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FOREWORD

Greetings from the Crossroads of America!

Indiana's Louis Stokes Alliance for Minority Participation (LSAMP) program is committed to increasing the number of minority students who graduate with baccalaureate degrees. Our expectation is that many of these students will enter the workforce in a science, technology, engineering, or mathematics (STEM)-related field or matriculate to a STEM graduate program. The eight Indiana LSAMP Alliance partner institutions (Ball State University, Indiana University Bloomington, Indiana University Purdue University Indianapolis (IUPUI), Indiana University Northwest, Indiana State University, Purdue University Calumet, Purdue University North Central, and Purdue University West Lafayette) have made commitments to diversify STEM educational experiences for students on their campuses via academic enrichment programs, undergraduate research opportunities, professional development sessions, and faculty mentoring of LSAMP-eligible scholars. Recently, through our Leveraging Institutional Networking and Knowledge (LINK) initiative, we have been working diligently to recruit students from Ivy Tech Community College to participate in academic and summer research programs at our four year institutions.

Since 2003, LSAMP Indiana has supported over 750 students in academic and summer research programs and over 680 students in peer mentoring programs. Across the Alliance, hundreds more have obtained book scholarships and graduate school application stipends and have attended LSAMP workshops, tutoring sessions, and the annual statewide research conference. As a result, LSAMP Indiana has established a global network of undergraduate and graduate students, faculty, staff, and administrators with goals of increasing the number of underrepresented minority students (URMs) graduating with baccalaureate STEM degrees.

LSAMP Indiana is excited about current and new initiatives that will allow the Alliance (1) to increase its visibility across the state, (2) to serve students who engage in empirically-based educational experiences in STEM education, and (3) to institutionalize LSAMP programmatic elements that advance the goals of the National Science Foundation, the nation, the state of Indiana, and the institutions affiliated with LSAMP Indiana.

Dr. Timothy Sands

LSAMP Indiana PI

*Executive Vice President for Academic Affairs and Provost
Basil S. Turner Professor of Engineering*



Dr. Monica F. Cox

LSAMP Indiana Co-PI

*Associate Professor of Engineering Education
Inaugural Director, Engineering Leadership @Purdue
Interim Statewide Director LSAMP Indiana*



Featured Scholars



*Right to left: Vinsche' Gray, Vincnessica Gray,
and Leontae Gray*

Meet the Gray Sisters

Leontae Gray
Mechanical Engineering
Purdue University
Calumet

Vinchesica Gray
Industrial Technology
Purdue University
West Lafayette

Vinsche' Gray
Psychology
Purdue University
West Lafayette

The Gray sisters have all participated in LSAMP undergraduate research experiences at their respective campuses. Leontae' completed her baccalaureate degree in Mechanical Engineering from Purdue University Calumet in 2011. Vinsche' and Vinchesica are both graduating seniors from the Purdue University West Lafayette campus. In addition to research, all three has served as LSAMP Indiana Student Ambassadors.



Featured Scholar



Juliet Thungu
Indiana University
Bloomington
Biology

Juliet Thungu is a junior at Indiana University Bloomington studying Biology. During the summer of 2011, Juliet began researching the motility of bacterial cells in the laboratory of Professor Clay Fuqua. She has also served as a peer-mentor for a freshman LSAMP scholar and has participated in a study abroad experience in Ghana, Africa.



EXECUTIVE SUMMARY

Indiana-based colleges and universities have worked to increase the diversity of the state's undergraduate students since 1991, when institutions of higher education throughout the state came together for the first annual *Enhancing Minority Attainment Conference*. By 2002, some of the participants recognized that a more formal network was needed and that interventions were particularly critical for addressing low numbers of underrepresented students in STEM fields.

Initially bringing together five universities, the LSAMP Indiana program was established in 2003. As a Phase I program, LSAMP Indiana successfully established a longitudinal education consortium specifically designed to increase students' motivation and commitment to STEM fields. Within three years, 589 underrepresented minority students earned bachelor's degrees in STEM fields through LSAMP Indiana, and the numbers continue to grow (Figure 1).

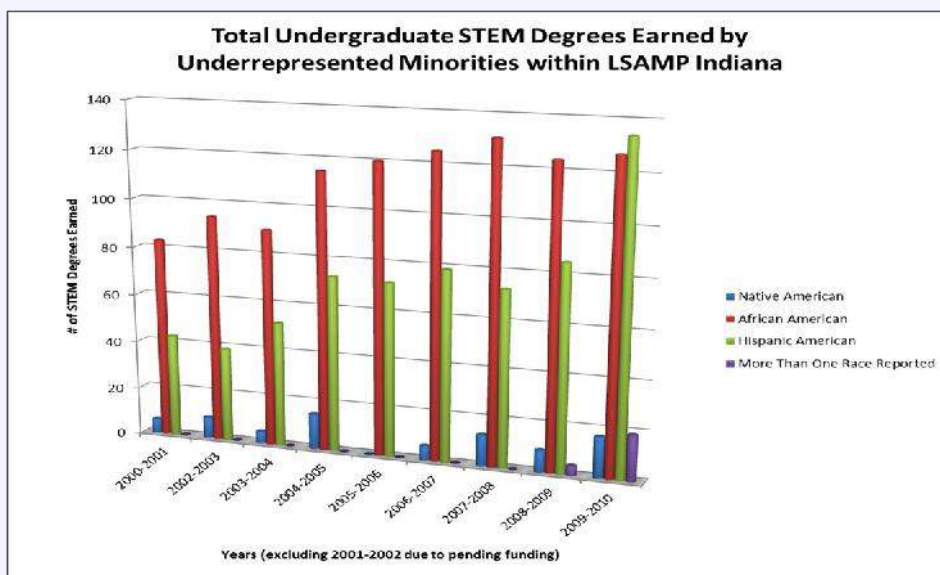
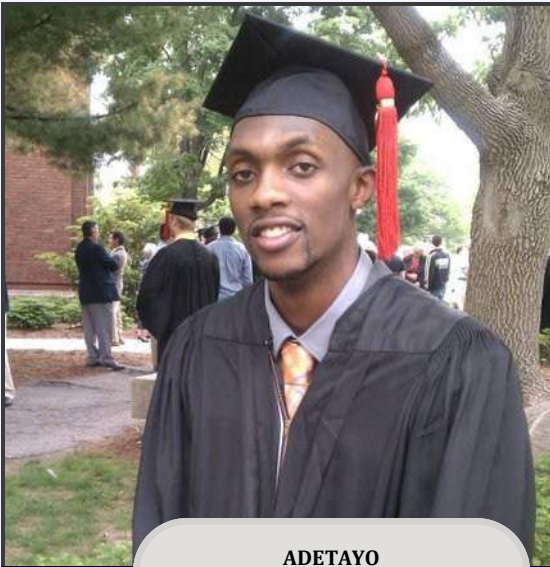


Figure 1- Underrepresented Minority Graduation Numbers within STEM Disciplines in Indiana

In Phase II, the mission of LSAMP Indiana expanded to include supplemental instruction, industry collaborators, and three new campuses. These partnerships have resulted in hundreds of students in Indiana being recruited to and retained in STEM via LSAMP Indiana efforts.

Each Alliance institution has made a commitment to changing the landscape of STEM education in Indiana. As a result, elements of the LSAMP program have been institutionalized. Evaluation results from the Goodman Research Group, Inc. (GRG) confirm that LSAMP Indiana is making a difference in the lives of its scholars and mentors. Via this book and future studies, it is the mission of LSAMP Indiana to disseminate information to researchers, practitioners, and policymakers about the most effective practices for underrepresented students in STEM.

