

Annual Report for Period:09/2008 - 08/2009

Submitted on: 08/18/2009

Principal Investigator: Coleman, John K.

Award ID: 0811826

Organization: Langston University

Submitted By:

Coleman, John - Principal Investigator

Title:

Langston's Integrated Network College Featuring The STEM Digital Village (LINC, Phase II)

Project Participants

Senior Personnel

Name: Coleman, John

Worked for more than 160 Hours: Yes

Contribution to Project:

Post-doc

Graduate Student

Undergraduate Student

Name: Mitchem, Sarita

Worked for more than 160 Hours: Yes

Contribution to Project:

S. Mitchem mentors and tutors other undergraduates

Name: Greene, Cedric

Worked for more than 160 Hours: Yes

Contribution to Project:

C. Green is a laboratory assistant

Name: Osborne, Toykeya

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Osborne helps manage the LINC office

Name: Osborne, James

Worked for more than 160 Hours: No

Contribution to Project:

J. Osborne participated in the mentoring & tutoring program

Name: Ekpo, Felicia

Worked for more than 160 Hours: Yes

Contribution to Project:

F. Ekpo participated in the mentoring, & tutoring program as well as help manage the LINC office.

Name: Caldwell, Kenta

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Caldwell participated as a research assistant for Dr. Lewis

Name: Blythe, Karole

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Blythe participated in the mentoring, tutoring program as well as help manage the LINC office.

Name: Vickers, Quanisha

Worked for more than 160 Hours: Yes

Contribution to Project:

Q. Vickers helps manage the LINC office

Name: Bradley, Justina

Worked for more than 160 Hours: Yes

Contribution to Project:

J. Bradley helps manage the LINC office

Name: Vann, Kendra

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Vann helps manage the LINC office, as well and participates in the mentoring and tutoring program

Name: Torres, Tamar

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Torres participates in the mentoring and tutoring program

Name: Momberger, Leslie

Worked for more than 160 Hours: No

Contribution to Project:

L. Momberger worked as a research assistant for Dr. Matand

Name: Stoutermire, Brittany

Worked for more than 160 Hours: Yes

Contribution to Project:

B. Stoutermire helps manage the LINC office, as well and participates in the mentoring and tutoring program

Name: Braggs, Kirk

Worked for more than 160 Hours: Yes

Contribution to Project:

K. Braggs participates in the mentoring and tutoring program

Technician, Programmer**Other Participant**

Name: Williams, Irene

Worked for more than 160 Hours: Yes

Contribution to Project:

The Program coordinator works closely with the PI/Director in coordination all program activities including budgetary concerns.

Name: Watkins, Willie

Worked for more than 160 Hours: Yes

Contribution to Project:

The education, technology & data coordinator assists the program coordinator in the coordination of the colloquiums, CPR-L, STEM Digital Village website & SEIS data.

Name: Chan, Douglass

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Chan helps coordinate the instrumentation laboratory.

Name: Kesete, Tesfai

Worked for more than 160 Hours: Yes

Contribution to Project:

T. Kesete helps in the coordination and upkeep for the instrumentation laboratory

Name: Hill, Anthony

Worked for more than 160 Hours: Yes

Contribution to Project:

Anthony Hill facilitates the Preparation for Success Colloquium

Name: McCarroll, Gjasmine

Worked for more than 160 Hours: Yes

Contribution to Project:

G. McCarroll helps manage the LINC office in filing and upkeep

Name: Franks, William

Worked for more than 160 Hours: Yes

Contribution to Project:

Dr. Franks facilitates chemistry and research colloquiums.

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

Collaborations were the key that enabled us to broaden the numbers of students impacted and ensure a degree of success in LINC I. We have maintained this list of contacts during our LINC Continuation grant. Although covered in our Final Report from our previous STEM LINC grant, they are included in the Appendix section as Exhibits I A and B, as a reference point for our LINC II grant.

During the 2008-2009 school terms, our funding collaborations yielded full support for nineteen (19) scholars.

Funding Collaborations continue to be a core recruiting and retention tool. However, during our first year of LINC II, focus and collaborations on the following activities helped support our overall objectives.

1. Educational Activities
2. Developmental Support
3. Research
4. Mentoring
5. Recruiting

Educational activities are detailed in the Activities and Findings: Research and Educational Activities section of this report.

Substantial Development Support was provided by Langston University in the form of \$125,000 to provide furnishings and other support for our CPR-L laboratory. We spent a considerable portion of year 1 securing resources, including furnishings and LU onsite building maintenance support for this element of our LINC II project.

Research collaborations resulted in Summer 2009 placement of twenty-two (22) students through collaborative arrangements with LINC partners. Venues included major U.S. institutions such as University of California at Berkeley, Stanford University, Rice University, and three Oklahoma Universities that include Langston. A featured research collaboration was our alliance with the Lawrence Berkeley National Laboratory, University of California-Berkeley. FAST (Faculty and Student Teams). Dr. Byron Quinn, a Langston University faculty member, and two Langston University (LU) students were selected to participate in the highly prestigious Department of Energy (DOE) Faculty and Student Teams (FAST) program during the 2009 Summer term. The FAST program allowed the LU team to work as researchers at a

state-of-the-art national laboratory. Details are in the Activities and Findings: Research and Educational Activities section of this report.

Recruiting collaborations were ongoing during LINC II's first year. High profile collaborations such as The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program occur during the summer sessions.

Details on Mentoring and Recruiting are covered under those specific headings.

Other collaborations during LINC II's first year including ongoing dialogue and activity with our Internet partner ? We Care Worldwide Inc. ? to set up appropriate support for database and Social Network management systems required for our current STEM Digital Village and CPR-L programs. All are now in place for the upcoming school year.

Activities and Findings

Research and Education Activities: (See PDF version submitted by PI at the end of the report)

Research and Education Activities:

Each of our activities in the Education and Research areas was aimed at meeting our original and continuing objectives of a) increasing the number of STEM graduates, and b) increasing the number of STEM graduates who matriculate to STEM graduate programs.

Activities and findings:

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EDUCATIONAL ACTIVITIES:

Following are Educational Activities conducted during the reporting period.

1. Technology in the Classroom
2. GRE Preparation
3. Supplementary Instruction (SI)
4. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program
5. Mentoring
6. Faculty Education

Technology in the Classroom

A major focus of the LINC program, and of Langston University, is to expand the use of technology in the classroom. To this end the following activities were accomplished during this past year. LU contributed \$125,000 dollars to this project through its Title 3 Program; other contributing funds are from the LINC Program.

1. Creation of two state-of-the-art Smart classrooms, including a computer laboratory featuring Tablet PCs, the primary tool used in the CPR-L process. Other attributes include LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability.
2. Creation of a media laboratory that supports the creation and dissemination of performance videos wherein students learn by teaching' core course concepts as they solve specific problems.

About CPR-L (Competency Performance Recordings for Learning)

CPR-L is simply a 'learning by teaching' method that embraces 21st century technologies and numerous learning protocols. It utilizes a smartboard, wireless projector, and tablet PC. According to the Learning Pyramid by National Training Laboratories in Bethel, Maine, 'learning by teaching' produces a 90% retention rate, the highest of all methods.

With CPR-L, students are required to take homework problems that contain core course concepts to a lab setting or home, and solve them on a tablet PC while utilizing clearly articulated problem-solving rubrics. The final product must be concise, compressed to essential steps, so students are encouraged to first utilize paper and pen to explore solutions until they believe that they have uncovered all elements in the selected rubrics, and reduced their findings to an effective description of the solutions process. The entire process is iterative, and requires intense re-thinking of the solution in order to reduce it to its essence and meet other required criteria. Students then prepare a Smartboard lecture on tablet PC. The tablet PC records the students' voice, as they are required to talk through the problem as though they were teaching it in class. The laptop visually captures the student's work in-progress straight through to its finished form as the problem solution is written on the tablet PC's surface with a stylus. The effectiveness of the solution is measured against the selected rubrics. Further, the process of recording requires a quiet environment, devoid of music and other typical distractions, writing the information down, as well as reading aloud to 'hear' ones' thoughts. This effort reinforces the learning process. All students' completed assignments are maintained in their performance file, and are accessible to them and to the instructor. This gives both a movie-like review of exactly how well the student understands core course concepts and what the progress trail looks like. Upon careful review of these performance 'movies', instructors can isolate student and course content weaknesses, recommend intervention, and better predict examination outcomes.

Technologies enable the student to wirelessly project a 'movie-like' presentation of the homework assignment, with sound, on a large whiteboard for classroom viewing and discussion. Since the student must iron out all of the kinks and fine tune the assignment outside the classroom, this process lessens the amount of time associated with traditional 'going to the board' activity, and permits broader classroom participation. When CPRL work sessions are completed in the tablet PC lab, the instructor is able to scrutinize each student's work separately, from the instructor's laptop, which may include working concurrently on the individual students' screen.

Selected CPR-L recordings are posted in The Digital Village website.

Other technologies employed in the classroom, and implemented earlier than the subject period, are listed in the Appendix section, Exhibit II-A. A Photo Gallery featuring technology in the classroom is attached as Exhibit II-B.

GRE Preparation

GRE Preparation (Collaboration with EPSCoR: Data analyzed by Dr. A. Peterson, Director LU-EPSCoR Program)

One of the primary predictors of how well undergraduate students will perform in graduate school is the preparation they received in their undergraduate curriculums. One of the primary measures of their potential success in graduate school is the Graduate Record Examination (GRE).

Background:

In 2002, Langston University issued an internal report on its students' GRE scores and readiness for graduate school. The report suggested that Langston University mathematics and science students who maintained a 3.2 GPA and scored at least 400/800 on each of the GRE core components were deemed competitive by several in-state graduate schools committees.

The LINC Program has been a proactive collaborator in providing STEM students with the opportunity to receive free GRE Course preparation since 2003. In recent years, EPSCoR has been a significant contributor to the GRE Kaplan Course. Since the implementation of the preparation course by the department more than 120 students have participated. The Kaplan GRE Preparation Course has been very effective in getting more minority students prepared for the GRE, hence, increasing their competitiveness for graduate school and/or professional schools. At least 50% of these students have been confirmed as having been admitted to or are currently attending graduate/professional schools throughout the United States.

Spring 2009 Cohort:

This report focuses on the cohort of fourteen (14) students who participated in the Spring 09 Kaplan GRE course at LU. Seven students were African American female and seven students were African American males. The mean overall scores for the Kaplan Course Diagnostic Pre-Test were 440/800 (quantitative component). The mean overall scores for the verbal component was 389/800. Again, we notice similarity between the two previous year's cohorts. The post-test scores were encouraging, but were not as strong as the previous year's results.

The mean quantitative component score was 600/800. This was a 160 point increase over the Kaplan diagnostic pre-test average. The mean verbal component score for the same group was 451/800. This was a 62 point increase when compared to the Kaplan diagnostics pre-test average. We did not see the huge improvement from last year to this year as we had in previous years. The combined results for last year (2007-2008) are 1059. This year's combined scores were 1051. This represents about a 1% decrease from last year's performance.

Summary: We are again delighted that the Kaplan GRE Preparation Course has had a positive effect in helping students increase their GRE

results. Students continue to report that the preparation course not only teaches them how to study for the GRE but also provides them with solid tips on answering seemingly difficult questions. However, the (verbal) portion of the GRE continues to be the 'sticking point' for our students.

We must extend the verbal portion of the GRE Prep Course throughout our school year; providing more assistance through course colloquiums. The students' verbal competences still appears to be the key to significantly impact the GRE scores. This could potentially make the GRE scores even more competitive for graduate schools applications.

Finally, Langston University graduated seven (7) African Americans STEM majors (4 female and 3 males) this Spring who were part of a previous GRE Preparation Course sponsored by Oklahoma EPSCoR and Langston University. There were three biology majors, three chemistry majors, and one mathematics major. Six of these students have been confirmed as being accepted to graduate school.

Supplementary Instruction in collaboration with Oklahoma EPSCoR
Data analyzed by Dr. Alonzo Peterson

Summary of Results

This is Langston University's fourth full academic year of the Supplemental Instruction (SI) Program. Langston University implemented the Supplemental Instruction Program in the Spring of 2004. Classes targeted were Mathematics (College Algebra, Trigonometry, Calculus I) and the Sciences (Biology I, Biology II, Chemistry, Physics I, Physics II, and Physical Science). This report includes data from the Spring 2009 and Summer 2009 semesters. This year's program consisted of eighteen SI leaders one coordinator, one SI Supervisor, and fifteen professors/instructors. Sessions continue to meet 2-3 times a week at various times. Sessions are held in the Mathematics Building and the Sciences Building. The program was implemented during the spring 2009 semester.

Participants

During the Spring 2009 and Summer 2009 semesters, more than 400 students had access to the Sciences SI sessions. SI was made available to almost 300 mathematics students in the Spring 2009 and Summer 2009 sessions. Approximately 97% of these students are African American. SI was implemented in 19 courses (Sciences-8 and Mathematics-11). This year SI was implemented in two new areas Physics II and Biology II in addition to the three new areas (Trigonometry, Calculus I, and Physics I) that were added in the previous year. The Physics II course was implemented at the requests of the students. Biology II was implemented at the instructor's request.

Leaders

There are currently 18 undergraduate students serving as SI leaders and number of these students worked in both the spring and summer semesters. There were 11 African American females and seven (7) African American males. Four of the leaders were mathematics majors, four were chemistry majors and the remaining ten were biology majors. Each of these students has strong analytical and problem solving skills. At least 14 of these leaders are McCabe Scholars, Langston Integrated Network College (LINC) Scholars or both. We believe that we have selected some of the strongest mathematics and science students the university has to offer.

SI leaders meet their sessions regularly and attendance is reported weekly. We received positive feedback from those students who are regularly attending SI sessions. However, we continue to observe that only a very small percentage of students are actually taking advantage of the SI program. We have continued our campaign to get students to realize the benefits of SI and to get them to attend the sessions. As mentioned in the preliminary report we have partnered with the Langston University Student Government Association in their 'Why Are You Failing' Campaign that provides information to students on study skills and time and place they can receive assistance in their mathematics and science courses. The staff met with the SI mentors to explain their roles and responsibilities in implementing SI. We also placed flyers and notices throughout the mathematics and sciences buildings. SI leaders were given the opportunity to introduce themselves and the SI program to the students in each SI class. Instructors allowed students time to determine the most convenient time to meet for the SI sessions. During our end of the 2007-2008 year questionnaire we found that approximately thirty-eight percent of the students said they did not attend SI because it was not convenient for them. We have attempted to address the concern by allowing and encouraging students to attend any SI session that is convenient for them. The following is a break down of the pass/fail rate of the SI sessions.

Sciences - Biology

Only about 12% of eligible students attended the Biology SI sessions during the Spring 2009 and Summer 2009 semester. However there was significant difference in the percentage of students receiving an 'ABC' or 'DFW'. The SI Group reported (93% 'ABC' rate and 7% 'DFW' rate respectively) and the Non-SI Group reported (60%, 40% respectively).

Sciences- Chemistry

Thirty percent of the 45 Chemistry I students attended Chemistry SI sessions during the Spring 2009 semester. For the second year in a row we observed positive results for these SI sessions. Again there was also a positive difference in the number of students receiving 'ABC' and 'DFW' grades between the two groups. The Non-SI group had a 60% 'DFW' rate while the SI group reported a 25% rate. The 'ABC' rate for SI group was very encouraging; the Non-SI group had a 40% 'ABC' rate while the SI group reported an 'ABC' rate that continued to impress at 75%.

Sciences-Physical Science

About 20% of the Physical Science students regularly attended the Physical Science sessions. This group earned about a 67%. Of the non-SI 67 % of the students enrolled in the passed the course. This is an area where the instructors continue to request SI for the students.

Sciences-Physics I

Fifty percent of the students in this class attended SI. About 0% of those students received an 'ABC' grade. 100% of these students received a 'DFW'. 17 % of non-SI students passed this class. 83 % of non-SI students received either a 'DFW' grade. This course will be addressed more aggressively during the upcoming semesters.

Sciences-Physics II

This course was implemented based on a request by the students. The students from this cohort were essentially the same students who requested SI during the previous year while enrolled in Physics I. The course is an extremely rigorous course. Approximately half of the 22 students regularly attended SI. Seventy percent of these students received an 'ABC' grade in this class. Of the remaining students who did not attend SI 58% of these students received a 'DFW' grade.

Mathematics-College Algebra

More than 200 College Algebra students were offered College Algebra SI during the Spring 2009 semester. In the previous year we reported only about 6% of the students attending the SI sessions. This year about 15% of the students attended the sessions. The SI group earned an 80% 'ABC' grade rate compared to a 50% 'ABC' grade rate for the Non-SI group.

Mathematics-Trigonometry

About 60% of those students enrolled in the course regularly attended SI sessions. Of that number 80% of them completed the course with an 'ABC' grade compared to 50% of the Non-SI students. This made a very strong statement for the inclusion of SI in this course.

Mathematics-Calculus I

About 30% of the 17 students attended the SI sessions on a regular basis. Again this year these students did extremely well in this course. In fact all those who regularly attended SI sessions passed the class. The majority of them made either an A or B. The final SI/Non-SI passage rate in this course was 100% and 62% respectively.

The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program

The SABC & STEM Double Bridge is a collaborative 4-week residential Summer Bridge Program for 15 incoming freshmen who have expressed an interest in STEM disciplines. It is held on the LU campus during the months of June-July. Classroom lectures on STEM topics are rendered during the morning and research activities are held during the afternoons in laboratories or in the field. The Summer Bridge program is designed to bridge the gap between high school and college for participants by offering additional tools which will enable success. Tools-for- success are: providing participants with opportunities for interaction with other students, working as a team member, and providing introductions to Pre-Calculus, Biology, Chemistry, and Research techniques. Students who successfully complete this program enter into the STEM Double Bridge program during the Fall semester.

Twelve (12) students were selected to attend the 2009 SABC/STEM Double Bridge Program, held June 22-July 17, 2009. Seven participants were females, five were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the

participants.

This summer's program provided an excellent opportunity to roll out the department's expanded 'Technology in the Classroom' program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre & Post assessments compared to an 85% improvement last year.

See more about CPR-L in Technology in the Classroom section.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium.

Bridge Director: Dr. John K. Coleman

Bridge Coordinator: Ms. I. B. Williams

Bridge Faculty: Mr. Anthony Hill, Dr. G. Naidoo, Dr. K. Matand, and Dr. W. Franks

Master High School attending: Ms. P. Anderson, Millwood High School

Counselors/Mentors: Karole Blythe, Brittanie Stoutermire, Kirk Braggs, and Tamar Torres

Participants attending Program: Shaffran Benton, Ashley Brown, August Brown, Marcell Bryant, Keiauna Clemons, Shaquanae Cotton, Kaiya Fletcher, Tony Griffin, Briana Morrow, Terrence Prince, Samantha Samuels, and Latonya Tolbert

Outstanding performers during the program were: Chemistry: Keiauna Clemons Pre-Calculus: August Brown & Shaffran Benton CPR-L Presenter: August Brown

The major components are:

1. Selecting participants. Early spring, notification by mail is sent to prospective students about the Summer Bridge program. Direct contacts are made through high school advisors/counselors and through visits by university faculty and past Summer Bridge participants. The applicants are screened and selected based on their interests and their academic performance in high school, including attention to all qualified underrepresented groups.
2. Morning lectures. Students attend academic lectures each morning. The lectures will cover a variety of topics, including current research projects conducted by faculty, modern research methods and techniques, university resources, campus life, and study methods. Faculty members with an interest in integrating research with curriculum are chosen to teach these morning sessions.
3. Conducting research. During the afternoons, each student joins a group of 5 to 6 students in a research lab or in the field. Faculty and student peer mentors lead the students in research projects covering a wide spectrum of STEM disciplines. Students learn the basic aspects of laboratory/field skills, literature search, data acquisition, and data analysis, while participating in cutting-edge research projects. At the end of the 4-week program, each student will present his or her findings to the entire student body of the Summer Bridge program.
4. Incorporating high school STEM teachers. A new component of the Summer Bridge program is the inclusion of a high school teacher. An experienced STEM teacher is selected from high schools in close proximity to each Summer Bridge campus. The teacher works alongside the Summer Bridge participants to gain research experience. The teacher serves as advisors to the Summer Bridge program. Research experiences gained by the teachers will be valuable for integration into the STEM curricula in their high school classrooms. They will be effective recruiters for the Summer Bridge students from high schools.

