physics
Basic Stat II	20(1)	20(1)		comp.science,math,physics, psychology, pharmacy

Currently, one of our Computer Based Mathematics Labs with 20 student computers is used for all basic statistics courses, Differential Equations, Calculus III, and some developmental course sections. However, Calculus I and II instructors would like to have at least one day a week in a computer classroom with their students, and currently we are able to accommodate many of those courses, but not all. Also, some precalculus instructors have expressed interest in using a computer classroom once a week in order to aid student learning with graphing software; students would be able to see the impact of shifting, reflecting, and stretching on basic graphs. Scientific WorkPlace , Mathematica, DP Graph and other software packages are used in Differential Equations, Linear Algebra and Calculus III. The new computing classroom would provide the necessary resources for an even larger population of students to get “hands-on” experience with modern technology and to get the level of instruction that meets today’s standards in teaching mathematics.

#### b.5 Impact on quality of students

The aim of the department is not to develop the department as to alienate the present student in favor of the more highly qualified student, but to enhance the quality of education of all students. Many of our students are very capable, but come from poorly funded major urban school systems where they are often poorly educated. However, Xavier University has succeeded in greatly enhancing the student’s ability to perform well in the science workforce; Xavier University is number one in placing African Americans into medical school and number one in producing African American pharmacists. Due to dedicated faculty, staff and administration, this university is unique in the type of student it attracts and educates to succeed. These students may not have experienced the benefits of technology, and it is the responsibility of the mathematics department to meet their needs, as well as the needs of the higher quality student. Fifty-six percent of Xavier’s students are from Louisiana, and despite any weakness in their educational backgrounds, many students have successfully continued on to graduate

schools, professional schools and careers. The significant increase in placing African American students in graduate schools in areas of science, engineering, and mathematics is one of the main goals of the university. Xavier has been founded with the purpose of meeting the needs of African American students, and will continue to do so. If we do not keep our eyes on the future, we cannot hope to maintain our status as a national leader in science education.

#### b.6 Impact on Faculty Development

For approximately the last ten years, reform has made its way into the mathematics curriculum beginning as early as elementary school. Consequently, a university mathematics department not accepting the impact technology has made on education would be doing its professors and students an injustice. Technology in the classroom would allow the instructor to put more emphasis on the important aspects of the course, and spend less time performing tedious computations. The instructor's teaching would be enhanced by the graphic capabilities of the computer; visual interpretation of mathematical results would become a natural extension of the curriculum. Computational experiments performed in the classroom would provide the instructor with a tool that would facilitate the learning and understanding of mathematical results. The new software that will be available for faculty research will also better enable the inclusion of undergraduate students in the faculty members research, better preparing the student for graduate school and/or the workplace. Through a BOR research Grant, Drs. Kocic and Stutson have been able to include students in their research by having them investigate mathematical behavior of mathematical equations via DP Graph. The instructors at Xavier's Mathematics Department are exuberant about the educational and research possibilities that would further become available through the addition of the *Mathematics Department Computer Based Teaching Labs*.

More powerful machines would enhance the instructor's ability to electronically submit papers, math reviews, etc. The high speed computing capabilities will enable those faculty members in Statistics and Numerical Analysis to achieve quality results. Other faculty's research may require high resolution graphics. The *Mathematics Department Computer Based Teaching Labs* will allow for frequent faculty workshops within the department, where new ideas and technology will be shared, thus resulting in a more "up to date" faculty in terms of technology use.

### C. Equipment

#### C.1 equipment request

The 10 computer desks and accessories will cost \$43700.00. These desks were chosen because they allow the student to have a clear view of the instructor, blackboard and laptop computer. When the computers are not being used in the classroom, they can be easily moved to the side allowing sufficient room for note and test taking. Each desk accommodates 2 students, and 2 sturdy chairs.

The HP desktop computers were chosen because these computers can be booted-up under the Windows Operating System or the Apple Operating System, allowing for more software options. These computers cost \$1,013.00

The 3 projectors requested with replacement bulbs and extended warranty cost \$3,632.00 totaling \$10896.00.

