LEQSF(2007-12)-ENH-PKSFI-PES-03

"An Interdisciplinary and Experimental Approach to Strengthen Recruitment, Retention, and Training in Biological and Materials Sciences in Post-Katrina New Orleans"

PI: Frank Jordan

Lead Institution: Loyola University New Orleans

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Proposal Narrative (without appendices)

COVER PAGE FOR POST-KATRINA SUPPORT FUND INITIATIVE
PRIMARILY EDUCATION SUBPROGRAM PROPOSALS
BOARD OF REGENTS SUPPORT FUND, FY 2006-07

003PKSFI-E-07

1. Primary Submission Discipline: ☑ **Biological Sciences** ☐ Information Technology ☐ Materials Science (check only one)	(For BoR Use Only) Application Number:
2. Name of Lead Institution of Higher Education: (Include Branch/Campus/Other Components)	**Loyola University New Orleans**
3. Address of Lead Institution of Higher Education: (Include Dept/Unit, Street Address/P.O. Box Number, City, State, Zip Code)	**Department of Biological Sciences, Loyola University New Orleans, 6363 St. Charles Avenue, P.O. Box 25, New Orleans, Louisiana 70118**
4. Title of Proposed Project:	**An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans**

5. Funds Requested:	P-KSFI Year 1: $255,278	ESIP (Year 1 only): $50,000	Total Project Request: $1,329,902	6. Proposed Duration: (Circle # of Yrs.) 1 2 3 4 ⑤

7. Name(s) of Partnering Institution(s):

8. Does This Proposal Contain Confidential or Proprietary Information Which Falls Into a Category Described in R.S. 44:4(16)?
☐ YES ☑ NO (NOTE: If YES, the proposal MUST be appropriately marked.)

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).

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(Form 1-PKSFI-PES, 1-2007)

Section 2
Project Summary

Name(s) of Lead Institution (Include Branch/Campus and School or Division) and Partnering Institution(s):

Loyola University New Orleans

Address of Lead Institution:

Department of Biological Sciences, Loyola University New Orleans, 6363 St. Charles Avenue, New Orleans, Louisiana 70118-6143

Principal Investigators:

Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Title of Project:

An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Abstract:

The flow and retention of disadvantaged local students into the Science, Technology, Engineering and Mathematics (STEM) pipeline of New Orleans was limited prior to Hurricane Katrina because these students had weak quantitative skills and few opportunities to experience the excitement of scientific research. Post-Katrina reorganization and revitalization of secondary education, including renewed focus on science and mathematics, provides a unique opportunity for universities to increase flow and retention of local students into the STEM pipeline. We propose to institute an interdisciplinary and experiential approach based on Bio2010 to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans. Our approach involves the following components: 1) participation in summer research experience involving mentoring teams (i.e., 1 faculty member + 1 high school teacher + 2 college students + 4 high school students); 2) required enrollment in summer section of "Mathematics for Scientists" to strengthen quantitative skills; 3) integration of physical science learning modules into introductory biology courses; 4) integration of more biological applications into introductory physics, chemistry, and mathematics courses; and 5) upgrade of scientific instrumentation in introductory biology, chemistry, and physics laboratories. We will offer tuition waivers, research stipends, and college credit in order to recruit students and teachers from high schools in the greater New Orleans community. Importantly, our curricular reforms and increased opportunities for undergraduate research will also increase recruitment and retention of non-local students into the greater New Orleans STEM pipeline.

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Section 4
Goals and Objectives

Our project is designed to **recruit and retain** students into the STEM pipeline by providing collaborative research opportunities, building solid quantitative skills, and providing an innovative and interdisciplinary science curriculum. Our project includes curriculum enhancement during the regular school year and an intense six-week research program during the summer that links together local high school students and teachers with university students and faculty. Our specific objectives include:

- Using Bio2010 as a model, revise science curricula to adopt a more interdisciplinary and quantitative approach. Incorporate more biology and health science applications into physical science courses and incorporate physical science modules into biology courses.
- Update equipment in core teaching laboratories so that students can conduct guided and open-ended experiments about scientific phenomena ranging from the molecular to ecosystem levels.
- Create six collaborative research teams each project year that consist of a faculty member, high school teacher, two undergraduate students, and four high school students. Each team will work for six weeks during the summer on a project related to the faculty member's research program.
- Invite prominent scientists to give seminars about their research and careers during our summer research program.
- Build science communication skills by having high school and undergraduates present their research results at a capstone mini-symposium at the end of the six-week summer research period.
- Help high school students develop solid quantitative skills by requiring their enrollment in a Math for Scientists course that will emphasize analysis, interpretation, and visualization of data collected by the six research teams.
- Provide high school teachers with new skills and experiences that they can use to enhance and enliven their own classrooms and laboratories.
- Build a strong mentoring culture rich in opportunities for experiential learning through our curricular revisions, summer research program, research seminars, and capstone mini-symposium.
- Promote a diverse and well-trained STEM workforce by encouraging women, minorities, and other underrepresented groups to participate in all phases of the project. We are especially interested in recruiting low-income, first generation college students.
- Finally, our overarching goal is to build linkages with local high schools, increase recruitment and retention of science majors at Loyola University New Orleans, and thereby increase the number of highly trained scientists entering into STEM related professions in the greater New Orleans community.

Section 5
Narrative and Bibliography

A. Project Rationale and Structure

"The nation must confront major obstacles that restrict the science and math pipeline. Many students are kept out of the pipeline due to poor teacher quality at the K-12 level and inadequate high school preparation in math and science, and these barriers are particularly strong for students of color. Others may be better prepared, but are dissuaded by long preparation and high tuition costs, low pay relative to fields such as law or business, and disappointing postsecondary experiences. For female students, a lack of role models and discouragement from pursuing science from an early age take their toll. And foreign talent increasingly has more places to go, as well as more difficulties coming to the United States. The United States has been addressing many of these concerns, but needs to do more to strengthen the STEM pipeline." (Russell and Siley 2005)

A1. Context for Project

The national science, technology, engineering, and mathematics (STEM) pipeline is not producing enough well trained professionals to solve today's bewildering array of scientific and technological problems. This problem was evident in New Orleans long before Hurricane Katrina because an under-funded and dysfunctional public school system could not adequately prepare most students to pass state education exams (LEAP), let alone for entry into academically rigorous college science programs. The problem is even more critical since Hurricane Katrina decimated social, economic, and educational systems and led to a "brain drain" as highly qualified professionals move away from the greater New Orleans community.

Clearly, the flow of qualified students into the STEM pipeline must be increased in order to mitigate "brain drain", to help develop a professional workforce and build a vibrant economy, and to help solve myriad technical and environmental problems associated with rebuilding New Orleans. The greatest decline in interest in math and science careers occurs during high school and the first year or two of college because 1) the cumulative effects of inadequate attention to quantitative skills begin to take their toll on student performance, 2) poorly designed curricula fail to engage students or to enhance weak quantitative skills, and 3) students are not exposed to the excitement and rewards of scientific discovery. High school and college educators clearly need to work together in order to overcome these obstacles that are restricting the flow of students into the STEM pipeline.

In this proposal we describe a project designed to recruit and retain students into the STEM pipeline by providing collaborative research opportunities, building solid quantitative skills, and providing an innovative and interdisciplinary science curriculum based in part on the ideas of Bio2010 (National Research Council 2003). Our project includes enhancement of our core science curricula during the regular school year and an intense six-week research program during the summer that links together local high school students and teachers with university students and science faculty.

Loyola University New Orleans has strong programs in biology, chemistry, mathematics, physics, and psychology that prepare significant numbers of students for entry into the STEM workforce, graduate school, and professional schools. One reason these programs have been so successful is that our faculty are committed to excellent teaching, outreach to local elementary and secondary schools, and maintaining externally funded research programs that usually involve collaboration with undergraduates, many of whom are from populations underrepresented in the sciences. Unfortunately, Hurricane Katrina resulted in a dramatic 35% drop in the enrollment of first-year students and a projected 20-30% attrition of upperclassmen in the 2007-2008 academic year. To offset these losses, Loyola eliminated 27% of the faculty and 43% of the administrative staff in math and sciences. The infrastructure for research at Loyola was also severely compromised by loss of equipment, research materials (e.g., biological cell lines, microbial cultures, and tissue samples), research time in the laboratory and field, and internal funding to support professional travel, research, and sabbatical leaves.

A2. Project Focus

The Louisiana Board of Regents' Post-Katrina Support Fund Initiative (P-KSFI) provides not only a means to help overcome losses associated with Hurricane Katrina, but also an opportunity to truly move forward by developing a more interdisciplinary curriculum and summer research program that will help recruit and train local high school students, provide hands-on experience and mentoring opportunities for undergraduates, build and reinforce quantitative skills, enhance retention during the first two years of college, and increase the flow of students into the STEM workforce. Our project is broad in scope and addresses all three of the education subprogram initiatives outlined in the P-KSFI Request for Proposal.

First, our project aims to enhance undergraduate education at Loyola by adopting most of the recommendations of Bio2010 and moving towards an **interdisciplinary approach** to preparing students for the STEM workforce. We will accomplish this by requiring a summer Math for Scientists course for high school students participating in our six-week summer research program, integrating physical science modules into our core biology curriculum, and increasing the amount of life science applications in our core physical science courses. Students will reinforce quantitative skills by increased analysis, interpretation, and visualization of data collected during our summer research program and in core biology laboratories. High school teachers who participate in our summer research program will likely spread the emphasis on multidisciplinary science and quantitative skills to their colleagues and administrators (Silverstein and Dubner 2006).

Second, our project aims to strengthen the **mentoring culture** that already exists in Loyola's science programs. We have a long history of working closely with undergraduates in our capacity as advisors, teachers, and research collaborators. P-KSFI support will allow us to increase the number of students involved in research collaborations and extend our mentoring culture by inviting high school teachers and students to participate in our summer research program. Importantly, our summer research program will involve

formation of research teams consisting of a faculty member, high school teacher, two undergraduates, and four high school students. These collaborative teams are analogous to research groups found at research universities and, like these, our expectation is that a diverse range of perspectives, ideas, and experiences will enhance the discovery process. We will also invite local, regional, and national scientists to visit campus during the summer research session to present research seminars and discuss opportunities and challenges associated with careers in research. Faculty and high school teachers will work closely with students to develop presentations for a capstone mini-symposium at the end of the summer research program, which will also help build scientific communication skills. A strong mentoring culture and development of scientific communication skills are additional recommendations of Bio2010.

Third, our project aims to increase **experiential learning** opportunities for high school students and undergraduates, especially in core laboratories during their first two years. Our six-week summer research program is the most direct mechanism for providing students with hands-on opportunities to make new scientific discoveries. We will offer similar opportunities during the regular school year by integrating more open-ended experiments in our core science laboratories. Indeed, this is already being done as part of ongoing curriculum reform in our science departments. We recently purchased a DNA sequencer and other equipment needed to conduct cell and molecular lab experiments, but we need more equipment to augment core biology, chemistry, and physics laboratories (see Appendix 1). Once again, increased opportunities for experiential learning is a key recommendation of Bio2010.

In addition to the high school outreach built into our summer research program, we will also arrange follow-up activities in which faculty team leaders visit the classrooms of their high school teacher counterparts to speak with students about their research programs, about the importance of post-secondary education, and about career opportunities in STEM. Undergraduate students who participate in the summer research program will also be encouraged to perform service learning activities in support of high school science education.

Finally, we recognize that our proposed approach to interdisciplinary education and training falls short of the Bio2010 ideal. This cannot be avoided because most of our science majors are interested in health professions and, unfortunately, medical schools in the region still require a traditional list of introductory science courses. Bio2010 recognized this dilemma and encouraged colleges to adopt the recommendations that best fit the needs of their students. Our long-term goal is to continue blurring the boundaries between disciplines as medical and other health professional schools alter their requirements to better match the realities of modern science. There is also growing momentum at Loyola to create interdisciplinary majors based on our current and emerging research strengths: biochemistry and cell biology, neurology and behavioral science, and environmental science.

A3. Personnel

Loyola University New Orleans is a Jesuit Catholic institution committed to **promotion of critical thinking and social justice** as part of our educational mission. Loyola faculty and undergraduates also have a long history of **collaborating with public schools** in the greater New Orleans community on a variety of educational initiatives. Our project combines these two aspects of Loyola's mission in order to promote recruitment and retention of students into the STEM pipeline by providing collaborative research opportunities, building solid quantitative skills, and providing an innovative and interdisciplinary science curriculum. We are especially interested in reaching out to populations that are underrepresented in the sciences.

The Project Director and Co-Principal Investigators of this project are Chairs of the math and science departments in the College of Humanities and Natural Sciences at Loyola. The information provided in Section 7: Biographical Sketches demonstrates that the Project Director and Co-Principal Investigators are committed teachers and active scientists with significant combined experience working with high school students, guiding curriculum reform, administering academic departments and programs, maintaining externally-funded research programs, and communicating science via oral presentations and peer-reviewed publications. Although project personnel will oversee the implementation of the summer research session, they must compete with other Loyola science faculty for the opportunity to lead summer research teams. The competition will be intense because Loyola science faculty are both excellent teachers and productive researchers. Indeed, most of our science faculty have maintained active research programs over the last three years, despite the ravages of Hurricane Katrina on our personal and professional lives (see table below). One way in which science faculty remain productive is by doing research during the summer. Our project will enhance summer productivity by providing additional resources and a suite of eager collaborators to help carry out research.

Percentage of tenured and tenurable science and math faculty with peer-reviewed publications and external funding since 2004, the year before Hurricane Katrina struck New Orleans.

Department	# of faculty	% funded	% published
Biology	10	90	70
Chemistry	5	80	60
Math	10	10	100
Physics	4	50	75
Psychology	7	14	71

The administration at Loyola is committed to providing faculty with the resources they need to maintain active research programs. Each faculty member is provided an office and research laboratory. There are also several shared instrumentation spaces and computing facilities. Individual departments have modest budgets to maintain and repair equipment, although these budgets were reduced significantly to offset revenue losses associated with

Hurricane Katrina. Faculty are provided annual support to travel to scientific meetings. Our library maintains a wide selection of print and electronic journals and is very generous about procuring articles in journals we do not subscribe to. Library personnel will give seminars during the summer research program on information literacy and how to use information technology effectively. Importantly, the administration will extend use of library facilities to high school teachers and students participating in our summer research program. Faculty are granted release time from teaching when they are awarded significant external grants. Additionally, they are allowed to incorporate requests for course releases into external grant proposals. Finally, Loyola has a math center that will be available for additional tutoring and computing exercises during the summer research program.

