



MAST e-Rapper Fall 2015

President's Message

I hope this message finds you relaxed, recharged, and ready to take on the new school year! I feel privileged and honored to represent such a dedicated group of educators as president of MAST this year. While I've been a Board member for the past six years, this role brings with it new responsibilities and exciting opportunities to represent some of the best educators in Maryland.

Science education is at a critical turning point with the adoption of the Next Generation Science Standards. It is my goal as President to make MAST your go-to resource for NGSS implementation, collaboration, and professional development. That is why I'm excited to share the news of our fall conference on October 16! This one day event promises to be the largest, most dynamic professional development opportunity to can attend all year.

This year the conference will be held from 7-4 on October 16 at the Johns Hopkins University Applied Physics Laboratory Kossiakoff Conference & Education Center. We are happy to announce that we have partnered again with Technology & Engineering Educators Association of Maryland (TEEAM) to bring you over 50 quality STEM sessions presented by top Maryland science educators, vendor displays and a keynote speaker you will surely not forget! Back by popular demand our keynote speaker is Retired Colonel Geoffrey Ling, MD, Ph.D. Dr. Ling was featured on two [60 Minutes](#) segments for his research work on upper-extremity prostheses.

Dr. Ling's portfolio includes neutrally controlled advanced prosthesis, preventing explosive blast brain injury, and pre-symptomatic disease detection. He will update us on the progress of his work developing a prosthetic arm that is controlled directly by a patient's brain. To do this and more, DARPA depends on today's teachers to prepare tomorrow's scientists and engineers. Beyond the traditional biology, chemistry, physics, and mathematics areas, today's educators will now need exposure to biomedical engineering, material science, robotics, neuroscience, system biology, nanotechnology, informatics, and more.

I look forward to meeting, and working, with many of you at the conference this year. Please consider sharing this information with your colleagues. For more details on the conference, keynote speaker, and vendors, please visit our website at www.emast.org. Like us on Facebook, Maryland Association of Science Teachers!

Best wishes for a wonderful 2015-2016!

Kimberly Saltsburg
 MAST President
 Science teacher
 Westminster High School

MAST MISSION STATEMENT

The Maryland Association of Science Teachers (MAST), a local affiliate of the National Science Teachers Association, is a professional, non-profit organization dedicated to science education in the state of Maryland. It strives to make science accessible and enjoyable to the citizens of Maryland by promoting and supporting career education in science and technology, instruction for general science literacy, and science outreach programs in all geographic regions of Maryland.

MAST PHILOSOPHY AND GOALS

The Maryland Association of Science Teachers, dedicated to scientific literacy, cares deeply about its mission and members engaged in science education. Its members believe that science is a human endeavor employing careful observation and reasoning necessary for professional and personal problem solving and decision making in our increasingly technological society. To support this MAST promotes science research, applied science, and science education as professional careers. It also understands that science literacy opens doors for all Marylanders to pursue alternative technology careers, and to understand and enjoy the world they live in.

To these ends, MAST has the following goals:

- 1) Provide science educators at all academic levels in the state of Maryland with the opportunities for professional development through the presentation and exchange of knowledge, strategies, and resources;
- 2) acknowledge the accomplishments of exemplary science teachers, students, and administrators;
- 3) encourage and utilize partnerships with business, professional organizations, and science resource centers;
- 4) broaden the base of support in MAST through increased membership throughout the five designated regions;
- 5) provide financial support for outstanding science-related educational programs

Annual Fall STEM Conference

Presented by
 Maryland Association of Science Teachers
 Technology and Engineering Educators Association of Maryland

JOHNS HOPKINS UNIVERSITY - APPLIED PHYSICS LAB
Kossiakoff Conference and Education Center
 11100 Johns Hopkins Road, Laurel, MD

Friday, October 16, 2015

Early Bird registration ends Friday, October 9!

Schedule

7:00 am| Registration and
 Breakfast
 8:00 am| Concurrent Sessions
 9:00 am| General Session
 10:15 am| Concurrent Sessions
 11:15 am| At the Movies
 12:00 pm| Lunch and Vendor
 Time
 1:30 pm| Concurrent Sessions
 2:30 pm| Concurrent Sessions
 3:30 pm| Wrap Up and Raffles

Sponsors

Thank you to the following sponsors for supporting the 2015 Annual STEM Conference to date!