The Scientific WorkPlace software has been chosen because many faculty members have used the software, and have been very satisfied with its ease of use and its powerful capabilities.

The software is well known in the mathematics field, and many universities use Scientific WorkPlace in the Calculus and Precalculus courses. This is in part due to the student's ability to learn the software easily. The software is also powerful enough for the researcher to use in his research. We currently have 20 licenses of Scientific WorkPlace 4.5 but this is in no way sufficient for the Mathematics Computer Based Teaching Lab. We are requesting a site license for 30 computers. The cost for this license is approximately \$7,800.

#### C.2 equipment on hand for project

One Computer Based Mathematics Lab is currently equipped with an instructor's computer and console, an old projection system, a VCR, a dry-erase board, and a SmartBoard, as well as 33 computers.

The other Computer Based Mathematics Lab is currently equipped with an instructor's computer and console, an old projection system, a worn dry-erase board and a SmartBoard.

The electronic classroom is currently equipped with an instructor's computer and poorly functioning console, VCR, SmartBoard, document camera and old projection system.

#### C.3 equipment housing and maintenance

All but 25 computers will be housed in rooms 320, 305 and 306 of the administration building. These rooms are protected with an alarm system. The remaining 25 computers will be housed in a computer lab on the 5<sup>th</sup> floor of the NCF Science Complex. This room is also secured by an alarm system. The maintenance of the proposed computer equipment will be provided by HP for the first 3 years as a part of the warranty and the remainder of the time by the Informational Technology Center. ITC consists of staff members whose mission is to establish, to maintain, and to facilitate the use of Xavier's information technology infrastructure in support of the University's mission. The Mathematics Department also has an equipment committee which is responsible for purchasing and updating equipment.

#### D. faculty and staff expertise

Every faculty member in the department has a computer in his office equipped with Internet access, Microsoft office, MAPLE and/or Scientific Workplace 4.5. Everyone in the department has developed the necessary experience to use their machines for individual research, teaching, and administrative projects. Instructors can quickly and sufficiently gain enough knowledge about Scientific Workplace or MAPLE to use it in the classroom, and being an expert is not necessary. Those faculty members who do their own programming and use more technical applications have gained further expertise consistent with their tasks. However, if faculty feel inadequate about using such software in the classroom they may attend workshops. Faculty could also attend conferences such as the annual International Conference on Technology in College Mathematics. Many of our faculty have presented at this conference with financial assistance from the university. Dr. Kocic has presented a minicourse "Teaching Precalculus with Scientific Workplace" during the conference. Dr. Gurdial Arora, Dr. Vlajko Kocic, Mrs. Raquel Mesa, Dr. Stutson, and Dr. Sindhu Unnithan attended a workshop at the University of New Orleans on the uses of technology in the classroom; this workshop was a collaborative effort between Loyola University, University of New Orleans, Southern University of New Orleans, and Xavier University. During the same summer, Xavier University sponsored a TI-92 3-day workshop for our mathematics faculty to help in the preparation of the Calculus I reform.

The equipment committee meets on a regular basis to discuss the computing equipment, departmental purchase of hardware and software, and consults with the faculty and students on computing needs and issues. The committee consists of Dr. Valerio De Angelis, Dr. Gurdial Arora, Dr. Carroll Diaz, Dr. Gideon Daspan and Dr. Donna Stutson(Chair). Collectively, they possess a great deal of knowledge of computers, gained from years of experience. The two individuals who will be key to the success of this project are Drs. Gurdial Arora and Donna Stutson and Vljako Kocic. They will oversee the purchase of the proposed equipment, and the housing of the equipment as well. Both Drs. Stutson and Kocic have used Scientific WorkPlace and DP Graph in their research.

