Dear Friends of Science Bound,

The 2015-2016 year was filled with new activities and events as we continued to engage and empower our students to excel and pursue STEM degrees. Yet, with all the exciting changes in Science Bound, one thing remains constant — Our Code. The Science Bound Code of Conduct embodies the mindset we expect our young people to internalize, individually and collectively, as they advance through the program and high school to college and into a career. In this annual report you will see how the Science Bound Code of Conduct is manifested throughout our program in Denison, Marshalltown, and Des Moines, and you will meet some of the young people who fully embrace the Code as their way of life.

As we embark on the 2016-2017 year, I want you to know that, with your support, we will:

• continue to advance diversity in the science, technology, engineering, and mathematics (STEM) pipeline,
• celebrate 10 years of student success with our programs in Denison and Marshalltown,
• serve more than 400 students and families in 19 schools in three Iowa school districts,
• welcome 46 new first-year Science Bound college students who will attend Iowa State University on the Science Bound scholarship, and
• mentor and advise the 165 ISU Science Bound students on campus this year.

We are so pleased to partner with you to positively impact STEM education. I look forward to working with you in the year ahead to further increase the number of ethnically and racially diverse Iowa youth who pursue careers in STEM fields.

Together in the work,

Connie Hargrave
Director
I am a Science Bound student.
I am here to succeed.

Science Bound students are Leaders.
I am a leader and I lead the way in the classroom with my attitude, my behavior, and the quality of my work.

Science Bound students are Proactive.
I am proactive. I don’t wait for things to come to me. I seek out opportunities and I make positive things happen.

Science Bound students are Committed.
I am committed to making my success happen— in school, at home, in preparation for college, and in pursuit of a career.

This is my time. My time to learn, grow, and develop myself. So I make the most of every opportunity. I am focused, determined, and success-bound.

I will accept NOTHING LESS THAN SUCCESS. That is why I am a Science Bound student.
For Science Bound (also referred to as SB) students to become the proactive, committed leaders who passionately prepare for and relentlessly pursue STEM careers, we deliver a comprehensive student-centered program that:

- Exposes students to cutting-edge STEM disciplines.
- Provides personally-engaging experiences with STEM content.
- Equips students with academic skills and knowledge.
- Empowers students with interpersonal skills and self-efficacy to navigate and negotiate higher education.

To do this, Science Bound:

- Develops student interest in, and supports the pursuit of, STEM careers.
- Increases student academic performance in science and mathematics.
- Provides parent/family support, encouragement, tools, and strategies for raising college-bound youth.
- Develops and implements a dynamic business-school district-university-community partnership that fosters STEM career pursuit.
- Leads a college-going workshop series for high school seniors and their parents/families.
- Raises teachers’ expectations of the academic abilities and career aspirations of students of color and develops their cultural competency.
- Encourages student enrollment in rigorous science and math courses and provides academic support.
- Increases partnerships with researchers, laboratories, and STEM professionals to offer in-depth STEM learning opportunities.
- Develops students’ professional communication and networking skills.
- Provides 4-year ISU tuition scholarships to students who complete the 5-year pre-college program and major in a STEM field.

DuPont Pioneer President Paul E. Schickler (center) joins the Des Moines and Iowa State University 2016 graduates.
Student. Student.

PROGRAM OVERVIEW

Student Selection. Science Bound continues to invite racially and ethnically diverse Iowa students (primarily Black, Latino and Native American) for participation in the program consistent with the National Science Foundation’s charge to increase diversity in our nation’s workforce. Identified at the end of 7th grade, students are selected for Science Bound based on their demonstrated propensity for math or science, standardized test scores, and teacher recommendations. Nearly 100 students are invited to become a part of Science Bound each year.

