

**Annual Report for Period:**07/2004 - 07/2005**Submitted on:** 06/01/2005**Principal Investigator:** Manning, Jean .**Award ID:** 0310321**Organization:** Langston University**Title:**  
Langston's Integrated Network College for Science, Technology, Engineering and Mathematics**Project Participants****Senior Personnel****Name:** Manning, Jean**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Coleman, John**Worked for more than 160 Hours:** Yes**Contribution to Project:****Name:** Goodman, Nathaniel**Worked for more than 160 Hours:** No**Contribution to Project:**

Nathaniel Goodman is not a CoPrincipal Investigator in this project. He is Director of Sponsored Programs.

**Name:** Barker, Shawn**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Shawn Barker is the coordinator for the LINC Program.

**Post-doc****Graduate Student****Undergraduate Student****Name:** Howard, Christianna**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Ms. Howard worked as an office and lab assistant @ \$7.00 per hour

**Name:** Martin, Tristan**Worked for more than 160 Hours:** Yes**Contribution to Project:**

T. Martin worked as a lab assistant.

**Name:** Anderson, Quincy**Worked for more than 160 Hours:** Yes**Contribution to Project:**

SI Leader \$1500 per semester

**Name:** Doss, Argenia**Worked for more than 160 Hours:** Yes**Contribution to Project:**

SI leader @ \$1500/ semester

**Name:** Harris, Steven

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 SI leader @ \$1500/semester  
**Name:** Stevenson, Steven

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 Office assistant \$7.00 per hour  
**Name:** Carroll, Deidre

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 SI leader @ \$7.00 per hour  
**Name:** Patterson, James

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 SI leader - paid from other source  
**Name:** Burdex, Ashley

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 SI leader - paid through other source  
**Name:** Evans, Marchonda

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 SI leader - paid through other source  
**Name:** Booker, Sheree

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 S. Booker worked as a office and lab assistant.  
**Name:** Wilson, Jeremiah

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 J. Wilson worked as a math tutor.  
**Name:** Green, Ebby

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 E. Green worked as a math tutor.  
**Name:** Finley, Christopher

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 C. Finley worked as a lab assistant.  
**Name:** Greene, Cedric

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**  
 C. Greene worked as a lab assistant.  
**Name:** Harrison, Jamie

**Worked for more than 160 Hours:** Yes  
**Contribution to Project:**

J. Harrison work as a lab assistant.

**Name:** Blythe, Derek

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

D. Blythe worked as a tutor.

**Name:** Culver, Ralph

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

R. Culver worked as tutor.

**Name:** Sykes, Alexander

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

A. Sykes worked as tutor.

**Name:** Williams, Nathan

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

N. Williams worked as tutor.

**Name:** Gebrehiwote, Makda

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

M. Gebrehiwote worked at tutor.

**Name:** Daniels, Antawan

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

A. Daniels worked as a lab assistant.

**Name:** Roseburr, Johnnie

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

J. Roseburr worked as a lab assistant.

#### Technician, Programmer

**Name:** Johnson, Leander

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Mr. Johnson assists with computer and Web design programs. Part-time at \$2,500 per semester

**Name:** Kesete, Tesfai

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

T. Kesete helps coordinate the new instrumentaion laboratory.

#### Other Participant

**Name:** Stevenson, Bonita

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Bonita Stevenson was the program coordinator for LINC at a salary of \$30,000/ yr.

**Name:** Ealy, David

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

David Ealy performed in-kind recruiting services for LINC at various high schools throughout Oklahoma and US.

**Name:** Lewis, Sharon

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Lewis facilitated the trial course-enhancement colloquium for general chemistry II for the spring 2004 semester and serves as coordinator for the curriculum enhancement program for LINC. Her addendum fee was \$1500 per semester.

**Name:** Jones, Doris

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Doris Jones coordinated the supplementary instruction (SI) program for LINC and SURE-STEP collaboration for the spring semester 2004 and will continue for fall 2004. She was supported by EPscore for the spring semester and will be supported by LINC and Sure-Step in the fall. Her support is \$1500 per semester.

**Name:** Hill, Anthony

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

A. Hill facilitated the 'Preparation-for-success' Colloquium.

**Name:** Poudavood, Reza

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Poudavood will coordinate the efforts for faculty training and enhancement activities. LINC will support at \$1500 per semester.

**Name:** Chan, Douglas

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Chan will supervise the usage, upkeep and instructional efforts for the research instrumentation in the instructional laboratory. LINC will support at \$1500 per semester.

**Name:** Barker, Shawn

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Mr. Barker will mentor undergraduate in a summer research project @ \$2000

**Name:** Matand, Kanyard

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Matand mentors student in research - Paid through other funding.

**Name:** McMahon, Timothy

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. McMahon mentors students in research activities - Paid through other funding.

**Name:** Williams, Robert

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Williams mentors students in research activities - paid by funding from other sources.

**Name:** Abraham, K.

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Abraham mentors students in research projects - paid through other sources.

**Name:** Benson, Bruce

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Mr. Benson is a university recruiter for LINC - inkind services

**Name:** Harkins, Rosemary

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Harkins, Chair Biology Department, is on the internal advisory board, TEAM

**Name:** Hedge, Clarence

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Hedge, Chair of Technology department, is on the internal advisory board, TEAM

**Name:** Ro, In

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. RO is on the internal advisory board, TEAM

**Name:** Burns, Marvin

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Burns, Dean of Agriculture & Research & Extension at LU, is on the internal advisory board, TEAM.

**Name:** Clark, Joan

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Clark, Dean of HONORS Program, is on the internal advisory board, TEAM. She offers collaborative financial& personel support.

**Name:** Williams, Sonya

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. Williams, Director of UBEP, is on the internal advisory board, TEAM

**Name:** Carter, Craig

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Carter, Director of Talent Search, is on the internal advisory board, TEAM

**Name:** Holloway, Ernest

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Ernest Holloway, president of Langston University is chair of the external board, PAC. He brings outstanding vision and leadership to the LINC program.

**Name:** Dale, Louis

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Dale is on the external advisory board, PAC.

His exensive experiences with large NSF projects & grants will bring enormous benefit to this advisory board.

