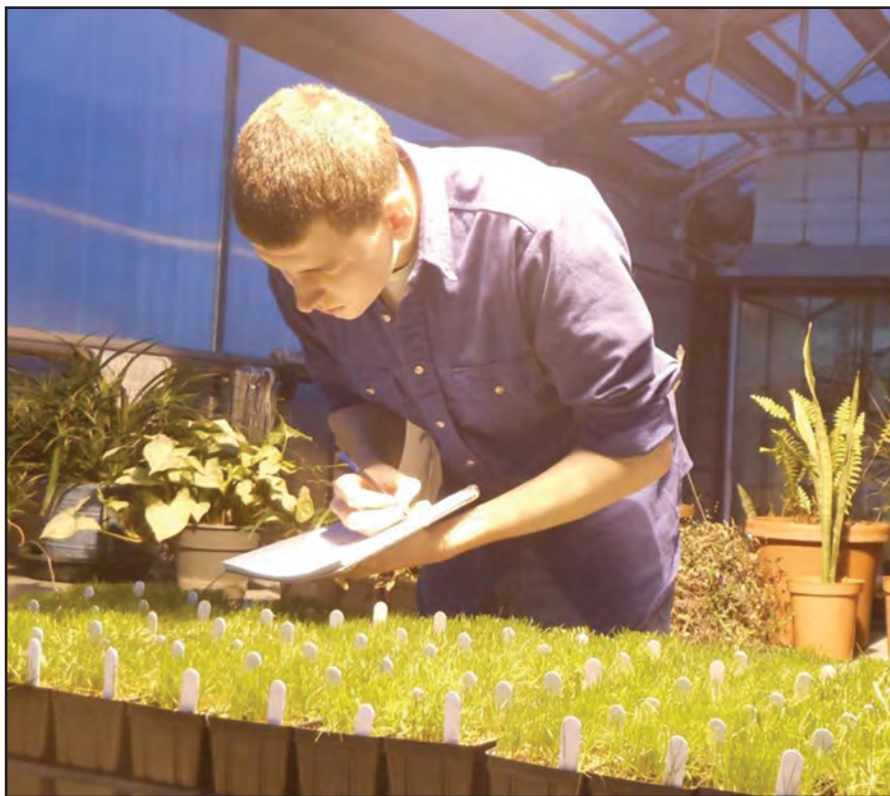


## Junior Science and Humanities Symposium (JSHS) Student goes to the White House

JSHS alumnus **Connor Klemenhagen** participated in the White House Science Fair on May 27, 2014. Currently a student at the University of Minnesota, Twin Cities, Connor earned the first place award in Environmental Science at the 2013 National JSHS. At the



White House Science Fair, he presented his award-winning research on turf grass mixtures that reduce the need for irrigation. His four-year project culminated with the development of a mixture of turf grass varieties that use less water than current grasses, while maintaining the visual qualities and other characteristics that homeowners desire.

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### 03 | A Page From Our History

**Elijah Ercolino:** “The Academy of Applied Science was a major influence in my life’s direction!”

### 04 | Students Changing The World

**Phoebe Hu** is making implanted medical devices safer with her biomedical research.

### 06 | Inspiration from a 4th Grader!

Profound statements come from today’s inventor—soon tomorrow’s patent holder!

### 08 | **Inventing!** by Elizabeth Amorelli – 5th Grade

Inventing is one way the passion for science is created. Read Elizabeth’s story.

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“Winning the National JSHS competition made all the difference in my life,” says Connor Klemenhagen, who credits JSHS with helping him apply his scientific skills and knowledge to solve a real problem: declining water supplies.



ACADEMY OF  
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» CONTINUED: JSHS Student Goes to White House

“Winning the National JSHS competition made all the difference in my life,” says Connor, who credits JSHS with helping him apply his scientific skills and knowledge to solve a real problem: declining water supplies. As the first person in his family to go to college, he is currently a cadet in the U.S. Army Reserve Officers Training Corps (ROTC). ■

“My four-year project culminated with the development of a mixture of turf grass varieties that use less water than current grasses, while maintaining the visual qualities and other characteristics that homeowners desire.”

—Connor Klemenhagan, Freshman in College



Connor Klemenhagan (third from left) was a first place winner at the 2013 National JSHS Symposium. Students often get their love of scientific research through the Academy's programs and continue their research into college and then a career! The mission of the Academy of Applied Science is to excite the youth of America in science and technology. Connor is one example of that success!

## Did You Know?

It is amazing to realize just how many students have been impacted by Academy programs over the last 51 years!



