

Maryland MESA Middle School Team Places in National MESA Competition

A four-student team from **Lake Elkhorn** (formerly Cradlerock) **Middle School** won 2nd place at the MESA National Engineering Design Competition. The students competed and won against top-ranked student teams from other MESA states including Arizona, California, Colorado, New Mexico, Oregon, Washington and Utah. **Alyssa Anwar, Jeanine Flanigan, Jesse Ketchum, and Kendall Davis** built the winning wind energy device. The team was led by MESA advisor Shawn Gatz.

The team beat out 41 other middle school teams in Maryland for the honor of going on to the nationals, held at Microsoft's headquarters in Seattle, WA. The wind energy project teaches students design principles like torque and energy transfer, as well as how to think like environmental scientists. ■



Lake Elkhorn Middle wins 2nd Place in the MESA USA National Engineering Design Wind Energy Challenge Competition in Seattle, WA

2011 MESA Days



JHU/APL hosted the statewide Maryland MESA Day on May 9th, welcoming over 2,300 elementary, middle, and high school students from 10 Maryland school districts.

MESA coordinates six regional MD MESA Day Competitions to serve the thousands of MESA students that participate each year. MESA Days are the result of months of preparation and activities. During this event, MESA students are able to demonstrate and highlight the technical skills, abilities, and interests they developed over the year. Students design, build, and test projects demonstrating their knowledge of math, science and engineering concepts. MESA competitions include the following: effective communications, SCRATCH banner design, bridge-building, electric-powered cargo plane, and the wind energy challenge. Winners from each regional competition participate in the statewide MESA competition. MESA state winners compete in the MESA National Engineering Design Competition. ■

MESA Summer Programs Ignite Interest in STEM



Serving over 150 students, MESA offered several exciting summer enrichment programs this year, including Rocketry, Deep Space Robotics, Biomedical Summer Enrichment, and College Preparation.

The Rocketry program offered elementary students in Baltimore County, Baltimore City and Talbot County an opportunity to explore scientific, mathematical, and engineering concepts by constructing and launching various types of paper airplanes, hot air balloons, and solid fuel rockets. Students also visited the Air and Space Museum in Washington, DC as a part of the summer enrichment program.

The Jacaranda Center for Family and Youth Development, in collaboration with MD MESA, provided a two-week Robotics summer camp for middle and high school students in Howard County & Baltimore City. This hands-on collaborative camp immersed students in the exciting and popular world of robotics. Students worked in small teams to learn about topics such as gear ratios, locomotion, and energy as they constructed robots with the LEGO Mindstorm NXT Robotics kit.

The 2011 Biomedical Summer Enrichment Program - S2MS: Science Service, Medicine, and Mentoring provided a medical immersion experience for prospective high school students. Howard County and Baltimore City students learned about the various aspects of the medical profession and medical specialties, as well as the importance of cultural competence, service activities and professionalism.

The College Preparation Program (CPP) helped high school students prepare for college and encompassed a variety of activities including SAT preparation, college application guidance, financial aid, and college visits. The 14-week program is taught by JHU/APL engineers Will Gray and Karla Roncal. ■

DIRECTOR'S CORNER



MD MESA is entering its 35th year and the mission of developing a “STEM” pipeline is still going strong. One of our newest activities introduces students to the world of cyber security. According to a report by Governor Martin O’Malley found in the Maryland Department of Business & Economic Development, “cyber threats are one of the most serious economic and national security challenges we face as a nation. Cyber criminals use sophisticated tools to deny service and infiltrate malicious codes in information systems.” The workforce needs in science, technology, engineering and mathematics continue to grow while the shortage of manpower remains consistent. It is important to prepare students to meet these demands. With this in mind

MD MESA will continue to support and expose our students to the opportunities that exist in the STEM workforce and the security needs of our nation.

