

ANNUAL REPORT



LEAD EXECUTIVE TEAM

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Principal Investigator

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YEAR 3 2013-2014

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PARTICIPANTS

Participants

A. PEOPLE

Alliance Lead Executives

David Holger

Principal Investigator

Associate Provost and Dean of the Graduate College

Iowa State University

Dr. Holger provides executive oversight and guidance to the IINSPIRE-LSAMP project. He serves as the primary contact for the lead executive team and facilitates collaboration with the governing board.

Alliance Co-Principal Investigators

The co-principal investigators provide executive input on the IINSPIRE-LSAMP project, collaborate with the lead executive team, and provide support to the alliance director and individual campus directors.

Raynard Kington

Co-Principal Investigator

President

Grinnell College

Kim Linduska

Co-Principal Investigator

Executive Vice President for Academic Affairs

Des Moines Area Community College

Harry Martyn

Co-Principal Investigator

Department Chair, Science

Little Priest Tribal College

Frederik Ohles

Co-Principal Investigator

President

Nebraska Wesleyan University

Alliance Leadership Team

Diane Rover

Alliance Director

Professor of Electrical and Computer Engineering

Iowa State University

Dr. Rover serves as the alliance director for the IINSPIRE-LSAMP project. She provides daily oversight of alliance level activities among all 16 institutions, ensures the PI team is informed of IINSPIRE-LSAMP activities, successes, and challenges, and communicates and implements PI team and governing board directives.

Jim Swartz
Inclusive Pedagogy Leader
Dack Professor of Chemistry
Director of the Center for Science in the Liberal Arts
Grinnell College

Dr. Swartz provides guidance to achieve the inclusive pedagogy objective. He works closely with the Science Education Resource Center (SERC) to implement and facilitate pedagogy workshops and develop an intranet site for the IINSPIRE alliance to conduct pedagogy development activities.

Soko Starobin
Internal Assessment Evaluator
Professor, School of Education
Iowa State University

Dr. Starobin coordinated assessment and evaluation for the IINSPIRE-LSAMP program during the beginning of year 3. She had overseen the design and implementation of a research and evaluation framework and worked in close collaboration with the External Evaluation Consultant.

Frankie Santos Laanan
Internal Assessment Evaluator
Professor, School of Education
Iowa State University

Dr. Laanan directs assessment and evaluation for the IINSPIRE-LSAMP program. He oversees the design and implementation of a research and evaluation framework. He works in close collaboration with the External Evaluation Consultant.

Mary Darrow
Assistant Director and Evaluation Coordinator
Graduate College Iowa State University

Dr. Darrow provides assistance to the program director and evaluation team. She assists with the implementation of program activities and developing the IINSPIRE-LSAMP evaluation framework.

Danielle Mitchell
Program Manager
Graduate College
Iowa State University

Ms. Mitchell provides support to all aspects of the IINSPIRE-LSAMP project. She assists in scheduling and providing agendas for meetings, maintaining the website, writing reports and memos, organizing program workshops and conferences, and provides faculty support.

Mariko Chang
External Evaluation Consultant

Dr. Chang is an experienced evaluator who consults with institutions around the country to evaluate programs for broadening the participation of underrepresented groups in STEM fields and to measure the broader impacts of research and education projects. She has developed the program's formal evaluation plan, works with the Internal Assessment Evaluator and Evaluation Coordinator to implement this plan, and performed annual program evaluations of the project.

J. Adin Mann III
Alliance External Partners Liaison
Principal Engineer

Fisher Value Division, Emerson Process Management

Dr. Mann developed the IINSPIRE-LSAMP proposal before leaving Iowa State University. He is currently employed at the Fisher Value Division of Emerson Process Management, which is an IINSPIRE-LSAMP alliance advocate. Dr. Mann serves as the alliance external partners liaison to provide leadership among the alliance partners and between the partner community and the alliance.

Steering Council *(alphabetical by institution)*

Campus directors provide oversight of IINSPIRE-LSAMP project activities on their respective campuses. They serve as the lead contact for faculty, staff, and students. Campus directors are responsible for developing STEM campus activities and increasing student recruitment and retention in STEM fields.

Lori Scott

Professor of Biology
Augustana College

Kari Hensen

Associate Dean of Arts and Sciences
Des Moines Area Community College

Sharmin Sikich

Assistant Professor of Chemistry
Doane College

Brian Ritter

Department Coordinator for Conservation Technology
Eastern Iowa Community College District

Jim Swartz

Dack Professor of Chemistry
Director of the Center for Science in the Liberal Arts
Grinnell College

Cynthia Bottrell

Dean of Mathematics, Natural and Social Sciences
Hawkeye Community College

Derrick Rollins

Professor of Chemical and Biological Engineering, Professor of Statistics
Iowa State University

Linda Barnes

Associate Professor of Biology
Iowa Valley Community College District

Lara Thoms

Office Associate Evaluation and Program Effectiveness
Iowa Valley Community College District

Juanita Limas

Professor of Anatomy & Physiology/Nutrition
Kirkwood Community College

Harry Martyn

Department Chair, Science
Little Priest Tribal College

Bradley Chamberlain

Associate Professor of Chemistry
Luther College

Candice Howell

Assistant to the Provost for Student Success and Diversity
Nebraska Wesleyan University

Richard Hichwa

Senior Associate Vice President for Research
University of Iowa

Douglas Mupasiri

Department Head and Professor of Mathematics
University of Northern Iowa

Katherine McCarville

Associate Professor of Geosciences
Upper Iowa University

LeAnn Faidley

Assistant Professor of Engineering
Wartburg College

Alliance Graduate and Undergraduate Students (*alphabetical by institution*)

Graduate and undergraduate students assisted the IINSPIRE-LSAMP campus directors and staff with event planning and coordination, assisting the evaluation team, compiling resources, drafting written documents, and updating the website.

Graduate Students

Anne Howsare Boyen

PhD Candidate, School of Education
Iowa State University

Steven Johnson

Masters Candidate, Student Affairs Administration
Michigan State University

Korey Kollasch

Masters Candidate, School of Education
Iowa State University

Kahntinetta Pr'Out

PhD Candidate, Mechanical Engineering
Iowa State University

Ryan Williams

Masters Candidate, Graphic Design
Iowa State University

Undergraduate Students

Eduardo Acosta

Junior, Management Information Systems
Iowa State University

Sonia Almodovar

Sophomore, Mathematics
Doane College

Mason Bishop

Sophomore, Construction Engineering
Iowa State University

Muijj Ghani
Junior, Biology
Doane College

Kayla Greiner
Senior, Agriculture and Life Science Education
Iowa State University

Courtnee Jackson
Junior, Aerospace Engineering
Iowa State University

John Le
Junior, Chemistry
Augustana College

Alliance Governing Board (*alphabetical by institution*)

The governing board provides consultation on overall direction and critical issues facing the project.

Margaret Farrar
Associate Dean of the College
Augustana College

Kim Linduska
Executive Vice President and Provost
Des Moines Area Community College

John M. Burney
Vice President for Academic Affairs
Doane College

Ellen Kabat-Lensch
Executive Director of Resource Development and Innovation
Executive Director of ATEEC
Eastern Iowa Community College District

Jim Swartz
Dack Professor of Chemistry
Director of the Center for Science in the Liberal Arts
Grinnell College

Jane Bradley
Vice President for Academic Affairs
Hawkeye Community College

Jonathan Wickert
Senior Vice President and Provost
Iowa State University

Christopher Russell
Dean of Students and Academic Affairs
Iowa Valley Community College District

Bill Lamb
Vice President for Academic Affairs
Kirkwood Community College

Christopher Stockdale
Academic Dean
Little Priest Tribal College

Kevin Kraus
Vice President for Academic Affairs and Dean of the College
Luther College

Judy Muyskens
Chief Academic Officer, Provost
Nebraska Wesleyan University

P. Barry Butler
Executive Vice President and Provost
University of Iowa

Michael Licari
Associate Provost for Academic Affairs
Dean of the Graduate College
Associate Professor of Political Science
University of Northern Iowa

William Duffy
President
Upper Iowa University

Kurt Wood
Provost
Upper Iowa University

Mark Biermann
Vice President for Academic Affairs
Wartburg College

Alliance Campus Team Members

Alliance campus team members work one-on-one with students participating in IINSPIRE-LSAMP activities or assist the campus director with administration and planning of LSAMP events at their respective institutions. Activities include recruiting and mentoring students, matching students with internships and/or summer research opportunities, family support activities, and developing bridge programs. Campus team members are listed in Appendix I.

B. ORGANIZATIONS

IINSPIRE-LSAMP Alliance Institutions

Augustana College
Des Moines Area Community College
Doane College
Eastern Iowa Community College District
Grinnell College
Hawkeye Community College
Iowa State University
Iowa Valley Community College District
Kirkwood Community College
Little Priest Tribal College
Luther College
Nebraska Wesleyan University

Science Education Resource Center at Carleton College
University of Iowa
University of Northern Iowa
Upper Iowa University
Wartburg College

C. COLLABORATORS

Alliance External Partners

Alliance partners from industry and government offer opportunities to impact state and regional policies, extend research and internship opportunities to IINSPIRE-LSAMP students, and provide additional program funding.

U.S. Department of Energy Ames Laboratory
Association of Universities for Research in Astronomy (AURA)
Avenue Scholars Foundation
Bethune-Cookman University
Fisher Controls International
HNI Corporation
Iowa 4-H Youth Program
Iowa Biotechnology Association
Iowa Business Council
Iowa Department of Economic Development
Iowa Math and Science Education Partnership
Iowa Space Grant Consortium (ISCG)
Nebraska Academy of Sciences
Novel Chemical Solutions
Office of the Governor, State of Iowa
Rockwell-Collins Corporation
State Science and Technology Fair of Iowa (SSTFI)
USDA-ARS Corn Insects and Crop Genetics Research Unit
USDA-ARS National Laboratory for Agriculture and the Environment
Winnebago Higher Education
Winnebago Public School
Winnebago Tribe of Nebraska

Other Partners within Alliance Institutions

The IINSPIRE-LSAMP project collaborates with several major programs to share information and programming. These programs are engaged in collaborative projects and meetings with IINSPIRE-LSAMP alliance institutions. Partner programs are described in Appendix II.

ACTIVITIES

Project Overview

The Iowa Illinois Nebraska STEM Partnership for Innovation in Research and Education (IINSPIRE) is an NSF LSAMP alliance among sixteen two-year and four-year colleges and universities working together to broaden the participation of underrepresented minorities in science, technology, engineering, and mathematics (STEM) education in the Midwest. The IINSPIRE Alliance colleges and universities collaborate to support students, increase their success, and provide students in the alliance with academic, research, training, and mentoring opportunities. The alliance consists of six two-year colleges, seven private bachelor's degree-granting institutions, and three public state universities, listed alphabetically:

- Augustana College
- Des Moines Area Community College
- Doane College
- Eastern Iowa Community College District
- Grinnell College
- Hawkeye Community College
- Iowa State University
- Iowa Valley Community College District
- Kirkwood Community College
- Little Priest Tribal College
- Luther College
- Nebraska Wesleyan University
- University of Iowa
- University of Northern Iowa
- Upper Iowa University
- Wartburg College

The IINSPIRE Alliance goal is to double the number of underrepresented minority (URM) STEM graduates in the alliance within five years to 350 graduates and to build a foundation for greater increases in future years. Because students from populations historically underrepresented in STEM disciplines are a growing segment of the region's population, there is statewide urgency to remove the barriers to progress in developing a diverse STEM workforce. IINSPIRE-LSAMP will serve as a model for Midwest colleges and universities. This will be accomplished through the following strategies:

- Grow the pool of college-ready, STEM-prepared URM high school students.
- Increase the number of URM students who choose STEM at each IINSPIRE Alliance institution.
- Improve retention at all IINSPIRE Alliance institutions.

The IINSPIRE Alliance has set forth the following objectives to guide alliance-wide activities in pursuit of the goal:

1. **Community-based and student recruiting:** Inform teachers, counselors, parents and students in Iowa, Illinois and Nebraska about IINSPIRELSAMP and increase their awareness about STEM careers. Engage current alliance students having interest and potential in STEM and increase their awareness about STEM majors and careers. Collaborate with community-based recruiting models within the alliance.
2. **Bridge programs and transitions:** Leverage and create initiatives that assist students in their transitions from high school to college and from community colleges to bachelor-granting institutions. Connect students with peer mentors.
3. **Faculty engagement and inclusive pedagogy:** Facilitate faculty collaboration and peer groups across the alliance to share inclusive pedagogy and mentoring practices that lead to greater student success.

4. **Student research opportunities, mentoring, and training:** Connect and support students with mentored research opportunities. Organize research training experiences for alliance students to earn a research certificate.
5. **Mentor training:** Provide training and resources for mentors who supervise undergraduate research projects.
6. **Project management, communication, and institutional integration:** Organize and manage IINSPIRE-LSAMP team members and activities to achieve project goals. Leverage institutional resources and partnerships, and use alliance and institutional data to implement effective programs based on institution-specific needs.
7. **Assessment and evaluation:** Track student participation and enrollment statistics. Assess alliance-wide and institutional outcomes and use evaluation results to inform and improve practices.

IINSPIRE-LSAMP activities draw upon available research and resources, focusing on the transitions from high school and community college to ensure that each student has rigorous academic preparation, social support, research preparation, and financial support to complete a STEM degree and continue onto graduate school. Work is being done to better understand these transitions and to increase the number of students on multiple pathways toward a STEM degree. The IINSPIRE-LSAMP student experience model is defined by key learning and training activities from entry through degree completion (see diagram at [http://www.iinspiresamp.iastate.edu/img/Student Experience Model.pdf](http://www.iinspiresamp.iastate.edu/img/Student%20Experience%20Model.pdf)). Students participate in pre-matriculation and community college transfer bridge programs, internships, research experiences and certification, campus seminars, mentoring, and alliance meetings. The programming is coordinated by team members on each campus and involves existing and new activities at each campus, as well as joint activities by the alliance. A key activity essential to the student experience is access to individual counseling, academic advising, and professional development and career advising. Campus directors are connecting key student activities to existing programs at alliance institutions in order to leverage the resources and expertise.

IINSPIRE-LSAMP reaches out to and works with a number of industrial and governmental partners. Partners have a commitment to broadening participation in STEM and meeting state and national STEM workforce needs. Partners offer various types of opportunities and support to the program, including interfacing with state-level policies and activities, supporting K-12 outreach, and providing internships and other financial support.

Research and Education Activities

A. ACTIVITIES OVERVIEW

The focus of the third year of the project was on student research opportunities and mentoring, community building and networking, building strong institutional teams to achieve alliance objectives, and increasing collaboration with industry and REU programs. The IINSPIRE Alliance annual conference was held November 8, 2014. Activities and accomplishments for year three are highlighted in this report. Table 1 gives a snapshot of activities across the alliance at the end of the first three years. The matrix indicates which objectives were addressed at each institution through major activities or effort during year one with a green dot (●), year two with a blue dot (●), and year three with a purple dot (●). The matrix shows that each of the objectives is being addressed by multiple alliance members and that activities associated with the objectives increased in year three.

TABLE 1. Objectives Addressed by Alliance Institution Activities during Years 1-3.

