issue 2

the neurite

west virginia's STEM magazine for students

Amy Pei and Drew Gupta
West Virginia Delegates at the
2016 National Youth Science Camp

Editor's Corner

This summer, I had the privilege to spend a couple days at the National Youth Science Camp (NYSC), right here in West Virginia's Pocahontas County. It was a privilege because it's almost like a secret society for some of the hardest working recent high school graduates in the country and internationally! Not many people know about the NYSC's existence, which makes it one of WV's best kept secrets! But this issue of the Neurite is here to change that.

The NYSC and opportunities like it are the focus of this issue of the Neurite because such experiences are so beneficial to your development. For instance, programs like NYSC provide you with a space in which you can be among people that have similar interests, making it a safe space where you can be yourself. Program activities can show you STEM fields in a different light because they are introduced through hands-on and/or project-based activities unlike in day-to-day classrooms. Also, such programs introduce you to fields that aren't taught in school, providing you with more options for your future. Who knows, you might be selling yourself short because you don't know all your options!

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By participating in opportunities like these, you have the chance to garner a variety of skills. The more skills you expose yourself to, the more paths to your future will emerge.

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One of these paths might lead you to become an entrepreneur, just like one of the featured NYSC alumni. Because to be an entrepreneur, you have to have a multitude of skills that cannot be found in one single academic subject or area of interest … and some skills might not even exist yet. Let me tell you this, no matter what you study, 20 years later, the world is going to be a different place requiring a whole new set of skills.

Anyway, I hope you will enjoy this issue of the Neurite and be inspired by the stories to participate in programs and to try new things.

Elisabeth Kager

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Want a free subscription to future issues of the Neurite? Send me an email, elisabeth.kager@wvresearch.org.

Photos by Chalice Keith & Hallie Bower

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Out-of-this-world National STEM Program in your Backyard!

Did you know there is an exciting and unique national science camp here in West Virginia allowing you to explore science, the outdoors and much more? Did you know that it is free to those who participate? Do you think you have what it takes to be selected?

The National Youth Science Camp (NYSC) was created in West Virginia in 1963. It is a residential science education program for students fresh out of high school who are interested and skilled in STEM.

Delegates, which is what participating students are called, come from all over the U.S. as well as other countries. They travel to West Virginia to be challenged academically through stimulating presentations and hands-on studies led by exceptional scientists and educators. Delegates meet other amazing young people like themselves and spend nearly a month together at NYSC. In addition to academics, there are also voluntary opportunities to enjoy the great outdoors with climbing, caving, backpacking, mountain biking, and kayaking. Plus, there are other fun surprises that you just have to be there for.

Delegates have said that it has changed their lives and that they have great memories of their time at NYSC. They have made lifelong friendships and connections that have helped them in college and their careers. But you will see this for yourself when reading delegates' testimonials throughout the magazine.

So, do you think you have what it takes to be selected to represent West Virginia at a future NYSC?

To learn more about this out-of-this-world program go to www.nysc.org. If you are a senior in high school and graduate next Spring, give it a try and apply. Applications start November 1 at www.apply.nysc.org.

An open mind + a multitude

West Virginians Yixuan "Amy" Pei and Drew Gupta gained many experiences and honors throughout their high school years and are now both freshmen at distinguished universities.

Both took similar approaches to their academic excellence. Let's see if they will let us in on their secrets.

Neurite Amy

Amy, what do you think makes you so successful?

A balance. I have moments when I don't feel as motivated to work and I just have to splurge myself with stuff I find pleasurable. Once I feel better, I can focus and get back into work. Also, it helps that I surround myself with people who love learning as much as I do.

Neurite Drew

How about you, Drew?

Adhering to a philosophy of hard work and persistence has allowed me to achieve many of my goals. Furthermore, an optimistic perspective helps me in seeing the bright side of things as well as viewing life as an opportunity by making the most of everything I do.

Amy and Drew were pretty active high schoolers, participating in sports, student government, clubs, academic summer programs, etc.

N D

Drew, why keep yourself so busy?

I participated in programs that challenged and stimulated me–something I didn't really experience in school. Not all of these programs focused on STEM, but they did provide an opportunity for me to explore a variety of potential fields of study and to focus on the topics that I'm passionate about: neuroscience and public health.

N D

When did you get passionate about these fields?

