

THIS MONTH:

- APR 2-6** SPRING BREAK
- APR 10** NEW ELECTIVES BEGIN
- APR 14** STATE SCIENCE FAIR
- APR 18** INTERIM 5 REPORT

Counselor's Corner

For students (and parents), spring means everything happening at full speed. Registration is complete and students have been notified which elective they received for next year. New electives will meet for the first time on 4/10.

Spring also means many events. We will be holding a canned food fundraiser for Feeding America the week of April 16th. Students may participate in one of two ways. Students may form ultimate Frisbee teams and each team member must donate 5 canned food items to play. We will also have our AM1 and PM1 classes competing to see who can bring the most canned food items in. The winning ultimate Frisbee team and the winning AM1 and PM1 classes will receive a pancake breakfast. Please encourage your students to bring in canned food! It's an easy and fun way to give back to our community.

Senior Dinner is scheduled at Hotel Roanoke for Monday, May 7th at 6:30. The invitations will be mailed on Tuesday, April 24th and the rsvp will be due to me by May 1st. We will also be having a Senior Breakfast on the morning of May 18th. I will be contacting senior parents in the near future asking for help coordinating and feeding our seniors. Thank you in advance for your help!

AP testing takes place in the first two full weeks of May. As in the past, students are to have registered for their AP tests through their home school. Students are responsible for paying the fees when registering at the home school. If you have questions, please contact your student's home school.

As always, if you have any questions or need any assistance, please do not hesitate to contact me.

Atomic Force Microscopy at RVGS

Last spring Emily Cathey went to Mr. Levy for guidance on how to turn her water research idea into a project that would really stand out, and Mr. Levy came up with a way Emily could work with water while also being one of the first students to explore our new \$40,000 atomic force microscope (AFM).

A signature piece of cutting-edge technology used in research at the nanoscale level – the prefix “nano” means “one-billionth” – our AFM was purchased last year by the RVGS Foundation, the non-profit fundraising arm of Roanoke Valley Governor's School. The Foundation raises money through donations to our Annual Appeal and from proceeds from our Silent Auction, and the Foundation's purchase of the AFM caused quite a buzz in our surrounding academic community. In fact, we're the only school in the Roanoke Valley to own one.

The Atomic Force Microscope works differently than traditional light microscopes, which provide optical images from light passing through samples. The AFM instead generates digital three dimensional images of the sample, generated by measuring the position of a probe as it passes across the material's surface. This method allows resolution beyond those capable through light images, resolving textures at nanometer scales. Each generated image is a composite of between 65,536 to 266,256 data points; so, over the course of intersession, students generated well over 10 million data points with the AFM!

After talking with Mr. Levy, Emily decided on a project that would determine and compare the corrosive effects of different concentrations of chlorine on copper water pipes. She also tested the inhibitive effect of phosphate on chlorine-induced copper corrosion, along with the corrosiveness of tap water from the Roanoke Valley, and she was able to use the AFM to determine the sub-microscopic effects of the copper corrosion.



“Corrosion of copper in potable water systems creates both economic and environmental problems,” said Emily, “and our AFM helped me show that higher concentrations of chlorine produce more corroded copper, and that phosphate is a very effective inhibitor of corrosion.”

Emily's project has won three ribbons already, and she will next compete at the state fair in April. During her project, Emily worked closely with one of our community partners, the Western Virginia Water Authority, and she has agreed to send her final paper to them at the end of the school year.

Emily wasn't the only student who made extensive use of the AFM during intersession. Kevin Cruz, a sophomore of in the PM session, also conducted research relying entirely on the AFM technology and used the equipment throughout Intersession. During his project, Kevin analyzed and established scanning parameters and techniques necessary to scan several different types of nanoparticles to determine if heat treatment increases surface binding of these molecules to glass substrate. Through his work, Kevin provided data to other students in support of their projects as well. In the highest resolution scan on the RVGS AFM to date, Kevin was able to image single-walled carbon nanotubes with a radius of approximately 1 nanometer!

-Regina Carson

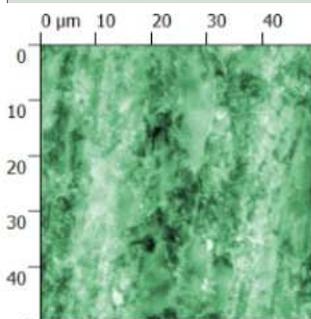
Right: Corroded copper scanned by AFM; dark spots represent developing pits in the metal's surface.