Paula H. Shelton

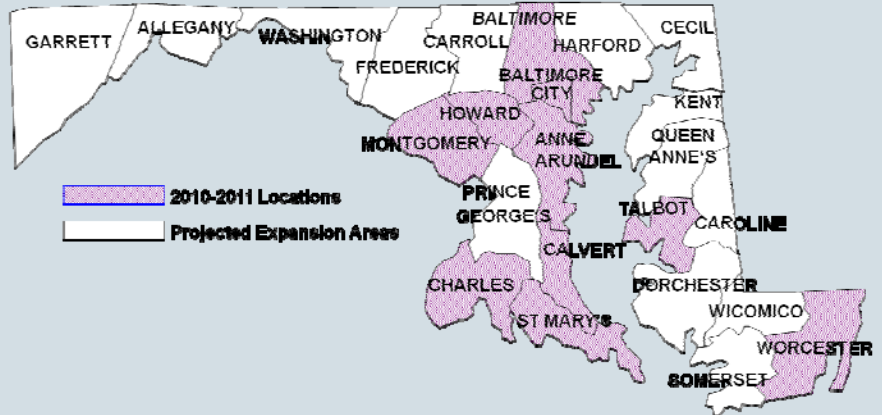
Paula H. Shelton, Executive Director

MD MESA *by the numbers*

2010-2011 MESA Program Enrollement

School Districts Served: 10

- Anne Arundel County Public Schools
- Baltimore City Public Schools
- Baltimore County Public Schools
- Calvert County Public Schools
- Charles County Public Schools
- Howard County Public Schools
- Montgomery County Public Schools
- St. Mary's County Public Schools
- Talbot County Public Schools
- Worcester County Public Schools



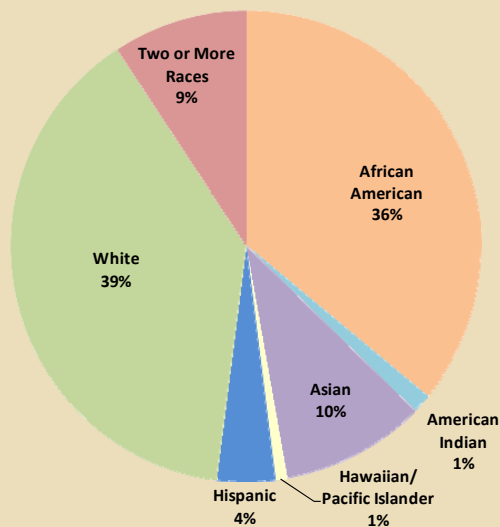
Schools Served: 135

- Elementary - 60
- Middle - 42
- High - 33

Total Number of Students Served: 2,449

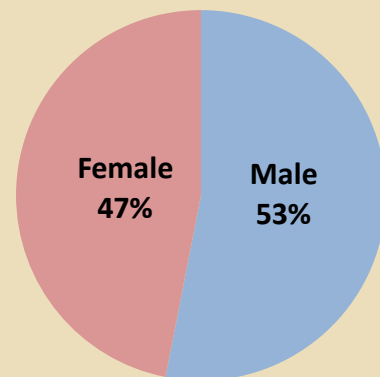
- Elementary - 1113
- Middle - 859
- High - 477

2010-2011 MESA Students by Ethnicity



Percentage of minority students participating in MD MESA: **61%**

2010-2011 MESA Students by Gender



Number of female students who participated in MD MESA: **1149**

MD MESA 2010-2011 Seniors

Senior Stats

Average SAT Math Score— 582

Average Cumulative GPA— 3.4

Average Years in MESA— 3

Major Choices

Percentage of 2010-2011 graduating seniors who expect to major in science, engineering, or math related career fields: **64%**

Engineering	43%	Biotechnology	2%
Undecided	23%	Communications	2%
Biology	7%	Education	2%
Business	3%	Environmental Science	2%
Computer Science	3%	Law	2%
Animal Science	3%	Mathematics	2%
Accounting/Finance	4%	Psychology	2%

*All values were rounded to nearest whole number.