**Name:** Mitchell, Earl

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Mitchel, Professor, Biochemistry and Director of Oklahoma Alliance for Minority Participation (OKAMP) at Oklahoma State University, Stillwater, OK, is on the external advisory board, PAC. He offers experience in managing NSF programs and offers a collaboration with NSF-OKAMP.

**Name:** Nelson, Donna

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Nelson, Professor, Organic Chemistry, University of Oklahoma, is on the external advisory board, PAC. She offers the opportunity for research internships for LINC faculty and students at OU.

**Name:** Barrick, Kirby

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Barrick, Assoc Dean, Academic Program, University of Illinois, is on the external advisory board, PAC. He offers the opportunity for research internships for LINC faculty and students at U of I.

**Name:** Jones, Wayne

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Jones, Director of Engineering at Tinker Air Force Base, OKC, Ok. will assist in obtaining internships at Tinker as well as give expert advise in his area.

**Name:** Ross, Richard

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Ross, Dean, College of Agriculture, Iowa State University, is on the external advisory board, PAC. He offers the opportunity for research internships for LINC faculty and students at ISU.

**Name:** Lindsay, Donald

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Lindsay, Assoc. Dean and Director of Academic Affairs, New Mexico State University, is on the external advisory board, PAC. He offers the opportunity for research internships for LINC students at NMSU.

**Name:** Bell, Paul

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Bell is on the external advisory board, PAC.

**Name:** Mize, Dolores

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Dr. Mize, Associate Vice-Chancellor for Oklahoma State Regents of Higher Education, is on the external advisory board, PAC. Dr. Mize manages all of the Board of Regent's academies for grades K-12 for the state of Oklahoma. She will offer various outreach opportunities among the K-12 population for the LINC program.

**Name:** Hayes, Rosmary

**Worked for more than 160 Hours:** No

**Contribution to Project:**

Rosemary Hayes is the external evaluator. LINC supports a rate of \$500/day.

**Name:** Bucki, Andrew

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. A. Bucki facilitated the Calculus II Colloquium.

**Name:** Sivanesan, Sivalingam

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. S. Sivanesan facilitated the Calculus I colloquium

**Name:** Wuliji, Tumen

**Worked for more than 160 Hours:** Yes

**Contribution to Project:**

Dr. T. Wuliji facilitated the Biology II colloquium

**Research Experience for Undergraduates**

**Organizational Partners**

**Other Collaborators or Contacts**

Part I. 3. Have you had other collaborations or contacts?

One of LINC's major strategies is to provide strategic financial and developmental support to program participants in order to attract more quality students in the STEM areas. These funds are needed to compete with larger universities that do not have as good a track record as Langston for graduating minority students in STEM disciplines. Langston University wholeheartedly endorses LINC's efforts, and has supported collaborations with an array of programs that include financial, developmental, and recruiting resources.

1. Scholarship collaborations with NSF- (OKAMP) Oklahoma Alliance Minority Program, (UBEP) Undergraduate Biomedical Program, and Honors Program at LU.

This financial collaboration expands the number of scholars in the LINC program.

The LINC Program originally was scheduled to accept 12-15 participants each year. However, due to effective leveraging of the scholarship monies with the OKAMP, UBEP and the HONORS Programs at Langston, the LINC program has been able to accept 46 scholars (3.0 and above) for the first two years.

LINC participants who are also part of the HONORS program (which has a higher g.p.a. requirement) are required to maintain their scholastic status. However, future selections are made and scholarship budgetary allowances are managed realizing the possibility that a LINC participant may lose their HONORS status and still be eligible for LINC.

2. a). SURE- STEP Summer Bridge Program for prospective STEM majors.

This collaboration provides a pool of potentially qualified LINC scholars as well as developmental opportunities for existing LINC Scholars. It also serves as an outreach effort into the Oklahoma community.

The LINC Director & Staff will participate in the summer 2005 bridge program (sponsored by the NSF) by teaching Chemistry and Physical science. The 20 participants will be high school scholars who will be entering Langston for the 2005 fall term in a STEM curriculum. They will be acclimated to LU & LU's STEM departments and will receive a \$500 stipend during the month of July. The LINC program will provide LINC tutors and SI student instructors. Excelling Bridge students will be offered LINC scholarships for the fall semester.

### 3. Langston University Department of Education

This collaborative recruiting effort with LU's Department of Education provides large-scale access to high school students throughout Oklahoma.

LINC participates in a variety of large scale recruiting events at the university sponsored by the Department of Education. Over 30 different high schools and 6,000 high schoolers from various towns throughout Oklahoma participate. Most high schools that attend have collaborative programs with the department of Education at LU.

### 4. TALENT SEARCH

LINC's collaboration with TALENT SEARCH provides recruitment services, as well as access to students who excel on the ACT test. This program provides In-kind services that include recruiting personnel, service-learning tutorial opportunities for LINC participants, data bank of excelling ACT-testing participants, and other vehicles for recruitment.

### 5. Faculty Training Center & University Collaboration

This state-of-the art facility provides In-Kind training for the STEM faculty for the implementation of technology in the classroom. Some of the training activities include training in Computer Technology Integration, Web CT, Web Design, egrade, Visualization Techniques, Microsoft Programs, etc. Over 24 STEM faculty have received training from this facility thus far. The LINC program has acquired a computer specialist and web master (Leander Johnson) to personally assist the STEM faculty in this endeavor. The university is also offering stipends to STEM faculty to receive training in WebCT during the summer 2005 session. Our goal is to have most of the STEM faculty using WebCT by the end of the 2004-5 school term. Presently, almost all STEM faculty are using WebCT.

### 6. Other Faculty Training

Additionally, LINC supported Faculty travel to various training workshops. Two professors traveled to Washington D.C. for a QEM workshop for grant writing in 2005. Others traveled to proposal evaluation workshops in the local area.

Developmental meetings and research forums included:

- Research Day at KU, Lawrence,KS.
- NSF Convention - New Orleans, LA.
- Beta Kappa Chi-NIS National Convention - Richmond, VA.



Research Day UCO, Edmond, OK.  
 Research Day at OSU, Stillwater, OK.

Additional university-sponsored trips included travel to the National Association of Neuroscience in San Diego, and the National Mathematical Association annual Meeting in Atlanta, Ga, Fall 2004.