LSAMP INDIANA ALUMNI



**ADETAYO
ADESANYA (2011)**

B.S Electrical and Computer Engineering Technology
Purdue University West Lafayette
Sales Engineer, ON Semiconductor



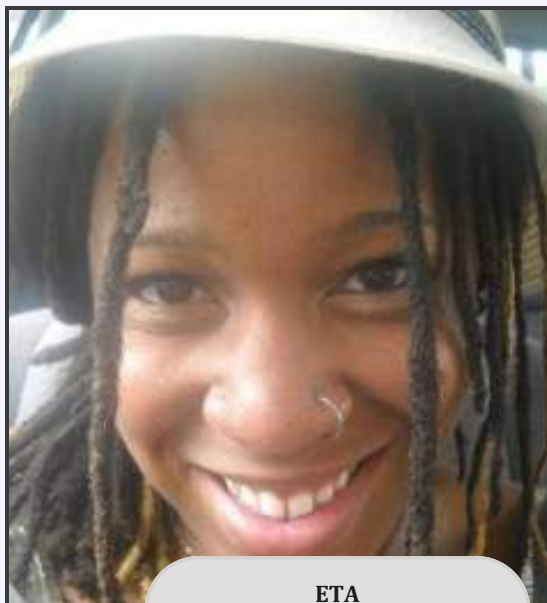
**BRANDON
GOVINDARAJOO (2008)**

B.S. Biochemistry, B.S. Mathematics, B.S. Physics
Indiana University Bloomington
Ph.D. Student, Bioinformatics, University of Michigan



**CAMELLIA
REYES (2010)**

B.S. Biochemistry
Purdue University West Lafayette
Ph.D. Student, Biochemistry, University of Virginia



**ETA
ISIORHO (2007)**

B.S. Biochemistry
Indiana University Bloomington
Ph.D. Student, Biochemistry University of Texas-Austin

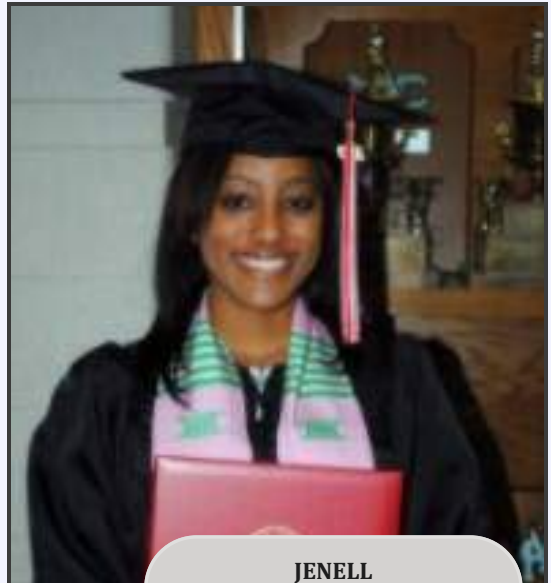


LSAMP INDIANA ALUMNI



**CASSANDRA
ADAMS (2009)**

B.S. Chemistry; B.A. Gender Studies
Indiana University Bloomington
Medical Student, The Ohio University Heritage College
of Osteopathic Medicine



**JENELL
BROWN (2011)**

B.S. Biology, Ball State University
Masters of Public Health Student,
Tulane University



**TAREK
AJAM (2009)**

B.S. Biology, Indiana University Bloomington
Medical Student, IU School of Medicine



**SANNAH
ZIAMA (2008)**

B.S. Physics, IUPUI
Ph.D. Student, Department of Physics,
Purdue University West Lafayette



LSAMP INDIANA ALUMNI



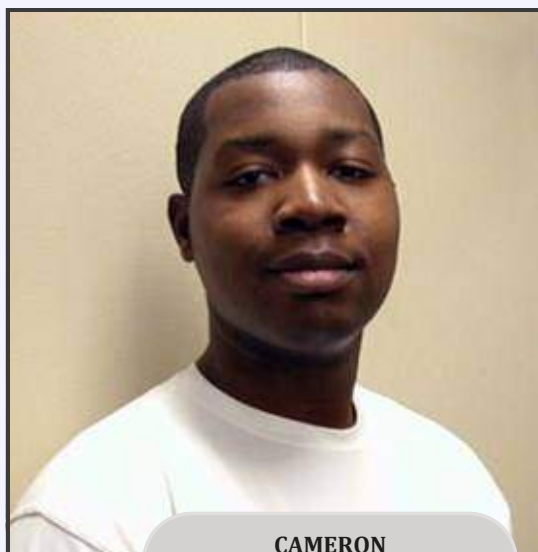
**DOMINIQUE
EDWARDS (2011)**

B.S. Biology Purdue North Central
M.S. Student, Biotechnology
The University of Maryland, University College



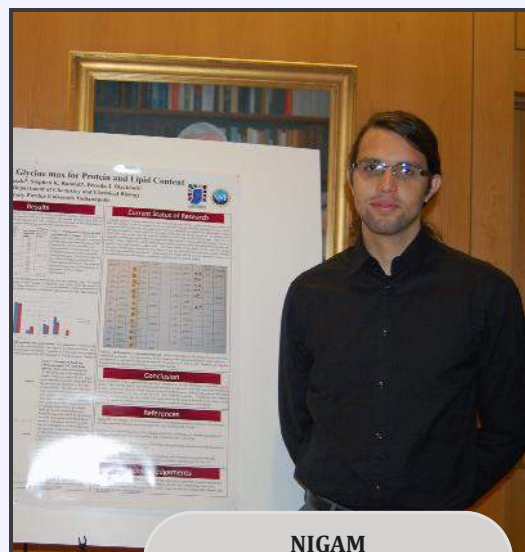
**TANEISHA
SPRINGFIELD—JONES (2011)**

B.S. Chemistry Purdue University West Lafayette
Researcher, Proctor & Gamble



**CAMERON
JILES (2007)**

B.S. Computer Engineering, IUPUI
Software Engineer, Technicolor



**NIGAM
ARORA (2011)**

B.S. Interdisciplinary Studies IUPUI
Ph.D. Student, Interdisciplinary Life Science,
Purdue University West Lafayette



LSAMP INDIANA PROJECT OVERVIEW

Featured Scholar



Photo courtesy of Purdue University 2011

John Franklin
Computer Science
Purdue University West Lafayette

John Franklin, working under the tutelage of his faculty mentor, Dr. Tim Korb, has developed an Android mobile application to help elementary school students improve literacy outside of the classroom. His research has garnered local and national attention. In February 2011, John received a travel award to present his research at the Emerging Researchers National (ERN) conference in Washington D.C.

John graduated from Purdue University West Lafayette with a B.S. in Computer Science with a minor in Electrical and Computer Engineering. John is currently working in the field of software development with plans if eventually owning his own business.



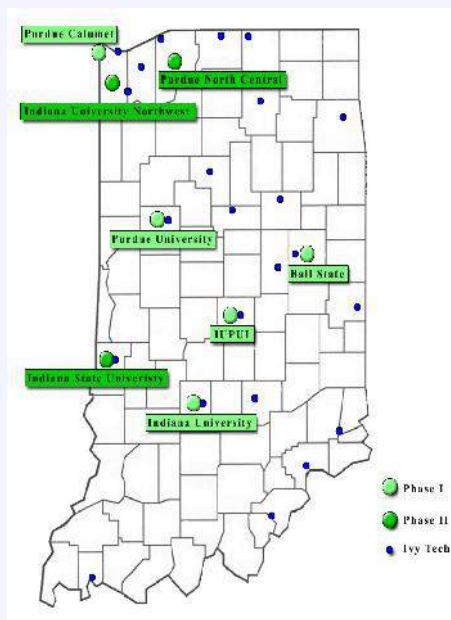
PHASE I

Since the inception of LSAMP Indiana in 2003, under the leadership of Statewide Director Dr. Pamella Shaw, the original five participating institutions: Purdue University, Indiana University, Ball State University, Purdue University Calumet, and IUPUI, built a strong foundation to support underrepresented minority students within the state of Indiana in STEM fields. LSAMP Indiana implemented programs that (1) provided early research enrichment experiences; (2) sustained teaching and mentoring opportunities in gatekeeper and upper-level courses; (3) personalized interactions with graduate students and faculty mentors beginning in students' freshman years; and (4) created professional and personal development opportunities. These early experiences with research and teaching encouraged students to forge and sustain an academic and a social identification within their STEM fields. Thus, LSAMP Indiana was able to increase student participation by almost 100 fold— from 29 students in 2002–03 to 207 students in 2005–06 (Table 1).