#### **E. Economic and Cultural Development Impact**

##### **E.1 Relationships with Industrial/institutional sponsors**

The Exxon/Mobil Corporation, through the grant awarded to the Math and Science Teaching Institute (MSTI) for Middle School Teachers, has sponsored a Xavier University program for middle school teachers. Dr. Stutson(Math), Dr. DeAngelis(Math), Dr. Edwards(Assoc. Dean of College of Arts and Sci.), Dr. Glaude(Education) and Dr. Akbar(Chair of Education) have worked through the summer with the consultant firm FSG to design the MSTI, whose pilot course will run during the Spring semester. Dr. Stutson and other Mathematics faculty will design the pilot course as well as the Summer program which is to begin in 2008. These courses and summer programs will be held in the Computer Based Mathematics Teaching Labs; it is the belief of the department that our middle school teachers should also be exposed to the latest technologies to enhance their understanding of the mathematics and in turn, their teaching in the classroom.

##### **E.2 Promotion of economic development**

Mathematics has a subtle but important effect on economic development. Businesses and high technology industries are more likely to locate in an area which offers a mathematically literate work force, and whose schools and universities offer high quality mathematics.

The increased emphasis on the use of high quality mathematics will help our math, statistics, and math education majors be better prepared for almost any job opportunity open to them. The overall technological competence of all Xavier students served by the Mathematics Department ( premed students, pharmacists, chemists, biologists, physicists, etc.) will be enhanced. With the appealing applications and the ability to solve nontrivial real world problems, the laboratory may also act as a magnet to attract more African American students into mathematics. The students will have more computing experience and make better employees than those with less computing experience.

As the Mathematics Departments faculty and students become more expert at working with the facilities, they will be more useful to businesses and research organizations that work in the same kind of environment.

#### **F. Additional Funding Sources**

# BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and consultants and collaborators. Begin with the principal investigator/program director. Photocopy this page for each person.

Name Dr. Donna Stutson		Position Title Associate Professor of Mathematics	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
University of New Orleans	B.S.	1987	Mathematics
University of New Orleans	M.S.	1988	Mathematics
University of Louisiana at Lafayette	Ph.D	1995	Applied Math

**RESEARCH AND PROFESSIONAL EXPERIENCE:** Starting with present position, list, in reverse chronological order, previous relevant employment, experience, and honors. Key personnel includes the principal investigator and any other individuals who participate in the development or execution of the project. Key personnel typically will include all individuals with doctoral or other professional degrees, but in some projects will include individuals at the masters or baccalaureate level provided they contribute in a substantive way to the development or execution of the project. Include present membership on any Federal Government public advisory committee. List, in reverse chronological order, the titles, authors, and complete references to pertinent publications during the past five years and to representative earlier publications pertinent to this application. DO NOT EXCEED TWO PAGES.

1. A few identities involving Jacobsthal Polynomials (jointly with G. Arora and V. Kocic), to appear International Journal of Pure and Applied Mathematics, Bulgaria
2. Global Behavior of Solutions of a Second Order Nonlinear Difference Equation. (with V. Kocic), *Journal Mathematical Analysis and Applications*, 246, 608-626 (2000).
3. Global Behavior of the Nonlinear Difference Equation,  $x_{n+1} = p_n x_n + x_{n-1} / x_n$ , (with R. DeVault and V. Kocic), *Journal of Difference Equations and Applications*, 11 (2005), 1-13
4. Global behavior of solutions of non-autonomous delay logistic difference equations (jointly with V. Kocic and G. Arora), accepted for publication in *Journal of Difference Equations and Applications*, 2004

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and consultants and collaborators. Begin with the principal investigator/program director. Photocopy this page for each person.