Message from the Director

While it might not feel like it, given the recent winter weather, we are rolling forward into spring events. Our students performed admirably at the Western Virginia Regional Science Fair, with thirteen projects advancing to the state fair and Grand Awards going to Logan Dunkenberger and Carly Smith. We also had students present their research at VaJSHS in March. Kenneth King and Christine Flora advanced to JSHS Nationals and RVGS students earned five gold medals. Congratulations to these students!

I would caution students and parents that this time of the year can sometimes lead to a challenge for students. With eight months of hard work behind them and many home schools shifting to review for state testing, there can be a temptation to ease off in effort level. It is important to continue a high level of motivation and commitment to maintain or improve academic success for the remainder of the year.

As always, please don't hesitate to reach out to me if you have any questions, concerns, or comments.



RVGS STEM CAREER PANELS

Remember the parent meeting Mr. Levy held last year to talk about where we are at the Governor's School and to get input on where we would like to go? One suggestion from the group was to bring in speakers from different STEM fields to talk about where *they* are and how they got there.

In response, Gov. School organized its first-ever **STEM Career Day!** On Tuesday, March 20, Mr. Levy introduced to the school an incredibly accomplished, informative, and diverse panel of eight area professionals to speak about their jobs and their journeys, and to take questions from our students.

It was a fascinating meeting. We heard from one panelist whose career has been a lifelong dream and from another who literally chose his college major by throwing a knife at the list. One panelist started at community college and another at a prestigious four-year university. One panelist has been with the same company for 10 years and another is a contract employee who changes companies regularly.

On a typical workday, their STEM careers vary widely. One panelist spends her days

killing bacteria, another saving lives, and still another testing equipment until it explodes. One focuses on sustainability, another on topography, and another on trouble-shooting. One panelist happily supervises and mentors over a dozen researchers in his own biotech lab – including occasional RVGS students – even though his undergraduate degree is in electrical engineering.

The panelists also addressed all kinds of things that our students are just starting to think about, including classes they should consider taking in college – writing and computer science – activities they should consider pursuing – lab research opportunities – and educational debt. They explained to the kids that many companies pay for their employees' graduate school and that PhD programs actually pay their students; that submitting papers and applying for grants take solid writing skills; that working in a lab helps students determine what they are and are not interested in.

They stressed that where you go to college is actually much less important than what you do when you get there.

The panelists spoke about the importance of exploring many fields and of having the confidence to switch to Plan B if Plan A doesn't work out. One reflected that, "I know I



like environmental studies" was actually a pretty good start, and another joked that "After a couple of Cs, you know it's time to move on, no matter how much you enjoy the work." Best of all, they talked about how effective communication skills are paramount, even in STEM, and about how far a good foundation – like the one our Lab Rats are getting at Gov. School – will take you.

Thank you to our spectacular panel for spending the day with us! Our Elite Eight were:

- Cassie Arenz**, an engineer with GE Renewable Energy
 - Dr. John Chappell**, an assistant professor of vascular biology at VTCRI
 - Tyler Draper**, an electrical engineer at GE
 - Jared Heffron**, a microbiologist at Novozymes
 - Erika Hoffman**, a GIS coordinator at the Western Virginia Water Authority
 - Martin Keely**, a telecommuting computer programmer for US Steel
 - Dr. Jessica Nguyen**, an emergency room physician at Carilion
 - Anh Tran**, RVGS/William Fleming Class of 2002, a biochemical researcher at Novozymes
- Regina Carson



Virginia Junior Science and Humanities Symposium 2018 at JMU

The Virginia Junior Science and Humanities Symposia Program (JSHS) is designed to challenge, engage, and publicly recognize students in grades 9-12 conducting research in the STEM fields. It is sponsored by the US Army, Navy, and Air Force, with the aim of preparing and supporting students to contribute as future scientists and engineers. On behalf of the Department of Defense, the Academy of Applied Science administers the national program, and our regional JSHS was held March 15-16 at JMU.