Selected Universities and Colleges

- Baltimore City Community College
- Brown University
- Community College of Baltimore County
- College of Notre Dame
- College of Southern Maryland
- Cornell University
- Drexel University
- Elizabethtown College
- Howard County Community College
- Massachusetts Institute of Technology
- Morgan State University
- North Carolina State University
- Penn State
- Salisbury University
- The College of William and Mary
- University of Delaware
- University of MD, Baltimore County
- University of MD, College Park
- University of MD, Eastern Shore
- University of Michigan, Ann Arbor
- University of Virginia
- United State Naval Academy
- Virginia Tech
- Virginia Union University

APL Engineers Develop MESA Cyber Challenges



For the past year, a team of APL professional engineers have been developing cyber based MESA challenges that address digital literacy and core technologies such as secure communication and computer security. Team members include Jeffery Chavis, Alison Carr, Alison Ebaugh, Shannon Ferrucci, Tao Jen, Michael Hanna, Paul Velez, Bart Paulhamus, Dwight Carr, Eric Farmer, Bruce Wright, Steven Hamer, and Kevin Chiou. Three age specific challenges were developed for elementary, middle, and high school levels. Each challenge builds on the previous one in depth and technical rigor.

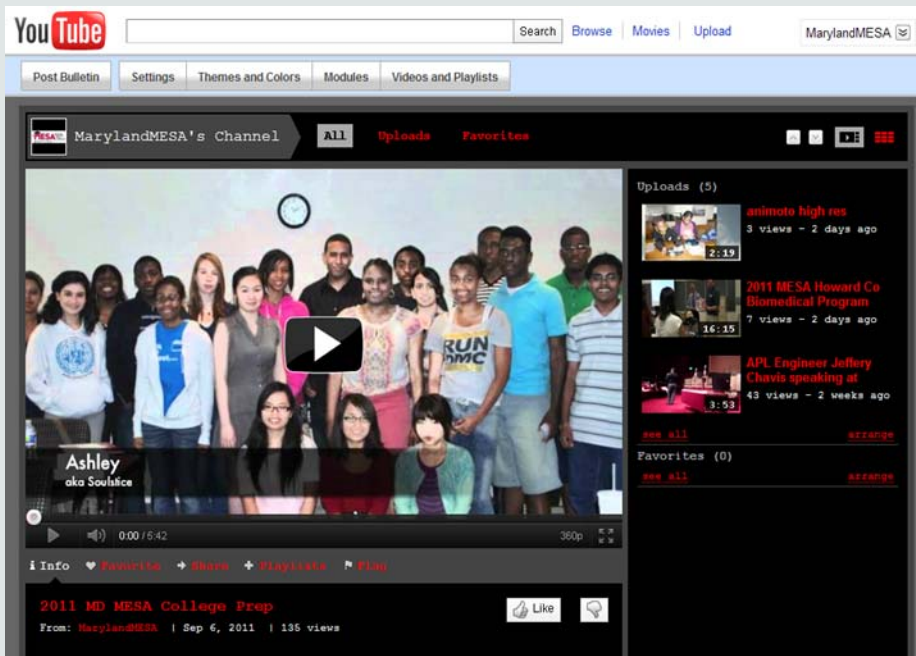
As students progress through the cyber challenges, they learn about programming/computational logic, coding-decoding/cryptography, and careers in information assurance/cyber security. By high school, MESA students who have competed in cyber challenges will have the skill set to successfully complete an internship at APL or similar company.

The elementary and middle school challenges leverage existing open source packages (Scratch and Alice) that teach programming to students. For the high school challenge, the team developed a software package using Python programming language as well as a game based software program that reinforces the concepts of computer programming, automated path finding algorithms for maze navigation, and cipher fundamentals related to encryption and decryption.

The team continues to work to address logistics related to implementing the challenges and will provide training opportunities to MESA school coordinators. This all will culminate with the regional and statewide MESA competitions held in May where approximately 3000 students will compete for the winning title. ■

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STAY CONNECTED TO MD MESA



Facebook—**Stay connected** with Maryland MESA on the MESA Facebook page. “Like” us at *Maryland MESA*.



YouTube—**Go to** youtube.com/user/MarylandMESA to watch MESA videos about students, programs and more on our YouTube channel.



Twitter—**Keep up** with latest news about the MESA program by following us on Twitter @ *MarylandMESA*

Maryland MESA recognizes **Audrey Highsmith**, **Norma Boyd**, and **Dr. Harold Williams** for their service to the MESA program and students.



Audrey Highsmith

Baltimore County Regional Coordinator, **Audrey Highsmith** began her work with the MESA program in 1993 after retiring from Baltimore City Public Schools. Her commitment to the MESA program and students over the last 18 years has been recognized by the Baltimore County School

Board and the MESA Central Office. Highsmith's greatest reward from working with MESA is learning how the program has shaped the lives of former students.