Mentoring

The Department of Chemistry spends a disproportionate amount of time working with its majors and non-chemistry major LINC students in order to influence them to pursue advanced degrees.

Langston's success at increasing the number of STEM graduates who elect to attend graduate school is due, in part, to the hands-on nurturing necessary to retain and influence program participants. Our faculty had to adjust to the reality of who our students and LINC scholars are, and what influences their behavior and decisions. Many are first generation college students who don't get a lot of encouragement from their family and friends to attend graduate school. Reaction from the home front is generally quite the opposite; they want their children to get a degree and

go to work so they can help out financially. LU STEM faculty soon discovered that the role of motivator and source of inspiration and encouragement falls on them if the LU and NSF goals are to be achieved. Students do not easily or quickly comply with application deadlines, queries into graduate school, or research internship opportunities. They are not readily compliant with many other administrative duties that support success. When nurtured, however, their brilliance and capabilities become evident. Although faculty and staff might grumble that assisting these otherwise bright, talented young people should not be necessary, all realize that we are in the process of creating a mind shift ? a process that requires patience, perseverance, and dedication.

LINC scholars serve as mentors and tutors in the following programs:

1. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge
2. Supplemental Instruction (SI)

Faculty Development and Education

Department faculty members served as presenter, grant readers or grant-writing mentor:

1. Dr. Sharon Lewis ?(reader) AP Chemistry Reading , Education Testing Service (ETS), Lincoln, Nebraska
2. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2008.
3. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2009.
4. Dr. Sharon Lewis - OK-INBRE IDeA Program National Symposium, Washington, D.C. Poster Presentation: 'Bioinformatics of Bipolar Disorder' August 6-8, 2008
5. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC December 1-2, 2008
6. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC April 1-2, 2009
7. Dr. Sharon Lewis: (Reader) AP Chemistry Reading, Education Testing Service (ETS), Lincoln, Nebraska, Lincoln, Nebraska June 11-19, 2009

Drs. Coleman and Lewis also participated in a number of industry conferences and meetings:

1. Developing Bioinformatics Programs Workshop, Pittsburgh Supercomputing Center, Carnegie Mellon University, Pittsburgh, PA July 13 - 25/2008 (S. Lewis)
2. Louis Stokes Alliance for Minority Participation Oklahoma State University, Stillwater, OK (September 20, 2008) (J. Coleman; S. Lewis)
3. ODOT/OTC Annual Research Symposium OKC, OK October 15, 2008 (S. Lewis)
4. NSF HBCU-UP National Convention ? Atlanta, GA ? October 23-26, 2008 (J. Coleman)
5. Seminar 'Molecular Genetic Analysis of COMT in Bipolar Disorder', Tools and Technology Class, Pilot Project, University of Michigan Medical School, Ann Arbor October 22 ? 27, 2008 (S. Lewis)
6. Oklahoma Research Day; University of Central OK Edmond, OK (November 30, 2008)(J. Coleman)
7. 66th Annual Joint Conference of Beta Kappa Chi and the

- National Institute of Science (NIS), March 25-29, 2009,
Norfolk, VA (J. Coleman & I. Williams)
8. National Center for Integrative Biomedical Informatics
(NCIBI) Annual Research Meeting at the University of Michigan
Medical School, Ann Arbor April 27-28, 2009 (S. Lewis)
9. Langston University Research Day ? (May 1, 2009) (J.
Coleman) & (S. Lewis)
10. Research Day and the OUHSC, OKC July 2008 & 2009

RESEARCH ACTIVITIES:

LINC Students and Faculty participated in RESEARCH activities during the reporting period.

Student Research was one of LINC's strategies to improve the retention rate of STEM students. Through this experiential learning, students were exposed to challenging and exciting applications of 'book learning'.

Thirty seven (37) students participated in Summer Research activities at major U.S. institutions that include University of California at Berkley, Stanford University, Rice University, and three Oklahoma Universities that include Langston.

A. LINC Students:

Through LINC, the Department of Chemistry has impacted research and mentoring experiences, and access to graduate school, of all LU STEM majors for the past 6 years.

Over 180 LINC STEM students have received research internships at over 25 major universities throughout the U.S. Over 50 participated during the last two years.

This year, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 5 first place awards, 3 second place, 1 third place, and 1 Top Five oral winner.

First Place

Felicia Ekpo (NSF HBCU-UP National research Conference)
Jamila Harris (NSF HBCU-UP National research Conference)
Brittanie Atkinson (K-INBRE Symposium Kansas City, MO)
Shabree Nichols (BKX/NIS National Research Conference)
Shree McDaniels (OUHSC- Summer Undergraduate Program)

Second Place

Felicia Ekpo (BKX/NIS National Research Conference) ?Beta Kappa Chi/National Institute of Science
Brittanie Atkinson (BKX/NIS National Research Conference)
Shree McDaniels (BKX/NIS National Research Conference)

Third Place

Samuel Henderson (BKX/NIS National Research Conference)

Top 5 Oral

Stacy Bean ? top 5 Oral (K-INBRE Symposium Kansas City, MO)

Competitors at national events come from a field of 70 HBCU's. There are between 500 -700 attendees at each national event. Two national venues are highlighted below.

NSF HBCU-UP National Convention ? Atlanta, GA ? October 23-26, 2008

LU undergraduates have had five (5) national winners in oral and poster presentation competition at the NSF HBCU-UP National Research Conference over the last two years. This includes three (3) first place winners, one (1) second place and one (1) third place winner. During each of the past two years, the HBCU-UP conference was held during LUs homecoming, which necessitated many students having to set aside activities and organizational obligations to participate at the conference. This year, 17 students, accompanied by two faculty advisors, (John K. Coleman & Cassandra Parker) took a one-stop flight via American Airlines to Atlanta, GA, to present the results of their 10-week summer research projects, conducted at various universities throughout the US. Although this year and last year's trips were bittersweet because homecoming events were sacrificed, LU students gave excellent presentations as they defended their findings in front of faculty judges. Their presentations earned them two (2) first place awards. The list of students attending and the students fortunate to be selected as winners are listed below. The picture of Jamila Harris (which appears on the NSF website) receiving her first place award at the convention is also included in the Appendix section. [Note: Brittanie Atkinson accepted the award for Jamila Harris who was not available at the moment of presentation].

Abstracts for all students are listed in the Appendix section of this report. (Ex. IV).

The 17 Students attending the NSF HBCU-UP National Convention, Atlanta, GA:

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Kirk Braggs, Leethaniel Brumfield III, Kenta Caldwell, Dominick Crane, Felicia Ekpo, Jamila Harris, Alex Henderson, Rochelle Howard, Charles Loftis, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA: Hosted by Norfolk State University and Hampton University.

LU has had ten (10) national winners in oral and poster presentation competition at the Annual Joint Conference of Beta Kappa Chi and the National Institute of Science over the last two years. This includes three (3) first place winners, five (5) second place and two (2) third place winners. This year, 10 students, accompanied by two faculty advisors, (John K. Coleman & Irene Williams) boarded a one-stop American Airlines flight to Norfolk, VA (where they would present the results of their research work), intending to arrive in Norfolk, the day before competition. The first leg of the flight was delayed due to inclement weather, and upon arrival in Dallas-Ft. Worth, the group learned that the last flight to Norfolk, VA had already departed. The news got worse. The earliest flight the next morning would not arrive in time for the oral presenters to make their scheduled defense; however, the poster presenters could meet their schedule. The first inclination of the group was for some of them to return to Oklahoma; however, it was quickly realized that the Conference presented many more opportunities for the undergraduates as a whole. Many nationally renowned speakers would appear, many workshops were anticipated and many Industry and University vendors would be present to recruit for employees and potential scholarship awardees. The missed flight prompted a need to make alternate arrangements, including an unscheduled overnight stay in Dallas and rescheduling a flight from Dallas to Norfolk the following morning.

Meanwhile, Kendra Vann, another LU undergraduate participant had traveled a different route. She arrived in Norfolk on schedule, via Nashville, TN where her interview for graduate school at Vanderbilt University was held. Upon learning that her teammates were delayed in Dallas, she met with Conference officials at Norfolk, on behalf of the LU group, informing them of the adverse circumstances with travel. The intervention resulted in good news. The conference coordinators rescheduled the five oral presenters for a later time; however, the competition refereed by faculty judges would take place almost immediately upon the group's arrival at the convention from the airport.

Back in Dallas, the group was up most of the night canceling and rescheduling activities and holding practice sessions. An early flight the next day was required in order to make the new presentation schedule. This group of students, although confronted with these unforeseen challenges, pulled together to garner one of their proudest moments as a group. They managed to overcome the woes and performed gallantly upon their arrival at the conference. They produced five (5) national winners; one of the largest amount of winners for any attending university and equaled only by the LU group the year before. Most conference attendees knew of the circumstances surrounding the Langston group's travel and they soon learned of the great sacrifice and commitment to task by the group. The list of students attending the conference and the fortunate winners are listed below. Research abstracts for all students are listed in the Appendix Section at the end of this report.

Students attending Norfolk Convention:

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Felicia Ekpo, Jamila Harris, Alex Henderson, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

Langston University also presents a venue that showcases students' research projects. The Department of Chemistry's LINC program was the

2009 program coordinator.

9th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, May 1, 2009

The LINC Program co-sponsored the 9th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on May 1, 2009. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally constructed the presentation display boards. The featured program speaker for the occasion was Steven A. Harris, a PhD candidate at the University of Oklahoma Department of Chemistry/Biochemistry, Norman, OK. Mr. Harris is also a LINC alum, as well as LU 2005, summa cum laude, graduate with a BS in Chemistry. He engaged symposium participants in a discussion on the pros and cons of continuing a graduate education. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

This year's event displayed over thirty (30) projects which were viewed by 300 participants, including the university, President Dr. JoAnn W. Haysbert, and many high ranking Industry Officials. Faculty judges chose 3 winners in both oral and poster categories. Winners from Oral Competition: First Place; Karole Blythe, Chemistry. Second Place; Brittanie Atkinson, Biology. Third Place; Felicia Ekpo, Biology. Winners from Poster Competition: First Place; Marshall Bailey, Biology. Second Place; Sheree McDaniels, Biology. Third Place; Shabree Nichols, Biology.

Each student who participated in this year's summer research internships was required to write a report about their results. Abstracts on research projects are published at various events. Two (2) of these students received 'second author' publication status based upon their summer research projects.

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuranam Krishnaswamy S. Kumar^{2*} Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate, ¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR, Protein Science.

Cheri Ognibene, S.A Lewis, Analysis of the Molecular Role of COMT in Bipolar Disorder Department of Chemistry, Langston University, Langston, OK., Journal of Biotech Research,

Note: Details on this year's participants, winners, publications, and venues where presentations took place are in the Appendix section, Exhibit III. Exhibit III also includes LU winners featured on pages from the HBCU-Up National Research Conference website, and an official picture of First Place winner, Jamilia Harris. Research Abstracts are included as Exhibit IV.

Six LINC STEM graduates received full scholarships for Ph.D. programs. These were competitive awards wherein scholars had to pursue the positions, travelling to numerous locations for interviews with various institutions who indicated an interest in having them join their ranks.

1. Karole Blythe, chemistry - The University of Texas, Austin
2. Kendra Vann, chemistry - Vanderbilt University, Nashville
3. Felicia Ekpo, Biology ? University of Arkansas-Fayetteville
4. Charles Loftis, chemistry ?University of Wisconsin ?Madison
5. Leethaniel Brumfield ? North Carolina University ? Chapel Hill
6. Brittanie Atkinson ? Indiana University - Bloomington

B. Faculty Research and Publications

1. Dr. Sharon A. Lewis' research conducted at Langston University on the 'Analysis of the Molecular Role of COMT in Bipolar Disorder'. Results were published in the Journal of Biotech Research. Final Publication cataloging pending.
2. Dr. Sharon Lewis collaborated with Jackson State University and North Carolina Central University through the University of Michigan's National Center for Integrative Biomedical Informatics on a project titled, Genetic Predisposition to Co-Morbidity of Bipolar Disorder and Substance Abuse in African-American Women.
3. Dr. Sharon Lewis: Research project - Warm Mix Asphalt Research Chemical Characterization of Asphalt in collaboration with OU and OSU
4. For two consecutive years, Dr. Byron Quinn has been selected for research internship at University of California, Berkeley, CA. Two (2) LU students were also selected to work on research projects for summer 2009. Although not technically in the Chemistry department, Dr. Quinn's

award is through a program that it directs ? a NSF LINC Supplementary award.

Results from this activity yielded two papers by the students participants. The title of their papers are listed below. Dr. Bryon was able to solicit collaborative agreement with his mentor Dr. Paul Adams with the University of California, Berkely and submit a grant. The tile of the grant is also listed below.

Titles of student papers:

Amanda D. Steele¹, Nigel W. Moriarty², Enhancing the Assignment of Chemical Parameters for X-Ray Crystallography, ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory

Brittanie Atkinson¹, Nigel W. Moriarty², Enhancing Automated Ligand Fitting: Reducing required time to identify & fit a ligand from a list of many possible ligands, ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory.

Title of grant submitted by Dr. Bryon Quinn : MRI-R2:RUI:LiT: Acquisition of Automated Structural Biology Instrumentation

Findings:

Major Findings

The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program

The program provided an excellent opportunity to roll out the department's expanded 'Technology in the Classroom' program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre & Post assessments compared to an 85% improvement last year.

Supplementary Instruction

Sciences - Biology

Only about 12% of eligible students attended the Biology SI sessions during the Spring 2009 and Summer 2009 semester. However there was significant difference in the percentage of students receiving an 'ABC' or 'DFW'. The SI Group reported (93% 'ABC' rate and 7% 'DFW' rate respectively) and the Non-SI Group reported (60%, 40% respectively).

Sciences- Chemistry

Thirty percent of the 45 Chemistry I students attended Chemistry SI sessions during the Spring 2009 semester. For the second year in a row we observed positive results for these SI sessions. Again there was also a positive difference in the number of students receiving 'ABC' and 'DFW' grades between the two groups. The Non-SI group had a 60% 'DFW' rate while the SI group reported a 25% rate. The 'ABC' rate for SI group was very encouraging; the Non-SI group had a 40% 'ABC' rate while the SI group reported an 'ABC' rate that continued to impress at 75%.

Sciences-Physical Science

About 20% of the Physical Science students regularly attended the Physical Science sessions. This group earned about a 67%. Of the non-SI 67 % of the students enrolled in the passed the course. This is an area where the instructors continue to request SI for the students.

Sciences-Physics I

Fifty percent of the students in this class attended SI. About 0% of those students received an 'ABC' grade. 100% of these students received a 'DFW'. 17 % of non-SI students passed this class. 83 % of non-SI students received either a 'DFW' grade. This course will be addressed more aggressively during the upcoming semesters.

Sciences-Physics II

This course was implemented based on a request by the students. The students from this cohort were essentially the same students who requested SI during the previous year while enrolled in Physics I. The course is an extremely rigorous course. Approximately half of the 22 students regularly attended SI. Seventy percent of these students received an 'ABC' grade in this class. Of the remaining students who did not

attend SI 58% of these students received a 'DFW' grade.

Mathematics-College Algebra

More than 200 College Algebra students were offered College Algebra SI during the Spring 2009 semester. In the previous year we reported only about 6% of the students attending the SI sessions. This year about 15% of the students attended the sessions. The SI group earned an 80% 'ABC' grade rate compared to a 50% 'ABC' grade rate for the Non-SI group.

Mathematics-Trigonometry

About 60% of those students enrolled in the course regularly attended SI sessions. Of that number 80% of them completed the course with an 'ABC' grade compared to 50% of the Non-SI students. This made a very strong statement for the inclusion of SI in this course.

Mathematics-Calculus I

About 30% of the 17 students attended the SI sessions on a regular basis. Again this year these students did extremely well in this course. In fact all those who regularly attended SI sessions passed the class. The majority of them made either an A or B. The final SI/Non-SI passage rate in this course was 100% and 62% respectively

LINC Student Research projects and presentations

LINC students continue to excel in this arena; their performance rivals or exceed that of other similar institutions.

This year, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 5 first place awards, 3 second place, 1 third place, and 1 Top Five oral winner.

First Place

Felicia Ekpo (NSF HBCU-UP National research Conference)

Jamila Harris (NSF HBCU-UP National research Conference)

Brittanie Atkinson (K-INBRE Symposium Kansas City, MO)

Shabree Nichols (BKX/NIS National Research Conference)

Shree McDaniels (OUHSC- Summer Undergraduate Program)

Second Place

Felicia Ekpo (BKX/NIS National Research Conference) ?Beta Kappa Chi/National Institute of Science

Brittanie Atkinson (BKX/NIS National Research Conference)

Shree McDaniels (BKX/NIS National Research Conference)

Third Place

Samuel Henderson (BKX/NIS National Research Conference)

Top 5 Oral

Stacy Bean ? top 5 Oral (K-INBRE Symposium Kansas City, MO)

Competitors at national events come from a field of 70 HBCU's. There are between 500 -700 attendees at each national event. Two national venues are highlighted below.

Training and Development:

Research collaborations resulted in Summer 2009 placement of twenty-two (22) students through collaborative arrangements with LINC partners. Venues included major U.S. institutions such as University of California at Berkley, Stanford University, Rice University, and three Oklahoma Universities that include Langston. A featured research collaboration was our alliance with the Lawrence Berkeley National Laboratory, University of California-Berkley. FAST (Faculty and Student Teams). Dr. Byron Quinn, a Langston University faculty member, and two Langston University (LU) students were selected to participate in the highly prestigious Department of Energy (DOE) Faculty and Student Teams (FAST) program during the 2009 Summer term. The FAST program allowed the LU team to work as researchers at a

state-of-the-art national laboratory.

Abstracts from LINC students' presentations are in the Appendix, Exhibit IV.

Details on LINC student Research experiences and Awards won for presentations on their research projects as a result of this project are in the Activities and Findings: Research and Educational Activities section of this report.

