Annual Report for Period: 09/2010 - 08/2011
Submitted on: 07/24/2011
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 hellp 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

Name: McCarroll, Gjasmine
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Walker, Antjuan
Worked for more than 160 Hours: Yes
Contribution to Project:
Antjuan Walker served as a counselor for summer program

Name: Watson, Detrick
Worked for more than 160 Hours: Yes
Contribution to Project:
Detrick Watson served as a tutor for summer program as well as a lab research assistant

Name: Pugh, Demetrius
Worked for more than 160 Hours: Yes
Contribution to Project:
Demetrius Pugh served as a counselor for summer program

Name: Miro, Njemile
Worked for more than 160 Hours: Yes
Contribution to Project:
Njemile Miro served as a research assistant

Name: Love, Kayla
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Cooper, Rose
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Henderson, Samuel
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Nichols, Shebre
Worked for more than 160 Hours: Yes
Contribution to Project:

Name: Johnson, Marcus
Worked for more than 160 Hours: No
Contribution to Project:
Student worked in chemistry laboratory

Name: Vann, Britani
Worked for more than 160 Hours: Yes
Contribution to Project:
Student worked in chemistry laboratory as well as worked in the chemistry office with the LINC coordinator

Name: Ross, Joceci
Worked for more than 160 Hours: Yes
Contribution to Project:
Student work in Computer Science laboratory as well as in the chemistry office.

Name: Pugh, Denzel
Worked for more than 160 Hours: Yes
Contribution to Project:
Student worked in chemistry laboratory

Name: White, Christopher
Worked for more than 160 Hours: Yes
Contribution to Project:
Student worked with the Education Coordinator

Name: Harding, James
Worked for more than 160 Hours: Yes
Contribution to Project:
Student worked in Biology laboratory

Name: McLaurin, Allen
Worked for more than 160 Hours: No
Contribution to Project:

Student worked in chemistry laboratory

Name: Richardson, LaCandace
Worked for more than 160 Hours: Yes
Contribution to Project:
Student worked in mathematics laboratory and office

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: Franks, William
Worked for more than 160 Hours: Yes
Contribution to Project:
Dr. Franks facilitates chemistry and research colloquiums.

Name: Harvey, Desmond
Worked for more than 160 Hours: Yes
Contribution to Project:
Desmond Harvey is the new Education, Technology and Data coordinator

Name: Parker, Casandar
Worked for more than 160 Hours: Yes
Contribution to Project:

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

Other Collaborators or Contacts

During this reporting period LINC had three (3) major categories of collaborations within the context of NSF defined collaborations.

There were three (3) major program areas within Langston University Collaboration; collaborations with three (3) other NSF projects through a LU connection; and collaborations that involved organizations other than the NSF.

There were 25 research sites for LU STEM summer interns.

1. Collaborations: Langston University collaborations provided three major programs that contributed to our LINC objectives. Those programs are:

a. Annual LU School of Arts and Sciences Research Day Symposium to showcase STEM scholars' research projects to the LU campus

b. High School Day Recruiting Activity, where students from all over the state visit LU's campus. LINC sponsors a display table where students meet LINC scholars. Each of the STEM disciplines also displayed recruitment booths.

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of the three areas are listed below.

Activity: 11th Annual Langston University Research Symposium, Agricultural Research & Extension Education Complex, Friday, April 29, 2011.

LU Department: School of Arts and Sciences

Purpose: Showcase for STEM students' research projects

Detail: The LINC Program co-sponsored the 11th Annual Langston University Research Day activities that were held in the Agricultural Research & Extension Education Complex on April 29, 2011. LINC program coordinator Irene B. Williams coordinated many of the activities including developing the official Program pamphlet. The featured program speaker for the occasion was Karole Blythe, a PhD candidate at University of Texas, Department of Chemistry, Austin, Texas. Ms. Blythe is also a LINC alum, as well as a LU 2008, summa cum laude, graduate with a BS in Chemistry. She engaged symposium participants in a discussion on the intricate ways of applying and succeeding in graduate school. Useful take-away information included a list of things-to-do in order to better prepare for attending graduate school. In addition, Karole gave a brief overview of her current research activities as well as information regarding the overall management of her time.

Results: Outcome: This year's event displayed over thirty (30) projects which were viewed by 300 participants. Over twenty Faculty judges participated and chose 3 winners in both oral and poster categories.

The winners are listed by name, major, title of project, location of project.

First place Oral: Phoebe Lewis, Biology, 'HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV' (John Hopkins School of Medicine).

Second Place Oral: Justina Bradley, Biology, 'IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE' (Brookhaven National laboratory, NY).

Third Place Oral: Justin Williams, Biology. ' AUTOMATED SELECTION OF PDB TEST SETS' (Lawrence Berkeley National Laboratory).

First Place Poster: Rashanda Brown, Biology, 'THE EFFECT OF CURCUMIN ON LIPOPOLYSCCHARIDE INDUCED LESIONS IN THE LIVER AND PANCREAS OF 129 SVEV MICE' (Tuskegee University).

Second Place Poster: Brittany Stoutermire, Biology, 'ANALYSIS OF FLANKING SEQUENCES AROUND ARABIDOPSIS PRE-MRNA SPLICING SITES' (Langston University).

Third Place Poster: Tristan Allen, Biology, 'THE GENOMIC SEQUENCING OF HALOTIOBACILLUS NEAPOLITANUS C2 AND THE INTERGRATION OF ANNOTATION WITH NATIONAL CENTER FOR BIOTECHNOLOGH INFORMATION SOFTWARE FORM'(Mississippi Valley State University).

Each first place winner received a $300 cash prize. Second place winners received $200, and third place received $100.

Activity: High School Day - Recruiting

LU Department: Admissions - Main Campus

Purpose: Showcase the LINC program, entice students to join LU's STEM program.

Detail: This event was held during November 3, 2011 on the LU main campus. High School participants from over 30 visiting high schools from throughout the state of Oklahoma attended the event. Departmental flyers and brochures were distributed to prospective students by all LU departments including all STEM departments. The marketing materials promoted department programs, scholarships and mentoring activities for incoming students. Science & math quizzes were 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.

STEM faculty participants: Faculty & students representatives were in attendance from all five STEM areas. There were between 25-30 LU personnel from the STEM areas on hand through-out the recruiting program.

Results: Over 150 potential incoming STEM majors signed the guest book on hand. Each likely candidate has been contacted by our STEM staff to solicit participation in our Summer Bridge program.

2. Collaborations: LU-LINC collaborations that involve other NSF programs

Through Langston University, LINC has five (5) programs (in addition to LINC) that involve the National Science Foundation. Each program made a major contribution to the success of our goals. Those programs are:

a. Faculty and Student Teams (FaST) ? research opportunities for a STEM faculty and 2 STEM students

b. STEM Double Bridge ? a 4-week summer program that introduces 13-15 incoming STEM majors to courses encountered during the first two years of college

c. Oklahoma Louis Stokes Alliance for Minority Participation(OK-LSAMP) - nurtures and assists 12 students through the undergraduate program, while creating opportunities to pursue graduate degrees in their selected STEM discipline.

Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) provides collaborative funding for two (2) programs:

d. Graduate Record Examination Preparation (GRE)

e. Supplemental Instruction (SI)

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of the three areas are listed below.

1) Program: FaST Program (Summer Program)

This report is for the Summer 2010 term, as activities are completed after the Annual Report is submitted.

Program Description: FaST is a LINC (HBCU-UP) Mini-grant for Faculty and two students to attend University of California ?Berkeley, CA during the summer term through the Department of Energy (DoE) and NSF collaborative program. [Faculty and Student Teams (FaST)]. The venue is the Lawrence Berkeley National Laboratory [LBNL]. Research work is with Dr. Paul Adams' research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project.

Purpose: Provide career and academic enhancement activities designed to assist in scholastic and vocational endeavors.

Outcomes: Participants were LU STEM faculty member Dr. Byron Quinn and 2 HBCU-UP students. Summer 2010 was the third year of the LU-FaST collaboration. Due to the previous participation in the FaST program during the past two years, two additional students applied and were accepted at the Berkeley facility, making a total of 4 student participants.

The LU-FaST team worked with the PHENIX project on creating a state of the art set of model parameters for crystallographic refinement, enhancing the automated fitting of ligands in electron density maps, development of advanced methods to model ligands on symmetry axis and the generation of validation test sets. Methods: This project employed the easy to use python programming language, hands on x-ray diffraction synchrotron data collection and data processing at the Advanced Light Source (ALS). The ALS is a division of Berkeley Lab, a national user facility that generates intense light for scientific and technological research and one of the world's brightest sources of ultraviolet and soft x-ray beams. Broader Impacts: One of the goals of the PHENIX project is to allow novice users the ability to solve macromolecular structures quickly. This goal is extremely ideal and has proven to be invaluable in bringing undergraduate students from LU into the field of structural biology research.

Researchers studying protein function will be able to benefit from the increased speed that proteins will be able to be deposited in the PDB. All (4) students at Berkeley successfully completed their research projects and presented either an oral or poster presentation of their work at atleast two different venues. Two won national awards for oral presentation of their work at the Beta Kappa Chi/National institute of Science Convention, March 23-27, 2011, Atlanta, GA. See Appendix.

2) Program: STEM Double Bridge Program (Summer Program)

This is a summer program that is a collaboration between our LINC Summer Academic Summer Bridge and Langston's Collaborative STEP program.

Purpose: The goal of the STEM Double Bridge to College program is to increase the number of students pursuing and receiving baccalaureate degrees in established or emerging fields within STEM. The program introduces incoming STEM majors to courses encountered during the first two years of college during an intensive four week enrichment experience, bridging the gap between high school and college.

This report is for the Summer 2010 session, as the current (2011) program is in progress. The 2011 program accomplishments will be included in the 2011 annual report.

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 22-July 17, 2010. Ten participants were females, three were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

Classes were conducted in our state-of-the-art Smart classroom that features Tablet PCs LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results. Pre-Calculus/Trigonometry, Chemistry, Biology, Introduction to Research & Research Presentation are the listed curricula.

Outcomes. Pre & Post Exams demonstrated outstanding achievement by the participants as a whole. However, the Chemistry group that used the CPRL process showed a 180 % improvement based on Pre & Post assessments compared to an 120% improvement last year. The Biology, & Mathematics summer programs both demonstrated above 100% improvement for the Pre & Post Exams.

All students successfully fulfilled the stated requirements and received certificates of completion and a $1500 stipend at the closing banquet in the LU Atrium. Outstanding performers and most improved performers were recognized. All students were admitted into a STEM program at LU during the Fall 2010 session. Six students were accepted as LINC scholars.

3) Program: OK-LSAMP (Oklahoma Louis Stokes Alliance for Minority Participation) and NSF. Dr. Sharon Lewis is LU campus Director.

Purpose: significantly increasing the recruitment, enrollment and retention of under-represented minority students in the STEM disciplines. The Oklahoma program nurtures and assists students through the undergraduate program, while creating opportunities to pursue graduate degrees in their selected STEM discipline. OK-LSAMP Scholars are provided with opportunities to interact with faculty and scientists, developing strong research experiences through academic year and summer internships; receive scientific integrity training; attend and present at local, state and national conferences; and prepare for transition into graduate programs, including GRE preparation.