Ever since a young age, I entertained an interest for neuroscience–further cultivating it by watching numerous Ted Talks on the subject. Unfortunately, I never had the opportunity to conduct research in this field and expand my interest. If I had to do it differently, I would've reached out to a known neuroscience professor and asked about potential opportunities; so, I advise all students to pursue your curiosity and reach out to experts.

The 2014 water crisis got me thinking about public health more and these thoughts have since made their way into my career path.

Left to Right: John Giroir, NYSC Director; Amy Pei; Dr. Paul Hill, Chancellor of the WV Higher Education Policy Commission and Drew Gupta.

# of experiences = success

In addition to opportunities offered by her school, Amy contacted a surgeon to ask for an internship, and she got it!

Amy, what did you get out of this experience?

It changed my idea of how surgery works. Being a surgeon is like an advanced sport, it's repetitive but you have to train hard to improve.

What did you get to do?

I got to watch hip and knee replacement surgeries and observe how to clean infections up close. I also participated in post-operation meetings with the surgeon and his patients.

When did you know you wanted to go into surgery?

I don't think the idea of surgery really crossed my mind until my sophomore year of high school, but working in medicine was always something my parents emphasized and something that I could see myself doing. Beyond the fact that it's a stable and monetarily-rewarding career choice, I've just always been intrigued by the idea that you can, quite physically, make other people's life-threatening problems go away.

Drew, 2016 George Washington HS graduate and Amy, a 2016 Morgantown HS graduate carry WV's flag during NYSC's morning flag ceremony.

This year, Amy and Drew represented West Virginia at the National Youth Science Camp (NYSC), which added to their list of extracurricular activities.

What was your favorite part about NYSC?

The people because of their varying life experiences and opinions. Also, NYSC has shown me my state. Morgantown, where I grew up, is so separated from the rest of the state that you could almost lose the West Virginia touch.

At first, I was intimidated by the delegates at NYSC as they were some of the most intelligent individuals I'd ever met. They motivated me to come out of my comfort zone and learn about other fields. These interactions definitely inspired me to work harder.

What advice do you have for our readers?

Contact people who have knowledge about your interests and apply to camps and such. The worst thing that can happen is that you get a rejection, but if you don't try you have already failed because only if you try can you succeed.

Don't focus on who you want to be but on what you want to do. Having said that, know the end goal because it will impact your path. On that path, stay open-minded because you never know what opportunities may come your way.

Amy is currently double-majoring in neuroscience and medicine, science & the humanities and minoring in management and entrepreneurship at John's Hopkins University. **Drew** is majoring in psychology as part of the neuroscience track at Yale University and is thinking about pursuing a Masters in public health.

Left: Giselle Serate

"I didn't know much about West Virginia besides that it is the coolest shaped state on the map!"

Giselle Serate
(2016 NYSC Delegate)

Girls Who Code

(https://girlswhocode.com/)
"Girls who code introduced me to different fields of computer science, like web design, coding, and robotics. I liked the order and logic of coding, it's kind of like writing, just in a different language."
–Giselle Serate, NYSC 2016 Nevada Delegate
Charleston

First Lego League*

First Lego League teams are made up of students in **4th-8th grade** who work together to develop a solution to a real-world problem, such as recycling, and design and build a robot out of Lego to compete with.
The Boa Constructors, Monroe County
The Clover STEMS, Putnam County

Health Science Club

(http://crh.marshall.edu/pipeline/)
Check out the website to find a health club near you!
High school "Health Science Clubs meet monthly with a variety of speakers from health care and science professions. Sometimes they take field trips to science related destinations."
–Debbie Curry, Rural Health Outreach Director
Cabell County | McDowell County | Mercer County

Zero Robotics*

Zero Robotics is a competition where robots are experimental satellites inside the International Space Station (ISS). **High school teams** have to program these satellites to take on an annual challenge. The championship is conducted by an astronaut on the ISS.
South Charleston High School

Here are some examples of **STEM op**
Check with your school or commun

*For more information on robotics programs in West Virginia, please visit: http://wvroboticsalliance.org/

West Virginia Governor's School

(http://www.govschools.wv.gov/Pages/default.aspx)
There are multiple Governor's schools available, each geared toward a specific grade and area of interest, such as the Governor's School for Math and Science or the Governor's Honors Academy (GHA). Both Amy and Drew attended the three-week residential GHA, which is intended for WV students who are academically motivated.

West Virginia University

Technology Student Association (TSA)

(http://www.tsaweb.org/)
The TSA provides **high school students** with the opportunity to compete in STEM activities and competitions in order for them to grow into STEM-skilled leaders.