Faculty Development and Education

Two department faculty members served as presenter, grant readers or grant-writing mentor:

1. Dr. Sharon Lewis (reader) AP Chemistry Reading, Education Testing Service (ETS), Lincoln, Nebraska
2. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2008.
3. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2009.
4. Dr. Sharon Lewis - OK-INBRE IDeA Program National Symposium, Washington, D.C. Poster Presentation: 'Bioinformatics of Bipolar Disorder' August 6-8, 2008
5. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC December 1-2, 2008
6. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC April 1-2, 2009
7. Dr. Sharon Lewis: (Reader) AP Chemistry Reading, Education Testing Service (ETS), Lincoln, Nebraska, Lincoln, Nebraska June 11-19, 2009

Drs. Coleman and Lewis also participated in a number of industry conferences and meetings:

1. Developing Bioinformatics Programs Workshop, Pittsburgh Supercomputing Center, Carnegie Mellon University, Pittsburgh, PA July 13 - 25/2008 (S. Lewis)
2. Louis Stokes Alliance for Minority Participation Oklahoma State University, Stillwater, OK (September 20, 2008) (J. Coleman; S. Lewis)
3. ODOT/OTC Annual Research Symposium OKC, OK October 15, 2008 (S. Lewis)
4. NSF HBCU-UP National Convention ? Atlanta, GA ? October 23-26, 2008 (J. Coleman)
5. Seminar 'Molecular Genetic Analysis of COMT in Bipolar Disorder', Tools and Technology Class, Pilot Project, University of Michigan Medical School, Ann Arbor October 22 ? 27, 2008 (S. Lewis)
6. Oklahoma Research Day; University of Central OK Edmond, OK (November 30, 2008)(J. Coleman)
7. 66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA (J. Coleman & I. Williams)
8. National Center for Integrative Biomedical Informatics (NCIBI) Annual Research Meeting at the University of Michigan Medical School, Ann Arbor April 27-28, 2009 (S. Lewis)
9. Langston University Research Day ? (May 1, 2009) (J. Coleman) & (S. Lewis)
10. Research Day and the OUHSC, OKC July 2008 & 2009

Outreach Activities:

Outreach and Recruiting Activities

Three LU faculty hold mentoring session for twenty (20) 9-10th grade Gear-Up students from the Tulsa area schools at the LU-Tulsa Campus with six (6) LINC students attending as student mentors, Oct 4, 2008.

The LU personnel in attendance were as follows: LU Faculty Drs: Alonzo Peterson, John K. Coleman, and Emily Patterson. LU Students: Karole Blythe, Shabree Nichols, Alex Henderson, Marshall Bailey, Rochelle Howard, and Brittanie Atkinson. Basic motivational comments were made by the LU faculty, encouraging students to make all effort to benefit from their education and to make special effort to strengthen their math and science skills. In addition, mathematical problem teasers and as well as teamwork exercises that required solutions were presented to the students to solve. LU undergraduates were assigned as mentors for each of the junior-high participants in order to facilitate the

activities as well as to provide further opportunity for follow-up activities. All of the students appeared excited about the event and indicated their interest in ultimately obtaining a career that would require a college degree. Students were provided ACT Study Guides and provided instructions as to how to use them. The event was hosted by Emily Patterson, Gear-Up Director.

High School Day, Nov 1, 2008, Multipurpose building, LU campus. The LU chemistry department personnel in attendance were as follows: LU Faculty: John K. Coleman LU Chemistry majors: Alex Henderson, Kendra Vann, and Jamie Wright. Departmental flyers and brochures were distributed to prospective visiting high school participants from various high schools throughout the state of Oklahoma. The marketing materials promoted department programs, scholarships and mentoring activities for incoming chemistry majors. A Chemistry quiz was displayed with a selection of candies as a reward for participation. A guest book was on hand to record contact information for potential entering undergraduates.

Recruitment day, OKC campus, Saturday, February 28, 2009. Irene B. Williams represented the the LINC II Program at the campus-wide recruitment day activities held at the LU-Oklahoma City campus. Departmental flyers and brochures were distributed to prospective Langstonites, marketing department programs, scholarships and mentoring activities for incoming chemistry majors.

Three LU faculty hold ACT workshop for twelve (12) 9-10th grade gear-Up students, April 15, 2009 LU-Tulsa Campus, Tulsa, OK. The LU personnel in attendance were as follows: LU Faculty Drs.: Alonzo Peterson, John K. Coleman, and Emily Patterson. Alonzo F. Peterson facilitated instruction and discussion for mathematics content questions that are generally administered on the ACT exam; John K. Coleman facilitated instruction and discussion for the science content questions that are normally administered. Questions from an actual ACT exam were presented to the students after the discussion of each concept encountered; students were allowed to practice their skills individually as well as share their solution process of each question. Students displayed great interest in improving their ACT prowess and demonstrated great improvement in their grasp of the concepts presented to them. Students were given practice ACT pamphlets and directions as to how to access the internet for further study. Similar events are scheduled to follow. The event was hosted by Emily Patterson, Gear-Up Director.

The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program

A recruiting outreach by Langston University, in collaboration with Department of Chemistry personnel, brings graduating high school students into this program. There is also a program element that includes participation by a high school teacher.

Incorporating high school STEM teachers. A new component of the Summer Bridge program is the inclusion of a high school teacher. An experienced STEM teacher is selected from high schools in close proximity to each Summer Bridge campus. The teacher works alongside the Summer Bridge participants to gain research experience. The teacher serves as advisors to the Summer Bridge program. Research experiences gained by the teachers will be valuable for integration into the STEM curricula in their high school classrooms. They will be effective recruiters for the Summer Bridge students from high schools. The summer Ms. P. Anderson, Millwood Senior high school, served as the master teacher for the summer bridge.

Research Apprenticeship Program (REAP). This program, sponsored by the Dept. of the Army, supports bringing high school students to Langston to participate in research. Dr. Sharon Lewis is the program Director. The program has been in existence since March 2007.

Journal Publications

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuranam Krishnaswamy S. Kumar², "Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate", Protein Science, p. , vol. , (2009). Pending Cataloguing,

Cheri Ognibene, S.A Lewis, "Analysis of the Molecular Role of COMT in Bipolar Disorder", Journal of Biotech Research, p. , vol. , (2009). Pending Cataloguing,

Books or Other One-time Publications

Web/Internet Site**URL(s):**

1. <http://www.stemdigitalvillage.com>;
2. <http://www.linconline.org>

Description:

Stem Digital Village features Video output from CPRL activity

LINC Online connects current and former LINC students to support mentoring

Other Specific Products**Contributions**

Contributions within Discipline:

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

Contributions Beyond Science and Engineering:

Conference Proceedings**Special Requirements**

Special reporting requirements: None

Change in Objectives or Scope: None

Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Organizational Partners

Any Book

Any Product

Contributions: To Any within Discipline

Contributions: To Any Other Disciplines

Contributions: To Any Human Resource Development

Contributions: To Any Resources for Research and Education

Contributions: To Any Beyond Science and Engineering

Any Conference

LINC II Final Report

2008 – 2009

Appendix

Exhibit Number	Title of Exhibit	# of Pages
I-A	List of Collaborators	1
I-B	Collaborators Letters of Support	27
II-A	Technology in the Classroom	2
II-B	Photo Gallery - Summer Academic Bridge-To-College Program & STEM Double Bridge Program	1
III-A	Research Presentation Venues	4
III-B	HBCU-UP 2008 Award Winners, as posted on National Convention Website	3
III-C	Official Photo of LU First Place Award Winner, as posted on 2008 HBCU-Up National Convention Website	1
IV	Abstracts of Research Presentations	12

External Educational Organizations (Letters of Support in Exhibit I-A)

Oklahoma State University
Oklahoma University
 Health Sciences Center
 School of Industrial Engineering
California Institute of Technology
Carnegie-Mellon Institute
University of California at Davis
University of California at Berkley
Georgia State University
University of Kansas Medical Center
 School of Medicine
 Interdisciplinary Graduate Program in the Biomedical Sciences
University of Arkansas
 Dept of Arts & Sciences
 Dept. of Chemistry & Biochemistry
 Dept of Biological & Agricultural Engineering
Kansas State University
Indiana University
University of Colorado at Boulder
University of North Texas
Texas A & M University
University of Michigan


External organizations/industry alliances

OK-Louis Stokes Alliance for Minority Participation in STEM
Oklahoma Space NASA Grant Consortium
Oklahoma EPSCOR
We Care Worldwide, Inc. (www.wecareworldwide.com)

LANGSTON INTEGRATED NETWORK ENDORSEMENT

This endorsement is to reaffirm commitment to strengthen the Langston University educational research environment and establish state-of-the-art educational and research facilities to edify Langston University's STEM discipline majors. The goals and objectives of the proposal being submitted to NSF HBCU-UP Initiative are in agreement with the vision of the Science, Technology, Engineering and Mathematics (STEM) departments and goals of the School of Arts and Sciences. We vow to support the implementations of the activities as planned and outlined in Langston's Integrated Network College (L.I.N.C) program. Therefore, the STEM departments pledge to contribute to this program by providing support in terms of the use of the research facilities, curriculum enhancement, graduate school preparation, curriculum restructuring, advisement, student recruitment, retention, overall any initiative to contribute to Langston University's trend in academic excellence.

Dr. Zola Drain
Chairperson Department of Biology



Dr. John K. Coleman
Chairperson Department of Chemistry



Dr. Hai Ro
Chairperson Department of Computer Science



Dr. Alonzo Peterson
Chairperson Department of Mathematics;
Math and Science Academy;
GRE Coordinator



Dr. Clarence Hedge
Chairperson Department of Technology;
Dean of Arts & Sciences



Dr. George Acquah
Chairperson School of Agriculture & Applied Sciences;
Summer Bridge Program

Dr. Acquah gave verbal approval. He was out of town and unable to sign.

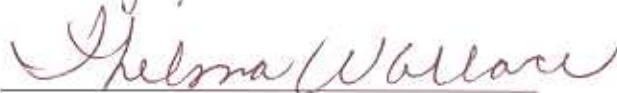
Dr. Sharon Lewis
OK-LSAMP (12 participating campuses)
OK-INBRE (9 participating campuses)



Dr. K.J. Abraham
K-INBRE (10 participating campuses);
Microbiology Research Lab



Dr. Thelma Wallace
NASA



Dr. Joann Clark
LU Honors Program



Ms. Valerie Harris
LINC Program Coordinator
SURE-STEP Program Coordinator

Valerie Harris

Dr. Betsy Showalter
Supplemental Instruction Coordinator;
Mathematics Laboratory

Betsy S. Showalter
Clark W.

Dr. Clark Williams
MANRR (Minorities in Agriculture Natural
Resources Related Sciences)

Theophilus A. Depona

Mr. Theophilus Depona
Bioinformatics Laboratory

Tom McChes

Dr. Tim McMahon
Gamma-Ray Astronomy Laboratory

Dr. Byron Quinn
DOT Asphalt Laboratory
Specific Gravity of Aggregates Laboratory

Byron Quinn

Dr. Gnanambal Naidoo
Plant Molecular Biology Laboratory

Naidoo G.

Ms. Shelia Edwards
Goat Research Laboratory

Shelia Edwards

Dr. Kanyand Matand
Biotechnological Research and Education
(CBRE)

Dr. Matand gave verbal okay. Away from
office.

Mrs. Teresa Gomez
SMART Scholarship Program

Teresa Gomez

Mr. Lukata Lawrence
Student Support Services

Lukata Lawrence

Ms. Gayle Robertson
Recruitment Director

Gayle Robertson

Dr. Conrad Kleinholz
Aquaculture Research

Dr. Kleinholz gave verbal okay. Away from
office.

Dr. Robert Williams
USDA/ARS Research

Robert Williams

CALIFORNIA INSTITUTE OF TECHNOLOGY



Division of Chemistry and Chemical Engineering
Mail Code 127-72
Pasadena, California 91125

James R. Heath, PhD
Elizabeth W. Gilloon Professor
and Professor of Chemistry

Phone: (626) 395-6079
FAX: (626) 395-2355
e-mail: heath@caltech.edu

December 5, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. The California Institute of Technology is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at California Institute of Technology.

The California Institute of Technology has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

James R. Heath, PhD
Director, the NCI NSB Cancer Center
Elizabeth W. Gilloon Professor and
Professor of Chemistry, California Institute of Technology



Department of Biochemistry and Molecular Biology
2468 Noble Research Center
Stillwater, Oklahoma 74078-3035
405-744-6189

6 Decmeber 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". I and my colleagues in the Department of Biochemistry & Molecular Biology of Oklahoma State University are pleased to be provided an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University. Having them in our laboratories will provide us with an opportunity to encourage these students to pursue graduate school at Oklahoma State University.

Over the past few years, I have had about five students from Langston University participate in research activities in my laboratory as summer interns. Several others have been in laboratories of my colleagues. We have enjoyed having these Langston University students with us and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

A handwritten signature in cursive script that reads "Ulrich Melcher".

Ulrich Melcher
RJ Sirny Prof. Ag. Biochem.

FROM

ALBERS

(THU) 12: 6: 07 17: 36/ST. 17: 35/NO. 4061879367 P 2

DEPARTMENT OF BIOLOGY

Mailing Address:

P.O. Box 4010
Atlanta, GA 30302-4010

In Person:

Kell Hall - Room 407
24 Ponce de Leon Avenue
Atlanta, GA 30303

Phone: 404/651-2259

Fax: 404/651-2509



December 5, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant Proposal

Dear Dr. Montgomery:

As an Assistant Professor and Science Educator with the Atlanta-based Center for Behavioral Neuroscience, I am pleased to send this letter in support of your NSF HBCU Undergraduate Programs proposal entitled "**Langston's Integrated Network College (LINC) - Phase II, featuring the STEM Digital Village**". Our Center of Behavioral Neuroscience strives to provide research and training opportunities through laboratory research experiences for outstanding undergraduate students like those from Langston University. Not only do we benefit from the work the students provide for their research projects, but also we benefit by introducing good students to graduate programs in neuroscience and related fields, such as neuroengineering and biotechnology, at some of our member institutions (Georgia State University, Emory University, Georgia Institute of Technology, and Morehouse School of Medicine). The Center for Behavioral Neuroscience has enjoyed having Langston University students participate in summer internships in the past, and we look forward to more applicants in the future.

We view your initiative as a potential conduit between Langston University and the summer research programs we plan to sustain in Atlanta. Similar exchanges of students and faculty appear to contribute effectively to the pursuit of science, technology, engineering, and mathematics worldwide. Thus, the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve students and faculty members from under-represented groups in the United States as they pursue careers in science, technology, engineering, and mathematics.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Kyle J. Frantz".

Kyle J. Frantz, Ph.D.
Assistant Professor and Science Educator

The University of Kansas Medical Center

Tel: (913) 588-7068
Fax: (913) 588-1412
E-Mail: pterrano@kumc.edu

Paul F. Terranova, Ph.D.
Vice Chancellor for Research
University of Kansas Medical Center
Senior Associate Dean for Research & Graduate Education
School of Medicine

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

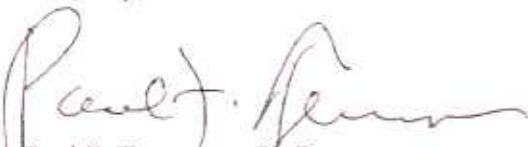
Dear Dr. Montgomery:

I am writing a letter of support for your proposed NSF HBCU Undergraduate Programs grant entitled "**Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village**". Kansas University Medical Center is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at Kansas University Medical Center.

Thank you for the opportunity to continue to provide undergraduate research opportunities for Langston's students. This has been a very positive experience. Kansas University Medical Center has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,



Paul F. Terranova, Ph.D.
Vice Chancellor for Research
University of Kansas Medical Center
Senior Associate Dean for Research and Graduate Education
School of Medicine



Fulbright College of Arts and Sciences
Department of Biological Sciences
Science Engineering, Room 526
Fayetteville, Arkansas 72701-1201

Telephone: 479-575-3797
Fax: 479-575-4010
Email: dmcnabb@uark.edu

December 5, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". University of Arkansas is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of Arkansas.

The University of Arkansas has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply. From my on personal experience, the students coming from Langston University as summer interns have performed wonderfully in the research laboratory.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

David S. McNabb, Ph.D
Associate Professor



J. William Fulbright College of Arts & Sciences
Department of Chemistry and Biochemistry
Chemistry Building 119
University of Arkansas
Fayetteville AR 72701

December 5, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. University of Arkansas is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of Arkansas.

The University of Arkansas has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

Paul D. Adams

Paul D. Adams
Assistant Professor, Department of Chemistry and Biochemistry
Assistant Professor, Department of Cellular and Molecular Biology
Robert C. and Sandra Connor Endowed Faculty Fellow, Fulbright College of Arts and Sciences
University of Arkansas-Fayetteville
Chemistry Building 119, Fayetteville, AR 72701
Phone: 479-575-5621
Fax: 479-575-4049



Graduate School
103 Fairchild Hall
Manhattan, KS 66506-1103
785-532-6191
Fax: 785-532-2983

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. Kansas State University (K-State) is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at Kansas State University.

K-State Graduate School in collaboration with Kansas Idea Networks of Biomedical Research Excellence supported four undergraduate students from Langston University to participate in summer research experience programs. During summer 2007, three students from Langston University participated in the Summer Undergraduate Research Program sponsored by the K-State Graduate School and one student participated in the Grassland Ecology Research Experience for Undergraduates coordinated by the Division of Biology and funded by the National Science Foundation. The students commented that they had a very positive experience and had learned a significant amount about research and being part of a research team. The research presentations the students gave after their nine week experience was evident that each student had grown professionally and personally. In addition to their research experience they participated in weekly seminars that focused on preparing for and applying to graduate school. K-State Graduate School and the academic units that sponsor REUs look forward to having more students from Langston participate in these experiences and to pursue their graduate degrees at K-State.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

Carol Shanklin, Ph.D.
Interim Dean of the Graduate School

INDIANA UNIVERSITY



SCHOOL OF MEDICINE

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". My laboratory at Indiana University School of Medicine on the IUPUI campus is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at IUPUI.

In the summer 2007, a STEM student from your University, Mr. Merrill Brouillette, worked in my laboratory to investigate translation initiation factor in colon cancer. I have enjoyed very much having Merrill and will be delighted to have more Langston University student to attend summer internships in my laboratory in the future.

I see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. I believe that the grant for which Langston is applying will assist both my institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely yours,

A handwritten signature in red ink, appearing to read "J. Zhang".

Jian-Ting Zhang, Ph.D.
Professor of Pharmacology and Toxicology
Member of IU Cancer Center
and Walther Oncology Center/Walther Cancer Institute

Department of
Pharmacology and
Toxicology

Indiana University
Cancer Center

Walther Oncology
Center

Walther Cancer
Institute

R4-166
1044 W. Walnut Street
Indianapolis, IN 46202

Tel. 317-278-4503
Fax 317-274-8046
Email
jianzhan@iupui.edu



The University of Oklahoma
Health Sciences Center

GRADUATE COLLEGE

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". The University of Oklahoma Health Science Center is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at the OU Health Science Center. These students participate in our well established Summer Undergraduate Research Program. This program is a nine-week summer program where the students do a mentor-guided research project that they present as a poster at the end of the program. In addition, there are a number of enrichment sessions for the students that expose them to both research seminars as well as how to prepare a research poster and how to apply to graduate programs. The OU Health Science Center has enjoyed having Langston University students attend our Summer Undergraduate Research Program in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

James J. Tomasek, Ph.D.
President's Associates Presidential Professor
David Ross Boyd Professor
Dean, Graduate College



203 Engineering Hall • Fayetteville, Arkansas 72701 • (479) 575-2351 • (479) 575-2846 (FAX)

Department of Biological & Agricultural Engineering

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

December 5, 2007
Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. The University of Arkansas is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at the University of Arkansas.