After Student Project Forum each year, the RVGS faculty invites 10 to 12 students to present their research projects at JSHS. This year, 11 Gov. School students were selected for the all-expense paid trip to the regional conference, and Ms. Bohland and Mr. Wages served as chaper-

ones. Competition at the symposium was fierce, but our group fared extremely well.

Logan Dunkenberger, Christine Flora, Jessica Goad, Kenneth King, Gavin Oxley, Richard Qiu, and Matthew Svec were recognized for Outstanding Research. **Logan Dunkenberger, Christine Flora, Jessica Goad, Kenneth King, and Gavin Oxley** received Gold Awards, and **Christine Flora and Kenneth King** were named two of the symposium's five Regional Finalists, with Christine taking 5th place overall and Kenneth taking 3rd.



Please congratulate these students, and **wish Christine and Kenneth luck at nationals!** As Regional Finalists, they will receive an all-expense paid trip to present their research in the poster session at the 56th National Junior Science and Humanities Symposium held May 2-5 in Hunt Valley, Maryland.

-Regina Carson

Western Virginia Regional Science and Engineering Fair

The Western Virginia Regional Science and Engineering Fair is an annual event that celebrates science by bringing together in competition students from Botetourt, Craig, Franklin, and Roanoke counties, and the cities of Roanoke and Salem. This year's fair was held at Virginia Western Community College on March 17. Students competing at the regional fair have already won their categories in at least one fair and often two, and they arrive at the regional fair ready to compete for prizes, awards, and two all-expense paid trips to the Intel International Science and Engineering Fair (ISEF), the largest pre-college science competition in the world.

RVGS typically sends around 70 students to the regional fair, and we generally hope to have a dozen or so advance to the state fair. I am thrilled to report that this year, Gov. School produced a bumper crop! Not only did 18 students win their categories at the regional fair, qualifying them to advance to states, but both Grand Award winners and both Alternate Grand Award winners were Governor's School students.

Congratulations to **Logan Dunkenberger** and **Carly Smith**, the fair's two Grand Award winners! They will receive an all-expense paid trip to ISEF, which will be held this year in Pittsburgh, Pennsylvania, from May 13 – 19. At the fair, Logan and Carly will interact with over 1,700 other gifted young scientists from more than 75 countries, regions and territories, and they will compete for \$4 million in prizes and special



awards. Last year's top winner at ISEF received a \$75,000 cash prize for designing and constructing a remote control prototype of a new "flying wing" aircraft.

Congratulations to **Jack Sherman** and **Reid Tenzer**, the fair's two Alternate Grand Award winners! They will compete at ISEF if Logan and Carly are unable to attend the event.

Congratulations to all of the RVGS students who won first place category awards at regionals and advanced to the state competition at the Berglund Special Events Center in Roanoke on April 14:

Ana Barrios, Emily Cathey, Reece Derrick, Richard Dorss, Logan Dunkenberger, Mary Grace Giles, Tiana Horace, Claire Nichols, Jai'Chaun Paige, Kate Pufko, Carson Pugh, Richard Qiu, Ryan Rigatti, Kevin Sheng, Jack Sherman, Carly Smith, Matthew Svec, and Reid Tenzer.

Many other Governor's School students received second, third, and fourth place category awards, as well as two dozen special awards totaling over \$1,500 in cash prizes. For the full listing of award winners from the Western Virginia Regional Science and Engineering Fair, please visit the RVGS home page at www.rvgs.k12.va.us.

-Regina Carson



Mr. Smith Honored By the American Chemical Society

Hooray for Mr. Smith! The Virginia Blue Ridge Section of the American Chemical Society just named him its 2018 Outstanding High School Chemistry Teacher of the Year! The award recognizes innovation in classroom and program activities, and comes with a cash prize for Mr. Smith and for RVGS! ACS's Blue Ridge Section covers Roanoke City, plus the Virginia counties of Alleghany, Amherst, Bedford, Botetourt, Campbell, Craig, Floyd, Franklin, Giles, Henry, Montgomery, Pittsylvania, Pulaski, Roanoke, and Rockbridge, and the West Virginia county of Mercer. Congratulations, Mr. Smith! You're on fire!

Another accolade for Mr. Smith! His fellow teachers voted him Gov. School's 2017-2018 Teacher of the Year! Congratulations, Mr. Smith! Our favorite PUN-dit!