**JSHS: 234,000**  
Since 1976



**REAP: 3,332**  
Since 1980



**YIP: 55,329**  
Since 1986

**Total Students Impacted: 292,661**

A story of a person who has been instrumental in some part of the  
51 year history of the Academy of Applied Science

## a page from **Our History**



“Being around the Rines family and the consistent STEM (Science, Technology, Engineering and Math) focus of the Academy was a major influence in my life’s direction.”

### **Elijah Ercolino**

You never know the impact of a chance meeting until you look back many years later! When Elijah Ercolino met Laura (step-daughter of AAS founder Dr. Robert Rines and daughter of the AAS Board President Joanne Hayes-Rines) while working on a political campaign in Montana, his life’s pathway was forever changed. Not only did he end up working for Dr. Rines, but he discovered his love for engineering.

Elijah reflects warmly, “Being around the Rines family and the consistent STEM (Science, Technology, Engineering and Math) focus of the Academy was a major influence in my life’s direction.”

Elijah had earned an undergraduate degree in Political Science from University of Idaho. Because of his experiences with Dr. Rines and the Academy, he decided to pursue a career in engineering. Elijah received his Master of Science in Mechanical Engineering from Boston University where he founded the BU Energy Club. Now as Director of Building Automation Services at Boston University, Elijah leads the efforts to reduce energy and water consumption through the use of controls that allow buildings to operate more efficiently with improved occupant comfort and reduced maintenance costs. ■

Have you played a role in the history of the Academy? We want to hear about it.  
Send us an email to [info@AAS-World.org](mailto:info@AAS-World.org) or call the Academy at 603-228-4530.

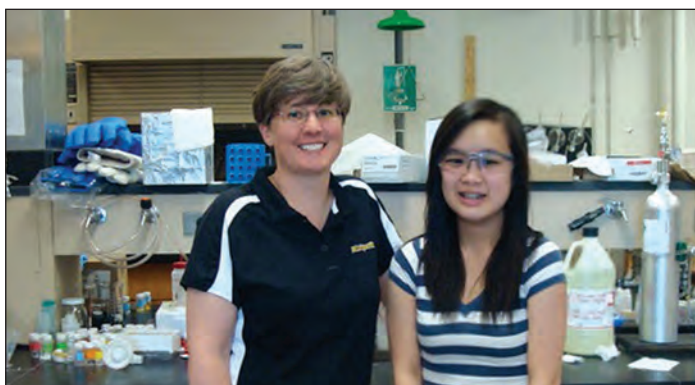
# Students Changing The World

by Phoebe Hu

THE REAP (Research and Engineering Apprenticeship Program) experience was one that greatly impacted my life choices and how I approached the real world. In the beginning the whole concept scared me; I wasn't sure if I was mature enough or mentally ready to throw myself into the same workplace as professionals.

Eventually I decided it was worth a try, and I applied for the program through Michigan Technological University. Upon being accepted, I chose Dr. Megan Frost of the Biomedical Engineering department and materials Science & Engineering Department as my mentor.

The first day working in the Biomed lab was undeniably nerve wracking. I had no idea where I was supposed to go, and I was worried that I had gotten myself into something that wasn't right for me. What I didn't expect was to be openly welcomed and was treated as an equal by the college students who shared the lab space with me. Once I had been taught how to use the technology, the whole experience became a much easier ship to sail. It felt great



REAP Mentor Asst. Professor Megan Frost with Phoebe Hu at Michigan Technological University

development. My general goal was to become a doctor, as it was apparent to me every time I went for a check-up that these individuals had the ability to change the future. Working in the Biomedical Engineering lab over the summer brought me to a new conclusion; that the people behind the scenes could make just as big of a difference. I grew to appreciate the new discoveries that these individuals brought to the wellbeing of our society. Knowing that being part of the REAP Experience made me one of them was probably one of the best feelings I'd ever had.

Over the course of the summer, I collected enough significant data under the guidance of my professor, Dr. Frost, to formulate a paper. And so, the abstract for the "Development of Biodegradable SNAP/PLLA Particles for Local Nitric Oxide (NO) Delivery" was born. A significant medical problem exists with medical devices, such as ventricular assist pumps, which become infected after implantation. These infections could become extremely difficult to treat due to the continuous development of antibiotic resistant strains of bacteria. It is well known that nitric oxide (NO) can kill many types of bacteria without contributing to antibiotic resistance. Therefore, in this research project, we are developing an injectable system, which delivers the broad spectrum antimicrobial agent NO to treat bacterial infection developing on devices.