7. LINC-UBEP - Research Internship collaboration. The LINC & UBEP programs have collaborative agreements for placing undergraduate interns. Some of the collaborative programs include the K-INBRE program at the University of Kansas at Lawrence, The INBRE program at the OU Health Sciences Center and Oklahoma State University, Stillwater, OK; The NSF Carver Project at the University of Arkansas, Fayetteville; the NSF-REU Program at Texas A & M at College Station; and the NSF-REU Program University of North Texas HSC.

8. EPSCoR and LINC Collaboration for Supplementary Instruction (SI).

LINC and EPSCoR continue to collaborate to support LINC's first curriculum enhancement program, Supplementary Instruction (SI).

SI is a program that focuses on historically difficult classes (e.g. Chemistry, Biology, Algebra, Calculus, etc.) and is active at 500 institutions across the US. The goals of SI are to improve student grades, reduce the attrition rate within those courses, and increase the graduation rates of students. It helps students master course content while they develop and integrate learning and study strategies.

Dr. S. Williams, who is a Biology Professor, obtained supplemental funding from EPSCoR to support the implementation of SI instruction for the school term 2004-05.

A SI 'Train-the-Trainer' workshop was conducted for 12 STEM students by Doris Jones, Math Instructor, during the Fall 2004 term. Six (6) of the 12 STEM students who participated were LINC participants. All were funded by EPSCoR.

A training workshop and SI sessions were also conducted during the spring 2005-semester. Trained STEM students facilitated SI sessions for courses in algebra, biology I & II, and general chemistry II.

The following departments participated in SI courses during the Spring 2004, Fall 2004 & Spring 2005 academic sessions:

The Department of Mathematics  
 The Department of Biology  
 The Department of Chemistry

### Activities and Findings

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

NOTE: Exhibit I, II, III and IV, associated with this section are located at the end of this section.

1. Describe the major research and education activities of the project.

Major education and research activities are listed by category.

EDUCATION CATEGORY:

In support of LINC's goal of increasing the number of underserved students who receive undergraduate and advanced degrees in STEM

disciplines, and to increase the number of Langston's STEM graduates by 15% annually, LINC has implemented a number of programs during the first two years of its grant period.

Two of the aforementioned programs also support LINC's Curriculum Enhancement Program, designed to address pre-existing deficiencies of incoming STEM majors, incorporate preparation for nationally standardized testing into standard curriculum, ensure that students are motivated and well prepared for graduate school entry and program completion, and support personal and professional development. These programs are 1. Supplementary Instruction (SI), and 2. A Curriculum Enhancement Colloquium in General Chemistry I & II; Biology I & II; Calculus I & II; and a Preparation-for-Success (PFS) Colloquium.

#### (1) Supplementary Instruction (SI)

(A collaboration between LINC and EPSCoR for Curriculum Enhancement)

Ms. Doris Jones facilitates SI Training.

The LINC program helped finance SI training for 15 STEM faculty during our first year of operation.

The Spring (2004) and Fall (2004) semester programs consisted of twenty (20) SI leaders, one coordinator, one SI supervisor, and eighteen professors/instructors. Sessions met on an average of 3 times a week for nine different sections each semester. Approximately 800 students were impacted during the two semesters. College algebra, Trigonometry, Biology I & II, General Chemistry I & II, and Physical Science were the target programs. Presently, SI is a volunteer program and some students do not attend on a regular basis. Thirteen percent of the students from the SI courses attended the SI sessions at least one time. Grades improved one letter grade for those who attended on a regular basis but grades worsened or remained unchanged for those who only came just before test time. Over-all grades improved one-letter grade for approximately 64 % of regular attendees. There was a 31% one-letter grade improvement for those not attending any SI sessions. Improvement is indicated for those obtaining a letter grade of 'C' or better when comparing their final grades to their mid-term grades. Exhibit II shows the number of students who availed themselves of SI and the impact of SI on their grade performance for three different disciplines.

Evaluation and suggestions for improvement.

Regular attendees of the SI program consistently show improvement; however, surveys from the SI Instructors, SI leaders', SI participants and independent evaluation indicated the following strategies for improvement.

1. Develop innovative ways to increase participation
2. Provide continuous training for SI leaders, faculty and staff
3. Develop more models, exercises, or activities to assist student facilitators to consistently remain in a facilitator mode.
4. Develop innovative ways to strengthen the faculty-mentor/student relationship.

All STEM faculty, who are participating in the curriculum enhancement programs, received SI training. Techniques learned in the SI workshop are utilized in SI instruction, regular classes, as well as in LINC's curriculum enhancement colloquiums.

Note: SI is a dynamic activity that continues to evolve. It serves as a best practices incubator for student-to-student learning facilitation.

While it is too early to assess impact of this activity, SI is a best practices technique that supports improved performance in STEM courses.

#### (2) Curriculum Enhancement Colloquiums

Dr. Sharon Lewis assisted with the curriculum enhancement program.

In keeping with LINC's stated planned activity of implementing STEM course curriculum enhancements, a trial colloquium for General Chemistry II (colloquium CH 1501) was conducted during the spring 2004 semester that served as a prototype for subsequent colloquiums.

Curriculum enhancement colloquiums for the biology, chemistry and mathematics departments were implemented for the fall 2004 & Spring 2005 semesters for the following courses:

Biology I & II  
Chemistry I & II  
Calculus I & II

In addition, two (2) Preparation-for-Success (PFS) Colloquiums were implemented. LINC scholars are required to take STEM colloquium classes. Our findings are that students who participate in colloquium classes fare substantially better on ACS standardized exams than their non-colloquium student counterparts. Further, there is a much higher percentage of students who achieve a grade of 'B' or better among colloquium participants versus their non-colloquium student counterparts. See Exhibit I.

Our experience regarding optimum length of colloquiums is that they should be of 90 minute duration. Subsequent colloquiums will follow this format.