She believes MESA provides students with the opportunity to explore the many opportunities in the fields of mathematics, science, engineering, and technology. During her work with the program, she has seen how MESA positively impacts students by developing problem solving skills and improving grades in mathematics and science. She also believes the program fosters teamwork and provides educational enrichment opportunities that encourage students to pursue careers in STEM.

When asked to reflect on the most memorable or enjoyable experience with the MESA program over the years, Highsmith describes the success stories of MESA alumni. Highsmith keeps in touch with many MESA alumni who have gone on to pursue rewarding careers in engineering and science. One former MESA student is currently a teacher in Baltimore County Public Schools and serves as MESA school coordinator, preparing her students for successful opportunities in STEM.

Highsmith is very active in her church, singing in the choir and volunteering with ministry outreach programs. She also serves in the national and local chapters of the Bennett College alumni association and the Alpha Kappa Alpha Sorority. ■



Dr. Harold Williams

"MESA is important and necessary because it helps to alleviate the shortage of STEM professionals by steering students to pursue careers in these areas of work. In addition, it seeks with a sense of urgency, to achieve the Nation's goal of increasing the number of scientific and technical professionals," states **Dr. Harold Williams** when describing the signifi-

cance of MESA. Williams, who has been with the MESA program since September of 1997, serves as the Howard County MESA Regional Coordinator.

Over the last 14 years, Dr. Williams has dedicated his time to developing the Howard County MESA program and has witnessed the impact of MESA in supporting students to pursue STEM careers. According to Williams, MESA provides successful STEM experiences for Howard County students through educational enrichment programs and exposes students to opportunities and advantages of STEM careers. Many Howard County MESA alumni "are successfully employed in a variety of jobs and others are candidates for terminal degrees."

A highlight for Williams is watching students prevail in tough competitions. Some of his most memorable experiences with MESA include watching students successfully compete in Try-Mathalons and MESA USA competitions. This year, one of William's regional middle schools, Lake Elkhorn Middle School, won 2nd place at the MESA National Engineering Design Competition.

Williams has received numerous awards and recognitions including the Walter Reed Army Institute of Research Director's Award; Howard County Human Rights Commission Distinguished Service Award; American Chemical Society, Metro Washington, D.C. Award for Coordinator of the Year; Alpha Kappa Alpha Sorority Meritorious Service Award; and MESA Awards for Excellence and Dedication. When he is not dedicating his time to MESA, Williams spends time mentoring, gardening and bowling. ■



Norma Boyd

Norma Boyd, often referred to as the “MESA Lady,” has served multiple roles within the MD MESA program. She began her journey with the program in 1986 as a middle school MESA School Coordinator in Baltimore City Public Schools. In 1990, Boyd became the Statewide Coordinator in the MESA Central Office and in 1996 she went on to serve as the Deputy Director of MD MESA. She has been in her current role as the Baltimore City Regional Coordinator since 2002.

When asked why MESA is important, Boyd refers to President Obama’s “Educate to Innovate” campaign that strives to increase the number of students pursuing STEM careers and the United States Census Bureau projection that about 50 percent of the U.S. population will be African-American, Hispanic, or Asian by 2050. According to Boyd, MD MESA has always understood the importance of developing the interest and skills of K-12 students in STEM careers, especially females and minorities who are traditionally underrepresented in these fields. “Since its inception in 1976, MD MESA continues to be a viable program that is about the students and their needs.”

Boyd believes that MESA offers rewarding experiences for Baltimore City students and parents. She explains “MESA [shows] students that it is ‘cool’ to be smart and that they can achieve success in STEM careers.” The program helps students and parents understand the need for STEM education while developing students’ skills and confidence in STEM. MESA accomplishes this by offering students opportunities to engage in hands-on STEM projects, compete professionally, visit college campuses (such as Morgan State University), and interact with professionals in the industry.

Boyd struggles to select just one memorable experience with the MESA program, indicating that she has had so many enjoyable experiences in her time with the program. A few of the memories she described included observing a former MESA student receive an award for most promising engineer at the Black Engineer of the Year Awards Conference, attending the graduation ceremony of a MESA alumnus who received a graduate degree in engineering from JHU, and meeting former President George Bush when MD MESA was awarded the National Science Foundation Presidential Award for Excellence in Science Mathematics And Engineering Mentoring (PAESMEM) in 2001.