Name Gurdial Arora		Position Title: Chairperson, Professor of Mathematics	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Delhi University	Ph.D	1976	Mathematics
Delhi University	M.Sc	1972	Mathematics
Panjab University	B.Sc (Hons)	1970	Mathematics

**RESEARCH AND PROFESSIONAL EXPERIENCE:** Starting with present position, list, in reverse chronological order, previous relevant employment, experience, and honors. Key personnel includes the principal investigator and any other individuals who participate in the development or execution of the project. Key personnel typically will include all individuals with doctoral or other professional degrees, but in some projects will include individuals at the masters or baccalaureate level provided they contribute in a substantive way to the development or execution of the project. Include present membership on any Federal Government public advisory committee. List, in reverse chronological order, the titles, all authors, and complete references to pertinent publications during the past five years and to representative earlier publications pertinent to this application. **DO NOT EXCEED TWO PAGES.**

## APPOINTMENTS:

2007-	Chairperson, Math Department
2003-present	Professor , Xavier University of LA
1997-2002	Associate Professor, Xavier University of LA
1991-1996	Assistant Professor, Xavier University of LA
1990-1991	Visting Professor, Bowling Green State University, Ohio

## SELECTED PUBLICATIONS:

- Generalized entropies and image segmentation problem, Invited Talk, Ramagaria College, Phagwara, India Aug 25, 2007
- On magic graphs, lecture delivered at Hindu College Delhi , India, September 15, 2007
- Image thresholding using two dimensional Tsallis-Havrda-Charvat-Daroczy entropy, Pattern Recognition Letters, an international journal, Volume 27, Number 6, 520-528, 2006
- (jointly with P. Sahoo) A thresholding method based on two-dimensional Renyi's entropy (appeared in Pattern Recognition, 2004)
- A sufficient Bound for Codes Correcting CT Bursts with Lee Weight Constraint, paper accepted for presentation at 2004 - FIMXI (Eleventh International Conference of Interdisciplinary Mathematical and Statistical Techniques) to be held at Lucknow, India during December 27-29, 2004.
- Global behavior of solutions of non-autonomous delay logistic difference equations (jointly with V. Kocic and Donna Stutson), accepted for publication in Journal of Difference Equations and Applications, 2004
- A few identities involving Jacobsthal Polynomials (jointly with D. Stutson and V.Kocic), to appear in International Journal of Pure and Applied Mathematics, Bulgaria
- A new measure to determine the ambiguity level of qualitative statements (Jointly with A. Chandra, Gary A. Holt), Clinical Research and Regulatory Affairs, Volume 20, No. 1, 47-57, 2003
- Single and double length error detecting decimal codes jointly with Larry Dunning, paper presented by Larry Dunning at International Symposium on Information Theory, Lausanne, Switzerland, June 30-35, 2002. Extended abstract appeared in the proceedings of the conference.
- Uncertainty for Rough Sets and Rough Relational Databases, to appear as a chapter in the book entitled, "Fuzzy Sets, Rough Sets and Decision Making Processes" published by Springer-Verlag, 2000.
- T. Beaubouef, F. E. Petry and Gurdial Arora, Information theoretic measures of uncertainty and rough relational databases, Information Sciences, Vol. 109, 185-195, 1998.
- Arora, Gurdial and DeVault R. C. and Kocic, V. (1997) Global behavior of solutions of  $x_{n+1} = a x_n + f(x_n, x_{n-1})$  (1997) Journal of Difference Equations and Its Applications.
- On Fuzzy codes for asymmetric and unidirectional errors, Fuzzy sets and systems, Volume 36, 365-373, 1990 (jointly with L. Hall)
- Unidirectional byte error detecting codes for computer memory systems, IEEE Transactions on Computers, 1990 (jointly with L. Dunning and M. Varanasi)
- On axiomatic characterization of the weighted entropy of type  $(\alpha, \beta)$ , Aplikace Matematiky, Volume 26, 418-425, 1981 (jointly with Inder Jeet Taneja)
- Multiple decoding scheme and bounds on the probability of error and erasure over a multiple access channel, Kybernetika, Volume 12, 1976, 213-222 (jointly with Bhu Dev Sharma)
- Bounds on distortion due to error for rates below and above the channel capacity, Information and Control, Volume 26, 1974, 272-279 (jointly with Bhu Dev Sharma)



**BIOGRAPHICAL SKETCH**

Provide the following information for the key personnel and consultants and collaborators. Begin with the principal investigator/program director. Photocopy this page for each person.