Key: ● Year 1 (2011-12) ● Year 2 (2012-13) ● Year 3 (2013-14)	OBJECTIVE						
	Community Based and Student Recruiting	Bridge Programs and Transitions	Faculty Engagement and Inclusive Pedagogy	Undergraduate Student Research and Training	Mentor Training	Project Management and Institutional Integration	Assessment and Evaluation
INSTITUTION							
Augustana College	● ● ●	● ●	● ●	● ●	● ●	● ●	● ●
Des Moines Area Community College	● ● ●	● ● ●	● ●	● ● ●		● ●	● ●
Doane College	● ● ●	● ● ●	● ●	● ● ●	● ●	● ●	● ●
Eastern Iowa Community College District	● ●		● ●	● ●	● ● ●	● ● ●	● ●
Grinnell College	● ●	● ●	● ● ●	● ● ●	● ●	● ●	● ● ●
Hawkeye Community College	● ● ●	●	● ●	● ●	● ●	● ●	● ●
Iowa State University	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
Iowa Valley Community College District	● ● ●	● ●	● ●	● ● ●	● ●	● ●	● ●
Kirkwood Community College			●			●	●
Little Priest Tribal College	● ●		● ●	●		● ●	● ●
Luther College	● ● ●		● ●	● ● ●	● ● ●	● ●	● ●
Nebraska Wesleyan University	● ● ●	●	● ●	● ● ●	● ●	● ●	● ● ●
University of Iowa	● ● ●		● ● ●	● ● ●	● ●	● ● ●	● ● ●
University of Northern Iowa	● ● ●		● ●	● ●	● ●	● ●	● ● ●
Upper Iowa University	● ● ●		● ●	● ● ●	● ● ●	● ● ●	● ●
Wartburg College	● ●	● ● ●	● ●	●	● ● ●	● ●	● ●

B. COMMUNITY-BASED AND STUDENT RECRUITING ACTIVITIES

During year 3, alliance members offered career awareness activities for prospective students and their families; hosted open houses and recruitment events; presented information during meetings of student clubs and organizations, assisted with pre-college activities such as special events and summer programs to introduce STEM fields and careers; continued their partnership and involvement in the Iowa Governor's STEM Advisory Council to promote STEM; and identified and recruited students into IINSPIRE LSAMP. Several activities are briefly described below.

Discover Engineering Day

Des Moines Area Community College, Iowa State University and area engineering firms sponsored a one-day event on April 2, 2014 targeting college-age students considering a career in engineering. Students learned about engineering careers, took part in hands-on interactive engineering activities, and met with engineering professionals and college students. Students received information about transferring into engineering degree programs. More information about the event is available through a poster (<https://go.dmac.edu/programs/pdp/Documents/DiscoverEngineeringDay-2014.pdf>).

Iowa Governor's STEM Advisory Council

Many of the IINSPIRE LSAMP campus directors and governing board members continue to be active with the Iowa Governor's STEM Advisory Council, including serving on regional boards. The IINSPIRE LSAMP Program

distributed information to students, faculty, and other professionals at the Iowa Statewide STEM Conference on March 28, 2014. More information is available at: <http://www.iastem.gov>.

Luther Summer Science Seminar Program

The summer science seminar is an intensive six-day summer seminar designed to provide high-performing URM high school students. URM high school students spent four days in the laboratory with faculty from biology, chemistry, and physics working on research projects. Students received mentoring from current URM college students who have experienced success in STEM at the college level. More information is available at: <http://www.luther.edu/diversity/sumseminar/>

STEM Clubs and Student Organizations

Hawkeye Community College collaborated with its on-campus STEM student club to promote awareness of STEM careers, to increase the number of STEM students interested in pursuing a STEM degree, provide information about research opportunities, and identify and recruit students into the IINSPIRE LSAMP program. The STEM Club hosted a number of activities.

At **Iowa State University**, the IINSPIRE LSAMP student students developed a STEM student organization, iResearch, for STEM student interested in research.

STEM Seminar Programs

Des Moines Area Community College, Doane College, and Iowa Valley Community College District held a series of lunch & learn programs throughout the calendar year to introduce students to opportunities within STEM career fields, promote resources for transfer, discuss internship/REU opportunities and scholarships, and inform students about the STEM majors on their campuses. The programs also provided students an opportunity to interact with peers, establish informal STEM learning communities, and to network and establish relationships with faculty.

OBJECTIVE TEAM ACTIVITIES

During year 3, the community-based and student recruiting objective team focused its attention on creating marketing approaches to help alliance institutions increase awareness of STEM careers and the IINSPIRE LSAMP Program on their campuses.

The objective team successfully completed flyer templates to use for advertising on-campus events and a bookmark to inform students about graduate college funding opportunities, such as the Bridge to the Doctorate Program. The objective team members identified new outlets for recruitment efforts.

C. BRIDGE PROGRAMS AND TRANSITIONS ACTIVITIES

During year 3, alliance members offered orientation and other academic planning and support services for IINSPIRE LSAMP students; offered individualized academic and transition advising to URM students; and created or expanded summer bridge programs. Several activities are described below.

Academic Programs for Excellence (APEX)

Iowa State University continued to expand its APEX summer bridge program for incoming multicultural students to provide specialized programming geared towards students interested in pursuing a STEM degree. The success of APEX-E program last summer encouraged Multicultural Student Affairs, the College of Liberal Arts and Sciences, the College of Agricultural and Life Sciences to launch APEX-CALS and APEX-LAS programs in the summer of 2014.

Bridge to Science and Mathematics

Doane College developed a pre-orientation bridge program for IINSPIRE-LSAMP eligible first year minority students interested in science, engineering, and mathematics majors and women interested in physics or engineering to aid the transition from high school to college. Program highlights included building a sense of community among a cohort of science and mathematics students; introducing students to Doane science and mathematics faculty and programs; learning about expectations and key study skills for success in science and

mathematics; students explored the full range of careers in science, engineering, and mathematics; and working on research problems and encouragement to participate in undergraduate research.

IINSPIRE LSAMP Summer Transitions Program

Nebraska Wesleyan University created a 3-day summer transitions program for incoming URM students interested in STEM. Students participated in a variety of activities aimed to enhance science skill sets and prepare them for the rigors of college. Students interacted with peer mentors that guided them through their transition to college life during the first year.

Grinnell Science Project First-Year Academic Planning

The Grinnell Science Project at **Grinnell College** is a one-week pre-orientation program for first-year students to assist them with advising and academic planning. The event is held the week preceding Grinnell's general orientation for new students. More information available at: <http://www.grinnell.edu/academics/divisions/science/gsp>.

OBJECTIVE TEAM ACTIVITIES

During year 3, the bridge program and transitions objective team focused its attention to assisting alliance institutions with creating bridge programs on their respective campuses. Best practices and resources were disseminated to alliance members and posted on the IINSPIRE LSAMP intranet and SERC sites. The objective team plans to hold targeted group discussions by institutional type with college and university alliance members to provide support and continued resources for institutions without a bridge program on their campus.

D. FACULTY ENGAGEMENT AND INCLUSIVE PEDAGOGY ACTIVITIES

Pedagogy workshops held during year 3 are described in the Training and Professional Development section of this report.

Alliance institutions continued to recruit faculty and staff to serve as institutional team members to assist with increasing awareness of the IINSPIRE LSAMP Program on their campus, developing and/or increasing recruitment efforts, providing mentoring support to students, and developing student professional development activities and training. All team members were invited to participate in alliance-wide professional development activities, such as the pedagogy workshops, the LSCME conference, the IINSPIRE LSAMP annual conference, and the assessment and evaluation retreat. More information is given in the Training and Professional Development section of this report.

OBJECTIVE TEAM ACTIVITIES

During year 3, the faculty engagement and inclusive pedagogy objective team determined topics and content for upcoming pedagogy workshops and continued to update best practices and resources available on the SERC site.

E. STUDENT RESEARCH OPPORTUNITIES, MENTORING, AND TRAINING ACTIVITIES

During year 3, alliance members recruited IINSPIRE LSAMP students to participate in undergraduate research experiences; partnered with undergraduate research programs, faculty researchers, and industries to provide paid, mentored research opportunities for URM students; and collaborated with established REU programs to offer training for IINSPIRE LSAMP research interns. The 2013-14 IINSPIRE LSAMP research interns are listed in the Key Outcomes section of this report. Several activities are briefly described below.

Alliance Research Opportunities

The alliance office worked with campus directors and other team members to identify and promote research opportunities. Opportunities within and outside the alliance are posted at the IINSPIRE LSAMP website. Campus directors provide information to prospective research interns. The annual conference included a research fair to inform students about upcoming and academic year research internships.

Efforts were made to place community college students into research experiences at four-year research institutions. Alliance members encouraged undergraduate students to apply to national REU programs and industry internships as well. Table 2 itemizes the placement of interns in particular organizations.

TABLE 2. 2013-14 2013-14 IINSPIRE LSAMP Research Intern Placement by Organization

ORGANIZATION TYPE	NUMBER OF STUDENTS PARTICIPATING 2012-13	NUMBER OF STUDENTS PARTICIPATING 2013-14
Industry Internships	0	3
International REU Programs	0	2
National REU Programs/Internships	0	2
Other LSAMP Alliances	0	1
Partner Institutions	7	14
Home Institutions	40	52
Total	47	77

Alliance institutions collaborated with REU programs to recruit and place URM STEM students into research experiences and to coordinate common programming for students. REU program collaborators are listed in the appendix. Other selected research experiences are described below.

Association of Universities for Research in Astronomy (AURA)

IINSPIRE LSAMP and AURA have collaborated to provide URM undergraduate students majoring in physics and astronomy, engineering, and computer science with a 10-week summer research experience. Students are paired with a mentor at one of six AURA centers. An **ISU** undergraduate student was placed at the observatory in Tucson, Arizona. More information about AURA is available at: <http://www.aura-astronomy.org/>

Nahant Marsh Education Center

Eastern Iowa CC District partnered with Nahant Marsh to provide URM undergraduate students majoring in environmental, biological, and geosciences with research opportunities. Three students were placed into research experiences. More information about Nahant Marsh is available at: <http://nahantmarsh.org/>

Research Certificate

The goal of a certificate program is to formalize a research training curriculum. Programs may emphasize introductory knowledge and skills in preparation for research including academic support, or may provide advanced training and development activities. Certificate programs are in the early stages of development. **ISU** has drafted a certificate program that is currently under review. **UNI** has specified several training and development activities that its students must comply with.

OBJECTIVE TEAM ACTIVITIES

During year 3, the research objective team reviewed procedures to streamline the research placement process. The team also benchmarked research certificate programs.

F. MENTOR TRAINING ACTIVITIES

During year 3, alliance members compiled mentoring resources; reviewed, adapted, or developed research and peer mentor training programs on their campuses; collaborated with on-campus programs to conduct mentor training workshops for research group leaders (including faculty, postdocs, and graduate students); and hosted peer mentor training activities. IINSPIRE LSAMP research interns are expected to be assigned a mentor, and the mentor is expected to participate in training. A collection of mentoring resources has been compiled on the IINSPIRE LSAMP intranet site and shared with mentors of IINSPIRE LSAMP research interns. Several activities are described in the Training and Professional Development section of this report.

OBJECTIVE TEAM ACTIVITIES

During year 3, the mentoring objective team developed a mentoring clusters program that allows students at smaller institutions or community colleges to connect with a faculty mentors at a 4-year alliance institution in close proximity. The students at the smaller institutions also will serve as peer mentors to students on their campus. **Hawkeye CC, UNI, Wartburg College, and Emerson Process Management** are piloting the program.

G. PROJECT MANAGEMENT AND INSTITUTIONAL INTEGRATION ACTIVITIES

Project leadership and governance remained the same in year 3. Refer to the participant section and appendix for team member information.

Organizational management included scheduling and conducting various face-to-face and teleconference meetings with the steering council. The steering council met once or twice a month by teleconference, or more frequently as needed. Face-to-face steering council meetings were held each semester. The steering council met November 7, 2013 at Hawkeye Community College and March 31, 2014 at Iowa State University. Objective teams primarily meet by teleconference and during steering council meetings.

The governing board met by teleconference on April 8, 2014. The board was advised on the progress towards recommendations in the evaluation report, priorities for year three, and partnering with industries.

In response to recommendations in the evaluation report the alliance office began visits to alliance institutions. An agenda for a half-day meeting was developed by the campus director. The institution's governing board member also participated. Six visits were conducted:

- Des Moines Area Community College: March 26, 2014
- Doane College: August 12, 2013
- Grinnell College: April 30, 2014
- Iowa Valley Community College District: May 1, 2014
- Little Priest Tribal College: August 13, 2013
- Nebraska Wesleyan University: August 12, 2013

Communication for/by/about the project focused on website, marketing materials development, and dissemination to various audiences. A website redesign is ongoing. Templates for IINSPIRE LSAMP student posters, PowerPoint slides, and event flyers were created for use by alliance members and student interns.

Most alliance institutions created institutional teams that meet regularly to engage key leaders and programs in IINSPIRE LSAMP work. These teams vary by institution but include faculty, staff, institutional researchers, and administrators who are critical to leveraging institutional resources and programming to meet alliance goals. The topic of institutional teaming was also discussed at our spring governing board meeting to encourage institution level leveraging and sustainability.

FINDINGS

Participation and Assessment Results

A formal evaluation plan, including data management, has been developed and guides assessment and evaluation activities for the alliance and individual institutions. The evaluation team continues to modify and emphasize the use of the project logic model as a means of defining common outcome measures across the alliance (Appendix III). The evaluation team is led by the internal evaluators. An external evaluation consultant works directly with the management and evaluation teams to facilitate the project's logic model processes and to conduct and document evaluation activities. Evaluation results for several activities during year 3 are tabulated in the appendix.

The Year 3 annual conference was held on November 8, 2013, at Hawkeye Community College. The conference provided the opportunity to engage students, external partners, campus directors, faculty and staff from alliance institutions around the theme of “*Building Community for Student Success in STEM.*” A total of 125 people attended the conference (63 students, and 62 faculty, staff, and other professionals). An online survey was sent to participants. The connections offered at the conference were valuable to students (Table 3). For example, in their evaluation of the career development workshop, 84% agreed with the statement “I have ideas for how to connect with other students and professionals” and 77% of students agreed the research/internship opportunities fair “was a valuable networking opportunity for me.” Students also rated the poster session quite highly, with 85% agreeing that the “Posters were informative and interesting” and 90% agreeing that “Students were well prepared and informed.” As was the case for students, the poster session was very highly evaluated by faculty, staff, and other professionals (Table 4). Interestingly, students were more likely than faculty, staff, and other professionals to agree that “Cash prizes IINSPIRE students to participate” (95% and 84% respectively).

TABLE 3. Participant Evaluation of 2013-14 Annual Conference Sessions on Student Research Opportunities, Mentoring and Training: Students.

SESSION/QUESTION	N	MEAN	% AGREEMENT
<i>Poster Session</i>			
Posters were informative and interesting	20	4.5	85%
Cash prizes IINSPIRE students to participate	20	4.7	95%
Students were well prepared and informed	20	4.5	90%
<i>Student Career Development Workshop</i>			
I learned about social capital needed for my own career development	19	4.2	74%
I enjoyed the discussion with other students	19	4.3	79%
I have ideas for how to connect with other students and professionals	19	4.5	84%
<i>Research Opportunity Fair</i>			
This session was helpful to students in planning for future opportunities	22	4.3	86%
This session was a valuable networking opportunity for me	22	4.3	77%

TABLE 4. Participant Evaluation of 2013-14 Annual Conference Sessions on Student Research Opportunities, Mentoring and Training: Faculty, Staff, and Other Professionals.

SESSION/QUESTION	N	MEAN	% AGREEMENT
<i>Poster Session</i>			
Posters were informative and interesting	25	4.6	92%
Cash prizes IINSPIRE students to participate	25	4.4	84%
Students were well prepared and informed	25	4.4	92%
<i>Research Opportunity Fair</i>			
This session was helpful to students in planning for future opportunities	19	4.2	84%
This session was a valuable networking opportunity for me	19	3.8	68%

Two mentor training workshops were held at Iowa State University, one in summer 2013 and one in summer 2014. The summer 2013 workshop was attended by 50 people (26 grad students, 8 post-docs, and 16 faculty/staff). After the workshop, participants completed an online evaluation in which they were asked, "On a scale of 1-5 rate yourself in terms of the following workshop participant objectives for both before and after participation in this workshop." As shown in Figure 1 participants reported greater awareness of sources of support for being a research mentor, they were more aware of the challenges they might face as mentors, and had greater confidence to serve as a mentor than before the workshop.