Student Activities. Science Bound students meet after school and on Saturdays for a youth development, STEM learning, and leadership activities, including:
- Kick-offs.
- Science Bound Orientation (5-hour workshop introducing students to the Code).
- Pre-algebra program (Des Moines, 8th graders).
- Science fair project development and presentation.
- Essay writing workshop and competition.
- One-week residential college exposure program at Iowa State University.
- 1-month summer academic boot camp (Des Moines 9-11th graders).
- After-school meetings lead by Science Bound teachers.
- Three SB Saturday ISU visits (half-day STEM workshops lead by professors, staff, students).
- Environmental sciences and goal setting retreat (8th graders).
- Catalyst Student Leadership Program (Des Moines 9-12th graders).
- Countdown to College (workshop series for 12th graders and families).
- School-based STEM activities developed and delivered by Science Bound teachers.

Program Requirements. For five years (from grade 8-12), each student must: earn a minimum grade point average of 3.0 each semester, participate in 75 percent or more of SB activities, complete college preparatory courses, and conduct themselves in a manner that is consistent with the SB Code of Conduct. Students also must participate in an academic development or career exploration program for a minimum of 40 hours each summer.

Benefits. In addition to the academic development, college preparation, self-confidence, and career exploration experiences, students who successfully complete the 5-year commitment earn a 4-year tuition scholarship to Iowa State University to major in a STEM field.

Science Bound partners with parents and families as well, providing workshops and communicating regularly with families about student progress. Science Bound also supports program graduates who attend Iowa State through seminars and workshops to further develop and ground students throughout their college career.

HIGHLIGHTS 2016

FY 2016 was transitional for Science Bound, as the program offices and staff settled into their new administrative unit (College of Human Sciences School of Education) and their new space in 2156 Gilman Hall. During the spring, a ribbon cutting ceremony and an Open House was held to celebrate the new space and the beginning of our 25th anniversary celebration (see p. 11).

Other program highlights include:
- High student retention, with all districts having rates above 82 percent.
- Record-setting number of Science Bound first year students enrolled at Iowa State (n=46).
- All-time high number of Science Bound students involved in summer research and academic opportunities at Iowa State and in Ames (n=317).

Program Sponsors. In addition, Science Bound continued in successful, multi-year partnerships with the following supporters:
- DuPont Pioneer
- Smithfield Foods
- United Way of Central Iowa
- Emerson Process Management, Fisher
- Andersen Corporate Foundation
- Mechdyne

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Program Sponsors.
Being a leader can feel like taking a leap into the unknown. Yet a group of principled teachers and community partners, with students and their families, took the plunge in 2006 to pilot the Science Bound program in Marshalltown.

Ten years later, five of those early program participants have graduated from college, blazing the trail for the

- 54 young people in the middle and high school pipeline.
- Seven high school graduates poised to excel in post-secondary education.
- 26 program graduates who will be on the Iowa State campus this fall.
- 22 percent of 10-12th grade Science Bound high school students earned a grade point average of 3.75 or higher over two semesters.

Learning to be a Science Bound Student: The Middle School Program

“Agriculture, science, technology, engineering and math are the future of the world. I will be someone that will have an impact in this world, and my participation in the Science Bound program will be one way to achieve my goal of becoming an engineer – that can help me make a difference.”

- Marshalltown Science Bound student, class of 2020

This student’s reflection highlights the STEM-identity opportunities provided to 8th grade program participants as part of the Springbrook environmental sciences and goal-setting retreat, just one the requirements for students in the program. One hundred percent of the 8th graders participated in Springbrook, and nearly 90 percent of the Class of 2020 participated in all of the program’s after school meetings and the three trips to Iowa State. Other activities in 2015-2016 included:

- Science Bound (SB) Orientation and Kick-off,
- Materials science and engineering experiences at the U.S. Department of Energy’s Ames Laboratory at Iowa State University,
- Development and presentation of science fair projects,
- Writing a college-level essay about SB experiences and career goals.
- Celebration of their accomplishments at the Crossover Ceremony.

Fifteen new 8th grade students are poised to begin the program in the fall of 2016.

Preparing for Success: The High School Program

High school students met weekly with their Science Bound teachers, who provided the students with the opportunity to engage in a variety of hands-on STEM activities. For instance, students learned about

the principles of engineering by designing, creating, testing, and redesigning paper flying machines. The Marshalltown Science Bound program also partnered with local industry, health care workers, and Iowa State professors for Mentoring Circles. Mentoring Circles facilitate youth/mentor engagement through structured interactions.