Paw Paw High School

Seeding your Future

http://seedingyourfuture.weebly.com
Seeding your Future hosts a series of workshops for **8th-12th graders** in order to encourage students to think about a career in STEM. Two-hour workshops in different STEM fields take place once a month.

Shepherd University

Youth Science Discovery Experience Field Trip

(http://fieldtrip.ysde.org)
It's a free, weekend-long STEM field trip for West Virginia **8th graders** during which students interact with people in various STEM careers as well as do fun, hands-on STEM activities themselves.

Math Counts

(https://www.mathcounts.org/)
"The goal of Math Counts is to reach **middle schoolers** at a critical part in their life and teach them tricks and processes in order to get them excited about and confident in math."
–Michael Haid, Executive Director of WV Math Counts

Buckhannon Upshur Middle School | Follansbee Middle School

Science Olympiad

(http://www.marshall.edu/so/default.php)
Science Olympiad explores science through student team competitions that mirror the ever-changing nature of STEM fields in today's world.
WV's Science Olympiad will be hosted on Marshall University's campus on February 11 2017, so form your team now!

opportunities around West Virginia.

ity for these or similar opportunities.

"GO FIND YOUR INNOVATION FRONTIER, AND INNOVATE." – Simon Solotko

NYSC Alumni Highlight #1:

Simon Solotko was an NYSC delegate representing Ohio in 1990. He studied sociology and social thought in undergrad and got a Master of Business in Finance. Today, Simon is an entrepreneur in virtual and augmented reality.

Wow, that's a mouth full. What are virtual and augmented reality and what in the world is an entrepreneur?

Virtual reality (VR) creates a world that only exists digitally. Surgeons use training simulators to practice medical procedures with virtual tools on virtual patients. Meanwhile, augmented reality (AR) creates a digital layer to add to the real world, just like in Pokémon Go.

Neurite Simon

Simon, can you tell us what being an entrepreneur entails?

There is tremendous **creative** freedom in entrepreneurship unlike more specialized careers which make it harder to develop into a **well-rounded** and ultimately **self-determining** professional. Having said that, the level of **competence** required to be an entrepreneur is high, but you can compensate for what you don't know by learning how to **work effectively with others** and **build teams**.

The Seebright Ripple™ in action.

N S

Having studied sociology and finance in college, how did you pull off being a pioneer in VR and AR?

My interest was self-motivated. I took college courses in math and computer science throughout high school, then started one big project. I was 17 when I wrote a 3D interface and particle physics simulator with open-ended scenarios. With it, I won the Ohio Junior Science and Humanities Symposium. That project shaped the rest of my life.

It was also my ticket to the NYSC, which was fundamental to my journey and helped to substantially improve my confidence.

Besides, you should never let degree programs or educational expectations shape your interest in learning outside of a field. My hybrid of skills has prepared me to help mentor and lead technology businesses.

What advice do you have for our readers to get ready for a thriving future?

Simple.

Find your inner fire–that's a tough one in a world where everyone seems to have already done something. Find the bleeding edge–it's a lot easier to innovate on the edge of something evolving–like augmented reality, virtual reality, information visualization, etc. than something that people have been banging their heads against for the past decade.

Do your own projects, based on your own ideas. It helps if they comprise some intellectual rigor and a reasonable goal and outcome. Just step off the beaten path, take your own work seriously, continue to believe in yourself, and focus your ideas and energies on the projects you love or you won't do a good job.

Simon just recently went from an idea for an affordable handheld AR viewer to putting his product, the SEEBRIGHT RIPPLE™, on the market within 90 days.

In addition to working on his own innovations, Simon mentors technology startup companies and young learners, so if you need some entrepreneurial advice, feel free to contact him on Linkedin (www.linkedin.com/in/solotko).

Delegates' advice to you:

- Don't be scared of trying new things; you learn from failure.
  – Kristel Nivela Denas (Ecuador, 2016)
- Do what you really love, you must not be afraid to fail; it's the process that matters.
  – Fernando Saldivia Yanez (Chile, 2016)
- Keep an open mind.
  – Mark Ali (Trinidad and Tobago, 2016)
- I think students are under pressure to perform at higher and higher levels at a younger and younger age. I encourage them to fight the pressure and preserve time to be creative and use other parts of their brain--the artistic, the verbal, or the musical. Creative, well-rounded problem solvers come from this broader well of experience.
  – Dr. Julie Robinson (ID, 1985)
- Don't box yourself in or define yourself with one thing because that thing could change.
  – Giselle Serate (NV, 2016)
- Take every opportunity because then new doors will open for you.
  – Kimmet Piedra Garbanzo (Costa Rica, 2016)

ARDUINO – A Tool for Entrepreneurs

NYSC Alumni Highlight #2:

Dr. Paul Miller was an NYSC delegate representing Wyoming in 1987. He studied physics and secondary science education. Today, Paul is teaching physics at WVU and is active in physics education outreach.

