a publication of the Academy of Applied Science

Academy NEWS

SPRING 2015

AAS002

The Young Inventors' Program® Grows Inventors – One Student at a Time!

THE YOUNG INVENTORS' PROGRAM has reached 5,000+ students in K-8th grades across the state of New Hampshire every year since its inception in 1986. Out of the 55,329 students who have participated, there are superstars who shine. Ian Palleiko is one of them.

From 2nd grade to 7th grade, Ian excelled at inventing projects, and now at 17 he continues his involvement as a judge and also sponsors an award to inspire the next generation of inventors. In 2014, Ian started teaching at the MIT Spark program in Cambridge, Massachusetts. Last

year, he taught Introduction to Electronic Music Production, and this year he plans to teach a class on computer hacking and information security.

Ian is now a junior at Berwick Academy in South Berwick, Maine and recently answered some questions about his YIP experience.

How has your experience with YIP impacted your life and career decisions?

"I'm not sure how it will impact my career decisions, maybe you should ask me again in ten years, but it has definitely strengthened my belief that you can make things happen in your own life. I was really lucky when YIP gave me my first opportunity. Once you have your first success, you build on it. Eventually you're making your own opportunities. Making your own options. I still don't get perfect grades at school, but I'll get to teach a class

» continues on page 2

"Once you have your first success, you build on it. Eventually you're making your own opportunities. Here's the thing: You need to let kids try things and get messy. Help them find what they love. Whenever you can, give them the tools to make it happen."

AAS | Academy of Applied Science
24 Warren Street, Concord, NH 03301
telephone: 603.228.4530 • fax: 603.228.4730
www.AAS-World.org • Info@AAS-World.org

» CONTINUED: YIP Grows Inventors

in my school next year, and I get to teach with MIT Spark. The point is, you don't have to wait for someone to tell you you're a success, and you don't have to wait for an invitation to make things happen.

"Here's the thing. You need to let kids try things and get messy. Help them find what they love. Whenever you can, give them the tools to make it happen. It's not about spending money or signing your kids up for classes that they don't want to be in. More than anything, kids need freedom, and the time and space to become who they really are. Opportunity is everything, and the Young Inventors' Program is a great opportunity for kids who are interested in technology, mechanics, building, and art. Rube Goldberg machines are definitely works of art. YIP is an excellent program."

TOP: Young Ian exhibiting at a YIP Celebration. ABOVE: "Rube Goldberg" would have been proud of Ian's determination.

What did you like best about participating in the YIP as an inventor?

"What's great about the Young Inventors' Program is that you're free to create your own project and to work entirely on your own terms. As a student, the best part was being able to share my work with experts and to experience real success. These kids get to experience honest success for their creativity. The judges appreciate your work, you're respected for your ideas, and you get real feedback."

What do your think is the most valuable quality of the Young Inventors' Program?

"Just the fact that it exists. The opportunity that it creates. Without it, there would be a void. Children need the freedom to find what they love and someone, a parent, teacher, or one of these judges, to encourage them find a way to make it happen. That's exactly what the Young Inventors' Program offers. You set your own limits, or lack of limits, which is exactly what gives kids the opportunity to excel."

What is it like now that you're a YIP judge?

"Being a judge is great. It's fun and requires a lot less preparation. There are always a handful of kids who really impress me with their ideas, and, of course, I still like talking to the judges, especially Steve Caney, and hearing about their projects and ideas. I wanted to come back and be a judge to give back to the program. It was really cool when YIP offered me the opportunity to give my own award, I think the kids get a kick out of someone my age giving them an award. This year, Dremel has chosen to partner with me on the award, so I get to give a Dremel Kit along with the cash award! It's a perfect match, since it's the hackers award. Dremel is the ideal hacking tool. I use mine all the time."

Anything else you'd like to add?