B. Work Plan

B1. Proposed Work

We propose to do the following:

- Revise science curricula to adopt a more interdisciplinary and quantitative approach
- Incorporate physical science modules into biology courses
- Incorporate biology and health science applications into physical science courses
- Acquire modern equipment and instrumentation for introductory science labs
- Create summer research program emphasizing mentoring and experiential learning
- Form six collaborative research teams each summer consisting of one faculty, one high school teacher, two undergraduates, and four high school students
- Require high school students to take Math for Scientists course during summer
- Invite prominent speakers to give seminars during the summer
- Hold a capstone mini-symposium at the end of each summer research session
- Faculty conduct follow-up visits to high schools and undergraduates engage in service learning in support of high school education
- Use P-KSFI program as leverage to secure additional external support
- Evaluate project success and share results with appropriate stakeholders

Our project is significant in that it will implement most of the recommendations of Bio2010 in order to recruit and retain students into the STEM pipeline of a community that is recovering from the worst natural disaster in our nation's history. The linkages we establish with local high schools are sustainable and scalable to other universities and other communities throughout Louisiana and will lead to a significant increase in the quality of STEM education. The greatest limitation that our project must overcome is the availability of high school students capable of participating in our summer research program. We will overcome this limitation by working closely with high school teachers and administrators and Upward Bound staff to advertise our program. Additionally, we will offer stipends as incentives for participation in the summer research program and tuition waivers for college credit as incentives for enrollment in our Math for Scientists course, which will provide the quantitative skills needed to succeed in scientific research.

B2. Project Structure

Our project is designed to recruit and retain students into the STEM pipeline by providing collaborative research opportunities, building solid quantitative skills, and providing an innovative and interdisciplinary science curriculum. Our project includes curriculum enhancement during the regular school year and an intense six-week research program during the summer that links together local high school students and teachers with university students and faculty in focused research teams. The following structure will be used to focus our activities:

i. We will form an advisory committee consisting of the Project Director and the chairs of the biology, chemistry, math, physics, and psychology departments. Co-Principal Investigators on this proposal will continue to serve on the advisory committee even if they stop serving as Chair of their respective departments. The purpose of this advisory committee is to assist the Project Director with development of criteria for selection of faculty, undergraduates, high school teachers, and high school students to participate in summer research teams. The committee will also provide guidance to departments on how to move forward with curriculum reform issues.

ii. The advisory committee will oversee purchasing of equipment and instrumentation for core science labs (see Appendix 1). We initiated the process of updating and modernizing our science labs about a decade ago, with a major emphasis on renovating core chemistry labs. This process was slowed considerably because of Hurricane Katrina. Nonetheless, dedicated faculty have managed to work with a variety of private, state, and federal organizations over the last couple of years to secure cell and molecular bench-top equipment, a DNA sequencer, a mass spectrometer, equipment for a new laser lab, a microwave for digestion and synthesis, a solvent purification system, and a new multi-passenger van to transport students on field trips. The advisory committee will use P-KSFI funds to acquire additional equipment and instrumentation for core science laboratories so that students can conduct guided and open-ended experiments about phenomena ranging from the molecular to ecosystem levels. This equipment will also be used to support the summer research program and other teaching and research activities. We are also requesting video and computing equipment needed to set up an interactive multimedia science classroom.

iii. Review, reform, and assessment of major curricula are ongoing processes carried out by each department at Loyola University as part of our SACS accreditation. Departments desiring to alter their major curriculum must submit a proposal to a college-level curriculum committee for approval, and this proposal must include a letter of support from each department affected by proposed curriculum changes. Biology, chemistry, math, physics, and psychology have adjunct requirements that span across all five departments, so we are mandated to work closely with one another on curricular issues. The advisory committee will work with departmental curricular committees to strengthen the multidisciplinary nature of our science major curricula and build in more opportunities to build quantitative skills that are essential to success in science. Biology and Physics are currently in the process of revising our

core curricula. The focus of curriculum revision in biology is creation of a experience-based laboratory for our first course (Cells and Heredity), creation of a freshman advising position and associated Biology Freshman Seminar course, and reduction of the core curriculum to 12 hours. The focus of curriculum revision in physics is the addition of a Pre-Medical track and integration of more biophysics courses and research opportunities. The next step in biology is to work closely with physics and chemistry faculty to develop physical science modules to incorporate into our core curriculum. For example, we could develop a module that reinforces fluid dynamic concepts as part of a discussion of the circulatory system. At the same time, biology faculty will provide our colleagues with biological applications that reinforce physical science concepts. We feel these changes are essential given that the majority of students in introductory physical science courses are biology and psychology students interested in health professions. These changes should also benefit students in the Forensic Chemistry track, who tend to have weaker academic backgrounds than other chemistry majors.

iv. The Project Director will create a web site to describe and advertise the summer research program. The web site will have an online form for high school teachers and students to use to register for the summer research program. The web site will highlight past accomplishments and provide links to other summer research opportunities. The site will also contain information used to assess the success of the program.

v. The Project Director will contact principals and science faculty at high schools in the greater New Orleans community to advertise the summer research program and recruit high school teachers and students.

vi. The Project Director and advisory committee will oversee selection of faculty, undergraduates, high school teachers, and high school students for summer research teams.

vii. The Project Director will create and disseminate a handbook that outlines the goals and expectations of the summer research program to members of summer research teams.

viii. The Project Director will administer the project, manage the budget, arrange payment of summer stipends, and organize the mini-symposium at the end of the summer research session.

ix. The Math for Scientists instructor and two undergraduate tutors will handle all aspects of their course. The instructor will work closely with summer research faculty to obtain real data to be analyzed, interpreted, and visualized in class.

x. The Project Director will work with faculty to identify and invite local, regional, and national scientists to visit campus during the summer research session to present research seminars and discuss opportunities and challenges associated with careers in research.

xi. Faculty selected to lead summer research teams are responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, helping students create presentations for mini-symposium at end of summer

research session, and follow up visits to high schools. Loyola faculty have active research programs addressing a wide range of basic and applied problems in biological and materials sciences.

xii. The Project Director will collect and maintain data needed to assess the success of the project (see Section B4: Performance Measures and Milestones). The Project Director will also serve as lead author on a manuscript describing substantive results of this project.

B3. Project Impact

Prior to Hurricane Katrina, the flow of high school and college students into the STEM pipeline was negligible because there were limited resources available to provide quality science education in the public schools of greater New Orleans. Our project is specifically designed to enhance science education and will therefore have immediate and lasting impact on the flow of high school and college students into the STEM pipeline of New Orleans and Louisiana.

First, we will recruit a total of 120 high school students (24 per year) to collaborate with science faculty on summer research projects. These students will gain direct research experience that will lead to a better understanding of, and excitement for, STEM-related careers. These students will also acquire quantitative skills that will greatly increase their success as science majors in college and thereafter in graduate and professional school. Importantly, we anticipate that our project will provide training opportunities and college credit to a significant number of disadvantaged and/or minority students.

Second, we will recruit a total of 30 high school teachers (6 per year) to collaborate with science faculty on summer research projects. These teachers will learn new techniques that they can incorporate into their own classrooms and laboratories. Perhaps more importantly, these teachers will gain a greater appreciation and enthusiasm for research and hopefully this will renew their excitement about teaching science. Silverstein and Dubner (2006) found that high school teachers participating in a Columbia University summer research program similar to ours increased the amount of problem-solving in their lessons, revised content of lessons and laboratories, increased hands-on activities, increased use of rigorous writing assignments, incorporated new teaching technologies, placed greater emphasis on science as a career path, increased their own reading of primary literature, increased their leadership role in new science education initiatives, and actively recruited other teachers and administrators to participate in reform and enhancement of science teaching. Perhaps more importantly, the students of these teachers showed increased interest in science and performed better on state standardized tests than control students. These results are promising because students in New Orleans public schools have a tragic history of poor performance on the Louisiana's standardized LEAP exam.

Third, we will recruit a total of 60 undergraduates (12 per year) to collaborate with science faculty on summer research projects. Like their high school counterparts, these students will benefit immensely from their hands-on research experience and increase their appreciation for basic and applied scientific research as a viable career option. Research

experiences such as those proposed herein provide students with a significant advantage when applying to graduate and professional schools.

Fourth, the curriculum reforms that we will institute are designed to make science education more exciting, more interdisciplinary, and more quantitatively rigorous. We anticipate that these reforms, along with enhanced opportunities to participate in collaborative research, will enhance recruitment of students both locally and nationally. Furthermore, we anticipate that curricular reform, especially renewed emphasis on quantitative skills, will lead to increased recruitment and a significant increase in the number of students entering into graduate and professional schools, or directly entering the STEM workforce. Purchase of new equipment listed in Appendix 1 will allow us to conduct more exciting and contemporary experiments in our core science laboratories.

Fifth, faculty teaching and research will benefit from the diverse array of ideas and perspectives that are likely to characterize each summer research team. Faculty can capitalize upon the intellectual and labor resources of the research team to enhance research productivity. More importantly, faculty can leverage P-KSFI support to increase their competitiveness for external research support from state, federal, and private stakeholders.

Finally, our program should be readily transportable to other universities in New Orleans and Louisiana. If our expectations are realized, we anticipate a variety of organizations will be interested in sustaining and perhaps expanding our program after P-KSFI support has ended in five years. For example, we recently submitted a highly ranked but unfunded proposal to HHMI; a P-KSFI funded project will greatly increase our chances of obtaining HHMI support in the future.

B4. Performance Measures and Milestones

The following performance measures will be tracked annually during this five-year project:

- Evaluations by program participants
- Number of high school teachers completing summer research program
- Number of high school students completing summer research program
- Grades of high school students in Math for Scientists course
- Scores of high school students on quantitative sections of ACT or SAT
- Number of high school students accepted into college
- Number of high school students selecting STEM major
- Enrollment of undergraduates into Loyola University science programs
- Retention of undergraduates in Loyola University science programs
- Number of undergraduate students completing Honor's Theses
- Number and amount of external research grants using P-KSFI project for leverage
- Number of presentations and publications based on P-KSFI project

We will work with university and high school administrators to identify appropriate information to use for comparison and to determine success of our efforts. Results of these comparisons will be incorporated into a manuscript to be submitted to a peer-reviewed

journal such as Journal of Research in Science Teaching or BioScience.

Selection and funding of P-KSFI projects will not be completed until June 2007, which does not leave sufficient time to recruit the faculty, undergraduates, high school teachers, and high school students comprising each of six research teams. Therefore, we will use the first academic year to organize the program and recruit the first teams to begin research in the summer of 2008. Our specific milestones for this project are as follows:

Year 1 (through mid July 2008)

- Appoint advisory committee to help select team members and guide program
- Advertise program to high schools in greater New Orleans community
- Begin acquiring and setting up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Begin developing physical science modules to incorporate into biology courses
- Provide biology and health science applications to physical science courses
- Create handbook describing program goals and expectations
- Select first cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select first cohort of high school students and teachers to participate in program
- Recruit first cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2008
- Use P-KSFI program as leverage to secure additional external support
- Evaluate project success to date

Year 2 (through mid July 2009)

- Advertise program to high schools in greater New Orleans community
- Continue acquiring and setting up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Finish developing physical science modules to incorporate into biology courses
- Provide biology and health science applications to physical science courses
- Select second cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select second cohort of high school students and teachers to participate in program
- Recruit second cohort of undergraduate research students
- Carry out summer research program with capstone mini-symposium in July 2009
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date

Year 3 (through mid July 2010)

- Advertise program to high schools in greater New Orleans community
- Continue acquiring and setting up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Incorporate physical science modules into biology courses
- Provide biology and health science applications to physical science courses
- Select third cohort of faculty to lead research teams

- Recruit Math for Scientists instructor and tutors
- Select third cohort of high school students and teachers to participate in program
- Recruit third cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2010
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date

Year 4 (through mid July 2011)

- Advertise program to high schools in greater New Orleans community
- Continue acquiring and setting up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Review and update physical science modules in biology courses
- Provide biology and health science applications to physical science courses
- Select fourth cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select fourth cohort of high school students and teachers to participate in program
- Recruit fourth cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2011
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date

Year 5 (through mid July 2012)

- Advertise program to high schools in greater New Orleans community
- Finish acquiring and setting up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Review and update physical science modules in biology courses
- Provide biology and health science applications to physical science courses
- Select fifth cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select fifth cohort of high school students and teachers to participate in program
- Recruit fifth cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2012
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date

After Year 5

- Review overall program success
- Revise and renew program based on evaluation outcome and availability of funding
- Prepare and submit manuscript describing outcome of program

B5. Sustainability and Scalability

Loyola University's faculty, departments, and administrators have long been committed to providing excellent learning opportunities for high school students in the greater New Orleans and this commitment has increased since Hurricane Katrina. Similarly, science faculty had been working closely with the administration to enhance science education for both majors and non-majors prior to Hurricane Katrina. P-KSFI funds will provide the catalyst we need to move curriculum reform forward and at the same time build strong, productive, and sustainable linkages with high schools in the greater New Orleans community.

We will complete revising our science curricula for majors and modernizing our core science laboratory infrastructure during the five-year period funded by P-KSFI. Special emphasis will be placed on biology and physics because these departments have already begun revising their core and elective curricula, including a new emphasis on biophysics and pre-medical training in physics. Curriculum reform is an ongoing and iterative process that is guided in large part by the results of assessment; fortunately, Loyola University implemented departmental curriculum assessment as part of our recent SACS accreditation process. Also, there is growing momentum to revise our non-major science curriculum. Preliminary efforts have emphasized replacing traditional discipline-specific courses with a truly integrated two-semester science sequence for non-majors that requires extensive use of quantitative methods.

Increased exposure to high school students in the greater New Orleans community, increased opportunities for student participation in cutting edge research, modernized core laboratories, and innovative and interdisciplinary curricula should result in increased recruitment of students into our science programs. A renewed emphasis on developing strong quantitative skills should result in increased retention of these students in our programs and ultimately increase the flow of well-trained scientists into the local STEM pipeline. We expect this program will be self-sustaining and autocatalytic. However, we will need to procure external support to provide stipends for high school teachers and students to participate in science faculty's summer research programs. A promising source of future support to help sustain this program is the various external granting agencies (e.g., NIH, NSF, Department of Defense) that currently provide research support to our faculty. Many of these agencies and others such as HHMI are enthusiastic about linking together secondary and university education programs in order to increase recruitment into the STEM pipeline.

The concept of bringing high school teachers and students together with university faculty and students to collaborate on research can easily be adopted by other universities in the greater New Orleans community in order to further increase the flow of students into the STEM pipeline.

C. Leveraging of Resources

Our ability to implement and sustain long-term educational change depends on leveraging resources from several sources with requested funding from P-KSFI.

First, we will depend upon high schools in the greater New Orleans community to help advertise and promote our summer research program to their students. We will work closely with principals, guidance counselors, science teachers, and Upward Bound staff to disseminate information and help make connections. This will require a modest commitment of time from each of these secondary education specialists. Ideally, each group of high school teachers and students that participate in the program will serve as our strongest and most enthusiastic spokespersons.