Neurite Paul: **How has the NYSC influenced your life?**

My experiences at NYSC inspired me to become a teacher, which has enabled me to continue to work at the camp in various capacities including being the Director. It's also what drew me to West Virginia!

N P: **At this year's NYSC, you led a directed study on Arduino, can you tell the readers what Arduino is?**

Arduino is an electronics board that reads inputs and turns them into outputs via commands in code. Arduino is a useful, accessible way to give students who aren't particularly comfortable with programming or electronics a rewarding, hands-on experience. They can create their own project and develop it from idea to working prototype very quickly—which is exciting!

I like Arduino because it's inexpensive, you can do physical computing without really any background at all, and easily get to the point where you can do something cool within an hour or two.

NYSC Delegate Testimonies

Many times in a scientific career there is pressure to specialize and become the world's expert in a very small area. At NYSC, I learned to be OK to stay interested more broadly and that it made you a more creative scientist.

– Dr. Julie Robinson (ID, 1985)

Dr. Julie Robinson, Chief Scientist for the International Space Station

Camp has opened up my mind to different things and helped me discover who I am.

– Mark Ali (Trinidad and Tobago, 2016)

Could you give an example of an Arduino produced prototype?

This year, a group of students built a simple weather station, which measured and then displayed air temperature and relative humidity to an LCD display. Another group built a laser trip wire alarm.

Arduino is the perfect tool to get started as an entrepreneur because with the help of Arduino you could make anything that you can possibly come up with. You can start out by building your own water quality monitor or recreate the Weasley Clock from Harry Potter for your own family. From there, you can work your way toward your own invention. How cool is that?

The bottom line is there are endless possibilities for creative minds like yours!

Delegates working on their Arduino project.