"As a kid, I always loved doing projects for the Young Inventors' Program. I was also lucky to have parents who supported me—and didn't mind when the house 'blew up' with a project (see photo above). I appreciate the impact that the Academy of Applied Science has had on my life. YIP gave me the opportunity for my first success and several more through 7th grade. You could say that this experience built a foundation for success that will serve me the rest of my life. I plan to support the Academy of Applied Science for as long as I can." ■

A Light and a Direction

—by Kristen and Jeff Palleiko, Ian's Parents

OUR FAMILY HAS BEEN coming to the invention celebration since 2006, and our favorite YIP celebration will always be Ian's first, in 2006, when we had the honor of hearing Dr. Rines speak. Ian was a bit young to remember it well, but Jeff and I will never forget what an absolutely wonderful and inspirational speech that was. Every year we see how the program continues on in his spirit!

Our story is a very personal one, and I know it doesn't speak to everyone's educational experience, but I do think it's valuable and probably familiar to many parents of creative children. Traditional education never seemed to have a place for Ian's skills. Here was a bright, energetic little boy with a million ideas a day, but when he started school

» continues on page 3

» CONTINUED: A Light and a Direction

he seemed to lose his spark. Even though his teachers recognized his strengths and appreciated his creativity, Ian was frustrated and disappointed with school from the day he started. Reading and writing did not come easily to him and there seemed to be no curriculum in sight that dealt with the things he knew best. It was so discouraging for him.

Luckily, Ian had an incredible first grade teacher. She understood his frustration and saw his potential, and she suggested that he participate in our school's Invention Convention. In second grade, Ian entered his first invention. He won the grade school competition and went on to the win Most Creative and Unique and first place in the IEEE Electrical Award at the YIP Celebration. But what YIP gave Ian wasn't just a prize—it gave him the opportunity to work on projects that played to his strengths, the chance to share his work with knowledgeable professionals (the judges) and to experience genuine success. And this is what the Young Inventors' Program (and the teachers who support it) offers hundreds of children every year. It's a perfect opportunity for teachers to encourage process-oriented learning and is a compelling spark for science and creativity!

Ian has continued his involvement in technology focused areas, and in 2014, he had the honor of being the first student speaker and panelist at Berwick Academy's Innovation Celebration. Next year, he plans to develop and teach a Sound Design class at Berwick under the guidance of the head of the music department. Ian wants to eventually work in the field of information/network security. ■

The Academy of Applied Science celebrated its 29th statewide **Young Inventors' Program®** Annual Celebration on Saturday, March 28, 2015 from 9am to 2pm at Merrimack Valley High School. Over 200 young inventors representing fifty K–8 schools throughout New Hampshire displayed their inventions and innovative thinking that earned them top honors in their local school competitions.

Please contact Pamela Hampton, **phampton@aas-world.org** for more information.

WANT TO START YOUR OWN BUSINESS SOMEDAY?

You need to know about the S&W Startup Challenge and Startup Series

ONE OF THE BIGGEST CHALLENGES for entrepreneurs is they often don't know what they don't know! They need a trusted knowledge source and sage guidance to follow. Easy to say…hard to find!

After reading the last issue of *AAS News*, Martin Etcheverry from Sullivan & Worcester, LLP told the Academy of Applied Science about the S&W Startup Series that provides FREE information sessions about key issues facing entrepreneurs—for everything from intellectual property protection to employee hiring practices—at their Boston office location. A list of the upcoming topics and the registration links are located at this website: http://www.aas-world.org/newsletter/ These presentations help entrepreneurs navigate the legal challenges of running a startup and have experts speak at the monthly series.

If participants meet specific criteria, they can compete to win $10,000 worth of free legal services with the Startup Challenge competition. http://www.aas-world.org/newsletter

We thought it was a natural fit to let our audience know of this FREE speaker series. From our Young Inventors' Program® to the Junior Science and Humanities Symposium, there are creative, useful and patentable inventions created every year that have commercial value. You might just want to keep this newsletter for future reference when you want to protect an invention, start a business around it or are looking to gain practical business knowledge. ■

AAS SPOTLIGHT:

Fidelity Investments

The AAS Spotlight tells the story of a person or company who has been instrumental in the Academy of Applied Science (AAS) some time since its inception in 1963.