The University of Arkansas has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

Danielle Julie Carrier, PhD
Associate Professor
Biological and Agricultural Engineering



University of Colorado at Boulder

Amy E. Palmer, Asst Professor
Department of Chemistry and Biochemistry
Campus Box 215
Boulder, Colorado 80309-0215
303-492-1945 (office), 303-492-5894 (Fax)
e-mail: Amy.Palmer@colorado.edu

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. University of Colorado is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of Colorado.

University of Colorado has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We think this program is mutually beneficial to both the University of Colorado and Langston University. Moreover, the benefits extend to other students, not directly affiliated with the program. For example, a number of our students are involved as mentors to summer internship students. This helps build a peer network and gives under-represented students the opportunity to serve in leadership positions. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

A handwritten signature in cursive script that reads "Amy E. Palmer".

Amy E. Palmer
Assistant Professor
Department of Chemistry and Biochemistry
University of Colorado at Boulder



UNIVERSITY of NORTH TEXAS
HEALTH SCIENCE CENTER at Fort Worth

★
Education, Research,
Patient Care and Service

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Department of Family Medicine
OEAR - Division of Education and Research
817-735-2405

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". University of North Texas Health Science Center is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of North Texas Health Science Center.

The University of North Texas Health Science Center has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply. In particular, I had the privilege to have one of Langston's finest, Ms. Victoria Thomas, who worked with our research team on the North Texas Healthy Heart Study, a NIH-funded project assessing the impact of psychosocial factors on cardiovascular disease and its contribution to known cardiovascular disparities. Her self-driven nature was realized as she developed a unique study idea relating to the relationship between microalbuminuria and coronary artery calcium burden. Her project was exceptional. This unique opportunity in clinical research provides a mentored pathway to increase the diversity of the medical and science workforce.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

Roberto Cardarelli, DO, MPH, FAAFP
Director, Primary Care Research Institute
Director, North Texas Primary Care Practice-Based Research Network
Assistant Professor of Family and Community Medicine
Chief, Division of Research

UNIVERSITY OF CALIFORNIA, DAVIS

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

Atul N. Parikh
Department of Applied Science
One Shields Avenue, Davis, CA 95616-8686

Phone: (530) 754-7055
FAX: (530) 752-2444
e-mail: anparikh@ucdavis.edu
url: <http://parikh.ucdavis.edu>

Monday, December 3, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "**Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village**". Our research group and our partner institutions at the University of California-Davis are pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University. We believe this partnership will allow students to profit from associations with their graduate student peers at UC Davis, get an opportunity to participate in research, and explore their interests in graduate work. We will surely encourage these students to pursue graduate studies at University of California-Davis as well as provide guidance in the graduate school application process.

We at the University of California-Davis has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

Atul N. Parikh

Atul N. Parikh
Professor of Applied Science
Biophysics, Chemical Engineering, Materials Science,
and Biomedical Engineering graduate groups
University of California, Davis

Digitally signed by Atul N. Parikh
DN: cn=Atul N. Parikh, ou=University of California, Davis,
ou=Applied Science, email=anparikh@ucdavis.edu, c=US
Date: 2007.12.06 15:46:29 -08'00'



The University of Oklahoma

SCHOOL OF INDUSTRIAL ENGINEERING

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

December 6, 2007

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "**Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village**". University of Oklahoma is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of Oklahoma.

University of Oklahoma has enjoyed having Langston University students attend graduate school and summer internships in the past, present, and look forward to having many more apply in the future.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,

A handwritten signature in black ink, appearing to read "Chen Ling", with a long, sweeping horizontal stroke extending to the right.

Chen Ling, Ph.D.
Assistant Professor
School of Industrial Engineering
University of Oklahoma
202 West Boyd, Rm. 124, Norman, OK 73019
405.325.4185 phone; 405.325.7555 fax



UNIVERSITY of NORTH TEXAS
HEALTH SCIENCE CENTER at Fort Worth

★
Education, Research,
Patient Care and Service

Department of Pharmacology and Neuroscience

12-07-07

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. University of North Texas Health Science Center is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at University of North Texas Health Science Center.

The University of North Texas Health Science Center has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Best Regards,

Marianna E. Jung, Ph.D.
Assistant Professor
Pharmacology and Neuroscience
University of North Texas Health Science Center
Fort Worth, TX 76107



TEXAS A&M UNIVERSITY

College of Science
Office of the Dean

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "**Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village**". Both of our institutions support the broadened participation in the nation's STEM workforce and both are committed to increasing the number of minority STEM students who enter graduate school, attain advanced degrees, and pursue careers in the sciences. I am delighted to see that you are seeking to continue this very worthwhile work by requesting a continuation of your Implementation grant.

We at Texas A&M University have enjoyed having students from Langston as part of our various REU programs over the past three years. They have contributed to the research and out community of scholars in many ways. The work of Nathan Williams was published in an article in Physical Review C. We are particularly pleased that a number of them have gone on to graduate school. Texas A&M University is pleased to continue to provide such opportunities for research and training of students from Langston University. Additionally we will encourage these students to pursue graduate studies and would be delighted to have them as part of our graduate programs here at Texas A&M University.

We, at Texas A&M University are extremely pleased with the collaborative activities that our two institutions have enjoyed thus far. We see this initiative enabling educational opportunities for outstanding students and contributing to advancement in science, technology, engineering, and mathematics. The grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve an under-represented population. We at Texas A&M University will do everything possible to assist in your success.

Sincerely,

A handwritten signature in black ink, appearing to read "Sherry J. Yennello".

Sherry J Yennello
Professor of Chemistry and Associate Dean for Diversity



University of Michigan

Department of Chemistry

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Dear Dr. Montgomery:

I am pleased to provide a letter in support of your proposed NSF HBCU Undergraduate Programs grant entitled **"Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village"**. The Department of Chemistry at the University of Michigan is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and to encourage these students to pursue graduate school at the University of Michigan.

As a part of our NSF-funded REU Site, we have enjoyed having Langston University students attend our summer program in the past, and we look forward to having many more apply. We have entered into arrangements with other Colleges and Universities to provide, on a regular basis, the promise of a spot in our REU Site, and this is something that we would like to pursue with Langston.

We believe that this initiative can begin an ongoing arrangement with Langston University, which is intended to create a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Please feel free to contact me, or my colleague, Professor Anna Mapp, as your program moves forward. We wish you the best of success in this application.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Brian P. Coppola'.

Brian P. Coppola
Arthur F. Thurnau Professor of Chemistry
Associate Chair for Curriculum and Faculty Affairs

The University of Kansas Medical Center

School of Medicine
Department of Anatomy and Cell Biology

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Re: Support of Grant

December 7, 2007

Dear Dr. Montgomery:

This letter is in support of your proposed NSF HBCU Undergraduate Programs grant entitled "Langston's Integrated Network College (LINC)-Phase II, featuring the STEM Digital Village". Kansas University Medical Center is pleased to provide an opportunity to serve as a source of laboratory experiences for research and training for students from Langston University and encourage these students to pursue graduate school at Kansas University Medical Center.

Kansas University Medical Center has enjoyed having Langston University students attend summer internships in the past and look forward to having many more apply. I personally benefited from having one student, Ashley Burdex, in my lab. Ashley was a very hard working student, and we really enjoyed having her in our lab. She was very bright, energetic and intelligent. It was an outstanding environment for her, and we also benefited from her participation in this program. In addition, we currently have a graduate student in our program here from Langston. Argenia Doss is currently a third year graduate student in the department of Molecular and Integrative Physiology. Argenia is performing extremely well in her courses and research. We truly hope to attract more students like Argenia into our program.

We see this initiative as an ongoing arrangement with Langston University to support a system of exchange of students and faculty for the purpose of contributing to the pursuit of science, technology, engineering, and mathematics. We believe that the grant for which Langston is applying will assist both our institutions in meeting the increased demand to serve the under-represented population in the United States in science, technology, engineering, and mathematics.

Sincerely,



Michael J. Werle, Ph.D.
Director, Interdisciplinary Graduate Program
In the Biomedical Sciences
Associate Professor



LANGSTON UNIVERSITY

School of Arts and Sciences

Department of Chemistry & Physical Sciences

December 5, 2007

TO: Dr. Clyde Montgomery
Vice-President of Academic Affairs
Langston University
Langston, OK 73050

FROM: Sharon A. Lewis, Ph.D.
Assistant Professor
Chemistry Department
Langston University
Langston, OK 73050

REFERENCE: HBCU-UP Grant

Dear Committee Members,

It is with great enthusiasm that I write this letter of support for the renewal of the Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP) grant at Langston University under the guidance of Dr. John K. Coleman. He developed and implemented this grant through Langston's Integrated Network Colleges (LINC). As a member of the Chemistry Department of which Dr. Coleman is the Chairman, I have been a direct beneficiary of the technological advances that the funding of this grant has allowed him to establish. During my first year of teaching at Langston University, I taught my General Chemistry and Physical Chemistry lectures using transparencies. Dr. Coleman investigated and purchased a Toshiba tablet PC and projector so that my notes are permanent and only require minor adjustments for further explanations. Today, four years into his HBCU-UP grant, my notes are very valuable for the teaching of the General Chemistry I and II, Physical Sciences, and Introduction to Bioinformatics classes. Dr. Coleman's leadership allowed for the implementation of the Hyper Interactive Teaching Techniques (H-ITT) system to aid with attendance and assessment of students. In short, the funding of this grant has allowed for a superior teaching experience.

Dr. Coleman's HBCU-UP grant funded the Supplemental Instruction Workshop (January, 2004), which introduced many faculty at LU to SI's ability to raise the grades of students enrolled in our science, engineering, technology, and mathematics (STEM) courses. This program is now established at LU and very vital to the campus. The same student, Miss Karol Blythe, has been gracious enough to serve as the SI leader for my general chemistry I class for the last several years. She is a chemistry major supported with the LINC grant that Dr. Coleman offers to students for excellence in academics and who also have a desire to matriculate to a Ph.D. program in the STEM disciplines.

The funding of Dr. Coleman's HBCU-UP grant provided me, an assistant professor, an opportunity to develop professionally at Langston University. I received support to attend numerous grant writing workshops, to include, the Quality Education for Minorities (QEM) Network Major Research Instrumentation (MRI) Proposal Workshop (November, 2004) and the QEM CAREER Proposal Workshop (January, 2005). Additionally, because of this grant, I have been fortunate enough to be selected as campus liaison for the Academy of Applied Sciences (Concord, New Hampshire) funded

Establishing A Firm Foundation: Excellence in Teaching and Research



LANGSTON UNIVERSITY

School of Arts and Sciences

Department of Chemistry & Physical Sciences

Research and Engineering Apprenticeship Program (REAP); the National Institutes of Health funded Minority Access to Research Careers (MARC) grant from the Pittsburgh Supercomputing Center at Carnegie Mellon University, Pittsburgh, PA., to establish the Introduction to Bioinformatics course at LU; the National Science Foundation funded Oklahoma-Louis Stokes Alliance for Minority Participation (LSAMP) Bridge to Doctorate Program at Oklahoma State University, Stillwater, OK; and the National Institutes of Health funded Oklahoma IDeA Network of Biomedical Research Excellence (OK-INBRE) at the University of Oklahoma Health Sciences Center, OKC, OK.

As campus liaison for LSAMP, part of my job is to require students to apply for at least five summer internships and five graduate schools. The LSAMP program pays a travel stipend and a stipend to congratulate the students for maintaining high grades since the minimum GPA is 3.2. The HBCU-UP grant is crucial to the LSAMP program in several ways to include, providing an up-front travel stipend for a student, Danny Terry, to attend his summer internship when the LSAMP money was dispersed to this student at least a month after the beginning of his summer 2007 internship. On November 15, 2004, Dr. Coleman's grant completely supported (travel, hotel, rental car, etc.) a trip to Oak Ridge National Laboratory Research Day, Oak Ridge, Tennessee for four students, Dr. Tumen Wuliji and me. During the summer of 2005, the HBCU-UP grant provided summer internship stipends for 3 LU undergraduate students who performed bioinformatics and molecular biology in my research lab for eight weeks. From January 4 thru 10, 2006, Dr. Coleman's grant provided a stipend to Miss Shenequah Brison, a senior computer science major, who accompanied me to the Computational Science Workshop for Underrepresented Groups at the University of Southern California, Los Angeles, California to learn more about advanced computing and simulations.

As campus liaison for the Oklahoma IDeA Network of Biomedical Research Excellence (OK-INBRE), I keep faculty informed of collaborative and mini-grant opportunities and I encourage students to apply to the summer research opportunities. The HBCU-UP grant provides support throughout the school year for the students that I target to apply for participation in these research opportunities. The pool of students receiving the LINC scholarship have proven their maturity and responsibility level, therefore, any one of these students can compete at the comprehensive universities, not only in Oklahoma, but across the country. Many of these LU students have won accolades for presentation of their research. Two of the students (Desmond Harvey and Nathan Williams), who Dr. Coleman mentored through his HBCU grant, were added to publications as a result of their summer internships.

As a result of how much Dr. Coleman's HBCU-UP grant has benefited me professionally, I enthusiastically support the renewal of this grant. It has provided financial support to many programs that I am responsible for at LU.

Thank you,

Sharon A. Lewis, Ph.D.

Establishing A Firm Foundation: Excellence in Teaching and Research

APPENDIX I
LETTERS OF SUPPORT

CATEGORIES

Letters from external organizations/industry

OK-Louis Stokes Alliance for Minority Participation in STEM
Oklahoma Space NASA Grant Consortium
Oklahoma EPSCOR
We Care Worldwide, Inc. (www.wecareworldwide.com)

Steve Conley, CEO
sconley@wecareworldwide.com
St. Louis, MO



WE CARE WORLDWIDE, INC.

December 3, 2007

Dr. Clyde Montgomery
Vice President – Academic Affairs
Langston University
Langston OK

Dear Dr. Montgomery:

On behalf of We Care Worldwide, Inc. I am pleased to advise you that our company stands ready to work with Langston University's LINC program to support its Digital Village in any way that we can.

We Care Worldwide, Inc. applauds the efforts of LU, and Dr. Coleman and his LINC team, in the wonderful work you are doing to advance the cause of STEM readiness among minorities. We are a cause-driven company, and collaborating with your institution provides a natural outlet for providing our services in a way that makes a difference in the lives of our next generation of leaders.

As you know, we will provide hosting for all websites related to this project for as long as this worthwhile project (or a similar project) exists. Our personnel will also assist as needed with site development, and however else we can be of service. We know that Internet access, and the kinds of programs planned for the Digital Village, will have benefit to all who are involved.

Dr. Coleman and his staff have been a pleasure to work with, and we look forward to a long, results-driven collaboration.

Please let us know how else we may be of service.

Sincerely,


Steve Conley
CEO
We Care Worldwide, Inc.

cc: Dr. John K. Coleman
LINC Director



EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

Frank Waxman, Ph.D.
Professor of Microbiology & Immunology
The University of Oklahoma Health Sciences Center
Oklahoma EPSCoR and INBRE Director
Oklahoma State Regents for Higher Education
655 Research Parkway, Suite 200
Oklahoma City, OK 73104

December 6, 2007

Dr. Clyde Montgomery
Vice President Academic Affairs
Langston University
Langston, OK 73050

Dear Dr. Montgomery:

Re: HBCU-UP Proposal

It is with pleasure that I write in support of Langston University's proposal to the National Science Foundation's Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) entitled "Langston's Integrated Network College (LINC) Phase II, Featuring the STEM Digital Village." The proposal is designed to enhance the quality of undergraduate science, technology, engineering and mathematics (STEM) education at Oklahoma's HBCU.

As you know, I serve as the Project Director for Oklahoma's NSF EPSCoR Research Infrastructure Improvement Award (RII). One of the core missions of NSF EPSCoR is to facilitate the successful recruitment of outstanding underrepresented students to foster a more diverse population of researchers in STEM fields. Oklahoma EPSCoR has provided support for outreach initiatives at Comanche Nation College, the only tribal college in Oklahoma, as well as Northeastern State University, which matriculates the greatest number of Native American students in the country, as well as Langston University, specifically supporting Langston's Supplementary Instruction (SI) and Graduate Record Examination (GRE) programs. Langston University has shown great success in surpassing goals set for its HBCU-UP project award.

We are pleased to participate in this worthy endeavor and look forward to working with you to ensure that our efforts work synergistically to encourage students to seek advanced degrees in STEM fields.

Sincerely,

A handwritten signature in black ink, appearing to read "FWaxman".

Frank Waxman



OKLAHOMA LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION IN SCIENCE,
TECHNOLOGY, ENGINEERING, AND MATHEMATICS

Funded by the National Science Foundation

OKLAHOMA STATE UNIVERSITY • CAMERON UNIVERSITY • EAST CENTRAL UNIVERSITY • LANGSTON UNIVERSITY • NORTHEASTERN
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OKLAHOMA STATE UNIVERSITY • UNIVERSITY OF CENTRAL OKLAHOMA • UNIVERSITY OF OKLAHOMA • UNIVERSITY OF TULSA



Cornell Thomas, Ed.D. • Program Director • c.thomas@okstate.edu

December 4, 2007

Dr. Jean Bell Manning
Vice President, Academic Affairs
Langston University
Langston, OK 73050

Dear Dr. Manning:

As Program Manager for the *Oklahoma Louis Stokes Alliance for Minority Participation in Science, Technology, Engineering, and Mathematics (OK-LSAMP STEM)*, I am pleased to write this letter in support of the grant entitled "*Langston Integrated Network College of Undergraduate Programs for Science, Technology, Engineering and Mathematics*." It is pleasing to know that the success of this grant is an opportunity to enhance nationwide efforts aimed at developing a highly successful diverse scientific workforce.

Since Oklahoma LSAMP was inceptioned in 1994, Oklahoma State University has worked collaboratively with Langston University and other regional universities in implementing programs aimed at increasing the number of students from under-represented populations who receive STEM degrees. Langston University is very active in Alliance programs and activities, having had students: (1) participate in poster presentations at state and national conferences; (2) awarded a UNCF/MERCH Undergraduate Science Foundation Award; (3) participate in NIH Internships; (4) participate in the George Washington Carver Research Program; and (5) accepted into Ph.D. programs in STEM fields all within the last year.

We at Oklahoma State University look forward to collaborating with Langston University in the development of quality students in the areas of science, technology, engineering and mathematics. We highly support this very important grant application.

Sincerely,

Kay Porter
Program Manager

kp



OKLAHOMA NASA SPACE GRANT CONSORTIUM

University of Oklahoma
College of Atmospheric and Geographic Sciences
1623 Cross Center Drive, Suite 9
Norman, OK 73019



Lead Institution

The University of Oklahoma

Charter Affiliates

Cameron University
Langston University
Oklahoma State University

Institutional Affiliates

East Central University
Southeastern Oklahoma State University
Southern Nazarene University
Southwestern Oklahoma State University

Academic Affiliates

Applications Engineering Program
Center for Spatial Analysis
K20 Center

Industrial Affiliates

The Boeing Company
Frontier Electronic Systems Corporation

City Government

Affiliate

Norman Economic Development Coalition

State Government

Affiliate

Oklahoma Space Industry Development Authority

Informal Science

Education Affiliates

Kirkpatrick Air & Space Science Museum at OMNIPLEX
STARBASE Oklahoma, Inc.

December 4, 2007

Dr. John K. Coleman, Director
HBCU-UP Initiatives
Langston University
Langston, Oklahoma 73050

Dear Dr. Coleman:

The National Aeronautical and Space Administration (NASA) – Oklahoma Space Grant Consortium (OSGC) is pleased to support the "HBCU-UP Initiatives". OSGC has worked with the math and science areas on various projects during the past fourteen years. We share a relationship that provides scholarship students as mentors and tutors to the School of Arts and Sciences which includes the Chemistry and Biology departments. Underrepresented students have also applied and received scholarships through the OSGC Program.