During 2015-2016, Marshalltown Science Bound high school students participated in additional activities including:

- Kick Off and Senior Countdown to College.
- Local job shadowing.
- Oral justification preparation and presentation.
- ISU visits.
- Community Night activities.
- Tutoring opportunities.

Other 2015-2016 highlights include:

- Celebrating 100 percent retention for the Classes of 2017 and 2019.
- Noting an overall program retention rate of 93 percent.
- Preparing to welcome seven members of the Class of 2016 to Iowa State.
- Honoring Marshalltown Science Bound Iowa State graduates Freddy Ramirez (Agricultural Business) and Diana Yepez (Criminal Justice) who earned bachelor’s degrees in May, 2016 (see picture below).

2015-2016 Marshalltown Community School District At-a-Glance

- PK-12 enrollment: 4,975
- Percentage Latino/a PK-12: 51
- Percentage Latino/a, African-American, American Indian PK-12: 55

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<td><strong>High School Total</strong></td>
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<td><strong>DISTRICT TOTAL</strong></td>
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HERRERA’S ATTITUDE PLACES HIM ON PATH TO SUCCESS

When Joe Herrera moved to Marshalltown seven years ago to live in Iowa with his aunt and uncle, Patricia and Marco Herrera, he had never heard of Science Bound. But Mrs. Herrera, a tutor at Miller Middle School, knew about the program. So when Science Bound teacher Jennifer Edel invited Joe to participate, Mrs. Herrera attended the Science Bound informational meeting with Joe and helped him make the decision to participate in Science Bound.

“I helped point out what his strengths were in his education,” said Mrs. Herrera. “Joe always showed a strong interest in math and science,” she said; “he just needed the support and encouragement to reach his academic goals.”

“One I saw what the program was really about, I had the motivation to push myself to achieve the best possible,” said Joe. “Science Bound greatly impacted my performance in class. The program required a minimum of a 3.0 GPA (grade point average) to stay in the program. I was able to achieve a 3.8 GPA overall. As the years went on, I began to see why this program was a great opportunity for me,” he added.

One of the ways that Science Bound was a great opportunity:

- it provided STEM learning experiences. During his summers, Joe participated in the Early Outreach Program at Iowa State (a one-week residential college exposure program that introduces students to college, majors, and life as a college student), the U.S. Department of Agriculture’s VetBound program at the USDA Laboratory Services in Ames (an intensive animal science and veterinary science experience) and the George Washington Carver Summer Research Internship program at ISU (a six-week research internship where students participate in an ISU professor’s research group and contribute to a research project.)

- It is this significant level of engagement, coupled with Joe’s strong GPA, that led to his recognition as 2016 Marshalltown Science Bound Student of the Year at the Honors Banquet. Dr. Connie Hargrave, Science Bound director, bestowed the award on Joe in recognition of his strong academic achievements, exemplary engagement, as well as his demonstrated leadership inside and outside of the classroom.

- “To become a leader you have to lead in the right way … Science Bound helps you become a good leader, because you are leading your underclassmen in the right direction and showing them what this program is really about,” said Joe.

- Mrs. Herrera didn’t doubt for a moment that her nephew would find that right direction and do well academically, and she appreciates that Science Bound has shaped Joe into the young man that he is today.

- “The program really helped him find who he is and who he wants to be at this point in his life,” Mrs. Herrera said, “and I think his mind is set.”

- And Joe’s mind does appear to be set. “My dream career is to become a software engineer by going to ISU, since it is one of the best colleges for engineers,” said Joe.

- “Science Bound is important to me because the program really helped me build character and shape me for the future. Without Science Bound, I don’t think I would be where I am today,” said Joe, who began the next phase of his journey towards fulfillment of his dream at Iowa State this fall.

Joe Herrera with the Marshalltown Senior Student of the Year award.

Joe Herrera (third from right) with the Marshalltown Class of 2016 during their senior oral justification.
Science Bound students are proactive.