Race/Ethnicity	'02-'03	'03-'04	'04-'05	'05-'06	'06-'07
Black or African American	10	49	69	120	158
Hispanic or Latino	6	13	30	42	49
Native American	1	1	3	4	7
Native Hawaiian or Pacific Islander	0	0	1	1	0
More than one race reported – minority	0	0	0	1	3
Non-Minority	9	15	25	26	42
Rate not Reported or Unknown	3	1	10	13	1
Total	29	79	138	207	260

PHASE II

The goals of the Phase II project included (1) expanding the LSAMP Indiana Alliance by three campuses, from five to eight primary members, and adding Ivy Tech Community College as a collaborative partner; (2) expanding the Phase I Summer Transition and Academic Research (STAR) Program for 1st and 2nd year students to the three new Phase II partners; (3) incorporating the Phase I Supplemental Instruction program into a new, more comprehensive program; (4) emphasizing undergraduate research and faculty mentoring that is complemented by Learning Communities, peer tutoring, and professional development activities; and (5) enhancing the Alliance's coordination and development programs to maximize collaboration and effectiveness.



BALL STATE UNIVERSITY

The LSAMP Indiana program has had a notable impact at Ball State University (BSU) and has a tremendous impact on the lives of BSU LSAMP Scholars. At BSU, the LSAMP grant has primarily funded research internship opportunities through a summer research program that is run in conjunction with the Chemistry Research Immersion Summer Program (CRISP) that has been successfully conducted by the chemistry department for the last 35 years. All research is faculty-driven, and students are given safety instructions and training early in the summer. The LSAMP grant has supported 111 Scholars during the 2003-2012 period. Moreover, the LSAMP grant also supports teaching assistantships for graduate students to mentor undergraduates and tutor them, in addition to assisting the Campus Director in collecting and recording data and with other aspects of the program. LSAMP Scholars are also supported to attend and present their research at scientific meetings within their disciplines at the local, regional, and national levels. Since 2003, BSU LSAMP Scholars have made over 250 scientific presentations!

Through their association with other scientific groups such as the Student Affiliate of the American Chemical Society (SAACS), LSAMP Scholars are awarded opportunities to participate in social and educational events such as National Chemistry Week at the Indianapolis Children's Museum and Science Day at the Delaware County Fairgrounds at Muncie, annually. LSAMP Scholars are also involved with the EXCEL program, a program aimed at allowing incoming URM students to become acclimatized to campus life by making connections with peer mentors prior to the start of the semester. Additionally, students are involved with the Explore BSU day for URM high school students that come to campus on a school visit.

Of the 111 students who have participated in the program from 2003-2012, 63 students have graduated with STEM degrees (56.8 %), and 38 of the 63 have entered some level of graduate study, including professional schools. Figure 3 displays BSU's success over time. numbers underscore the success of the program on campus.

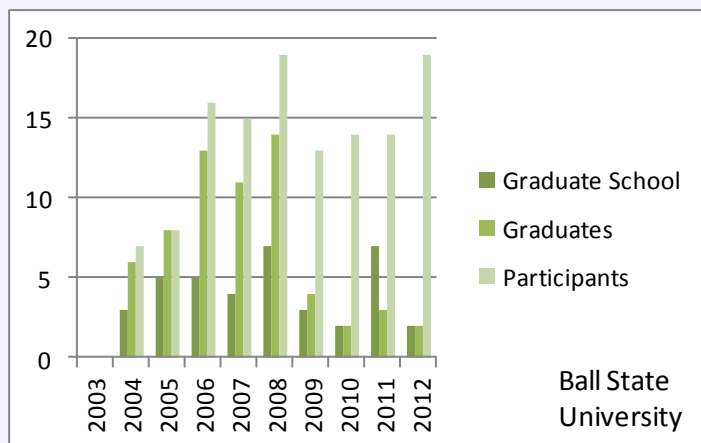


Figure 3– BSU LSAMP Participants, Graduates, and Graduate School Admits

Featured Scholar



Orlando Acevedo
Biology and Cultural
Anthopology
Ball State University

Orlando is currently a graduating senior at Ball State University studying Biology and Cultural Anthropology. Orlando participated in the summer 2011 LSAMP research program and plans to attend graduate school to study Public Health.



Featured Scholar



Nigam Arora
Biology and Chemistry
IUPUI

Nigam Arora came to IUPUI to study biology and chemistry focused on renewable energy and graduated with a B.A. from the Honors College in 2011 with a major in Interdisciplinary Studies and a minor in Chemistry. Arora is currently in his Ph.D. program at Purdue University, West Lafayette, pursuing his research interest in renewable energy.



INDIANA UNIVERSITY PURDUE UNIVERSITY INDIANAPOLIS (IUPUI)

In the last ten years, IUPUI has aggressively recruited and enrolled minority students to be commensurate with the proportion of those students graduating from high schools in Indiana and within the IUPUI service area. Efforts have been made on campus to promote diversity in the student population, especially within STEM degree programs. The LSAMP program has served as a catalyst for broadening the participation of URM students in STEM undergraduate programs at IUPUI. It is centrally located in the Center for Research and Learning (CRL) and reports directly to the Vice Chancellor for Research under the leadership of CRL Executive Director, Dr. Rick Ward, a high profile researcher and Professor in Anthropology who is a strong advocate for undergraduate student research.

Unique features of LSAMP at IUPUI include the following:

- Number of degrees in STEM earned by URM students has almost tripled from 29 in 2002 to 85 in 2010 (Figure 5)
- LSAMP activities are fully integrated into the mainstream of undergraduate learning and are academically aligned with IUPUI's RISE initiative—Research, International, Service Learning, and Experiential Learning.

In the past ten years, there has been an increase of faculty participation in mentoring undergraduate researchers. As each LSAMP student is paired with a STEM faculty through the Summer Research Training program, the number of faculty mentors has grown from 6 in 2003 to 42 in 2011. Several faculty members have served as mentors to more than one LSAMP student. Many faculty members include LSAMP students in their peer-reviewed publications and continue mentoring the students through graduate school and into their STEM careers.

Academic and social integration are the underlining features of LSAMP programming at IUPUI, and the impacts on student achievement are significant—a 98% retention rate and a 90% graduation rate of LSAMP scholars at IUPUI (in four years). Currently there are four LSAMP Scholars enrolled in Ph.D. programs, one has earned a M.D., one is in medical school, and five scholars have completed M.S. STEM degrees. More than 20 Scholars are employed in STEM fields.

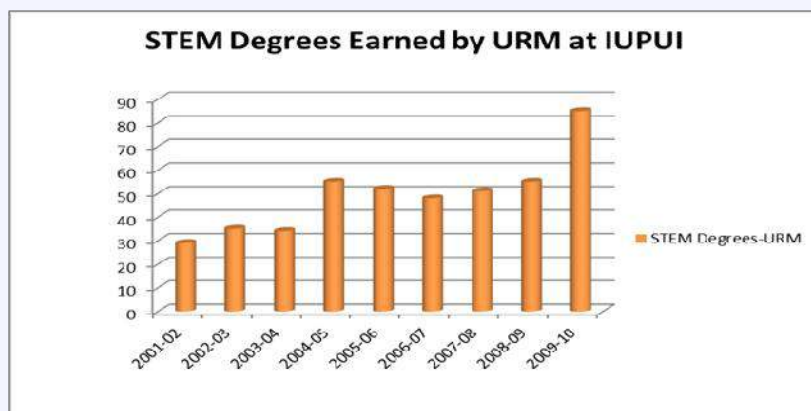


Figure 5- Number of URM STEM Graduates from IUPUI

INDIANA UNIVERSITY BLOOMINGTON

Indiana University (IU) is deeply committed to ensuring that underrepresented students are provided with the encouragement and the support they need as they pursue degrees in STEM disciplines. IU Bloomington is delighted to note the successes of their campus LSAMP programming, which has engaged students in peer mentoring and peer tutoring and has given them invaluable opportunities to engage in faculty-guided research.