Funds are provided for Scholars to apply to five graduate schools during their senior year of undergraduate studies. Stipends are awarded to Scholars in the amount of $500-$2000 per semester

Outcome: 12 STEM scholars received OK-LSAMP stipends. Each participated in annual Research day symposium held at Oklahoma State University.

4) Program: Graduate Record Exam (GRE) Preparation, an EPSCoR-LU-LINC collaboration. Dr. Alonzo Peterson is the LU campus coordinaator for EPSCoR.

Purpose: Provides access to GRE preparation for STEM scholars students. The LINC Program has been a proactive collaborator in providing STEM students with the opportunity to receive free GRE Course preparation since 2003. 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.

Outcomes:
Twelve students took the Graduate Record preparation course during the Spring 2010 term. Upon completion of the course their Mean Verbal Score improved by 83 points, the Mean Quantitative Score improved by 134 points, and the Combined score improved by 217 points. Year over year, the scores were higher pre and post course.

5) Program: Supplemental Instruction (SI), an EPSCoR, LU, LINC collaboration

Purpose: Provides facilitated study sessions to STEM majors that augment classroom participation. SI leaders provide facilitated study sessions for biology, chemistry, physical science, physics, algebra, trigonometry, and calculus I for STEM majors.

This report is for the Fall 2009/Spring 2010 school session, because participants' final grades must be computed and distributed before the SI impact can be assessed. That activity is still in progress.

Outcomes: The 122 students who regularly attended the 16 SI classes offered over the course of 2 semesters out performed students who did not attend, except for Trigonometry during the Fall 2010 semester.

3. Collaborations: LU-LINC collaborations that involve organizations other than the NSF.

Through Langston University, LINC has three (3) programs funded by other than the NSF that contribute to our success.

An additional non-NSF organization is We Care Worldwide, Inc., that provides Internet bandwidth resources to support our STEM Digital Village.

The following three programs are possible through a number of collaborations:

a) OK-INBRE IDeA Collaborative Grant
b) OK-INBRE Mini grant
c) K-INBRE IDeA Collaborative Grant

The collaborating entity, purpose of collaboration, a detailed description of the program, program results, and coordinating entity for each of

the three areas are listed below.

a. Program: OK-INBRE IDeA Collaborative Grant. Dr. Sharon Lewis, Coordinator.

Purpose: This is a collaborative grant with EPSCoR and other Oklahoma state universities that supports students in the STEM areas toward biomedical research. It is funded through the National Institute of Health (NIH).

Dr. Lewis coordinates this program and offers 6-10 scholarships to students each year.

b. Program: K-INBRE IDeA Collaborative Grant. Dr. K.J. Abraham, campus coordinator.

Purpose: This is a collaborative grant with EPSCoR and Kansas universities that supports students in the STEM areas toward biomedical research. It is funded through the National Institute of Health (NIH).

Dr. Abraham coordinates this program and offers 6-10 scholarships to students each year.

c. Program: OK-INBRE Mini grant support for research

Purpose: Provide research experience for STEM faculty

Outcome: STEM faculty member Dr. Sharon Lewis was awarded a mini grant to do utilize research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder. Dr. Lewis has been involved in this area of research for several years. The result of her prior work under this grant is in the process of being published in the Journal of Biotech Research.

Abstract of research: According to a genome wide association study, mutations in the ANK3 gene may be involved in the bipolar disorder, which is a chemical imbalance of neurotransmitters in the brain, thereby causing dramatic mood swings characterized by episodes of elation and high activity alternating with periods of low mood and low energy. Dr. Sharon Lewis's research focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Results: Dr. Lewis mentored 6-10 students each year in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder.

Other collaborations:

Organization: We Care Worldwide, Inc. and Positive Images Community Outreach Foundation

Purpose: Support the LINC project by providing website hosting and content-building assistance

Organizations supply high bandwith hosting for www.linconline.org, permitting LINC 24/7 access to site administration. They also provide LINC access to domain name pointing and promotion link removal for www.stemdigitalvillage.com, and assist with website content development.

Outcomes: LINC continues to have sufficient bandwidth and server access to support online presence and community building for the STEM Digital Village.

There are 25 universities throughout the U.S. that are hosting LU STEM summer interns.

Activities and Findings

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

Major research and education activities of the project

Description of activities implemented and of challenges or barriers to program implementation during the reporting period.

Goals:

LINC, Phase II project goals are twofold: 1) to further increase the number of underserved students who enter college, receive undergraduate and advanced degrees in STEM disciplines, and choose STEM careers, and 2) expand the diversity of participants in the LU STEM program.

Objectives:

LINC's objectives are to 1) increase the number of students who enroll in a STEM major by 15% by 2013; 2) increase the number of LU STEM graduates by 15%; 3) increase the number of students who enroll in STEM graduate programs by 25 %; and 4) increase the course completion rate of gatekeeper courses by 15% over the rate average of the past 3 years.

NUMBER OF SCHOLARS CURRENTLY IN LINC PROGRAM: 21

ACTIVITIES DEFINED TO REACH OBJECTIVES:

There are six (6) new activities, two (2) of which are innovative and utilize cyber technology while based on existing, tried and true teaching, learning, and communication methods.

1. CPR-L
2. STEM Digital Village
3. Summer Bridge
4. Developmental Internships and Master Tutors, Lab Assistant and Research Internships
5. Stars Tutorial Program
6. Dr. Freddie Fraiser's Mathematical videos tapes

STATUS OF EACH ACTIVITY:

1. CPRL: Purpose, objectives, and goals

Although enabled by 21st century technologies, CPR-L is simply a 'learning by teaching' method that embraces numerous learning protocols. 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. It also includes Concept Rubrics as a basis for understanding the application of a concept or equation. As a result, students become more adept at understanding nuances embedded in complex problem statements, and overall problem-solving skills are enhanced. CPR-L incorporates 6 categories of Cognitive Learning as defined in Bloom's Taxonomy. It also includes criteria for learning the 'right way' as outlined in M. S. Donovan and J. D. Bransford's book 'How students learn: Mathematics in the classroom'. As a STEM course colloquium component, CPR-L's goal is to improve the number of students' successful matriculation through gate keeping STEM courses, and demonstrate a capacity to improve test scores. Its objectives are 1) improve the grades of students who participate in the process (compared to baseline performance); 2) demonstrate improvement in students' capability to apply core course concepts to solve problems, as measured by adherence to course rubrics; 3) improve students' capability in articulating core course concepts (as measured by competency performance recordings), and 4) utilize students' experiences and demonstrated capabilities to impact the broader LU STEM community and beyond (as measured by the posting of CPR-L recordings in The Digital Village and presentations nationwide.

The program is managed by Dr. John K. Coleman, LINC Director, with the assistance of Ms. Irene Williams ? LINC Coordinator, and Mr.

Desmond Harvey ? Education, Technology, and Data coordinator.

Accomplishments:

LINC Director John Coleman worked individually with STEM Double Bridge students during the Summer 2010 session and Organic Chemistry students during the Fall 2010 session to coach them on the concept of core course concepts and their relevance in problem solving. Actions included the following:

1. Elimination of multiple choice test questions that required selecting an answer from a list, unless the student was required to provide justification for the answer selected.

2. Including word problems in all in-class problem examples, and on all exams, to break the 'plug and play' mindset because students use a guessing game and a helter-skelter substitutions of variable for pre-set problems. This breaks the cycle of only seeking answers without any idea of how they were achieved.

3. Students had to articulate the process and logic used in solving problems during in-class exercises. This repetitive exercise helped students to understand the intention of the problem as well as given and missing elements. It also simulated a 'teaching' channel, the highest level of retention.

4. Recording class lectures and making them available online so students can listen repetitively until the concept 'sticks.' This also adds the auditory learning channel.

Students who participated in this process received A and high B grades versus students not selected to participate, who received lower grades across the board.

These activities and findings are being used as a foundation for the development of rubrics for selected STEM core course concepts that is currently in progress.

The resulting rubrics will be embedded into the CPRL process, and implemented in Fall 2011. This is the final step in the full implementation of the CPRL process.

As previously indicated, development of rubrics for each significant core course concepts is key to the CPR-L process. It will support consistency in instruction and consistency in core course concept information presented as well as received.

Examples of Problems and Rubrics associated with their solution are included in the Appendix.

2. STEM Digital Village:

Purpose, objectives, and goals

The STEM Digital Village is an online community managed by the LU STEM group. It's goal is to facilitate increasing the numbers of students who enroll in STEM disciplines and retaining STEM scholars. It's objectives are: 1) reducing the administrative personnel support necessary to provide and receive all support documents critical to the program, 2) creating and tracking a repository of LU STEM graduates who are enrolled in graduate programs or are STEM professionals, thus increasing access to capable and supportive mentors, 3) supporting retention by creating a vehicle that encourages on-demand dialogue between cohorts, or between cohorts and STEM graduates, 4) impacting retention by showcasing the accomplishments of STEM scholars ? making them role models in their home communities, 5) showcasing the accomplishments of the STEM program, particularly as it regards new programs featuring scholars, and 6) serving as a flow of positive public relations to potential LU STEM scholars. This activity contributes to LU's recruiting and retention goals, assists in the overall program dissemination process, and reaches a broader sector of LU STEM scholars.

The program is managed by Dr. John K. Coleman, LINC Director, with the assistance of Ms. Irene Williams ? LINC Coordinator, and Mr. Desmond Harvey ? Education, Technology, and Data coordinator.

Accomplishments:

The STEM Digital Village program is on track. Details are online at www.stemdigitalvillage.com.

We have accomplished the following milestones:

Established warehousing resources and study aids that include scholarship opportunities; research opportunities; graduate application process info and forms; timelines for all applications; GRE Prep; interview tips; time management tools; career goals statement; and STEM course information with study resources.

Posted STEM-Tube CPR-L Castings that include video shorts of students' problem-solving exercises are available online in a format similar to that utilized on You Tube. We are finding that STEM scholars experience a surge in self-confidence as they hear their Competency Performance Recordings for Learning on this section of the Digital Village. STEM staff monitors recordings, so posted works demonstrate excellence.

Networking. STEM students are joining the online STEM community. Alumni have also begun to join, although at a slower pace. We are in the process of linking the STEM Digital Village community to Facebook, as our students are already prolific Facebook users. This will expedite the process of getting students involved.

3. STEM Summer Bridge-To-College:

Purpose, objectives, and goals

The STEM Summer Bridge is a four (4) week program with intense study and activities in Chemistry, Biology, and Calculus. Its goal is to better prepare incoming STEM freshmen for successful experiences in entry level STEM gate keeping courses. The objective is to increase the number of potential STEM majors at LU. Components that support the program are intensive classes in: chemistry and Stoichiometry operational methods; methods of research in chemistry and biology; mathematics and calculus graphing; and preparation for success. Field Trips will augment the curriculum with real world examples of the integral relationships of mathematics, science and technology, and supplement and enhance the central work of the academy on campus.