Second, we have the commitment of administrators to sustain this program because it is consistent with Loyola University's Jesuit mission of helping disadvantaged students attend college and because a stronger science program will serve as an excellent recruitment tool. At a minimum, this commitment will entail subsidizing faculty to travel to scientific meetings, providing one course release per faculty member per semester to support research, providing the Project Director an additional course release per semester to oversee this program, and providing funds to maintain and repair equipment as needed. The administration is also gearing up for a new Capital Campaign that could raise money for substantial renovations of science classrooms and laboratories.

Third, we have the commitment of departments to continue working together to develop interdisciplinary approaches to teaching science. Our ultimate goal is to reach the Bio2010 ideal, so we will introduce more physical science modules into biology courses and use more biological applications in physical science courses. We will continue collaborating across disciplines and further explore the feasibility of creating interdisciplinary majors in biochemistry and molecular biology, environmental science, and neurology and behavioral science.

Fourth, we have the commitment of faculty to sustain this program because we are committed to performing collaborative research with enthusiastic high school and undergraduate students. Loyola University does not have graduate programs in the sciences, so we depend heavily upon students for assistance with research in the laboratory and field. Most of our faculty receive grants to fund their research programs and these grants often include support for undergraduate research assistants. Importantly, student support provided by P-KSFI can be used to leverage additional external research support and help grow faculty research programs.

Finally, we believe that increases in the number of students flowing into the STEM pipeline as a result of this five-year project will serve as a strong marketing tool to attract additional support to sustain and continually revitalize our science programs and strengthen linkages with high schools in the greater New Orleans community. External support has been used to substantially renovate upper level chemistry laboratories and we are seeking additional resources to renovate introductory chemistry laboratories.

D. Bibliography

National Research Council. 2003. BIO2010: Transforming Undergraduate Education for Future Research Biologists. The National Academies Press.

Russell, A. and Siley, C. 2005. American Association of State Colleges and Universities Volume 2, Number 11.

Silverstein, S. C. and J. Dubner. 2006. Summer Research Program for Science Teachers: 2004 & 2005 Report of Activities. Columbia University in the City of New York.

Section 6
Budget and Budget Narrative

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

① 2 3 4 5 COMPOSITE

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
A. 1. Research Salaries	$ 65,833	$ 14,749	$
2. Clerical Salaries	0	0	
3. Subtotal	65,833	14,749	
4. Fringe Benefits (% of A.3)	10,303	3,957	
5. Graduate Asst.	0	0	
6. Student(s)	3,876	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 80,012	$ 18,706	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	30,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	110,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	31,002	0	
b. College Student Stipend	23,256	0	
c. H. S. Student Stipend	31,008	0	
d. Waivers for Students	0	20,808	
e. Waivers for Teacher	0	6,498	
8. Subcontracts	0	0	
9. Subtotal B	$225,266	$ 27,306	
C. Overhead:			
1. 59% of salaries/wages	NOT PERMITTED	$ 96,395	$
TOTAL PROJECT COST:	$305,278	$ 142,407	$

Budget Justification Year 1

1. Research Salaries

a. Project Director, Frank Jordan, will spend one and a half summer months coordinating the six Research Teams. He will be committing one and a half summer months time/effort to the project each year ($58,995 x 1.5/9 = **$9,833 is requested**. In addition, he will be committing 25% time/effort during the academic year to advertise the program, recruit and select new participants, coordinate hiring students and staff, and assessing the success of this project ($58,995 x 2/8 = $14,749). **The university will be matching the academic year time and effort totaling $14,749**. These amounts reflect an annual salary increase of 3% per year.

b. Faculty Research Stipends, each year six faculty members will be eligible to apply to be one of the six team leaders. These faculty will be responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, and helping students create presentations for mini-symposium at end of summer research session. Each team leader will receive an $8,000 stipend ($8,000 x 6 = **$48,000 is requested**).

c. Math for Scientists instructor stipend ($8,000 x 1 instructor **$8,000 is requested**).

3. Subtotal

$65,833 is requested and $14,749 will be contributed by the university.

4. Fringe Benefits

Loyola University's full-time, academic year fringe benefit rate for faculty is 26.83%; the summer fringe benefit rate for full-time faculty is 15.65%.

a. (Project Director Summer Salary $9,833 x 15.65% = **$1,539 is requested**)
(Project Director Academic Year salary $14,749 x 26.83% = **$3,957 will be contributed**)
b. Faculty Research Stipends ($8,000 x 15.65% = $1,252 x 6 = **$7,512 is requested**)
c. (Math for Scientists Instructor salary $8,000 x 15.65% = **$1,252 is requested**)
$10,303 is requested and $3,957 will be contributed by the university.

6. Students

a. Math for Scientists undergraduate student tutors ($1,800 + 7.65% FICA = $1,938 x 2 tutors **$3,876 is requested**.

8. Subtotal A

$80,012 is requested and $18,706 will be contributed by the university.

Supportive Expenses

2. Supplies

Funds are requested for consumable laboratory and field supplies (e.g., glassware, chemicals) and transportation costs associated with field research for six research teams.

($5,000 per team x 6 teams = $30,000 is requested.)
Total Supplies Requested: $30,000

6. Equipment
1. Funds are requested for equipment listed in Appendix 1 for the introductory science laboratories ($60,000 per year is requested)
2. Additional funds are requested for the first year through ESIP funds to purchase equipment for the introductory science laboratories (see Appendix 1) $50,000
Equipment Total Requested: $110,000: $50,000 (ESIP) is requested and $60,000 (PKSFI) is requested.

7. Other Expenses
a. High School Teacher Stipend ($4,800 + 7.65% FICA = $5,167 x 6 teachers per year = **$31,002 is requested**. High school teachers will participate in the program to enhance their teaching skills.
b. College Student Stipend ($1,800 + 7.65% FICA = $1,938 x 12 students per year = **$23,256 is requested**. College students will participate in the program to gain research experience.
c. High School Student Stipend ($1,200 + 7.65% FICA = $1,292 x 24 students per year = **$31,008 is requested**. High school students will participate in the program to gain research experience.
d. Tuition Waivers for High School Students ($289 x 3 credit hours = $867 per course x 24 students = **$20,808 will be contributed**.
e. Tuition Waivers for High School Teachers ($361 x 3 credit hours = $1,083 per course x 6 teachers = **$6,498 will be contributed**.
Other Expenses Subtotal: $85,266 is requested and $27,306 will be contributed.

9. Subtotal B
$225,266 is requested and $27,306 will be contributed by the university.

Overhead
1. Loyola University New Orleans' indirect cost rate is 59% of salaries and wages ($163,382 x 59% = **$96,395) will be contributed by the university**.

Total Project Cost for Year 1
$305,278 will be requested ($50,000 from ESIP and $255,278 from PKSFI) and $142,407 will be contributed by the university.

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

1 ② 3 4 5 COMPOSITE

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
1. Research Salaries	$ 66,128	$ 15,191	$
2. Clerical Salaries	0	0	
3. Subtotal	66,128	15,191	
4. Fringe Benefits (% of A.3)	10,349	4,076	
5. Graduate Asst.	0	0	
6. Student(s)	3,876	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 80,353	$ 19,267	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	30,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	60,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	31,002	0	
b. College Student Stipend	23,256	0	
c. H. S. Student Stipend	31,008	0	
d. Waivers for Students	0	20,808	
e. Waivers for Teacher	0	6,498	
8. Subcontracts	0	0	
9. Subtotal B	$175,266	$ 27,306	
C. Overhead:			
1.59% of salaries/wages	NOT PERMITTED	$ 96,830	$
TOTAL PROJECT COST:	$255,619	$ 143,403	$

Budget Justification Year 2

1. Research Salaries

a. Project Director, Frank Jordan, will spend one and a half summer months coordinating the six Research Teams. He will be committing one and a half summer months time/effort to the project each year ($60,765 x 1.5/9 = **$10,128 is requested**. In addition, he will be committing 25% time/effort during the academic year to advertise the program, recruit and select new participants, coordinate hiring students and staff, and assessing the success of this project ($60,765 x 2/8 = $15,191). **The university will be matching the academic year time and effort totaling $15,191**. These amounts reflect an annual salary increase of 3% per year.

b. Faculty Research Stipends, each year six faculty members will be eligible to apply to be one of the six team leaders. These faculty will be responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, and helping students create presentations for mini-symposium at end of summer research session. Each team leader will receive an $8,000 stipend ($8,000 x 6 = **$48,000 is requested**).

c. Math for Scientists instructor stipend ($8,000 x 1 instructor **$8,000 is requested**).

3. Subtotal

$66,128 is requested and $15,191 will be contributed by the university.

4. Fringe Benefits

Loyola University's full-time, academic year fringe benefit rate for faculty is 26.83%; the summer fringe benefit rate for full-time faculty is 15.65%.

a. (Project Director Summer Salary $10,128 x 15.65% = **$1,585 is requested**)
(Project Director Academic Year salary $15,191 x 26.83% = **$4,076 will be contributed**)
b. Faculty Research Stipends ($8,000 x 15.65% = $1,252 x 6 = **$7,512 is requested**)
c. (Math for Scientists Instructor salary $8,000 x 15.65% = **$1,252 is requested**)
$10,349 is requested and $4,076 will be contributed by the university.

6. Students

a. Math for Scientists undergraduate student tutors ($1,800 + 7.65% FICA = $1,938 x 2 tutors **$3,876 is requested**.

8. Subtotal A

$80,353 is requested and $19,267 will be contributed by the university.

Supportive Expenses

2. Supplies

Funds are requested for consumable laboratory and field supplies (e.g., glassware, chemicals) and transportation costs associated with field research for six research teams.

($5,000 per team x 6 teams = $30,000 is requested.)
Total Supplies Requested: $30,000

6. Equipment
1. Funds are requested for equipment listed in Appendix 1 for the introductory science laboratories ($60,000 per year is requested)
Equipment Total Requested: $60,000 (PKSFI) is requested.

7. Other Expenses
a. High School Teacher Stipend ($4,800 + 7.65% FICA = $5,167 x 6 teachers per year = **$31,002 is requested**. High school teachers will participate in the program to enhance their teaching skills.
b. College Student Stipend ($1,800 + 7.65% FICA = $1,938 x 12 students per year = **$23,256 is requested**. College students will participate in the program to gain research experience.
c. High School Student Stipend ($1,200 + 7.65% FICA = $1,292 x 24 students per year = **$31,008 is requested**. High school students will participate in the program to gain research experience.
d. Tuition Waivers for High School Students ($289 x 3 credit hours = $867 per course x 24 students = **$20,808 will be contributed**.
e. Tuition Waivers for High School Teachers ($361 x 3 credit hours = $1,083 per course x 6 teachers = **$6,498 will be contributed**.
Other Expenses Subtotal: $85,266 is requested and $27,306 will be contributed.

9. Subtotal B
$175,266 is requested and $27,306 will be contributed by the university.

Overhead
1. Loyola University New Orleans' indirect cost rate is 59% of salaries and wages ($164,119 x 59% = **$96,830) will be contributed by the university**.

Total Project Cost for Year 2
$255,619 will be requested and $143,403 will be contributed by the university.

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

1 2 ③ 4 5 COMPOSITE

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
1. Research Salaries	$ 66,431	$ 15,647	$
2. Clerical Salaries	0	0	
3. Subtotal	66,431	15,647	
4. Fringe Benefits (% of A.3)	10,396	4,198	
5. Graduate Asst.	0	0	
6. Student(s)	3,876	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 80,703	$ 19,845	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	30,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	60,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	31,002	0	
b. College Student Stipend	23,256	0	
c. H. S. Student Stipend	31,008	0	
d. Waivers for Students	0	20,808	
e. Waivers for Teacher	0	6,498	
8. Subcontracts	0	0	
9. Subtotal B	$175,266	$ 27,306	
C. Overhead:			
1.59% of salaries/wages	NOT PERMITTED	$ 97,278	$
TOTAL PROJECT COST:	$255,969	$ 144,429	$

Budget Justification Year 3

1. Research Salaries

a. Project Director, Frank Jordan, will spend one and a half summer months coordinating the six Research Teams. He will be committing one and a half summer months time/effort to the project each year ($62,588 x 1.5/9 = **$10,431 is requested**. In addition, he will be committing 25% time/effort during the academic year to advertise the program, recruit and select new participants, coordinate hiring students and staff, and assessing the success of this project ($62,588 x 2/8 = $15,647). **The university will be matching the academic year time and effort totaling $15,647**. These amounts reflect an annual salary increase of 3% per year.

b. Faculty Research Stipends, each year six faculty members will be eligible to apply to be one of the six team leaders. These faculty will be responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, and helping students create presentations for mini-symposium at end of summer research session. Each team leader will receive an $8,000 stipend ($8,000 x 6 = **$48,000 is requested**).

c. Math for Scientists instructor stipend ($8,000 x 1 instructor **$8,000 is requested**).

3. Subtotal

$66,431 is requested and $15,647 will be contributed by the university.

4. Fringe Benefits

Loyola University's full-time, academic year fringe benefit rate for faculty is 26.83%; the summer fringe benefit rate for full-time faculty is 15.65%.

a. (Project Director Summer Salary $10,431 x 15.65% = **$1,632 is requested**)
(Project Director Academic Year salary $15,647 x 26.83% = **$4,198 will be contributed**)
b. Faculty Research Stipends ($8,000 x 15.65% = $1,252 x 6 = **$7,512 is requested**)
c. (Math for Scientists Instructor salary $8,000 x 15.65% = **$1,252 is requested**)
$10,396 is requested and $4,198 will be contributed by the university.

6. Students

a. Math for Scientists undergraduate student tutors ($1,800 + 7.65% FICA = $1,938 x 2 tutors **$3,876 is requested**.

8. Subtotal A

$80,703 is requested and $19,845 will be contributed by the university.

Supportive Expenses

2. Supplies

Funds are requested for consumable laboratory and field supplies (e.g., glassware, chemicals) and transportation costs associated with field research for six research teams.

($5,000 per team x 6 teams = $30,000 is requested.)
Total Supplies Requested: $30,000

6. Equipment
1. Funds are requested for equipment listed in Appendix 1 for the introductory science laboratories ($60,000 per year is requested)
Equipment Total Requested: $60,000 (PKSFI) is requested.

7. Other Expenses
a. High School Teacher Stipend ($4,800 + 7.65% FICA = $5,167 x 6 teachers per year = **$31,002 is requested**. High school teachers will participate in the program to enhance their teaching skills.
b. College Student Stipend ($1,800 + 7.65% FICA = $1,938 x 12 students per year = **$23,256 is requested**. College students will participate in the program to gain research experience.
c. High School Student Stipend ($1,200 + 7.65% FICA = $1,292 x 24 students per year = **$31,008 is requested**. High school students will participate in the program to gain research experience.
d. Tuition Waivers for High School Students ($289 x 3 credit hours = $867 per course x 24 students = **$20,808 will be contributed**.
e. Tuition Waivers for High School Teachers ($361 x 3 credit hours = $1,083 per course x 6 teachers = **$6,498 will be contributed**.
Other Expenses Subtotal: $85,266 is requested and $27,306 will be contributed.