IU Bloomington LSAMP has directly supported 27 research scholars and indirectly supported many more student researchers under the supervision of faculty mentors. Of students receiving direct support, all but one have graduated from IU Bloomington, and 91 percent have received degrees in STEM fields.

LSAMP Peer Mentoring at IU Bloomington is a model program that has an enormous impact on the lives of both mentors and mentees. Through a structured program of training, support, and supervision, LSAMP student mentors and mentees engage in constructive dialogue addressing issues surrounding academics, study skills, and personal growth. Since 2003, we have directly supported 503 students in the LSAMP program.

Peer Tutoring also provides valuable support to students as they navigate the challenges of university-level STEM coursework. Each semester, LSAMP funds support the hiring of tutors in Biology, Chemistry, Physics, and Mathematics.

The net impact of these programs has no doubt played a role in the increased graduation rates of underrepresented students in STEM fields on the IU Bloomington campus. In 2003, 36 minority students received STEM degrees; in 2010, IU Bloomington LSAMP graduated 88 students in STEM fields, an increase of 144 percent.

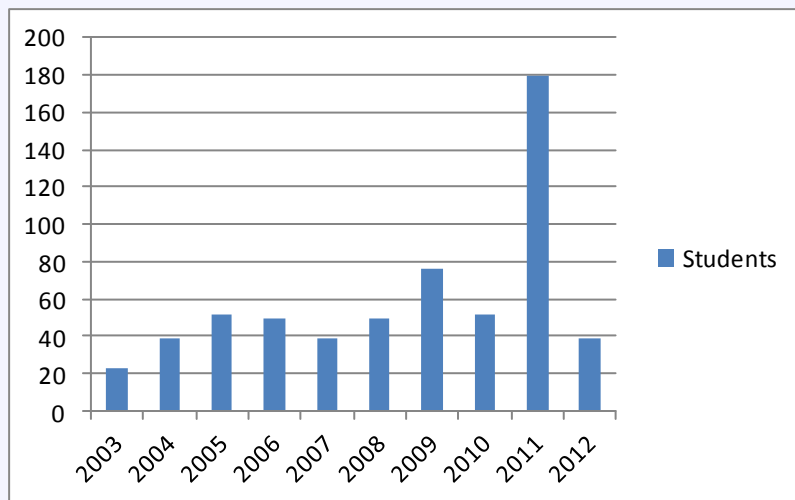


Figure 4 displays the number of LSAMP students who have participated in the program at IU Bloomington.

Featured Scholar



David Beal
Biology
Indiana University
Bloomington

David Beal earned a B.A. in chemistry from Indiana University Bloomington in 2007. He immediately began the MEDPREP program at Southern Illinois University in Carbondale. Currently, David is studying for an M.D. at the Stritch School of Medicine at Loyola University in Chicago.



PURDUE UNIVERSITY CALUMET

Featured Scholar



Ramon Verdusco
Chemistry
Purdue University
Calumet

Ramon received his B.S. in Chemistry in 2007 from Purdue University Calumet and then began graduate studies in Chemistry at the University of Nebraska Lincoln. Ramon began doing undergraduate research early in his academic career and was awarded an LSAMP undergraduate research stipend for the summer 2005. Ramon traveled with his mentor to the University of Nebraska at Lincoln to collaborate with Dr. James Takacs. As a result of this research opportunity, Ramon was awarded the PUC Student Research Award in April 2006. Ramon also presented his work at the Central Regional Meeting of the American Chemical Society (CERMACS) in Covington, Kentucky in May 2007. Ramon is currently employed in the SSCI division of Aptuit in Lafayette as a scientist.



The LSAMP Indiana program has greatly impacted the Purdue University Calumet (PUC) campus and through this program PUC LSAMP have seen a significant increase in the success of underrepresented minority students. Approximately 33% of undergraduate students are URMs, and this is reflected in the consistent and effective engagement of these students in the LSAMP program even though the student population in STEM degree programs has a much smaller number of students that belong to the target population. Figure 8 presents additional information about PUC student numbers.

Much of the success of LSAMP Indiana program on PUC can be attributed to the active involvement of faculty mentors and an institutional commitment to undergraduate research and experiential learning. Currently, 48 faculty members from eight departments are actively involved in mentoring students in the LSAMP program. The LSAMP program is supported through strong collaborations with the Student Research Office and the McNair Achievement Program. The Student Research Office supports LSAMP students by providing opportunities to present their research, financial support for travel to meetings and conferences, and funding for research supplies. LSAMP students join with McNair Scholars at workshops on such topics as research ethics, communicating research results and the graduate school application process. The campus coordinator for the LSAMP program is committed to strengthening these partnerships and further increasing faculty involvement.

Purdue University Calumet has committed to expanding global engagement of students as part of the current Strategic Plan. The growth of international study and research opportunities for students is an integral piece to achieving this goal. The international connections at PUC will transform seamlessly into activities that support the goals of the LSAMP program. PUC has a growing study abroad program with diverse international institutions. PUC faculty members are also engaged in developing research partnerships. Some of these partnerships resulted from the Research Abroad Program in Taiwan (2007), Hong Kong (2008) and Poland (2009). Individual research projects provide the opportunity to engage student in an ongoing project with the possibility of working at the partner laboratory. For example, Dr. Neeti Parashar, an Associate Professor of Physics, frequently mentors LSAMP students and her research activities are accomplished at Fermi National Accelerator laboratory in Batavia, Illinois and at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland. Developing an international model for the PUC LSAMP program will be a compliment to the universities commitment to global engagement.

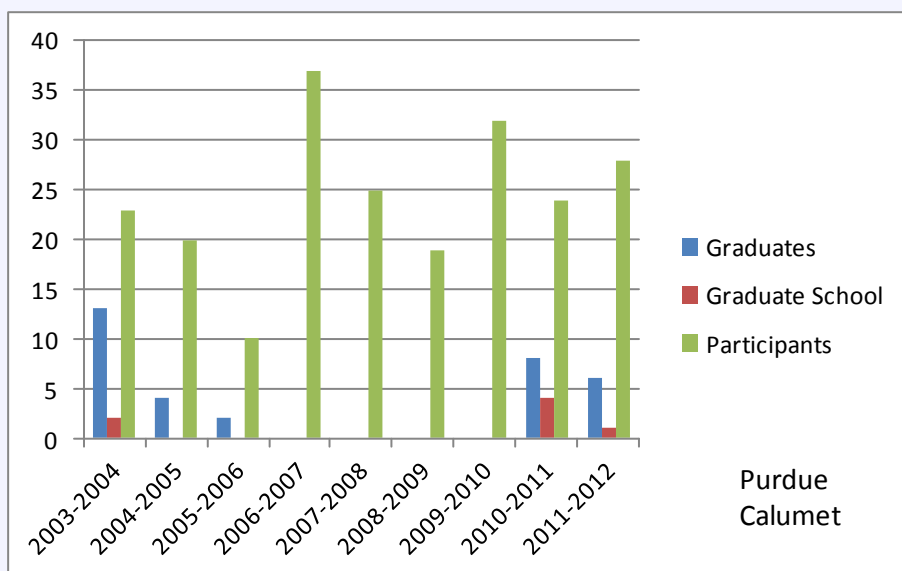


Figure 8– Purdue Calumet LSAMP Participants, Graduates, and Graduate School Admits

PURDUE UNIVERSITY WEST LAFAYETTE

Developing support structures and initiatives for underrepresented and underserved students in STEM disciplines has been a mainstay of Purdue, dating back to 1974 with the creation of the nationally acclaimed Minority Engineering Program (MEP). Since its inception, MEP has provided support for more than 2,400 URM students, who have obtained degrees in engineering from Purdue University. Purdue University is also the birthplace for the National Society of Black Engineers (NSBE), the largest student run organization in the world with membership exceeding 35,000. More recently, Purdue was the first to establish a Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Student Chapter in the Midwest. The work of the Purdue Chapter received national recognition as 2010 Chapter of the Year for their efforts in hosting the first SACNAS Regional Conference in the 30+year history of the SACNAS organization.