- Biozone
- National Geographic - Cengage Learning
- Delta Education/FOSS
- Everfi
- Stevenson University
- Goodheart-Wilcox Publisher
- Houghton Mifflin Harcourt
- Howard Hughes Medical Institute
- Lab Aids
- Diversified Educational Systems
- It's about Time
- MdBio Foundation
- Maryland Department of Energy
- McGraw Hill Education
- National Academy of Sciences
- Pearson
- University of Maryland Eastern Shore
- Frey Scientific/CPO Science
- National Science Teachers Association
- Towson University
- Vernier Software & Technology
- Start Engineering

Keynote Speaker – Back by Popular Demand from last year ... "He was worth the price of admission alone"



Applying Science and Engineering to Restore Patients

Ret. Colonel Geoffrey Ling, MD, Ph.D.
Deputy Director, Defense Sciences Office for Defense Advanced
Research Projects Agency (DARPA)
Arlington, VA
Friday, October 16, 2015

The Defense Advanced Research Projects Agency (DARPA) continues its mission to conduct scientific research that challenges the limits of science and engineering as well as the limits of imagination. Dr. Ling was featured on two [60 Minutes](#) segments for his research work on upper-extremity prostheses. Dr. Ling's portfolio includes neutrally controlled advanced prosthesis, preventing explosive blast brain injury, and pre-symptomatic disease detection. He will update us on the progress of his work developing a prosthetic arm that is controlled directly by a patient's brain. To do this and more, DARPA depends on today's teachers to prepare tomorrow's scientists and engineers. Beyond the traditional biology, chemistry, physics, and mathematics areas, today's educators will now need exposure to biomedical engineering, material science, robotics, neuroscience, system biology, nanotechnology, informatics, and more.

ABOUT THE SPEAKER

Retired Col. Geoffrey Ling, M.D., Ph.D., is a medical doctor who retired from the [United States Army](#) as a Colonel, and is currently the Director of the [Defense Advanced Research Projects Agency](#) (DARPA) Biological Technologies Office. He is considered to be the "US Army's premier subject matter expert on traumatic brain injury (TBI)", and was for years the only neuro-intensive care specialist in the US military.

Prominent in his research portfolio are neuroscience, specifically, Preventing Violent Explosive Neuro Trauma (PREVENT), the prevention of [traumatic brain injury](#), and development of responsive, brain-controlled, artificial arms. He also serves as the Deputy Director of the Defense Sciences Office. Ling is a recipient of the Humanitarian Award from the Brain Mapping Foundation.

Conference Strands:

The Three Dimensions of the Next Generation Science Standards (NGSS): the Practices, the Crosscutting Concepts and the Disciplinary Core Ideas The Next Generation Science Standards are composed of three dimensions that have been developed as a framework for K-12 science education in order to fulfill the vision of what it means for students to be proficient in science. The science and engineering practices are the skills with which questions are answered and problems are solved. The crosscutting ideas are a means by which to coherently link different domains of science and to interrelate knowledge from multiple fields of science. The disciplinary core ideas focus on the content to be taught and what is to be assessed. It is these behaviors and skills, the development of a scientifically-based view of the world, and the ability to apply and extend knowledge that students will need to take with them into college and careers. Workshops and sessions in this strand will emphasize the practices, crosscutting concepts and disciplinary core ideas in science and engineering.

Engineering and Technology Education: Engineering Practices to solve Real-World Problems

Engineering is a systematic practice of design to find solutions to real-world problems. Technologies results when engineers apply their understanding of the natural world and of human behavior to design ways to satisfy human needs and wants. Workshops and sessions for this conference strand will engage participants in engineering and technology education activities for classrooms at all levels.

Computer Science: Simulations, Modeling, Big Data, Computational Thinking Computer science drives innovation in the US economy and society. The NGSS science standards include standards related to computer simulation used to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interaction within and between systems relevant to the problem. (NGSS HS-ETS-1-4). New courses in computer science focus on the computational tools for statistical analysis to analyze, represent, and model data. Students learn to work with abstractions and algorithms, work with large data sets, and understand the global impacts of computing that affect different populations. Workshops and sessions will provide the opportunity to educators, business partners and government to share the significant impact of computer science in our world today.

Greening PreK-12 Education: Environmental Literacy for All Students Our environment is changing. Science and engineering educators are powerful agents for helping our students understand and respond to these changes. In this increasingly interconnected global community, all members must understand the implication of our choices and the impact we can have globally and locally. This strand will increase participants' knowledge of effective practices to help students understand, appreciate, protect, and restore our natural environment.