### (3) Math Tutorials & enhanced teaching tool

(In-Kind collaboration with Langston University)

LU provides the following Math software:

Educo: tutorial

ALEX: Advanced software for Calculus

MAPLE V: Advanced math software

Mathematica: software tool

Educo has evolved as an excellent tutorial offered by the Math Department. It enables students to become more proficient in algebra through self-paced learning. The project has developed into an online laboratory that has generous hours of accessibility. Students are able to electronically access tutorial assistance on a broad range of mathematical problems. It is also an excellent teaching & testing tool.

Case studies and best practices suggest that this and other education enhancements will impact the retention rate and performance of STEM students. It is too early to assess impact.

### (4) Hand-held PDAs (Personal Digital Assistance)

Charter LINC scholars are given PDAs to demonstrate how technology assists learning, assist in their managing schedules and commitments, serve as a learning-assist tool in the PFS colloquiums and serve as a personal computer. The PDA has wireless capability. Students can obtain Internet access for classroom participation, and enjoy mentor-student & student-student sharing of digital information at a moments notice.

This and other education enhancements are intended to impact the retention rate and performance of students in the LINC program. Although the enthusiasm and usage of this tool are high, it is too early to assess impact on retention rates.

### (5) Faculty Education: Faculty Training

(A collaborative effort with Langston University)

Effective faculty is crucial to the success of all educational programs. LU is committed to support LINC by supporting faculty education in technology and new teaching methods. To this end LU's faculty training facility (FTC Center) and staff provide In-Kind training for STEM faculty in technology in the classroom.

Since the fall 2003 session, over 24 STEM faculty have received training in Computer Technology Integration, Web CT, Web Design, egrade, Visualization Techniques, and Microsoft Programs. LINC has acquired a computer specialist and web master (Leander Johnson) to personally assist the STEM faculty in this and related endeavors.

Additionally, LINC supported Faculty travel to various training workshops. Two professors traveled to Washington D.C. for a QEM workshop for grant writing in 2005. Others traveled to proposal evaluation workshops in the local area.

Developmental meetings and research forums included:

- Research Day at KU, Lawrence, KS.
- NSF Convention - New Orleans, LA.
- Beta Kappa Chi-NIS National Convention - Richmond, VA.
- Research Day UCO, Edmond, OK.
- Research Day at OSU, Stillwater, OK.

Additional university-sponsored trips included travel to the National Association of Neuroscience in San Diego, and the National Mathematical Association annual Meeting in Atlanta, Ga, Fall 2004.

In addition LU offers faculty stipends to STEM faculty who will develop their WEBCT options, develop new courses or enhance existing courses.

STEM faculty has implemented this tool into its teaching methods use it to enhance students' learning experiences.

#### (6) Education support: Mentoring

Although mentoring is embedded in special research programs, each LINC participant has been assigned a faculty mentor who is required to meet with assigned students bi-monthly.

It is anticipated that mentoring relationships will uncover potential problems before they become real issues, and assist in finding solutions to them. As a result, LINC scholars are more likely to meet or exceed requirements of the program as well as remain in STEM disciplines.

Each STEM department recommends STEM candidates for LINC and assigns mentors. Participating departments include Biology, Chemistry, Agriculture, Mathematics, Technology, and Computer Science.

Our latest assessment indicates that our mentoring program could be strengthened through a more robust process. We are currently working to implement such a process.

#### RESEARCH ACTIVITIES:

Student Research is one of LINC's strategies to improve the retention rate of STEM students. Through this experiential learning, students

are exposed to challenging and exciting applications of 'book learning'.

LINC-UBEP Research Internship collaboration. The LINC & UBEP programs have collaborative agreements for placing undergraduate interns. Some of the collaborative programs include the K-INBRE program at the University of Kansas at Lawrence, The INBRE program at the OU Health Sciences Center and Oklahoma State University, Stillwater, OK; the NSF Carver Project at the University of Arkansas, Fayetteville; the NSF-REU Program at Texas A & M at College Station and the NSF-REU Program at North Texas HSC. Through its own efforts and collaboration with other entities 44 STEM students are participating in research internships during the 2005 summer session. All but two LINC students are participants. This represents an increase in the number of scholars placed year over year, Exhibit IV. Exhibit III provides details about the internships.

All research projects are expected to culminate with an oral and poster presentation.

#### (4). STEM Instructional Laboratory

Dr. Douglas Chan & Tesfai Kesette facilitate instruction.

The Instructional laboratory has acquired appropriate equipment and became operational during the summer 2004 session. Equipment includes: HPLC (high performance Liquid Chromatography), Infra Red Spectrophotometer, UV Spectrophotometer, Gas Chromatograph.

This STEM Instructional Laboratory is the base for introducing students to state-of-the-art laboratory equipment, and enhances tutoring and mentoring efforts. It also enhances student interaction and laboratory skills development. It is anticipated that it will attract students who may be on the borderline of attending a larger university because of access to state-of-the-art facilities.

#### (5). Research Conferences and Presentations

##### (a) NSF convention - Feb 10-13, 2005

LINC supported 9 LINC scholar participants' attendance at a NSF national convention at Southern University in New Orleans, LA. Each presented a poster presentation of their respective research projects. Desmond Harvey was awarded a third place finish.

##### (b) Beta Kappa Chi-NIS National Convention - March 16-20, 2005.

LINC in collaboration with the NIS supported 14 STEM students' attendance at Beta Kappa Chi-NIS national convention, Richmond, VA. Each student presented an oral or poster presentation. Argenia Doss & Steven Harris were awarded a third place finish.

##### (c) NSF Research Day at UCO - Oct 15, 2004

Research day was held at the University of Central Oklahoma, Edmond, OK for regional universities. LINC supported over 28 STEM majors to attend this event. Each student presented a poster presentation.

##### (d) NSF Research Day at OSU - Sept 25, 2004

Research day was held at Oklahoma State University, Stillwater, OK for the NSF-OKAMP Program. LINC supported over 22 STEM majors to attend this event. Each student presented an oral or poster presentation.

##### (e) Research Day at KU - Jan 14, 2005

Research day was held at the University of Kansas, Lawrence, KS. LINC supported over 15 STEM majors to attend this event. Each student presented a poster presentation.

##### (f) Alpha Chi Convention - April 4, 2005

Steven Harris attended the Alpha Chi Regional Convention - St. Louis, Missouri.