Purdue has built an organizational infrastructure within each of its academic units which are designed to provide academic support and mentoring to underrepresented and underserved students. Institutional leadership for the college based initiatives is provided through the Office of the Vice Provost for Diversity and Inclusion. The recent realignment of Purdue's LSAMP program into this office a natural fit for the programmatic endeavors of the project.

Undergraduate students who participate in faculty sponsored research also participate in a one-credit LSAMP Professional Development Seminar that enhances students' research experiences by providing professional development topics, including, but not limited to, reflective journals, group discussions, and career exploration. Invited guest speakers (i.e., faculty, staff, graduate students, and alumni) engage students in topics such as developing a research abstract, creating a research poster and PowerPoint presentations, and successfully navigating the academy as a STEM student.

All Purdue campus research cohorts present their research at the Annual LSAMP Indiana Research conference. The Purdue Campus Program has recently developed a partnership with the Semi-conductor Research Corporation Education Alliance Undergraduate Research Opportunities (SRCEA URO) program through the College of Engineering's Summer Undergraduate Research Fellowship (SURF) Program in an effort to engage LSAMP students with year-long research experiences related to electrical engineering and similar fields of study.

Figure 10 shows the growth of the Purdue LSAMP Program from the start of the program in 2003 until 2012. The total number of participants from 2003 until 2012 is 341 students.

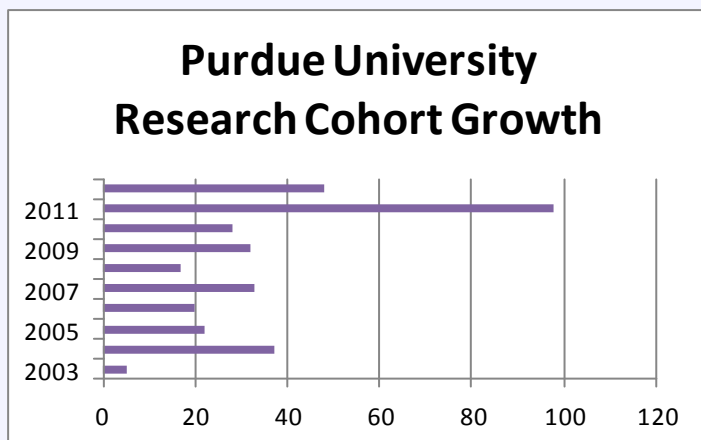


Figure 10– LSAMP Student Affiliation at Purdue University over time

Featured Scholar



(Margaret pictured with Dr. Cox and Dr. Sands)

Margaret Ramos Miller
Biology
Purdue University
West Lafayette

Margaret Ramos Miller is currently a junior at Purdue University West Lafayette studying Biology. During her freshman year, Margaret began conducting LSAMP research under the tutelage of Dr. Claudio Aguilar. During the 2011 Spring break, Maggie traveled to Las Delicias, El Salvador where she assisted in various renovations and health related projects through the Foundation of International Medical Relief of Children. In December 2011, Maggie will accompany her faculty mentor, Dr. Aguilar, to Denver, Colorado, to present their research at the American Society for Cell Biology Annual Meeting. Most recently, Margaret research placed first at the 2013 LSAMP Indiana Research and Alliance Enrichment Conference.



PURDUE UNIVERSITY NORTH CENTRAL

Featured Scholar



Dominique Edwards
Biology
Purdue University
North Central

Dominique Edwards graduated with a B.S. in Biology from Purdue University North Central. Dominique is currently pursuing a M.S. in Biotechnology from the University of Maryland, University College.

The LSAMP Indiana program has created a tremendous number of opportunities for undergraduates at Purdue University North Central (PNC). In the past four years, three minority students involved in the LSAMP Indiana program graduated with a Bachelor's degree in Biology (Carlos Garzo, Megan McGlothin, and Dominique Edwards). This demonstrates that LSAMP has made an impact at PNC, because prior to these three graduates, no minority students had graduated with a bachelor's degree in any STEM field at PNC.

The number of faculty participating in LSAMP has also increased. This is demonstrated not only by the increase in research at PNC but also in the number of PNC STEM faculty attending research conferences with students, including annual trips to the Butler Undergraduate Research Conference, the Indiana Academy of Science, and the LSAMP Indiana Annual Research Conference.

PNC LSAMP participants have given a total of twenty-four presentations, including nine at the Butler Undergraduate Research Conference, twelve at the LSAMP Conference, and two at an American Chemical Society (ACS) meeting.

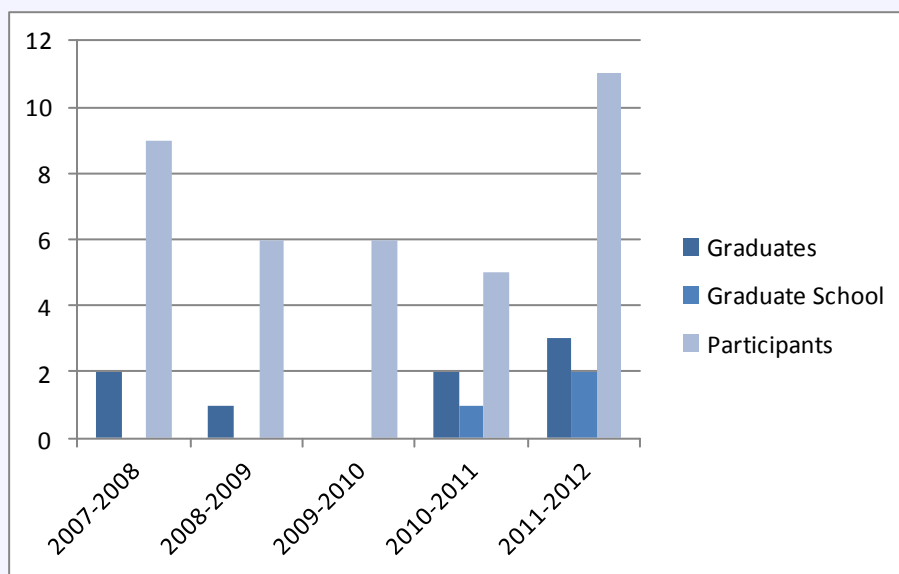


Figure 9– Purdue North Central LSAMP Participants, Graduates, and Graduate School Admits



INDIANA STATE UNIVERSITY

Indiana State University (ISU) joined the Indiana LSAMP Alliance in 2007 at the beginning of the Phase II grant. The LSAMP Program at ISU consists of faculty sponsored research that provides stipends for students, research expenses and supplies, and travel support. To date, 37 students have been supported in some way with LSAMP funds, and 14 different faculty mentors have been involved in the program from biology, chemistry, geosciences, and physics. Most students who participate in the LSAMP Program focus on summer research opportunities through the Summer Undergraduate Research Experience (SURE). SURE usually has 30 or more students each summer, and LSAMP supports four to eight of those students as either part-time or full-time SURE participants. Many of these students continue their research in the fall, and often present their research at regional and national meetings. Data about the number of ISU LSAMP participants, graduates, and graduate school admits are presented in Figure 6.

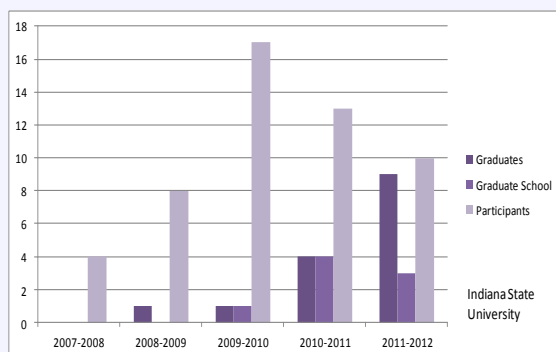


Figure 6—ISU LSAMP Participants, Graduates, and Graduate School Admits

INDIANA UNIVERSITY NORTHWEST

The Special Retention Programs Office is responsible for the implementation of the Indiana University Northwest LSAMP program. The IUN LSAMP program consists of two summer programs- Summer Transition to College and Summer Research Project. The Summer Transition to College program focuses on creating a cohort of math and science majors and providing them with experienced mentors from those majors. These students participate in summer workshops and other activities, including networking opportunities with faculty in Science and Math disciplines. Additional supplemental instruction leaders and tutors are available for these courses.