9. Subtotal B
$175,266 is requested and $27,306 will be contributed by the university.

Overhead
1. Loyola University New Orleans' indirect cost rate is 59% of salaries and wages ($164,878 x 59% = **$97,278) will be contributed by the university**.

Total Project Cost for Year 3
$255,969 will be requested and $144,429 will be contributed by the university.

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

1 2 3 ④ 5 COMPOSITE

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
1. Research Salaries	$ 66,744	$ 16,117	$
2. Clerical Salaries	0	0	
3. Subtotal	66,744	16,117	
4. Fringe Benefits (% of A.3)	10,445	4,324	
5. Graduate Asst.	0	0	
6. Student(s)	3,876	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 81,065	$ 20,441	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	30,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	60,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	31,002	0	
b. College Student Stipend	23,256	0	
c. H. S. Student Stipend	31,008	0	
d. Waivers for Students	0	20,808	
e. Waivers for Teacher	0	6,498	
8. Subcontracts	0	0	
9. Subtotal B	$175,266	$ 27,306	
C. Overhead:			
1.59% of salaries/wages	NOT PERMITTED	$ 97,740	$
TOTAL PROJECT COST:	$256,331	$ 145,487	$

Budget Justification Year 4

1. Research Salaries

a. Project Director, Frank Jordan, will spend one and a half summer months coordinating the six Research Teams. He will be committing one and a half summer months time/effort to the project each year ($64,466 x 1.5/9 = **$10,744 is requested**. In addition, he will be committing 25% time/effort during the academic year to advertise the program, recruit and select new participants, coordinate hiring students and staff, and assessing the success of this project ($64,466 x 2/8 = $16,117). **The university will be matching the academic year time and effort totaling $16,117**. These amounts reflect an annual salary increase of 3% per year.

b. Faculty Research Stipends, each year six faculty members will be eligible to apply to be one of the six team leaders. These faculty will be responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, and helping students create presentations for mini-symposium at end of summer research session. Each team leader will receive an $8,000 stipend ($8,000 x 6 = **$48,000 is requested**).

c. Math for Scientists instructor stipend ($8,000 x 1 instructor **$8,000 is requested**).

3. Subtotal

$66,744 is requested and $16,117 will be contributed by the university.

4. Fringe Benefits

Loyola University's full-time, academic year fringe benefit rate for faculty is 26.83%; the summer fringe benefit rate for full-time faculty is 15.65%.

a. (Project Director Summer Salary $10,744 x 15.65% = **$1,681 is requested**)
(Project Director Academic Year salary $16,117 x 26.83% = **$4,324 will be contributed**)
b. Faculty Research Stipends ($8,000 x 15.65% = $1,252 x 6 = **$7,512 is requested**)
c. (Math for Scientists Instructor salary $8,000 x 15.65% = **$1,252 is requested**)
$10,445 is requested and $4,324 will be contributed by the university.

6. Students

a. Math for Scientists undergraduate student tutors ($1,800 + 7.65% FICA = $1,938 x 2 tutors **$3,876 is requested**.

8. Subtotal A

$81,065 is requested and $20,441 will be contributed by the university.

Supportive Expenses

2. Supplies

Funds are requested for consumable laboratory and field supplies (e.g., glassware, chemicals) and transportation costs associated with field research for six research teams.

($5,000 per team x 6 teams = $30,000 is requested.)
Total Supplies Requested: $30,000

6. Equipment
1. Funds are requested for equipment listed in Appendix 1 for the introductory science laboratories ($60,000 per year is requested)
Equipment Total Requested: $60,000 (PKSFI) is requested.

7. Other Expenses
a. High School Teacher Stipend ($4,800 + 7.65% FICA = $5,167 x 6 teachers per year = **$31,002 is requested**. High school teachers will participate in the program to enhance their teaching skills.
b. College Student Stipend ($1,800 + 7.65% FICA = $1,938 x 12 students per year = **$23,256 is requested**. College students will participate in the program to gain research experience.
c. High School Student Stipend ($1,200 + 7.65% FICA = $1,292 x 24 students per year = **$31,008 is requested**. High school students will participate in the program to gain research experience.
d. Tuition Waivers for High School Students ($289 x 3 credit hours = $867 per course x 24 students = **$20,808 will be contributed**.
e. Tuition Waivers for High School Teachers ($361 x 3 credit hours = $1,083 per course x 6 teachers = **$6,498 will be contributed**.
Other Expenses Subtotal: $85,266 is requested and $27,306 will be contributed.

9. Subtotal B
$175,266 is requested and $27,306 will be contributed by the university.

Overhead
1. Loyola University New Orleans' indirect cost rate is 59% of salaries and wages ($165,661 x 59% = **$97,740) will be contributed by the university**.

Total Project Cost for Year 4
$256,331 will be requested and $145,487 will be contributed by the university.

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

1 2 3 4 ⑤ COMPOSITE

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
1. Research Salaries	$ 67,067	$ 16,600	$
2. Clerical Salaries	0	0	
3. Subtotal	67,067	16,600	
4. Fringe Benefits (% of A.3)	10,496	4,454	
5. Graduate Asst.	0	0	
6. Student(s)	3,876	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 81,439	$ 21,054	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	30,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	60,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	31,002	0	
b. College Student Stipend	23,256	0	
c. H. S. Student Stipend	31,008	0	
d. Waivers for Students	0	20,808	
e. Waivers for Teacher	0	6,498	
8. Subcontracts	0	0	
9. Subtotal B	$175,266	$ 27,306	
C. Overhead:			
1.59% of salaries/wages	NOT PERMITTED	$ 98,216	$
TOTAL PROJECT COST:	$256,705	$ 146,576	$

Budget Justification Year 5

1. Research Salaries

a. Project Director, Frank Jordan, will spend one and a half summer months coordinating the six Research Teams. He will be committing one and a half summer months time/effort to the project each year ($66,400 x 1.5/9 = **$11,067 is requested**. In addition, he will be committing 25% time/effort during the academic year to advertise the program, recruit and select new participants, coordinate hiring students and staff, and assessing the success of this project ($66,400 x 2/8 = $16,600). **The university will be matching the academic year time and effort totaling $16,600**. These amounts reflect an annual salary increase of 3% per year.

b. Faculty Research Stipends, each year six faculty members will be eligible to apply to be one of the six team leaders. These faculty will be responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, and helping students create presentations for mini-symposium at end of summer research session. Each team leader will receive an $8,000 stipend ($8,000 x 6 = **$48,000 is requested**).

c. Math for Scientists instructor stipend ($8,000 x 1 instructor **$8,000 is requested**).

3. Subtotal

$67,067 is requested and $16,600 will be contributed by the university.

4. Fringe Benefits

Loyola University's full-time, academic year fringe benefit rate for faculty is 26.83%; the summer fringe benefit rate for full-time faculty is 15.65%.

a. (Project Director Summer Salary $11,067 x 15.65% = **$1,732 is requested**)
(Project Director Academic Year salary $16,600 x 26.83% = **$4,454 will be contributed**)
b. Faculty Research Stipends ($8,000 x 15.65% = $1,252 x 6 = **$7,512 is requested**)
c. (Math for Scientists Instructor salary $8,000 x 15.65% = **$1,252 is requested**)
$10,496 is requested and $4,454 will be contributed by the university.

6. Students

a. Math for Scientists undergraduate student tutors ($1,800 + 7.65% FICA = $1,938 x 2 tutors **$3,876 is requested**.

8. Subtotal A

$81,439 is requested and $21,054 will be contributed by the university.

Supportive Expenses

2. Supplies

Funds are requested for consumable laboratory and field supplies (e.g., glassware, chemicals) and

transportation costs associated with field research for six research teams.
($5,000 per team x 6 teams = $30,000 is requested.)
Total Supplies Requested: $30,000

6. Equipment
1. Funds are requested for equipment listed in Appendix 1 for the introductory science laboratories ($60,000 per year is requested)
Equipment Total Requested: $60,000 (PKSFI) is requested.

7. Other Expenses
a. High School Teacher Stipend ($4,800 + 7.65% FICA = $5,167 x 6 teachers per year = **$31,002 is requested**. High school teachers will participate in the program to enhance their teaching skills.
b. College Student Stipend ($1,800 + 7.65% FICA = $1,938 x 12 students per year = **$23,256 is requested**. College students will participate in the program to gain research experience.
c. High School Student Stipend ($1,200 + 7.65% FICA = $1,292 x 24 students per year = **$31,008 is requested**. High school students will participate in the program to gain research experience.
d. Tuition Waivers for High School Students ($289 x 3 credit hours = $867 per course x 24 students = **$20,808 will be contributed**.
e. Tuition Waivers for High School Teachers ($361 x 3 credit hours = $1,083 per course x 6 teachers = **$6,498 will be contributed**.
Other Expenses Subtotal: $85,266 is requested and $27,306 will be contributed.

9. Subtotal B
$175,266 is requested and $27,306 will be contributed by the university.

Overhead
1. Loyola University New Orleans' indirect cost rate is 59% of salaries and wages ($166,467 x 59% = **$98,216) will be contributed by the university**.

Total Project Cost for Year 5
$256,705 will be requested and $146,576 will be contributed by the university.

BOARD OF REGENTS SUPPORT FUND
POST-KATRINA SUPPORT FUND INITIATIVE, FISCAL YEAR 2006-07

BUDGET
PROJECT YEAR (CIRCLE ONE):

1 2 3 4 5 **COMPOSITE**

Title of Proposed Project: An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

Principal Investigator(s): Frank Jordan, Kurt Birdwhistell, Mike Kelly, Martin McHugh, and Elizabeth Yost Hammer

Institution(s) of Higher Education: **Loyola University New Orleans**

I. PROPOSED BUDGET:

	Support Fund Money Requested*	Institutional Match**	Private Sector/ Other Match***
1. Research Salaries	$ 332,203	$ 78,304	$
2. Clerical Salaries	0	0	
3. Subtotal	332,203	78,304	
4. Fringe Benefits (% of A.3)	51,989	21,009	
5. Graduate Asst.	0	0	
6. Student(s)	19,380	0	
7. Endowment(s)****	0	0	
8. Subtotal A	$ 403,572	$ 99,313	
B. Supportive Expenses:			
1. Travel	$ 0	$ 0	
2. Supplies	150,000	0	
3. Consultants	0	0	
4. Rentals	0	0	
5. Printing	0	0	
6. Equipment	350,000	0	
7. Other Expenses (Identify)			
a. H. S. Teacher Stipend	155,010	0	
b. College Student Stipend	116,280	0	
c. H. S. Student Stipend	155,040	0	
d. Waivers for Students	0	104,040	
e. Waivers for Teacher	0	32,490	
8. Subcontracts	0	0	
9. Subtotal B	$ 926,330	$ 136,530	
C. Overhead:			
1. 59% of salaries/wages	NOT PERMITTED	$ 486,459	$
TOTAL PROJECT COST:	$1,329,902	$ 722,302	$

Section 7
Biographical Sketches

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 **Frank Jordan**		Position Title **Associate Professor and Chair of Biological Sciences**	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
FSU, Tallahassee, FL	**BS**	**1987**	**Biology**
FSU, Tallahassee, FL	**MS**	**1989**	**Biology**
UF, Gainesville, FL	**PhD**	**1996**	**Zoology**

RESEARCH AND PROFESSIONAL EXPERIENCE:

Employment history

2005-present	Chair, Biological Sciences	Loyola University New Orleans
2002-present	Associate Professor	Loyola University New Orleans
1997-2002	Assistant Professor	Loyola University New Orleans
1993-97	Visiting Assistant Professor	Jacksonville University
1993-94	Fisheries Biologist	National Biological Survey
1989-96	Graduate Teaching and Research Assistant	University of Florida
1987-96	Graduate Teaching and Research Assistant	Florida State University
1984-87	Undergraduate Research Assistant	Florida State University

Representative publications (Note: asterisks denote student co-authors)

- Jordan, F., and A. C. McCreary*. 1996. Effects of an odonate predator and habitat complexity on survival of flagfish, *Jordanella floridae*. Wetlands 16:583-586.
- Jordan, F., C. J. DeLeon*, and A. C. McCreary*. 1996. Predation, habitat complexity, and distribution of the crayfish *Procambarus alleni* within a wetland habitat mosaic. Wetlands 16:452-457.
- Jordan, F., M. Bartolini*, C. Nelson*, P. Patterson*, and H. Soulen*. 1996. Risk of predation affects habitat selection by pinfish, *Lagodon rhomboides*. Journal of Experimental Marine Biology and Ecology 208:45-56.
- Jordan, F., K. J. Babbitt, and C. C. McIvor. 1998. Seasonal variation in habitat use by marsh fishes. Ecology of Freshwater Fish 7:159-166.
- Turner, A. M., J. C. Trexler, F. Jordan, S. J. Slack, P. Geddes, and W. Loftus. 1999. Targeting ecosystem features for conservation: standing crops in the Florida Everglades. Conservation Biology 13:898-911.
- Trexler, J.C., W. F. Loftus, F. Jordan, J. Lorenz, and J. Chick. 2000. Empirical assessment of fish introductions in a subtropical wetland: an evaluation of contrasting views. Biological Invasions 2:265-277.
- Jordan, F. 2002. Field and laboratory evaluation of habitat use by rainwater killifish (*Lucania parva*) in the St. Johns River estuary, Florida. Estuaries 25:288-295.
- Dorazio, R., H. L. Jelks, and F. Jordan. 2005. Improving removal-based estimates of abundance by sampling a population of spatially distinct subpopulations. Biometrics 61:1093-1101.
- Ruetz, C. R., J. C. Trexler, F. Jordan, W. F. Loftus, and S. A. Perry. 2005. Population dynamics of wetland fishes: spatio-temporal patterns synchronized by hydrological disturbance? Journal of Animal Ecology 74:322-332.
- Jordan, F., H. L. Jelks, S. Bortone, and R. M. Dorazio. 2007. Comparison of visual survey and seining methods for a benthic stream fish. Environmental Biology of Fishes (published online)

Representative external funding

- Jordan, F. 1996-1998. An Evaluation of Relationships Between Submerged Aquatic Vegetation and Fish Community Structure in the St. Johns River. $54,000. St. Johns River Water Management District.
- Jordan, F. 1997-1999. Food Web Dynamics in Channelized and Restored Pools of the Kissimmee River. $26,500. South Florida Water Management District.
- Jordan, F. 1995-2003. Ecology of Marsh Fishes in Water Conservation Area 3 (Florida Everglades). $367,297. South Florida Water Management District and U.S. Army Corps of Engineers.
- Jordan, F. 2001-2003. Descriptive and experimental study of factors affecting organization of marsh fish communities in the Mississippi River Delta. $44,520. Louisiana Board of Regents LEQSF.
- Jordan, F. 2002-2005. Evaluation of restoration success in coastal Louisiana: responses of fishes to restoration of marshes in the Mississippi River delta. $52,962. Louisiana Sea Grant College Program.
- Jordan, F. 1994-2007. Population monitoring of the endangered Okaloosa Darter Monitoring Research. $197,424. U.S. Department of Defense.