One of the primary goals of the OSGC program is to promote and increase the number of K-12 grade students in math in science. Additionally, we provide funds for educational activities, conferences, field trips, and materials. OSGC support opportunities for college student teachers to participate in pre-service training workshops in other states.

Through participation in this program students are provided with hands on experience and research opportunities that enhance their knowledge and skills to successfully compete in the global market. The NASA-OSGC program looks forward to continuing our collaborative working relationship with the HBCU-UP project grant.

Should you need additional information or assistance please contact me.

Sincerely,

Thelma Wallace,
Associate Director OSGC

Office (405) 325-6559
Fax (405) 325-5537
Website okspacegrant.ou.edu
nasa.epscor.ou.edu



The NASA Mission: *To understand and protect our home planet.
To explore the universe and search for life.
To inspire the next generation of explorers.
... as only NASA can.*



The NASA Vision: *To improve life here.
To extend life to there.
To find life beyond.*

Appendix: Exhibit II-A

Technology in the Classroom

A major focus of the department is to expand the use of technology in the classroom. To this end the following activities were accomplished during this past year. LU contributed \$125,000 dollars to this project through its Title 3 Program; other contributing funds are from the LINC Program. The following projects are 90% complete; final installations should occur by the end of August, 2009.

1. Creation of two state-of-the-art Smart classrooms, including a computer laboratory featuring Tablet PCs, the primary tool used in the CPR-L process. Other attributes include LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability.
2. Creation of a media laboratory that supports the creation and dissemination of performance videos wherein students learn by teaching' core course concepts as they solve specific problems.

Other technologies employed in the classroom are:

- **HI-TT - (Hyper-interactive teaching techniques) technology** is utilized to assist the instructor in assessing class members' comprehension of the lecture in real-time. Each student has a hand-held remote to answer multiple-choice questions at a moment's notice. Results of classroom participation are instantly projected, analyzed and recorded.
- **The LUBE (Langston University's Board Exercise) technique** is utilized to replicate a "going-to-the-board" exercise when written responses from students are desired. Tablet PCs along with a wireless projector is required. Each student has a tablet PC in class. Their individual response can be instantly projected on a screen with a flick of a pen.
- **OneNote (Shared-Notes) software** is utilized for student groups to work on the "same-page" projects via internet in class or from various locations. Tablet PCs, connected to an instant voice messenger or voice over IP, is utilized. This process also provides the faculty the ability to respond to students' questions with visual aids via internet as well as provide the faculty the ability to deliver a very low cost unassisted lecture from any location. In some instances internet tutoring of high school students has been utilized.
- **The CPR-for-Learning** technique utilizes technology to "resuscitate" the students' learning of the analytical process of problem solving. This program merges technology, tried-and-true learning principles, and performance measurements in a way that

enables students to improve learning skills. The technology piece utilizes video recorder software for tablet PCs to capture a learning process in progress, and wireless projectors to share the problem-solving process in class. The technique also provides experiences for each student to teach the concept to others through Ipaqs, Ipods or CPR-Casting.

- **Langston's STEM Digital Village** is an on-line environment that joins LU's STEM undergraduates, graduates and professionals to share aspirations as well as practical day-to-day obstacles encountered in their quest for STEM degrees, graduate school access and STEM careers. Protocols utilized in managing the Digital Village include internet blogging, message boards and chat rooms. Adjoining websites contain a wealth of information and resources that inform students about grants, interview skills, graduate school time-lines and applications, research, internships, and job opportunities. Intellectual discourse on the state of STEM education; access to mentors; links to repositories of relevant information and study tools; and cutting edge practices aimed at improving scholastic performance and life skills are also posted.

Ex II-B: PHOTO GALLERY
2009 Summer Bridge Program
For College Bound Math & Science Students



Appendix: Ex. III - A

RESEARCH PRESENTATION VENUES

NSF HBCU-UP National Convention – Atlanta, GA – October 23-26, 2008

LU undergraduates have had five (5) national winners in oral and poster presentation competition at the NSF HBCU-UP National Research Conference over the last two years. This includes three (3) first place winners, one (1) second place and one (1) third place winner. During each of the past two years, the HBCU-UP conference was held during LUs homecoming, which necessitated many students having to set aside activities and organizational obligations to participate at the conference. This year, 17 students, accompanied by two faculty advisors, (John K. Coleman & Cassandra Parker) took a one-stop flight via American Airlines to Atlanta, GA, to present the results of their 10-week summer research projects, conducted at various universities throughout the US. Although this year and last year's trips were bittersweet because homecoming events were sacrificed, LU students gave excellent presentations as they defended their findings in front of faculty judges. Their presentations earned them two (2) first place awards. The list of students attending and the students fortunate to be selected as winners are listed below. The picture of Jamila Harris (which appears on the NSF website) receiving her first place award at the convention is also included in the Appendix section. [Note: Brittanie Atkinson accepted the award for Jamila Harris who was not available at the moment of presentation]. Abstracts for all students are listed in the Appendix section of this report.

The 17 Students attending the NSF HBCU-UP National Convention, Atlanta, GA

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Kirk Braggs, Leethaniel Brumfield III, Kenta Caldwell, Dominick Crane, Felicia Ekpo, Jamila Harris, Alex Henderson, Rochelle Howard, Charles Loftis, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

More about the HBCU-UP National Research Conference.....

The HBCU-UP National Research Conference highlights undergraduate student research and institutional strategies to enhance the quality of undergraduate science, technology, engineering, and mathematics (STEM) education and research at HBCUs. The conference is co-sponsored by the National Science Foundation (NSF) HBCU-UP Program and the American Association for the Advancement of Science (AAAS). NSF recognizes and supports the important role that HBCUs play in increasing the numbers of underrepresented ethnic minorities that are well prepared for participation and leadership at every level of education and research in STEM. The gathering constitutes more than 700 students, faculty, and administrators from all universities with NSF programs. The Program has Oral and Poster presentation competitions by undergraduate students about their research, and a faculty workshop with oral and poster presentations by faculty and program administrators about their programs or research. In addition, exhibitors from across the US promote: (1) Undergraduate student research programs, (2) Graduate school programs, (3) Fellowship opportunities and (4) Faculty research programs.

66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA: Hosted by Norfolk State University and Hampton University.

LU has had ten (10) national winners in oral and poster presentation competition at the Annual Joint Conference of Beta Kappa Chi and the National Institute of Science over the last two years. This includes three (3) first place winners, five (5) second place and two (2) third place winners. This year, 10 students, accompanied by two faculty advisors, (John K. Coleman & Irene Williams) boarded a one-stop American Airlines flight to Norfolk, VA (where they would present the results of their research work), intending to arrive in Norfolk, the day before competition. The first leg of the flight was delayed due to inclement weather, and upon arrival in Dallas-Ft.Worth, the group learned that the last flight to Norfolk, VA had already departed. The news got worse. The earliest flight the next morning would not arrive in time for the oral presenters to make their scheduled defense; however, the poster presenters could meet their schedule. The first inclination of the group was for some of them to return to Oklahoma; however, it was quickly realized that the Conference presented many more opportunities for the undergraduates as a whole. Many nationally renowned speakers would appear, many workshops were anticipated and many Industry and University vendors would be present to recruit for employees and potential scholarship awardees. The missed flight prompted a need to make alternate arrangements, including an unscheduled overnight stay in Dallas and rescheduling a flight from Dallas to Norfolk the following morning.

Meanwhile, Kendra Vann, another LU undergraduate participant had traveled a different route. She arrived in Norfolk on schedule, via Nashville, TN where her interview for graduate school at Vanderbilt University was held. Upon learning that her teammates were delayed in Dallas, she met with Conference officials at Norfolk, on behalf of the LU group, informing them of the adverse circumstances with travel. The intervention resulted in good news. The conference coordinators rescheduled the five oral presenters for a later time; however, the competition refereed by faculty judges would take place almost immediately upon the group's arrival at the convention from the airport.

Back in Dallas, the group was up most of the night cancelling and rescheduling activities and holding practice sessions. An early flight the next day was required in order to make the new presentation schedule. This group of students, although confronted with these unforeseen challenges, pulled together to garner one of their proudest moments as a group. They managed to overcome the woes and performed gallantly upon their arrival at the conference. They produced five (5) national winners; one of the largest amount of winners for any attending university and equaled only by the LU group the year before. Most conference attendees knew of the circumstances surrounding the Langston group's travel and they soon learned of the great sacrifice and commitment to task by the group. The list of students attending the conference and the fortunate winners are listed below. Research abstracts for all students are listed in the Appendix Section at the end of this report.

Students attending Norfolk Convention:

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Felicia Ekpo, Jamila Harris, Alex Henderson, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

More about Beta Kappa Chi & NIS convention.....

Beta Kappa Chi has the purpose of encouraging the advancement of scientific education through original investigations; the dissemination of scientific knowledge; and the stimulation of high scholarship in the pure and applied sciences. The Conference constitutes more than 500 students, faculty, and administrators from all HBCUs with organizational chapters. Seventy (70) HBCU institutions participate. The Program has Oral and poster presentation competitions by undergraduate students about their research, and various faculty workshops for faculty enhancement and development activities. In addition, exhibitors from across the US promote: (a) Graduate school programs, and (b) Scholarship & Fellowship opportunities.

9th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, May 1, 2009

The LINC Program co-sponsored the 9th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on May 1, 2009. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally constructed the presentation display boards. The featured program speaker for the occasion was Steven A. Harris, a PhD candidate at the University of Oklahoma Department of Chemistry/Biochemistry, Norman, OK. Mr. Harris is also a LINC alum, as well as LU 2005, *summa cum laude*, graduate with a BS in Chemistry. He engaged symposium participants in a discussion on the *pros* and *cons* of continuing a graduate education. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

This year's event displayed over thirty (30) projects which were viewed by 300 participants, including the university, President Haysbert and many high ranking Industry Officials. Faculty judges chose 3 winners in both oral and poster categories. **Winners from Oral Competition: First Place; Karole Blythe, Chemistry. Second Place; Brittanie Atkinson, Biology. Third Place; Felicia Ekpo, Biology. Winners from Poster Competition: First Place; Marshall Bailey, Biology. Second Place; Sheree McDaniels, Biology. Third Place; Shabree Nichols, Biology.**

About the Research Symposium.....

The Research Symposium provides a platform for the LU community to display results of research projects in Oral and Poster presentations. It highlights undergraduate student research, and enhances its quality. It also encourages the dissemination of knowledge, the stimulation of high scholarship and the advancement of education through original investigations.

Following is a list of all Presentation Venues during 2008-9:

- Louis Stokes Alliance for Minority Participation Oklahoma State University, Stillwater, OK (September 20, 2008)
- Oklahoma Research Day; University of Central OK Edmond, OK (November 30, 2008)
- NSF-HBCU-UP National Convention – Atlanta, GA (October 23-26, 2009)
- Beta Kappa Chi/ National Institute of Science National Convention. Norfolk, VA (March 25-29, 2009)
- K-INBRE Symposium Kansas City, MO (January 17-18, 2009)
- Langston University Research Day – (May 1, 2009)

<p>Oct. 29 - Nov. 1, 2009</p> <p>Renaissance Washington Hotel 999 Ninth Street, NW Washington, DC</p>	<p>Historically Black Colleges & Universities Undergraduate Program</p> <p>HBCU-UP National Research Conference</p>
<p>HOME ABOUT HBCU-UP MEETING & HOTEL REGISTRATION AGENDA SPONSORS/EXHIBITORS POSTERS/ABSTRACTS FAQS LINKS/RESOURCES CONTACT US</p>	

About

[HBCU-UP General Info](#)

[2008 Poster and Oral Presentation Winners](#)

[2007 Poster and Oral Presentation Winners](#)

[2006 Poster and Oral Presentation Winners](#)



About HBCU-UP

2008 Awards for Poster and Oral Presentations

Biological Sciences

Poster

FIRST

Michael Williams — Morehouse College

Randy Amoako — North Carolina A&T State University

Charlie Ponder III — Ft. Valley State University

SECOND

Tameka Howard — Ft. Valley State University

Jarielle Fluellen — Ft. Valley State University

THIRD

Jessica Gray — Johnson C. Smith University

Ebony Steverson — Savannah State University

Kassmier Haynes — Norfolk State University

Oral

FIRST

Quintina Rogers — Albany State University

SECOND

Faith Bupe — Allen University

THIRD

Davetta Robinson — Benedict College

Francisco R. Sáenz — University of the District of Columbia

Chemistry and Chemical Sciences

Poster

FIRST

Dharendra Thapa — Morgan State University

SECOND

Jana Hoerner — University of the District of Columbia

Rachel Hickerson — Grambling State University

THIRD

Stanley Oyaghire — Morgan State University

Melissa Pinard — Morgan State University

Oral

FIRST

Kelvin Frazier — Savannah State University

Vanessa Malone — University of the Virgin Islands

SECOND

Khalifa Jordan — Tuskegee University

THIRD

Ja'Pel Sumpter — Winston Salem State University

Olaniran Atchade — University of the District of Columbia

Computer Sciences and Information Management

Poster

FIRST

Walter Lewis — Cheney University of Pennsylvania

SECOND
Asia Walton — Talladega College

Oral **FIRST**
India Waddell — North Carolina A&T University
Derren Lewis — Albany State University

SECOND
DeMarcus Thomas — Mississippi Valley State University

THIRD
Jonecia Keels — Spelman College

Ecology and Environmental Earth Sciences

Poster **FIRST**
Gabrielle Jones — Ft. Valley State University

SECOND
Lillian Oglesby — Ft. Valley State University

THIRD
Courtney McGeachy — Hampton University

Oral **FIRST**
Jeffery Ambrose — Southern University at New Orleans

SECOND
Charisse Carter — Norfolk State University

THIRD
Megan Wilkerson — Ft. Valley State University

Mathematics and Statistics

Poster **FIRST**
Marvin Jones — North Carolina A&T University

SECOND
Brian Cunningham and **Jamin Gallman** —
 Bowie State University

THIRD
Kimberly Jones and **Stephanie Parker** —
 Savannah State University
Gregory Morton — Morehouse College
Earnest Baulkmon — Savannah State University

Oral **FIRST**
Shernita Lee — Alabama State University

SECOND
Shawn King — Albany State University

THIRD
Stephanie Loggins — Albany State University

Nanoscience

Poster **FIRST**
Derrick Stokes — Jackson State University

SECOND
Chase Graham — Claflin University

THIRD
Terence Holloway — Norfolk State University

Oral **FIRST**
Benjamin Newton — University of Arkansas, Pine Bluff

SECOND
Osei Amponsah — Norfolk State University

THIRD
Carla McKinney — Norfolk State University

Physics

Poster **FIRST**
Saba Hamidi Vadeghani — South Carolina State University

SECOND
Shawna Jones — Hampton University

THIRD
Leigh Peterson and **Lisa Barnes** — Hampton University

Oral **FIRST**
Felicia Ekpo — Langston University

SECOND
Neville Brackett — Albany State University

THIRD
Stephen Broughton — University of Arkansas, Pine Bluff

Social and Behavioral Sciences

Poster **FIRST**
Jamila Harris — Langston University

SECOND
Jeremiah Miller — State University of New York, Potsdam

THIRD
Jasmine Abrams — Virginia State University

Oral **FIRST**
Gregory Davis — Morehouse College

SECOND
Steven Siggers — LeMoyne-Owen College

Technology and Engineering

Poster **FIRST**
William Harkins — Norfolk State University

SECOND
Leon Crawley and **Tona Booker** — Virginia State University

THIRD
Chester Rodrigues III — South Carolina State University

Oral **FIRST**
Tena Hunter — Howard University

Gerard Spivey — Howard University

SECOND
LaVonda Brown — Norfolk State University

Download printable [2008 Awards List](#) [PDF]

CONTACT US

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 Science Foundation.



1st place -Jamila Harris (Langston University), 2nd place -Jeremiah Miller (State University of NY-Potsdam), 3rd place -Jasmine Abrams (Virginia Station Univ.) – Ric Weibl –(Judge/Reviewer- from AAAS) Poster presentation winners in Social and Behavioral Sciences (pictured from left to right, Jamila Harris, Jeremiah Miller, Jasmine Abrams, and Ric Weibl)

LANGSTON UNIVERSITY ANNUAL RESEARCH DAY

Abstracts Oral Presentations

1. **RECOMBINANT OPIUM POPPY SALUTARIDINE SYNTHASE AND SALUTARIDINOL ACETYLTRANSFERASE EXPRESSION IN *PICHA PASTORIS***

Erica Smith, Dr. Toni Kutchan, Donald Danforth Plant Science Center; Langston University, Langston, OK

The morphine biosynthesis pathway has been under investigation for many years. Morphine is a commonly used analgesic drug that acts directly on the central nervous system. Salutaridine synthase and salutaridinol acetyltransferase are vital enzymes in the biosynthesis of morphine in opium poppy. Salutaridine synthase is an enzyme that is responsible for production of salutaridine, an alkaloid that is involved in the biosynthesis of morphine. Salutaridinol acetyltransferase is an enzyme responsible for the conversion of salutaridinol to salutaridinol-7-O-acetate, also in the biosynthetic pathway of morphine. In the present study we used *Pichia pastoris* as an expression system to determine if propagation of these specific genes could occur and functional proteins could be obtained from the cloned genes. With each enzyme, polymerase chain reactions were used to amplify specific DNA in our vector, pA0815. By performing phenol chloroform isoamyl alcohol extractions (P:C:I), ethanol precipitations, and gel extractions we were able to perform restriction digest with EcoRI on each PCR product and the vector. P:C:I and ethanol precipitation were then performed again before conducting Calf Intestinal Alkaline Phosphatase (C:I:A:P). A gel extraction was performed to remove all proteins from the gene insert, whereas P:C:I and ethanol precipitation were done on the vector. DNA ligation was then performed in preparation for transformation into *E. coli*. With our gene inside of pA0815, we transformed salutaridinol acetyltransferase and salutaridine synthase into *E. coli* and grew the bacteria on plates made up of LB with ampicillin. Only the ampicillin resistant colonies would grow, thereby increasing our chances of finding the clone. Colony PCR was then performed on several colonies to confirm that the gene and vector were present. Mini-preps were done on those colonies of salutaridinol acetyltransferase that showed positive results. They were then prepared for DNA sequencing. Sequencing of the salutaridinol acetyltransferase showed that the gene and the vector were present and the gene had been placed in the right direction inside of the vector. Salutaridine synthase had a lower transformation efficiency and colony PCR confirmed that one colony carried the gene and the vector. Transformation into *Pichia pastoris* with subsequent assay tests will be done in the future.