The Summer Research Project pairs students with a faculty mentor in their field to develop and to pursue a research project. Students participating in this aspect of IUN LSAMP will receive a stipend and the opportunity to present their original research at the LSAMP- Indiana Annual Research Conference. Data about IUN LSAMP participants, graduates, and graduate school admits are displayed in Figure 7.

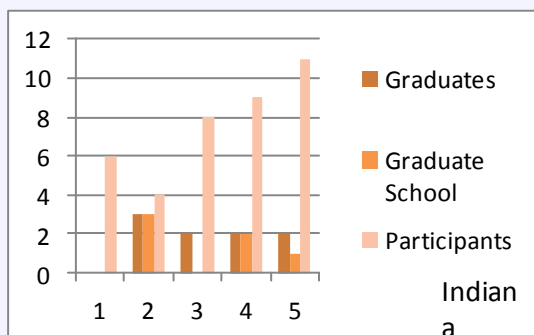


Figure 7—IUN LSAMP Participants, Graduates, and Graduate School Admits

Featured Scholar



Miracle Anokwute
Biology
Indiana University
Northwest

Miracle Anokwute received his B.S. degree in Biology and minors in Chemistry and Psychology at IU Northwest. At the Indiana University School of Medicine-NW, Miracle studied the age related changes of the corneal innervation: implications for understanding “dry eye.” Miracle also served as a Supplemental Instruction leader for Biology and participated in the 2011 International Human Cadaver Prosection Program at IU Northwest. The LSAMP grant gave him the opportunity to apply the concepts that he has learned in his subject area and to interact with experts in his field of study.



Featured Scholar



Jazmine Luckey
Agricultural and Biological
Engineering
Purdue University
West Lafayette

Jazmine Luckey participated in the first Cohort of LINK scholars for LSAMP- Indiana. She attended Ivy Tech Community College- Lafayette Campus majoring in Chemical Technology. She was accepted to conduct research on the Purdue West Lafayette campus under the tutelage of Dr. Klein Ileije. From participating in the LSAMP Research program, Jazmine was able to decide her STEM major. After learning more about the academic possibilities afforded on the Purdue campus, with the assistance of the LSAMP staff, Jazmine applied and was accepted into Purdue to study Agricultural and Biological Engineering.



LEVERAGING INSTITUTIONAL NETWORKING AND KNOWLEDGE (LINK)

According to the U.S. Census Bureau, more than 25% of Indiana's high school graduates continue their educations at two-year or vocational programs. Leveraging Institutional Networking and Knowledge (LINK) is an initiative to connect STEM Associate's degree students with LSAMP Indiana universities. LINK provides students with the confidence and experiences they need to address the challenges of pursuing a Bachelor's degree in a STEM discipline at a four-year university. LINK students spend a summer conducting research and taking a course at one of the Alliance's universities while learning strategies for transitioning to a LSAMP Indiana campus.

LSAMP Indiana's primary community college partner is Ivy Tech, a statewide open-admissions community college with twenty-three campuses offering two-year associate's degrees and one-year technical certificates. It is the second-largest postsecondary institution in Indiana, serving more than 102,000 students each year. In summer 2011, three Ivy Tech students, Anna Mirza, Dario Santos, and Jazmine Luckey (see panel), conducted research at Alliance campuses as members of the first LINK Cohort. Due to support from Ivy Tech faculty and administrators, LSAMP Indiana has seen a promising growth with this program.

In Fall 2011, Ivy Tech Lafayette and Ivy Tech Columbus campuses became our primary partners to assist in the recruitment of STEM students and the organization of activities to engage their students and faculty in research opportunities with the LSAMP Indiana Alliance. To date, eighteen Ivy Tech students have participated in research programs at our four year alliance institutions. Three students have matriculated to Purdue University West Lafayette and IUPUI to pursue a baccalaureate degree in a STEM field. In addition, of these eighteen students, five have participated in an international research experience in Hidalgo, Mexico researching sustainable wastewater management systems. At the 2013 LSAMP Indiana Research and Alliance Enrichment conference, Ivy Tech research scholars Lasha Figueroa and Aaron Tucker research received second place and Maria Cunningham research received the Student's Choice award.



Ivy Tech LSAMP research scholars pictured with Ivy faculty and administrators

LSAMP ANNUAL RESEARCH AND ALLIANCE ENRICHMENT CONFERENCE

LSAMP Indiana hosts an annual conference to create and to support a group of caring and well-informed individuals at all levels of the university who can respond to minority students' needs, concerns, and experiences. The conferences create a forum for LSAMP students to present their research projects and to share their experiences with students from other Alliance campuses. In order to enhance the LSAMP students' identifications with STEM disciplines, conference speakers include outstanding research scholars and/or LSAMP alumni who can discuss their research or experiences as a member of an underrepresented group in STEM.

A timeline of LSAMP Indiana Research Conference Activities are presented below:

November 2003

The LSAMP Indiana 1st Annual Research and Enrichment Conference was held at Purdue University West Lafayette. There were 75 attendees, including 17 students. Twelve students presented their research topics.

November 2004

The LSAMP Indiana 2nd Annual Research and Enrichment Conference was held at Indiana University Bloomington. There were 77 attendees, including 38 students. Fifteen students presented their research topics, and three students presented posters.

November 2005

LSAMP Indiana and the Midwest Crossroads AGEP alliances hosted their 1st "Joint Annual LSAMP/AGEP Conference" on the Indiana University - Purdue University Indianapolis campus. There were 151 students, faculty, administrators and guests in attendance at the conference.

November 2006

LSAMP Indiana held its 2nd Joint Annual Conference with the Midwest Crossroads AGEP alliance at Purdue University West Lafayette.

November 2007

LSAMP Indiana hosted its 3rd Joint Annual Conference with the Midwest Crossroads AGEP at Indiana University Bloomington

November 2008

LSAMP Indiana hosted its 4th Annual Joint Annual Conference with the Midwest Crossroads AGEP at Purdue University West Lafayette. We were honored to have Dr. A. James Hicks, NSF LSAMP Program Director, as our keynote speaker for the conference. There were over 223 students, faculty, staff, and administrators registered for the conference. One-hundred six undergraduate and graduate students collaborated to present poster and oral presentations.

November 2009

The LSAMP Indiana 3rd Annual Research and Enrichment Conference was held at Purdue University West Lafayette. There were over 93 students, faculty, staff and administrators registered for the conference. Seventy-nine LSAMP Indiana undergraduate students collaborated to present poster and oral presentations.

November 2010

The LSAMP Indiana 4th Annual Research and Enrichment Conference was held at Purdue University West Lafayette. There were over 120 students, faculty, staff and administrators registered for the conference. Thirty-five LSAMP Indiana undergraduate students collaborated to present poster and oral presentations.

April 2013

The LSAMP Indiana 5th Annual Research and Enrichment Conference was held at Purdue University West Lafayette. There were over 155 students, faculty, staff and administrators registered for the conference. Sixty LSAMP Indiana undergraduate students collaborated to present poster and oral presentations.