WHAT DO YOU THINK non-profit organizations value most? If you said VOLUNTEERS, you're right!

Since 2003, more than 300 volunteers from Fidelity Investments' employee volunteer program, "Fidelity Cares," have contributed to the Young Inventors' Program. These volunteers have provided valuable staffing and judging assistance during the annual celebration and at participating schools. Fidelity volunteers have shown their enthusiasm and commitment to the YIP by donating 1,625 hours of their time. Support of the YIP program is just one example of Fidelity's long-standing commitment to students and education.

In 1986, the YIP was created by a team of New Hampshire teachers who recognized the need to stimulate inventive thinking in young people. The Young Inventors' Program® encourages practical ingenuity through hands-on experimentation and discovery. Since that time, the Academy of Applied Science has administered the program to give teachers, elementary and secondary school students in the state of New Hampshire an approach to invention and innovation. This approach is based on the proven notion that the process of invention encourages and develops problem-solving skills and creativity. The goal of the Young Inventors' Program® is to foster cognitive growth so that students can think creatively and apply problem-solving in the real world; a skill that develops a wide range of conceptual and logical thinking capabilities.

More than 5,000 students from 600+ schools use STEM (Science, Technology, Engineering and Math) concepts to create their inventions. The most innovative students and creations are selected to attend the annual YIP State-wide celebration. This year's event was held at Merrimack Valley High School in Penacook, N.H., on Saturday, March 28, from 9 am – 2 pm.

More than 300 volunteers from Fidelity Investments' employee volunteer program, "Fidelity Cares," have contributed to the Young Inventors' Program®.

Thanks to the generous sponsorship of many companies and individuals, this event provides a fun and creative atmosphere for students to showcase their inventions (see the list of sponsors on page 6.)

Fidelity Investments has been a primary supporter of the statewide celebration for many years. The firm's commitment to educational growth is portrayed in its volunteerism and endorsement of the Young Inventors' Program. Fidelity's partnership with the Academy of Applied Science has ensured that the Young Inventors' Program® gives New Hampshire students the opportunity to expand their creativity, problem-solving skills and inventive-thinking.

We appreciate the valuable support provided by Fidelity Investments and its volunteers. On behalf of the 55,329 students who have benefited from the YIP experience, *Thank You!* ■

Want to give a classroom the Young Inventors' Program experience? Sponsor a YIP Kit for your favorite school. For $500 you can supply everything the teacher of a class of 25 students needs to teach the year-long curriculum. The YIP Kit includes 25 invention diaries, teacher's manual, display boards, trophies/ ribbons/ certificates, name tags, and everything else they need to have their school Young Inventors' Program competition. Every school has the opportunity to send its winners to the state YIP event held every March. Sponsor the classroom of your choice today using the form on page 7 of this newsletter.

My Water Flea Research May Help Stop Raynaud's Disease

—by Nicole Biddinger

Nicole Biddinger, Sophomore in college; JSHS 2013 Participant

I WAS A SOPHMORE in high school, enjoying working on my independent research project for my first Junior Science and Humanities Symposium (JSHS) project, when the discoloration in my extremities was diagnosed as Raynaud's Disease. Growing up with this disease wasn't easy—it causes a purple discoloration in my very cold hands and feet, which many of my peers still have trouble understanding to this day. This is my story of how JSHS changed my life and enabled discoveries that may be key to stopping the progression of my newly diagnosed Raynaud's Disease.

I began my project the summer before my senior year in high school, and was fortunate enough to have the opportunity to work in a lab at Oklahoma State University. My research studied the effects of climate change on evolutionary changes in Daphnia pulex—an aquatic invertebrate commonly known as the water flea—which plays a strong role in our ecosystems. What makes these organisms so amazing to study is that after they reproduce, dormant egg banks are preserved under lake bed sediment dating as far back as the 1500s. Using sediment cores, and what is known as resurrection ecology, these viable eggs can be retrieved and once exposed to proper spring-like conditions, they actually come back to life! I worked with seventeen genotypes of these organisms from the 1500s to today, allowing for a comparison of response in heat tolerance trials over a nearly 500 year time frame to mimic patterns observed with climate change. The results of the heat tolerance experiments revealed that a strong correlation exists between tolerance and age of the Daphnids, showing that an adaptation in their heat shock genes may have occurred over time.