Courses taught

Animal Behavior, Biology of Fishes, Biology of Organisms, Cultural Biology, Biology of Coral Reef Fishes, Ecology, Invertebrate Zoology Laboratory, Ecology of Seagrass Habitats, Marine Biology Laboratory, Ecology of Wetland Fishes, Marine Ecology, Fish Ecology Discussion Group, Zoological Diversity, and Exploring the Natural World (science for education majors).

Activities related to K-12 and undergraduate science education:

- Taught Saturday at the Sea marine biology program for K-12 students in Leon County, Florida for Florida State University.
- Directed 16 undergraduate honors research theses at Loyola University New Orleans since 1997.
- Created and taught Biology Freshmen Seminar at Loyola University New Orleans since 2006.
- Participated as scientist in Centers for Ocean Sciences Education Excellence (COSEE) in 2003 and 2006.
- Directed field research and mentored students from The Young Women's Leadership School of Harlem in 2004 (3 students), 2005 (5 students), 2006 (8 students), and 2007 (7 students in April).

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 **Kurt Birdwhistell**		Position Title **Professor and Chair of Chemistry**	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Univ. West Fla, Pensacola,FL **Univ. of North Carolina-Chapel Hill, NC**	**BS** **PhD**	**1980** **1985**	**Chemistry** **Inorganic Chemistry**

RESEARCH AND PROFESSIONAL EXPERIENCE:

2004-present	Earl and Gertrude Vicknair Distinguished Professor of Chemistry
2004-present	Chair of Chemistry Dept., Loyola University, New Orleans, LA
2003-present	Professor of Chemistry, Loyola University, New Orleans,LA
2002	Research Associate, Shearwater Polymers in Huntsville, AL
1996-2002	Chair of Chemistry department, Loyola Univ., New Orleans, LA
1992-2003	Assoc. Professor, Loyola Univ., New Orleans, LA
1988-92	Asst. Professor, Loyola Univ., New Orleans, LA
1986-88	Senior Research Development Chemist, Waterborne Polymers Division, BASF Corp., Southfield, MI
1985-86	Post doctoral appointment, CSU, Ft. Collins, CO

Representative publications (Note: # denote student co-authors)

- Cahill, J.J.; Panayotov, V.G.; Cowen, K.A.; E. Harris, Koplitz, L. V.; Birdwhistell, K.R.; Koplitz, B. "Development of a method for investigating caron removal processes during photoassisted film growth using organometallic precursors: Application to platinum" *J. Vac. Sci. Technol.* **A 25(1)**, Jan. **2007**.
- Harper, Brandy#, A.; Rainwater, J. Chance#; Birdwhistell, Kurt; Knight, D. Andrew; "Aqueous-Phase Palladium-Catalyzed Coupling" J. Chem. Educ. **2002**, 79, (6), 729-31.
- Kurt R. Birdwhistell, Thom G. Spence*; "A New Glow on the Chromatography of M&M Candies", J. Chem. Educ. **2002**, 79(7), 847.
- Birdwhistell, K. R. ; Lanza, J#; Pasos, J.#; "Carbodiimide Metathesis Catalyzed by Vanadium Oxo and Imido Complexes via Imido Transfer", J. Organomet. Chem. ,, **1999**, 584, 200-205.
- Birdwhistell, K. R.; Lanza, J.# "Simple Synthesis and Use of a Nickel Isomerization Catalyst: An Advanced Lab in Inorganic/Organometallic Chemistry", *J. Chem. Educ.* **1997**, 74, 579-581.
- Birdwhistell, K.R.; "Many Phases of Sulfur", *J. Chem. Educ.*, **1995**, 72, 56.
- Birdwhistell, K.R.; Boucher,T.#, Ensminger, M.#; Harris, S.#; Johnson, M.#; Toporek, S.# "Catalysis of Phenyl Isocyanate Condensation to N,N'-Diphenylcarbodiimide via Vanadium Oxo and Imido Complexes", Organometallics, **1993**, 12, 1023-1025.

Representative external funding

- Louisiana Support Fund, Dept. Enhancement Grant, "MALDI-TOF Mass Spectrometer for the Study of Polymers and Biomolecules within the Loyola Chemistry Department", Birdwhistell, Kurt, $117,710, 6/30/06-7/07, Funded.
- Motorola Corporation grant, "Commitment to a Resurrecting Community: Renewed Laboratories for a Greener Educational Future", Birdwhistell, Kurt R.; Knight, D. Andrew; Birdwhistell, Teresa, $58,000, 6/06-9/07, funded.
- National Science Foundation-CCLI grant entitled "Greening the Chemistry Laboratory Curriculum at Loyola University", Knight, D. Andrew; Birdwhistell, Kurt R. $149,760 Funded, 1/2006-1/2009.
- Board of Regents, Birdwhistell, K(PI), "MALDI-TOF Mass Spectrometer for the Study of Polymers and Biomolecules within the Loyola Chemistry Department, $117,000 funded, 7/2006-07.
- National Science Foundation Supplement Grant, "PEG Modified Rhodium Catalysts for the Conjugate Addition of Silane Reagents to a,b Unsaturated Ketones" , K Birdwhistell(PI), Funded for $14,830, 3/03-9/03.
- Board of Regents Knight, D.A.(PI); Birdwhistell, K.R.(coPI); "An Anasazi FT-NMR Upgrade for Undergraduate Instruction", $62,791, 6/02-7/03. Funded.
- National Science Foundation, Alworth (TU), Ensley (TU), Li (TU), Ramamurthy (TU), Thayumaran (TU), "Upgrade of a 400 MHz NMR for Chemical Research", K. Birdwhistell wrote Loyola's part, Loyola gets approximately $12,000 for a workstation, software and internet access to the high field NMR at Tulane. (status: Funded $220,000, 6/00-6/02).

Courses Taught

General Chemistry lecture and Lab, Organic II lab, Inorganic chemistry lecture and lab, Quantitative analysis lecture and lab, Instrumental Analysis lecture and lab, Integrated lab, and Chemical Literature.

Activities related to K-12 and undergraduate science education:

- Gave a presentation to the Lusher Middle School Science class on "Properties of Cobalt", Fall 2001
- Participated in the National Chemistry Week program at Louisiana Children's Museum every year in October since 1989.
- Faculty advisor to the Loyola ACS student Affiliate for over 10 years.
- Instructor at a one day Chemistry Camp at the Louisiana Children's Museum, July 5, 2004.
- Instructor at a one day Chemistry Camp at the Louisiana Children's Museum, July 2005.

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 **Michael Kelly**		Position Title **Professor and Chair of Mathematics**	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
SUNY-College at Cortland, NY	**BS**	**1975**	**Mathematics**
SUNY-Binghamton Univ., NY	**MS**	**1977**	**Mathematics**
SUNY-Binghamton Univ., NY	**PhD**	**1985**	**Mathematics**

RESEARCH AND PROFESSIONAL EXPERIENCE:

Employment history

2003-present	Professor of Mathematics	Loyola University New Orleans
2001-present	Chair of Mathematics and Computer Science	Loyola University New Orleans
1995-2003	Associate Professor	Loyola University New Orleans
1992-1995	Assistant Professor	Loyola University New Orleans
1992 (spring)	Visiting Assistant Professor	Loyola University New Orleans
1989-1992	Assistant Professor	University of Idaho
1988-1989	Visiting Assistant Professor	Tulane University
1987-1988	Assistant Professor	University of South Alabama
1985-1987	Adjunct Assistant Professor	UCLA
19977-1979	Peace Corps Volunteer	St. Andrews College, Mampong, Ghana

Representative publications

- The Nielsen number as an isotopy invariant, Topology and Its Applications **62** 1995, (127-143).
- Computing Nielsen numbers of surface homeomorphisms, Topology **35** 1996, (13-25).
- A bound on the fixed-point index for surface mappings, Ergodic Theory and Dynamical Systems **17** 1997, (1393-1408).
- Bounds on the fixed point indices for self-maps of certain simplicial complexes, Topology and its Applications **108** 2000, (179-196).
- Maps into the torus and minimal coincidence sets for homotopies, (joint with D.L. Goncalves), Fundamenta Mathematica **172** 2002, (99-106).
- Fixed points of boundary-preserving maps on the punctured projective planes, Topology and its Appl. **124** 2002, 145-157.
- The boundary Wecken classification of surfaces, (joint with R.F. Brown), Algebraic and Geometric Topology, **4** (2004), 49-71.
- Nielsen fixed point theory on surfaces, Handbook of Topological Fixed Point Theory, 2005, pp. 647-658, Springer, Dordrecht.
- The Nielsen fixed point structure for homotopy idempotents on surfaces. Topological Aspects of Group Theory (Nashville,TN, 2004), 191-196, Contemp. Math. **394**, Amer. Math. Soc., Providence, RI, 2006.
- Wecken type problems for self-maps of the Klein bottle, (joint with D.L. Goncalves), Fixed Point Theory and Appl. **2006** (2006), Article ID 75848, 15 pages.

Representative external funding

- Kelly, M. Retraining program working toward improved teaching of mathematics, Eisenhower MSEA Grant, LaBOR, 1993-94, $32,966
- Kelly, M. Retraining program working toward improved teaching of mathematics, Eisenhower MSEA Grant, LaBOR, 1994-95, $45,000

Courses taught

(Undergraduate) Finite Mathematics, Survey of Mathematical Ideas, Survey of Calculus, Computational Matrix Algebra, Discrete Mathematics, Mathematics in Western Civilization (Honors Program), Concepts in College Algebra, Problem Solving in Ecology, Precalculus, Calculus I,II,III Linear Algebra, Advanced Linear Algebra, General Topology, Ordinary Differential Equations, Partial Differential Equations, Non-Euclidean Geometry, Advanced Calculus, Complex Variables, Differential Geometry

(Graduate MST) Introduction to Functions, Application Oriented Algebra, Analysis I, Analysis III, Foundations of Mathematics, Probability and Statistics, Discrete Dynamical Systems. (Other Graduate) Algebraic Topology; Seminars: Dynamical Systems, Characteristic Classes, Three-Dimensional Topology

Activities related to K-12 and undergraduate science education:

- Student Teacher Supervision, Peace Corps Volunteer, St. Andrews College, Ghana, 1977-1979.
- Participated in the LaPROMPT Workshop sponsered by LaCEPT and organized by the Greater New Orleans Collaborative, May 22-26 and August 8-11, 1995.
- Participated in LaPROMPT-2 Workshop, UNO, May 1996.
- Participated in the GNOC Workshop : Educational Applications of Technology, UNO, May 18-22, 1998.

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 **Martin P. McHugh**		Position Title **Associate Professor and Chair of Physics**	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
U. of Rochester, Rochester, NY	**BS**	**1985**	**Physics**
U. of Colorado, Boulder, CO	**MS**	**1987**	**Physics**
U. of Colorado, Boulder, CO	**PhD**	**1992**	**Physics**

RESEARCH AND PROFESSIONAL EXPERIENCE:

Employment history

2006-present	Chair, Physics	Loyola University New Orleans
2006-present	Associate Professor	Loyola University New Orleans
2000-2006	Assistant Professor	Loyola University New Orleans
1996-2000	Senior Postdoctoral Research Associate	Louisiana State University, Baton Rouge LA
1994-96	Postdoctoral Research	Observatoire de Besançon, France
1994	Instructor	Université de Franche-Comté, Besançon, France
1992-93	Phillips Laboratory Scholar Program	Hanscom Air Force Base, Bedford MA
1986-91	Research Assistant	University of Colorado, Boulder CO
1985-86	Teaching Assistant	University of Colorado, Boulder CO

Representative publications (Note: asterisks denote student co-authors)

- *Galilean test for the fifth force*, Phys. Rev. Lett. **59**, 609-612 (1987), T.M. Niebauer, **M.P. McHugh** and J.E. Faller.
- *Pulsar timing and the upper limits on a gravitational wave background : a Bayesian approach,* Phys. Rev. D **54**, 5993-6000, (1996) **M. P. McHugh**, G. Zalamansky, F. Vernotte and E. Lantz.
- *First search for gravitational wave bursts with a network of detectors*, Phys. Rev. Lett **85**, 5046-5050, (2000), Z.A. Allen, P. Astone, L. Baggio, D. Busby*, M. Bassan, D.G. Blair, M. Bonaldi, P. Bonifazi, M. Cerdonio, E. Coccia, L. Conti, C. Cosmelli, V. Crivelli Visconti, S. D'Antonio, V. Fafone, P. Falferi, P. Fortini, S. Frasca, W.O. Hamilton, I.S. Heng, E.N. Ivanov, W.W. Johnson, M. Kingham*, C. R. Locke, A. Marini, V. Martinucci, E. Mauceli, **M.P. McHugh**, R. Mezzena, Y. Minenkov, I. Modena, G. Modestino, A. Moleti, A. Ortolon, G. V. Pallottino, G. Pizzella, G. A. Prodi, E. Rocco, F. Ronga, F. Salemi, G. Santostasi, L. Taffarello, R. Terenzi, M.E. Tobar, G. Vedovato, A. Vinante, M. Visco, S. Vitale, L. Votano and J.P. Zendri
- *Progress on stochastic background search codes for LIGO,* Classical and Quantum Gravity **19**, 1521-1527 (2002) (gr-qc/0110019), John T. Whelan, Warren G. Anderson, Martha Casquette*, Mario C. Díaz, Ik Siong Heng, **Martin McHugh**, Joseph D. Romano, Charlie W. Torres Jr.*, Rosa M. Trejo* and Alberto Vecchio
- *Allegro: Noise performance and the ongoing search for gravitational waves*, Classical and Quantum Gravity **19**, 1889-1895 (2002), I.S. Heng, E. Daw, J. Giaime, W.O. Hamilton, **M.P. McHugh** and W.W. Johnson
- *Methods and results of the IGEC search for burst gravitational waves in the years 1997-2000,* Phys. Rev. D **68**, 022001 (2003), P. Astone, D. Babusci, L. Baggio, M. Bassan, D. G. Blair, M. Bonaldi, P. Bonifazi, D. Busby*, P. Carelli, M. Cerdonio, E. Coccia, L. Conti, C. Cosmelli, S. D'Antonio, V. Fafone, P. Falferi, P. Fortini, S. Frasca, G. Giordano, W. O. Hamilton, I. S. Heng, E. N. Ivanov, W. W. Johnson, A. Marini, E. Mauceli, **M. P. McHugh**, R. Mezzena, Y. Minenkov, I. Modena, G. Modestino, A. Moleti, A. Ortolan, G. V. Pallottino, G. Pizzella, G. A. Prodi, L. Quintieri, A. Rocchi, E. Rocco, F. Ronga, F. Salemi, G. Santostasi, L. Taffarello, R. Terenzi, M. E. Tobar, G. Torrioli, G. Vedovato, A. Vinante, M. Visco, S. Vitale, and J. P. Zendri
- *Stochastic background search correlating ALLEGRO with LIGO engineering data*, Class.Quant.Grav. **20** (2003) S689-S695, John T. Whelan, Edward Daw, Ik Siong Heng, **Martin P McHugh** and Albert Lazzarini
- *Analysis of LIGO data for gravitational waves from binary neutron stars,* Phys. Rev. D **69**, 122001 (2004) http://www.arxiv.org/abs/gr-qc/0308069 , the LIGO Scientific Collaboration (http://www.ligo.org)
- *Analysis of first LIGO science data for stochastic gravitational waves*, Phys. Rev. D **69**, 122004 (2004) http://www.arxiv.org/abs/gr-qc/0312088 , the LIGO Scientific Collaboration (http://www.ligo.org)
- *Optimal combination of signals from co-located gravitational wave interferometers for use in searches for a stochastic background,* Phys. Rev. D **70**, 062001 (2004) http://www.arxiv.org/abs/gr-qc/0403093 Albert Lazzarini, Sukanta Bose, Peter Fritschel, **Martin McHugh**, Tania Regimbau, Kaice Reilly, Joseph D. Romano, John T. Whelan, Stan Whitcomb and Bernard F. Whiting
- *Limits on Gravitational-Wave Emission from Selected Pulsars Using LIGO Data,* Phys. Rev. Lett. **94**, 181103 (2005) http://www.arxiv.org/abs/gr-qc/0410007, the LIGO Scientific Collaboration (http://www.ligo.org)