Mentoring and Diversity Webinar



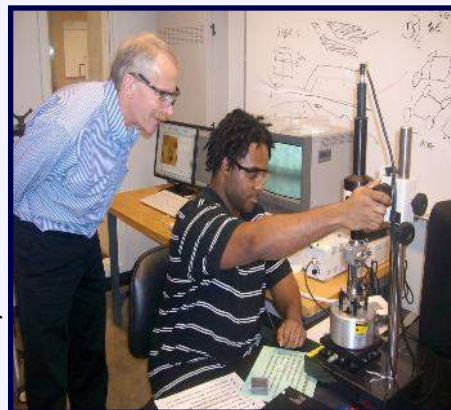
Under the leadership of current LSAMP Indiana Statewide Director Dr. Monica F. Cox, the LSAMP Indiana Alliance staff has developed a directory of STEM faculty across Alliance campuses. This directory has allowed the Alliance to inform and to recruit mentors for LSAMP-eligible students and has allowed Alliance staff to solicit feedback about ways to increase student participation in programmatic events. Via this communication, the Alliance has discovered that time constraints associated with travel prevents many faculty from participating in on-campus trainings. Therefore, the Alliance, in collaboration with the Purdue Diversity Resource Office, hosted its first statewide mentoring and diversity webinar, October 2011. This webinar allows STEM faculty across the state of Indiana to participate virtually in an in-depth training sessions about mentoring diverse students. An electronic version of the LSAMP Indiana Mentoring and Diversity manual is located online at www.purdue.edu/discoverypark/lsamp-indiana/information/faculty-staff.php.



BRIDGING THE GAP BETWEEN FACULTY AND STUDENTS

Annually, the LSAMP Indiana Alliance is evaluated by the Goodman Research Group (GRG), Inc. From information gathered through surveys and campus visits, it is clear that strong mentoring relationships directly impact student success as they navigate through the academy.

Our LSAMP Indiana faculty mentors are not only some of the best and most talented researchers within their respective fields, but they have proven their strong commitments to increasing the number of URM students earning baccalaureate degrees in STEM fields. Mentors dedicate their time to serving the needs of LSAMP scholars, and they open their labs to inexperienced undergraduate students who actively participate in high quality research experiences.



To ensure the mentoring relationship is beneficial to both the faculty mentor and student, the LSAMP Indiana Alliance, in collaboration with the Purdue University Diversity Resource office, developed a Mentoring and Diversity Handbook for faculty in 2004 and later finalized an accompanying student edition in 2011 (see panel). These handbooks, along with corresponding mentoring and diversity workshops, focus on mentoring diverse students and providing in depth tools and resources to ensure that the LSAMP relationship is beneficial and enjoyable for both the mentor and mentee.

The impact of these mentoring relationships is outstanding. From a survey issued by the GRG, a LSAMP mentor stated, "Both students that I mentored through LSAMP not only remained within our program, but also excelled, and are now some of the best students in the department. My first LSAMP student is now in graduate school."

By opening research labs and entrusting students to working independently on various components of a research project, scholars are responsive and receptive to the guidance provided by mentors. From these research projects, LSAMP Indiana scholars have participated in local, state, and national poster symposiums to present their research and have accompanied their mentors to various STEM conferences across the nation. These experiences are significant because they allow scholars opportunities to network with other researchers in their fields of study and to learn more about opportunities within their majors. Some scholars have also reported that traveling to a research conference allowed them to take their first plane rides and to visit regions outside of the state of Indiana.



LSAMP INDIANA INITIATIVES

SOPHOMORE RESEARCH-BASED LEARNING COMMUNITY

In 2011, LSAMP Indiana partnered with the Student Access, Transition and Success Programs Office at Purdue University to launch a LSAMP Sophomore Research-Based Learning Community (SRBLC). Students in the LSAMP SRBLC live, learn, and study with other LSAMP-eligible students with similar STEM academic goals; conduct research with a faculty mentor; participate in weekly professional development workshops; obtain mentoring and academic coaching from graduate students in the NSF-funded Alliance for Graduate Education and the Professoriate (AGEP) Program; and participate in a service-learning project. As a member of the SRBLC, LSAMP students receive financial support to conduct research; attend and present research at local, regional, and national STEM conferences; prepare for graduate school in STEM disciplines; and gain professional skills to enter the STEM workforce.

SOCIAL NETWORKING, RECRUITMENT, AND COMMUNITY BUILDING

One of the goals of the Phase II LSAMP grant was to create a statewide database with current contact information of LSAMP-eligible students. In addition to compiling this information, LSAMP Indiana have created a directory containing contact information of STEM faculty across the eight Alliance institutions. Using a listserv created exclusively for the Alliance, LSAMP Indiana periodically informs STEM faculty across Indiana about Alliance initiatives and campus happenings. Via this directory, STEM faculty who have never engaged with LSAMP have inquired about ways that they can partner with the program to engage students in on-campus and international research opportunities. This listserv will be used in the future to invite STEM faculty to Alliance-sponsored mentoring workshops, to solicit partners for co-sponsored LSAMP research initiatives, and to identify faculty who can provide expertise in areas of interest to students and faculty in the Alliance.

STEM FACULTY DATABASE & LISTSERV CREATION

One of the goals of the Phase II LSAMP grant was to create a statewide database with current contact information of LSAMP-eligible students. In addition to compiling this information, LSAMP Indiana have created a directory containing contact information of STEM faculty across the eight Alliance institutions. Using a listserv created exclusively for the Alliance, LSAMP Indiana periodically informs STEM faculty across Indiana about Alliance initiatives and campus happenings. Via this directory, STEM faculty who have never engaged with LSAMP have inquired about ways that they can partner with the program to engage students in on-campus and international research opportunities. This listserv will be used in the future to invite STEM faculty to Alliance-sponsored mentoring workshops, to solicit partners for co-sponsored LSAMP research initiatives, and to identify faculty who can provide expertise in areas of interest to students and faculty in the Alliance.

Featured Scholar



Kyasha Edmond
Industrial Technology
Purdue University
West Lafayette

Kyasha Edmond is a graduating senior at Purdue University West Lafayette completing a degree in Industrial Technology. As a research scholar, working under the tutelage of Dr. Henry Kraebber, Kyasha has been able to travel to Germany and Costa Rica to collect data towards her research in the area of LEAN Healthcare. Recently, Kysha's research has been accepted in the Journal of Purdue Undergraduate Research (JPUR) for publication.



LSAMP INDIANA STUDENT AMBASSADORS

Featured Scholar



Kehara Taylor
Mathematics and
Computer Science
Purdue University
West Lafayette

Kehara Taylor is currently a junior at Purdue University studying Mathematics and Computer Science. She conducted research focused on Engineering Education in the summer of 2011 under the tutelage of Dr. Monica F. Cox. From this experience and using her organizational and leadership skills, Kehara assists in the recruitment of underrepresented minority students from Purdue University to participate in LSAMP Indiana activities and K-12 service learning projects.



In the spring of 2012, at the urging of research scholars from the Purdue University West Lafayette campus, LSAMP Indiana began its LSAMP Student Ambassador Program. Student Ambassadors work together to develop new initiatives to better serve underrepresented minority students majoring in a STEM discipline within the state of Indiana. Due to these students, LSAMP has had an

increase in the number of student participants in webinars, students networking social activities, and professional development workshops. One of the greatest attributes of these ambassadors is their commitment to providing STEM related service learning experiences to underrepresented minority K-12 students.

With LSAMP Indiana staff only serving in an advisory role, LSAMP ambassadors are required to write proposals to secure funding from various institutional departments, develop programmatic activities, work within the budget of funds awarded, and create evaluations for the visiting students and their chaperones (which includes K-12 teachers, administrators, and parents). At the conclusion of each service learning project activity, ambassadors are required to submit a final report including their evaluation findings to the LSAMP Indiana office. To date, these scholars have successfully raised over ten thousand dollars and has impacted over 224 K-12 students!



LSAMP Ambassadors (light blue shirts) pictured with fourth—sixth grade students from Murray Language Academy

LSAMP INDIANA IMPACT DATA

Figure 11 displays information about the total number of LSAMP student participants, the number of graduates, and the number of students entering graduate school.