The program is managed by:
1. Bridge Director: Dr. John K. Coleman
2. Bridge Coordinator: Ms. I. B. Williams

Accomplishments:

Data shown is for the Summer 2010 session, as the current (2011) program is in progress. The 2011 program accomplishments will be included in the 2011 annual report.

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 22-July 17, 2010. Ten participants were females, three were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

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.

Classes were conducted in our state-of-the-art Smart classroom that features Tablet PCs LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results.

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

4. Developmental Internships and Master Tutors, Lab Assistant and Research Internships:

Purpose, objectives, and goals

Purpose: attract and maintain new STEM scholars through providing financial assistance, and enriching research experiences.

Objectives: grant 15 LINC awards per year and not over 40 awards at any one time over a four-year period. Engage Scholars as Master Tutors and Lab Assistants as a means of additional financial assistance.

Description: This activity is a critical factor in competing with other institutions for high-performing students. Most LINC candidates will have credentials that will qualify them for financial assistance through other programs available at the university. The LINC Developmental Internships will be offered to scholarly students who do not have the full amount of their college cost; these internships will help the student avoid the accumulation of loans or assuming excessive workloads. The goal is to grant 15 awards per year and not over 40 awards at any one time over a four-year period. Master Tutors, Lab Assistant and Research Internships are competitive opportunities for approximately 10-15 advanced students and are coordinated with the Developmental Internship.

Accomplishments: We are meeting our goal in this area. We awarded 25 scholars Developmental Internships.

5. Stars Tutorial Program

This is an on-line administrative program provides tracking data for more effectively evaluating and analyzing the effectiveness of our SI and tutorial programs.

We have not utilized the Stars Tutorial Program. However, we are in the process of entering names, expert area, and contact information for tutors in the STEM Digital Village. Students will have access to this information, including how to contact tutors directly.

6. Dr. Freddie Fraiser's Mathematical videos tapes

This is a series of videos taped lectures for remedial Algebra and Calculus. These highly acclaimed tapes will be additional resources for out STEM students.

Status:

We are in the process of ordering these tapes, and will have them in place during the 2011 Fall season. In addition, we are using other online lectures as resources for our students.

ADVISORY/STEERING COMMITTEE ACTIVITY

We held two Project Advisory Committee sessions with the Vice President of Administration, Dean of Arts and Sciences, and STEM staff.

Dates of committee meetings:

September 7 2010
May 3, 2011
?

BUDGET

We have approximately $100,000 remaining in the budget. We deliberately offset some of our costs through collaborative funding, and delayed some expenses pending completion of the CPRL laboratory, until the Fall 2011 session. Our aim is to utilize any excess after purchasing equipment to expand the number of scholars that we have in our program.

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

The two major activities included in LINC ? CPRL and STEM Digital Village ? utilize technology in the classroom. A description of each of these programs, including their goals, objectives, and planned outcomes, are included in Section II.1. of this report. The current and near-term impact of these activities are listed below.

COMPETENCY PERFORMANCE RECORDING FOR LEARNING (CPRL)

Results:

LINC Director John Coleman worked individually with STEM Double Bridge students during the Summer 2010 session and Organic Chemistry students during the Fall 2010 session to coach them on the concept of core course concepts and their relevance in problem solving. Actions included the following:

1. Elimination of multiple choice test questions that required selecting an answer from a list, unless the student was required to provide justification for the answer selected.

2. Including word problems in all in-class problem examples, and on all exams, to break the 'plug and play' mindset because students use a guessing game and a helter-skelter substitutions of variable for pre-set problems. This breaks the cycle of only seeking answers without any idea of how they were achieved.

3. Students had to articulate the process and logic used in solving problems during in-class exercises. This repetitive exercise helped students to understand the intention of the problem as well as given and missing elements. It also simulated a 'teaching' channel, the highest level of retention.

4. Recording class lectures and making them available online so students can listen repetitively until the concept 'sticks.' This also adds the auditory learning channel.

Students who participated in this process received A and high B grades versus students not selected to participate, who received lower grades across the board.

These activities and findings are being used as a foundation for the development of rubrics for selected STEM core course concepts that is currently in progress.

The resulting rubrics will be embedded into the CPRL process, and implemented in Fall 2011. This is the final step in the full implementation of the CPRL process.

As previously indicated, development of rubrics for each significant core course concepts is key to the CPR-L process. It will support consistency in instruction and consistency in core course concept information presented as well as received.

Examples of Problems and Rubrics to be followed in determining a solution are included in the Appendix.

STEM DIGITAL VILLAGE

Results:

We continuously populate our Stem Digital Village with information and tools that benefit our students.

1. The 'New' tab showcases our STEM scholars accomplishments, including awards won for research at national competitions.
2. Under the 'Study Aids' tab we added study aids for math and science courses, CPR-L rubrics, and time management and interview tips.

3. Under the 'Opportunities' tab we added links to internships, scholarships, and other funding sources.

4. Information, including photographs and videos, about our activities and events can be fund under our 'Activities' tab.

5. CPR-L and other studies related videos are under the 'Videos' tab.Posted STEM-Tube CPR-L Castings that include video shorts of students' problem-solving exercises are available online in a format similar to that utilized on You Tube. We are finding that STEM scholars experience a surge in self-confidence as they hear their Competency Performance Recordings for Learning on this section of the Digital Village. STEM staff monitors recordings, so posted works demonstrate excellence.

6. STEM students have joined the online STEM community. Alumni have also begun to join, although at a slower pace. We are in the process of linking the STEM Digital Village community to Facebook, as our students are already prolific Facebook users. This will expedite the process of getting students involved.

GRE (Graduate Record Examination) PREPARATION

One of the primary predictors of how well undergraduate students will perform in graduate school is the preparation they received in their undergraduate curricula. One of the primary measures of their potential success in graduate school is the GRE.

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

Results:

Twelve students took the Graduate Record preparation course during the Spring 2010 term. Upon completion on the course their Mean Verbal Score improved by 83 points, the Mean Quantitative Score improved by 134 points, and the Combined score improved by 217 points. Year over year, the scores were higher pre and post course.

Next Steps:

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.

SUPPLEMENTARY INSTRUCTION

(Program is in collaboration with Oklahoma EPSCoR. Data analyzed by Dr. Alonzo Peterson)

This is Langston University's sixth full academic year of the Supplemental Instruction (SI) Program. We implemented SI in the Spring of 2004.

Results:
SI sessions were held for a total of 16 STEM courses during the Fall 2010 and Spring 2011 school terms. Courses were held during both semesters for all courses except Biology II and Physics II, which were offered only during the Spring semester.

Results for the Fall 2010 and Spring 2011 sessions, by course, are as follows:

Sciences - Biology
10% of the eligible Biology I students (12 out of 126) attended Fall SI sessions and 8% (12 out of 158) attended the Spring 2011 session. 67% and 58%, respectively (Fall, Spring), of these attendees received a grade of ABC , while 32% and 35%, respectively, of non-SI students received a grade of ABC.

Sciences- Chemistry
Only 2 of the 68 eligible Chemistry students attended SI sessions during the Fall 2010 session; 100% of them received a grade of ABC. 45% of the non-SI students received a grade of ABC.

Sciences-Physics I
4 out of 25 eligible Physics I students regularly attended Fall 2010 SI classes. 50% of these attendees received a grade of ABC versus 29% of the non-SI attendees.

Mathematics-College Algebra
29 of the 149 eligible College Algebra students attended the Fall SI classes, and 9 of 149 attended Spring 2011 classes. 48% of the Fall 2010 group achieved a grade of ABC, versus 31% of the non-SI group. During the Spring 2011 semester, 67% of the SI group achieved a grade of ABC, versus 39% of the non-SI group.

Mathematics-Trigonometry
7 of the 43 eligible Trigonometry students regularly attended Fall 2010 SI classes, and 3 out of 14 eligible students attended Spring 2011 classes. The Fall 2010 class is the only instance wherein non-SI students out performed SI students; 47% of the non-SI students achieved a grade of ABC while 43% of SI students achieved a grade of ABC. However, during the Spring 2011 session, 67% of regular SI attendees achieved a grade of ABC, versus 36% of non-SI students.

Mathematics-Calculus
2 of the 19 eligible Calculus students regularly attended Fall 2010 SI classes, and 9 out of 24 eligible students attended Spring 2011 classes. 100% of those who regularly attended Fall 2010 classes received a grade of ABC, versus 53% of non-SI students. During the Spring 2011 session, 89% of those who regularly attended received a grade of ABC versus 53% of non-SI students.

THE SUMMER ACADEMIC BRIDGE-TO-COLLEGE (SABC) PROGRAM AND STEM DOUBLE BRIDGE PROGRAM

The goal of the SABC AND STEM Double Bridge is to increase the number of students pursuing and receiving baccalaureate degrees in established or emerging fields within STEM.

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.

Results:

The data for the 2010 program is not included in this report because the report must be submitted prior to the complete analysis of the summer program data..

The 2010 Summer Program followed the format of the Summer 2009 program, which was as follows:

Thirteen (13) students were selected to attend the SABC/STEM Double Bridge Program, held June 22-July 17, 2010. Ten participants were females, three were males. Four faculty provided the academic instruction and four LINC students provided peer mentoring for the participants.

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.

Classes were conducted in our state-of-the-art Smart classroom that features Tablet PCs LED monitors, screen and projectors with wireless transmission, speakers, student interactive response systems, document cameras, blue ray, blue tooth, CD/DVD capability. These tools, and the relatively small class size, enabled us to utilize the CPR-L (Competency Performance Recordings for Learning) process and monitor results.

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

MENTORING AND RECRUITING

Given the characteristics of our target population, STEM faculty spends a disproportionate amount of time as mentors. As previously stated, faculty often act as nurturers and counselors because our group comes with few positive role models. We serve to motivate, inspire, and nudge.

In addition, we hosted a number of informal outreach activities that serve to mentor the next generation of STEM scholars. The primary formal activity was High School Day during October 2010.

1. High School Day, November 3, 2010. Multipurpose building,
LU campus.

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.

FACULTY DEVELOPMENT AND EDUCATION

Activities listed here may have been reported in an earlier section. However, this section seems to require a re-statement of the information presented earlier.

Activities listed only reflect those connected with the LINC program.

Four LU STEM faculty participated in research activities, three in successful grant writing initiatives, and two in multiple presentations, as listed below.

Research

Dr. Sharon Lewis - Dr. Lewis's research in Bioinformatics and molecular biology for root causes of Bipolar Disorder focuses on genotyping ANK3 in African American and Caucasian populations in the NIMH (National Institute of Mental Health) Genetics Initiative Bipolar Disorder Consortium. The degree of nucleotide sequence similarity in the ANK3 gene between 100 African-American and Caucasian cases versus 100 African-American and Caucasian controls obtained from the NIMH Genetics Initiative Bipolar Disorder Samples is investigated. In addition, the differences between nucleotides in male and female populations will be monitored.

Funding is though a National Science Mini grant, in collaboration with LINC.