2. **REGULATING CB₂ CANNABINOID RECEPTOR PHOSPHORYLATION**

Atkinson B^a, Atwood B^b, Mackie K^b, ^aLangston University at Langston, OK ^bDepartment of Psychological & Brain Sciences and the Gill Center for Biomolecular Science, Indiana University at Bloomington

Many effects of cannabis and the endogenous cannabinoids are mediated by G protein-coupled receptors (GPCRs), CB₁ and CB₂. GPCR signaling is often regulated by phosphorylation of the receptor. We hypothesized a single amino acid replacement of serine at position 352 in the human CB₂ (hCB₂) receptor by alanine will prevent hCB₂ receptor phosphorylation and

internalization and prevent recruitment of the G protein receptor kinases (GRKs) 2 and 3. This hypothesis is based on previous findings that hCB₂ is phosphorylated at Ser352 following hCB₂ activation and phosphorylation leads to the internalization of other GPCRs. A PCR-based mutagenesis approach was used. Briefly, sense and antisense primers were used to amplify and mutate the portion of hCB₂ containing Ser³⁵². Reaction mixtures were analyzed for the presence of the desired amplicon by electrophoresis in 0.8% low melt agarose stained with ethidium bromide. The product was extracted using a QIAquick Gel Extraction Kit. The amplicon was restriction digested with Bcl 1 and Bgl 2 and then ligated into a vector (pHhCB₂-pcDNA3) containing hCB₂ that had been cut with Bgl 2. Competent bacterial cells were transformed with the ligation mix.

DNA was obtained from the transformed bacterial colonies and proper incorporation of the mutation was assessed by DNA sequencing. The role of Ser352 phosphorylation will be assessed by transfecting HEK293 cells with the mutated CB₂ receptors and GFP-GRK3 or GFP-GRK2. Both hCB₂ internalization and recruitment of the GFP-labeled GRK's will be measured and compared to control HEK293 cells transfected with wild type hCB₂ and GFP-GRK3/GRK2. Other research has shown that GRK3, rather than GRK2 plays a more significant role in GPCR internalization. Thus, I purpose that if there is a distinct difference between the wild type hCB₂ and the mutated hCB₂ the difference will be seen with GRK3. Preliminary issues in mutating hCB₂ included difficulties with cutting the insert before ligation. Gel electrophoresis analysis showed unexpected cuts in the amplicon. This was due to an overlooked BamH I site in-between the desired site that could produce more than 5 different unwanted products. This issue was solved when we replaced BamH with Bcl I.

3. CHARACTERIZATION OF MET-INDUCED CELL MOTILITY

Kendra R. Vann¹, Doug Jones², Jennifer Cochran, Ph.D. ²; ¹ Langston University, Langston, Oklahoma 73050; ² Department of Bioengineering Stanford University, Stanford, CA 94305

The intensifying research of many scientists has driven a vast amount of progress in understanding mechanisms of the MET tyrosine kinase receptor and its role in the spread of cancer (metastasis). The MET receptor is proto-oncogene, which is a normal gene that can become a cancer agent (oncogene) due to mutations or increased expression. The Hepatocyte Growth Factor (HGF) also known as the scatter factor (SF) plays a significant role in the motility interaction with MET receptor. HGF is the activating ligand of the trans-membrane receptor MET. However, the detailed relationship of the HGF/SF and Met is not yet clear. Previous mutagenesis data has indicated that NK1 (the N-terminal and first kringle domains of HGF) is responsible for high affinity binding of HGF to the Met receptor. However, NK1-Met binding affinity is too weak to be therapeutically viable. Defining how wild-type NK1 and high affinity NK1 mutants interact with Met in cell scattering and cell invasion assays can provide insights on approaches to inhibit Met-driven tumor metastasis. The objective of this research project is to develop and troubleshoot biological assays to evaluate Met receptor activation. The cell-based assays were successfully developed, enabling investigation of engineered NK1 mutants on Met receptor activation using scatter and invasion assays. We have shown that the high affinity NK1 mutant 20-1 is active in the cell-based biological assays. Previous researchers have identified mutations that transform NK1 from an activating into an inactivating ligand. Collectively, these results support future exploration to more fully characterize its biological effects and its potential as a therapeutic.

4. GLUCOSE MEASUREMENT BASED ON FOSTER RESONANCE ENERGY TRANSFER BETWEEN CONCANAVALIN A-FLUORESCEIN ISOTHIOCYANATE AND DEXTRAN/GOLD NANOPARTICLES

Felicia Ekpo¹, Jared Garret², Dr. Kaiming Ye², ¹School of Arts and Sciences; Department of Biology, Langston University, P.O. Box 175, Langston, OK 73050, ²School of Engineering; Department of Biomedical Engineering, University of Arkansas, 700 Research Center Blvd., Fayetteville, AR 72701

Diabetes affects approximately 16 million people in the United States and over 100 million people worldwide. Numerous diabetics prefer a painless method to measure their blood glucose levels in order to manage the fluctuation of their levels more effectively. The goal of the experiment is to develop a new glucose sensor that will act effectively with the fluorescent light in order to be sensed through the tissue after excitation from an internal or external source by the Förster resonance energy transfer (FRET). If the goal is accomplished there will be a great possibility to develop biocompatible materials for assay encapsulation. If results are sufficient, the ideas of implantable glucose-sensitive microspheres will be more feasible. During experimentation, the concentrations of the dextran, gold nanoparticles, and Concanavalin A-Fluorescein Isothiocyanate (Con A-FITC) solutions were established and several tests were run to ensure accurate results. The results proved that the .6 μ M of ConA-FITC at the fluorescence intensity at 520 nm would be most effective when testing because the concentration is neither too high nor low and demonstrated that the effects were consistent with the Förster Resonance Energy Transfer.

5. CONSTRUCTING THEORETICAL THREE DIMENSIONAL MODELS OF GLYCOSYLTRANSFERASES INVOLVED IN HEMICELLULOSE SYNTHESIS USING HOMOMOLOGY MODELING

Karole Blythe*, and Dr. Paul Adams⁺ *Langston University; ⁺Division of Physical Biosciences at the Lawrence Berkeley National Laboratory

Plants are an inexpensive source of carbon, and therefore, are an excellent candidate to generate an efficient biofuel. The process of producing biofuel from biomass requires the deconstruction of lignocellulose (cellulose, hemicellulose, and lignin) into fermentable sugars. Unfortunately, hemicellulose binds tightly to cellulose and lignin forming a sturdy connection to the plants walls. Hemicellulose is also composed of high percentages of pentose monosaccharides, which are difficult to ferment. The complications of fermentation caused by hemicellulose are the main focus of this research. This study examines one method of better understanding hemicellulose, which is to create theoretical three dimensional models of the glycosyltransferases responsible for hemicellulose synthesis. The technique of homology modeling is used to construct the theoretical models. The names and amino acid sequences (query sequences) of genes encoding glycosyltransferases involved in hemicellulose synthesis were identified. MODELLER and BLAST programs were used to pinpoint protein sequences (templates) from the Protein Data Bank containing high similarities to the residues in the query sequences. After which, MODELLER was used for sequence alignments with each of the query sequences and templates previously identified. Finally, MODELLER calculated a theoretical model for each sequence alignment. The models chosen received the best MODELLER objective function score.

Unfortunately, two of the models contain longed strands of disordered amino acids and will not give any indications to the proteins function in that region, and were therefore omitted from the results.

6. SEX CHROMOSOME ABNORMALITIES IN SYSTEMIC LUPUS ERYTHEMATOSUS

James W. Harding Jr., Oklahoma Medical Research Foundation and Langston University

Recent work has shown that men with Klinefelter's syndrome (47,XXY) are 14-fold increased among men with systemic lupus erythematosus (Scofield, et al, 2008). This increase predicts a rate of lupus in 47,XXY men that is equivalent to 46,XX women and 10-times greater than in 46,XY men. These observations prompted a comprehensive review of any contradictory data concerning sex in the 6433 lupus cases and 5261 controls, mainly in the Lupus Family Registry and Repository. We began by searching the genotyping results for men who had been genotyped as women, which might be explained by mislabeled samples, genotypic 46,XY men living as women (transvestites), or 47,XXY men (Klinefelter's syndrome). We found 11 men who were alleged to have two X chromosomes. We used 6 microsatellites to determine whether any of these men had polymorphic X chromosomes. We will attempt to collect new samples any men who appear to be polymorphic at X. In the meantime, the evaluation of a lupus patient with Turner's syndrome 46,X del Xq, shows evidence for two copies of genes in X, except for Xq, where there is only one copy in this patient. At this point, chromosome analysis now shows evidence for Klinefelter's syndrome (47,XXY) or a mosaic of normal and Klinefelter's syndrome (46,XY/47,XXY) in 7 of 238 (2.94%) male lupus patients, continuing to confirm the high level of Klinefelter's among men with lupus. Clearly, sex chromosomes influence the risk of lupus. What makes this happen will be the subject of much future research.

LANGSTON UNIVERSITY ANNUAL RESEARCH DAY

Abstracts Poster Presentations

7. THE FUNCTION OF THE JNK1 SIGNALING PATHWAY IN ZEBRAFISH DEVELOPMENT

Marshall Bailey, Dr. Daniel S. Wagner, Rice University Department of Biochemistry and Cell Biology, Biology Department Langston University, Langston, OK

The aim of our research is to understand the role of JNK1 signaling pathway in the embryonic development of zebrafish, *Danio rerio*. Understanding the function of JNK is important because the mechanisms that regulate embryonic development in the zebrafish also regulate development in human embryos. JNK is a kinase that phosphorylates a diverse set of proteins including the transcription factor c-Jun, and likely regulates multiple embryonic processes; therefore, we hypothesize that JNK is essential for understanding the embryonic development of *Danio rerio*. Wild-type cDNA of the zebrafish JNK1 and its upstream regulators MAP2K4a and MAP2K7 were isolated from standard PCR methods and gel electrophoresis. The purified products were cloned and sequenced to confirm their identity. cDNA containing the open reading frame for each gene was cloned into PCS2+, a plasmid designed for efficient *in vitro* mRNA production. A dominant negative form of JNK1 (DN-JNK) was created by site directed mutagenesis and mRNA was produced by *in vitro*-transcription reaction. This RNA was microinjected into developing zebrafish embryos for analysis and observation of the resulting phenotype.

8. INFORMATICS TO IMPROVE CLINICAL BRAIN MAGNETIC RESONANCE SPECTROSCOPY

Kenta Caldwell, D. H. Wu, Ph.D., Department of Radiological Sciences, University of Oklahoma Health Sciences Center; Department of Chemistry Langston University, Langston, OK

Objective: Magnetic Resonance Spectroscopy (MRS) Imaging is a clinical imaging technique that radiologists use to gain information about biological chemicals in the body, in this case the brain. In this particular project, MRS images from brain cancer patients were collected from several research papers for an informatics meta-analysis; furthermore, from these sources, a Meta-analysis will be conducted for brain tumors. The primary goal of this project was to standardize information from different sources and to provide standardized information to differentiate between different glioma grades.

Methods: Our lab has developed specialized software to extract metabolite information from several MRS images. We used specialized informatics software designed in the lab to go through all of the relevant articles, which are available in PubMed, to extract metabolite information from several MRS images in goal to create standardized information to many different types of brain tumors.

Result: Informatics Methodology provides better information for clinicians to evaluate our clinical MRS exams.

Conclusions: We created Confidence intervals for Brain Glioma MRS Data. This information was useful in improving our clinical services as it was able to provide us with the baseline expectations from the literature which will help us compare our results with these baselines.

9. EFFECTS OF TREATMENT WITH VITAMINS C AND E ON HEPATIC AND RENAL BIOTRANSFORMATION IN DIABETIC RATS

Shabree Nichols^a, Ruth Sanders^b, John B. Watkins III^b, ^a Langston University, Langston, OK, ^bSchool of Medicine, Indiana University, Bloomington, IN

Diabetes is a disease that is characterized by the body's inability to produce sufficient insulin to maintain normal glucose levels in the blood. Diabetes has many known effects such as nephropathy, retinopathy, neuropathy, and cardiovascular complications, many of which stem from oxidative stress. Oxidative stress has been proven to result from many factors such as free radicals, whose disruption of metabolic activities causes a disturbance of normal cellular activity. This study sought to show the effects of the antioxidant vitamins C and E on hepatic and renal detoxification in normal and diabetic rats. We hypothesized that the treatment of rats with vitamins C and E would reverse some of the complications associated with diabetes. The results of this study suggest that treatment with vitamins C and E is beneficial in the normalization of cytochrome P450 enzymes in the liver, though there seem to be no effects in kidney.

10. RADIOLABELING LIPOSOMES WITH ^{99m}Tc

Kirk Braggs¹, V. Awasthi², ²Department of Pharmaceutical Sciences, University of Oklahoma College of Pharmacy, University of Oklahoma Health Sciences Center; ¹Department of Chemistry, Langston University, Langston, OK

Objective: Liposomes are a lipid-based drug delivery system and are used as a vehicle for a few clinically used anticancer and antifungal drugs. Knowing the distribution of liposomes after administration may be of interest to determine whether the drug has reached its intended destination in the body. Labeling liposomes with a gamma ray emitting radionuclide, coupled with non-invasive imaging can be particularly useful. Our objective was to prepare liposomes capable of being labeled with technetium-99m (Tc-99m).

Methods: Our first goal was to synthesize a lipid that can chelate Tc-99m while structurally inside the lipid bilayer of liposomes. To this effect we synthesized, Distearoylphosphatidylethanolamine conjugated to 6-hydrazinonicotinate (DSPE- HYNIC). The compound was monitored by TLC. Next, we prepared liposome with distearoylphosphatidylcholine, DSPE-HYNIC, and cholesterol (1:0.07:1, molar ratio). The liposomes were allowed to react with Tc-99m as the pertechnetate, in the presence of stannous chloride reductant and tricine as a co-ligand. Labeling efficiency was monitored by gel exclusion chromatography with PD-10 column.

Results: We could successfully synthesize the chelating lipid DSPEC-Hynic in high yields, 36%. The labeling efficiency of liposomes containing this lipid ranged from 10-35%. After PD-10 column purification the labeled product yielded >95% radioactivity associated with the liposomes.

Conclusion: Liposomes can be successfully labeled with Tc-99m. More work needs to be performed for optimal conditions of labeling in order to obtain higher labeling efficiency. Future work will entail the use of this technique to follow in vivo distribution of labeled liposomes with gamma camera imaging.

11. DECIPHERING STRUCTURAL FEATURES IMPORTANT FOR HETEROAROTINOID GROWTH INHIBITION ACTIVITY IN NORMAL AND CANCEROUS OVARIAN CELLS

Sheree McDaniel, D. Benbrook, Department of Obstetrics and Gynecology, University of Oklahoma Health Sciences Center; Biology Department Langston University, Langston, OK

Objective: The hypothesis is that specific structural features of the flexible heteroarotinoid (Flex-Het) chemicals are responsible for their differential killing of cancer cells over normal cells. Our objective was to determine which Flex-Het structural features are responsible for the cell killing activities.

Methods: Cancer cells and normal cells were plated into 96 well plates. The cultures were incubated with a series of Flex-Hets that differed by single structural alterations over a range of concentrations from 0 to 10 micromolar. After 72 hours treatment, the CellTiter 96 Assay was used to measure the number of cells remaining after each treatment. For each compound, the potency was derived as the concentration that induced 50% cell kill, and the efficacy was derived as the maximal percent cell loss observed.

Results: Both compounds with and without N heteroatoms exhibited differential effects on cancer vs. normal cultures. The potencies and efficacies of compounds with the N heteroatoms were weaker than their counterparts without heteroatoms. Other changes to the drug structure had minor consequences.

Conclusions: Since the compounds with N heteroatoms were weaker than their counterparts without heteroatoms, we propose that the N heteroatom decreases the cytotoxicity in general and that other structural features are important for the differential cytotoxicity on cancer over normal cells.

12. DISTRIBUTION OF INTRINSIC CHOROIDAL NEURONS IN CHICK WHOLE MOUNTS

Richard Anderson¹, L. Shelton², J. Summers Rada², ¹Department of Chemistry, Langston University, Langston, OK; ²Department of Cell Biology, University of Oklahoma Health Sciences Center

Objective: Recent investigations have demonstrated that the choroid plays a vital role in regulation of myopic defocus. The current study suggests that the changes in choroidal permeability, thickness, and blood flow that occur during this ocular compensatory regulative behavior may be stimulated by intrinsic choroidal neurons (ICN). The objective was to determine the distribution of ICN in the chick choroid and the possible changes in distribution of the neurons during different stages of myopia.

Methods: Eyes were enucleated from untreated, day old chicks as well as chicks undergoing form deprivation for 4 or 7 days to induce myopia. NADPH-diaphorase was utilized to identify nitric oxide containing ICN in choroidal whole mounts and cross sections. The neurons were counted using a dissecting microscope and diaphorase stained whole mounts and cross sections were viewed with light microscopy at magnifications of 40 – 100X.

Results: Quantitation of ICN in choroids of untreated, day old chicks indicated that the neurons were most abundant in the superior and temporal regions of the eye with averages of 45% and 30% respectively, and less abundant in the nasal and inferior regions with averages of 19% and 8% respectively. The number and distribution of ICN was similar in control and myopic eyes. Additionally, examination of whole mounts and cross sections indicated localization of the neurons on the retinal side of the choroid.

Conclusions: Results of these studies indicate that ICN are most abundant in the superior and temporal regions of the choroid and less abundant in the nasal and inferior regions. The finding that the neurons are located on the retinal surface suggests that ICN may play a role in controlling the blood vessels of the choroidal capillaries. Although the number of ICN was

similar in control vs. myopic eyes, this may indicate less density of the neurons during elevated stages of myopia since the myopic eye is larger.

13. SEX CHROMOSOME ABNORMALITIES IN SYSTEMIC LUPUS ERYTHEMATOSUS

James W. Harding Jr., Oklahoma Medical Research Foundation and Langston University

Recent work has shown that men with Klinefelter's syndrome (47,XXY) are 14-fold increased among men with systemic lupus erythematosus (Schofield, et al, 2008). This increase predicts a rate of lupus in 47,XXY men that is equivalent to 46,XX women and 10-times greater than in 46,XY men. These observations prompted a comprehensive review of any contradictory data concerning sex in the 6433 lupus cases and 5261 controls, mainly in the Lupus Family Registry and Repository. We began by searching the genotyping results for men who had been genotyped as women, which might be explained by mislabeled samples, genotypic 46,XY men living as women (transvestites), or 47,XXY men (Klinefelter's syndrome). We found 11 men who were alleged to have two X chromosomes. We used 6 microsatellites to determine whether any of these men had polymorphic X chromosomes. We will attempt to collect new samples any men who appear to be polymorphic at X. In the meantime, the evaluation of a lupus patient with Turner's syndrome 46,X del Xq, shows evidence for two copies of genes in X, except for Xq, where there is only one copy in this patient. At this point, chromosome analysis now shows evidence for Klinefelter's syndrome (47,XXY) or a mosaic of normal and Klinefelter's syndrome (46,XY/47,XXY) in 7 of 238 (2.94%) male lupus patients, continuing to confirm the high level of Klinefelter's among men with lupus. Clearly, sex chromosomes influence the risk of lupus. What makes this happen will be the subject of much future research.

14. THE SIX-COLOR THEOREM

Rochelle Howard, Dr. Paul Kirk, Indiana University, Bloomington, IN; Langston University, Langston, OK,

The purpose of this study is to prove the Six-Color Theorem. This theorem is a commonly known theorem that is used in the study of Topology. It states that every planar graph can be colored with at most six colors. To prove The Six-Color Theorem, the Planar Graph Fact (every planar graph has at least one vertex of order five or less) is needed. Using an argument by contradiction, the Planar Graph Fact can be proven thus proving the Six-Color Theorem.