**DES MOINES: SUMMERTIME + PROACTIVE ENGAGEMENT = STRONG STEM PREPARATION**

In the state of Iowa’s largest school district (Des Moines Public Schools) it can be easy to get lost in the crowd. But for more than 25 years, Science Bound has been asking students of color to be proactively engaged in their education. The result?

- More than 3,000 students have benefitted from participation in Science Bound.
- 464 youth have earned tuition scholarships to Iowa State University.
- An additional 300 youth are in the 2016-2017 Science Bound pipeline to college and a STEM career.
- In FY16, more than 200 students participated in summer programs.

**Proactive Learning: Algebra Champions and the 8th Grade Program**

Science Bound asks students new to the program to begin their proactive engagement with the Science Bound Orientation. In Des Moines, this is coupled with Algebra Champions, an algebra tiles method of math preparation. More than 70 students participated in the program last year.

Academic year program requirements include:

- Participation in an environmental sciences and goal setting retreat.
- Development and presentation of an exemplary science fair project.
- Writing a college-level essay about their Science Bound experiences and STEM career aspirations.
- Participation in Learn and Earn, a 4-week summer academic boot-camp.

Students also meet regularly with SB teachers in each of the district’s 10 middle schools and family members participate in kick-offs, celebrations, and parent workshops. Sixty-one young people from the Class of 2020 successfully completed all program requirements during the 2015-2016 academic year; 73 students from the Class of 2021 began the Science Bound orientation and algebra enrichment process this summer.

**Developing a Proactive Mindset: The High School Program**

Nearly 200 Des Moines Public Schools students in the district’s five comprehensive high schools participated throughout the 2015-2016 academic year. As part of their school-based programs, Science Bound students across the district:

- Participated in the Kick Off and Awards reception (for Science Bound students with grade point averages above 3.75 and participation of 100 percent over two semesters).
- Met weekly with their SB teachers to engage in a variety of hands-on STEM activities.
- Visited Iowa State University three times for SB Saturday.
- Prepared for college through the Countdown to College program for seniors and family members.
- Developed Career Exploration projects.
- Took advantage of STEM professional development opportunities such as job shadows, Mentoring Circles (with employees from DuPont Pioneer), and personal interactions with STEM professionals during presentations, (e.g. Doctor of Chiropractic Medicine).
- Prepared for and presented oral justifications.
- Participated in team-building activities.
- Studied the chemistry of make-up.
- Competed in the World Food Prize essay competition.
- Participated in volunteer initiatives, such as the Sunglasses Project, Community Night, and City Planning Project.
- Learned about the Youth Leadership Initiative and Neal Smith Wildlife Refuge.
- Participated in the Catalyst Leadership program.
- Celebrated the program’s 36 high school graduates at the Honors banquet.

Other highlights include:

- 33 percent of 10th-12th grade students earned a GPA of 3.75 or above and/or had 100 percent program participation (2014-2015).
- 32 of the program’s 38 graduates are attending Iowa State Fall 2016.
- 90 percent 2015-2016 program retention rate.
- Nine Iowa State University Science Bound graduates completed their bachelor’s degree.
- More than 40 Des Moines Science Bound students were involved in summer programs at Iowa State, including research opportunities.

**2015-2016 Des Moines Public Schools At-a-Glance**

PK-12 enrollment: 33,565 students

Percentage Latino/a, African-American, American Indian PK-12: 44%

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<th>Retention 2015-16</th>
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<td>40</td>
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<tr>
<td>2017</td>
<td>43</td>
<td>41</td>
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<td>2018</td>
<td>56</td>
<td>51</td>
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<tr>
<td>2019</td>
<td>68</td>
<td>62</td>
<td>91%</td>
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<td><strong>High School Total</strong></td>
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<td><strong>192</strong></td>
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<td>2020</td>
<td>76</td>
<td>62</td>
<td>82%</td>
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<td><strong>DISTRICT TOTAL</strong></td>
<td><strong>283</strong></td>
<td><strong>254</strong></td>
<td><strong>90%</strong></td>
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**Note:** Includes early graduates.

I am a Science Bound student. I am here because I want the best quality of my work. Science Bound helps me prove I am less than successful, and more than a leader.