Heat shock genes can be found in organisms ranging from bacteria to humans, and they are responsible for maintaining proper protein folding which keeps us alive in stressful conditions such as extreme temperature exposure. If these organisms had been unable to adapt to changing climate conditions over time, it would disrupt the balance of many of our lake and ocean ecosystems.

I hope to apply the results of the heat tolerance experiments to human heat shock protein disease research, as the heat shock genes of the Daphnids may be similar to those of humans. Raynaud's Disease is, in part, caused by antibodies forming against heat shock proteins in my extremities. These are the same proteins I studied at the molecular level in Daphnids last summer as a continuation of my project using the feedback I received from National JSHS.

Over the course of the past few years, the opportunities for personal and professional growth JSHS provided for me changed my life forever. There are no words to express how being recognized for the research I love so much meant to me on the night of May 4, 2013 as I walked from the banquet table in Dayton, Ohio at the National JSHS awards ceremony to the stage to receive my scholarship. This money reduced the financial burden enabling attendance at my dream school which has an incredible focus on undergraduate research opportunities, Purdue University.

The format of JSHS also enabled me to connect with individuals from around the country in nearly every field of STEM research. I still keep in touch with many of the friends I made at JSHS, surrounding me with a network of supportive individuals filled with a common love of science. These connections with fellow students are truly long-lasting and vital for personal and professional growth. JSHS was the catalyst to pursuing my scientific career.

Working in a university level lab prior to graduating high school was an unbelievable opportunity. I've found that it's one thing to read about application of the scientific method in a textbook and an entirely separate entity to physically apply it to your own research. I hope to serve as a role model for other young women aspiring to pursue careers in science.

My goal is to provide support for students like myself who desire a hands-on research experience outside of the classroom. Our nation needs more students pursuing careers in STEM-related fields to continue to further our societal advancement. The way to retain students in STEM is through encouragement at a young age, and a major asset to that is through programs like JSHS that help foster new ideas and kindle a growing love of science.

Most importantly, it is because of programs like JSHS that students can find the support they need to pursue a career in a STEM field. JSHS is a major part of the reason why I am currently studying biology-health and disease at Purdue University. ■

Students invent ways to grow vitamin and protein-packed corn while reducing fertilizer pollution

NORMALLY TO GET a larger corn crop, you have to add a lot of fertilizer—which translates to a lot of nitrates leaching into the water system and harming the living aquatic ecosystems. Jordan Dinwiddie and Isiah Nelson took a creative approach to this problem and pre-treated their seeds with vitamins and amino acids and then added iron and sulfur to the little bit of fertilizer that they did use. The result has the opportunity to change the way corn is grown around the world and packs more nutrition into the bigger corn cobs while reducing the pollution leached into the water! *This is their story*.

Research and Engineering Apprenticeship Program (REAP) Students Study Increasing Crop Production

by Leonard Sonnenschein, President, World Aquarium and Conservation for the Oceans Foundation

During the summer of 2014, Jordan Dinwiddie and Isiah Nelson, REAP students from Vashon High School, participated in a corn-growth study through the World Aquarium in St. Louis, Missouri. The study was entitled, "Improving corn production while decreasing downstream effects through seed pre-treatment and modification of fertilizer." Jordan tested the efficacy of pre-treated seeds; Isiah tested the effects of various fertilizer mixes.

What Was Done?

On July 2, 2014 at the George Washington Carver Experimental Farm in Normandy, Missouri, eight different conditions for sweet corn were set-up by Jordan and Isiah to test the effects of pre-treatment, iron+sulfur fertilizer and reduced fertilizer use on corn production and nutrient quality. For this project Jordan and Isiah became farmers: plowing, fertilizing, and growing corn seeds. Twice a week, they would go the farm to water the plants, pull weeds, and take measurements.