Boyd has also received various commendations from schools and educational groups promoting STEM activities as well as a degree of Doctor of Humane Letters (DHL) from Eastern Seminary in Lynchburg, VA. When she is not working with the MESA program, she enjoys reading and computer activities as well as serving as a Deacon, Trustee, and Co-Coordinator of the Women's Ministry at Sharon Baptist Church in Baltimore, MD. She is also a member of both the Maryland and Baltimore City Retired Teachers Associations. She is determined to learn how to swim, having taken over seven beginner classes to improve her swimming skills.



Attention: Howard County MESA High School Students

The Johns Hopkins University Applied Physics Laboratory (JHU/APL) has partnered with Howard County high schools to support and provide mentorship opportunities for students in the areas of mathematics, science, engineering, computer science and technology. APL’s High School Mentorship Program places qualified, who are students recommended by their schools, with an APL assigned mentor. The students come to APL for an average of 5-10 hours per week during the academic school year to work on research projects. Examples of projects include the unmanned aerial system and using programming languages such as MATLAB and Python.

To get involved contact your Gifted and Talented (GT) Resource Teacher or High School MESA Coordinator!



Terrell Long, Jr.
Sophomore majoring in
Electrical Engineering
Morgan State University

Alumni Q & A

Q: When were you involved in MESA, and how did you hear about it?

A: In the 4th grade at Windy Hill Elementary, my guidance counselor had conducted an interest meeting for the minority students in the 4th and 5th grade. He explained what MESA was

and what we'd be doing. From there, I was interested and began to stay after school every Tuesday and Thursday to work on STEM projects.

Q: What does MESA mean to you?

A: MESA, to me, was the physical application to all of the things we were learning in school. I enjoyed math and learning about science, but I still would wonder 'What is the point?' From playing sports, I loved competition so MESA allowed me to compete against other schools, encouraged me to learn more about math and science, and reminded me that what we learn now will be used in the future.

Q: How did your participation in the MESA program impact you?

A: Participating in the MESA program forced me to be more creative and resourceful. The program creates 'junior engineers' because kids are using cheap materials and a lot of theory to generate a product that is very efficient and effective. The MESA program embedded this mentality.

Q: Was there something the MESA program offered that particularly helped you with your classes or major?

A: The MESA program did help me with my major now. Under the spirit of competition and knowing you had to be more knowledgeable and efficient than the next person, I got a head start on learning about physics equations we learn in depth now. It also helped me realize the competition I was actually up against in the engineering field. It encourages me to learn as much as I can so I can stack up against the rest of the engineers.

Q: What is your major and when will you graduate?

A: I'm finishing my sophomore year pursuing a BS degree in Electrical Engineering. I will be graduating in 2013.

Q: What advice would you give students wanting to enter in math, science or engineering fields?

A: I would advise students entering math, science, and engineering fields to be prepared to work hard. Of course, these fields are not easy but they are possible. In high school, I never really studied and did pretty well. In college, however, I faced reality and had to put in long hours of studying in order to do well. Overall, just don't be discouraged. Keep working at it. And working with friends makes things a lot easier.

Q: Were you the first person in your family to go to college? If so, how has that experience affected you?

A: My mother had gone to a community college for an Associate's degree. But in 2009, two of my cousins and I were the first to attend a university. We were once the babies of the family, but now they look up to us and support us.

Q: What are your future career, professional development and/or educational plans.

A: As far as future plans, I don't have any one specific path. My major includes both electrical and computer engineering classes so I'm learning a wide variety of skills that will hopefully lead to a variety of different jobs to choose from. I plan to pinpoint what I really want to do after a few more internships.