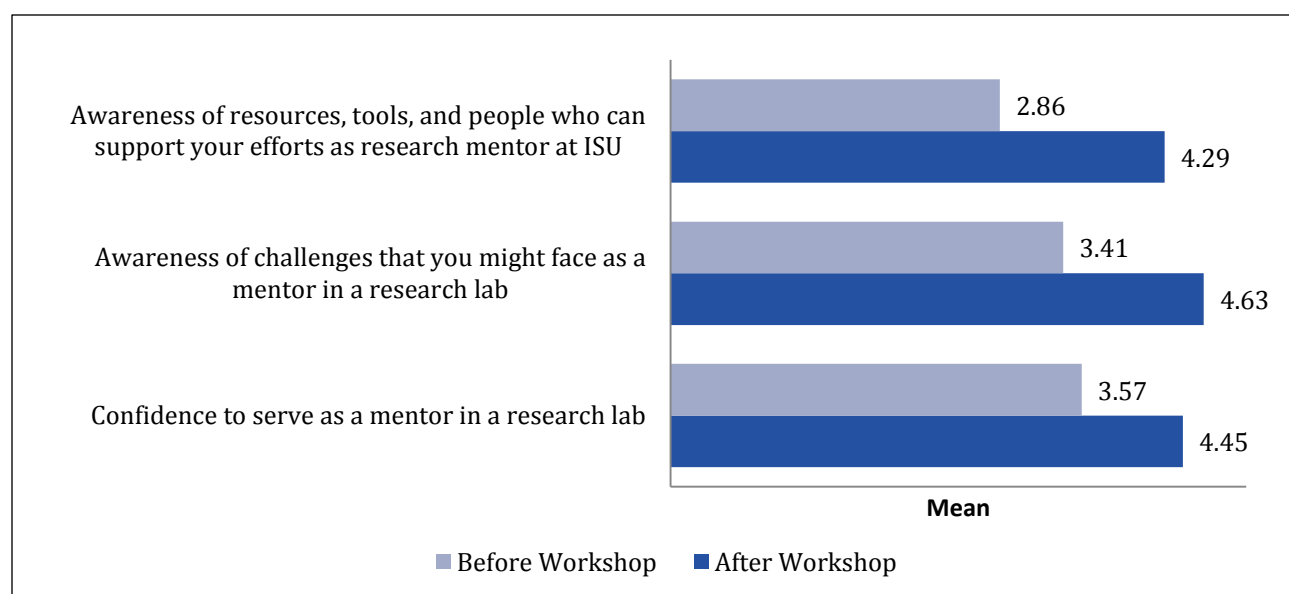


FIGURE 1. 2013 Mentor Training Workshop Outcomes (N=38)

Two pedagogy workshops were held in year 3. The first pedagogy workshop was on bridge and transition programs and was held at Grinnell College on July 15, 2013. The second pedagogy workshop on community building took place at the annual conference in November for faculty, staff, and other professionals.

Twenty-one participants attended the summer 2013 bridge and transitions workshop and evaluation forms were completed by 19 participants. Findings show that all workshop participants agreed that the four stated goals of the workshop were met (Table 5). Overall workshop satisfaction was also very high, with a mean level of satisfaction of 8.9 on a 10-point scale. Open-ended comments suggest respondents found value in (a) learning about successful bridge programs and hearing successful practices from those with bridge program experience (including from the key presentations), (b) group discussions, (c) receiving feedback, and (d) having time to plan.

Evaluation forms for the pedagogy workshop at the annual conference are shown in Table 6, almost all participants agreed the goals of the workshop were met, with 97% agreeing the goal to “share practices and experiences of building community among students in STEM” was achieved and 93% agreeing the goal to “identify potential programs for my campus that could be implemented to build a sense of community for STEM students” was met.

TABLE 5. Participant Evaluation of Summer 2013 Pedagogy Workshop on Bridge Programs (N=19)

SESSION/QUESTION	MEAN	% AGREEMENT
Being able to discuss workshop content with other participants was critical to my learning	3.7	100%
The workshop leaders' expertise contributed significantly to the success of the workshop	3.9	100%
I believe the goals of the workshop as stated were met:		
Explore models and resources for summer bridge programs	3.7	100%
Share practices and experiences of existing summer bridge programs	3.6	100%
Develop plans for next steps at own institution for a summer bridge program	3.7	95%
Develop plans for future work and potential collaboration	3.6	95%

TABLE 6. Evaluation of 2013-14 Annual Conference Pedagogy Workshop on Community Building

SESSION/QUESTION	N	MEAN	% AGREEMENT
Being able to discuss workshop content with other participants was critical to my learning	31	3.6	100%
The workshop leaders' expertise contributed significantly to the success of the workshop	29	3.6	100%
I believe the goals of the workshop as stated were met:			
Share practices and experiences of building community among students in STEM	31	3.5	97%
Identify strategies I can use to build a sense of community for STEM students <i>in my day-to-day work</i> with them	31	3.5	87%
Identify potential programs <i>for my campus</i> that could be implemented to build a sense of community for STEM students	30	3.3	93%
Contribute to collaborations between institutions for building a sense of community for students in STEM	31	3.4	90%
Contribute to collaborations between institutions for building a sense of community for students in STEM	31	3.2	77%

A day-long face-to-face steering council meeting was held on March 31, 2014, at Iowa State University. The meeting included time to connect in small groups by institutional type, connecting objective team plans to institutional activities and needs, updating and sharing objective team plans, and a discussion of partnering with industry. An online survey was sent to participants with two open-ended questions: “What worked well in terms of the IINSPIRE Steering Council Meeting on March 31st?” and “What changes need to be made in the future?” Seven participants responded. The themes that emerged from responses were that participants especially valued the opportunity to meet with others of the same institution-type and valued the discussions.

An assessment and evaluation retreat was held on May 19-20, 2014. Institutional teams of 2-5 members attended from each institution and included faculty, administrators, and institutional researchers. Each institution examined their institutional data taken from WebAMP and throughout the two-day session had extended conversations about what they currently know and needed to know about their URM STEM students. Through a series of intentional activities, institutional teams created “dashboards” to illustrate what they know and need to know about their students. Several evaluation and assessment tools were shared by workshop leaders as well as by campus teams throughout the workshop.

The external evaluation consultant conducted a two-day site visit during the assessment and evaluation retreat. During the visit, interviews were conducted with 14 campus directors and other stakeholders. Two additional interviews were conducted by phone after the site visit. The total number of interviews conducted was 16. Interviews with campus directors during this visit reinforced other data that suggests that alliance relationships continue to create connections that ultimately benefit our URM STEM students. Campus directors are consistently engaged both on the campuses and with the alliance with an eye towards our collective goal of doubling URM STEM graduates.

In the 2013-14 reporting cycle, we have modified our processes for collecting annual reporting information and data. We have found that having each individual institution enter data into WebAMP has resulted in inconsistencies across institutions. In consultation with WiscAMP, we have now implemented a new system for annual reporting that gathers and enters annual information and data centrally. The goal of this system is to increase our efficiency, accuracy, and consistency in LSAMP WEBAMP reporting.

In conclusion, the IINSPIRE LSAMP Program has made significant strides in the past year with respect to strengthening inter-institutional and intra-institutional relationships and leveraging resources. The campus directors reported feeling more sure of their roles and expectations. Stakeholders are engaging more with the data from their own campuses and express the desire to incorporate assessment to help them improve and to identify effective strategies for moving toward their goals. Increasing attention toward examining student impacts for formative feedback and summative evaluation will be essential for assessing the effectiveness of Alliance activities and for efforts to disseminate successful practices.

A. BASELINE DATA AND WEBAMP REPORTING

IINSPIRE Alliance members gathered and entered programmatic and institutional data in the WebAMP System for the 2012-13 reporting period. Degree data from this reporting period indicate an increase of URM STEM graduates across the Alliance of 27 students going from 177 in 2011-12 to 204 in 2012-13 (Tables 7 and 8). The IINSPIRE LSAMP Goal is to double the number of URM STEM graduates in the alliance by 2016. The target for this goal is 350 URM STEM graduates.

TABLE 7. Underrepresented Minority STEM Students At 4-Year Alliance Institutions, 2011-12

ALLIANCE INSTITUTION	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	NOT REPORTED/ UNKNOWN	TOTAL	BACHELOR DEGREES AWARDED
Iowa State University	335	156	141	182		814	97
University of Iowa	86	77	59	89	10	321	35
Univ. of Northern Iowa	20	14	13	22		69	7
Upper Iowa University	4	3	0	4		11	0
Augustana College	4	13	5	15		37	16
Doane College	*	1	2	3		6	2
Grinnell College	*	4	12	8		24	8
Luther College	2	7	6	11		26	4
NE Wesleyan University	*	0	1	1		2	3
Wartburg College	41	13	10	5		69	5
Total	492	288	249	340	10	1379	177

* Freshman do not declare a major

TABLE 8. Under-Represented Minority STEM Students at Alliance Institutions, 2012-13

ALLIANCE INSTITUTION	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR	TOTAL	BACHELOR DEGREES AWARDED
<u>4-Year Institutions</u>						
Iowa State University	363	230	181	203	907	102
University of Iowa	119	79	70	63	331	38
Univ. of Northern Iowa	25	10	21	24	80	9
Upper Iowa University	0	0	0	0	0	1
Augustana College	0	15	16	4	35	4
Doane College	*	0	4	3	7	2
Grinnell College	*	0	14	11	25	9
Luther College	0	13	8	6	27	7
NE Wesleyan College	0	3	4	2	9	3
Wartburg College	20	6	6	5	37	5
Total	527	356	324	321	1458	180
<u>2-Year Institutions</u>						
Des Moines CC	167					
Eastern Iowa CC	78					
Hawkeye CC	8					
Iowa Valley CC	9					
Kirkwood CC						
Total	262					
Little Priest Tribal College	Data not reported					

* Freshman do not declare a major

Enrollment is an additional metric that is reported in WebAMP and indicates the extent to which the alliance is moving towards its goal of doubling URM STEM graduates. URM STEM enrollment at 4 year institutions increased from 1379 in 2011-12 to 1643 in 2012-13. In the 2012-13 reporting period, the Alliance piloted a data collection system which identifies community college STEM enrollments based upon STEM course taking patterns, student intent, and major designations. Using this system, community college URM STEM enrollment for 2012-13 totaled 262 students at four community colleges (not including Kirkwood). This effort has provided useful data for our community college partners allowing them to focus their efforts on these students and expand their efforts to recruit and encourage students to take more general STEM courses.

B. STUDENT PARTICIPATION IN IINSPIRE-LSAMP

Alliance institutions increased the number of students participating in IINSPIRE LSAMP during 2013-14. Various participation metrics are shown in Tables 9-11. The number of research interns increased from 47 to 72, as shown in the table. The 2013-14 IINSPIRE LSAMP research interns are listed below, sorted alphabetically by institution.

1. John Le, Augustana, Chemistry
2. Ruby Loera, Augustana, Neuroscience
3. Brian Lovejoy, Augustana, Environmental Studies & Biology
4. Jacob Torres, Augustana, Biology
5. Stephanie Flores, DMACC, Life/Biological Sciences
6. Bryan Hermosillo, DMACC, Life/Biological Sciences
7. Myra James, DMACC, Environmental Engineering
8. Solena Mendez, DMACC, Life/Biological Sciences
9. Elizabeth Morgan, DMACC, Biochemistry
10. Esdras Murillo, DMACC & ISU, Electrical Engineering
11. Revay Stewart, DMACC, Medical/Conservation
12. Michael Tingle DMACC, Pre-Engineering
13. Sonia Almodovar, Doane, Mathematics-Education
14. Gary Batres, Doane, Chemistry
15. Lani Brown, Doane, Life/Biological Sciences
16. Carlos Delara, Doane, Undeclared
17. Aaron Castaneda, EICCD,
18. Alyson Glynn, EICCD,
19. Anna Pienta, EICCD,
20. Travis Raygoza, EICCD,
21. Loren Rosas, EICCD,
22. Bradley Ryan, EICCD, Chemical Engineering
23. Helen Barroso, Grinnell, Biology/Spanish
24. Tyler Davidson, Grinnell, Biological Chemistry
25. Gabrielle Mercado, Grinnell, Biology
26. Queenster Nartey, Grinnell, Biological Chemistry
27. Jose Espinoza, Hawkeye CC, Engineering
28. Anthony Niederklopf, Hawkeye CC, Mechanical Engineering
29. Derrick Anderson, ISU, Engineering
30. Stanley Barbel, ISU, Aerospace Engineering
31. Jordan Becquer, ISU, Aerospace Engineering
32. Mariama Carter, ISU, Microbiology
33. Christopher Demings, ISU, Chemical Engineering
34. Edgardo Diaz, ISU, Aerospace Engineering
35. David Enciso, ISU, Aerospace Engineering
36. Paul Faronbi, ISU, Chemical Engineering
37. Darrall Flowers, ISU, Software Engineering
38. Nathalie Fuentes, ISU, Biochemistry
39. Justin Glasper, ISU, Chemical Engineering
40. Ufuoma Ikoba, ISU, Chemical Engineering
41. Courtnee Jackson, ISU, Aerospace Engineering

42. Lizette Jimenez, Iowa State University, Chemical Engineering
43. Crystal Jones, ISU, Genetics
44. Jan Michael Lopez, ISU, Aerospace Engineering
45. Connie Maluwelmeng, ISU, Electrical Engineering and Mathematics
46. Christian Miller, ISU, Biological Systems Engineering
47. Zachery Reyna, ISU, Industrial Engineering
48. Christopher Sheafe, ISU, Electrical Engineering
49. Jonathan Vasquez, ISU, Mechanical Engineering
50. Tara Weber, ISU, Diet and Exercise
51. Lamin Ceesay, IVCCD, Software Engineering
52. Lexie Dubberke, IVCCD, Undeclared
53. Norma Granados, IVCCD, Mechanical Engineering
54. Kenyanna Williams, IVCCD, Physical Therapy
55. Edson deOliveira, NWU, Life/Biological Sciences
56. Brittney Dewald, NWU, Biology
57. Ziomara Juardo, NWU, Life/Biological Sciences
58. Jordan Stickney, NWU, Life/Biological Sciences
59. Ryan Arce, UI, Engineering
60. Callie Espanto, UI, Human Physiology
61. Rodrigue Mbog, UI, Life/Biological Sciences
62. Barbara Newhall, UI, Chemistry
63. Bisola Omoba, UI, Life/Biological Sciences
64. Brittanie Dotson, UNI, Biology
65. Gwendolyn Fine, UNI, Life/Biological Sciences
66. Brandon Hoskins, UNI, Biology/Biomedical
67. Maria Jaime, UNI, Biology
68. Briana McDowell, UNI, Mathematics
69. Austin Palmer, UNI, Engineering
70. Allysan White, UNI, Biology
71. Ariel Williams, UNI, Geosciences
72. Joseph Alanis, UIU, Mathematics
73. Deshawn Benn, UIU, Environmental Science
74. Emylsse Magana, UIU, Forensic Science
75. Hayley Vaughn, UIU, Life/Biological Sciences
76. Brittney Culmore, Wartburg, Life/Biological Sciences
77. Ashley Kerns, Wartburg, Life/Biological Sciences

TABLE 9. 2012-13 IINSPIRE-LSAMP Student Participation

ALLIANCE INSTITUTION	RESEARCH INTERNS	RESEARCH MENTORS TRAINED	BRIDGE/TRANSITION PARTICIPANTS		BRIDGE/TRANSITION MENTORS
			TOTAL	URM	
Augustana College			12	2	
Des Moines Area CC	1		**	**	
Doane College	3		**	**	2
Eastern Iowa CCD	3				3
Grinnell College	3		11*	11*	1
Hawkeye CC					
Iowa State University	12	65	24	24	5
Iowa Valley CCD	3		12	12	
Kirkwood CC	1				
Little Priest Tribal College					
Luther College	2				
NE Wesleyan University	1				
University of Iowa	14				
University of Northern Iowa	1				
Upper Iowa University	3				
Wartburg College					5
Total	47	65	59	49	16

TABLE 10. 2013-14 IINSPIRE-LSAMP Student Participation

ALLIANCE INSTITUTION	RESEARCH INTERNS	RESEARCH MENTORS TRAINED	BRIDGE/TRANSITION PARTICIPANTS		BRIDGE/TRANSITION MENTORS
			TOTAL	URM	
Augustana College	4				
Des Moines Area CC	8		8	8	
Doane College	4		3	3	1
Eastern Iowa CCD	6				
Grinnell College	4				
Hawkeye CC	2				
Iowa State University	22	51	53	53	3
Iowa Valley CCD	4		4	4	
Kirkwood CC					
Little Priest Tribal College	9				
Luther College					
NE Wesleyan University	4	9	2	2	9
University of Iowa	5				
University of Northern Iowa	8				
Upper Iowa University	4				
Wartburg College	2				
Total	86	60	70	70	13

*These students participated in a course-based research experience.