15. LAYER-SPECIFIC GLYCOSAMINOGLYCAN CONTENT AND MECHANOBIOLOGY OF THE AORTIC VALVE

Alex Henderson¹, Hubert Tseng², K Jane Grande-Allen²

¹-Langston University, Department of Chemistry, Langston, OK

²-Rice University, Department of Bioengineering, Houston, TX 77005

The aortic valve is paramount to the ability of the heart to pump blood to the rest of the body. During ventricular systole, pressure rises in the left ventricle. Once the pressure in left ventricle

has risen above the pressure in the aorta the aortic valve opens allowing blood to exit the left ventricle and flow into the aorta. This process also closes the aortic valve. The aortic valve exists as a tricuspid valve meaning there are three valves, the right, left, and non coronary valves. Each of these valves can be split up into three layers, fibrosa, spongiosa, and ventricularis. Until recently, it was widely believed that tissue engineering a heart valve could be done by examining the leaflets as a whole. This research intends to investigate the valve leaflets by their three layers. Particularly close attention will be paid to the fibrosa and ventricularis layers because the spongiosa layer is difficult to extract. The ventricularis layer is known for its elasticity while fibrosa is known for its strength. Glycosaminoglycans (GAGs) can be covalently linked to a protein to form proteoglycans (PGs). Using this knowledge an inference can be made as to which PGs comprise each valve layer. Once a quantitative analysis of the GAGs and subsequent PGs in each layer is complete inferences about the mechanobiology of the proteoglycans in each layer can be made. To do this a technique known as Fluorophore Assisted Carbohydrate Electrophoresis (FACE) will be implemented.

16. APPLICATIONS OF MODULAR RINGS IN NUMBER THEORY

Domonick Crane, Andrew Bucki, Langston University Department of Mathematics, Langston, OK

In the era of technology it is almost impossible to imagine to start any type of computation without using computers or supercomputers. However, there are still problems that computers cannot help without applying some knowledge of advance mathematics. The goal of this display is to show how to apply Abstract Algebra, or more precisely, Modular Rings in some other disciplines like Number Theory or Cryptology. By applying the natural projection epimorphism $p: \mathbb{Z} \rightarrow \mathbb{Z}/m\mathbb{Z}$ from the ring of integers \mathbb{Z} to a modular ring $\mathbb{Z}/m\mathbb{Z}$ and orders of cyclic subgroups of the group of invertibles V_m it will be possible to solve some problems similar to the Fermat Theorem and problems related with divisibility of large numbers.

17. HEART RATE VARIABILITY IN INSULIN RESISTANCE

DOG MODEL; EARLY INDICATOR OF AUTONOMIC DYSFUNCTION OF CARDIO METABOLIC SYNDROME

Detrick R. Watson, Matthew A. Barlow, James L. Caffery, Dept. Of Integrative Physiology, University of North Texas Health Science Center at Fort Worth

Introduction: Physiologically the cardiometabolic syndrome provokes a decrease in the autonomic nervous system control of respiratory sinus arrhythmia in insulin resistant dogs. The sympathetic nerves increase heart rate, whereas the parasympathetic (vagus) nerves slow heart rate. The influence of parasympathetic innervations can be evaluated by analyzing the heart rate variability through the use of power spectral analysis (PSA). When vagal influences are strong, the high frequency power increases. **Hypothesis:** We hypothesize that the high frequency power of fat-fed, insulin resistant dogs will be significantly lower compared to the baseline time measurements and to lean controls. **Methods:** The dogs in this study were fed a high fat hyper caloric diet for 6 weeks, and changes in the body mass, blood glucose and insulin sensitivity were monitored. The high fat diet was reported to produce a diet-induced insulin resistance and hyperinsulemia. **Results:** The heart rate increased from week 0 to week 6 in 4 of 6 of the fat-fed, insulin resistant dogs and was largely unchanged in the control dogs. Likewise, the average high

frequency power in the insulin resistant dogs decreased significantly in 4 of 6 animals and was unchanged in controls. **Conclusion:** We conclude that the changes in heart rate consequent to fat feeding are the result of changes in parasympathetic influence as evident from parallel changes in the high frequency power in the insulin resistant dogs. The dog model will thus be helped for the study of early diet-induced alterations in parasympathetic activity and cardiometabolic function prior to the development of obesity and diabetes.

18. EFFECT OF ISOMETRIC HANDGRIP AND COLD PRESSOR STIMULUS ON MEAN ARTERIAL PRESSURE IN HUMANS

Walker A, Pacchia N, Cain S, Raven J, Smith M

The body responds to stressors like exercise and pain by modulating various components of the cardiovascular system. For example, elevation of muscle temperature has been shown to increase mean arterial pressure (MAP) during isometric exercise in humans. Isometric handgrip and cold pressor test (CPT) have been previously used to evoke muscle afferents and pain sensory responses, respectively. Both are used to examine a variety of cardiovascular responses in humans. This study investigates the MAP response to CPT and isometric handgrip combined.

Hypothesis: We hypothesize that there will be a significant difference in MAP response during combined cold pressor and handgrip, compared to handgrip and cold pressor alone.

Methods: A total of 12 healthy volunteers were recruited for the study. Subjects were studied and instrumented to record MAP during every procedure. Subjects squeezed a handgrip at 30% MVC while a gel pack with temperatures of 2 C was wrapped around their forearm. The three treatment conditions were 1) cold pressor, 2) handgrip, 3) both cold pressor and handgrip. Data were collected before and during each treatment condition.

Results: Cold pressor stimuli did significantly alter mean arterial pressure in 10 out of 12 subjects. Change in mean arterial pressure during cold pressor was significantly different than change in MAP during handgrip and both treatments combined. There was no significant difference in MAP between the three treatment conditions.

Conclusion: Applying gel pack to the forearm is an effective method to elicit a MAP response in normal resting humans. Pain stimulus created a greater MAP response when compared to the metaboreflex and both combined.

19. UNDERSTANDING THE MECHANISM OF TRICHLOROACETIC ACID-INDUCED PRECIPITATION OF PROTEINS

Charles Loftis², Dakshinamurthy Rajalingam¹, Jiashou J. Xu¹, and Thallapuranam Krishnaswamy S. Kumar^{1*}

¹Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR 72701, ²School of Arts and Sciences, Langston University, Langston, OK 73050.

Protein folding is a process by which an unfolded polypeptide chain folds into a specific native structure with associated biological activity. Protein aggregation is a widespread phenomenon that occurs during protein folding *in vivo* and *in vitro*. Understanding the mechanism of protein aggregation is important in solving the problem of formation of inclusion bodies during overexpression of recombinant proteins in host vectors and also in the prevention and cure of various human diseases (including Alzheimer's disease). 2,2,2-trichloroacetic acid (TCA) is a well-known protein precipitating agent. In the present study, we attempt to understand the mechanism by which TCA induces precipitation of proteins, using various biophysical techniques including polyacrylamide gel electrophoresis, steady state fluorescence, 8-anilino-1-naphthalene sulfonate (ANS) binding, circular dichroism, and multidimensional NMR spectroscopy. The TCA-induced protein precipitation curves are observed to be U-shaped and

maximum protein precipitation is observed between 5 % to 45 % (w/v) of TCA. TCA-induced protein precipitation curve does not significantly depend on the nature and size of the protein. However, in the presence of increasing concentrations of urea (denaturant), the amount of protein precipitated is significantly decreased. It is observed that the protein-precipitate-inducing effects of TCA are due to the trichloro group. Using acidic fibroblast growth factor (aFGF), as a model protein, we attempt to understand the molecular basis for the TCA-induced effects. We demonstrate that aFGF is in a partially structured “molten-globule” state in 5 % (w/v) sodium trichloroacetate (STCA). It appears that TCA-induced protein precipitation occurs through coalescence of partially structured state(s) of the protein.

20. Monitoring the Formation of Inclusion Bodies During Overexpression of Interleukin 1 α in Escherichia coli

Charles Loftis, School of Arts and Sciences, Langston University, Langston, OK 73050.

This study is aimed at understanding the overexpression of interleukin-1 α (IL-1 α), a cytokine, in Escherichia coli (E. coli). IL-1 α is overexpressed as inclusion bodies in E. coli. Alteration of the conditions of bacterial growth is found to share little effect on the overexpression of IL-1 α . The inclusion bodies of IL-1 α accumulate maximally 9 hours after initiation of bacterial growth. Mass spectroscopy data suggests that formation of inclusion bodies of IL-1 α proceeds via coalescence of misfolded monomeric intermediate states. A novel Congo red based staining method has been developed to specifically detect the formation of inclusion bodies in bacterial cells.

21. LIGAND INVESTIGATION

Jamie Wright, Department of Chemistry, Langston University, Langston OK 73050

Nigel Moriarty, Paul Adams, Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley CA 94720

There have been many studies of ligands, small molecules that bind to protein molecules. Although the identification of ligand structures has been performed for many years and over 8,800 structures have been deposited in databases, there are ligands that are variants of the same structures. The goal of this research is to create a list of the top 200 most commonly used ligands. This list can benefit crystallographers who study protein crystals and may have a ligand in their protein. Knowing that a specific ligand is contained in the x-ray diffraction data will be significant to the crystallographer's research. This new list will cover over sixty percent of ligand entries and will increase the probability of finding ligands.

22. OPTIMIZATION OF CRYSTALLOGRAPHIC HEME RESTRAINTS

Kamille Kelly, Department of Biology, Langston University, Langston OK 73050

Nigel Moriarty, Paul Adams, Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley CA 94720

The process of x-ray protein crystallography is one of the widely used techniques used to solve protein structure. When x-rays are projected through a crystallized protein, diffraction patterns are created. The diffraction patterns can be converted into a 3-D model. In solving proteins the protein structure is positioned in electron density using complex algorithms. In some protein structures different components become distorted when placed inside electron density. Specifically, in hemoproteins there is puckering in the heme structure. This study looks at optimizing the geometry of hemes to fit accurately inside the electron density. To this end, a set of restraints has been constructed to optimize the geometry and chemical restraints of the heme structure. Tests performed on the heme structure have shown that the new restraints have decreased the difference maps sigma values, proving that the structure has a better fit inside the density.

Activities and findings:

Research and Education Activities:

Each of our activities in the Education and Research areas was aimed at meeting our original and continuing objectives of a) increasing the number of STEM graduates, and b) increasing the number of STEM graduates who matriculate to STEM graduate programs.

EDUCATIONAL ACTIVITIES:

Following are Educational Activities conducted during the reporting period.

1. Technology in the Classroom
2. GRE Preparation
3. Supplementary Instruction (SI)
4. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program
5. Mentoring
6. Faculty Education

Technology in the Classroom

A major focus of the LINC program, and of Langston University, is to expand the use of technology in the classroom. To this end the following activities were accomplished during this past year. LU contributed \$125,000 dollars to this project through its Title 3 Program; other contributing funds are from the LINC Program.

1. Creation of two state-of-the-art Smart classrooms, including a computer laboratory featuring Tablet PCs, the primary tool used in the CPR-L process. Other attributes include LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability.
2. Creation of a media laboratory that supports the creation and dissemination of performance videos wherein students learn by teaching' core course concepts as they solve specific problems.

About CPR-L (Competency Performance Recordings for Learning)

CPR-L is simply a "learning by teaching" method that embraces 21st century technologies and numerous learning protocols. It utilizes a smartboard, wireless projector, and tablet PC. According to the Learning Pyramid by National Training Laboratories in Bethel, Maine, "learning by teaching" produces a 90% retention rate, the highest of all methods.

With CPR-L, students are required to take homework problems that contain core course concepts to a lab setting or home, and solve them on a tablet PC while utilizing clearly articulated problem-solving rubrics. The final product must be concise, compressed to essential steps, so students are encouraged to first utilize paper and pen to explore solutions until they believe that they have uncovered all elements in the selected rubrics, and reduced their findings to an effective description of the solutions process. The entire process is iterative, and requires intense re-thinking of the solution in order to reduce it to its essence and meet other required criteria. Students then prepare a Smartboard lecture on tablet PC. The tablet PC records the students' voice, as they are required to talk through the problem as though they were teaching it in class. The laptop visually captures the student's work in-progress straight through to its finished form as the problem solution is written on the tablet PC's surface with a stylus. The effectiveness of the

solution is measured against the selected rubrics. Further, the process of recording requires a quiet environment, devoid of music and other typical distractions, writing the information down, as well as reading aloud to “hear” ones’ thoughts. This effort reinforces the learning process. All students’ completed assignments are maintained in their performance file, and are accessible to them and to the instructor. This gives both a movie-like review of exactly how well the student understands core course concepts and what the progress trail looks like. Upon careful review of these performance “movies”, instructors can isolate student and course content weaknesses, recommend intervention, and better predict examination outcomes.

Technologies enable the student to wirelessly project a "movie-like" presentation of the homework assignment, with sound, on a large whiteboard for classroom viewing and discussion. Since the student must iron out all of the kinks and fine tune the assignment outside the classroom, this process lessens the amount of time associated with traditional "going to the board" activity, and permits broader classroom participation. When CPRL work sessions are completed in the tablet PC lab, the instructor is able to scrutinize each student’s work separately, from the instructor’s laptop, which may include working concurrently on the individual students’ screen.

Selected CPR-L recordings are posted in The Digital Village website.

Other technologies employed in the classroom, and implemented earlier than the subject period, are listed in the *Appendix section, Exhibit II*. A Photo Gallery featuring technology in the classroom is attached as *Exhibit II-A*.

GRE Preparation

GRE Preparation (Collaboration with EPSCoR: Data analyzed by Dr. A. Peterson, Director LU-EPSCoR Program)

One of the primary predictors of how well undergraduate students will perform in graduate school is the preparation they received in their undergraduate curriculums. One of the primary measures of their potential success in graduate school is the Graduate Record Examination (GRE).

Background:

In 2002, Langston University issued an internal report on its students’ GRE scores and readiness for graduate school. The report suggested that Langston University mathematics and science students who maintained a 3.2 GPA and scored at least 400/800 on each of the GRE core components were deemed competitive by several in-state graduate schools committees.

The LINC Program has been a proactive collaborator in providing STEM students with the opportunity to receive free GRE Course preparation since 2003. In recent years, EPSCoR has been a significant contributor to the GRE Kaplan Course. Since the implementation of the preparation course by the department more than 120 students have participated. The Kaplan GRE Preparation Course has been very effective in getting more minority students prepared for the GRE, hence, increasing their competitiveness for graduate school and/or professional schools. At least 50% of these students have

been confirmed as having been admitted to or are currently attending graduate/professional schools throughout the United States.

Spring 2009 Cohort:

This report focuses on the cohort of fourteen (14) students who participated in the Spring 09 Kaplan GRE course at LU. Seven students were African American female and seven students were African American males. The mean overall scores for the Kaplan Course Diagnostic Pre-Test were 440/800 (quantitative component). The mean overall scores for the verbal component was 389/800. Again, we notice similarity between the two previous year's cohorts. The post-test scores were encouraging, but were not as strong as the previous year's results.

The mean quantitative component score was 600/800. This was a 160 point increase over the Kaplan diagnostic pre-test average. The mean verbal component score for the same group was 451/800. This was a 62 point increase when compared to the Kaplan diagnostics pre-test average. We did not see the huge improvement from last year to this year as we had in previous years. The combined results for last year (2007-2008) are 1059. This year's combined scores were 1051. This represents about a 1% decrease from last year's performance.

Summary: We are again delighted that the Kaplan GRE Preparation Course has had a positive effect in helping students increase their GRE results. Students continue to report that the preparation course not only teaches them how to study for the GRE but also provides them with solid tips on answering seemingly difficult questions. However, the (verbal) portion of the GRE continues to be the "sticking point" for our students.

We must extend the verbal portion of the GRE Prep Course throughout our school year; providing more assistance through course colloquiums. The students' verbal competences still appears to be the key to significantly impact the GRE scores. This could potentially make the GRE scores even more competitive for graduate schools applications.

Finally, Langston University graduated seven (7) African Americans STEM majors (4 female and 3 males) this Spring who were part of a previous GRE Preparation Course sponsored by Oklahoma EPSCoR and Langston University. There were three biology majors, three chemistry majors, and one mathematics major. Six of these students have been confirmed as being accepted to graduate school.

Supplementary Instruction in collaboration with Oklahoma EPSCoR

Data analyzed by Dr. Alonzo Peterson

Summary of Results

This is Langston University's fourth full academic year of the Supplemental Instruction (SI) Program. Langston University implemented the Supplemental Instruction Program in the Spring of 2004. Classes targeted were Mathematics (College Algebra, Trigonometry, Calculus I) and the Sciences (Biology I, Biology II, Chemistry, Physics I, Physics II, and Physical Science). This report includes data

from the Spring 2009 and Summer 2009 semesters. This year's program consisted of eighteen SI leaders one coordinator, one SI Supervisor, and fifteen professors/ instructors. Sessions continue to meet 2-3 times a week at various times. Sessions are held in the Mathematics Building and the Sciences Building. The program was implemented during the spring 2009 semester.

Participants

During the Spring 2009 and Summer 2009 semesters, more than 400 students had access to the Sciences SI sessions. SI was made available to almost 300 mathematics students in the Spring 2009 and Summer 2009 sessions. Approximately 97% of these students are African American. SI was implemented in 19 courses (Sciences-8 and Mathematics-11). This year SI was implemented in two new areas Physics II and Biology II) in addition to the three new areas (Trigonometry, Calculus I, and Physics I) that were added in the previous year. The Physics II course was implemented at the requests of the students. Biology II was implemented at the instructor's request.

Leaders

There are currently 18 undergraduate students serving as SI leaders and number of these students worked in both the spring and summer semesters. There were 11 African American females and seven (7) African American males. Four of the leaders were mathematics majors, four were chemistry majors and the remaining ten were biology majors. Each of these students has strong analytical and problem solving skills. At least 14 of these leaders are McCabe Scholars, Langston Integrated Network College (LINC) Scholars or both. We believe that we have selected some of the strongest mathematics and science students the university has to offer.

SI leaders meet their sessions regularly and attendance is reported weekly. We received positive feedback from those students who are regularly attending SI sessions. However, we continue to observe that only a very small percentage of students are actually taking advantage of the SI program. We have continued our campaign to get students to realize the benefits of SI and to get them to attend the sessions. As mentioned in the preliminary report we have partnered with the Langston University Student Government Association in their "Why Are You Failing" Campaign that provides information to students on study skills and time and place they can receive assistance in their mathematics and science courses. The staff met with the SI mentors to explain their roles and responsibilities in implementing SI. We also placed flyers and notices throughout the mathematics and sciences buildings. SI leaders were given the opportunity to introduce themselves and the SI program to the students in each SI class. Instructors allowed students time to determine the most convenient time to meet for the SI sessions. During our end of the 2007-2008 year questionnaire we found that approximately thirty-eight percent of the students said they did not attend SI because it was not convenient for them. We have attempted to address the concern by allowing and encouraging students to attend any SI session that is convenient for them. The following is a break down of the pass/fail rate of the SI sessions.

Sciences - Biology

Only about 12% of eligible students attended the Biology SI sessions during the Spring 2009 and Summer 2009 semester. However there was significant difference in the percentage of students receiving an “ABC” or “DFW”. The SI Group reported (93% “ABC” rate and 7% “DFW” rate respectively) and the Non-SI Group reported (60%, 40% respectively).

Sciences- Chemistry

Thirty percent of the 45 Chemistry I students attended Chemistry SI sessions during the Spring 2009 semester. For the second year in a row we observed positive results for these SI sessions. Again there was also a positive difference in the number of students receiving “ABC” and “DFW” grades between the two groups. The Non-SI group had a 60% “DFW” rate while the SI group reported a 25% rate. The “ABC” rate for SI group was very encouraging; the Non-SI group had a 40% “ABC” rate while the SI group reported an “ABC” rate that continued to impress at 75%.