(g) Research Day at the capitol - March 21, 2005

Research day for undergraduate research papers was held at the Oklahoma state capitol during March 21, 2005. All schools in the state of Oklahoma were allowed to send a representative for the research competition. Argenia Doss, a LINC participant was selected as Langston's representative.

(g) The School of Arts & Sciences Research Day at LU - April 15, 2005.

The School of Arts & Sciences held its annual Research Day in April 15, 2005. 46 STEM majors presented their research projects either as an oral or poster presentation. LINC scholars received 1st, 2nd and 3rd place awards.

#### SEIS DATA AND REPORTING:

The university has become more involved in collecting data as we are continually focusing on the accuracy and updating SEIS data.

#### ADDITIONAL DATA AND TRACKING:

Internal assessments of colloquiums are established. Teacher observations and student assessment forms are utilized.

Assessments are done for all colloquium courses as well as for each SI session.

External Evaluation is in place. Dr. Rosemary Hayes, Director of The Center for Institutional Data Exchange and Analysis at the University of Oklahoma has been retained. She will complete an appropriate Evaluation for each year of the program.

#### OTHER SALIENT POINTS:

LINC program output: 10 graduating seniors were among 46 LINC scholars. 6 graduated Summa cum laude. 7 have been accepted into a Ph.D. program for the fall 2005 term. 2 have selected STEM careers.

- (1). Project (LINC) steering committee (TEAM) selected and operational
- (2). Supplemental TEAM members appointed
- (3). LINC Advisory Committee (PAC) selected and operational
- (4). LINC web site developed and online: <http://www.lunet.edu/linc/>
- (5). LINC brochure developed and distributed

Collaborative agreements for scholarships, research internships, recruiting, and curriculum enhancements have been put in place with over 15 statewide and university entities.

#### Findings:

1. Describe major findings resulting from these activities.  
(Barriers, with anticipated solutions)

Although LINC is on target with most of its activities, we are making some adjustments based upon two (2) years of experience, as

summarized below:

#### (d) Curriculum Enhancement

The number of course -enhancement colloquiums outlined in the proposal appears to have been too aggressive for Langston's resources (8 for each of the five participating departments).

Our experiences thus far indicate that a more cautious approach of implementation of these courses is required. We have implemented Chemistry I & II, Biology I & II and Calculus I & II. These departments (chemistry, biology & mathematics) contain the gate-keeping courses (as suggested by NSF) and they will be the initial focus. Our experience is that 90 minute sessions are optimal instead of the 2-hour sessions originally envisioned.

Presently Supplementary Instruction (SI) is a volunteer program; and some students do not attend on a regular basis.

Regular attendees of the SI program consistently show improvement; however, surveys from the SI Instructors, SI Leaders, SI participants and independent evaluation indicated the following strategies for improvement.

- Develop innovative ways to increase participation
- Provide continuous training for SI leaders, faculty and staff
- Develop more models, exercises, or activities to assist student facilitators to consistently remain in a facilitator mode.
- Develop innovative ways to strengthen the faculty-mentor/student relationship.

Evaluation:

Our program is evaluated by an external evaluator. That report is due imminently, after spring semester grades have been properly assessed.

#### **Training and Development:**

3. Describe the opportunities for training and development provided by your project.

Effective faculty is crucial to the success of all educational programs. LU is committed to support LINC by supporting faculty development and training as follows:

##### 1. Technology in the Classroom Training

(A collaborative effort with Langston University)

LU's faculty training facility and staff provide In-Kind training for STEM faculty for technology in the classroom.

To date over 24 STEM faculty have received training in Computer Technology Integration, Web CT, Web Design, egrade, Visualization Techniques, and Microsoft Programs. LINC has acquired a computer specialist and web master (Leander Johnson) to personally assist the STEM faculty in this and related endeavors.

STEM faculty implemented this learning into its teaching methods during the Fall, 2004 term, and anticipate that they will enhance students' learning experiences.

##### 2. Additional Training and Development

Additionally, LINC supported Faculty travel to various training workshops. Two professors traveled to Washington D.C. for a QEM workshop for grant writing in 2005. Others traveled to proposal evaluation workshops in the local area.

Developmental meetings and research forums included:

Research Day at KU, Lawrence, KS.  
 NSF Convention - New Orleans, LA.  
 Beta Kappa Chi-NIS National Convention - Richmond, VA.  
 Research Day UCO, Edmond, OK.  
 Research Day at OSU, Stillwater, OK.

Additional university-sponsored trips included travel to the National Association of Neuroscience in San Diego, and the National Mathematical Association annual Meeting in Atlanta, Ga, Fall 2004.

LU's commitment to faculty training & development is in progress. It sponsored STEM faculty attendance at the following:  
 National Association of Neuroscience in San Diego, CA.  
 National Mathematical Association annual meeting, Atlanta, GA.

Student training and development activities are in the areas of a) serving as SI Facilitators, b) Mentoring during outreach activities, c) receiving guidance from faculty mentors, d) participating in research activities, and e) PDA training.

### 1. Supplementary Instruction (SI) Facilitators

(A collaboration between LINC and EPSCoR for Curriculum Enhancement) strategies.

Since the spring 2004-semester, trained LINC students facilitated SI sessions for courses in algebra, general chemistry I, general chemistry II, biology I and Organic chemistry II.

Further information is on page 4, under 'Research and Education Activities'.

### 2. Mentoring during outreach activities

LINC, in collaboration with Langston University, has a number of outreach forums wherein faculty and Scholars interact with the Oklahoma community in an effort to showcase the facility, LINC, and the value of pursuing STEM disciplines. Following is a list of major activities:

#### (a) Recruiting event:

LINC collaborates with LU's Department of Education to reach over 30 different high schools and 6,000 high school students throughout Oklahoma. LU's recruiters distribute LINC's brochure and application, which feature a link to our website. LINC personnel attend High School Day activities.

#### (b) SURE-STEP summer 2005 bridge program for perspective STEM majors.

LINC staff continues to participate in this NSF-sponsored program by teaching Chemistry and Physical Science. LINC scholars will serve as mentors. Students who excel will be offered LINC scholarships for fall 2005 semester.

#### (c) TALENT SEARCH

TALENT SEARCH provides In-Kind services that include a bank of high-performing ACT-test participants (over 500) for consideration by LINC. It also provides use of its recruiting personnel and service-learning tutorial opportunities.