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**"Essentially, we developed a broad-spectrum antimicrobial treatment of bacterial infections developing on implanted medical devices."**

knowing that once I got the basics down I was able to use my knowledge to further my research. A few days in the lab cemented my dream: to work permanently in a field similar to the one I was experiencing.

From a young age I always knew that I wanted to be someone who could have an impact on the world's

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**Want to Help a Student Like Phoebe? Donate today at: [www.AAS-World.org/donation/](http://www.AAS-World.org/donation/)**

With Dr. Frost's help I submitted the paper to the American Chemical Society (ACS) in hopes of earning a spot as an oral presenter at their upcoming national meeting in San Francisco, California. At that point, I didn't have high hopes. I was a high school student, nearly half the age of most of the other presenters. I was inexperienced, less prepared, and my confidence level was almost rock bottom. I couldn't believe my eyes when less than a month later I received an email from the ACS saying that my abstract had been accepted. The acceptance letter was two-sided, though. It represented that fact that I'd reached my goal of presenting my research at the meeting, but I didn't have the monetary means to travel from Michigan to California. I contacted the Academy of Applied Science with my worries, in hopes that they could help me find a solution. Little did I expect, they provided me with not only the financial support that I need, but also the encouragement to persevere. Renie O'Mara, Director of REAP, and Jill Malcom, AAS Development Director, presented the opportunity to the AAS Board of Directors. Two Board members, Dr. Sheldon Apsell and Toby Kusmer, donated the necessary funds for me to attend! Thank you to these dedicated people and the countless others who have made possible a wish I never believed I could achieve. I can't express fully how thankful I am!

Fast forward to the future of August 14th, early in the morning. No amount of practice could have prepared me for what I was standing in front of. The ballroom where I'd have to present my work in was huge and even the podium upon the stage in the front intimidated me. The largest venue I'd ever spoken at before was in a classroom at my school, which was nothing compared to what I was facing. Yet once I walked up that stage towards that podium, and faced the audience while nervously adjusting the microphone, I felt myself really feel more comfortable. Of

course, the first few minutes of my presentation were a blur of trembling hands and wavering voices, but the more I talked, the more I felt in my element. I found that while looking at the audience, I could pick out a few smiling faces to help calm myself down. Everyone seemed more surprised to see someone my age talking at such a large professional venue than I was to be up there in front of them.

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"I realized then that I was doing something special...I would have never gotten there without the caring hands of REAP, the Academy of Applied Science and those who had supported my dreams from the start."

After my fifteen minute presentation came the five-minute question period, when the audience could ask me anything about what I'd talked about. This was what I was most scared about, considering I had only limited knowledge concerning the field of science compared to everyone else in the room. However, the five minutes went by smoothly; all the questions I received were ones I could answer. During the break period between presentations, the session chair came up to me and said that my presentation had been even better than some college graduate students' she had seen. I realized then that I was doing something special. And I would never have gotten there without the caring hands of REAP, the Academy of Applied Science, and those who had supported my dreams from the start. Without those mornings spent reviewing slides with Dr. Frost, countless encouraging conversations with Ms O'Mara and Ms Malcom, and advice from the graduate students I met along the way, presenting at the ACS national meeting would have only been a wisp in a field of wishes. ■

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You can make a difference in a FUTURE SCIENTIST'S life!

# INSPIRATION from a Fourth Grader



*Katie Lessard wrote this text in her “Story” submission on the Academy website. The last thought is a really profound thoughts from a 4th grader!*

“For my invention project, I made ‘The Rage Cage’ a concussion-preventing lightweight soccer helmet. I made that because last February I got a concussion from a soccer ball hitting me in the back of my head. I was out of school for a month, and I couldn’t read or use any electronics. Light hurt my eyes, and I had a headache and nausea.

“Ever since I was four I’d wanted to be an inventor, but I had really only come up with thing[s] for pleasure like toys, and utensils for saving a little work. That concussion experience made me think of a better, more useful idea that will change the world.

“The Young Inventors’ Program helped me dig into myself for answer[s] to questions like ‘How does it work?’ and ‘How can I improve it?’ and ‘What name is catchy?’ because I had judges and people needing to know my answer. That helped me think like that for everything.”

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“The YIP program is great because it makes people think up solutions to problems and think creatively. Anybody can follow a simple direction, but it’s really creativity that changes the world.”

—Katie Lessard, 4th Grader

CONGRATULATIONS to **Elizabeth Amorelli** from Danville Elementary! She was the randomly drawn winner of the first iPad Mini from the stories or Academy Ambassador registrants completed by June 30th.



Read Elizabeth’s story on the back page.