- *Calibration of the ALLEGRO resonant detector,* Class. Quantum Grav. **22** (2005) S965-S973. http://stacks.iop.org/0264-9381/22/S965 **Martin P. McHugh**, Warren W. Johnson, William O. Hamilton, Jonathan Hanson*, Ik Siong Heng, Daniel McNeese*, Phillip Miller*, Damon Nettles, Jordan Weaver* and Ping Zhang
- *Upper Limits on a Stochastic Background of Gravitational Waves,* Phys. Rev. Lett. **95**, 221101 (2005) http://www.arxiv.org/abs/astro-ph/0507254, the LIGO Scientific Collaboration (http://www.ligo.org)
- *Search for gravitational waves from binary black hole inspirals in LIGO data,* Phys. Rev. D **73**, 062001 (2006), http://www.arxiv.org/abs/gr-qc/0509129, the LIGO Scientific Collaboration (http://www.ligo.org)
- *Joint LIGO and TAMA300 Search for Gravitational Waves from Inspiralling Neutron Star Binaries,* Phys. Rev. D **73**, 102002 (2006), http://arxiv.org/abs/gr-qc/0512078 the LIGO Scientific Collaboration (http://www.ligo.org) and the TAMA collaboration (http://tamago.mtk.nao.ac.jp/)
- *Searching for a Stochastic Background of Gravitational Waves with LIGO,* Ap. J. **658**, 70384 (2007), http://www.arxiv.org/abs/astro-ph/0608606 , the LIGO Scientific Collaboration (http://www.ligo.org)

Representative external funding

- McHugh, M. P. 2002 - 2004. RUI: Search for a Stochastic Background of Gravitational Radiation with LIGO and the ALLEGRO Resonant Detector. $101,310. National Science Foundation
- King, C. A., McHugh, M. P. 2002-2003. Mathematical Modeling Laboratory: Praxis and Curriculum Development in Physics. $23,766. Louisiana State Board of Regents, LEQSF.
- McHugh, M. P. 2004 - 2007. RUI: stochastic background searches with the LIGO and ALLEGRO detectors. $105,000. National Science Foundation
- Kargol, A., King, C. A., McHugh, M. P. 2005-2006. Interdisciplinary Laboratory Training: Introducing Biophysics into Physics Laboratory Courses. $31,755. Louisiana State Board of Regents, LEQSF.

Courses taught

Introduction to Physics, Basic Physics I&II, Basic Physics Laboratory, Quantum Topics, Thermal Physics, Classical Mechanics I&II, Advanced Physics Laboratory I&II, Lasers and Optics.

Activities related to K-12 and undergraduate science education:

- Directed 10 undergraduate research students at Loyola University New Orleans since 2000.
- Seminar for summer undergraduate research students at LIGO Laboratory, Livingston LA, 2001.
- LIGO Laboratory undergraduate student field trips 2000, 2003.
- High School Science Fair judge, Ursuline Academy New Orleans, 2003.

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 **Elizabeth Yost Hammer**		Position Title **Associate Professor and Chair of Psychology**	
EDUCATION (Begin with baccalaureate or other initial professional education and include postdoctoral training.			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Troy State University, Troy, AL	**BS**	**1989**	**Psychology**
Tulane University, New Orleans, LA	**MS**	**1993**	**Social Psychology**
Tulane University, New Orleans, LA	**PhD**	**1994**	**Social Psychology**

RESEARCH AND PROFESSIONAL EXPERIENCE:

Employment history

2004-present	Chair, Psychology	Loyola University New Orleans
2002-present	Associate Professor	Loyola University New Orleans
2001-2002	Assistant Professor	Loyola University New Orleans
1994-2000	Assistant Professor (tenure awarded)	Belmont University Nashville, TN
1994	Adjunct Instructor	Loyola University New Orleans
1989-94	Graduate Teaching and Research Assistant	Tulane University

Representative publications (Note: asterisks denote student co-authors)

- Hammer, E. Y. (2006). Teaching and mentoring female students. In William Buskist & Stephen Davis (Eds.), *Handbook of the Teaching of Psychology*. Blackwell.
- Hammer, E. Y. (2005). From the laboratory to the classroom and back: The science of interpersonal relationships informs teaching. *Journal of Social and Clinical Psychology*, 24(1), 3-10.
- Ruscher, J. B., & Hammer, E. Y. (Eds.). (2004). *Current Directions in Social Psychology*. Upper Saddle River, NJ: Prentice-Hall.
- Ruscher, J. B., Santuzzi, A. M., & Hammer, E. Y. (2003). Shared impression formation in the cognitively interdependent dyad. *British Journal of Social Psychology*, 42, 411-425.
- Hammer, E.D., & Hammer, E. Y. (2002). Using social psychology to teach social psychology: How the field informs the course. In William Buskist & Stephen Davis (Eds.), *The Teaching of Psychology: Essays in Honor of Wilbert J. McKeachie and Charles L. Brewer*. Earlbaum.
- Giordano, P.J., & Hammer E.Y. (1999). In-class collaborative learning: Practical suggestions from the teaching trenches. *Teaching of Psychology*, 26, 42-44.
- Ruscher, J.B., & Hammer, E. Y. (1996). Choosing to sever or maintain association induces biased impression formation. *Journal of Personality and Social Psychology*, 70, 701-712.
- Ruscher, J.B., Hammer, E. Y., & Hammer, E.D. (1996). Forming shared impressions through conversation: An adaptation of the continuum model. *Personality and Social Psychology Bulletin*, 22,705-720.
- Langley, T., O'Neal, E. C., Craig, K. M., & Yost, E. A. (1992). Aggression-consistent, -inconsistent, and -irrelevant priming effects on selective exposure to media violence. *Aggressive Behavior*, 18, 349-356.
- Craig, K. M., O'Neal, E. C., Taylor, S. L., Yost, E. A., Langley, T., Rambow, R., Allgower, A., & Folger, R. G. (1993). Equity and derogation of those against whom we have aggressed. *Aggressive Behavior*, 19, 355-360.

Representative external funding

- Hammer, E. Y., McKay, M., & Bhalla, M. (AY 2003-2004). From learning community to learning-centered classroom: Freshman enhancement project in psychology. Louisiana Board of Regents, $26,705.

Courses taught

Introduction to Psychology, Social Psychology, Developmental Psychology, Research Methods, Psychology of Disasters, History and Systems of Psychology, Human Sexuality, Group Dynamics, Interpersonal Relationships

Activities related to K-12 and undergraduate science education:

- Reader for Advanced Placement (AP) Psychology since 1998.
- Hold leadership position in Advanced Placement (AP) Psychology since 2001.
- Directed 28 undergraduate honors/senior research theses at Loyola University New Orleans since 2000.
- Have 4 students who have published in Psi Chi Undergraduate Journal since 2000.
- National Past-President of Psi Chi, the National Honor Society in Psychology.

Contract Work Plan

Scope of Services

The Principal Investigator hereby agrees to furnish the following services:

a. Goals and Objectives

Our project is designed to recruit and retain students into the STEM pipeline by providing collaborative research opportunities, building solid quantitative skills, and providing an innovative and interdisciplinary science curriculum. Our project includes curriculum enhancement during the regular school year and an intense six-week research program during the summer that links together local high school students and teachers with university students and faculty. Our specific objectives include:

- Using Bio2010 as a model, revise science curricula to adopt a more interdisciplinary and quantitative approach. Incorporate more biology and health science applications into physical science courses and incorporate physical science modules into biology courses.
- Update equipment in core teaching laboratories so that students can conduct guided and open-ended experiments about scientific phenomena ranging from the molecular to ecosystem levels.
- Create three collaborative research teams each project year that consist of a faculty member, high school teacher, two undergraduate students, and four high school students. Each team will work for six weeks during the summer on a project related to the faculty member's research program.
- Build science communication skills by having high school and undergraduates present their research results at a capstone mini-symposium at the end of the six-week summer research period.
- Help high school students develop solid quantitative skills by requiring their enrollment in a Math for Scientists course that will emphasize analysis, interpretation, and visualization of data collected by the three research teams.
- Provide high school teachers with new skills and experiences that they can use to enhance and enliven their own classrooms and laboratories.
- Build a strong mentoring culture rich in opportunities for experiential learning through our curricular revisions, summer research program, research seminars, and capstone mini-symposium.
- Promote a diverse and well-trained STEM workforce by encouraging women, minorities, and other underrepresented groups to participate in all phases of the project. We are especially interested in recruiting low-income, first generation college students.
- Finally, our overarching goal is to build linkages with local high schools, increase recruitment and retention of science majors at Loyola University New Orleans, and thereby increase the number of highly trained scientists entering into STEM related professions in the greater New Orleans community.

b. Deliverables
As indicated in "Section X" of the contract, the Annual Project Reports will be submitted by June 30, 2008, June 30, 2009, June 30, 2010, June 30, 2011, and the Final Project Report will be submitted by June 30, 2012. The Final Expenditures Report will be submitted by September 30, 2012.

c. Performance Measures

The following performance measures will be tracked annually during this five-year project:

- Evaluations by program participants
- Number of high school teachers completing summer research program
- Number of high school students completing summer research program
- Grades of high school students in Math for Scientists course
- Scores of high school students on quantitative sections of ACT or SAT
- Number of high school students accepted into college
- Number of high school students selecting STEM major
- Enrollment of undergraduates into Loyola University science programs
- Retention of undergraduates in Loyola University science programs
- Number of undergraduate students completing Honor's Theses
- Number and amount of external research grants using P-KSFI project for leverage
- Number of presentations and publications based on P-KSFI project

We will work with university and high school administrators to identify appropriate information to use for comparison and to determine success of our efforts. Results of these comparisons will be incorporated into a manuscript to be submitted to a peer-reviewed journal such as Journal of Research in Science Teaching or BioScience.

Selection and funding of P-KSFI projects will not be completed until June 2007, which does not leave sufficient time to recruit the faculty, undergraduates, high school teachers, and high school students comprising each of three research teams. Therefore, we will use the first academic year to organize the program and recruit the first teams to begin research in the summer of 2008. Our specific milestones for this project are as follows:

Year 1 (through June 2008)
- Appoint advisory committee to help select team members and guide program
- Advertise program to high schools in greater New Orleans community
- Acquire and set up new equipment in core science laboratories
- Continue review, revision, and assessment of science curricula
- Begin developing physical science modules to incorporate into biology courses
- Provide biology and health science applications to physical science courses
- Create handbook describing program goals and expectations
- Select first cohort of faculty to lead research teams

- Recruit Math for Scientists instructor and tutors
- Select first cohort of high school students and teachers to participate in program
- Recruit first cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2008
- Use P-KSFI program as leverage to secure additional external support
- Evaluate project success to date
- Submit Annual Project Report and Financial Status Report

Year 2 (through June 2009)

- Advertise program to high schools in greater New Orleans community
- Continue review, revision, and assessment of science curricula
- Finish developing physical science modules to incorporate into biology courses
- Provide biology and health science applications to physical science courses
- Select second cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select second cohort of high school students and teachers to participate in program
- Recruit second cohort of undergraduate research students
- Carry out summer research program with capstone mini-symposium in July 2009
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date
- Submit Annual Project Report and Financial Status Report

Year 3 (through June 2010)

- Advertise program to high schools in greater New Orleans community
- Continue review, revision, and assessment of science curricula
- Incorporate physical science modules into biology courses
- Provide biology and health science applications to physical science courses
- Select third cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select third cohort of high school students and teachers to participate in program
- Recruit third cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2010
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date
- Submit Annual Project Report and Financial Status Report

Year 4 (through June 2011)

- Advertise program to high schools in greater New Orleans community
- Continue review, revision, and assessment of science curricula
- Review and update physical science modules in biology courses
- Provide biology and health science applications to physical science courses
- Select fourth cohort of faculty to lead research teams

- Recruit Math for Scientists instructor and tutors
- Select fourth cohort of high school students and teachers to participate in program
- Recruit fourth cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2011
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date
- Submit Annual Project Report and Financial Status Report

Year 5 (through June 2012)

- Advertise program to high schools in greater New Orleans community
- Continue review, revision, and assessment of science curricula
- Review and update physical science modules in biology courses
- Provide biology and health science applications to physical science courses
- Select fifth cohort of faculty to lead research teams
- Recruit Math for Scientists instructor and tutors
- Select fifth cohort of high school students and teachers to participate in program
- Recruit fifth cohort of undergraduate research students
- Enroll high school students in Math for Scientists course for college credit
- Carry out summer research program with capstone mini-symposium in July 2012
- Use P-KSFI program as leverage to secure additional external support
- Assess project success to date
- Submit Final Project Report and Financial Status Report

Follow up

- Review overall program success
- Revise and renew program based on evaluation outcome and availability of funding
- Prepare and submit manuscript describing outcome of program
- Submit Final Expenditures Report by September 30, 2012

d. Monitoring Plan

The Principal Investigator will comply with "Section IV" and "Section X" of the contract.

e. Utility of the Final Product

Our project is specifically designed to enhance science education and will therefore have immediate and lasting impact on the flow of high school and college students into the STEM pipeline of New Orleans and Louisiana. Our project will provide training opportunities and college credit to a significant number of disadvantaged and/or minority students who are currently underrepresented in the natural sciences.