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I am a Science Bound student. I am here because I want the best quality of my work. Science Bound helps me prove I am less than successful, and more than a leader.
Science Bound students are Proactive.

THE ALIS: BROTHER AND SISTER SEEK OUT OPPORTUNITIES FOR A SUCCESSFUL FUTURE

Sometimes, it’s watching a big brother pursue his dream that fuels your own.

El-Sadig Ali (or Sadig, a senior at Iowa State University in microbiology) was a junior at Roosevelt High School in Des Moines when his sister, Nosa, was invited to join Science Bound at Callanan Middle School. After accepting the invitation, Nosa made a Science Bound friend, then the two (with transportation provided by the friend’s mother) spent part of their summer before 8th grade at Iowa State. They began working with ISU biotechnology education outreach coordinator Mike Zeller to develop their 8th grade science fair projects a full six months before they would need to be presented. Nosa knew what to expect because she had watched her big brother Sadig. She continued to follow in his footsteps, successfully completing each requirement of Science Bound.

It was also Sadig who planted the seed for Nosa’s latest adventure: becoming one of 24 high school students from across the country selected as a 2016 Borlaug-Ruan Intern with the World Food Prize organization.

“I first became involved with the World Food Prize in 10th grade when my older brother, who was also a George Washington Carver intern (a summer agricultural sciences research experience at ISU), introduced me to the program,” said Nosa.

Sadig was familiar with the World Food Prize program because in 2014 he earned a prestigious summer fellowship at the U.S. Department of Agriculture’s (USDA) Agriculture Research Service Plant Science Unit in Raleigh, North Carolina. He became one of only 33 students nationwide selected to participate in the Wallace-Carver Fellowship, a program hosted by the USDA and the World Food Prize Foundation.

The Wallace-Carver fellowship offers exceptional high school and college students the opportunity to collaborate with world-renowned scientists and policymakers through paid internships at leading USDA research centers and offices across the United States. Similarly, the Borlaug-Ruan Internship that Nosa accepted invites high ability students to participate in projects with distinguished researchers at leading agricultural research centers around the world.

Nosa’s summer experience involved an internship at the Brazilian Agricultural Research Corporation (EMBRAPA) in Londrina, Brazil. The goal of the project on which she worked is to produce soybean plants that are resistant to drought and cold-stress. Nosa’s work included germinating, planting, and observing soybean plants for responses to stress conditions.

While Sadig’s career aspirations are more towards medicine, Nosa’s are closely tied to her internship experience.

“My dream career is to do research around the world on efficient techniques for food production in order to help end world hunger,” said Nosa. And she believes what she has learned in Science Bound has been instrumental in helping her achieve her dream.

“Like the Science Bound Code of Conduct states, Science Bound has really encouraged me to seek out and make the most of every opportunity, aim high and try to succeed in whatever I do,” said Nosa. “I’ve been able to use this mindset in even non-academic activities too! I try to seek out opportunities that would be beneficial to my goals.”
DENISON: HIGH SCHOOL STUDENTS 100% COMMITTED

The Denison Science Bound program began in 2007 with funding from Smithfield Foods and Farmland Foods. The corporate commitment and support from Smithfield Foods continues today. As in other districts, Denison students and families are asked to make a 5-year commitment to the student’s success.

This year, high school students in the Denison program demonstrated their commitment to Science Bound in a big way: by achieving a 100 percent high school retention rate for 2015-2016. This is a first for any Science Bound high school. Equally impressive: the 12 students in the graduating class of 2016 represent a 5-year class retention rate of 75 percent.

Committing to Preparation at School: The Middle and High School Programs

Fifteen Denison middle school students met regularly with their Science Bound instructors twice each month; high school students met weekly. In addition to the Springbrook environmental science and goal setting retreat, visits to Iowa State University, science fair projects and essay preparation, middle school students also benefitted from:
• Forensics scientist Kristen Eggers’s career presentation.
• A 4-week robotics building competition.

Food Science was the focus of the high school Science Bound program. Students participated in eight labs on food science concepts and principles and had six career-focused meetings where food science professionals shared their career experiences. Topics included:
• Veterinary medicine.
• Food science and nutrition.
• Food production, food preparation, food processing, food safety.
• Hormones and pesticides.