2012 MESA CALENDAR

January	<p>5 - Regional Coordinators Meeting</p>
February	<p>2 - Regional Coordinators Meeting 24 - 1st and 2nd Quarter Grades Due in MESA Database</p>
March	<p>1 - Regional Coordinators Meeting 8-11 - 2012 Innovate STEM Conference at Morgan State University 30 - MESA Scholarship Applications Due 31 - Nominations for Teacher & Student of the Year Due 28 - April 2 - 2012 Society of Black Engineers (NSBE) Conference in Pittsburgh, PA 29 - Charles County Elementary Regional MESA Day 30 - Charles County Middle & High MESA Day</p>
April	<p>11 - Howard/Anne Arundel/Montgomery/Carroll Counties Regional MESA Day 12 - Baltimore City & Baltimore County Regional MESA Day 19 - Calvert County Elementary Regional MESA Day 20 - Calvert County Middle & High Regional MESA Day 27 - Third Quarter Grades Due 26 - USA Science & Engineering Festival – Washington, DC</p>
May	<p>7- Statewide MESA Day held at the JHU/APL's Kossiakoff Center 25 - Senior Summary Data Due in MESA Database</p>
June	<p>2 - Regional Coordinators Meeting 23-26 - MESA USA Competitions in Seattle, WA</p>

THINKQUEST

Up to 2,000 MESA students in four states will learn a collaborative online learning model provided by the Oracle Education Foundation. The ThinkQuest platform allows students to compete in real world, problem-solving projects.

The foundation will train more than 300 teachers on ThinkQuest and give students the opportunity to enter the ThinkQuest International Competition 2011. MESA students are encouraged to showcase their MESA Day engineering projects through ThinkQuest to solve real world issues such as renewable energy. MESA students will also have the opportunity to compete amongst each other as a MESA Day activity.

Students from California, Colorado, Maryland, and Washington will participate.

MESA Expands to Prince George’s and Carroll Counties

Prince George’s and Carroll County Public School Systems implemented the MESA program into local schools and began serving students this Fall. MESA will now serve 120 middle school students in Carroll County and 180 middle and high school students in Prince George’s County.

Karen Ganjon, Director of Minority Achievement and Intervention Programs, is the MESA Regional Coordinator of Carroll County and Renee Henderson, Instructional Technology Specialist, is the MESA Regional Coordinator from Prince George’s County. MD MESA is excited to expand these two counties in order to prepare students for stimulating opportunities in STEM.

STUDENT SPOTLIGHT

Maryland MESA highlights three outstanding MESA students – **Christopher Clasing**, **Shrey Gupta**, and **Kane Wade**.



Christopher Clasing

“I was honored to be recognized as an *Outstanding MESA Student*. I feel that this is a symbol of my commitment and future success as a member of the engineering field,” states **Clasing**. Clasing was the recipient of a \$1000 Baltimore County MESA Scholarship given to selected students residing in Baltimore County and pursuing careers in STEM. He has participated in MESA for the past two years and enjoyed being able to come up with his own designs of the cargo and wood bridge competitions.

When asked how participating in MESA has been beneficial, Clasing says, “The MESA program has taught me the importance of time management and teamwork. These two skills are necessary if you want to go above and beyond the level of success.” He advises future MESA students to participate in all of the MESA competitions that you possibly can. “They are all a lot of fun, and at the same time you learn a lot of valuable information about engineering.”

Clasing is enrolled in the Civil engineering program at the University of Delaware. After college, he plans to pursue a professional engineering (PE) certification in civil engineering and eventually open his own civil engineering firm.



Shrey Gupta

“It means a great deal for me since I am just one of the few out of thousands of students. I am really honored by this achievement,” shares **Gupta**, who also was a recipient of the Baltimore County MESA Scholarship.

Gupta has participated in MESA for three years and his favorite memories with the program include participating in MESA competitions. Gupta explains that MESA has helped him to become a better problem-solver and he advises future MESA students to stay persistent and “never give up.”

Gupta attends Cornell University and plans to major in engineering or computer science.



Kane Wade

Wade, who participated in MESA in middle and high school, was the recipient of the Chesapeake Bay Roost Scholarship. Since 1990, the Chesapeake Bay Roost, the mid-Atlantic chapter of the Association of the Old Crows, has provided financial assistance to deserving MD MESA high school graduates pursuing careers in electrical engineering, physics, and related fields.