TABLE 11. Student Research Presentations at State, Regional, and National Conferences

STUDENT NAME	INSTITUTION	CONFERENCE	DATE
Gary Batres	Doane	MindExpo; A Showcase of Undergraduate Academic Excellence	April 17, 2014
Deshawn Benn	UIU	Louis Stokes Midwest Center of Excellence Conference	October 20-22, 2013
Courtnee Jackson	ISU	Louis Stokes Midwest Center of Excellence Conference	October 20-22, 2013
Crystal Jones	ISU	Symposium on Undergraduate Research & Creative Expression	April 15, 2014
Ziomara Juardo	NWU	SEA-Phage Undergraduate Research Conference	June 14, 2014
Maria Juarez	Doane	Nebraska Research Innovation & Conference	
Esdras Murillo	DMACC/ISU	Louis Stokes Midwest Center of Excellence Conference	October 20-22, 2013
		Symposium on Undergraduate Research & Creative Expression	April 15, 2014
		Research in the Capitol	April 1, 2014

TABLE 12. Student Conference Attendance at State, Regional, and National Conferences

STUDENT NAME	INSTITUTION	CONFERENCE	DATE
David Enciso	ISU	American Astronautical Society ISS Research & Development Conference	June 17-19, 2014

External Evaluation Results

IINSPIRE LSAMP has made meaningful progress in Year 3. Campus directors and other stakeholders reported that they have gained momentum and have a better sense of their roles and responsibilities. Internal and external evaluation feedback is being used to improve activities and processes. Based on data collected by both the internal and external evaluators, the primary strengths and challenges of year 3 are listed below.

Accomplishments and Strengths:

- The project addressed key recommendations from last year's external evaluation report, most notably:
 - Increasing opportunities for face-to-face meetings
 - Helping to increase institutional buy-in through campus visits
 - Better-integrating smaller institutions and more geographically isolated institutions and encouraging their participation as equal partners
 - Providing more opportunities for institutions to meet as subgroups
 - Helping institutions use data to guide their programming

- Campus Directors report greater sense of community within the Alliance and many have strengthened partnerships with other Alliance institutions.
- Campus Directors report leveraging of resources on their campuses as a result of LSAMP.
- Community colleges have developed methods to identify STEM students.
- Smaller institutions and more geographically isolated institutions are feeling more integrated within the Alliance and feel valued by the group.

Challenges:

1. Campus Directors report that balancing work on O-Teams, Alliance work on their own campuses, and their regular faculty, staff, or administrator duties as a huge challenge.
2. Campus Directors report a lack of recognition for IINSPIRE LSAMP service by stakeholders' home institutions and concern about the possible implications of unrecognized service for Assistant Professors when they are evaluated for tenure.
3. Politics of forging IINSPIRE partnerships with industry as distinct from institutional partnerships
4. Difficulty of identifying which students from which institutions are applying to which REU programs.
5. Confusion about purpose and use of LSAMP form for students applying for REUs filled out online when applying for REUs.
6. Development of and effective strategies for sharing Alliance-wide resources

TRAINING & PROFESSIONAL DEVELOPMENT

Training and Professional Development

In general, faculty, staff, and students involved with the project have increased their understanding of effective practices for URM STEM student success, their knowledge of the NSF LSAMP program, and their awareness about programs at institutions in the alliance. This has resulted from networking and information sharing activities with alliance members and other collaborators and professionals.

The 2013-14 IINSPIRE LSAMP Annual Conference, hosted by Hawkeye Community College on November 8, 2013, attracted students, faculty, and staff from alliance institutions and representatives from alliance partners. Various aspects of community-building were explored, including social capital, professional networking, student-faculty interaction, student programs, pedagogy, and the use of social media, such as Facebook and Twitter. Dr. Aurelio Curbelo gave the luncheon keynote on how to prepare students with STEM, leadership, and global experiences. Information on the annual conference is available at http://www.iinspirelsamp.iastate.edu/conference-info_13-14.php. Other conference sessions specific to each audience are highlighted below.

A. FOR FACULTY AND STAFF

At the alliance annual conference, faculty and staff participated in a half-day workshop on pedagogy, “Building a Sense of Community for Student Success in STEM.” Attendees learned about successful communities, barriers, and community support through programs, pedagogy, and student-faculty interactions. SERC facilitators used a web portal for collaborative development and sharing of materials and presented a compilation of resources on community building, <http://serc.carleton.edu/lisamp/community.html>. Workshop presentations are listed in the Products section of this report.

This workshop and a second pedagogy workshop are described at the SERC portal, <http://serc.carleton.edu/lisamp/workshops/>. The second workshop, hosted at Grinnell College on June 25, 2014, focused on research and research-like experiences in science courses. The workshop presented a range of options. A team of faculty from **DMACC** participated, as well as alliance members from **Kirkwood CC**, the **University of Iowa**, and **Upper Iowa University**.

Alliance team members attended the 2013 LSMCE Conference in Indianapolis, October 20-22, 2013. Team members from **DMACC**, **Doane College**, **Grinnell College**, **Hawkeye CC**, **ISU**, and **Upper Iowa University** participated. They learned about other alliances, effective programs and practices, and selected research. Participation also enhanced team building.

Alliance members participated in various faculty/staff development workshops organized on their own campuses with attention given to undergraduate STEM diversity. Examples include **Grinnell College**’s cooperative learning workshop and **ISU**’s student success summit. They also attended regional conferences. **ISU** sponsored the Iowa Latina/o Education Initiative Conference, October 16, 2013 (<http://www.hs.iastate.edu/news/2013/10/01/latino-conference/>), hosted at the **DMACC** Ankeny Campus. An IINSPIRE LSAMP graduate assistant was a member of the program planning committee. **Hawkeye CC** hosted the Community College Diversity in STEM Conference, “Building Pipelines to Access and Inclusion” on Friday, April 25, 2014.

B. FOR STUDENTS

At the alliance annual conference, a student track offered career and professional development for students. In one session, students explored strategies and actions to build social capital and sharpened their networking skills. Students presented posters in a poster, and best poster awards were given. Exhibitors from research programs and companies provided information about upcoming summer internship opportunities.

IINSPIRE LSAMP students gave oral and poster presentations at several local, regional and national conferences during the year. A list of formal student presentations for 2013-14 is given in the appendix. Three students from **ISU** and **Upper Iowa University** were selected to present posters at the 2013 LSMCE Conference, and one of them was invited to give an oral presentation. All three students networked with students and faculty from LSAMP alliances, enhanced their presentation skills, learned about new research opportunities, and received education and career advice.

Summer research programs/experiences were offered by **Augustana College, Doane College, Eastern Iowa CCD, Grinnell College, ISU, Luther College, Nebraska Wesleyan University, the University of Iowa, UNI, Upper Iowa University, and Wartburg College**. Students at **DMACC, Hawkeye CC, Iowa Valley CCD, and Kirkwood CC** also were active in research experiences. Students learned about laboratory safety, responsible conduct of research, designing and financing a research project, using a laboratory notebook, communicating effectively, and preparing for graduate school.

Iowa NSF EPSCoR provided research experiences in renewable energy for four students from **DMACC** and **Hawkeye CC** during summer 2014 at **ISU**. IINSPIRE and Iowa EPSCoR collaborated to recruit and place URM STEM students into research labs. The interns were partially supported by IINSPIRE LSAMP.

The **ISU HHMI Project** offered a summer program for community college students to work in faculty research labs. During summer 2014, URM students from **DMACC** and **Iowa Valley CC District's Marshalltown Campus** interested in pursuing a science or engineering B.S. degree participated in the program. Students completed math, biology and physics workshops, visited local industries, and learned about careers, resume writing, university study skills, lab report writing, community service, and leadership. All HHMI students were partially supported as IINSPIRE LSAMP research interns, and IINSPIRE partnered with the HHMI Project on selected programming.

Little Priest Tribal College offered research training through a course-based, research-like experience that mapped sightings of mountain lions within the Winnebago community. The training included a literature review and instruction in research methods. The experience enhanced student interest in science, promoted understanding of relevance and importance to everyday life, and educated the public.

Training for students was also provided through summer bridge program experiences at alliance institutions as listed in the section on Bridge Programs and Transitions.

At **ISU**, team members collaborated campus-wide with on-campus REU programs to coordinate and share events and training activities across summer research programs. The IINSPIRE office arranged graduate school preparation and communications workshops, open to students from all participating REU programs. Shared programming included: Graduate School Preparation; Communications I: Writing a Personal Statement; Communications II: Giving a Presentation; Statistical Analysis of Data; Science Seminars Series; Ethics and Bio-Ethics; Etiquette Luncheon; Mathematics Workshop Series; How to Create a Poster; Poster Symposium; and Industry Visits.

C. FOR MENTORS

At **ISU**, IINSPIRE LSAMP collaborated with the Honors Program, HHMI, and Iowa NSF EPSCoR to conduct a mentor training workshop on May 15, 2014. It was arranged the same as last year with panel discussions and case studies (from "Entering Mentoring," Wisconsin HHMI Professors Program). Workshop materials were made available electronically for campus directors to share with mentors on their campuses.

Warburg College supported upper level URM students in STEM to serve as peer mentors to lower level IINSPIRE LSAMP students. Peer mentors assisted the campus director in planning and running activities and creating a community of URM STEM students.

Augustana College and **Hawkeye CC** recruited upper level students in STEM, who will serve as peer mentors to future IINSPIRE LSAMP students. The peer mentors are being trained and will assist the campus director with activity development, community building, and student recruitment.

DISSEMINATION

Dissemination to Communities of Interest

To achieve the overall goal of increasing the number of URM students entering into and graduating from STEM fields, IINSPIRE LSAMP campus directors and team members have been providing information to various audiences, including faculty, staff, and students on alliance campuses; advisory boards; other NSF projects; local organizations and companies; teachers and families; and STEM professionals. Many of the directors have shared informational and recruitment materials at local and statewide events.

The publications, presentations, and websites listed in the Products section of this report are examples of dissemination to various audiences. The web portal managed by the NSF Science Education Resource Center (SERC) at Carleton College for IINSPIRE LSAMP (<http://serc.carleton.edu/lsamp/>) serves as a repository to compile and share resources related to the pedagogy workshops.

Team members led the following sessions at the 2013 LSMCE Conference, also listed in the Products session:

- Jim Swartz, **Grinnell College**, “Grinnell Science Project” – The GSP addressed barriers to success in the sciences for students of color, women students, and first-generation college students at Grinnell College.
- Mary Darrow, **Iowa State University**, and Cynthia Bottrell, **Hawkeye CC**, “Defining STEM Majors in Community Colleges for WebAMP Reporting: Guidelines and Recommendations for Practice” – The IINSPIRE LSAMP alliance developed a strategy for identifying STEM community college students based on course taking patterns for the purpose of tracking and reporting these students.

Several examples of community-oriented dissemination by alliance and team members are described below.

DMACC and **ISU** cosponsored Discover Engineering Day, described earlier in this report under Recruiting Activities, part of DMACC’s Career Discovery Days. The event was covered in the Des Moines Register Education Report on March 22, 2014: <http://www.desmoinesregister.com/story/news/education/2014/03/23/education-report-isu-dmacc-partner-on-engineering-event/6727487>.

Upper Iowa University issued a news release on August 16, 2013, highlighting IINSPIRE LSAMP goals and support in the creation of its new STEM Support Center, <http://www.uiu.edu/ocm/news/2013/aug/stem-support.html>.

Upper Iowa University also shared their LSAMP/STEM brochure at outreach events, including the 2014 Statewide STEM Conference on March 28, 2014, and three iExploreSTEM festivals held in northeast Iowa in March and April, 2014.

Little Priest Tribal College attended the Higher Learning Commission Conference on April 10-14, 2014. The campus director and a team member presented their experience with interdisciplinary learning communities at Little Priest Tribal College.

The following stories about IINSPIRE LSAMP-funded undergraduate researchers were posted to the web through university and partner news services, making them available to a larger audience.

Connie Maluwelmeng Story

Electrical engineering junior Connie Maluwelmeng awarded Gilman Scholarship for research internship in Germany

<http://news.engineering.iastate.edu/2014/05/07/gilman-scholarship-aids-maluwelmengs-research-internship-in-germany/>

Excerpt: The bi-annual Gilman Scholarship Program named Connie Maluwelmeng, a junior in electrical engineering and mathematics, as one of the 2014 summer finalists to receive financial aid to study abroad.

Maluwelmeng will complete an internship at RWTH Aachen University in Germany, researching solar power. Her research experience is also supported by IINSPIRE LSAMP. "I think having an experience abroad will help me look at things from different perspectives to see how people of different cultures would view things," she said. "It would also help me to learn how to communicate better with people from other countries, which is especially helpful for my future if I have to collaborate with teams from international companies." With two more years at Iowa State, she isn't sure yet what her plans will be after graduation, but she is considering graduate school. "I am interested in research." Maluwelmeng enjoys her time at Iowa State by volunteering at SWE (Society of Women Engineers) outreach events, presenting mathematical research at events like the Nebraska Conference for Undergraduate Women in Mathematics, and working on fun projects in her electrical and computer engineering labs.

"I appreciate all the opportunities I have had because I came to Iowa State," said Maluwelmeng. "None of these things—including the opportunity to do research abroad—would have been available to me if I hadn't come here."

Esdras Murillo Story

Student Presents Interlock House Research at LSMCE Conference

<http://www.iowaepscor.org/news/2013/lsmce>

Excerpt: Esdras Murillo, former Des Moines Area Community College (DMACC) student, Iowa NSF EPSCoR intern, and current Iowa State University junior in electrical engineering, presented a research poster at the Louis Stokes Midwest Center of Excellence (LSMCE) conference in Indianapolis, Indiana, October 20-22. Diane Rover, director of LSAMP-IINSPIRE and member of Iowa NSF EPSCoR broader impacts, commented, "He was invited by the LSMCE conference organizers from among all student presenters who submitted posters." Murillo's research poster, entitled "Annual Energy Consumption in a Community Lab and Analysis of the Electricity Energy Flow" was based on research completed at the Interlock House and was co-authored by Iowa NSF EPSCoR postdoc Shan He and energy utilization researcher Ulrike Passe. Murillo's summer internship was partly funded by DMACC and the LSAMP IINSPIRE program as he completed his associate's degree from DMACC. He is now a full member of the Iowa NSF EPSCoR building science research team through Iowa State University. "I cannot explain the level of excitement and the experience that this meant to me," Murillo said. "I am glad to be part of EPSCoR and LSAMP-IINSPIRE but also know the amazing people that make all this possible. LSAMP-IINSPIRE has given me the necessary tools to be a researcher but also eventually to go into graduate school and be able to help future generations," Murillo said.

See also:

Student earns two awards, DMACC Boone Campus Banner News, December 4, 2013

[https://go.dmac.edu/publications/Boone Banner Archive/2013-12-04.pdf](https://go.dmac.edu/publications/Boone%20Banner%20Archive/2013-12-04.pdf)

Courtnee Jackson Story

Aerospace engineering sophomore Courtnee Jackson finds her passion through internships

<http://news.engineering.iastate.edu/2014/04/18/courtnee-jackson-sophomore-in-aerospace-engineering-finds-her-passion-through-internships/>

Excerpt: Like many engineers, Courtnee Jackson excelled at math and science in high school, which led her principal to introduce her to an aerospace engineering major. The St. Louis, Mo. native took an interest in the subject, but more so in the fact that her new friend was a female in engineering. "I felt like she was doing something different, something that was great." Now Jackson is a sophomore in aerospace herself and striving to make her own goals and achievements. While she's only in her second year of college, Jackson already has some impressive experiences under her belt. Last summer she conducted research at the Center for Nondestructive Evaluation at Iowa State and presented it at a conference in the fall, where she met her current employer. Jackson works at Emerson in Marshalltown, Iowa, doing nondestructive testing. Jackson started out working with spreadsheets of data on pressure valves, how they are measured and how they change. Looking it over, she found a mistake. "I mentioned it to my boss, and he sent out a group email to everybody. That actually felt really good because it was my second day and everybody said, 'Hey, good job!' It was a great experience." Jackson said she's been assigned to several big projects all at once, which makes her feel like her supervisors have confidence in her abilities.