Dr. Byron Quinn , along with two STEM scholars, is working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. This project is through the Department of Energy (DoE) Faculty and Student Teams (FaST) program at the Lawrence Berkeley National Laboratory (LBNL). This will be the third year that the LU-FaST will be working with Dr. Paul Adams research group on the Python-based Hierarchical Environment for Integrated Xtallography (PHENIX) project. PHENIX is a software suite designed for automated macromolecular structure determination with minimal human intervention. Intellectual Merits: Due to the rapid pace that genomes are being solved, there has recently been a great deal of effort to increase the speed of macromolecular protein structure solution. PHENIX is designed to allow researchers to rapidly get to the final protein structure after data collection, thus having a dramatic effect on decreasing the amount of time it takes to get structures deposited in the Protein Data Bank (PDB).

Funding is through a National Science Foundation mini-grant.

Drs. John Coleman; Douglas Chan; and William Franks. Research is on Biomass and Biofuels. The project addresses the need for alternative energy resources. Specifically, the project focuses on efforts to increase the yield of biomass for fuel production as well as increase non-productive rangelands for the production of biomass. There is a growing realization that this country has to reduce its dependence on petroleum-based products. The reliance on imported sources of energy threatens our national security, economy and future competitiveness. LINC supports this initiative.

Dr. Wm Franks, August JaJa, & Dr. John K. Coleman. This project collaboration is an on-going two year activity between Langston University, The City of Edmond, Oklahoma's Department of Public Works and Utilities (EDPWU), the City of Langston's Public Works Authority (LPWA) and the LINC program. The LPWA operates both a surface water plant and a Sequential Batch Reactor wastewater plant in LU's host community. Currently routine chemical analyses are performed to ascertain that LPWA's water and wastewater plants are operating within government specifications. Turbidity, dissolved oxygen, pH, alkalinity, chlorine, and settle ability solids are some of the routine test. The LINC program helps to maximize student involvement and dissemination of findings in local and national settings by involving LU STEM scholars enrolled in CH 4612 (Introduction to Chemical Research). August JaJa, the liaison at the EDPWU, is a graduate of the LU chemistry department. Dr. W. Franks, the liaison at the LPWA is a former LU Chemistry Department Chairman and present adjunct professor. Dr. John K. Coleman, LINC PI, helps to manage the collaborative resources, with full support of the Vice President of Academic Affairs. Students are presently involved with rudimentary research efforts utilizing the Gas chromatograph and HPLC instrumentation located in the HBCU-UP Instrumentation Laboratory at LU which are not assessable at the LPWA. However, LU is presently seeking funds to up-grade instrumentation to provide additional opportunities in cutting edge non-routine testing and research. It is hopeful that our Gas Chromatograph will be upgraded with a MS/GC Purge Trap and the HPLC up-graded with a Mass Spectrophotometer in order to engage students with cutting edge research activities involving disinfection by-products associated with chlorine disinfection of potable water. Research that involves micro and nano size particles of these by-products requires such listed instrumentation as protocols to meet the standards set by the Oklahoma Department of Environmental Quality and the United States Environmental Protection Agency.

Grant Writing and Collaboration initiatives

Dr. Sharon Lewis - OK-INBRE IDeA Collaborative Grant through the NIH ($55,000)

Dr. Sharon Lewis - Louis Stokes Alliance for Minority Participation Collaborative Grant ($45,000)

Dr. Sharon Lewis - OK-INBRE Mini-Grant Procurement for Research in the area of bioinformatics and molecular biology for root causes of Bipolar Disorder ($22,000)

Dr. John K. Coleman - STEM Double Bridge Program Grant Collaboration ($72,000)

Dr. John K. Coleman with Dr. Byron Quinn - Mini-Grant Procurement: FAST Program ($22,000)

Dr. John K. Coleman ? Corporate Collaboration (website hosting and assistance)

Dr. K. J. Abraham - Mini Grant (azoreductase) with K-Inbre

Dr. A. Naidoo - Mini Grant with EPScOR

RESEARCH ACTIVITIES

Developmental and Research Internships:

During the course of the LINC project (LINC I and LINC II) thirty eight (38) students have won awards for presentations on their research projects in regional and national competition.

During this grant reporting period, there were 22 student research presentations at three different competitive venues; two of which were national settings. Eight (8) students won national awards for their research presentations. There were four (4) first place winners, three (3) second place, and one (1) third place winners.

In addition, Langston University hosted its Annual Research Day (its eleventh) on April 29, 2011.

Each student who participated in summer research internships was required to write a report about their results. Abstracts on research projects are published in the official programs of each event.

The presentation venues, participating scholars, and their research topics are included below.

The story on each event below is featured at www.stemdigitalvillage.com, at the 'News' tab.

Emerging Researchers National Conference
Washington, DC
February 24-26

Nine (9) LINC scholars and STEM majors presented their research findings at the ERN venue. Tristan Allen and Kayla Love took 1st and 2nd place awards, respectively. Other LU STEM scholars who made presentations are: Justin Williams, Justina Bradley, Rose Cooper, ShaRhonda Pickett, Yasmeen Shumate, Brittany Stoutermire, and Rashanda Brown.

Tristan Allen's research topic was 'THE GENOMIC SEQUENCING OF HALOTIOBACILLUS NEAPOLITANUS C2 AND THE INTERGRATION OF ANNOTATION WITH NATIONAL CENTER FOR BIOTECHNOLOGH INFORMATION SOFTWARE FORM'(Mississippi Valley State University).

Kayla Love's research topic was 'THE USE OF SPECIAL PEANUT HAIR, EMERGENCE, AS EXPLANT FOR SHOOT ORGANOGENESIS' (Langston University).

Langston University Advisors accompanying students: Dr. John K. Coleman, LINC Coordinator Ms. Irene Williams, and Desmond Harvey, LINC Coordinator of educational activities and data.

BKX/NIS Joint Conference in Atlanta, GA
Clark Atlanta University, at the Loews Hotel
March 23 ? 27, 2011

Twelve (12) LINC scholars and STEM majors presented their research findings at the BKX/NIS venue. Five (5) of the twelve won awards for their presentations: two (2) first place winners (Kayla Love, Yasmeen Schumate), two (2) second place winners (Justina Bradley, Phoebe Lewis), and, one (1) third place winner (Justin Williams). Other STEM students who participated: Tristan Allen, Sarah Ballard, Rashanda Brown, Rose Cooper, ShaRhonda Pickett, Brittany Stoutermire, and Quanisha Vickers.

1st Place winners:
Yasmeen Shumate, Biology major, 1st place oral. 'EFFICIENT COMPUTER PROGRAMMING FOR LIGAN FITTING IN CRYSTALLOGRAPHY' (Lawrence Berkeley National Laboratory)

Kayla Love, Chemistry major, 1st place Poster. 'THE USE OF SPECIAL PEANUT HAIR, EMERGENCE, AS EXPLANT FOR SHOOT ORGANOGENESIS" (Langston University)

2nd Place winners:
Justina Bradley, Biology major, 2nd place Oral. 'IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE' (Brookhaven National laboratory, NY).

Phoebe Lewis, Biology major, 2nd place Oral. 'HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV' (John Hopkins School of Medicine).

3rd Place winners:
Justin Williams, Biology major, 3rd place Oral. 'AUTOMATED SELECTION OF PDB TEST SETS' (Lawrence Berkeley National Laboratory).

Oklahoma EPSCoR Research Day at the Capitol
Oklahoma City, OK
March 31, 2011

Langston University's LINC scholar and STEM major Justina Bradley earned a 1st place award for her poster presentation on 'IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE' (Brookhaven National laboratory, NY). This is the second (2nd) Oklahoma EPSCoR Research Day at the Capitol award for a Langston LINC scholar.

11th Annual Langston University Research Symposium
Agricultural Research & Extension Education Complex
Friday, April 29, 2011

This year's event displayed over thirty (30) projects which were viewed by 300 participants. Over twenty Faculty judges participated and chose 3 winners in both oral and poster categories.

Winners: Oral Presentations

Phoebe Lewis
Jusitna Bradley
Justin Williams

Winners: Poster Presentations

Rashawna Brown
Britany Stoutermire
Tristan Allan

The featured program speaker for the occasion was Carol Blythe, a PhD candidate at the University of Texas, Department of Chemistry, Austin, TX. Ms. Blythe is also a LINC alum, as well as LU 2009, summa cum laude, graduate with a BS in Chemistry

All winners and their research topics are included in the Appendix section.

Findings:
MAJOR FINDINGS

The CPRL process has a major impact on student learning, comprehension, and retention. It will require a comprehensive list of core course concepts in order to minimize time required for implementation.

Development of specific rubrics for selected concepts is having a significant impact on students' ability to problem solve.

It is taking time to develop rubrics for all course concepts will be required to effectively address the deficiencies of our target participants. However, their development is key to the CPR-L process and improved problems solving skills. It will support consistency in instruction and consistency in core course concept information presented as well as received.

Posting students' educational projects and accomplishments on monitors continues to provide a great impact on their willingness to participate and learn.

Training and Development:
STUDENT DEVELOPMENTAL RESEARCH PROJECTS

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FACULTY DEVELOPMENT

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Dr. John K. Coleman ? Corporate Collaboration (website hosting and assistance)

Outreach Activities:
OUTREACH AND RECRUITING ACTIVITIES

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High School Day, November 3, 2010. Multipurpose building, LU campus.

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.

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:

The principal discipline(s) of the project

The CPR-L (Competency Performance Recordings for Learning) Process is poised to make a tremendous contribution to the pedagogical techniques in education. It is aimed at at 'resuscitating' students' learning of the analytical process of problem solving, thus enhancing their problem solving skills as well as their understanding of core course concepts. It utilizes modern technologies to reinforce tried and proven learning processes and is simply a 'learning by teaching' method that embraces numerous learning protocols. 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.

The primary uniqueness of the CPR-L process is that it includes Concept Rubrics as a basis for understanding the application of a concept, and repetition over multiple learning channels so that learning is retained. Concept Rubrics take the students through a logical process of evaluating problem elements, and foster thorough research. Combined 21st century technologies (smartboard, wireless projector, and tablet pc) allow the well established learning techniques to be more versatile, dynamic and administered to a larger population; they also work to preserve adherence to the integrity of the overall process.

At the end of this program we will have established Concept Rubrics for STEM courses that can be applied at high school and college levels of teaching. The CPRL process will be sufficiently defined so that it can be replicated beyond Langston University.

During this project we institutionalized a process that focuses LINC scholars on obtaining relevant research experiences, augmented by enhancing their presentation capabilities as well as their capacity for defending their work. Nurturing and confidence-building are included in our process. Our scholars' performance attests to the efficacy of the process. During the course of the STEM program well over 200 STEM scholars presented their research findings and at numerous venues, including national settings. Thirty eight (38) students have won national awards defending their projects before a national panel of faculty judges. Performance is on a very positive trajectory: During the 4 year period of 2004-2008 there were 18 winners, an average of 4.5 per year (compared to 2 for the 4 year period 1999-2003).

Contributions to Other Disciplines:

Contributions to Human Resource Development:

Contributions to Resources for Research and Education:

A state-of-the-art Smart classroom, including a computer laboratory featuring Tablet PCs has been created as 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. These elements provide the basis 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.

The online portal, STEM Digital Village, showcases output from CPR-L exercises, warehouses a host of study aids and other information relevant to STEM students, and serves as a community forum.

