

EMILY CHENG, Methacton High School, Eagleville, Pa.

KELLY JIANG, Conestoga High School, Berwyn, Pa.

GERALD LIU, Methacton High School, Eagleville, Pa.

PROJECT: "Simultaneous Detection of Genetic and Epigenetic DNA Modifications by Targeted Next Generation Sequencing for Cancer Screening--Assay and Data Analysis Software Development for the Detection of Hepatocellular Carcinoma"

MENTOR: Ying-Hsiu Su, Principal Scientist, Blumberg Institute

"Our team developed a panel that includes DNA modifications for liver cancer, in addition to creating novel software that bypasses the data analysis bottleneck in next generation sequencing."

Emily, Kelly, and Gerald developed a panel of genetic and epigenetic DNA markers for the early detection of Hepatocellular Carcinoma, or cancer of the liver, and also created software to analyze the data to create accurate and specific diagnoses that bypasses the pre-existing data analysis bottleneck in next generation sequencing. With their project, the team looks to one day develop a panel to effectively screen for cancer in the early stages and prevent it from becoming life threatening for the many people affected around the world.



EMILY CHENG

YEAR: Junior

HOMETOWN: Lansdale, Pa.

Emily began participating in school science fairs after her mother convinced her in kindergarten, and has participated every year since. Emily's project inspiration came when a close family friend was diagnosed with Stage 4 liver cancer and passed away due to late detection. From there, Emily was determined to find ways to detect cancer early on and to identify other preventative measures. She was also inspired by previous Siemens competition national finalist Benjamin Song, who worked in the same lab as her.

Emily is a member of the National Honors Society and president of the French Club and Academic Decathlon Club. She also enjoys history and geography and learning about ancestry and human evolution, finding it important to understand different cultures, religions, and ethnicities. Outside the classroom, Emily is very involved in her church, plays piano for nursing homes in her free time, and enjoys playing tennis and soccer. Emily's career aspiration is to become an obstetrician.



KELLY JIANG
YEAR: Junior
HOMETOWN: Wayne, Pa.

With this project, Kelly hopes to develop a way to detect cancer in the early stages and save lives through prevention. Kelly was inspired to study this area of research while working in her lab and observing a lack of successful methods to ensure the early detection of colon and liver cancer accurately and efficiently.

Kelly's favorite subject in school is history because she loves learning about how human interactions have changed over time and how it affects the world today. She also enjoys biology and chemistry because of the freedom and hands-on experience gained from her lab work. Kelly belongs to the National Honor Society and National Art Honor Society. Outside the classroom, Kelly is a varsity runner on her school cross country and track teams. One of her proudest moments was winning a cross country race. Kelly aspires to be a pediatrician.



GERALD LIU
YEAR: Junior
HOMETOWN: Audubon, Pa.

Gerald plays a vital role to the team with his background in bioinformatics and ability to efficiently analyze data. He was eager to pursue this project because it fit his interests revolving around biology

and computers. Gerald was inspired by Ben Song and Jack Chen, former Siemens competition finalists, who work in the same lab as his team.

Like his teammates, Gerald's favorite subject in school is history. He enjoys reading about the past and sometimes finds it silly and entertaining. His earliest memories that piqued an interest in STEM were simple chemistry experiments he conducted at home as a kid. Gerald plans to apply to MIT, Stanford, Carnegie Mellon, and other universities as he gears up for his senior year. Gerald's hero is Bill Gates and if he could meet any person in history, he would meet Aristotle to listen to him lecture and learn about the views of science and philosophy at the time.

Outside the classroom, Gerald likes to cook and play the violin and has played for the Philadelphia Sinfonia Players. At the 2008 Summer Olympics in Beijing, Michael Jordan sat behind Gerald and his family during a soccer match between Brazil and Argentina.