Sciences-Physical Science

About 20% of the Physical Science students regularly attended the Physical Science sessions. This group earned about a 67%. Of the non-SI 67 % of the students enrolled in the passed the course. This is an area where the instructors continue to request SI for the students.

Sciences-Physics I

Fifty percent of the students in this class attended SI. About 0% of those students received an “ABC” grade. 100% of these students received a “DFW”. 17 % of non-SI students passed this class. 83 % of non-SI students received either a “DFW” grade. This course will be addressed more aggressively during the upcoming semesters.

Sciences-Physics II

This course was implemented based on a request by the students. The students from this cohort were essentially the same students who requested SI during the previous year while enrolled in Physics I. The course is an extremely rigorous course. Approximately half of the 22 students regularly attended SI. Seventy percent of these students received an “ABC” grade in this class. Of the remaining students who did not attend SI 58% of these students received a “DFW” grade.

Mathematics-College Algebra

More than 200 College Algebra students were offered College Algebra SI during the Spring 2009 semester. In the previous year we reported only about 6% of the students attending the SI sessions. This year about 15% of the students attended the sessions. The SI group earned an 80% “ABC” grade rate compared to a 50% “ABC” grade rate for the Non-SI group.

Mathematics-Trigonometry

About 60% of those students enrolled in the course regularly attended SI sessions. Of that number 80% of them completed the course with an “ABC” grade compared to 50% of the Non-SI students. This made a very strong statement for the inclusion of SI in this course.

Mathematics-Calculus I

About 30% of the 17 students attended the SI sessions on a regular basis. Again this year these students did extremely well in this course. In fact all those who regularly attended SI sessions passed the class. The majority of them made either an A or B. The final SI/Non-SI passage rate in this course was 100% and 62% respectively.

The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge Program

The SABC & STEM Double Bridge is a collaborative 4-week residential Summer Bridge Program for 15 incoming freshmen who have expressed an interest in STEM disciplines. It is held on the LU campus during the months of June-July. Classroom lectures on STEM topics are rendered during the morning and research activities are held during the afternoons in laboratories or in the field. The Summer Bridge program is designed to bridge the gap between high school and college for participants by offering additional tools which will enable success. Tools-for- success are: providing participants with opportunities for interaction with other students, working as a team member, and providing introductions to Pre-Calculus, Biology, Chemistry, and Research techniques. Students who successfully complete this program enter into the STEM Double Bridge program during the Fall semester.

Twelve (12) students were selected to attend the 2009 SABC/STEM Double Bridge Program, held June 22-July 17, 2009. Seven participants were females, five were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

This summer’s program provided an excellent opportunity to roll out the department’s expanded “Technology in the Classroom” program (CPRL laboratory) and institute the CPRL teaching process in General Chemistry.

Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 120 % improvement based on Pre & Post assessments compared to an 85% improvement last year.

See more about CPR-L in Technology section.

All students successfully fulfilled the stated requirements and received certificates of completion and a \$1500 stipend at the closing banquet in the LU Atrium.

Bridge Director: Dr. John K. Coleman

Bridge Coordinator: Ms. I. B. Williams

Bridge Faculty: Mr. Anthony Hill, Dr. G. Naidoo, Dr. K. Matand, and Dr. W. Franks

Master High School attending: Ms. P. Anderson, Millwood High School

Counselors/Mentors: Karole Blythe, Brittanie Stoutermire, Kirk Braggs, and Tamar Torres

Participants attending Program: Shaffran Benton, Ashley Brown, August Brown, Marcell Bryant, Keiauna Clemons, Shaquanta Cotton, Kaiya Fletcher, Tony Griffin, Briana Morrow, Terrence Prince, Samantha Samuels, and Latonya Tolbert

Outstanding performers during the program were: **Chemistry:** Keiauna Clemons **Pre-Calculus:** August Brown & Shaffran Benton **CPR-L Presenter:** August Brown

The major components are:

1. Selecting participants. Early spring, notification by mail is sent to prospective students about the Summer Bridge program. Direct contacts are made through high school advisors/counselors and through visits by university faculty and past Summer Bridge participants. The applicants are screened and selected based on their interests and their academic performance in high school, including attention to all qualified underrepresented groups.
2. Morning lectures. Students attend academic lectures each morning. The lectures will cover a variety of topics, including current research projects conducted by faculty, modern research methods and techniques, university resources, campus life, and study methods. Faculty members with an interest in integrating research with curriculum are chosen to teach these morning sessions.
3. Conducting research. During the afternoons, each student joins a group of 5 to 6 students in a research lab or in the field. Faculty and student peer mentors lead the students in research projects covering a wide spectrum of STEM disciplines. Students learn the basic aspects of laboratory/field skills, literature search, data acquisition, and data analysis, while participating in cutting-edge research projects. At the end of the 4-week program, each student will present his or her findings to the entire student body of the Summer Bridge program.
4. Incorporating high school STEM teachers. A new component of the Summer Bridge program is the inclusion of a high school teacher. An experienced STEM teacher is selected from high schools in close proximity to each Summer Bridge campus. The teacher works alongside the Summer Bridge participants to gain research experience. The teacher serves as advisors to the Summer Bridge program. Research experiences gained by the teachers will be valuable for integration into the STEM curricula in their high school classrooms. They will be effective recruiters for the Summer Bridge students from high schools.

Mentoring

The Department of Chemistry spends a disproportionate amount of time working with its majors and non-chemistry major LINC students in order to influence them to pursue advanced degrees.

Langston's success at increasing the number of STEM graduates who elect to attend graduate school is due, in part, to the hands-on nurturing necessary to retain and influence program participants. Our faculty had to adjust to the reality of who our students and LINC scholars are, and what influences their behavior and decisions. Many are first generation college students who don't get a lot of encouragement from their family and friends to attend graduate school. Reaction from the home front is generally quite the opposite; they want their children to get a degree and go to work so they can help out financially. LU STEM faculty soon discovered that the role of motivator and source of inspiration and encouragement falls on them if the LU and NSF goals are to be achieved. Students do not easily or quickly comply with application deadlines, queries into graduate school, or research internship opportunities. They are not readily compliant with many other administrative duties that support success. When nurtured, however, their brilliance and capabilities become evident. Although faculty and staff might grumble that assisting these otherwise bright, talented young people should not be necessary, all realize that we are in the process of creating a mind shift – a process that requires patience, perseverance, and dedication.

LINC scholars serve as mentors and tutors in the following programs:

1. The Summer Academic Bridge-To-College (SABC) Program & STEM Double Bridge
2. Supplemental Instruction (SI)

Faculty Development and Education

Two department faculty members served as presenter, grant readers or grant-writing mentor:

1. Dr. Sharon Lewis –(reader) AP Chemistry Reading , Education Testing Service (ETS), Lincoln, Nebraska
2. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2008.
3. Dr. John K. Coleman Grant Mentor for Oklahoma Board of Regents Grant Writing Institute, Board of Regents, OKC July 2009.
4. Dr. Sharon Lewis - OK-INBRE IDeA Program National Symposium, Washington, D.C. Poster Presentation: "Bioinformatics of Bipolar Disorder" August 6-8, 2008
5. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC December 1-2, 2008
6. Dr. Sharon Lewis: National Science Foundation, Review Panelist-LSAMP proposals, Washington, DC April 1-2, 2009
7. Dr. Sharon Lewis: (Reader) AP Chemistry Reading, Education Testing Service (ETS), Lincoln, Nebraska, Lincoln, Nebraska June 11-19, 2009

Drs. Coleman and Lewis also participated in a number of industry conferences and meetings:

1. Developing Bioinformatics Programs Workshop, Pittsburgh Supercomputing Center, Carnegie Mellon University, Pittsburgh, PA July 13 - 25/2008 (S. Lewis)
2. Louis Stokes Alliance for Minority Participation Oklahoma State University, Stillwater, OK (September 20, 2008) (J. Coleman; S. Lewis)
3. ODOT/OTC Annual Research Symposium OKC, OK October 15, 2008 (S. Lewis)
4. NSF HBCU-UP National Convention – Atlanta, GA – October 23-26, 2008 (J. Coleman)

5. Seminar "Molecular Genetic Analysis of COMT in Bipolar Disorder", Tools and Technology Class, Pilot Project, University of Michigan Medical School, Ann Arbor October 22 – 27, 2008 (S. Lewis)
6. Oklahoma Research Day; University of Central OK Edmond, OK (November 30, 2008)(J. Coleman)
7. 66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA (J. Coleman & I. Williams)
8. National Center for Integrative Biomedical Informatics (NCIBI) Annual Research Meeting at the University of Michigan Medical School, Ann Arbor April 27-28, 2009 (S. Lewis)
9. Langston University Research Day – (May 1, 2009) (J. Coleman) & (S. Lewis)
10. Research Day and the OUHSC, OKC July 2008 & 2009

RESEARCH ACTIVITIES:

LINC Students and Faculty participated in RESEARCH activities during the reporting period.

Student Research was one of LINC's strategies to improve the retention rate of STEM students. Through this experiential learning, students were exposed to challenging and exciting applications of 'book learning'.

During the extension period of LINC, Phase I and beginning of the LINC Continuation period (Summer 2008), thirty seven (37) students participated in Summer Research activities at major U.S. institutions that include University of California at Berkley, Stanford University, Rice University, and three Oklahoma Universities that include Langston.

A. LINC Students:

Through LINC, the Department of Chemistry has impacted research and mentoring experiences, and access to graduate school, of all LU STEM majors for the past 6 years.

Over 180 LINC STEM students have received research internships at over 25 major universities throughout the U.S. Over 50 participated during the last two years.

This year, 30 STEM scholars presented their research findings at six different venues; two at national settings. Ten (10) students won national awards for their research presentations. There were 5 first place awards, 3 second place, 1 third place, and 1 Top Five oral winner.

First Place

Felicia Ekpo (NSF HBCU-UP National research Conference)
 Jamila Harris (NSF HBCU-UP National research Conference)
 Brittanie Atkinson (K-INBRE Symposium Kansas City, MO)
 Shabree Nichols (BKX/NIS National Research Conference)
 Shree McDaniels (OUHSC- Summer Undergraduate Program)

Second Place

Felicia Ekpo (BKX/NIS National Research Conference) –Beta Kappa Chi/National Institute of Science
Brittanie Atkinson (BKX/NIS National Research Conference)
Shree McDaniels (BKX/NIS National Research Conference)

Third Place

Samuel Henderson (BKX/NIS National Research Conference)

Top 5 Oral

Stacy Bean – top 5 Oral (K-INBRE Symposium Kansas City, MO)

Competitors at national events come from a field of 70 HBCU's. There are between 500 -700 attendees at each national event. Two national venues are highlighted below.

NSF HBCU-UP National Convention – Atlanta, GA – October 23-26, 2008

LU undergraduates have had five (5) national winners in oral and poster presentation competition at the NSF HBCU-UP National Research Conference over the last two years. This includes three (3) first place winners, one (1) second place and one (1) third place winner.

During each of the past two years, the HBCU-UP conference was held during LUs homecoming, which necessitated many students having to set aside activities and organizational obligations to participate at the conference. This year, 17 students, accompanied by two faculty advisors, (John K. Coleman & Cassandra Parker) took a one-stop flight via American Airlines to Atlanta, GA, to present the results of their 10-week summer research projects, conducted at various universities throughout the US. Although this year and last year's trips were bittersweet because homecoming events were sacrificed, LU students gave excellent presentations as they defended their findings in front of faculty judges. Their presentations earned them two (2) first place awards. The list of students attending and the students fortunate to be selected as winners are listed below. The picture of Jamila Harris (which appears on the NSF website) receiving her first place award at the convention is also included in the Appendix section. [Note: Brittanie Atkinson accepted the award for Jamila Harris who was not available at the moment of presentation]. Abstracts for all students are listed in the Appendix section of this report.

The 17 Students attending the NSF HBCU-UP National Convention, Atlanta, GA

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Kirk Braggs, Leethaniel Brumfield III, Kenta Caldwell, Dominick Crane, Felicia Ekpo, Jamila Harris, Alex Henderson, Rochelle Howard, Charles Loftis, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

66th Annual Joint Conference of Beta Kappa Chi and the National Institute of Science (NIS), March 25-29, 2009, Norfolk, VA: Hosted by Norfolk State University and Hampton University.

LU has had ten (10) national winners in oral and poster presentation competition at the Annual Joint Conference of Beta Kappa Chi and the National Institute of Science over the last two years. This includes three (3) first place winners, five (5) second place and two (2) third place winners. This year, 10 students, accompanied by two faculty advisors, (John K. Coleman & Irene Williams) boarded a one-stop American Airlines flight to Norfolk, VA (where they would present the results of their research work), intending to arrive in Norfolk, the day before competition. The first leg of the flight was delayed due to inclement weather, and upon arrival in Dallas-Ft. Worth, the group learned that the last flight to Norfolk, VA had already departed. The news got worse. The earliest flight the next morning would not arrive in time for the oral presenters to make their scheduled defense; however, the poster presenters could meet their schedule. The first inclination of the group was for some of them to return to Oklahoma; however, it was quickly realized that the Conference presented many more opportunities for the undergraduates as a whole. Many nationally renowned speakers would appear, many workshops were anticipated and many Industry and University vendors would be present to recruit for employees and potential scholarship awardees. The missed flight prompted a need to make alternate arrangements, including an unscheduled overnight stay in Dallas and rescheduling a flight from Dallas to Norfolk the following morning.

Meanwhile, Kendra Vann, another LU undergraduate participant had traveled a different route. She arrived in Norfolk on schedule, via Nashville, TN where her interview for graduate school at Vanderbilt University was held. Upon learning that her teammates were delayed in Dallas, she met with Conference officials at Norfolk, on behalf of the LU group, informing them of the adverse circumstances with travel. The intervention resulted in good news. The conference coordinators rescheduled the five oral presenters for a later time; however, the competition refereed by faculty judges would take place almost immediately upon the group's arrival at the convention from the airport.

Back in Dallas, the group was up most of the night cancelling and rescheduling activities and holding practice sessions. An early flight the next day was required in order to make the new presentation schedule. This group of students, although confronted with these unforeseen challenges, pulled together to garner one of their proudest moments as a group. They managed to overcome the woes and performed gallantly upon their arrival at the conference. They produced five (5) national winners; one of the largest amount of winners for any attending university and equaled only by the LU group the year before. Most conference attendees knew of the circumstances surrounding the Langston group's travel and they soon learned of the great sacrifice and commitment to task by the group. The list of students attending the conference and the fortunate winners are listed below. Research abstracts for all students are listed in the Appendix Section at the end of this report.

Students attending Norfolk Convention:

Richard Anderson, Brittanie Atkinson, Marshall Bailey, Karole Blythe, Felicia Ekpo, Jamila Harris, Alex Henderson, Sheree McDaniel, Shabree Nichols, Erica Smith, and Kendra Vann.

Langston University also presents a venue that showcases students' research projects. The Department of Chemistry's LINC program was the 2009 program coordinator.

9th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, May 1, 2009

The LINC Program co-sponsored the 9th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on May 1, 2009. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. Dr. Clarence A. Hedge, Acting Dean of the School of Arts and Science, personally constructed the presentation display boards. The featured program speaker for the occasion was Steven A. Harris, a PhD candidate at the University of Oklahoma Department of Chemistry/Biochemistry, Norman, OK. Mr. Harris is also a LINC alum, as well as LU 2005, *summa cum laude*, graduate with a BS in Chemistry. He engaged symposium participants in a discussion on the *pros* and *cons* of continuing a graduate education. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school.

This year's event displayed over thirty (30) projects which were viewed by 300 participants, including the university, President Dr. JoAnn W. Haysbert, and many high ranking Industry Officials. Faculty judges chose 3 winners in both oral and poster categories. **Winners from Oral Competition:** *First Place; Karole Blythe, Chemistry. Second Place; Brittanie Atkinson, Biology. Third Place; Felicia Ekpo, Biology. Winners from Poster Competition: First Place; Marshall Bailey, Biology. Second Place; Sheree McDaniels, Biology. Third Place; Shabree Nichols, Biology.*

Each student who participated in this year's summer research internships was required to write a report about their results. Abstracts on research projects are published at various events. Two (2) of these students received "second author" publication status based upon their summer research projects.

Charles Loftis¹, Dakshinamurthy Rajalingam², Jiashou J. Xu², and Thallapuram Krishnaswamy S. Kumar^{2*} **Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate**, ¹Department of Chemistry, Langston University, Langston, OK, ²Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR, **Protein Science**.

Cheri Ognibene, S.A Lewis, Analysis of the Molecular Role of COMT in Bipolar Disorder Department of Chemistry, Langston University, Langston, OK., **Journal of Biotech Research**.

Note: Details on this year's participants, winners, publications, and venues where presentations took place are in the *Appendix section, Exhibit III. Exhibit III also includes LU winners featured on pages from*

the HBCU-Up National Research Conference website, and an official picture of First Place winner, Jamilia Harris. Research Abstracts are included as Exhibit IV.

Six LINC STEM graduates received full scholarships for Ph.D. programs. These were competitive awards wherein scholars had to pursue the positions, travelling to numerous locations for interviews with various institutions who indicated an interest in having them join their ranks.

1. Karole Blythe, chemistry - The University of Texas, Austin
2. Kendra Vann, chemistry - Vanderbilt University, Nashville
3. Felicia Ekpo, Biology – University of Arkansas-Fayetteville
4. Charles Loftis, chemistry –University of Wisconsin –Madison
5. Leethaniel Brumfield – North Carolina University – Chapel Hill
6. Brittanie Atkinson – Indiana University - Bloomington

B. Faculty Research and Publications

1. Dr. Sharon A. Lewis' research conducted at Langston University on the "Analysis of the Molecular Role of COMT in Bipolar Disorder". Results were published in the Journal of Biotech Research. Final Publication cataloging pending.
2. Dr. Sharon Lewis collaborated with Jackson State University and North Carolina Central University through the University of Michigan's National Center for Integrative Biomedical Informatics on a project titled, Genetic Predisposition to Co-Morbidity of Bipolar Disorder and Substance Abuse in African-American Women.
3. Dr. Sharon Lewis: Research project - Warm Mix Asphalt Research Chemical Characterization of Asphalt in collaboration with OU and OSU
4. For two consecutive years, Dr. Byron Quinn has been selected for research internship at University of California, Berkeley, CA. Two (2) LU students were also selected to work on research projects for summer 2009. Although not technically in the Chemistry department, Dr. Quinn's award is through a program that it directs – a NSF LINC Supplementary award.

Results from this activity yielded two papers by the students participants. The title of their papers are listed below. Dr. Bryon was able to solicit collaborative agreement with his mentor Dr. Paul Adams with the University of California, Berkely and submit a grant. The tile of the grant is also listed below.

Titles of student papers:

Amanda D. Steele¹, Nigel W. Moriarty², Enhancing the Assignment of Chemical Parameters for X-Ray Crystallography, ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory

Brittanie Atkinson¹, Nigel W. Moriarty², Enhancing Automated Ligand Fitting: Reducing required time to identify & fit a ligand from a list of many possible ligands. ¹Department of Biology, Langston University, Langston, OK, ²Physical Biosciences Division at the Lawrence Berkeley National Laboratory.

Title of grant submitted by Dr. Bryron Quinn : MRI-R2:RUI:LiT: Acquisition of Automated Structural Biology Instrumentation