Career Readiness: Establishing Workforce Connections Developing purposeful partnerships with business and industry is essential for fostering career readiness in students. These partnerships can help draw applied connections between course content and the work performed by business and industry professionals. This strand will focus on exposing educators to vetted resources provided by business and industry to foster career readiness in science, technology, engineering, and mathematics (STEM) fields; identifying how to form and maintain partnerships with business and industry; and assessing what makes an effective partnership.

Opportunities to attend!

Of special interest for Earth Science teachers:

National Conference of the Geological Society of America is in Baltimore Oct 31 to Nov 4, 2015. Information:

<http://community.geosociety.org/gsa2015/home>

Registration for geology professionals is hundreds of dollars, but K12 teacher registration for the entire meeting is just \$55 until Sep 28, changing to \$65 after that.

Events of note:

Many geology field trips before and after the conference, especially on Saturday, Oct 31.

Many short courses on a variety of subjects, including several on education subjects, on Oct 31.

Sessions on education on Sunday Nov 1 thru Wednesday Nov 4 - check out the complete list of sessions on the website Special speakers such as James Balog and others.

Community Open House on Saturday, Oct. 31, 9 a.m. to 1 p.m., to engage community youth in hands-on scientific discovery. This is being developed

- watch the website for more information.

It's a great opportunity to have this meeting in our backyard, so don't miss it!

For Immediate Release**BREAKTHROUGH PRIZE AND KHAN ACADEMY ANNOUNCE*****BREAKTHROUGH JUNIOR CHALLENGE FOR*****HIGH SCHOOL STUDENTS**

\$400,000 in educational prizes to be awarded for a video bringing scientific and mathematical ideas to life

Video submissions accepted through October 7, 2015

SEPTEMBER 14, 2015 (San Francisco) – The Breakthrough Prize and Khan Academy are joining forces to launch the *Breakthrough Junior Challenge*, an annual, global competition for high school science and math students to inspire creative thinking about fundamental concepts in the natural sciences and mathematics.

"This project is about unleashing young people's capacity for fresh thinking and inspiring a new generation of scientists. We want to encourage students from around the world to share complex ideas with their peers," said Breakthrough Prize co-founder Dr. Priscilla Chan.

Students ages 13 -to-18 from countries across the globe are invited to create original videos (up to 10 minutes in length) that bring to life a concept or theory in the life sciences, physics or mathematics. The submissions will be judged on the student's ability to communicate complex scientific ideas in the most engaging, illuminating, and imaginative ways. The deadline for submissions is October 7, 2015.

One winner will be recognized and will be awarded a \$250,000 educational prize. The science teacher who inspired the winning student will win \$50,000. The winner's school will also receive a state-of-the art science lab (valued at \$100,000).

The *Breakthrough Junior Challenge* winner will also be invited to the Breakthrough Prize awards ceremony in Silicon Valley, where he or she will get to meet with the giants of science, technology, media and the arts. The winning student and his or her teacher will be announced during the live, nationally televised show, broadcast in the US by *National Geographic* Channel on Sunday, November 8 at 7.00pm PT, 10.00pm ET, and rebroadcast globally via *National Geographic* and the *Fox Cable Networks*.

"Breakthroughs in science and math often start with a new way of seeing things. The goal of this prize is to inspire young people to explain big ideas in math and science in new and novel ways, possibly opening all of our minds to the mysteries of the universe and leading to the breakthroughs of the future!" said Khan Academy founder Salman Khan.

In addition to creating and producing their own video entries, students will have the opportunity to participate in peer-to-peer scoring of fellow students' submissions. The winning video submission will be reviewed by Breakthrough Prize laureates and other leaders in science, technology and education from Khan Academy.

"I love the way that the *Breakthrough Junior Challenge* gives young people worldwide a creative, scientific mission, asking them to share their understanding, research and vision with others. Who better to explain and illuminate difficult ideas and concepts to young people than their peers? I'm very honored to join the judging panel," said *Breakthrough Junior Challenge* judge, author and educator Lucy Hawking.

Breakthrough Junior Challenge is a global initiative to develop and demonstrate young people's knowledge of science and scientific principles; generate excitement in these fields; support STEM career choices; and engage the imagination and interest of the public-at-large in key concepts of fundamental science. *Breakthrough Junior Challenge* is funded by Mark Zuckerberg and Priscilla Chan, and Yuri and Julia Milner, through the Breakthrough Prize Foundation, based on a grant from Mark Zuckerberg's fund at the Silicon Valley Community Foundation and a grant from Milner Global Foundation.