What Findings Were Obtained?

On August 30, 2014, the corn was harvested and corn cobs were measured and compared through statistical t-test analysis. Extreme significance was found through comparing corn cob weights, heights, volumes and densities. To test the nutritional impact of each treatment group, the corn was analyzed for niacin and protein content by the Nestle-Purina Analytical Laboratories in St. Louis, who

» continues on page 7

A very special THANK YOU to our donors who have contributed since the last published newsletter! Together we are encouraging more students to enter and continue in Science, Technology, Engineering and Math (STEM) fields. You have made a difference!

Company/Organization Sponsors	Individual Sponsors
Act One Creative, LLC	Dr. Diana Dabby
AFP Northern New England Chapter	Dr. Sheldon Apsell
Blue Hill Research	Dr. Subhash Minocha
Capitol Copy	Gary Miller
Citizens Bank & The Parker-Nelson Foundation	Irene O'Mara
Contegix Hosting	James & Susan Milliken
Fidelity Investments	Jill Malcom
Harborside Inn, Cafe & Lounge	Joanne Hayes-Rines
In Honor of Bob and Joanne Rines	Kate Trojano
Modern Woodmen of America	Kimberly Peaslee
Salesforce Foundation	LT. General Frederick McCorkle
Sulllivan & Worcester, LLP	Paula Apsell
The Barley House Restaurant and Tavern	Robert DiMatteo
Unitil	Robert M. Asher
Portland Glass Company	Toby Kusmer
Comfort Inn	
Gibson's Book Store	
Inner True Healing	
Upton & Hatfield, LLP	

Project Team (left to right): Leonard Sonnenschein (President, World Aquarium), Isiah Nelson, Jordan Dinwiddie, Joyce McGrath (Normandy School District), Mayor Patrick Green (Normandy, MO), Dr. Edward Haynie (Incubator Scientist Program Executive Director), and Bobby Watts (Experimental Farm Mentor)

» CONTINUED: Increasing Crop Production

graciously donated their services for the benefit of the students.

One of the most surprising results was that pretreated seeds made a big difference in the nutritional composition of the crop, increasing protein by 42% and niacin up to 437%. The increase in protein and vitamin content has broad application throughout the world, especially for developing countries. For those countries who do not have the means by which to fertilize their crops, seed pre-treatment may have significant impact upon the nutritional value of the crops that are produced and help aide against hunger.

By adding iron and sulfur to the reduced amount of fertilizer used on pre-treated seeds, the corn cob size and weight increased and the amount of nitrates leaching into water and transferring to living aquatic ecosystems was reduced significantly by 27% in freshwater and 11% in saltwater. ■

Want to Help the Academy Without Giving Cash?

■ Do you bank at **TD Bank**? If so, give the teller the form below (or tell them to use our AG440 code) and TD BANK WILL DONATE $10 to the Academy of Applied Science for each checking (Business & Consumer), savings, money market, CD or retirement account. If you open a new non-interest checking account and select the Academy as your charity of choice, TD BANK DONATES $50 to us and YOU GET $25! Talk about a win-win!

Dear Teller, Please have TD BANK donate to the Academy of Applied Science (using their affinity program code of: **AG440**) simply because I bank at TD Bank. I understand this is money that TD Bank is donating to community organizations and I pay nothing out of my account.

Thanks for helping out the community.

Print Name _____

Signature _____

■ .5% of your purchases on **Smile.Amazon.com** will be donated by Amazon to the Academy. Everything available on Amazon.com is also available from Smile.Amazon.com. Use your regular Amazon ID and Password to sign in on the **Smile.Amazon.com** site. You can also use this direct link: http://smile.amazon.com/ch/04-2314685 to immediately designate the Academy as your charity of choice. If you do purchasing for your company, please consider designating the Academy of Applied Science as your charity of choice. Everyone's ½ of a percent really adds up!