Name Vljako Kocic

Position Title Keller Family Foundation Professor of  
and Sciences;  
Professor of Mathematics

INSTITUTION AND LOCATION

YEAR  
CONFERRED

University of Belgrade  
University of Belgrade  
University of Belgrade

B.S.

1979

1977

Mathematics

Applied Mathematics  
Electronics

Electrical Engineering

1977	Applied Mathematics Electrical Engineering
------	---

**RESEARCH AND PROFESSIONAL EXPERIENCE:** Starting with present position, list, in reverse chronological order, previous relevant employment, experience, and honors. Key personnel includes the principal investigator and any other individuals who participate in the development or execution of the project. Key personnel typically will include all individuals with doctoral or other professional degrees, but in some projects will include individuals at the masters or baccalaureate level provided they contribute in a substantial way to the development or execution of the project. Include present membership on any Federal Government public advisory committee. List, in reverse chronological order, the titles, all authors, and complete references to pertinent publications during the past five years and to representative earlier publications pertinent to this application. DO NOT EXCEED TWO PAGES.

**MENTS**  
Xavier University in Louisiana

Keller

present Xavier University in Louisiana

Keller Family Foundation Professor of Arts and Sciences 2005 -  
Professor of Mathematics  
Chair  
(Assoc.) 2002 -present

University of Rhode Island  
1994

University of Belgrade

Institute "Mihajlo Pupin" -Belgrade  
990

1987 - 1990 Ins

Associate Professor (1990-1992), Assistant Professor (1985-1990),  
Instructor (1978-1985)  
Consultant,

a. Research monograph

Global Behavior of Nonlinear Difference Equations of Higher Order with Applications, (with G. Ladas),  
Kluwer Academic Publishers, Dordrecht -- Boston -- London, 1993.

b. **Selected research papers**

1. Global attractivity

b. Selected research papers

1. Global attractivity in nonlinear delay difference equations, (with G. Ladas), *Proc. Amer. Math. Soc.* 115, 1992, 1083-1088.
2. Global stability of a recursive sequence, (with R. DeVault and G. Ladas), *Dynamic Systems and Appl.* 1, 1992, 13-21.
3. Linearized oscillations for difference equations, (with G. Ladas), *Hiroshima Math. J.* 22, 1992, 95-102.
4. Linearized oscillations in nonautonomous delay differential equations, (with G. Ladas and C. Qian), *Differential and Integral Equations*, 6, 1993, 671-683.
5. On rational recursive sequences, (with G. Ladas and I. W. Rodrigues), *J. Math. Anal. Appl.* 173, 1993, 127-157.
6. Modeling the effects on destructive fishing practices on tropical coral reefs, (with S. B. Saila and J. W. McManus), *Mar. Ecol. Prog. Ser.*, 94, 1993, 51-60.
7. Periodicity in a simple genotype selection model, (with E. A. Grove, G. Ladas and R. Levins), *Differential Equations and Dynamical Systems*, 1, 1993, 35-50.
8. Oscillation and stability in a simple genotype selection model, (with E. A. Grove, G. Ladas and R. Levins), *Quart. Appl. Math.* 52, 1994, 499-508.
9. Global stability of nonlinear Volterra difference equation, (with E. A. Grove, G. Ladas and R. Levins), *Dynamical Systems*, 2, 1994, 337-345.
10. Global attractivity in second-order nonlinear difference equations, (with S. Elaydi), *Differential Equations and* 1993, 144-150.
11. Monotone unstable solutions of difference equations and conditions for boundedness, (with E. Camouzis, E. A. Grove, and G. Ladas), *Journal of Difference Equations and Applications*, 1, 1995, 17-44.
12. Stability of Lyness' Equation, (with G. Ladas, G. Tzanetopoulos, and E. Thomas), *Dynamics of Continuous Discrete and Impulsive Systems*, 1, 1995, 245-254.
13. Permanence and global attractivity in nonlinear difference equations, (with G. Ladas), In V. Lakshmikantham, ed. *World Congress of Nonlinear Analysts '92*, 161-1172. Walter de Gruyter, Berlin 1996.
14. Global Attractivity in a Nonlinear Second-Order Difference Equation (with G. Ladas). *Communications on Pure and Applied Mathematics*, Vol XLVIII, (1995), 1115-1112.
15. Oscillations of a nonlinear second order difference equation, (with G. Ladas), *Proceedings of the International Conference on Difference Equations*, Edited by S. N. Elaydi, 297-310.
16. Oscillation and Stability in a Genotype Selection Model, (with G. Ladas and R. Levins), *Journal of Difference Equations*, 1995, 1083-1088.