The STEM Instructional Laboratory, managed by Drs. Douglas Chan and Tesfai Kesette, is now embedded at Langston. It became operational during the summer 2004 session. Equipment includes: ICP Optical Emission Spectrometer, FT-IR Infrared Spectrometer, UV/VIS Spectrometer, Gas Chromatograph with Mass Spectrometer, High Performance Liquid Chromatograph (HPPLC), Auto Refractometer, and Auto Polarimeter.

This STEM Instructional Laboratory was the base for introducing students to state-of-the-art laboratory equipment, and enhanced tutoring and mentoring efforts. It also enhanced student interaction and laboratory skills development.

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 Other Disciplines
Contributions: To Any Human Resource Development
Contributions: To Any Beyond Science and Engineering
Any Conference

2011

LINC ANNUAL REPORT

APPENDIX

Appendix Index

LINC 2011 Annual Report

CPR-L – Using Technology to Enhance Understanding of Core Course Concepts and Problem Solving Skills

The CPR-L Process combines best practices for learning into its process.

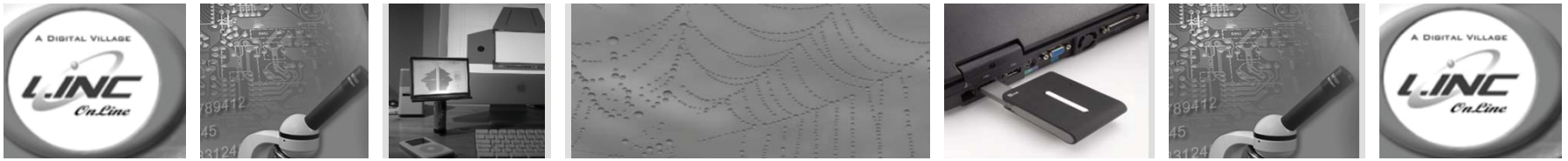
- The CPR-L for Problem solving uses a typical three step process – the three A's:

  Articulate, Assess, Ascertain

- The CPR- L utilizes a designated rubric combined with technology to maintain process consistency.

- A 12 step rubric guides the student through the steps required for following the problem solving protocol.

- The tablet PC serves to maintain the protocols, present a teaching platform for students, as well as to preserve the integrity of the process.



CPR-L

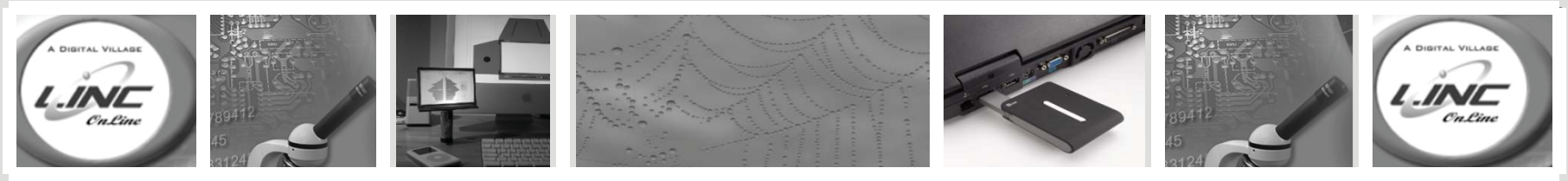
The Process

Word problems that encompass core course concepts assigned to students as homework

Rubrics for problem solving guide students' approach to solving problem

Students work through problem until solution can be presented succinctly in under 3 minutes

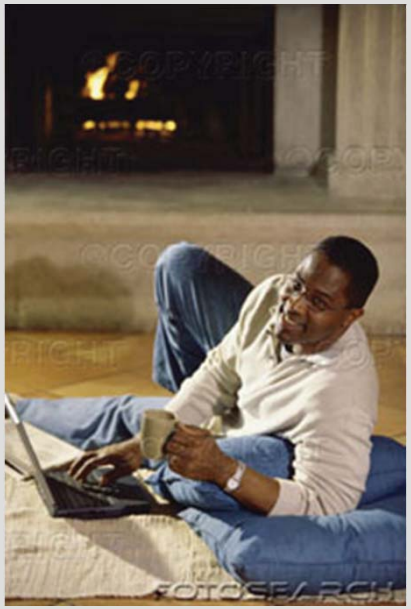
Students use tablet PC with audio/video recording software to record final solution



CPR-L

The Process

In a quiet environment, student begins Step I: articulating the problem. This is the process of sketching it out, talking it out, putting ideas and concepts down on paper.



Step II follows. Student must research applicable concepts, equations, laws, that govern what the problem is asking for. There can be some doodling while clarifying how the solution might be derived, so paper and pencil are recommended for this phase.

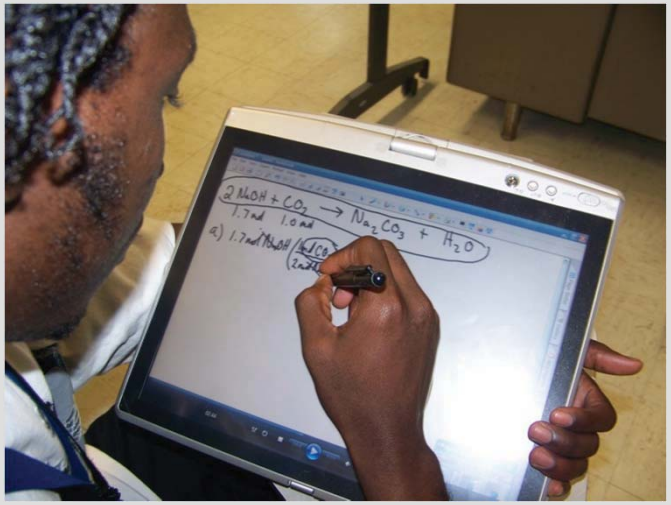
CPR-L

The Process

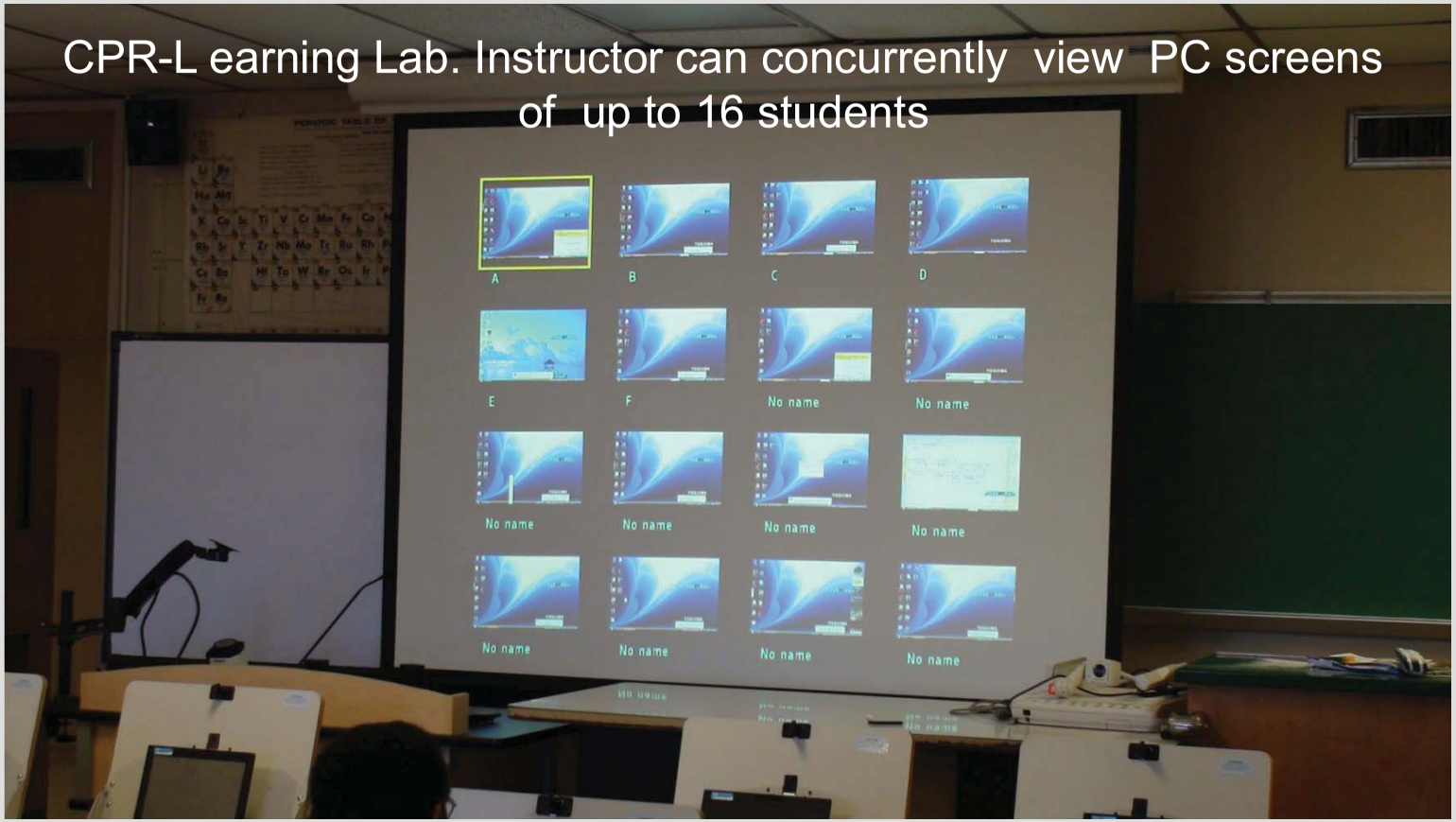
In Step III, Ascertaining solution, all desired parameters from the problem set data are obtained, compatibility of units and dimensions are ensured, and the solution derived.

This may require solving all mathematical or chemical equations or, assessing and correlating data to derive a conclusion.