### 3. Guidance from Mentors

Although mentoring is embedded in special research programs, each LINC participant has been assigned a faculty mentor who is required to meet with assigned student bi-monthly.

It is anticipated that mentoring relationships will uncover potential problems before they become real issues, and assist in finding solutions to them. As a result, LINC scholars are more likely to meet or exceed requirements of the program as well as remain in STEM disciplines.

Each STEM department recommends STEM candidates for LINC and assigns mentors. Participating departments include Biology, Chemistry, Agriculture, Technology, and Computer Science.



#### 4. Research

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

LINC has established a number of collaborations that provide these enriching experiences for LINC scholars. Specific arrangements for summer 2005 are contained in Exhibit III.

##### (b) STEM Instructional Laboratory

The Instructional laboratory has acquired appropriate equipment and has been operational since the summer 2004 session. Equipment includes: high performance Liquid Chromatography, Infra Red Spectrophotometer, UV Spectrophotometer, Gas Chromatograph.

This STEM Instructional Laboratory is the base for introducing students to state-of-the-art laboratory equipment, and enhance tutoring and mentoring efforts. It also enhances student interaction and laboratory skills development. It is anticipated that it will attract students who may be on the borderline of attending a larger university because of access to state-of-the-art facilities.

(c) Research Conferences and Presentations. (See page 8, item #5, 'Research Conferences and Presentations')

##### PDA - Training

Students received training on the use of their PDAs in order to more effectively use them. Students have wireless access to the internet, managing schedules & commitments, vocabulary usages, WEBCT assignments, and wireless sharing of digital information between mentor-student & student-student.

#### **Outreach Activities:**

4. Describe outreach activities your project has undertaken.

LINC, in collaboration with Langston University, has a number of outreach forums wherein faculty and Scholars interact with the Oklahoma community in an effort to showcase the facility, LINC, and the value of pursuing STEM disciplines. Following is a list of major activities:

Recruiting event:

LINC collaborates with LU's Department of Education to reach over 30 different high schools and 6,000 high school students throughout Oklahoma. LU's recruiters distribute LINC's brochure and application, which features a link to our website. LINC personnel attend High School Day activities.

SURE-STEP Summer 2005 Bridge program for perspective STEM majors.

LINC staff participates in this NSF-sponsored program by teaching Chemistry and Physical Science. LINC scholars serve as mentors. Students who excel will be offered LINC scholarships for fall 2005 semester.

#### TALENT SEARCH

TALENT SEARCH provides In-Kind services that include a bank of high-performing ACT-test participants for consideration by LINC. It also provides use of its recruiting personnel and service-learning tutorial opportunities. TALENT Search has collaborative programs with over 30 high schools throughout Oklahoma.

#### **Journal Publications**

**Books or Other One-time Publications**

John K. Coleman, "Langston's Integrated Network College for Science, Technology, Engineering & Mathematics \_ Brochure", (2004).  
 Brochure, Published  
 Editor(s): N/A  
 Collection: N/A  
 Bibliography: N/A

John K. Coleman, "Langston's Integrated Network College for Science, Technology, Engineering & Mathematics \_Application", (2004).  
 Application, Published  
 Editor(s): N/A  
 Collection: N/A  
 Bibliography: N/A

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

[www.lunet.edu/linc](http://www.lunet.edu/linc)

**Description:**

III. Publication and Products

What have you published as a result of this work?

1. Internet Dissemination

LINC is utilizing current technology to effectively and efficiently disseminate information about its offerings. Our site is online at [www.lunet.edu/linc](http://www.lunet.edu/linc). From the site, Internet visitors can learn about LINC's program and philosophy, as well as access its application and brochure. A calendar of events keeps interested parties advised of upcoming special events.

Hardcopies of the brochure and application are also available at Langston's recruiting office and placed strategically throughout the university's physical facility. They were mailed to target high schools and organizations throughout Oklahoma.

**Other Specific Products****Contributions**

**Contributions within Discipline:**

**Contributions to Other Disciplines:**

**Contributions to Human Resource Development:**

**Contributions to Resources for Research and Education:**

4. Contributions to Resources for Science and Technology:

STEM Instructional Laboratory

Dr. Douglas Chan will facilitate instruction.

The Instructional laboratory has acquired appropriate equipment and has been operational since the summer 2004 session. Equipment includes: HPLC (high performance Liquid Chromatography), Infra Red Spectrophotometer, UV Spectrophotometer, Gas Chromatograph.

This STEM Instructional Laboratory is the base for introducing students to state-of-the-art laboratory equipment, and enhances tutoring and mentoring efforts. It also enhances student interaction and laboratory skills development. It is anticipated that it will attract students who may be on the borderline of attending a larger university because of access to state-of-the-art facilities.

While acquisition of equipment is on schedule, an inordinate amount of time was required to scrutinize and assess the many proposed choices by numerous vendors presented during the lengthy open bid process.