17. Global Stability of Nonlinear Delay Difference Equations, (with S. N. Elaydi and J. Li). *Journal of Difference Equations and Applications*, 2, 1996, 87-96.
  18. Global Behavior of solutions of  $x_{n+1} = \max\{x_n^k, A\}/x_{n-1}$ , (with E. J. Janowski, G. Ladas and G. Tzanetopoulou). *Journal of Difference Equations and Applications*, 3(1998), 297-310.
  19. Global Behavior of Solutions of  $x_{n+1} = ax_n + f(x_n, x_{n-1})$  (with R. C. DeVault, G. Dial, and G. Ladas), *Journal of Difference Equations and Applications*, 3 (1998), 311 - 327.
  20. Global Behavior of Solutions of a Second Order Nonlinear Difference Equation. (with D. Stutson), *Journal of Mathematical Analysis and Applications*, 246, 608-626 (2000).
  21. On the Discrete Model of West Nile-Like Epidemics, (with T. Darensburg) in *Dynamic systems and applications*. Vol. 4, 358--366, Dynamic, Atlanta, GA, 2004
  22. A Note on the Nonautonomous Beverton-Holt Model, *J Journal of Difference Equations and Applications*, 11, (2005), 415 - 422
  23. Global Behavior of the Nonlinear Difference Equation,  $x_{n+1} = p_n + x_{n-1}/x_n$ , (with R. DeVault and D. Stutson), *Journal of Difference Equations and Applications*, 11 (2005), 1-13
  24. Global Behavior of Solutions of a Nonlinear Second-Order Nonautonomous Difference Equation, in *Difference Equations and Discrete Dynamical Systems*, World Scientific, London, 2005, 101-119
  25. Dynamics of a discontinuous piecewise linear map, in Eds: Ravi P. Agarwal, and Kanishka Perera, *Proceedings the Conference on Differential & Difference Equations and Applications*, Hindawi Publishing Company, (2006), 56-574
- b. Editor of Conference Proceedings**

Guest-editor of Volume 3 Numbers 3-4, (1998) the *Journal of Difference Equations and Applications*, devoted to the Special Session "Asymptotic Behavior of Difference Equations with Application, AMS Meeting # 911 Baton Rouge, April 1996."

## CURRENT AND PENDING SUPPORT

(From ALL sources, including Board of Regents Support Fund)

The following information MUST be provided for each investigator and other senior personnel. Use additional sheets if necessary.

NAME OF INVESTIGATOR: Dr. Donna Stutson

Status of Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title: LEQSF (2004-2007) RD-A-040 Global Behavior of Nonlinear Discrete Systems with Applications

Source of Support: Louisiana Board of Regents

Award Amount (or Annual Rate): \$ 77,722 Period Covered: 2004 - 2008

Location of Activity: Xavier University of Louisiana

Person-Months or % of Effort Committed to the Project:

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Person-Months or % of Effort Committed to the Project: Period Covered:

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Person-Months or % of Effort Committed to the Project: Period Covered:

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Person-Months or % of Effort Committed to the Project: Period Covered:

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Person-Months or % of Effort Committed to the Project: Period Covered:

## CURRENT AND PENDING SUPPORT

(From ALL sources, including Board of Regents Support Fund)

The following information MUST be provided for each investigator and other senior personnel. Use additional sheets as needed.