Student is now ready to record conclusions of each of the 3 steps onto a tablet PC



Technology Permits migration of Students' Solutions from the classroom to the Digital Village

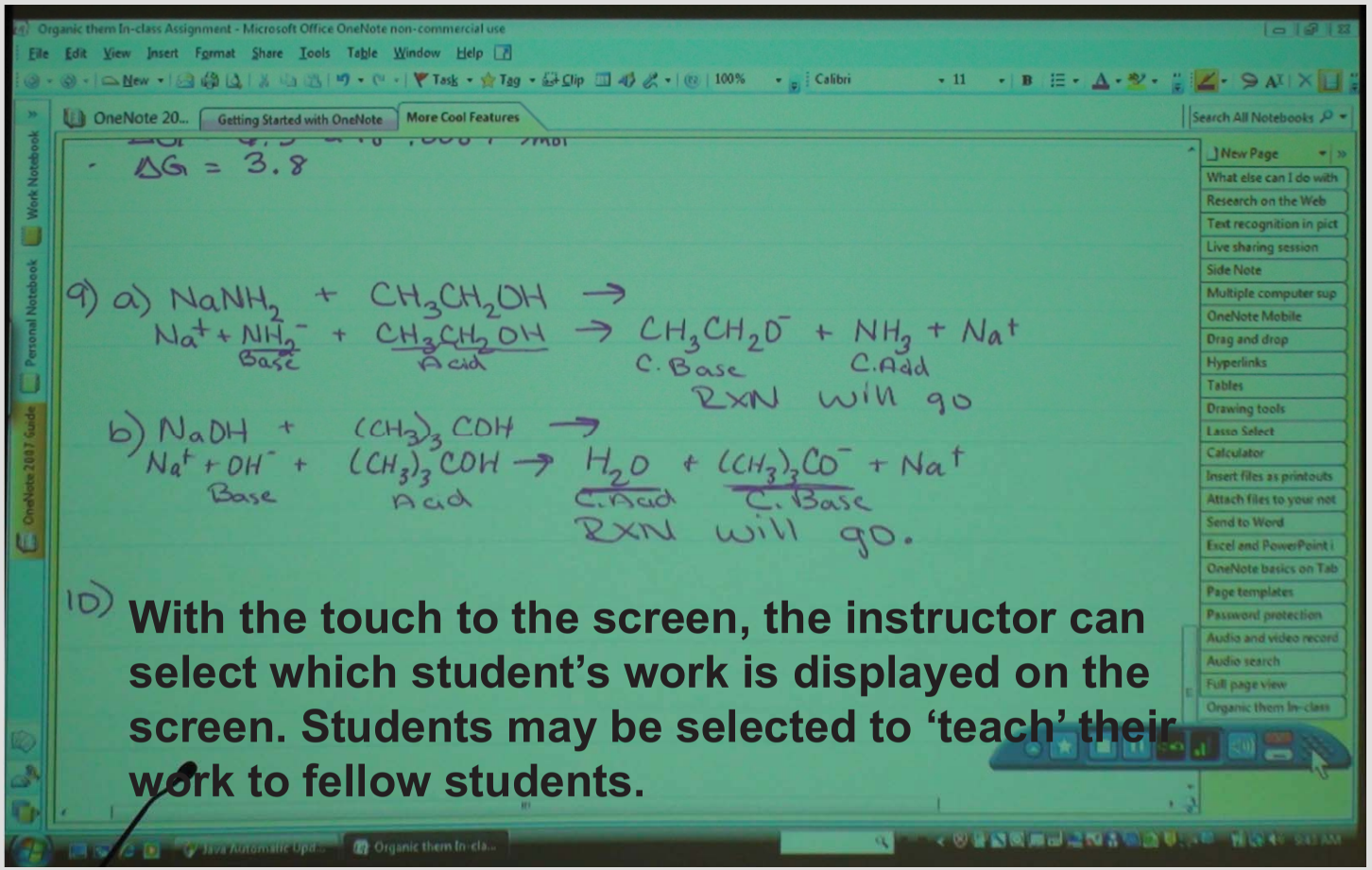


CPR-L earning Lab. Instructor can concurrently view PC screens of up to 16 students

Technology Permits migration of Students' Solutions from the classroom to the Digital Village

Technology-enabled CPR-L Learning Lab

Technology Permits migration of Students' Solutions from the classroom to the Digital Village



Competency Performance Recording for Learning (CPRL)

2011 Status Report

LINC Director John Coleman worked individually with STEM Double Bridge students during the Summer 2010 session and Organic Chemistry students during the Fall 2010 session to coach them on the concept of core course concepts and their relevance in problem solving.
Actions included the following:

1. Elimination of multiple choice test questions that required selecting an answer from a list, unless the student was required to provide justification for the answer selected.
2. Including word problems in all in-class problem examples, and on all exams, to break the "plug and play" mindset because students use a guessing game and a helter-skelter substitutions of variable for pre-set problems. This breaks the cycle of only seeking answers without any idea of how they were achieved.
3. Students had to articulate the process and logic used in solving problems during in-class exercises. This repetitive exercise helped students to understand the intention of the problem as well as given and missing elements. It also simulated a "teaching" channel, the highest level of retention.
4. Recording class lectures and making them available online so students can listen repetitively until the concept "sticks." This also adds the auditory learning channel.

Students who participated in this process received A and high B grades versus students not selected to participate, who received lower grades across the board.

These activities and findings are being used as a foundation for the development of rubrics for selected STEM core course concepts that is currently in progress.

The resulting rubrics will be embedded into the CPRL process, and implemented in Fall 2011. This is the final step in the full implementation of the CPRL process.

The following five (5) pages contain examples of problems that require knowledge of core course concepts , and rubrics that must be applied to successfully solve the problems.

Problem I

Isotope

From the isotope symbol,_____explain how to determine the element, number of protons, neutrons, and electrons and give a thorough explanation of the mass number.

A.	$^{15}_{7}X^{-3}$
B.	$^{15}_{7}X^{-2}$
C.	$^{15}_{7}X^{-1}$
D.	$^{16}_{8}X^{-3}$
E.	$^{16}_{8}X^{-2}$
F.	$^{16}_{8}X^{-1}$
G.	$^{20}_{10}X^{-3}$
H.	$^{20}_{10}X^{-2}$
I.	$^{20}_{10}X^{-1}$
J.	$^{24}_{14}X^{-2}$
K.	$^{28}_{14}X^{-2}$
L.	$^{28}_{14}X^{-1}$
M.	$^{34}_{17}X^{-3}$

Rubric Example

From the isotopic symbol, explain how to determine the element, the number of protons, neutrons, and electrons and give a thorough explanation of the mass number.

Chemical Symbols and Isotope Introduction

Target (5 points)	Acceptable (4 points)	Marginal (3 points)	Unacceptable (0 points)	Total
Thoroughly defines an isotope	Acceptably defines an isotope	Marginally defines an isotope	Unacceptably defines an isotope	
Articulates thorough understanding of the identification of an element from the chemical symbol	Articulates acceptable understanding of the identification of an element from the chemical symbol	Articulates marginal understanding of the identification of an element from the chemical symbol	Articulates unacceptable understanding of the identification of an element from the chemical symbol	
Thoroughly explains how to determine the number of protons	Acceptably explains how to determine the number of protons	Marginally explains how to determine the number of protons	Unacceptably explains how to determine the number of protons	
Thoroughly explains how to determine the number of neutrons	Acceptably explains how to determine the number of neutrons	Marginally explains how to determine the number of neutrons	Unacceptably explains how to determine the number of neutrons	
Thoroughly explains how to determine the number of electrons	Acceptably explains how to determine the number of electrons	Marginally explains how to determine the number of electrons	Unacceptably explains how to determine the number of electrons	
Articulates thorough understanding of the mass number and how it is derived	Articulates acceptable understanding of the mass number and how it is derived	Articulates marginal understanding of the mass number and how it is derived	Articulates unacceptable understanding of the mass number and how it is derived	

30-27 = A 26-23 = B 22-20 = C Below 20 = Unacceptable

Problem II

FORMULAS

From the compound formula,_____give mathematical equivalencies for the relationships for ALL mol-to-mol, mol-to-molecule, molecule-to-atom and atom-to-atom relationships that are represented by the compound formula. Molar mass, Advogadro's Number & all mass relationships that are also represented by the formula must be thoroughly explained.

A.	$C_4H_8O_2$
B.	$C_4H_7O_3$
C.	$C_3H_8O_3$
D.	$C_4H_8S_3$
E.	$C_3H_8S_2$
A.	$C_4H_8O_2$
B.	$C_4H_7O_3$
C.	$C_3H_8O_3$
D.	$C_4H_8S_3$
E.	$C_3H_8S_2$
F.	$C_4H_7S_2$
G.	$C_5H_8O_2$
H.	$C_5H_6O_2$
I.	$C_5H_7O_2$
J.	$C_6H_8O_2$
K.	$C_6H_8O_6$
L.	$C_4H_6S_6$
M.	$C_6H_6O_2$