YEAR 4

Plans for Year 4

Planning for year 4 is underway and is guided by project objectives, the logic model, objective team input, institution-specific needs, and evaluation results and recommendations. We continue to utilize recommendations from the external evaluation reports. The reports are used for reflection and guide alliance level activity planning.

We continue to build upon the achievements of our first three years by: working to leverage resources, including engaging with external partners and identifying sources of funding to build and sustain programs; increasing opportunities for face-to-face meetings with the director, campus directors, and stakeholders across institutions (to strengthen relationships, enhance institutional buy-in, and communicate the sharing of information); ramping up recruitment activities; ensuring all institutions are equal partners; using baseline data to strategically guide programming; and providing continued attention to evaluation efforts and priorities.

Institutionalization: Leveraging Resources and Developing Partnerships

- We will continue to work in this area by working to engage objective teams in alliance-level work and leveraging resources through face to face meetings. It is clear through evaluations that campus directors value time together to discuss and share strategies and develop shared resources.
- The alliance is also planning to add an additional objective team that will focus on industry partnerships. There have been discussions in year 3 but also challenges face this work including running up against competing institutional priorities in terms of industry partnerships.
- The alliance leadership team will continue to make campus visits a priority. In year 3, 6 visits to individual campuses were completed. These visits included meetings with institutional teams and governing board members, focus on institutional data, and institution-specific discussions regarding opportunities and challenges. These visits also allows for strategic conversations with institutional leaders regarding specific challenges that the Campus Director might be facing.
- The governing board and leadership team are especially critical for helping to establish key relationships that can guide fundraising (such as identifying or creating established protocols for soliciting funding from external partners) and enhance long-term engagement, sustainability, and institutionalization of alliance programs and goals. This will continue to be a priority in year 4.
- We will continue to develop alliance-wide resources including centralized processes for student research opportunities and internships, access to mentors in industry, media templates, and a unified marketing strategy (for example, brochures). The objective teams will continue to identify relevant research-based practices and alliance resources that can guide the implementation of programming. These practices and resources will continue to be collected and shared through the SERC site and through alliance meetings.

Communication and Team-Building

- We will continue to provide opportunities for face-to-face meetings with campus directors and the leadership team. In year 3, there were 3 face-to-face meetings. In year 4, we are planning to have 4, or 2 per semester.
- We will continue to engage more campus professionals in the planning and implementation of the work across the alliance. Leveraging resources and prioritizing goals will also help reduce the heavy workload.
- It is clear that more time and focus needs to be placed on objective team work and progress. Two face-to-face meetings in year 4 will focus on this work.
- At each of our meetings we have grouped like institutions for planning and discussion. We will continue this practice as well as engaging professionals and effective practice from a range of institutions.

Programming

Recruitment continues as one of the biggest challenges and is also essential to increasing STEM enrollment. Affecting institutional recruitment cycles requires partnerships with admissions and recruiting staff at alliance institutions. During year 4, campus directors will be encouraged to leverage campus recruiting resources. We will continue to develop and share student training models that lead to a research certificate. This includes content for both lower and upper class students and will be aimed at building research capacity and skills as well as graduate school aspirations and knowledge.

In year 3, the alliance hosted a two-day assessment and evaluation retreat which focused on institutional data and planning. Each institution reviewed enrollment, graduation, and participation data from WebAMP and engaged in guided discussion regarding what they know and what they need to know about URM STEM success on their campus. Institutional teams created a “dashboard” of their institutional data and were encouraged to use their “dashboard” to guide year 4 planning. “Dashboard” discussions will continue in the fall of year 4 in our fall face-to-face meeting focusing on year 4 institutional planning.

Evaluation

Continued Attention to Evaluation Efforts Including Periodically Reviewing Evaluation Priorities.

Evaluation priorities for the upcoming grant year should be established and metrics identified. Evaluators should continue to work with each other and with the alliance leadership team to review priority evaluation tasks, assess ongoing evaluation, and periodically re-assess evaluation goals, metrics, and priorities. Derived from the strengths and challenges identified above and evaluation findings from the external evaluator report, the following recommendations will be considered to strengthen project activities and maximize impact:

- **Strengthen evaluation of student impacts.** Additional evaluation of student experiences took place in year 3 (the SURE Surveys and focus groups with HHMI participants), but additional evaluation of student impacts and experiences will allow the program to gather formative feedback to refine activities and assess the effectiveness of the activities upon the recruitment, persistence, and completion of STEM majors by under-represented minority students. The team should discuss how to best approach the evaluation of student impacts at the alliance and institution-levels.
- **Assess the structure of the O-Teams.** The objective teams play an important role in achieving the alliance objectives. Having campus directors serve on objective teams is also valuable for enhancing cross-institution communication and building capacity. However, given feedback from the campus directors, the team should consider if there are ways to adjust the structure or responsibilities of the objective teams. It might be useful to solicit feedback from the campus directors and objective team members to inform the discussion.
- **More consistently and explicitly link evaluation form questions with Alliance objectives.** To enhance formative feedback and summative assessment, questions on the evaluation forms can be more consistently coupled with alliance objectives and the measurement of expected outcomes. Some evaluation forms are doing this, but more consistently ensuring the evaluation questions measure alliance objectives will strengthen the ability to demonstrate specific impacts.
- **Continue campus visits by IINSPIRE Leadership Team.** Alliance institutions have responded very favorably to the campus visits conducted by the IINSPIRE leadership team. Institutions report that it has helped them leverage resources and engage their institutional partners. Those institutions that had not yet had a campus visit were looking forward to the opportunity.
- **Continue to explore strategies for engaging industry partners.** The team has been exploring ways to more fully engage industry partners that are sensitive to political issues surrounding institutional fundraising. The expertise of the Governing Board should be leveraged to discuss strategies and best practices

IMPACTS

Impacts

A. IMPACT ON STEM DISCIPLINES

As described in the activities and results sections, the STEM pathway through different types of institutions is being influenced through IINSPIRE LSAMP recruiting, bridge programs, pedagogy development, research training, faculty networking, and workforce development.

Awareness of and participation in IINSPIRE LSAMP is beginning to influence each campus community in a more meaningful way. Faculty and staff are gaining a greater appreciation of what IINSPIRE LSAMP has to offer and the benefits of broadening participation of groups not traditionally served.

Co-curricular and extra-curricular activities, such as STEM student clubs, research skills training, and research experiences, are being implemented to more fully engage undergraduate students in STEM disciplines beyond the classroom.

These impacts will be measured through the following expected outcomes of project objectives:

- Increase in applications to and participation in STEM research experiences and bridge programs at alliance institutions
- Increase in URM STEM students in IINSPIRE sponsored events
- Increase in URM STEM enrollments, transfers, and graduates at alliance institutions
- Increase in the number of students receiving a research training certificate
- Improved quality of research experiences and mentoring
- Increase in the number of mentor training sessions offered and the number of faculty, industry professionals, graduate students, and undergraduate peer mentors participating in training
- Increase in faculty participation in professional development activities
- Increase in the number and scope of faculty networks

B. IMPACT ON OTHER DISCIPLINES

There is extensive collaboration between STEM and education communities on this project.

IINSPIRE LSAMP activities such as bridge programs and mentor training often involve both STEM and non-STEM participants. Focused programming for STEM participants may improve the training of non-STEM participants.

This impact will be measured in part through the following expected outcomes of project objectives:

- Increase in the number and scope of faculty networks
- Development of institution level activities
- Increased leveraging of institutional resources to support alliance goals

C. IMPACT ON HUMAN RESOURCES DEVELOPMENT

Development of human resources is at the heart of the IINSPIRE LSAMP program, as with all NSF LSAMP programs. Funding provided through the NSF LSAMP grant provides opportunities that were not previously available on many of the alliance campuses. IINSPIRE LSAMP objectives are focused on increasing the success of URM STEM students, which will ultimately grow and strengthen the STEM workforce. The Training and Professional Development section of the report summarizes the impact on various groups.

Alliance institutions are reporting that their programs are influencing student decision-making; for example, student preparation for, interest in, and decisions to attend graduate school, or to transfer to a 4-year institution and major in STEM, have increased or are more likely. The programs are helping students grow academically, professionally and socially and establish their identity within STEM and the on-campus community. Greater student networking with peers and professionals is expected to benefit their academic and career success.

Faculty/staff networking raises awareness of issues involved in achieving access, equity, and excellence in education. Cross-institution communication and capacity building is supported through project activities and management structures such as the objective teams.

These impacts will be measured through the following expected outcomes of project objectives:

- Increase in applications to and participation in STEM research experiences and bridge programs at alliance institutions
- Increase in URM STEM students in IINSPIRE sponsored events
- Increase in URM STEM enrollments, transfers, and graduates at alliance institutions
- Increase in the number of students receiving a research training certificate
- Improved quality of research experiences and mentoring
- Increase in the number of mentor training sessions offered and the number of faculty, industry professionals, graduate students, and undergraduate peer mentors participating in training
- Increase in faculty participation in professional development activities
- Increase in the number and scope of faculty networks

D. IMPACT ON INSTITUTIONAL RESOURCES THAT FORM INFRASTRUCTURE

Alliance institutions are reporting that synergistic partnerships within institutions, across the alliance, and with external partners are advancing institutional level efforts in support of project goals. Campus directors reported community building, cross-unit collaborations, and leveraging of resources on their campuses as a result of IINSPIRE LSAMP. They reported that campus visits conducted by the IINSPIRE Leadership Team helped them leverage resources and engage their institutional partners. Many also reported strengthened partnerships with other alliance institutions.

IINSPIRE programs are forging connections with other diversity programs and support on campus. Collaboration between IINSPIRE and established programs will enhance the capacity to increase the number of URM graduates in STEM. Recruitment and retention programs on alliance campuses are expected to be strengthened. Examples of program collaboration are evident in the project activities and outcomes described in this report. In some cases, these relationships are leading to new opportunities for grant writing and funding. IINSPIRE programs have initiated the formation of STEM clubs/organizations for students.

Regional partnerships among alliance institutions (e.g., the pilot programming among Hawkeye Community College, Wartburg College, and the University of Northern Iowa) have significant potential to improve institutional practices and STEM pathways for URM students.

These impacts will be measured in part through the following expected outcomes of project objectives:

- Improved quality of research experiences and mentoring
- Increase in faculty participation in professional development activities
- Increase in the number and scope of faculty networks
- Development of institutional plans and reports and institution level activities
- Increased leveraging of institutional resources to support alliance goals
- Demonstration of ongoing assessment, feedback loops, and continuous improvement

E. IMPACT ON INFORMATION RESOURCES THAT FORM INFRASTRUCTURE

The program materials, websites, assessment tools and aggregated data assessment and analysis across the alliance will serve as powerful information resources to support faculty, students, and evidence-based practices.

IINSPIRE LSAMP developed proposed guidelines to identify STEM majors at community colleges based on course taking patterns for reporting and tracking purposes. These guidelines also recommended that the WebAMP System add a “General STEM” category of majors. A systematic process for identifying STEM community college students will enable more targeted programming and assessment.

These impacts will be measured in part through the following expected outcomes of project objectives:

- Development of institutional plans and reports
- Demonstration of ongoing assessment, feedback loops, and continuous improvement

F. IMPACT ON SOCIETY BEYOND SCIENCE AND TECHNOLOGY

Given the regional concentration of the alliance and demographic trends, the longer term outcomes of IINSPIRE LSAMP are expected to positively impact workforce quality, communities, and the economy in the region. Alliance institutions are reporting early efforts in community engagement, such as making connections with individuals and organizations that work with underprivileged students, and raising awareness about STEM careers and societal impact with external public audiences.

Just as teams achieve greater results than individuals, the alliance of sixteen institutions across three states and involving diverse types of institutions brings together people, resources and capabilities with the potential to tackle new and complex projects. New proposals, research and innovations may result from the relationships within the alliance.

PRODUCTS

A. PUBLICATIONS

E. Upah. "CoE students win poster contest at LSAMP IINSPIRE conference." *Iowa State University College of Engineering*. Web. January 24, 2014.

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E. Upah. "Courtnee Jackson, sophomore in aerospace engineering, finds her passion through internships." *Iowa State University College of Engineering*. Web. April 18, 2014.

<http://news.engineering.iastate.edu/2014/04/18/courtnee-jackson-sophomore-in-aerospace-engineering-finds-her-passion-through-internships/>.

"Curbelo Presents Keynote at IINSPIRE Conference." *The College of Agriculture and Life Sciences Newsletter*. Web. December 22, 2013. <https://www.cals.iastate.edu/news/agonline/issue/777>.

M. Chang. "External Evaluation - LSAMP: Iowa Illinois Nebraska STEM Partnership for Innovation in Research and Education (IINSPIRE)." Septebmer, 2014.

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"Iowa State undergraduates showcase their research at annual Capitol event April 1." *Iowa State University News Service*. Web. March 21, 2014. <http://www.news.iastate.edu/news/2014/03/21/ric>.

"Student Presents Interlock House Research at LSMCE Conference." *Iowa NSF EPSCoR*. Web. 2013. <http://iowaepscor.org/news/2013/lsmce>.

E. Upah. "Students showcase work at research symposium." *Iowa State University College of Engineering*. Web. April 23, 2014. <https://news.engineering.iastate.edu/2014/04/23/students-showcase-work>.

M. Heaton. "Upper Iowa University creates STEM support center for students." *Upper Iowa University Office of Communication and Marketing*. Web. August 16, 2013. <http://www.uiu.edu/ocm/news/2013/aug/stem-support.html>.

B. PRESENTATIONS

F. Laanan (2014). *Astin's I-E-O Model: Studying College Student Outcomes*. IINSPIRE LSAMP 2014 Assessment and Evaluation Retreat. Des Moines, IA.

A. Curbelo (2013). *Building Global Academic Opportunities for Multicultural Students in the ASTEM Areas*. IINSPIRE LSAMP 2013-14 Annual Conference. Waterloo, IA.

D. Sanborn, K. McCarville, M. Moore, K. Pr'Out, Q. Nartey (2013). *Community Building and Recruitment Through Social Media*. IINSPIRE LSAMP 2013-14 Annual Conference. Waterloo, IA.

J. Mann, D. Mupasiri (2013). *Community Building and Recruitment Through Social Media*. IINSPIRE LSAMP 2013-14 Annual Conference. Waterloo, IA.

M. Darrow, C. Bottrell (2013). *Defining STEM Majors in Community College for WebAMP Reporting: Guidelines and Recommendations for Practice*. Louis Stokes Midwest Center of Excellence Conference: A Call To Action: LSAMP

Model for Broadening Participation. Indianapolis, IN.

A. Howsare Boyens (2014). *Evaluation of APEX-E: Academic Program for Excellence in Engineering*. IINSPIRE LSAMP 2104 Assessment and Evaluation Retreat. Des Moines, IA.

L. Gregg-Jolly (2014). *Grinnell College Introduction to Biological Inquiry*. IINSPIRE LSAMP 2014 Pedagogy Workshop: Research and Research-Like Experiences in Science Courses. Grinnell, IA.

J. Swartz (2013). *Grinnell Science Project*. Louis Stokes Midwest Center of Excellence Conference: A Call To Action: LSAMP Model for Broadening Participation. Indianapolis, IN.

K. Pr'Out, M. Darrow, F. Laanan (2014). *HHMI Summer of Research Science Program: Understanding the Impact on Underrepresented Minority STEM students*. IINSPIRE LSAMP 2014 Assessment and Evaluation Retreat. Des Moines, IA.

D. Rover, M. Darrow, D. Mitchell (2013). *IINSPIRE LSAMP – An Alliance Modeling How to Broaden Participation in Changing Midwest Demographics*. Louis Stokes Midwest Center of Excellence Conference: A Call To Action: LSAMP Model for Broadening Participation. Indianapolis, IN.