Annual Report for Year 3 (ending 6/30/2010)

An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

PKSFI Primarily Education Subprogram

2009-2010 Progress Report

June 30, 2010

Submitted by

Frank Jordan

Project Director

Loyola University New Orleans

1a. Overview of Personnel

The Project Director administers the project, manages the budget, arranges payment of personnel, organizes the summer mini-symposium, creates and maintains a website to describe and advertise the summer research program (www.loyno.edu/score), advertises the program to local high school students and teachers, recruits participants into the program, invites speakers for summer seminars, and collects and analyzes data needed to assess the success of the program.

The PKSFI advisory committee consists of the Project Director and the chairs of the biology, chemistry, math, physics, and psychology departments. Co-Principal Investigators on the original proposal may continue to serve on the advisory committee even if they stop serving as Chair of their respective departments. The purpose of the advisory committee is to assist the Project Director with purchasing of equipment and instrumentation for core science labs, development of criteria for selection of faculty, undergraduates, high school teachers, and high school students to participate in summer research teams. The committee also provides guidance to departments on how to move forward with curriculum reform issues.

Faculty team leaders are responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, helping students create presentations for mini-symposium at end of summer research session, and publishing results of their research.

The math instructor handles all aspects of the math or statistics course offered to high school students. The instructor works with summer research faculty to obtain real data to be analyzed, interpreted, and visualized in class.

High school student participation leads to a better understanding of, and excitement for, STEM-related careers. High school students enroll in a math or statistics course to acquire quantitative skills to increase their success as science majors in college and thereafter in graduate and professional school. They work closely with faculty team leaders to learn about ongoing research projects and to develop new research skills.

High school teachers collaborate with science faculty on summer research projects in order to learn new techniques that they can incorporate into their own classrooms and laboratories. High school teachers gain a greater appreciation and enthusiasm for research in order to renew their excitement about teaching science.

Undergraduates collaborate with science faculty on summer research projects in order to obtain hands-on research experience, increase appreciation for basic and applied scientific research as a viable career option, and gain a significant advantage when applying to graduate and professional schools.

1b. Project personnel during 2009-2010. Parentheses denote faculty team leaders.

Position	Name
Director	Frank Jordan
Faculty	Kurt Birdwhistell
Faculty	Don Hauber
Faculty	Craig Hood
Faculty	Lawrence Lewis
Faculty	Kimberlee Mix
Faculty	Thom Spence
Faculty	Bill Walkenhorst
HS student	Kate Birdwhistell
HS student	Timberly Briscoe
HS student	Theresa Cao
HS student	Tory Herring
HS student	Vivian Hoang
HS student	Mariah Jackson
HS student	Danielle LeBlanc
HS student	Kevin Mah
HS student	Ha Van Nguyen
HS student	Angel Pittman
HS student	Chae-Yun Um
HS student	Slone Vom Baur
HS student	Chyna Washington
HS student	Ambert Yeh
HS teacher	Eric Leefe (Spence)
HS teacher	Mary Macklin (Mix)
HS teacher	Michelle White (Hauber)
Math instructor	Lawrence Lewis
Undergraduate	Annalisa Hernandez (Hood)
Undergraduate	John Nguyen (Hauber)
Undergraduate	David Reeves (Hauber)
Undergraduate	Dana Walkenhorst (Mix)
Undergraduate	Jordan Wolfgang Klein (Walkenhorst)
Undergraduate	Paula Inna Dizon (Birdwhistell)
Undergraduate	Caitlin LaVine (Hood)
Undergraduate	Andrew Allain (Spence)
Undergraduate	Dayaamayi Kurimella (Walkenhorst)
Undergraduate	Lewis Baker (Lewis)

2. Activities and Findings

2a. *Major research findings and educational activities* — Our project has three fundamental components: 1) revision and integration of science and math curricula; 2) updating of equipment and instrumentation in our core science laboratories; and 3) creation of summer outreach and research program for undergraduates, high school teachers, and high school students. As the following table indicates, we are on track to meet all of the specific performance milestones delineated in our original proposal and scope of work.

Performance milestone for 2009-2010	**Status**
Appoint advisory committee to help select team members and guide program	Completed
Advertise program to high schools in greater New Orleans community	Completed
Acquire and set up new equipment in core science laboratories	Ongoing
Review, revise, and assess science curricula	Ongoing
Develop physical science modules to incorporate into biology courses	Ongoing
Provide biology and health science applications to physical science courses	Ongoing
Recruit third cohort of faculty to lead research teams	Completed
Recruit math instructor	Completed
Recruit third cohort of high school students and teachers to participate in program	Completed
Recruit third cohort of undergraduate research students	Completed
Enroll high school students in math or statistics course for college credit	Completed
Carry out summer research program with capstone mini-symposium in August 2010	Ongoing
Use P-KSFI program as leverage to secure additional external support	Ongoing
Evaluate project success to date	Ongoing

Review, revision, and assessment of major curricula are ongoing processes carried out by each department at Loyola University as part of our SACS accreditation. Departments desiring to alter their major curriculum must submit a proposal to a college-level curriculum committee for approval, and this proposal must include a letter of support from each department affected by proposed curriculum changes. Biology, chemistry, math, physics, and psychology have adjunct requirements that span across all five departments, so we are mandated to work closely with one another on curricular issues. The advisory committee has worked peripherally with departmental curricular committees to strengthen the multidisciplinary nature of our science major curricula and build in more opportunities to build quantitative skills that are essential to success in science. Biology and Physics core curricular revisions have been approved by the university and will be in place beginning this fall semester. The focus of curriculum revision in biology is creation of an experience-based laboratory for our first semester Cells and Heredity course, creation of a freshman advising position and associated Biology Freshman Seminar course, and reduction of the core

curriculum to 12 hours. The focus of curriculum revision in physics is the addition of a Pre-Medical track and integration of more biophysics courses and research opportunities. We are using data collected by Loyola faculty to provide examples for our summer math or statistics course and we are exchanging biological and physical science examples in order to "cross pollinate" our math and science courses.

Loyola is about to launch a major revision of our Common Curriculum, which is the core set of courses and academic experiences shared by all undergraduates. The new Common Curriculum will increase enrollment in math courses and require all non-science majors to take a new introductory science course, a science elective, and a laboratory. The goal is to increase student understanding of the critical role of natural sciences in society, science literacy, and critical thinking skills.

Science is both a collection of facts about the natural world and a unique process of discovery used to uncover these facts. Successful science education requires access to teaching and research laboratories fitted with modern equipment and instrumentation. Loyola has been working hard to keep our teaching and research laboratories up to date and we used PKSFI support to purchase a thermal gravimetric analyzer, a Teachspin interferometry apparatus, four Qubit plant physiology teaching kits, six iWorx animal physiology teaching kits, two melting point apparatuses, and two benchtop pH meters. This equipment has purchases and is in use. Importantly, we were able to use our PKSFI grant as leverage to obtain addition internal and external support that we used to purchase most of the equipment that was listed in our original proposal and subsequently eliminated in our final work plan. Finally, we also used PKSFI money to order graphing calculators and digital cameras in support of our summer research program.

A summer research program is the cornerstone of our PKSFI project. The Summer Collaborative Outreach and Research Experience (SCORE) is key to helping Loyola recruit and retain more qualified students into STEM programs and ultimately into the STEM workforce in Louisiana. This year we have 14 high school students, 3 high school teachers, 10 undergraduates, and 8 faculty members involved in (and financially supported by) SCORE (see Personnel section). We received applications from students attending 11 different high schools and the final 14 participants represent 9 different high schools and include a significant number of students from groups traditionally underrepresented in the sciences.

2b. *Data supporting major findings resulting from these activities* — The second cohort of SCORE students will begin college this fall. Equipment we purchased has already paid off in the sense that we used PKSFI support as leverage to obtain funds to purchase more equipment, including much of the equipment that was omitted from our final work plan.

2c. *Opportunities for student training and workforce development* — as mentioned above, SCORE is the cornerstone of our PKSFI project and the summer outreach and research activities of 14 high school students and 10 undergraduates are supported by SCORE. This includes substantial training on science equipment and instrumentation, use of personal computers, and strengthening of oral and writing communication skills. High school

students are enrolled in a math or statistics course that uses real data to teach pre-calculus level mathematics, statistics, and some computing.

2d. *Community development and/or outreach activities* — Our PKSFI project has two primary outreach activities. First, SCORE recruits high school students and teachers from the greater New Orleans community. Second, SCORE participants engage in a full day of service learning. In addition, the Project Director hosted high school students from the Young Women's Leadership School of East Harlem during the past three years. These students assisted the Project Director with environmental research and also participated in service learning in association with the Audubon Institute and Eglin Air Force Base.

2e. *Problems encountered during the past year* — No major problems were encountered during the last year.

3. Contributions:

3a. *Improvements to undergraduate science education* — Our PKSFI project directly benefits undergraduate science education by revising and integrating our science and math curricula, by acquiring equipment and instrumentation for our teaching and research laboratories, and by providing a summer research experience.

3b. *Building institutional and community capacity* — Loyola University was on the verge of investing considerable resources into science and math programs when Hurricane Katrina struck and upended our institutional priorities. It is our hope that PKSFI support is serving as a catalyst to reinvigorate and reenergize our science and math programs and to encourage the administration to get back to enhancing the sciences. We are in the beginning phase of renovation of Monroe Hall, which houses all of Loyola's natural science departments. We are also creating a new interdisciplinary major – Environmental Studies – which will attract more science majors who want to contribute to solving problems such as coastal wetland loss and amelioration of the effects of the Deepwater Horizon oil spill. As our program grows, we will increase our outreach to the local community – especially high school students – and in turn increase the flow of students into the local STEM pipeline.

3c. *Ensuring project sustainability and/or scalability* — we are meeting our overall objectives of 1) revising and integrating science and math curricula; 2) updating equipment and instrumentation in our core science laboratories; and 3) creating a summer outreach and research program for undergraduates, high school teachers, and high school students. We therefore believe that our program is scalable and can serve as a model that can be exported to other schools in Louisiana and beyond. We plan on sustaining this program by seeking external support from NSF or a similar funding source.

4. Project Revision

This year we requested and received permission from our Post-Katrina Support Fund Initiative Program Manager to adjust the number and composition of research teams during the Summer Collaborative Outreach and Research Experience (SCORE).

The primary rationale for these changes was that many high school students were not fully engaged in the research process, which led to concerns about data quality and decreased faculty research productivity.

To address these concerns, we removed high school students from SCORE research teams and used the funds originally budgeted for high school students to increase the number of undergraduate research collaborators.

This year we are providing high school students with weekly research seminars that are followed up by hands-on training of different laboratory and field research methods. Faculty team leaders are taking turns providing the seminars and hands-on training.

Finally, we varied the size of research teams to increase the number of faculty participating and diversify the kinds of research opportunities available for undergraduates and high school teachers.

Annual Report for Year 2 (ending 6/30/2009)

An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

PKSFI Primarily Education Subprogram

2008-2009 Progress Report

July 6, 2009

Submitted by

Frank Jordan

Project Director

Loyola University New Orleans

1a. Overview of Personnel

The Project Director administers the project, manages the budget, arranges payment of personnel, organizes the summer mini-symposium, creates and maintains a website to describe and advertise the summer research program (www.loyno.edu/score), advertises the program to local high school students and teachers, recruits participants into the program, invites local and regional speakers for summer seminars, and collects and analyzes data needed to assess the success of the program.

The PKSFI advisory committee consists of the Project Director and the chairs of the biology, chemistry, math, physics, and psychology departments. Co-Principal Investigators on the original proposal may continue to serve on the advisory committee even if they stop serving as Chair of their respective departments. The purpose of the advisory committee is to assist the Project Director with purchasing of equipment and instrumentation for core science labs, development of criteria for selection of faculty, undergraduates, high school teachers, and high school students to participate in summer research teams. The committee also provides guidance to departments on how to move forward with curriculum reform issues.

Faculty Team Leaders are responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, helping students create presentations for mini-symposium at end of summer research session, and follow up visits to high schools.

The Math Instructor and one undergraduate Math Tutor handle all aspects of their course. The instructor will work closely with summer research faculty to obtain real data to be analyzed, interpreted, and visualized in class.

High school students collaborate with science faculty on summer research projects and thereby gain direct research experience that will lead to a better understanding of, and excitement for, STEM-related careers. High school students will also acquire quantitative skills to increase their success as science majors in college and thereafter in graduate and professional school.

High school teachers collaborate with science faculty on summer research projects in order to learn new techniques that they can incorporate into their own classrooms and laboratories. High school teachers gain a greater appreciation and enthusiasm for research in order to renew their excitement about teaching science.

Undergraduates collaborate with science faculty on summer research projects in order to obtain hands-on research experience, increase appreciation for basic and applied scientific research as a viable career option, and gain a significant advantage when applying to graduate and professional schools.

1b. Project personnel during 2008-2009

Position	Name
Faculty	Maria Calzada
Faculty	Don Hauber
Faculty	Frank Jordan
Faculty	Thom Spence
Faculty	Bill Walkenhorst
HS student	Nhu Ngoc Pham
HS student	Jihye Lim
HS student	Triston Wong
HS student	Ishan Williams
HS student	Shamit Dua
HS student	Palvin Jhita
HS student	John Skelton
HS student	Gage Louis
HS student	Blake Donald
HS student	Dominique Rochon
HS student	Abraham Ibrahim
HS student	Jade Wimby
HS student	Mohammed Ibrahim
HS student	Brittany Melson
HS teacher	Michelle White
HS teacher	Kelly Williams
Math instructor	Lawrence Lewis
Math tutor	TBA
Undergraduate	Holly Gardner
Undergraduate	John Nguyen
Undergraduate	Ashley Melancon
Undergraduate	Anna Lee
Undergraduate	Jessica Cosgrove
Undergraduate	Pepper Hanna
Undergraduate	TBA

2. Activities and Findings

2a. *Major research findings and educational activities* — Our project has three fundamental components: 1) revision and integration of science and math curricula; 2) updating of equipment and instrumentation in our core science laboratories; and 3) creation of summer outreach and research program for undergraduates, high school teachers, and high school students. As the following table indicates, we are on track to meet all of the specific performance milestones delineated in our original proposal and scope of work.