Rubric Example

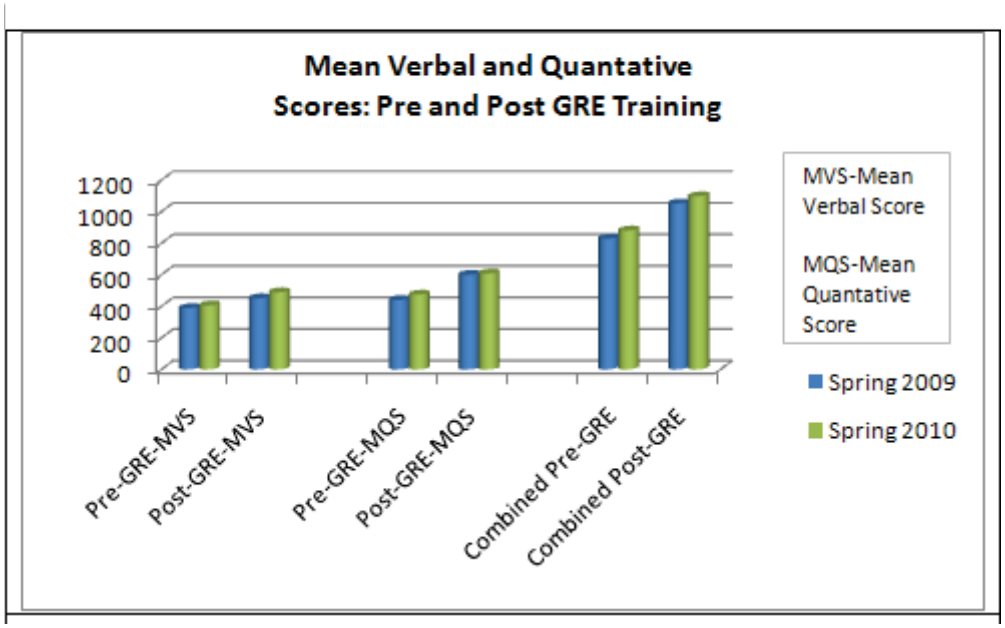
Atoms, Substance and Avogadro's number

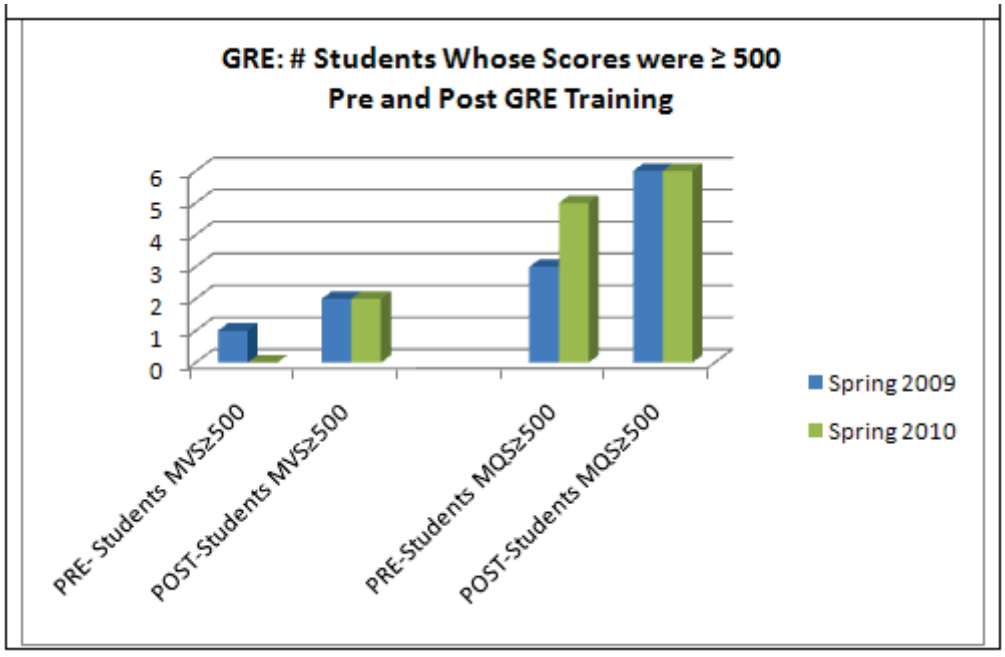
Target (5 points)	Acceptable (4 points)	Marginal (3 points)	Unacceptable (0 points)	Total
Gives a mathematical equivalency for one mol of the compound formula to the mass of the compound formula in grams. Clearly defines molar mass and formula weight for the compound.	Gives an acceptable mathematical equivalency for one mol of the compound to the mass of the compound formula in grams. Clearly defines molar mass and formula weight for the compound.	Gives a marginal mathematical equivalency for one mol of the compound to the mass of the compound formula in grams. Clearly defines molar mass and formula weight for the compound.	Gives an unacceptable mathematical equivalency for one mol of the compound to the mass of the compound formula in grams. Clearly defines molar mass and formula weight for the compound.	
Gives mathematical equivalencies for the mol-to-mol relationships for one mol of the compound formula to each of the elements in the compound.	Gives acceptable mathematical equivalencies for the mol-to-mol relationships for one mol of the compound formula to each of the elements in the compound.	Gives marginal mathematical equivalencies for the mol-to-mol relationships for one mol of the compound formula to each of the elements in the compound.	Gives unacceptable mathematical equivalencies for the mol-to-mol relationships for one mol of the compound formula to each of the elements in the compound.	
Gives mathematical equivalencies for the mol-to-mol relationships for each of the elements in the compound formula to each other.	Gives acceptable mathematical equivalencies for the mol-to-mol relationships for each of the elements in the compound formula to each other.	Gives marginal mathematical equivalencies for the mol-to-mol relationships for each of the elements in the compound formula to each other.	Gives unacceptable mathematical equivalencies for the mol-to-mol relationships for each of the elements in the compound formula to each other.	
Clearly distinguishes a mol of the compound formula from a molecule of the compound formula.	Acceptably distinguishes a mol of the compound formula from a molecule of the compound formula	Marginally distinguishes a mol of the compound formula from a molecule of the compound formula	Clearly distinguishes a mol of the compound formula from a molecule of the compound formula	
Gives a mathematical equivalency for one mol of the compound formula to the number of molecules in the compound. Clearly explains the relationship between Avogadro's number and a mol if the compound.	Gives an acceptable mathematical equivalency for one mol of the compound to the number of molecules in the compound. Clearly explains the relationship between Avogadro's number and a mol if the compound.	Gives a marginal mathematical equivalency for one mol of the compound to the number of molecules in the compound. Clearly explains the relationship between Avogadro's number and a mol if the compound.	Gives an unacceptable mathematical equivalency for one mol of the compound to the number of molecules in the compound. Clearly explains the relationship between Avogadro's number and a mol if the compound.	

Gives a mathematical equivalency for the mass of one molecule of the compound formulas in amu's.	Gives an acceptable mathematical equivalency for the mass of one molecule of the compound formulas in amu's.	Gives a marginal mathematical equivalency for the mass of one molecule of the compound formulas in amu's.	Gives an unacceptable mathematical equivalency for the mass of one molecule of the compound formulas in amu's.	
Gives mathematical equivalencies for one molecule of the compound formula to the number of atoms for each of the elements contained in the compound.	Gives acceptable mathematical equivalencies for one molecule of the compound formula to the number of atoms for each of the elements contained in the compound.	Gives marginal mathematical equivalencies for one molecule of the compound formula to the number of atoms for each of the elements contained in the compound.	Gives unacceptable mathematical equivalencies for one molecule of the compound formula to e number of atoms for each of the elements contained in the compound.	
Gives mathematical equivalencies for the atom-to-atom relationships for each of the elements in the molecule of the compound to each other.	Gives acceptable mathematical equivalencies for the atom-to-atom relationships for each of the elements in the molecule of the compound to each other.	Gives marginal mathematical equivalencies for the atom-to-atom relationships for each of the elements in the molecule of the compound to each other.	Gives unacceptable mathematical equivalencies for the atom-to-atom relationships for each of the elements in the molecule of the compound to each other.	
Gives mathematical equivalencies for one molecule of the compound to the mass of each of the elements contained in the molecule in amu's.	Gives acceptable mathematical equivalencies for one molecule of the compound to the mass of each of the elements contained in the molecule in amu's.	Gives marginal mathematical equivalencies for one molecule of the compound to the mass of each of the elements contained in the molecule in amu's.	Gives unacceptable mathematical equivalencies for one molecule of the compound to the mass of each of the elements contained in the molecule in amu's.	
Gives mathematical equivalencies for the atom-to-atom mass relationships for each of the elements in the molecule of the compound to each other, in amu units.	Gives acceptable mathematical equivalencies for the atom-to-atom mass relationships for each of the elements in the molecule of the compound to each other in amu units.	Gives marginal mathematical equivalencies for the atom-to-atom mass relationships for each of the elements in the molecule of the compound to each other in amu units.	Gives unacceptable mathematical equivalencies for the atom-to-atom mass relationships for each of the elements in the molecule of the compound to each other in amu units.	

GR E Mean Scores: 2009-2010

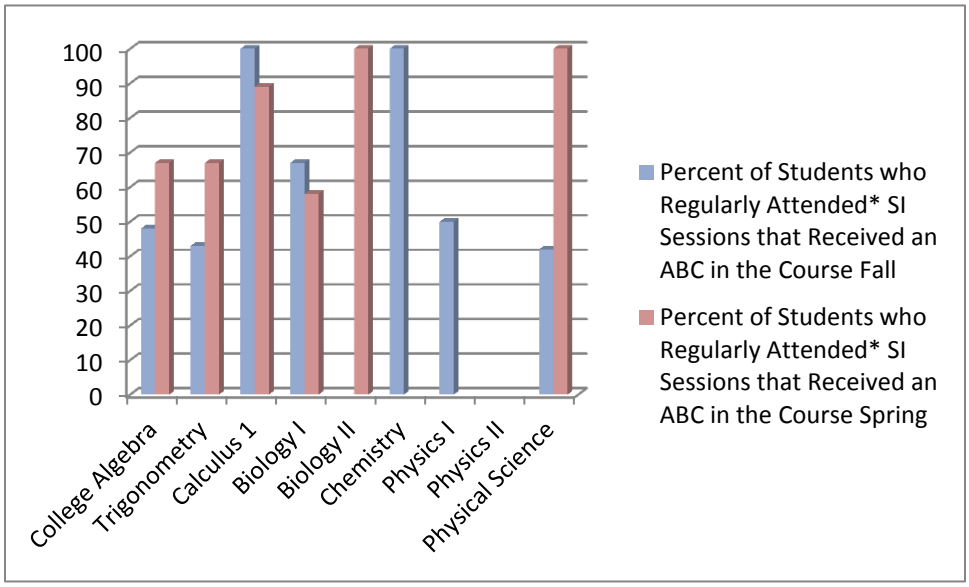
Graduate Record Examination Preparation



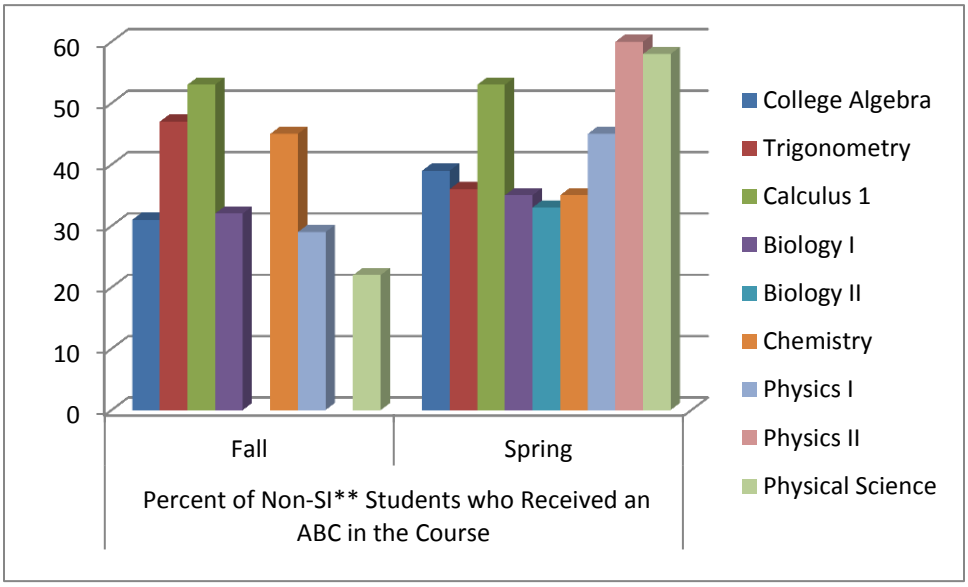


Impact of SI on STEM Grades: Fall 2010 & Spring 2011

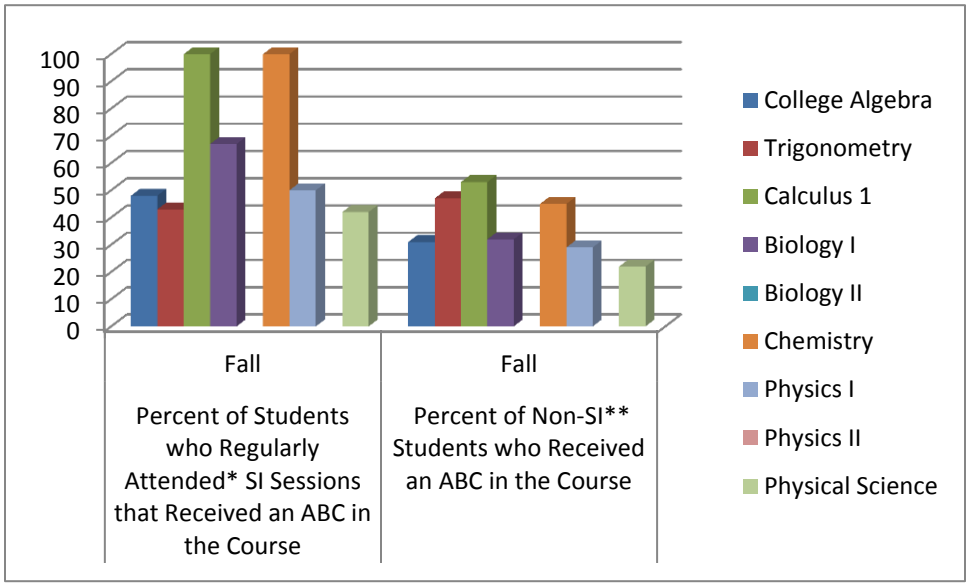
Per cent SI Students who receive grade of ABC