J. Antonellis, A. Martyn (2014). *Interdisciplinary Learning Community Courses: Perspectives from a Tribal College*. 2014 Annual Conference of the Higher Learning Commission. Chicago, IL.

E. Iverson (2014). *Introduction to the Science Education Resource Center (SERC) website and resources available*. IINSPIRE LSAMP 2014 Pedagogy Workshop: Research and Research-Like Experiences in Science Courses. Grinnell, IA

E. Iverson, J. Swartz (2013). *Pedagogy Work shop on Community Building I*. IINSPIRE LSAMP 2013-14 Annual Conference.. IINSPIRE LSAMP 2013-14 Annual Conference. Waterloo, IA.

E. Iverson, J. Swartz, B. Ritter, J. Johnson (2013). *Pedagogy Work shop on Community Building II*. IINSPIRE LSAMP 2013-14 Annual Conference. IINSPIRE LSAMP 2013-14 Annual Conference. Waterloo, IA.

D. Lopatto (2014). *Research-like experiences in science courses: Finding from the CURE survey*. IINSPIRE LSAMP 2014 Pedagogy Workshop: Research and Research-Like Experiences in Science Courses. Grinnell, IA.

J. Swartz, L. Gregg-Jolly, E. Iverson (2014). *Second Year Science Student Survey*. IINSPIRE LSAMP 2014 Assessment and Evaluation Retreat. Des Moines, IA.

K. Pr'Out (2014). *Sense of Belonging and URM STEM Students*. IINSPIRE LSAMP 2014 Assessment and Evaluation Retreat. Des Moines, IA.

J. Swartz (2014). *The Other Extreme: A simple two week introductory chemistry research like experience* IINSPIRE LSAMP 2014 Pedagogy Workshop: Research and Research-Like Experiences in Science Courses. Grinnell, IA.

C. WEBSITES

Doane IINSPIRE LSAMP Program:

<http://www.doane.edu/doane-iinspire-lsamp-program>

IINSPIRE LSAMP Land's End eStore:

http://ocs.landsend.com/cd/frontdoor?store_name=iinspire_lsamp&store_type=3

IINSPIRE LSAMP Program at Augustana College:

https://sites.google.com/a/augustana.edu/acss/iinspire_at_augustana

IINSPIRE LSAMP Program at University of Iowa:

<http://research.uiowa.edu/lkamp-iinspire-program>

D. OTHER PRODUCTS

IINSPIRE LSAMP Flyer Templates. IINSPIRE LSAMP Program: Iowa State University, 2014. Print.

IINSPIRE LSAMP PowerPoint Slides Template. IINSPIRE LSAMP Program: Iowa State University, 2013. Electronic.

IINSPIRE LSAMP Stand-up Banner. IINSPIRE LSAMP Program: Iowa State University, 2013. Print.

IINSPIRE LSAMP Student Research Poster Template. IINSPIRE LSAMP Program: Iowa State University, 2013. Electronic.

NSF LSAMP - Bridge to the Doctorate Bookmark. IINSPIRE LSAMP Program: Iowa State University, 2014. Print.

STEM at UIU Brochure, IINSPIRE LSAMP Program: Upper Iowa University, 2013. Print.

STEM Careers at DMACC Brochure, Des Moines Area Community College, 2013. Print.

APPENDIX I. Alliance Campus Team Members

INSTITUTION	GOVERNING BOARD MEMBER	CAMPUS TEAM MEMBERS	STUDENT ASSISTANTS
Augustana College <u>Campus Director</u> Lori Scott, <i>Professor of Biology</i>	Margaret Farrar, <i>Associate Dean of the College</i>	Jose Boquin, <i>Professor of Chemistry</i> Tierney Brosius, <i>Professor of Biology</i> Patrick Crawford, <i>Professor of Chemistry,</i> Kevin Geedey, <i>Professor of Biology</i> Michael Reisner, <i>Director of the Upper Mississippi Research Center</i> Mark Salisbury, <i>Director of Institutional Research</i> Michael Schroeder, <i>Professor of Education</i> Sue Standley, <i>Director of Financial Assistance</i> Pam Trotter, <i>Professor of Chemistry</i>	John Le, <i>Junior, Chemistry</i>
Des Moines Area Community College <u>Campus Director</u> Kari Hensen, <i>Associate Dean of Arts & Sciences</i>	Kim Linduska, <i>Vice President and Provost</i>	Ahmed Agyeman <i>Pre-Engineering Academic Advisor</i> Chandra Karunatilaka, <i>Instructor, Chemistry</i> Deb Koua, <i>Director of Grants and Contracts</i> Norma Perez-Kahler, <i>Director of Student Support Services</i> Brad Spielman, <i>Academic Advisor/Adjunct Instructor</i> Vijay Varadarajan, <i>Instructor, Physics</i> Nancy Woods, <i>Instructor, Physics and Mathematics</i>	

Doane College <u>Campus Director</u> Sharmin Sikich, <i>Assistant Professor of Chemistry</i>	John M. Burney, <i>Vice President for Academic Affairs</i>	Tessa Durham Brooks, <i>Bridge Program Volunteer/Assistant Professor of Biology</i> Peggy Hart, <i>Advisory Panel/Associate Professor of Mathematics</i> Andrea Holmes, <i>Faculty Mentor/Associate Professor of Chemistry</i> Wilma Jackson, <i>Director of Multicultural Support Services</i> Ramesh Laungani, <i>Bridge Program Volunteer/Assistant Professor of Biology</i> Kate Marley, <i>Assistant Professor of Biology</i> Carrie Petr, <i>Advisory Panel/Director of the Hansen Leadership Program</i> Karen Sookram, <i>Advisory Panel/Director Learning Center</i> Russ Soucek, <i>Advisory Panel/Professor of Environmental Science</i> Raja Tayah, <i>Director of Institutional Research</i> Chris Wentworth <i>Professor of Physics</i>	Sonia Almodovar, <i>Sophomore, Math</i> Muijj Ghani, <i>Junior, Biology</i>
Eastern Iowa Community College District <u>Campus Director</u> Brian Ritter, <i>Nahant Marsh Facilitator Program Director for Conservation Technology</i>	Ellen Kabat Lensch, <i>Executive Director of Resource Development and Innovation, Executive Director of ATEEC</i>	Carina Easley-Appleyard, <i>LSAMP Research Coordinator</i> Angela Ghrist, <i>Biology Instructor</i> Victoria Green, <i>LSAMP Research Coordinator</i> Mik Holgersson, <i>Research Consultant/Advisor</i>	

Grinnell College <u>Campus Director</u> Jim Swartz, <i>Dack Professor of Chemistry</i> <i>Director of the Center for Science in the Liberal Arts</i>	Jim Swartz, <i>Dack Professor of Chemistry,</i> <i>Director of the Center for Science in the Liberal Arts</i>	Johnathan (Jackie) Brown, <i>Professor of Biology</i> Leslie Gregg-Jolly, <i>Professor of Biology</i> Shannon Hinsa-Leasure, <i>Assistant Professor of Biology</i> Stephan Sieck, <i>Associate Professor of Chemistry</i>	
Hawkeye Community College <u>Campus Director</u> Cynthia Bottrell, <i>Dean of Mathematics, Natural, and Social Sciences</i>	Jane Bradley, <i>Vice President for Academic Affairs</i>	Cynthia Boyd, <i>Instructor of Natural Science</i> Karen Ernst, <i>Instructor of Natural Science</i> Keanna Levy, <i>Admissions Recruiter</i> David Mercer, <i>Instructor of Natural Science</i>	
Iowa State University <u>Campus Director</u> Derrick Rollins, <i>Professor of Chemical & Biological Engineering</i>	Jonathan Wickert, <i>Senior Vice President and Provost</i>	Lequetia Ancar, <i>Assistant Director of Student Services</i> <i>Multicultural Liaison Officer for the College of Engineering</i> Krishna Athreya, <i>Program Coordinator for the Center for Biorenewable Chemicals</i> Theresa Cooper, <i>Assistant Dean for Diversity of the College of Agriculture and Life Sciences</i> Aurelio Curbelo, <i>Multicultural Liaison Officer for the College of Agriculture and Life Sciences</i> Luiza Dreasher, <i>Multicultural Liaison Officer for the College of Liberal Arts and Sciences (fmr.)</i> Thelma Harding, <i>Program Coordinator for the Graduate College</i>	Eduardo (Eddie) Acosta, <i>Junior, Management Information Systems</i> Mason Tyler Bishop, <i>Sophomore, Construction Engineering</i> Kayla Greiner, <i>Senior, Agriculture and Life Science Education</i> Anne Howsare Boyen, <i>PhD Candidate</i> <i>School of Education</i> Courtnee Jackson, <i>Junior, Aerospace Engineering</i> Steven Johnson, <i>Senior, Industrial Engineering</i> Korey Kollasch, <i>M.S., School of Education</i>

<p>Iowa State University (cont.)</p>		<p>Connie Hargrave, <i>Director, Science Bound</i> <i>Associate Professor, School of Education</i></p> <p>Japannah Kellogg, <i>Director of Student Support Services</i></p> <p>Patricia Leigh, <i>Professor, School of Education</i></p> <p>Gary Mirka, <i>Associate Dean of Undergraduate Graduate Education,</i> <i>College of Engineering</i></p> <p>Craig Ogilvie, <i>Assistant Dean of the Graduate College</i></p> <p>Debra Sanborn, <i>Program Coordinator, Dean of Student's Office</i></p> <p>Dana Schumacher, <i>Assistant Director for Scholarship and Research</i></p> <p>Udoyara (Sunday) Tim, <i>Associate Professor of Agricultural &</i> <i>Biosystems Engineering</i></p> <p>Denise Williams, <i>Diversity Coordinator of the College of</i> <i>Human Sciences</i></p> <p>Katrina Williams, <i>Advisor, Aerospace Engineering</i></p>	<p>Andrew Mushel, <i>Junior, Technical Communication</i></p> <p>Kahntinetta Pr'Out, <i>PhD Candidate,</i> <i>Mechanical Engineering</i></p>
<p>Iowa Valley Community College District</p> <p><u>Campus Directors</u></p> <p>Linda Barnes, <i>Associate Professor of Biology</i></p> <p>Lara Thoms, <i>Office Associate, Evaluation and</i> <i>Program Effectiveness</i></p>	<p>Christopher Russell, <i>Dean of Students and Academic Affairs</i></p>	<p>Matthew Bandstra, <i>Anatomy, Physiology and Biology Faculty</i></p> <p>Jason Poock, <i>Chemistry Faculty</i></p> <p>Sally Wilson, <i>Biology Faculty</i></p>	

Kirkwood Community College <u>Campus Director</u> Juanita Limas, <i>Professor of Anatomy and Physiology/Nutrition</i>	Bill Lamb, <i>Vice President for Academic Affairs</i>	Heather Conley, <i>Director of Grants Development</i> John Henik, <i>Associate Vice President for Academic Affairs</i>	
Little Priest Tribal College <u>Campus Director</u> Harry (Al) Martyn, <i>Department Chair, Science</i>	Christopher Stockdale, <i>Interim Dean of Academic Affairs</i>	Jessie Antonellis, <i>Developmental Math Instructor</i> Andrea Vandall, <i>Director of Student Records & Institutional Research</i> Janyce Woodard, <i>Environmental Science Instructor</i>	
Luther College <u>Campus Director</u> Brad Chamberlain, <i>Associate Professor of Chemistry, Director of Advising</i>	Kevin Kraus, <i>Vice President for Academic Affairs</i>	Scott Carlson, <i>Associate Professor of Biology</i> Mark Eichinger, <i>Associate Professor of Biology</i> Derek Hartl, <i>Director of Admissions</i> Michael Johnson, <i>Assistant Professor of Mathematics</i> Angela Kueny, <i>Assistant Professor of Nursing</i> Keith Lesmeister, <i>Coordinator of Diversity RecruitmentPhysics</i> Olga Rinco, <i>Associate Professor of Chemistry</i> Terry Sparkes, <i>Associate Dean, Director of Curriculum Development and College Honors, Associate Professor of Religion</i> Jeffrey Wilkerson, <i>Associate Dean, Director of Faculty Development, Professor of Physics</i>	

<p>Nebraska Wesleyan University</p> <p><u>Campus Director</u></p> <p>Candice Howell, <i>Director of Student Success and Retention</i></p>	<p>Judy Muyskens, <i>Chief Academic Officer and Provost</i></p>	<p>Melissa Edrmann, <i>Associate Professor of Mathematics and Computer Science</i></p> <p>Nathanael Fackler, <i>Associate Professor of Chemistry and Chair of Department</i></p> <p>Gary W. Gerald II, <i>Assistant Professor of Biology</i></p> <p>Angela McKinney, <i>Professor of Biology</i></p> <p>Lisette Torres, <i>Adjunct Professor of Biology, LSAMP Intern</i></p> <p>Nancy Wehrbein, <i>Director of Sponsored Programs</i></p>	
<p>University of Iowa</p> <p><u>Campus Director</u></p> <p>Richard Hichwa, <i>Professor, Senior Associate Vice President for Research</i></p>	<p>P. Barry Butler, <i>Executive Vice President and Provost</i></p>	<p>Lori Adams, <i>Adjunct Assistant Professor for Biology, Co-Director of Iowa Biosciences Advantage Program /Assessment Specialist</i></p> <p>Marta Gomez, <i>Research Support Manager</i></p> <p>Nancy Humbles, <i>Director Center for Diversity and Enrichment</i></p> <p>Robert Kirby, <i>Director of the Iowa Center for Research by Undergraduates</i></p> <p>Tonya Peeples, <i>Professor of Chemical and Biochemical Engineering, Director of the Ethnic Inclusion Effort for Iowa Engineering</i></p> <p>Deandrea Watkins, <i>STEM Specialist, Center for Diversity and Enrichment</i></p>	

<p>University of Northern Iowa</p> <p><u>Campus Director</u></p> <p>Douglas Mupasiri, Head, Professor of Mathematics</p>	<p>Michael Licari, Interim Executive Vice President and Provost</p>	<p>Kavita Dhanwada, Associate Dean of the College of Humanities, Arts and Science, Associate Professor of Biology</p> <p>Latricia Hylton, Math Coordinator of the Academic Learning Center</p> <p>Kristin Moser, Senior Research Analyst, CIO's Office & Institutional Research</p>	<p>Rachel Reetz, PSM Candidate, Industrial Mathematics/Actuarial Science</p>
<p>Upper Iowa University</p> <p><u>Campus Director</u></p> <p>Katherine (Kata) McCarville, Assistant Professor of Geosciences</p>	<p>William Duffy, President</p> <p>Kurt Wood, Provost</p>	<p>William Jones, Assistant Professor of Biology</p> <p>Douglas McReynolds, Bissell Professor of English</p> <p>Manzoor Murshed, Associate Professor of Management Information Systems</p> <p>George Nigel, Associate Professor of Mathematics and Physics</p> <p>Sara Sheeley, Assistant Professor of Biology</p> <p>Amy Tucker, Co-Chair, Council on Diversity & Inclusion/Diversity Program</p>	

Wartburg College <u>Campus Director</u> LeAnn Faidley, <i>Assistant Professor of Engineering</i>	Mark Biermann, <i>Vice President for Academic Affairs</i>	Joy Becker, <i>Associate Professor of Mathematics</i> Krystal Madlock, <i>Director of Student Diversity Programs</i> J. Keith McClung, <i>Professor of Biology</i> Eric Merten, <i>Assistant Professor of Biology</i> Kendra Oswald, <i>Administrative Assistant, Enrollment Management</i> Jennifer Pothast, <i>Assistant Professor of Mathematics</i> Abbie Raum, <i>Student Employment Coordinator</i> Chealsey Sensor, <i>Administrative Assistant, Enrollment Management</i>	
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APPENDIX II. Program Partners