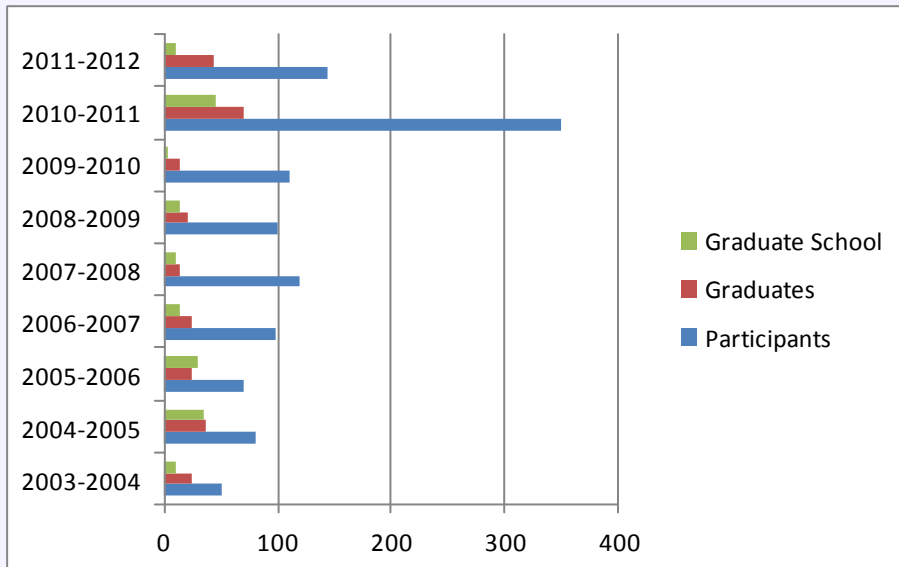


Figure 11– LSAMP Indiana Participants, LSAMP Graduates, and LSAMP Graduate Enrolled in Graduate School (~1,463 students)

Figure 12 displays the number of LSAMP STEM degree recipients LSAMP program at the beginning of the LSAMP funding period and during the most recent academic year.

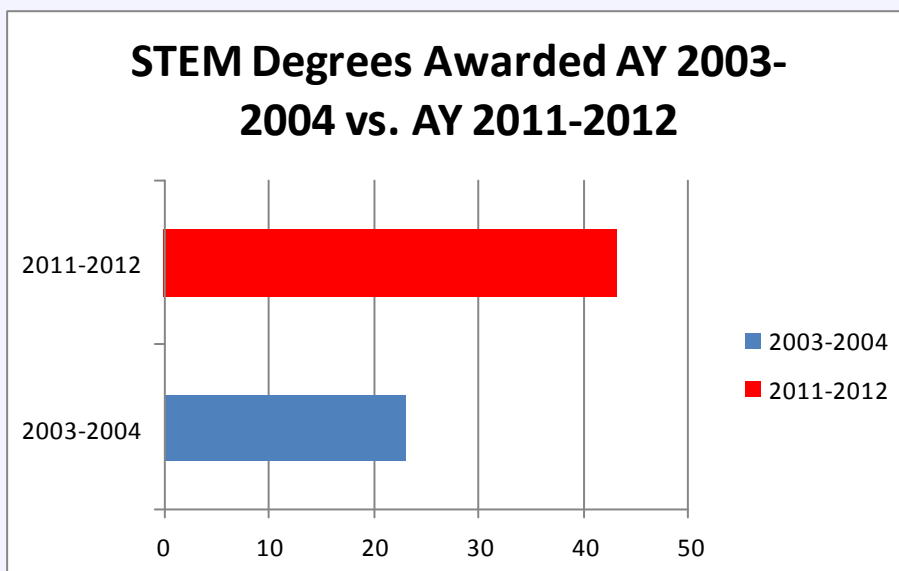


Figure 12– STEM Degrees Awarded to LSAMP Students: Comparison of Academic Year 2003-04 vs. Academic Year 2011-12

LSAMP Indiana Institutional Collaborators

- Bethune Cookman College
- Howard University
- Alabama A & M University
- Miami University (Ohio)
- Midwest Crossroads Alliance for Graduate Education and the Professoriate (AGEP)
- IU Graduate School
- IU Medical School
- IU Biology Department
- IU Chemistry Department
- IU Academic Center
- Indiana Space Grant Consortium
- IU School of Dentistry
- IU School of Optometry
- IU School of Nursing
- IU School of Public and Environmental Affairs
- Purdue MARC/AIM Summer Research Program
- Purdue /NASA Specialized Center of Research and Training for Advanced Life Support (NSCORT)
- Purdue College of Agriculture
- Purdue College of Engineering
- Purdue College of Science
- IU Hudson and Holland Scholars Program
- IUPUI McNair Scholars
- Purdue Summer Research Opportunity Program (SROP)



LSAMP Indiana Industrial & Governmental Collaborators

- Allison Transmission
- The Children's Museum of Indianapolis
- Crane Naval Surface Warfare Center
- Eli Lilly
- Rolls-Royce
- Eastman Chemical Company
- Marion County Forensic Services Agency
- The National Aeronautics and Space Administration (NASA)
- Indiana Pacers Foundation
- NCAA Hall of Champions
- Brownsburg Challenger Learning Center
- Project SEED Indiana
- Minority Access, Inc.
- Cook, Inc.
- Indiana Department of Transportation
- The Office of U.S. Senator Richard Lugar
- The Office of U.S. House of Representative Andre Carson



ECONOMIC IMPACT

LSAMP Alliance campuses provide students with numerous opportunities to engage with world-class researchers in state-of-the-art facilities. At Purdue, more than 10 major construction projects have taken place since 2001, each providing more space for students to learn and collaborate with others in STEM fields. Among these projects include the \$52 million Neil Armstrong Hall of Engineering and the \$25 million Hall of Discovery Learning and Research, a facility that offers innovative spaces for STEM students to engage. Purdue's Global Policy Research Institute, under the leadership of former NSF Director Arden Bement, provides opportunities for faculty, staff, and students to engage in issues of global STEM policy while advancing research discoveries impacting society. At IU Bloomington, Multidisciplinary Science Building Phase II and Simon Hall allow hundreds of science researchers to conduct interdisciplinary research. With a \$15 million award from the Lilly Endowment, Inc., IU Bloomington will soon be home to the Pervasive Technology Institute. At Ball State University, a strong emphasis on media technology will allow LSAMP students to connect STEM activities to the university's Emerging Media Initiative. At Indiana State University, a \$1.5 million grant received from the NSF in 2010 will be used to renovate seven research labs in chemistry, geology, and biology, thereby allowing LSAMP students to conduct high quality experiments in these disciplines. At Purdue North Central, students engage in research with veterinarian investors within 50 miles of the campus at the \$1.4 million North Central Veterinary Emergency Center. At IUPUI, the university funds Signature Centers that, along with hundreds of other centers at IUPUI, provide cutting-edge opportunities for students interested in making research impacts in the state, nation, and world.



Jennifer Latimer, Indiana State University Campus Director and Assistant Professor of Geology, works in her research lab, one that was renovated at ISU using NSF funds.

ACKNOWLEDEMENTS

The LSAMP Indiana Alliance would like to acknowledge Dr. James Hicks, Dr. John Rand, and other NSF LSAMP Program staff for their continued support and guidance to LSAMP Indiana administrators, faculty, staff, and students. This book would not be possible without the leadership of current PIs Dr. Timothy Sands, Dr. Monica F. Cox, and former LSAMP Indiana PIs Dr. Sally Mason, Dr. Beverly Davenport-Sypher, and Dr. Pamela Shaw. Thank you also to Ball State, Indiana State, IUPUI, IU Bloomington, IU Northwest, Purdue Calumet, Purdue North Central, and Purdue West Lafayette administrators, staff, faculty, and students for providing their energy to this statewide project. We acknowledge the generous contributions of industrial, institutional, and governmental partners, and look forward to continuous collaborations with them.

Dr. Cox would like to thank LSAMP Indiana alumni and LSAMP campus directors for their continued support of the program and its mission along with the LSAMP Indiana Alliance staff for diligently working to produce an Impact Book that represents the efforts of hundreds of individuals who are ready to change the landscape of STEM education.

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For more information
about upcoming events and
initiatives within the
LSAMP Indiana Alliance,
VISIT US ON THE WEB!

[www.purdue.edu/
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