Performance milestone for 2008-2009	**Status**
Appoint advisory committee to help select team members and guide program	Completed
Advertise program to high schools in greater New Orleans community	Completed
Acquire and set up new equipment in core science laboratories	Completed
Review, revise, and assess science curricula	Ongoing
Develop physical science modules to incorporate into biology courses	Ongoing
Provide biology and health science applications to physical science courses	Ongoing
Recruit second cohort of faculty to lead research teams	Completed
Recruit math instructor	Completed
Recruit second cohort of high school students and teachers to participate in program	Completed
Recruit second cohort of undergraduate research students	Completed
Enroll high school students in statistics course for college credit	Completed
Carry out summer research program with capstone mini-symposium in July 2009	Ongoing
Use P-KSFI program as leverage to secure additional external support	Ongoing
Evaluate project success to date	Ongoing

Review, revision, and assessment of major curricula are ongoing processes carried out by each department at Loyola University as part of our SACS accreditation. Departments desiring to alter their major curriculum must submit a proposal to a college-level curriculum committee for approval, and this proposal must include a letter of support from each department affected by proposed curriculum changes. Biology, chemistry, math, physics, and psychology have adjunct requirements that span across all five departments, so we are mandated to work closely with one another on curricular issues. The advisory committee has worked peripherally with departmental curricular committees to strengthen the multidisciplinary nature of our science major curricula and build in more opportunities to build quantitative skills that are essential to success in science. Biology and Physics core curricular revisions have been approved by the university and will be in place beginning this fall semester. The focus of curriculum revision in biology is creation of an experience-based laboratory for our first semester Cells and Heredity course, creation of a freshman advising position and associated Biology Freshman Seminar course, and reduction of the core

curriculum to 12 hours. The focus of curriculum revision in physics is the addition of a Pre-Medical track and integration of more biophysics courses and research opportunities. We are using data collected by Loyola faculty to provide examples for our summer math course and we are exchanging biological and physical science examples in order to "cross pollinate" our math and science courses.

Science is both a collection of facts about the natural world and a unique process of discovery used to uncover these facts. Successful science education requires access to teaching and research laboratories fitted with modern equipment and instrumentation. Loyola has been working hard to keep our teaching and research laboratories up to date and we used PKSFI support to purchase a thermal gravimetric analyzer, a Teachspin interferometry apparatus, four Qubit plant physiology teaching kits, six iWorx animal physiology teaching kits, two melting point apparati, and two benchtop pH meters. This equipment has all been ordered and most is already in use. Importantly, we were able to use our PKSFI grant as leverage to obtain addition internal and external support that we used to purchase most of the equipment that was listed in our original proposal and subsequently eliminated in our final work plan. Finally, we also used PKSFI money to order graphing calculators and digital cameras in support of our summer research program.

A summer research program is the cornerstone of our PKSFI project. The Summer Collaborative Outreach and Research Experience (SCORE) is key to helping Loyola recruit and retain more qualified students into STEM programs and ultimately into the STEM workforce in Louisiana. This year we have 12 high school students, 2 high school teachers, 7 undergraduates, and 6 faculty members involved in (and financially supported by) SCORE (see Personnel section). We received applications from students attending over 20 different high schools and the final 12 participants represent 10 different high schools and include a significant number of students from groups traditionally underrepresented in the sciences. Visit http://gallery.mac.com/gambusia for some pictures from our first week of SCORE.

2b. *Data supporting major findings resulting from these activities* — The first cohort of SCORE students will begin college this fall and we will report on their acceptance rates in next year's report. Equipment we purchased has already paid off in the sense that we used PKSFI support as leverage to obtain funds to purchase more equipment, including much of the equipment that was omitted from our final work plan.

2c. *Opportunities for student training and workforce development* — as mentioned above, SCORE is the cornerstone of our PKSFI project and the summer research activities of 12 high school students and seven undergraduates are supported by SCORE. This includes substantial training on science equipment and instrumentation, use of personal computers, and strengthening of oral and writing communication skills. High school students are enrolled in a math class that uses real data to teach pre-calculus level mathematics, statistics, and some computing.

2d. *Community development and/or outreach activities* — Our PKSFI project has two primary outreach activities. First, SCORE recruits high school students and teachers from the greater New Orleans community. Second, SCORE participants will engage in a full day of service learning. Third, the Project Director hosted high school students from the Young Women's

Leadership School of East Harlem during the past two years. These students assisted the Project Director with environmental research and also participate in service learning in association with the Audubon Institute.

2e. *Problems encountered during the past year* — No major problems were encountered during the last year.

3. Contributions:

3a. *Improvements to undergraduate science education* — Our PKSFI project directly benefits undergraduate science education by revising and integrating our science and math curricula, by acquiring equipment and instrumentation for our teaching and research laboratories, and by providing a summer research experience.

3b. *Building institutional and community capacity* — Loyola University was on the verge of investing considerable resources into science math programs when Hurricane Katrina struck and upended our institutional priorities. It is our hope that PKSFI support is serving as a catalyst to reinvigorate and reenergize our science and math programs and to encourage the administration to get back to enhancing the sciences. As our program grows, we will increase our outreach to the local community – especially high school students – and in turn increase the flow of students into the local STEM pipeline.

3c. *Ensuring project sustainability and/or scalability* — we are meeting our overall objectives of 1) revising and integrating science and math curricula; 2) updating equipment and instrumentation in our core science laboratories; and 3) creating a summer outreach and research program for undergraduates, high school teachers, and high school students. We therefore believe that our program is scalable and can serve as a model that can be exported to other schools in Louisiana and beyond. We plan on sustaining this program by seeking external support from NSF or a similar funding agency.

4. Project Revision

No major project revisions were required this year.

Annual Report for Year 1 (ending 6/30/2008)

An interdisciplinary and experiential approach to strengthen recruitment, retention, and training in biological and materials sciences in post-Katrina New Orleans

PKSFI Primarily Education Subprogram

2007-2008 Progress Report

June 30, 2008

Submitted by

Frank Jordan

Project Director

Loyola University New Orleans

1a. Overview of Personnel

The Project Director administers the project, manages the budget, arranges payment of personnel, organizes the summer mini-symposium, creates and maintains a website to describe and advertise the summer research program (www.loyno.edu/score), advertises the program to local high school students and teachers, recruits participants into the program, invites local and regional speakers for summer seminars, and collects and analyzes data needed to assess the success of the program.

The PKSFI advisory committee consists of the Project Director and the chairs of the biology, chemistry, math, physics, and psychology departments. Co-Principal Investigators on the original proposal may continue to serve on the advisory committee even if they stop serving as Chair of their respective departments. The purpose of the advisory committee is to assist the Project Director with purchasing of equipment and instrumentation for core science labs, development of criteria for selection of faculty, undergraduates, high school teachers, and high school students to participate in summer research teams. The committee also provides guidance to departments on how to move forward with curriculum reform issues.

Faculty Team Leaders (3 per year) are responsible for selecting their research focus, acquiring necessary equipment and supplies, arranging project logistics, helping students create presentations for mini-symposium at end of summer research session, and follow up visits to high schools.

The Math Instructor and one undergraduate Math Tutor handle all aspects of their course. The instructor will work closely with summer research faculty to obtain real data to be analyzed, interpreted, and visualized in class.

High school students (12 per year) collaborate with science faculty on summer research projects and thereby gain direct research experience that will lead to a better understanding of, and excitement for, STEM-related careers. High school students will also acquire quantitative skills to increase their success as science majors in college and thereafter in graduate and professional school.

High school teachers (3 per year) collaborate with science faculty on summer research projects in order to learn new techniques that they can incorporate into their own classrooms and laboratories. High school teachers gain a greater appreciation and enthusiasm for research in order to renew their excitement about teaching science.

Undergraduates (6 per year) collaborate with science faculty on summer research projects in order to obtain hands-on research experience, increase appreciation for basic and applied scientific research as a viable career option, and gain a significant advantage when applying to graduate and professional schools.

1b. Project personnel during 2007-2008

Position	Name
Faculty	Frank Jordan
Faculty	Kurt Birdwhistell
Faculty	Don Hauber
Faculty	Thom Spence
Faculty	Bill Walkenhorst
Math instructor	Ralph Tucci
Math tutor	Tara Umana
Undergraduate	Collette Eusey
Undergraduate	Truc Le
Undergraduate	Dana Walkenhorst
Undergraduate	Anna Lee
Undergraduate	Rachel Hahn
Undergraduate	Phuong Vo
HS student	Channel Huff
HS student	Samaneh Khoshini
HS student	Tasneem Chowdury
HS student	Quayshawn Martin
HS student	Leo Olivares
HS student	Mai Kim Vu
HS student	Shonte' Joseph
HS student	Paul Nguyen
HS student	Danielle Alexander
HS student	Amanda Deadmond
HS student	Allese Joplin
HS student	Charla Lee
HS teacher	Lori Fasone
HS teacher	Michelle White
HS teacher	Kelly Williams

2. Activities and Findings

2a. *Major research findings and educational activities* — Our project has three fundamental components: 1) revision and integration of science and math curricula; 2) updating of equipment and instrumentation in our core science laboratories; and 3) creation of summer outreach and research program for undergraduates, high school teachers, and high school students. As the following table indicates, we are on track to meet all of the specific performance milestones delineated in our original proposal and scope of work.

Performance milestone for 2007-2008	**Status**
Appoint advisory committee to help select team members and guide program	Completed
Advertise program to high schools in greater New Orleans community	Completed
Begin acquiring and setting up new equipment in core science laboratories	Ongoing
Continue review, revision, and assessment of science curricula	Ongoing
Begin developing physical science modules to incorporate into biology courses	Ongoing
Provide biology and health science applications to physical science courses	Ongoing
Create handbook describing program goals and expectations	Completed
Select first cohort of faculty to lead research teams	Completed
Recruit Math for Scientists instructor and tutors	Completed
Select first cohort of high school students and teachers to participate in program	Completed
Recruit first cohort of undergraduate research students	Completed
Enroll high school students in Math for Scientists course for college credit	Completed
Carry out summer research program with capstone mini-symposium in July 2008	Ongoing
Use P-KSFI program as leverage to secure additional external support	Ongoing
Evaluate project success to date	Ongoing

Review, reform, and assessment of major curricula are ongoing processes carried out by each department at Loyola University as part of our SACS accreditation. Departments desiring to alter their major curriculum must submit a proposal to a college-level curriculum committee for approval, and this proposal must include a letter of support from each department affected by proposed curriculum changes. Biology, chemistry, math, physics, and psychology have adjunct requirements that span across all five departments, so we are mandated to work closely with one another on curricular issues. The advisory committee has worked peripherally with departmental curricular committees to strengthen the multidisciplinary nature of our science major curricula and build in more opportunities to build quantitative skills that are essential to success in science. Biology and Physics core curricular revisions have been approved by the university and will be in place beginning this fall semester. The focus of curriculum revision in biology is creation of an experience-based laboratory for our first semester Cells and Heredity course, creation of a freshman advising

position and associated Biology Freshman Seminar course, and reduction of the core curriculum to 12 hours. The focus of curriculum revision in physics is the addition of a Pre-Medical track and integration of more biophysics courses and research opportunities. We are using data collected by Loyola faculty to provide examples for our summer Math for Scientists course and we are exchanging biological and physical science examples in order to "cross pollinate" our math and science courses.

Science is a collection of facts about the natural world and a unique process of discovery used to uncover these facts. Successful science education requires access to teaching and research laboratories fitted with modern equipment and instrumentation. Loyola has been working hard to keep our teaching and research laboratories up to date and we used PKSFI support to purchase a thermal gravimetric analyzer, a Teachspin interferometry apparatus, four Qubit plant physiology teaching kits, six iWorx animal physiology teaching kits, two melting point apparati, and two benchtop pH meters. This equipment has all been ordered and most is already in use. Importantly, we were able to use our PKSFI grant as leverage to obtain addition internal and external support that we used to purchase most of the equipment that was listed in our original proposal and subsequently eliminated in our final work plan. Finally, we also used PKSFI money to order graphing calculators and digital cameras in support of our summer research program.

In many ways, our summer research program is the cornerstone of our PKSFI project. The Summer Collaborative Outreach and Research Experience (SCORE) is key to helping Loyola recruit and retain more qualified students into STEM programs and ultimately into the STEM workforce in Louisiana. PKSFI funding was not received early enough in 2007 to host SCORE last summer, so our first SCORE began on June 23, 2008. We have 12 high school students, three high school teachers, seven undergraduates, and six faculty members involved in (and financially supported by) SCORE (see Personnel section). High school students represent nine different area high schools and include a significant number of students from groups traditionally underrepresented in the sciences. We have only completed the first week of SCORE, but all participants seem very enthusiastic and our labs are buzzing with activity that we hope leads to increased excitement about science and to enhanced research productivity. In summary, we have used PKSFI support to engage in significant educational activities that we hope will result in major research findings that can be described in our next annual report. Visit http://gallery.mac.com/gambusia for some pictures from our first week of SCORE.

2b. *Data supporting major findings resulting from these activities* — as mentioned above, SCORE did not begin until last week. We will include data supporting the major findings of SCORE activities in our next annual report. The equipment we purchased has already paid off in the sense that we used PKSFI support as leverage to obtain funds to purchase more equipment, including much of the equipment that was omitted from our final work plan.

2c. *Opportunities for student training and workforce development* — as mentioned above, SCORE is the cornerstone of our PKSFI project and the summer research activities of 12 high school students and seven undergraduates are supported by SCORE. This includes substantial training on science equipment and instrumentation, use of personal computers, and strengthening of oral and writing communication skills. High school students are

enrolled in a math class that uses real data to teach pre-calculus level mathematics, statistics, and some computing.

2d. *Community development and/or outreach activities* — Our PKSFI project has two primary outreach activities. First, SCORE recruits high school students and teachers from the greater New Orleans community. Second, SCORE participants will engage in a full day of service learning (i.e., educationally focused volunteer work) on July 27, 2008.

2e. *Problems encountered during the past year* — No major problems were encountered during the last year. A minor issue that we dealt with was recruiting adequate numbers of capable and enthusiastic high school teachers and students. We will increase our recruitment efforts next year in order to expand and diversify our pool of applicants.

3. Contributions:

3a. *Improvements to undergraduate science education* — Our PKSFI project directly benefits undergraduate science education by revising and integrating our science and math curricula, by acquiring equipment and instrumentation for our teaching and research laboratories, and by providing a summer research experience.

3b. *Building institutional and community capacity* — Loyola University was on the verge of investing considerable resources into science math programs when Hurricane Katrina struck and upended our institutional priorities. It is our hope that PKSFI support is serving as a catalyst to reinvigorate and reenergize our science and math programs and to encourage the administration to get back to enhancing the sciences. As our program grows, we will increase our outreach to the local community – especially high school students – and in turn increase the flow of students into the local STEM pipeline.

3c. *Ensuring project sustainability and/or scalability* — we are meeting our overall objectives of 1) revising and integrating science and math curricula; 2) updating equipment and instrumentation in our core science laboratories; and 3) creating a summer outreach and research program for undergraduates, high school teachers, and high school students. We therefore believe that our program is scalable and can serve as a model that can be exported to other schools in Louisiana and beyond. We plan on sustaining this program by seeking external support from NSF or a similar funding agency.

4. Project Revision

No major project revisions were required this year. Some minor budget revisions were submitted to and approved by the Louisiana Board of Regents.