PROGRAM NAME	PROGRAM TYPE	PROGRAM LEADER(S)	ALLIANCE INSTITUTION
APEX www.dso.iastate.edu/msa/learningcommunities/apex-faq.html	Bridge	Ebony Williams, <i>Program Coordinator</i>	Iowa State University
APEX ^E www.dso.iastate.edu/msa/learningcommunities/apex-faq.html	Bridge	Lequetia Ancar, <i>Program Coordinator</i>	Iowa State University
Biological Materials and Processes Research Experience for Undergraduates (BioMAP) http://www.cbe.iastate.edu/research/undergraduate-research/	REU	Monica Lamm <i>Program Director,</i>	Iowa State University
CBIRC NSF Engineering Research Center for Biorenewable Chemicals www.cbirc.iastate.edu	REU	Brent Shanks, <i>Director</i>	Iowa State University
Emerson Process Management, Fisher Controls Division	Internships	J. Adin Mann, <i>Principal Engineer</i>	Alliance
Howard Hughes Medical Institute (HHMI) Project at Grinnell College	REU	Leslie Gregg-Jolly, <i>Program Director</i>	Grinnell College
Howard Hughes Medical Institute (HHMI) Project at Iowa State University http://pws2.ait.iastate.edu/wiki/display/HHMI/Together+Engaging+Student+Science	REU	Craig Ogilvie, <i>HHMI-ISU Director</i>	Iowa State University
Iowa Experimental Program to Stimulate Competitive Research (Iowa EPSCoR) www.iowaepscor.com/	REU	Sriram Sundararajan <i>Co-Project Director,</i>	Iowa State University
Microscale Sensing Actuation and Imaging Program (MoSAIC) http://www.me.iastate.edu/mosaic/	REU	Sriram Sundararajan <i>Program Director,</i>	Iowa State University
Nahant Marsh Education Center http://nahantmarsh.org/	REU	Brian Ritter <i>Facilitator and Program Director</i>	Eastern Iowa Community College District
Southeast Nebraska Area Health Education Center (AHEC) at Doane College's School of Graduate and Professional Studies http://www.doane.edu/ahec	Educational	Drew Case, <i>Executive Director</i>	Doane College
Summer Program for Interdisciplinary Research and Education-Emerging Interface Technologies (SPIRE-EIT) http://www.hci.iastate.edu/REU/	REU	Stephen Gilbert <i>Program Director,</i>	Iowa State University
Sustainable Production and Distribution of Bioenergy for the Central USA www.cenusa.iastate.edu	REU	Raj Raman, <i>Education Co-Director</i>	Iowa State University
University of Chicago, IL Type of Program: Internships https://www.luriechildrens.org/en-us/Pages/index.aspx	Internships	Sookyong Koh, M.D., <i>Pediatric Epileptologist,</i> Ann & Robert H. Lurie <i>Children's Hospital of Chicago</i>	Augustana College

APPENDIX III. Logic Model

IINSPIRE LSAMP Goals: Increase number of URM students in STEM majors at IINSPIRE institutions. Increase number of URM STEM transfers and graduates at IINSPIRE institutions.				
Objective	Activities	Outputs	Expected Outcomes	Source of Data for Measuring Outcomes
Community-Based and Student Recruiting	open houses, awareness activities, recruiting events, coordination with community-based recruiting models within the alliance	# of events, # of (URM) students/families attending, # of Recruitment materials developed and distributed, # of Recruiting Events.	Increase in applications to and participation in STEM research experiences and bridge programs at alliance institutions, increase in URM STEM students in IINSPIRE sponsored events, increase in URM STEM enrollments.	WebAMP Activity Data, WebAMP Enrollment Data, Print and web-based recruitment tracking, Focus groups and interview data.
Assumption: Recruiting increases the number of URM students entering STEM majors at IINSPIRE institutions.				
Bridge Programs and Transitions	bridge programs, transition advising	# of bridge programs, # of URM students in bridge programs, # of transition activities, # of URM students participating in transition activities	Increase in URM student applications to and participation in STEM research experiences and bridge programs at alliance institutions.	WebAMP Activity Data, Surveys (and follow-up surveys) of bridge program participants. Focus groups and interviews.
Assumption: Participation in bridge programs and transition activities increases the likelihood that students choose and persist in STEM majors.				
Faculty Engagement and Inclusive Pedagogy	workshops on summer bridge programs, pedagogy, and mentoring	# of workshops held, # of participants	Increase in faculty participation in professional development activities, increase in the number and scope of faculty networks. Faculty gain knowledge and skills about inclusive pedagogy and practice inclusive pedagogy.	WebAMP Activity Data, Workshop evaluation forms, annual conference evaluation forms
Assumption: Faculty engagement and practice of inclusive pedagogy increases URM persistence/graduating in STEM majors.				
Undergraduate Student Research and Training	student research opportunities, research certificate developed	# of URM students engaged in research opportunities, # of URM students receiving research certificate	Increase in URM student applications to and participation in STEM research experiences, increases in the number of students receiving the Research Certificate, improved quality of research experiences and mentoring.	WebAMP Activity Data, WebAMP Type I Student Data, SURE III, Other Surveys, Focus Groups/Interviews with Research Interns.
Assumption: Student research opportunities increase the number of URM students graduating in STEM majors				
Mentor Training	mentor training for faculty and students who supervise undergraduate research projects	# of mentor training sessions held, # of mentors trained, # of URM students receiving mentoring	Increase in the number of mentor training sessions offered and the number of faculty, industry professionals, prospective students, and peer mentors participating in training. Training increases the mentoring skills of faculty and students who mentor URM STEM students.	WebAMP Activity Data, WEBAMP Faculty Participant Data, SURE III, Other Surveys, Mentor Training Evaluations, Focus Groups/Interviews with Research Interns.
Assumption: URM STEM students receive mentoring to support their interest in STEM and progression toward STEM degrees.				
Institutional Commitments	Leverage institutional resources and partnerships, use alliance and institutional data to implement effective programs	# of faculty/staff on campus team, Participation in alliance events, # of partnerships, outputs/products from partnership work	Institutional plans and reports, institution level activities, increased leveraging of institutional resources to support Alliance goals.	WebAMP Data, Evidence from partnership work, Interviews with IINSPIRE team members and key partners
Assumption: Strengthening and leveraging of institutional partnerships and development of new institutional partnerships supports alliance goals.				
Assessment and Evaluation	Track student participation and enrollment statistics, Assess outcomes and use results to inform and improve practices	STEM enrollment and graduation data, Longitudinal tracking of type I students, Use of evaluation data to inform programming	Increased URM STEM enrollment and graduation numbers at Alliance Institutions, Ongoing Assessment, Feedback loops, Continuous improvement	Interviews with IINSPIRE team members, WebAMP Data, Type I student data, Program/Activity evaluation data.

APPENDIX IV. Student Research Abstracts

Rural Community Health Needs Assessment

Marlu Abarca, Grinnell College

The Community Needs Health Assessment (CNHA) is an assessment conducted by the Grinnell Regional Medical Center as required by the new federal Patient Protection and Affordable Care Act. Under this act, all nonprofit hospitals are mandated to conduct a CHNA survey at least once every three years and create an action plan to address community needs and concerns. The Grinnell Regional Medical Center, the town of Grinnell, IA, Poweshiek County and surrounding counties are working in collaboration with the faculty and students of Grinnell College to create action plans that address the community's top ten concerns: 1) Obesity, 2) Mental Health, 3) Preventative care, 4) Wellness education, 5) Nutrition, 6) Access to care, 7) Urgent care, 8) Insurance, 9) Quality of care and 10) Transportation.

Spatial Variability in Wetland Denitrification Rates

Fidencio Balderas, Marshalltown Community College

Mentors: Ian Ellickson and Dr. W.G. Crumpton

Nonpoint source loads of nitrate-nitrogen in agricultural drainage to surface waters in the U.S. corn belt are among the highest in the country (Iowa Department of Agriculture and Land Stewardship, 2013). These nitrogen loads can negatively affect human health where such water is used for drinking water supplies and are suspected to contribute to hypoxia in the Gulf of Mexico (Iowa Department of Agriculture and Land Stewardship, 2013). Strategically located and designed wetlands constructed through the Iowa Conservation Reserve Enhancement Program (CREP), are one of the most promising off-site strategies for reducing surface water contamination. Research conducted at Iowa State University has demonstrated that targeted wetlands have the potential to remove 40-90% of the nitrate in tile drainage from upper-lying croplands (Iowa Department of Agriculture and Land Stewardship, 2013). The effect of wetlands on large scale nitrate reduction is largely determined by the fraction of the total nitrate load that the wetlands intercept and the ability to remove nitrate which is determined by overall rate of denitrification. The objective of this study is to determine spatial variability in denitrification potential under ideal conditions and identify aspects associated with that variability. Observations from this study indicate cores containing live vegetation or with a substrata consisting primarily of sand within the top two inches of the soil core had the lowest rates of denitrification. Cores containing fine sediment within the top two inches of the soil core or containing large quantities of detritus had the highest rates of denitrification. Conducting the experiment twice allowed for improvements in the sampling technique, which in the second experiment yielded less variation and overall spread in rates of denitrification. In the second experiment, samples were collected from a wider variety of areas in the Schwartz wetland to enhance the scope of spatial analysis. Due to high variability within replicates taken in the same location, in comparison to variation between spatially distant samples, it was observed that individual core attributes affect rates of denitrification more than spatial location within the wetland.

How do Scallops Swim?

Stanley Barbel, Iowa State University

Mentors: Dr. Jeanne Serb and Dr. Dean Adams

In this research, I studied and implemented Computational-Fluid Dynamics (CFD) on the movement of scallops under different conditions using Reynolds Number, Bernoulli Principle and angles of attack. The CFD models used in this project were developed in MATLAB following the same conditions as the Itaru Hayami (1991) experiment, which was a flow tank experiment to understand how scallops swam in terms of hydrodynamics mechanism. Hayami's research found that the shell of a scallop functions differently depending on the circumstances placed on it (much like an airfoil). The focus of my research was to recreate Hayami's experiment using only MATLAB by treating the scallop shell like an airfoil. Another objective was to identify the mean camber line of a tracing of the shell profile. By doing so, I would find the lift and drag coefficients and estimate the results. The idea of this project was to approximate coefficients of lift and drag for scallop swimming using a MATLAB simulation. Once a suitable code was put together, different species of scallops were examined to determine which was the most efficient swimmer and why. With these results, we can predict and closely examine pitch, roll, and yaw paying partially close attention to the tailing edge. As a future study, once all the data has been collected, the findings from this project could potentially be applied to other aspects of engineering such as: ailerons, rotors, and even marine crafts.

Reactive Arrays of Colorimetric Sensors for Metabolite and Steroid Identification

Gary Batres, Doane College

Mentors: Talia Jones, Hannah Johnke, Dr. Mark Wilson, Dr. Andrea E. Holmes and Dr. Sharmin Sikich

The work described herein examines a rapid mix-and-measure method called DETECHIP suitable for screening of steroids and metabolites. The addition of steroids and metabolites to reactive arrays of colorimetric sensors generated characteristic color “fingerprints” that were used to identify the analyte. A color analysis tool was used to identify the analyte pool that includes biologically relevant analytes. The mix-and-measure arrays allowed the detection of disease metabolites, such as orotic acid and argininosuccinic acid; and steroids, such as androsterone and estrone. The steroid 1, 4-androstadiene was also detected by this method while dissolved in synthetic urine. Some of the analytes, such as androstadiene, stanzolol, and androsterone were co-dissolved with (2-hydroxypropyl)- β -cyclodextrin in order to increase solubility in aqueous buffered solutions. The colorimetric arrays do not intend to eliminate ELISA or mass spectroscopy based screening, but to possibly provide an alternative analytical detection method for steroids and metabolites.

Tracking Stress & Fatigue in Composite Structures

Jordan Becquer, Iowa State University

Mentors: Daniel J. Barnard

There has been a huge increase in the use of composites in military and commercial applications. Composites offer increased weather resistance, high strength-to-weight ratio, and stiffness. Following the rise in composite usage, the operator needs to determine the best way to increase their ability to detect and track fatigue. Invisible, low energy damage (micro-cracks) can initiate de-laminations in composite laminates with subsequent fatigue. The ability to track the growth of damage can help prevent catastrophic failure in the field.

Synthesis and Reactivity of Oxenium Ions

Lamin A. Ceesay, Marshalltown Community College

Mentors: Patrick Hanway

Chemical reactions frequently occur within our bodies, in very quick chemical processes, as well as in commercial productions like the creation of polymers or plastics on the megaton scale. Many times these reactions go through intermediates that are extremely unstable and difficult to isolate. To understand these reactions and to better predict them, one must understand the intermediates. With a better understanding of these reactants, one can better predict biological reactions, and also increase production of polymers or plastics that would result in more profit. A reactive intermediate is an extremely short-lived species that lives in solution for only a fraction of a second (a billionth or a trillionth of a second). This is the reason why such a species can be extremely difficult to observe. However, one can infer their presence based on the products formed after the reactions occur. Some of these intermediates are called oxenium ions. A precursor compound refers to a compound that leads to the desired product. In order to gain a more comprehensive understanding of oxenium ions, we synthesized precursors to oxenium ions that can be generated using light or heat, which then can be detected using laser spectroscopy. Due to time constraints, I was not lucky enough to actually do the laser studies as the nanosecond laser had some technical difficulties, and the femtosecond laser is only available at the University of Tokyo. The intriguing thing however, is we can actually predict these reactions ahead of time with the computational modeling without even going into the lab; and this software solves very complex equations that you do not have to do yourself. My mentor would continue more studies on these intermediates.

Experiencing LabVIEW

Edgardo Diaz, *Iowa State University*

Mentors: Dr. Richard Wlezien and Hephzibah Clemons

Laboratory Virtual Instrumentation Engineering Workbench (LabVIEW) is a program used mainly for data acquisition (DA), instrument control and industrial automation. During the summer, this program was used to control linear rails and pressure sensors that would allow the graduate students to obtain the data needed to prove the low turbulence in the wind tunnel. The turbulence was measured using hotwires and linear rails. My main goal during the summer was to complete three programs: 1) translating a MatLab code to a LabVIEW code that would graph the pressure distribution on an airfoil, 2) programming the movement of three different linear rails that would represent the x, y, and z axes inside the wind tunnel, and 3) collecting data from pressure ports and storing them in a spreadsheet. Completing these tasks on time was challenging since it was my first time working with both LabVIEW and the instruments used in the lab. Also, I had no prior experience with the different communication protocols. Despite the challenges faced in an effort to completing the assigned tasks, I was able to successfully finish the first two programs during the summer and completed the third one during the fall. Most importantly and additional to the results obtained for the programs at the lab, I had personal achievements regarding my professional career. Among other things, I had the opportunity to expand professional network and to have hands-on experience in an Aerospace Engineering lab. With this summer program, I also had the opportunity to participate in the LabVIEW Bootcamp and earn a globally recognized entry-level certification, the Certified LabVIEW Associate Developer (CLAD).

With its advanced graphical programming, LabVIEW facilitates the design and creation of a program that allows programmers to control their DA instruments and give users accurate and reliable results. LabVIEW can communicate with thousands of instruments through different communication protocols, such as Universal Serial Bus (USB) and Ethernet. In addition to this, information in LabVIEW can also be sent to other programs, such as an Excel Spreadsheet.

Making Images by Hand and By Code Motivating Students with Multi-Language Interactive Media Application Scripting

Martin Estrada, *Grinnell College*

Mentors: Chukwunweike T. Abuah, Rogelio Calderon, Zarni Htet (Cornnell) Adriana M. Hurley, Katherine Ingersoll Hart Russell Sydney Ryan, Kimberly Spasaro, Prashanna Tiwaree and Dr. Samuel A. Rebelsky

Computer science has different focus areas. An area that draws people's interests in computer science is programing, drawing, and testing in code. We used interactively scripting applications to encourage non-programmers to learn programming concepts. We choose interactive scripting, because it is more efficient, precise, and let students explore alternatives. This research was performed using the following programs: Inkscape, D-bus, and Wingware Python IDE. Our goal was to get the Inkscape program, a drawing program, to communicate with Wingware program, a programming program, through the D-bus, a programming program. In Inkscape the SVG file formatting has the potential to support some kind of scripting such as sending SVG to script and having the script return the modified SVG. Inkscape recently gained a D-bus extension. A downfall to the Inkscape D-bus interface was that not all important features were supported such as textures. Also, some methods names conflicted with the reserved word already in the program. The Inkscape D-bus procedures have intuitive names and limited number of parameters that will be easy on the non-programmers. We concluded that designing a D-bus interface for an application can be difficult, because one must reveal a wide variety of functions. Also to support beginning programmers, one must provide appropriate simple versions of functions, an easier way to select a service. Some scaffolding can be language-independent while other scaffolding might require new implementation for each language. In the future, we expect to rewrite the Inkscape D-bus interface to take advantage of new glib/gio libraries and to support additional operations.