■ Like us on **Facebook**

AAS | ACADEMY OF APPLIED SCIENCE

Donate to the Academy of Applied Science

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

Name _____

Company/Organization _____

Billing Address _____

City | State | Zip _____ | _____ | _____

Phone: _____ Cell/Work/Home (circle one)

Email _____

My donation is: ❑ Monetary ❑ Item ❑ Service

Donation Amount $: _____

Donation is: ❑ In-Kind ❑ Enclosed ❑ Bill me ❑ Call me ❑ I'll Volunteer

Use my donation for: ❑ YIP Kit for a School ($500) ❑ iPad Mini Awards ($300) ❑ JSHS Awards ($20) ❑ STEM Internship ($5000)

Use my donation for: ❑ Wherever is needed

❑ General Operations ❑ Endowment ❑ Call me to discuss

❑ Awards/Scholarship ❑ Other: _____

❑ Check Enclosed* ❑ Paying By Credit Card

Name on the card: _____

Card type: ❑ Mastercard ❑ Visa ❑ American Express

Card number: _____

Expiration: _____ 3 or 4 digit code: _____

Billing zip code of card statement: _____

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

Info@AAS-World.org • 603-228-4530

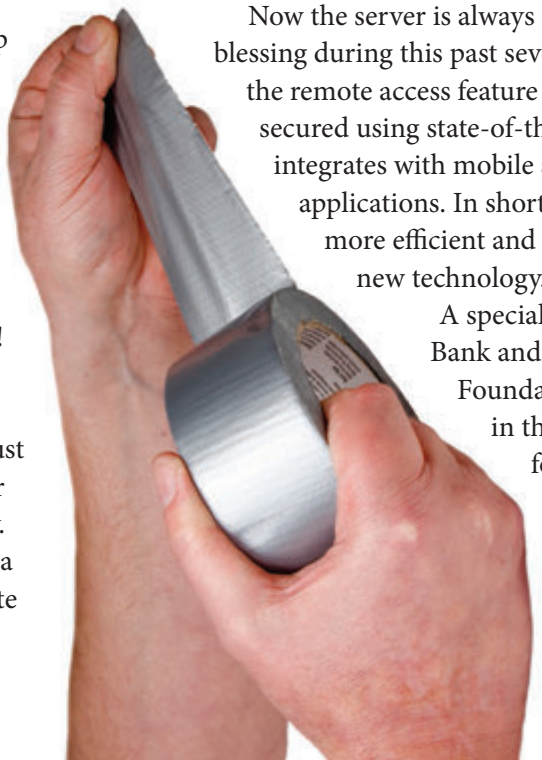
ACADEMY OF
APPLIED SCIENCE
24 Warren Street, Concord, NH 03301

No More "Duct Tape" Holding Together Our Server…

Thanks to Citizens Bank and The Parker Nelson Foundation!

EVERY BUSINESS STRUGGLES to keep up to date with today's technology changes. In the non-profit world, that struggle magnifies because of funding constraints. Very few foundations or grantors recognize that technology is part of the backbone for an efficient and productive non-profits. Citizens Bank and Parker Nelson Foundation is the blessed exception!

Citizens Private Bank & Trust serves as trustee and manages and administers the Parker Nelson grant program, which is a trust for charitable purposes. Grants are given for specific projects, equipment, or seed money. When we found this grant, it was like manna from heaven because buying a new corporate computer server was NOT in the budget for this year…and…the 'duct tape' wasn't going to hold another year! The $5,000 grant funded the majority of the costs required to purchase and install the server hardware!



Now the server is always accessible, which was a blessing during this past severe winter when we used the remote access feature extensively! Also access is secured using state-of-the-art protection and integrates with mobile and remote- desktop applications. In short, we at the Academy are more efficient and productive because of the new technology.

A special THANK YOU to Citizens Bank and The Parker Nelson Foundation for your investment in the community and especially for funding our new server! ■