HOLMDEL TOWNSHIP SCHOOL DISTRICT

"A COMMITMENT TO EXCELLENCE"

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HOLMDEL HIGH RESEARCH STUDENTS EXPERIMENT WITH SUCCESS

HOLMDEL (May 8, 2017) – Research and innovation are certainly alive and well at Holmdel High School as a number of students have been winning top awards at prestigious science competitions this spring. For a comprehensive list of student awards, click here.

Holmdel is home to the revered Bell Laboratories complex, which was the birthplace of radio astronomy and where experimentation for laser cooling resulted in a Nobel Prize. Renamed Bell Works in 2016, it has once again become a vital part of the community as it is working to attract business and industry back to the facility, including high tech companies that once put it on the map. And the students at Holmdel High School are feeding off this energy as they diligently launch their interest and academic careers in research and discovery.

Dr. Josephine Blaha has been a science teacher at Holmdel High School for the last fifteen years. She currently teaches the Honors Advanced Research (HAR) course, a class that engages students in high level problem-solving activities through research and experimentation, and in which students work closely with the instructor to enlist professional researchers to help them accomplish their goals. From there, students are encouraged to enter their independently-developed research projects in competitions to introduce them to the rigors, and benefits, of hands-on research and experimentation.

According to Blaha the benefits of the class include learning the basics of good scientific discovery, through the formal process of finding a topic, doing the literature review, writing a good experimental design, conducting the research, and writing it up both as a formal paper and as a poster. She says "the students are then encouraged to do what all scientists do: communicate their research to the public (both scientific and otherwise), and defend their work." This is great experience on the high school level for students who yearly aspire, and get accepted to, some of the top research universities in the country.

This year's HAR students have made Blaha, and the high school community, extremely proud. Holmdel had 17 students represent the high school at the Jersey Shore Science Fair this past March and 12 of them were awarded ribbons in recognition of their work. Based on their performance at the Jersey Shore event, six students were invited to represent the school at the Delaware Valley Science Fair which hosts over a thousand young researchers from New Jersey, Delaware and Pennsylvania. Five of the six Holmdel entrants won placed and/or received special awards, including three first place and two second place Category Award winners.

The second place winners were Sneha Sharma and her project in Chemistry titled “Extracting and Characterizing Biofuels from Spent Coffee Grounds and Waste Pine Needles” and Erica Wu with her project in Microbiology called “Sewer Electricity: A Microbial Fuel Cell Powered by Sludge”.

First place winners included Shravya Jasti with “Biochemistry: Evaluating the Effectiveness of Copper and Silver Ions in Removing Contaminants From Wastewater,” Daniel Gulko in Botany with “Water Purification of Heavy Metal Ions Using Cilantro, Parsley, and Lettuce,” and Cyrus Majd in Computer Science with “Finding Vulnerabilities in the Oracle VM VirtualBox Hypervisor Specific to CPU and RAM Attacks.” A very impressive showing for high school teens, considering one almost needs a degree in advanced research to even understand the titles!

This past Saturday students competed in the annual New Jersey Academy of the Sciences Annual Symposium. This is a yearly competition in which students present their research to an audience of their peers and judges in the field. Holmdel sophomore Cyrus Majd outperformed high school juniors and seniors from across the state and took first place in Computer Science while Erica Wu won first place in both Environmental Science and Ecology and Joyce Wang took third place in Marine Science.

When asked what they have gained by having the opportunity to take the HAR course, Dr. Blaha’s students were quite candid in their responses. Erica Wu, who garnered a second place award for her Microbiology study, said that she learned about topics she is interested in on a more in-depth level and gained a deeper understanding of the materials than she normally would in a regular classroom, given the restraints of the curriculum and the time to really delve deeply into the required research. Wu was proud to offer that “research has taught me to be a self-starter and to be persistent in solving problems when experiments don’t work, or results weren’t as expected.” Her teacher echoes these sentiments. Dr. Blaha explained that “the kids leave the class with a tremendous sense of accomplishment, of being able to conceive of an idea and follow it through, and even if the experiment did not work, they are still able to formulate a valid conclusion, and suggest further studies that can be done. Not every project concludes with positive results; negative results are also very valid.”

Shravya Jasti, a first place winner in Delaware for her Biochemistry research regarding the removal of contaminants from waste water, was equally enthusiastic about her experiences in the HAR class. She said that “the class has taught me to think independently and to challenge my own abilities. Spending most of my lunch periods in the lab and working endlessly, even outside of school, HAR has taught me the meaning of dedication and hard work. Research is a laborious process and it can become tedious at times and sometimes your results aren't what you initially expected, but the moment your innovation works it's an absolute feeling of euphoria.”

What made Jasti’s work and passion for the project even more impressive was the fact that it stemmed from her trip last summer to India, where she observed that people have difficulty getting clean water. Realizing that such water filters as Brita filters were too expensive for these communities, she decided to investigate the viability of using common substrates such as clay, impregnate these with copper ion or silver ion, and see if these can effectively remove bacteria and/or organic contaminants, and was successful. Her project is not only scientifically viable, but socially and globally conscious as well. This is exactly the type of things we are looking for in our young innovators today. Jasti’s dedication continues to pay off as she is set to represent New Jersey in the National Water Federation Society Symposium later this month in North Carolina.

Blaha is hopeful that the recent successes at the competitions will continue to excite students about the program. She is also hoping to collaborate more with colleagues in engineering,

economics, and statistics courses, which are vital to educating students in the research process. Superintendent of Holmdel Schools, Dr. Robert McGarry, is also optimistic that recent initiatives he is proposing will help in these efforts. One is the Holmdel 2020 Initiative, a plan to improve the infrastructure of the district schools, along with bringing science labs and media centers into the 21st century. Another is an initiative where incoming freshman will be able to chart their own learning course when entering the high school, to get a leg up in pursuing their interests in various career fields, and giving them hands-on experiences, like the HAR class does, across the curriculum.

The biggest advantages to these hands-on experiences, according to Dr. Blaha, are the doors that are open to the students of Holmdel once they reach college. With the skills they pick up, Blaha says, "they can dive right into research. They can show their professors what they did in high school, and will definitely have a big advantage in getting into research labs. Doing research is almost mandatory these days to get ahead in any scientific, engineering or the medical field, in college and beyond." Given their enhanced experience, and the dedication of the staff and parents in the district, students will be taking advantage of many educational opportunities in the years to come, and continue Holmdel's proud tradition of innovation.