**Contributions Beyond Science and Engineering:**

### Special Requirements

**Special reporting requirements:** None

**Change in Objectives or Scope:** None

**Unobligated funds:** less than 20 percent of current funds

**Animal, Human Subjects, Biohazards:** None

### Categories for which nothing is reported:

Organizational Partners

Any Journal

Any Product

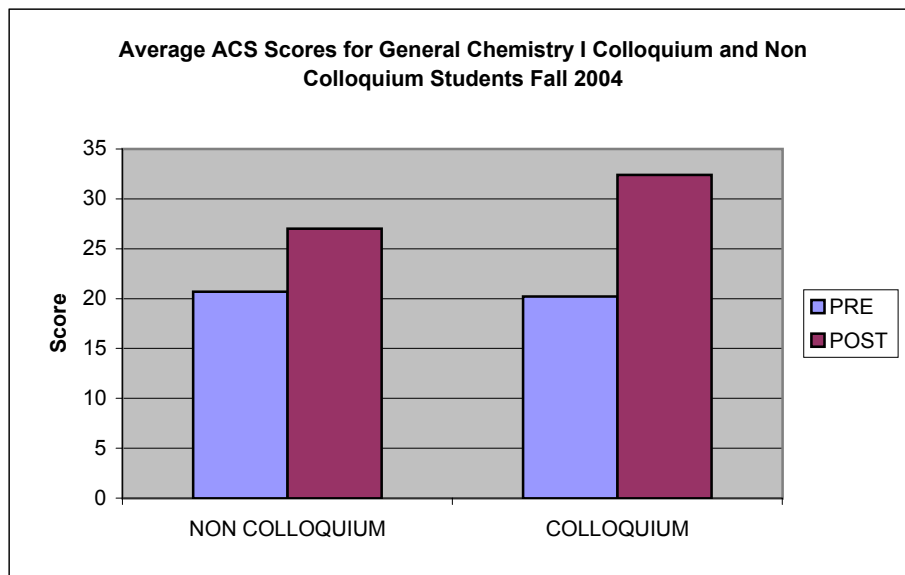
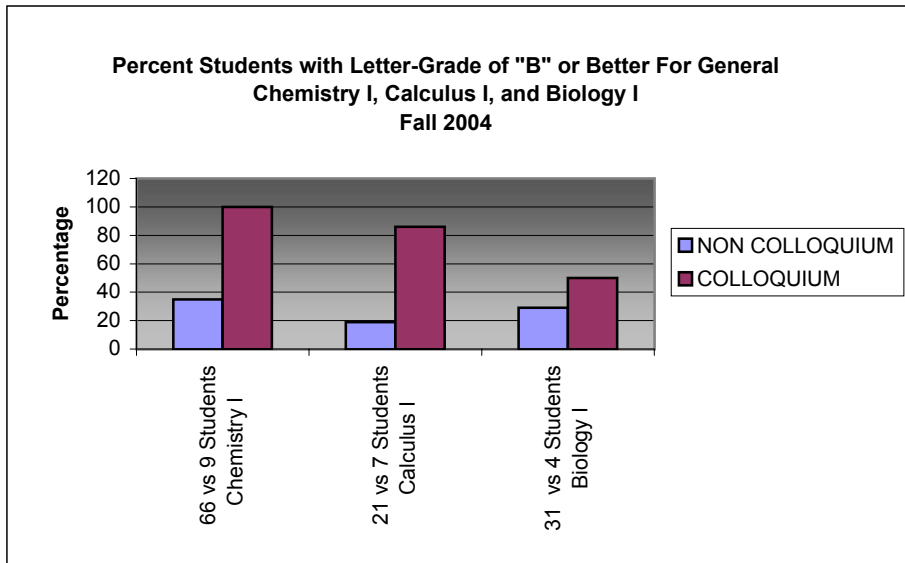
Contributions: To Any within Discipline

Contributions: To Any Other Disciplines

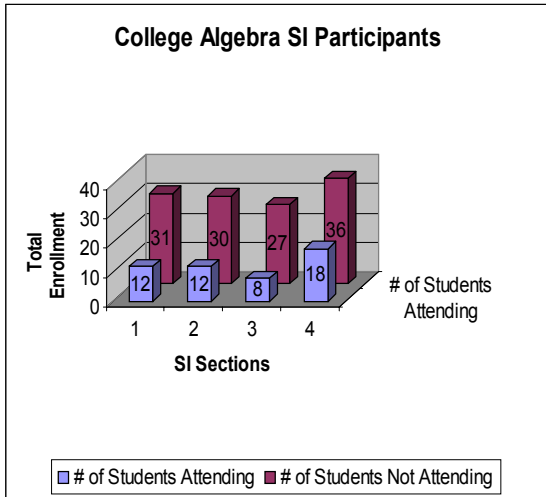
Contributions: To Any Human Resource Development