Wade states, “It means a lot to me to be recognized as an outstanding MESA student...it seems like the culmination of all my work in MESA has led up to this moment.” Wade gives thanks to his parents and teachers for supporting and aiding him during his time in the MESA program. He also grateful “to all of the [MESA] teams [he] has had the pleasure of being a part of for coming together with the single goal in mind to produce the best possible solution to the problem possible: that is what the program is all about, and that is indeed what it means to be an outstanding MESA student.”

Wade attends University of Maryland majoring in Aerospace Engineering. He hopes to one day work on experimental aircraft design. He advises current and future MESA students “to read the rules meticulously, and be sure to pick out all the small details. Pay extra attention to things like weight specifications and exactly how the tests are scored, a quick skim and you may miss a few important details.”

Wade enjoyed participating in MESA because it offered him an opportunity to work as a team with a group of like-minded individuals and participate in the competition that ensues from the project. “It’s a chance you get to take all those facts you’ve learned from your different science and math classes and put them together into a single, practical entity - basically you’re taking the knowledge you’ve happened upon in your studies and your research and you’re putting it together in application, applying the information is just as important as knowing it. Aside from that, I’ve also benefited from friends I’ve made over the course of my participation and I’ve received a generous \$1000 scholarship to aid me in paying for my college expenses.” ■

Are you a Maryland MESA Alum?

Did the Maryland MESA program have an impact on your academic, professional, or personal goals? We are interested in hearing from you and what you have been doing since you left MD MESA. We would also like to highlight alumni (with your permission, of course!) in future publications.

**Please contact us at
Maryland.MESA@jhuapl.edu
to share your story.**

We look forward to reconnecting!

- Maryland MESA Central Office



To learn more about the MD MESA program use the QR code below to access the MD MESA website.



2011-2012 School Districts

- Anne Arundel County Public Schools
- Baltimore City Public Schools
- Baltimore County Public Schools
- Calvert County Public Schools
- Carroll County Public Schools
- Charles County Public Schools
- Howard County Public Schools
- Montgomery County Public Schools
- Prince George's County Public Schools
- Talbot County Public Schools

Universities/Colleges

- Capitol College
- Howard Community College
- Montgomery College
- Morgan State University
- University of Maryland Baltimore County
- University of Rochester

Business/Industry/Foundations

- Alliant Techsystems (ATK)
- Black & Decker Corporation
- Career Communications Group
- Maryland Business Roundtable for Education
- Oracle Corporation
- Oracle ThinkQuest

Communities/Government/ Professional Organizations

- American Institute of Aeronautics and Astronauts
- American Water Works Association, Chesapeake Section
- Baltimore Museum of Industry
- Biomedical Engineering Society
- Chesapeake Bay Roost, Association of Old Crows
- Jacaranda Center for Family and Youth Development
- Johns Hopkins University Applied Physics Laboratory
- Maryland Science Center
- Maryland Space Grant Consortium
- Maryland State Department of Education
- NASA
- National Aquarium in Baltimore
- National Defense Education Program
- National Society of Black Engineers
- Naval Surface Warfare Center
- Office of Naval Research
- United Way of Central Maryland

YOUR SUPPORT MATTERS

Maryland Mathematics, Engineering, Science Achievement (MESA) is a youth program that depends on support from businesses, sponsor organizations and volunteers to be successful in meeting its objectives.

Over the years, Maryland MESA has faced challenging demands and new opportunities. In order to keep up with the demands and take advantage of the opportunities, particularly in these economic times, MESA needs an ongoing commitment of resources and support. Here are some of the ways you can be a part of this rewarding youth program.

- Sponsor Maryland MESA events, activities, or trips
- Sponsor regional and statewide MESA Days, prizes and awards
- Sponsor a MESA competition and the research involved
- Volunteer at one of the MESA events
- Serve as a tutor or mentor to students in the program
- Publicly endorse the program and its activities
- Host site visits or competitions
- Present or conduct a workshop at the annual Teachers' Workshop, STEM Fair, or at a participating school
- Contribute resources such as supplies, technical expertise, or time

By giving to Maryland MESA, you support America's future scientists and engineers; encourage a diverse population of youth to become interested in math, science, engineering, and technology where they are often underrepresented; aid in addressing skill gaps in these fields; and provide activities and events which contribute to and enhance our communities.

For additional information about the MESA program and its activities, contact the Maryland MESA Central Office or visit our website.



Maryland MESA Central Office

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