## You still could win!

*We have one more to give away!*

Go to [www.AAS-World.org/MyStory](http://www.AAS-World.org/MyStory) to submit your story about your experience participating in an Academy program.

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## KEY DATES & ANNOUNCEMENTS

### Young Inventors’ Program 2015 Annual Celebration

**Event Date:** 3/28/2015

**Online Registration Due:** 3/6/2015

**Event Location:** Merrimack Valley High School

### National Junior Science and Humanities Symposium

**Event Location:** Washington DC

**Event Date:** April 29 – May 2

*To volunteer to help with any Academy program or with the organization, email: [info@AAS-World.org](mailto:info@AAS-World.org) or call: 603-228-4530*

# About the Academy of Applied Science

Founded in 1963, the Academy of Applied Science (AAS) is a New Hampshire-based, 501(c)(3) non-profit organization that administers invention and STEM (Science, Technology, Engineering and Math) programs for 9 - 12th grade students.

Our unique programs are designed to engage and challenge students in STEM over the course of several weeks, a semester or longer. The programs encourage and guide students to learn how to apply scientific knowledge to everyday life, research and inventions.

Funding for AAS comes from two sources. Some programs are funded by grants and donations to the Academy. Others have been funded for more than 50 years by the three branches of the United States military.

More than 292,000 students in the U.S. and Department of Defense schools in Europe and the Pacific have had a long-term and meaningful engagement in STEM through AAS programs. The impact is significant: 87% of the surveyed high school students who participated in AAS programs planned to enroll in STEM studies at the undergraduate level.

■ **To find out more about AAS, visit our website:**  
[www.AAS-World.org](http://www.AAS-World.org)

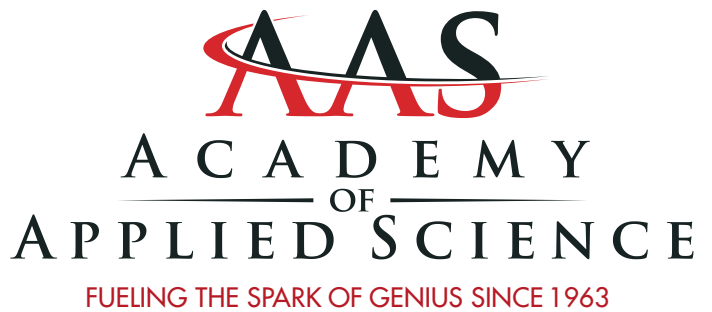
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[Facebook.com/NationalJSHS](https://www.facebook.com/NationalJSHS)

**VISION:** The Academy of Applied Science's vision is to be a catalyst that enables all youth to discover a passion for STEM (Science, Technology, Engineering and Math).

**MISSION:** Our mission is to excite the youth in STEM (Science, Technology, Engineering and Math).

**VALUE:** Technology is the foundation of our standard of living and a cornerstone of a strong economy.

**GOAL:** Our goal is to increase the number of students starting and continuing in STEM education resulting in a larger and more technologically capable workforce.



## Donate to the Academy of Applied Science

Support K-12 STEM programs that challenge today's students and inspire tomorrow's STEM careers!

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**1. My donation is:**  Monetary  Item  Service

Donation Amount \$: \_\_\_\_\_

**2. Donation is:**  In-Kind  Enclosed  Bill me

Call me  I'll Volunteer

**3. Use my donation for:**  Wherever is needed

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Total amount to charge \$ \_\_\_\_\_

E-mail address for CC receipt: \_\_\_\_\_

Signature: \_\_\_\_\_

\*Please make checks, corporate matches, or other gifts payable to:  
Academy of Applied Science, 24 Warren Street, Concord, NH 03301

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## Inventing by Elizabeth Amorelli



Elizabeth  
Amorelli,  
5th Grade

BEING AN INVENTOR has changed my life because I have been doing the Young Inventors' Program at my school since third grade, and every year I have gone to the state convention. This year was the first year that I received awards. My invention was called the Go-Go Glasses. I got the Fidelity Investments award, first place medical and electric, and most unique in my grade.

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"Inventing has inspired me to push my limits even more and keep up my work in both inventing and math."

Every year I've improved my inventions to be better than the last. Next year I am going into sixth grade, which is the first grade in my new middle school. My middle school doesn't do the invention program yet, but I am going to try to have it happen.

I am very interested in math and science, I am also very good at them. I would like to get a job in a math or science career field when I get older. I always like to push my limits in math, and learn different and easier ways to do the problems. I also like to learn new things about space and the solar system in science. Inventing has inspired me to push my limits even more and keep up my work in both inventing and math. ■

*READ how Elizabeth won an iPad Mini on page 6.*