Contributions: To Any Beyond Science and Engineering

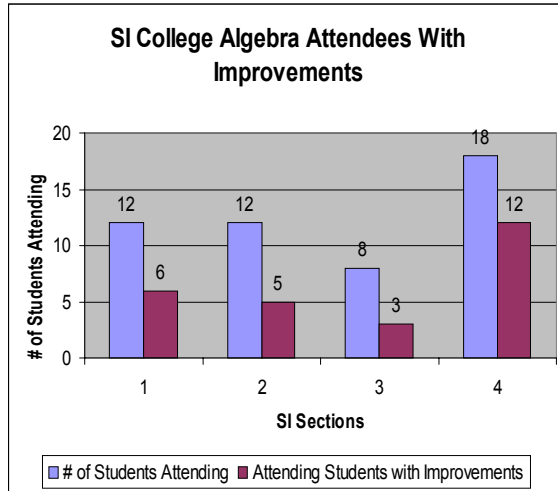
### EXHIBIT I



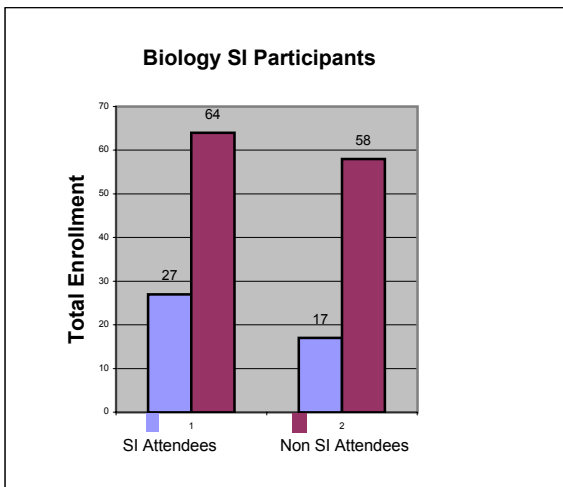
**EXHIBIT II**



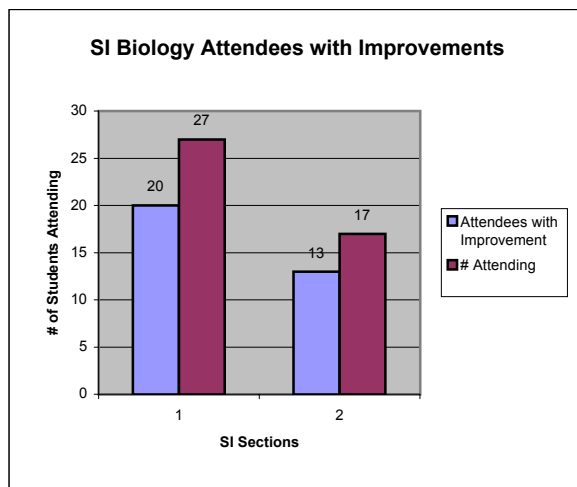
Graph 1



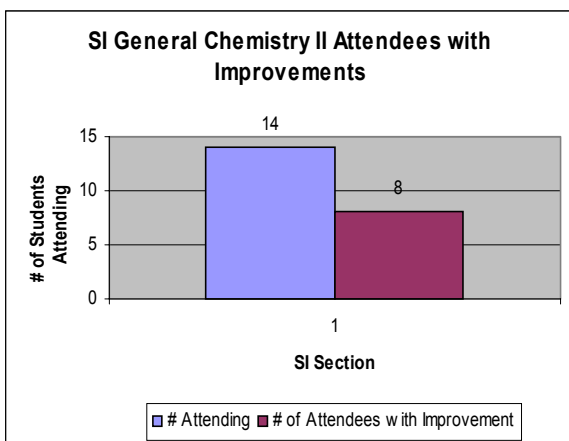
Graph 2



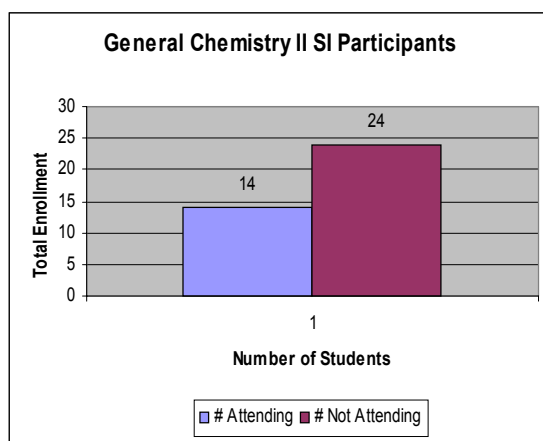
Graph 3



Graph 4



Graph 5



Graph 6

**EXHIBIT III**

**SUMMER INTERNSHIPS 2005**

1.ASHLEY BURDEX	UNIVERSITY OF OKLAHOM, HSC	
2.STEVEN HARRIS	UNIVERSITY OF MICHIGAN	
3.DESMOND HARVEY	CALIFORNIA INSTITUTE OF TECHNOLOGY	
4. MARQUITA ROWLAND	UNIVERSITY OF KANSAS-LAWRENCE	
5.QUINCY ANDERSON	UNIVERSITY OF ARKANSAS	
6. MARCHONDA EVANS	TEXAS A&M UNIVERSITY COLLEGE STATION	
7.ADRIENNE CHARLOT	EAST TENNESSE STATE UNIVERSITY	
8. DAVIA HOLLAND	UNIVERSITY OF KANSAS-LAWRENCE	
9.CONTESSA MAJORS	UNIVERSITY OF NORTH TEXAS, HSC	
10.QUANETTA RELERFORD	UNIVERSITY OF NORTH TEXAS, HSC	
11.SYNDIA TODD	UNIVERSITY OF KANSAS-LAWRENCE	
12.AARON WASHINGTON	UNIVERSITY OF KANSAS-LAWRENCE	
13.JESSIE LAWS-RODRIGUEZ	UNIVERSITY OF ARKANSAS	
14.NATHAN WILLIAMS	TEXAS A&M UNIVERSITY COLLEGE STATION	
15.LEETHANIEL BRUMFIELD	UNIVERSITY OF NORTH TEXAS, HSC	
16.CHERIE OGNIBENE	UNIVERSITY OF NORTH TEXAS, HSC	
17.DOMINICK CRANE	TEXAS A&M UNIVERSITY, COLLEGE STATION	
18.JASON CHANDLER	TEXAS A&M UNIVERSITY, COLLEGE STATION	
19.DANNY TERRY	EMORY UNIVERSITY	
20.SHANEQUA BRISON	NASA-	
21.JAMIE HARRISON	LANGSTON UNIVERSITY CHEMISTRY	
22.JOHNIE ROSEBURR	LANGSTON UNIVERSITY CHEMISTRY	
23.MONIQUE ROBINSON	UNIVERSITY OF ARKANSAS	
24.MACOLE MAYWEATHER	UNIVERSITY OF OKLAHOMA, HSC	
25.CHRISTAL CARPENTER	OKLAHOMA STATE UNIVERSITY	
26.DAMON WILLIAM	UNIVERSITY OF OKLAHOMA, HSC	
27.GEORGE KPELI	UNIVERSITY OF KANSAS-LAWRENCE	
28.MAKDA GEBREHIWOTE	TEXAS A&M UNIVERSITY, COLLEGE STATION	
29. MERCEDES HOOKS	DUKE UNIVERSITY	
30.BRITTANY JOHNSON	UNIVERSITY OF KANSAS-LAWRENCE	
31.CHASITY JACKSON	UNIVERSITY OF OKLAHOMA, HSC	
32.VIA'NEY PRICE	UNIVERSITY OF OKLAHOMA, HSC	
33.TIFFANY REYNOLDS	UNIVERSITY OF OKLAHOMA, HSC	
34.RALPH CULVER	LANGSTON UNIVERSITY	
35.CHARLES LOFTIS	LANGSTON UNIVERSITY	
36.JAMIE HARRISON	LANGSTON UNIVERSITY	
37.JOHNIE ROSEBURR	LANGSTON UNIVERSITY	
38.LECHEVERAUN BENNET	LANGSTON UNIVERSITY	
39. JOSH BUSBY	U.S. DEPARTMENT OF AGRICULTURE	
40. JERIMIAH WILSON	U.S. DEPARTMENT OF AGRICULTURE	
41. CHARLES RODGERS	US DEPARTMENT OF AGRICULTURE	
42. SHANTAE GUY	US DEPARTMENT OF AGRICULTURE	
43.DEANDRE TUGGLE	US DEPARTMENT OF AGRICULTURE	
44. DEREK BLYTHE	LOCKHEED-MARTIN	

**EXHIBIT IV**

**Summer Internship Focus Change: 2002-2005**