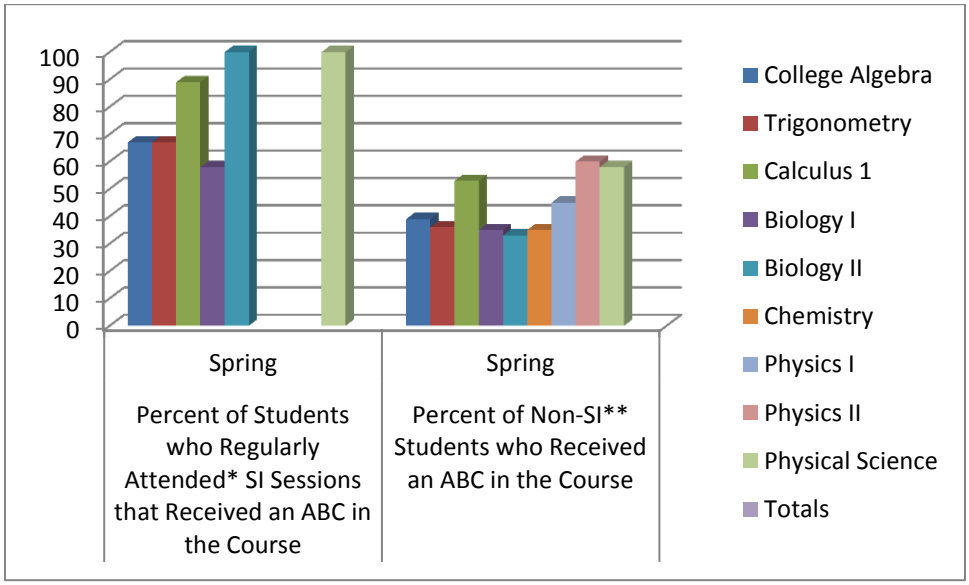
Per cent Non-SI Students who receive grade of ABC



Comparison: Per cent SI students who receive grade of ABC vs. per cent non-SI students who receive grade of ABC Fall 2010



Comparison: Per cent SI students who receive grade of ABC vs. per cent non-SI students who receive grade of ABC Spring 2011



2011 LINC Award Winners
For
Research Presentations

BKX/NIS Joint Conference in Atlanta, GA
Clark Atlanta University, at the Loews Hotel
March 23 – 27, 2011

NAME	MAJOR	PLACE	RESEARCH TITLE
ORAL Presentations:			
Yasmeen Shumate	Biology	**1st**	"**EFFICIENT COMPUTER PROGRAMMING FOR LIGAN FITTING IN CRYSTALLOGRAPHY**" **(Lawrence Berkeley National Laboratory)**
Justina Bradley	Biology	**2nd**	"**IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE**" **(Brookhaven National laboratory, NY)**
Phoebe Lewis	Biology	**2nd**	"HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV" **(John Hopkins School of Medicine)**
Justin Williams	Biology	**3rd**	"**AUTOMATED SELECTION OF PDB TEST SETS**" **(Lawrence Berkeley National Laboratory)**
POSTER Presentation			
Kayla Love	Chemistry	**1st**	"**THE USE OF SPECIAL PEANUT HAIR, EMERGENCE, AS EXPLANT FOR SHOOT ORGANOGENESIS**" **(Langston University)**

Other LINC Scholar Presenters

NAME	MAJOR	RESEARCH TITLE
ORAL Presentations		
Rose Cooper	Chemistry	"**INVESTIGATING THE ROLE OF COMMON VARIANTS IN KCNQ1 FOR AFFECTING FASTING GLUCOSE LEVELS AND PREDICTING FUTURE TYPE 2 DIABETES**" **(University of Oklahoma Health Science Center)**
ShaRhonda Pickett	Biology	"**IMPROVED MODELING OF LIGANDS ON A SYMMETRY AXIS**" **(Lawrence Berkeley National Laboratory)**
POSTER Presentations		
Sarah Ballard	Ag. Science	"VISUAL COMMUNICATION SIGNALS OF NORTHERN CRICKET FROGS (ACRIS CREPITANS)" **(Kansas State University Manhattan, Kansas)**
Quanisha Vickers	Biology	"ALTERNATIVE OPEN READING FRAMES FOR GENES OF HALOTHIOBACILLUS NEAPOLITANUS C2" **(Mississippi Valley State University)**
Brittany Stoutermire	Biology	"**ANALYSIS OF FLANKING SEQUENCES AROUND ARABIDOPSIS PRE-**

		MRNA SPLICING SITES" (Langston University)
Tristan Allen	Biology	**"THE GENOMIC SEQUENCING OF HALOTIOBACILLUS NEAPOLITANUS C2 AND THE INTERGRATION OF ANNOTATION WITH NATIONAL CENTER FOR BIOTECHNOLOGH INFORMATION SOFTWARE FORM"(Mississippi Valley State University)**
Rashanda Brown	Biology	**"THE EFFECT OF CURCUMIN ON LIPOPOLYSCCHARIDE INDUCED LESIONS IN THE LIVER AND PANCREAS OF 129 SVEV MICE" (Tuskegee University)**

Emerging Researchers National Conference
Washington, DC
February 24-26, 2011

NAME	MAJOR	PLACE	RESEARCH TITLE
Tristan Allen (Poster presentation)	Biology	1st	"THE GENOMIC SEQUENCING OF HALOTIOBACILLUS NEAPOLITANUS C2 AND THE INTERGRATION OF ANNOTATION WITH NATIONAL CENTER FOR BIOTECHNOLOGH INFORMATION SOFTWARE FORM"(Mississippi Valley State University)
Kayla Love (Poster presentation)	Chemistry	2nd	"THE USE OF SPECIAL PEANUT HAIR, EMERGENCE, AS EXPLANT FOR SHOOT ORGANOGENESIS" (Langston University)

Other presenters and their research topics:

NAME	MAJOR	RESEARCH TITLE
ORAL presentations		
Justin Williams	Biology	"AUTOMATED SELECTION OF PDB TEST SETS" (Lawrence Berkeley National Laboratory)
Justina Bradley	Biology	"IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE" (Brookhaven National laboratory, NY)
Rose Cooper	Chemistry	"INVESTIGATING THE ROLE OF COMMON VARIANTS IN KCNQ1 FOR AFFECTING FASTING GLUCOSE LEVELS AND PREDICTING FUTURE TYPE 2 DIABETES" (University of Oklahoma Health Science Center)
ShaRhonda Pickett	Biology	"IMPROVED MODELING OF LIGANDS ON A SYMMETRY AXIS" (Lawrence Berkeley National Laboratory)
Yasmeen Shumate	Biology	"EFFICIENT COMPUTER PROGRAMMING FOR LIGAN FITTING IN CRYSTALLOGRAPHY" (Lawrence Berkeley National Laboratory)
POSTER presentations		
Brittany Stoutermire	Biology	"ANALYSIS OF FLANKING SEQUENCES AROUND ARABIDOPSIS PRE-MRNA SPLICING SITES" (Langston University)
Rashanda Brown	Biology	"THE EFFECT OF CURCUMIN ON LIPOPOLYSCCHARIDE INDUCED LESIONS IN THE LIVER AND PANCREAS OF 129 SVEV MICE" (Tuskegee University)

Oklahoma EPSCoR Research Day at the Capitol
Oklahoma City, OK
March 31, 2011

1st Place Award

Justina Bradley (Poster Presentation)	Biology	"**IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE**" **(Brookhaven National laboratory, NY)**

11th Annual Langston University Research Symposium
Agricultural Research & Extension Education Complex
Friday, April 29, 2011

Winners:

NAME	MAJOR	PLACE	RESEARCH TITLE
Oral Presentations			
Phoebe Lewis	Biology	**1st**	"HEPATIC IMMUNE ACTIVATION IN THE SIV/MACAQUE MODEL OF HIV" **(John Hopkins School of Medicine)**
Justina Bradley	Biology	2nd	"**IONIC LIQUID INHIBITION OF ENZYMATIC HYDROLYSIS IN MIRCROCELLULOSE**" **(Brookhaven National laboratory, NY)**
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Poster Presentations			
Rashanda Brown	Biology	1st	"**THE EFFECT OF CURCUMIN ON LIPOPOLYSCCHARIDE INDUCED LESIONS IN THE LIVER AND PANCREAS OF 129 SVEV MICE**" **(Tuskegee University)**
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Tristan Allen	Biology	3rd	"**THE GENOMIC SEQUENCING OF HALOTIOBACILLUS NEAPOLITANUS C2 AND THE INTERGRATION OF ANNOTATION WITH NATIONAL CENTER FOR BIOTECHNOLOGH INFORMATION SOFTWARE FORM**"**(Mississippi Valley State University)**

Speaker – 2011 Annual Research Day at LU
LINC Alumnus; PhD Student

Speaker Biography

Ms. Karole L. Blythe,
Graduate Student
Department of Chemistry and Biochemistry
University of Texas at Austin

Ms. Karole Blythe is originally from Sacramento, CA. She graduated from Langston University in 2009, receiving a B.S. in chemistry with scholastic honors, Suma Cum Laude. During her undergraduate chemistry career she completed several research internships at University of North Texas Health Science Center, University of Arkansas, and the Lawrence Berkeley National Laboratory. She was a Langston's Integrated Network College (LINC) for Science, Technology, Engineering and, Mathematics (STEM) Scholarship recipient and a Edwin P. McCabe II Program Scholar. In 2009 she was nominates as Who's Who, Among Students in American Universities and Colleges. This annual directory includes the names of students based on their academic achievement, service to the community, leadership in extracurricular activities, and potential for continued success.

She is now pursuing a Ph.D. in Analytical Chemistry at the University of Texas at Austin as a member of Katherine Willets' research group. Her research focuses on using Surface Enhanced Raman Spectroscopy (SERS) and utilizing high resolution fluorescence microscopy, specifically Stochastic Optical Reconstruction Microscopy (STORM). Karole is the recipient of the UT Austin's Graduate School Diversity Recruitment Fellowship, the Integrative Graduate Education, and Research Traineeship NSF Fellowship. After receiving her Ph.D. she would like to continue conducting research in an industry setting.

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

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

Outstanding performers during the program were: Chemistry: *Keiauna Clemoens* **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.

<u>First Place</u>
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)

<u>Second Place</u>

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 Loftis[1], Dakshinamurthy Rajalingam[2], Jiashou J. Xu[2], and Thallapuranam Krishnaswamy S. Kumar[2]* ***Trichloroacetic acid-induced protein precipitation involves the reversible association of a stable partially structured intermediate ,*** [1]Department of Chemistry, Langston University, Langston, OK , [2]Department 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 p*ages 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. Steele[1], Nigel W. Moriarty[2], Enhancing the Assignment of Chemical Parameters for X-Ray Crystallography, [1]Department of Biology, Langston University, Langston, OK, [2]Physical Biosciences Division at the Lawrence Berkeley National Laboratory

Brittanie Atkinson[1], Nigel W. Moriarty[2], Enhancing Automated Ligand Fitting: Reducing required time to identify & fit a ligand from a list of many possible ligands, [1]Department of Biology, Langston University, Langston, OK, [2]Physical 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