

Press Release

Synopsys Alameda County Science & Engineering Fair 2017

Synopsys Alameda County Science & Engineering Fair founding director Patti Carothers asked and answered “What do you get when you put 700+ grade 6-12 Alameda County science students in one place at one time? You get the next generation of scientists and engineers”! That is what happened on March 10-12<sup>th</sup> at the Alameda County fairgrounds in Pleasanton.

The **6<sup>th</sup> annual Synopsys Alameda County Science & Engineering Fair** sponsored by the Synopsys Outreach Foundation, Lawrence Livermore National Laboratory, Oracle, Chevron, Professional Engineers in California Government, Alameda County Water and Waste Water Agencies, Alameda County Office of Education, Galaxy Press and East Bay Gives welcomed both individual and team science projects ranging in research areas of Human Behavior to Robotics and Intelligent Machines. Judged by close to 200 professionals from universities, community colleges, professional laboratories and sponsoring agencies the following participants brought home awards qualifying them to move on to the California State Science Fair, National Broadcom Masters, the International I-SWEEEP and the Intel International Science and Engineering Fairs.

The high level of science and engineering research coming out of the **Synopsys Alameda County Science and Engineering Fair** is light years ahead of the traditional science fair you may be familiar with. Full results and photos of the 3 day event can be found on the science fair website <http://acsef.org>

**One of two Middle School Grand Award Winners** – Top prize for grades 6-8 were won by **Aryanash Shrivastava**, from Hopkins Junior High School student with an outstanding project using a microcontroller based device designed to monitor and give early emergency detection and alerts for the elderly by sending passively sending feedback to while monitor daily routine activities, e.g. sleep, medicine dose, bathroom visits, etc.

**The second Middle School Grand Award Winner** was **Aditya Indla** a student of Vimala Sampath at Challenger School, Ardenwood who engineered a smart air purifier hat can control any standard air filter based on the level of air pollution capable of reading density of particulate matter 2.5 microns. The microcontroller than compares the readout with EPA air quality standards and turns a relay on or off. It can be connected to any air filter.

**Middle School standouts also included Grand Award - Runner-Up Aditya Mangalamapalli** another student at Hopkins Junior High School in Fremont from Kathryn Stoia’s class who created a Smart Stick attachment for the blind which when attached to the cane senses obstacles located between the knee and foot range of area by sending out ultrasonic waves and sending back to the cane haptic feedback about distance using a vibration motor. Each of these middle school students will move on to both the state competition in April and national competition.

Additionally 49 middle school students advanced to the **national Broadcom Masters** competition. In June their projects along with the top middle school students from each Broadcom Masters affiliated science fair across the country will be reviewed. Out of approximately 3,000 projects, 300 will be named to semi-finalists and after another round of reviews these will be narrowed to the top 30 middle school student projects in the nation. They will be invited to Washington DC in September to compete for scholarship and other awards.

Not to be outdone the top 5 high school research projects include these outstanding student winners.

**High School Grand Award – Runner- Ups from** American High School students, **Rohan Arora and Venkat Krishnan** who stated in their abstract “The toughest challenge in cancer therapy is being able to specifically target cancer cells without harming healthy cells. After screening 38,000 small molecules we were successful at creating a SMDC (Small Molecule Drug Conjugate) which was able to specifically target the L858R mutant of epidermal growth factor receptor (EGFR) as a treatment for Non-Small Cell Lung Cancer”. Rohan and Venkat will be joining the group headed for California State Science Fair and then in early May will be headed for the I-SWEEEP competition which highlights projects such as renewable energy, sustainable development and medical breakthroughs.

Each of the following **high school Grand Award winners** will be moving on to both the California State Science Fair in April and then on to the Intel international science and engineering Fair in May where the best student researchers from over 70 countries will gather to share their projects with each other and compete for over 3 million dollars in scholarship and prize money.

Student of teacher Ling Kuie, **High School Grand Award winner Anthony Zhou** from Mission San Jose High School developed a non-tracking two stage concentrator using the simultaneous multi surface design method which basically solves the main issues with solar power – high cost of expensive tracking systems to remain efficient. He eliminated that burden and then through an intelligent concentrator design created a cheap yet efficient concentrator that can concentrate light from varying angles without tracking the sun.

**Jessika Baral** also a student from Mission San Jose High School is among the High School Grand Award winners. In her second year study Jessika created a fully functional reliable device with increased validation that allows doctors, in one minute, to directly use the results from algorithm and learn about the metastatic potential of a patient’s lung tumors at the cost of \$1 per analysis. The tool takes readings of Nuclear Factor (liB (Nfib) staining to small cell lung cancer (SCLC) stage. This personalized treatment will decrease metastases, save millions of lives and extend survival time by over 10 years.

Amador Valley High School & Prospect High School combined cross-county team of **Shawn Zhang and Sahil Hegde** sought to study the effects of supermassive black holes (SMBHs) on their host galaxies in relation to their inherent properties. Unique from previous studies, we used a novel, empirically-driven convolution methodology. By constructing the black hole mass function (BHMF) and comparing  $M_{\bullet}-\sigma$  and  $M_{\bullet}-M^*$  relations, we discovered excellent agreement with past observational influences. We also discovered excellent agreement with past observational inferences. We also found a stronger link between those properties than previously believed.

Another team from Amador Valley High School **Shiladitya Dutta, Parth Saxena, Rishik Reddy** worked to create an accurate, low-cost machine-learning algorithms to diagnose and monitor Parkinson's disease by detecting dysphonic features. Their successful goal of creating an efficient diagnostic and telemonitoring tool for Parkinson's disease through a mobile application - aimed at providing accessibility to everyone, including those who do not have access to proper medical facilities. The students noted "We built a mobile iOS application where users submit audio recordings vocalizing the vowel sound /a/, process this recording through our unique machine learning algorithm, and then display the results as a true positive indicator of Parkinson's affliction back to the user". Their teacher is Cliff Simms.

Granada High School in Livermore is very proud of Grand Award Winner **Erica Yang** a student of teacher Amanda Cleveland. Using research chemical methods Erica developed a novel flexible MoS<sub>2</sub> Biosensor to detect lower concentrated areas of biological molecules using an improved immunological assay technique that makes use of an enzyme bonded antibody or antigen. This new methodology can detect antibody-antigen concentrations that are about 10,000 times lower than current ELISA methods allowing a faster and more accurate diagnosis of several diseases.

Director Carothers notes " All 580+ projects presented at SACSEF were reviewed for innovation and creativity of their research question or design problem, a clear and focused purpose, well designed plan including variables, controls and data collection, analysis and interpretation of the collected data, and both verbal and graphic presentation showing an understanding of the results and conclusion. Check the website for future registration and application deadlines for the 2018 Alameda County science fair <http://acsef.org>