Kylie Stevens

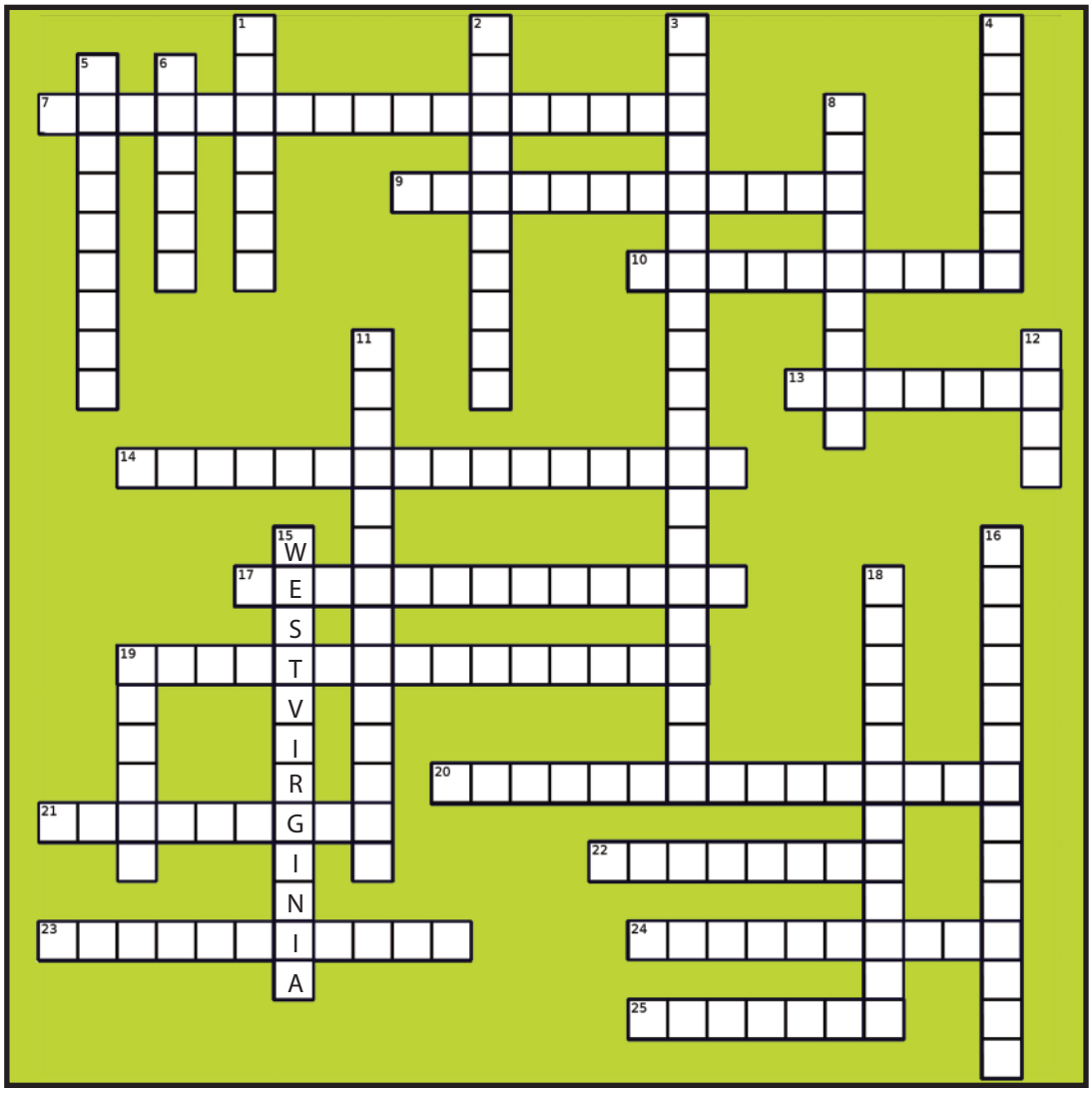
I think that camps in general provide a safe environment for students to find passions and share in the development of those passions. Camps also give a low/no pressure atmosphere in regards to new topics. Whether that is like NYSC or other camps, kids learn better because it is up to them to engage and if they choose not to, there is no negative impact on them (like poor grades). I also made so many amazing friends because of science camp. More than just good friends, the kind of relationships that transcend distance.

– Kylie Stevens (NV, 2009)

While I had terrific science teachers in high school (I graduated from George Washington High School in Charleston), NYSC was really my first opportunity to be around both lots of science professionals and lots of students from all over the country who thought science was cool and interesting. I didn't find my career path at NYSC (that came later), but NYSC gave me the confidence to try new things and branch out from my comfort zones.

– Dr. Alyson Wilson (WV, 1985)
Professor of Statistics at
NC State University

Fun with EXTRACURRICULARS



Across

7. TSA is an acronym for _____ Association.
9. South Charleston High School won the _____ Competition twice in a row.
10. _____ builds confidence and attitudes toward math and problem solving.
13. _____ is an electronics board.
14. _____ creates a digital layer to add to the real world.
17. _____ Clubs exist in 15 counties in WV.
19. FLL is an acronym for _____.
20. _____ explores science through team competitions.
21. _____ Ripple is a hand held AR viewer invented by Simon Solotko.
22. Preserve time to be _____ and use other parts of the brain - the artistic, the verbal, or the musical.
23. "Stay _____ because you may never know what opportunities may come your way."
24. NYSC gave me the _____ to try new things and branch out from my comfort zones.
25. Students come from all over the U.S. as well as countries like Chile, Trinidad and Tobago, _____, and Costa Rica.

Down

1. It is ok to stay interested more _____; it makes you a more creative scientist.
2. Amy got herself an _____ with a surgeon by just asking.
3. NYSC is an acronym for _____ Camp.
4. "I made so many amazing _____ because of science camp.
5. _____ are students that participate in the NYSC.
6. West Virginia "is the coolest-_____ state on the map!"
8. Ask your science teachers to take you on a Youth Science _____ Experience Field Trip to Davis, WV.
11. _____ creates a world that only exists digitally.
12. Arduino uses _____ to turn inputs into outputs.
15. The NYSC takes place in _____.
16. Governor's Schools of West Virginia host summer camps for _____, Arts, Honors, and possibly even Entrepreneurship.
18. An _____ is somebody who is creative, self-determined, competent, and works well with others.
19. "If you don't try, you have already _____ because only if you try you can succeed."

Having difficulties? Are you sure you read all the stories...?
For solutions to the crossword puzzle, visit **www.wvresearch.org.**