NAME OF INVESTIGATOR: Dr. Gurdial Arora

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Period Covered:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Period Covered:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Period Covered:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$

Location of Activity:

Period Covered:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

## CURRENT AND PENDING SUPPORT

(From ALL sources, including Board of Regents Support Fund)

The following information MUST be provided for each investigator and other senior personnel. Use additional sheets as necessary

NAME OF INVESTIGATOR: Vlado Kocic

Status of Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title: LEQSF (2004-2007) RD-A-040 Global Behavior of Nonlinear Discrete Systems with Applications

Source of Support: Louisiana Board of Regents

Award Amount (or Annual Rate): \$ 77,722 Period Covered: 2004 - 2008

Location of Activity: Xavier University of Louisiana

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☒ 1 Month ☐ Summ

Status of Support: ☒ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title: Development of a Nationally Recognized Model in Research Commercialization, Education and Workforce Development in Chemical Engineering and the Chemical Sciences through University and Community College Collaborations

Source of Support: Louisiana Board of Regents

Award Amount (or Annual Rate): \$ 1,400,000 Period Covered: 2007 - 2009

Location of Activity: Xavier University of Louisiana

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☒ 1 Month ☐ Summ

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$ Period Covered:

Location of Activity:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

Status of Support: ☐ Current ☐ Pending ☐ Submission Planned in Near Future

Contract Number/Proposal Title:

Source of Support:

Award Amount (or Annual Rate): \$ Period Covered:

Location of Activity:

Person-Months or % of Effort Committed to the Project: ☐ Cal Yr ☐ Acad ☐ Summ

**BOARD OF REGENTS SUPPORT FUND**  
**TRADITIONAL AND UNDERGRADUATE ENHANCEMENT, FY 2008**

**Budget and Budget Justification Pages**

Directions: Each line item under the columns "Support Fund Money Requested," "Institutional Match," and "Private Sector/Other Match" must be itemized, fully explained, and justified on a **separate budget justification page(s)**. Attach additional justification pages as needed.

Title of Proposal: Computer Based Mathematics Teaching Lab

Project Director(s): Dr. Donna Stuston (PI), Dr Gurdial Arora (co-PI); Dr. Vljako Kocic (co-PI)

Institution(s) of Higher Education: Xavier University of Louisiana

**PROPOSED BUDGET:**

	Support Fund Money Requested	Institutional Match <sup>1</sup>	Private/Other Match <sup>2</sup>
A. Equipment <sup>3</sup>	\$ 73,905.18		
B. Software	\$ 7,800.00		
C. Supplies			
D. Shipping/handling			
E. Installation			
F. Personnel training			
G. Other			
1. PI 1Summer month	\$5,866.67		
2. Fringe benefits 18%	\$1,056.00		
3.			
4.			
5. (etc.)			
H. Indirect costs	Not allowed	\$3441.65	
I. Maintenance	Strongly discouraged		
J. Total costs (A-I)	\$ 88,627.90	\$3441.65	

<sup>1</sup> Stipulate whether in-cash or in-kind. The Board strongly encourages the sharing of costs for proposed projects. Applicants and institutional officials should note, however, that the employing institution will be required to honor the commitments made in the original proposal before any awards are made. Discounts for equipment purchases are not allowable as institutional match.

<sup>2</sup> The budget page(s) must reflect and the budget justification pages must explain any external funds that are claimed in the proposal. External funds and their expenditure must be accounted for in the same manner as Support Fund money and institutional match.

<sup>3</sup> Equipment. If applicable, itemize and describe briefly the proposed equipment and its intended use in the project. Include the name, model number, and manufacturer(s).

(TR and UG Enhancement Program Budget and Budget Justification, Rev. 8/2007)