The high school Science Bound curriculum also included youth development activities on goals, grades, and leadership styles. The following is a summary of additional activities middle and high school Denison Science Bound students participated in 2015-2016:
• SB Orientation, Kick Off, and Senior Countdown to College Workshops.
• Local job shadowing.
• Crossover Ceremony for 8th grade students who successfully completed the program.
• Honors banquet for high school seniors graduating from the program, as well as students receiving awards for 100 percent participation and high grade point averages.

2015-2016 Denison Science Bound highlights:
• First Denison Science Bound student graduates from Iowa State University.
• Overall district retention rate of 96 percent.
• Twelve graduates in Class of 2016 (tied as largest graduating class in program history).
• Seven high school seniors (63%) are attending Iowa State in fall 2016.
• Five Science Bound high school students selected for participation in an Engineering Education program for gifted students at ISU.

2015-2016 Denison Community Schools At-a-Glance

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DISTRICT TOTAL

Denison Science Bound Class of 2016 poses outside Denison High School.
Each year, Science Bound requires every high school student to present an oral justification in order to continue in the program. This is the student’s opportunity to reflect on what he or she has gained from — and given to — Science Bound, and it sheds light on where a student is in the college-going process. Also, oral justifications give voice to the impact of Science Bound on the students in the program.

Yasmin Aleman, Class of 2016 from Denison High School, is the first in her family to graduate from high school. Aleman is attending Iowa State this fall and plans to eventually go on to medical school. She met the participation and grade point average requirements of Science Bound throughout her high school career and was recognized for a grade point average above 3.75 at the 2016 Honors Banquet. What has Science Bound meant to her in pursuit of her career? Following are excerpts from her 2015 Oral Justification:

“Nothing Less than Success. It is a motto that I believe is true and applies to my life in every aspect. This motto has taught me that settling for mediocre is never an option in life …. It has been through Science Bound that I have found the person that I am and who I want to become in life …. … Without Science Bound I would not have pushed myself academically the way that I currently do. I [took] anatomy, a CPR course and college English. … These [college] courses are especially helpful because they set the stage [for] what my future will hold in college. … I will strive in any environment to succeed whether it be a small or large task. … I believe that [the ability to work] hard is a quality that every Science Bound student has, and I am no exception. We are taught early on in the program that hard work is the best way to get ahead in life and it always pays off. This is just one of the many qualities that I have learned through this program. Science Bound not only taught me how to achieve success, it also taught me who I am and who I want to become. Many experiences in the program, such as the Ames trips, have taught me what type of career I am interested in. My career goal is to become a pediatrician …. Without Science Bound I would not know what I would do about college life and how to prepare for the future ….”

Yasmin Aleman
Gasaway and Gomez Get the (Ames Lab) Advantage

During Iowa State University’s spring semester, Science Bound partnered with the US Department of Energy’s Ames Laboratory at Iowa State to launch a new internship program for Science Bound students, allowing them to experience STEM careers with the agency. The program is called Ames Laboratory Advantage.

Ria Gasaway (Industrial Technology) and Becky Gomez (Industrial Engineering) spent 12 weeks in the pilot program this spring. Ames Lab became interested in providing an internship experience as the Department of Energy increased its attention on exposing racially and ethnically diverse students to science and innovation at the National Laboratories. Ames Laboratory is providing the Science Bound students an opportunity to test and apply their skills and prepare for a STEM career after graduation.

ISU seniors, Gasaway and Gomez learned about industrial safety, health, and training as they worked with Ames Lab professionals in Environmental Protection, Fire Protection, Industrial Hygiene, Laboratory Safety, Radiation Safety, and Training and Documents.

“It means a lot to me that I had the opportunity to get hands-on experience working with safety professionals,” said Gasaway.

Gomez was also enthusiastic about the experience. “I absolutely loved the internship because I saw how the topics I had learned about in class applied to a lab setting.”

Thanks to the success of the program, Ames Laboratory will offer opportunities to Science Bound students again this fall.