The Breakthrough Prize

Founded in 2012 by Sergey Brin and Anne Wojcicki, Jack Ma and Cathy Zhang, Yuri and Julia

Milner, Mark Zuckerberg and Priscilla Chan, the Breakthrough Prize is an annual award honoring outstanding achievements in life sciences, physics and mathematics. The prize aims to celebrate scientists and generate excitement about the pursuit of science as a career. Laureates of each prize are chosen by the respective Selection Committee comprised of previous recipients of the prize. In November 2014, two of its founders, Yuri Milner and Mark Zuckerberg, announced the New Horizons in Mathematics Prize for up-and-coming mathematicians, to run alongside the existing New Horizons in Physics Prize.

For more information on the Breakthrough Prizes: www.breakthroughprize.org.

Khan Academy

Khan Academy is a 501(c)3 nonprofit with a mission to change education for the better by providing a free, world-class education for anyone, anywhere. We believe that students of all ages should have free, unlimited access to the best educational content, and that they should be able to consume and master this content at their own pace. In addition, we believe that there are incredible opportunities to use intelligent software development, deep data analytics, and intuitive user interfaces to more effectively surface and present these educational resources to students and teachers around the world. Our library of content covers kindergarten to early college math, science topics such as biology, chemistry, and physics, and reaches into humanities with tutorials on economics, finance, music, philosophy, and art history. We have over 26 million registered students and to date, we have delivered over 580 million lessons and 3.8 billion exercise problems.

For further information, visit www.khanacademy.org.

Partners

The Breakthrough Prize Lab for the winning student's school is designed by and in partnership with Cold Spring Harbor Laboratory (CSHL). CSHL has shaped contemporary biomedical research and education and is home to more than 600 researchers and technicians. The Laboratory's education arm also includes an academic publishing house, a graduate school and programs for middle and high school students and teachers.

The *Breakthrough Junior Challenge* has also partnered with Facebook, Google Science and Google Education, and National Geographic to help reach science and math enthusiasts, educators, and high school students around the globe. *National Geographic* will broadcast the Breakthrough Prize Ceremony on *National Geographic Channel* at 7:00 PM Pacific / 10:00 PM Eastern, Sunday, November 8, 2015, followed by a worldwide broadcast on *Fox Network* and the *National Geographic Channels*. The *National Geographic Channels US* are a joint venture between *National Geographic* and *Fox Cable Networks*. The Channels contribute to the National Geographic Society's commitment to exploration, conservation and education with smart, innovative programming and profits that directly support its mission.

Contact

For more information, including competition rules and video submission guidelines, go to: www.breakthroughjuniorchallenge.org.

Please direct all queries on the forum page at www.breakthroughchallenge.org.

For press inquiries only, please contact:

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Maryland Association
of Science Teachers

MEMBERSHIP FORM

Welcome to MAST! Please print, complete, and mail this form to the address below.

Type of Membership – Please check one space in each column.

- | | |
|--|----------------------------------|
| <input type="checkbox"/> 1 year – \$15.00 | <input type="checkbox"/> New |
| <input type="checkbox"/> 3 year – \$40.00 | <input type="checkbox"/> Renewal |
| <input type="checkbox"/> Student – \$5.00 (1 year) | |

Member Information – Please fill this out completely!

Last Name		First Name		Level – please check all that apply: <input type="checkbox"/> Pre-K <input type="checkbox"/> Elementary <input type="checkbox"/> Student <input type="checkbox"/> Supervisory <input type="checkbox"/> Middle/Jr. High <input type="checkbox"/> High School <input type="checkbox"/> College/University <input type="checkbox"/> Organization (please specify) <input type="checkbox"/> Other (please specify)
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Local School System		School		
Home Phone	Work Phone		Cell Phone	
Email Address		Alternate Email Address		

I would like to donate \$ _____ to support:
 the MAST Awards for Excellence in Science Education Program
 the MAST Mini-Grants Program

Please make your check payable to the Maryland Association of Science Teachers (MAST) and send it with this completed application to:
 MAST
 P.O. Box 368
 Finksburg, MD 21048

For Office Use: Date Received _____ Amt Paid _____ Membership to: _____

Cash _____ Check Number _____ Check date _____ MER 5.2015