Tumor Suppression in Leukemia- Identifying Target Genes of Tumor Suppressor Ikaros in Leukemia Cells

Nathalie Fuentes, Iowa State University

Mentors: Chunhua Song Ph.D. (Penn State University) and Sinisa Dovat, MD/Ph.D. (Penn State University)

Leukemia is a type of bone marrow cancer characterized by an abnormal increase of white blood cells. Studies indicate that mutations and genetic inactivation in the Ikaros gene play an important role in triggering acute lymphoblastic leukemia. The Ikaros family of zinc finger transcription factors is important regulators of immune system development. Loss or mutation of Ikaros results in dramatic decreases in T cells, B cells, NK, and lymphoid-derived dendritic cells. Our research is focused on the tumor suppression genes such as Ikaros that acts as a transcription factor, binding DNA to regulate gene expression.

We hypothesized that the tumor suppressor such as Ikaros exerts its inhibitory function on tumor by suppressing its target gene expression. To validate our hypothesis, we used Chromatin Immunoprecipitation (ChIP) assay combined with real-time PCR (qPCR), called qChIP, to identify the genes whose expression is directly regulated by Ikaros. Using this technique we calculate the difference in Ikaros binding to the promoter region of the target genes versus nonspecific binding (control). In addition, we cloned the promoter region of these genes into luciferase report vectors for in vitro luciferase transcription assays. HEK293T cells were transiently transfected with the indicated promoter reporter constructs and pcDNA3.1-Ikaros or pcDNA3.1 vector. Luciferase activities were expressed as -fold change relative to values obtained from pGL4.74[hRluc/TK] vector only control cells.

The results showed that the increased binding of Ikaros to MYC, and two other novel target genes are 4.4, 3.9 and 8.5, respectively as compared to control. These results indicate that Ikaros binds to the promoter regions of these genes. Our data indicated that Ikaros binds to the promoter region of MYC, and two other novel target genes by ChIP-qPCR assay. Also, Ikaros suppresses the promoter activity of MYC and other two novel genes by luciferase report assay. C-MYC and other two novel genes are Ikaros target genes and it may exert its tumor suppression function by inhibition of their expression. Therefore, Ikaros dramatically inhibits the luciferase activity when it is co-expressed with the above constructs in HEK293 cells. Taken together, our results suggested that one of the mechanisms by which Ikaros exerts its tumor suppression function is by inhibition of expression of its target genes.

Electrical to Mechanical-Actuation of a Cantilever by Electric Field

Norma Granados, Marshalltown Community College

Mentors: Manan Sevak (Oakland University)

The ability to convert biochemical reactions to mechanical work has been an ongoing research topic on the minds of researchers over many years. Many researchers have conducted different projects to try and convert chemical reactions to mechanical work, to use as means of motion for work in mechanical fields. The ability to convert the biochemical reactions into mechanical work, to incorporate artificial parts into biological structures successfully, can open many possibilities for the future. As the years pass, new nano-structures are being developed that can imitate biomolecules and structures. Two studies that have spoken about these possibilities are of Wenmiao Shu and his group and Ian Y. Wong and his group of researchers. The research project and Dr. Shrotriya et al are working on is a combination of what Shu et al and Wong, et al did in their project and extending it slightly further. Their study is very important as it would agree that we can use an electrical field to change the conformation of molecules that is associated with surface stress and deflection. What is being proven is that the electrical field will be the only factor that will change the conformation of a molecule and nothing else. They have already proven that the conformation change will affect the binding. It is an important step because if we know that the electrical field will change the conformation of a molecule, then we can use this change to control the cantilever and its bending and use it for future projects.

Center for Nondestructive Evaluation

Courtnee Jackson, Iowa State University

Mentors: Dr. Joseph Gray

Over the summer I had the pleasure of working at the Center for Nondestructive Evaluation conducting NDE (Nondestructive Evaluation) research. NDE is referred to as the various methods of analyzing the properties of a component or system and identifying any deformities and/or cracks in its infrastructure that may cause it to destruct.

NDE research is very important. There are many things that are at our disposal for our convenience such as: cars, airplanes, and even our copy machines at work. What NDE does is insure our safe and reliable use of those items.

The method of NDE that I used this summer was radiography. I would take CT scans (a method using x-rays) of an object of interest. The images produced from taking the scans could then be manipulated into a 3-D representation of the object. The last step would be going through the images viewing and focusing in on any deformities or cracks in the object that may cause it to destruct.

Targeted Deletion of Zebrafish lncRNAis18 with TALENs

Crystal Jones, Iowa State University

Mentors: Staci L. Solin, Dr. Jeffery J. Essner and Dr. Maura McGrail

Long non-coding RNAs (lncRNAs) are important players in epigenetic regulation of gene expression during development and disease (Niland et al, 2012). A number of mechanisms have been proposed for lncRNA action, however, few functional studies of lncRNAs have been described. We are using Transcription Activator-Like Effector Nucleases (TALENs), engineered site-specific nucleases, to create targeted mutations in a novel zebrafish lncRNA. We previously mapped a highly penetrant retinal tumor model to transgene disruption of the zebrafish lncRNAis18 gene. The objective of this project is to isolate a second zebrafish lncRNAis18 allele that contains a deletion of part of the lncRNAis18 gene. Two TALEN pairs were designed to simultaneously target double-strand breaks to exons 2 and 5 of lncRNAis18. Injection of 25-40pg of the TALENs targeting individual exons into zebrafish embryos resulted in efficient mutagenesis of the target sites. To isolate the lncRNAis18 deletion allele we co-injected embryos with the TALEN pairs targeting both exons 2 and exon 5. We predicted co-injection of TALEN pairs targeting exons 2 and 5 of lncRNAis18 would create a 147kb deletion after loss of the intervening sequence and repair by the non-homologous enjoining pathway. PCR products spanning the fusion of exons 2 to 5 were amplified from somatic tissue in 9 out of 14 co-injected embryos. We verified the deletion allele by sequencing PCR products from 3 embryos. We have identified one founder that transmits the deletion allele to the F1 generation. F1 embryos are being raised to establish a new lncRNAis18del line. The lncRNAis18 deletion allele will provide a new genetic tool to study the function of lncRNAis18 in zebrafish development and cancer.

The Effect of a Change in pH Levels on the Surface Tension of Water in Vegetable Oil

Hyaquino Hyacinthe, Iowa State University

Mentor: Dr. Thomas Ward

The purpose of this project is to try to stabilize a water-in-vegetable oil emulsion for use as a biofuel. Adding water to the fuel mixture has been shown to significantly reduce NOx and smoke emissions, however the shelf-life of these emulsions is limited by how long it takes for the drops to settle out. Adding surfactants can significantly slow the sedimentation rate by inducing Marangoni stresses. In the case of a vegetable oil-based fuel, adding sodium hydroxide to the water can create surfactants through saponification. Aqueous sodium hydroxide drops with pH between 11 and 13 are allowed to settle in several oils such as corn, canola, soybean and olive. Every oil has a different composition of fatty acids and different sedimentation rates. The decreased, and in some cases increased, settling time of the drops compared to a clean water drop is observed.

L.A.S.E.R. (Light Aircraft Solar Extended Range)

Jan Michael Lopez, Iowa State University

Mentors: Matthew Nelson and Rohan Sharma

The Light Aircraft Solar Extended Range (LASER) team is building an aircraft capable of flying on alternative energy. The team has been able to successfully integrate flexible solar cells into the aircraft wings and is currently exploring hydrogen fuel cells usage. During the summer of 2013, my contribution along with team members included but is not limited to, the design and manufacturing of the wings and fuselage of the LASER prototype. We have flown the prototype with different propeller sizes and a battery operated motor. Unfortunately, the motor used was not strong enough to sustain flight. Based on results, it is our hope to utilize a new motor that has durability and power to launch and stabilize while in flight.

Annual Energy Consumption in a Community Lab and Analysis of the Electricity Flow

Esdras Murillo, Des Moines Area Community College/Iowa State University

Mentors: Shan He and Ulrike Passe

In order to achieve net-zero energy buildings, the electricity energy flow throughout a whole year needs to be analyzed because net-zero energy buildings requires the utility meter gain a zero balance throughout an entire year. This can be achieved with improving energy consumption efficiency and renewable energy production. A community lab designed to be a net-zero building was set up to study the balance between the electrical energy consumption and solar electrical energy production; it was set up with an advanced data acquisition system collecting the electrical energy consumption every minute. An advanced data acquisition system monitors the energy flow among all the appliances and mechanical systems in this house. With real time and history data, the energy consumption proportion of different terminals is analyzed. By analyzing the different percentages of energy consuming terminals and the energy production all year round, it is revealed that the system design and operation of the solar house has great potential to achieve net-zero. The air conditioner and the hot water heater are the biggest energy consumers in the house. Suggestions are made to improve the energy efficiency. With this study house users will be able to understand and better manage the energy flow for a net-zero energy building, and researchers can design the structures and mechanical systems of buildings with higher energy efficiency.

Length of Crop Rotation Influences Dynamics of Microbial Biomass and Inorganic Nitrogen in Soil

Queenster Nartey, Grinnell College

Mentor: Alison King (Iowa State Graduate Student), Ryan Williams (Iowa State PhD Student) and Kirsten Hofmockel (Professor at Iowa State University)

As demand for crops increases, farmers are faced with the challenge of yielding more crops while being mindful of environmental factors. Using synthetic nitrogen fertilizers is one way some farmers meet the high demand. After rain, however, some nitrogen may leach into waterways, promoting eutrophication. Diversified crop rotation is an alternative cropping system that previous studies have shown decreases the need for synthetic fertilizers and increases yield. Although declining with agricultural intensification, soil microbial biomass is vital for nutrient cycling, decomposition, soil aggregation and soil organic matter. In general, longer crop rotations have a higher carbon input, which increases the soils microbial biomass carbon. The overall goal of this study is to test if longer crop rotations will minimize the risk of synthetic fertilizers leaching into waterways and increase the microbial biomass in soil. We observed that nitrogen levels significantly decreased in the 3 and 4 year rotations compared to the 2 year rotation. Microbial biomass carbon increased significantly in the 3 and 4 year rotations compared to the 2 year rotation, however, increased levels of microbial biomass nitrogen in longer rotations were not significant. Most of our hypotheses were supported by our data, which shows the positive influence longer crop rotations have on microbial biomass and inorganic nitrogen in soil. Future work will include measuring rates of protein breakdown in soil and integrating more sampling times.

Impact of University Of Iowa STEM Seminars 2013 on Enriching Upward Bound's Science Curriculum

Mary Nyaema, University of Iowa

Mentors: Brent Studer, Deandrea Watkins, Alexander Lodge, Elizabeth Smith and Tonya Peeples

To enrich science and math portion of the program, Iowa NSF EPSCoR funded 32 under-represented minority graduate students and young professionals to share their science, technology, engineering, and mathematics (STEM) expertise, as well as their personal backgrounds with high school students. Throughout the summer, instructors led STEM seminars that encouraged in-depth investigation and hands-on experiences. With the instructors, students were able to experience lab research at the Genomics Laboratory at the University of Iowa, and make visits to science-related sites around Iowa including the Neal Smith National Wildlife Refuge in Polk City and the Iowa Energy Center's Biomass Energy Conversion Facility in Nevada.

At the beginning of the seminars, most of the students lacked interest in STEM Careers, as indicated in the pre-test. Most students had no ideas what the acronym STEM meant. The field trips and tours expanded the horizon of the number of career opportunities that they could engage in. Positive role models gave them an opportunity to learn in an interactive way. It helped the students to look at science in a different way by removing the rigor of everyday schoolwork. By the overwhelming improvement of their post-test scores, more opportunities should be given to such students to help them become more actively engaged in STEM fields. From the feedback given by the students, it was recommended to involve the students in more hands on activities and also work on building their critical thinking skills in STEM fields. This would have a huge impact on their likelihood of entering into a STEM based career.

Goat grazing and invasive species re-growth

Brad Ryan, Eastern Iowa Community Colleges

Mentors: Victoria Green (Eastern Iowa Community Colleges and Western Illinois University), Brian Ritter, Jacob Veal and JaeLin Smith (Eastern Iowa Community Colleges and Western Illinois University)

Invasive plants are defined as a non-native species whose presence does or is likely to cause harm to human, animal, plant, and environmental health. Land managers of natural areas have long struggled to control the impact of such species through several techniques. Mimicking the natural cycles of disturbance in this environment is one method to limit the propagation of invasive species. For thousands of years, there have been natural disruptions throughout the Midwest prairies such as floods, wildfires, and animal grazing. Some of the native plant species depend on this natural disturbance to survive. Land managers have sought to re-create this environment in modern times. At Nahant Marsh in Davenport, IA, goat grazing was used to clear invasive brush on a selected area. Pre- and post- grazing surveys were conducted to determine the effectiveness of controlling invasive species. Further research is needed to determine the long-term impacts.

Trail camera data and analysis

Jaelin Smith, Eastern Iowa Community Colleges and Western Illinois University

Mentors: Brad Ryan, Jacob Veal, Victoria Green and Brian Ritter

Scientists and researchers often use trail cameras to survey the populations of animals in certain area. Trail cameras are generally strapped to trees or some other stationary object and left for a few days. The motion activated camera will then take photographs of any item that crosses the path of the lens. Trail cameras are used to get up close and personal with animals that would usually be more apprehensive around humans. For this reason, cameras can be very useful to researchers in taking inventory of the animal populations of a certain area. Trail cameras were used at Nahant Marsh in Davenport, IA in order to gain a better understanding of the animals that inhabit this property. Further surveys are recommended.

A Journey of Exploration: Seeking a future in the intriguing and interesting field of Genetics

Hayley Vaughn, Upper Iowa University

In pursuing my undergraduate education, I have always been interested in the field of biology. However, I was not sure which direction that would take me in my graduate studies. I took a Genetics class and found out that I am highly fascinated by this unique field. I am interested in finding a future career in this field, and hope to continue my study of human genetics at the graduate level close to home. By carefully planning my education and seeking internship and research experiences, I hope to make a decision in the back and forth battle between continuing my education in Genetic Counseling or Genetics.

Length of Crop Rotation Influences Dynamics of Microbial Biomass and Inorganic Nitrogen in Soil

Jacob Veal, Eastern Iowa Community College

Mentor: Jaelin Smith (Eastern Iowa Community Colleges and Western Illinois University), Brad Ryan, Jacob Veal, Victoria Green (Eastern Iowa Community Colleges and Western Illinois University) and Brian Ritter

Turtle populations in the Midwest vary in levels of threat of extinction. The Blanding's turtle (*Emydoidea blandingii*) was placed on the IUCN's red list in August 2010 and is considered endangered in Illinois and Indiana. Major threats to turtles are road mortality and predation of adults and their offspring. These risks are increased when food resources or ideal habitat are located close to human settlements and transportation routes. Studying their habitat preferences and population structure is important to conservationists in understanding why the Blanding's turtle is at risk and how to effectively manage these populations.

Researchers at the Nahant Marsh in Davenport, Iowa utilized mark and recapture methods to monitor turtle populations. During capture events, carapace and plastron length (as well as width in Blanding's turtles) were also recorded. These dimensions have been compared to data that was recorded over the last three years to determine growth and reproduction rates of turtle populations at Nahant Marsh. If the growth rates are positive and number of caught unmarked turtles increased, this is indicative that Nahant Marsh is a suitable environment for turtles, resulting in increased growth, reproduction, and immigration to the site. This was the fourth year of surveying turtle populations at Nahant Marsh. Results are presented here.