SENIOR SCIENCE SOCIETY NEWSLETTER

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NEXT GENERAL MEETING

Mon, Nov 17, 2014 @ 7:00 PM
Harford Community College, Chesapeake Center, Dining Room South

Our speaker will be Dr. Mike O'Leary, Director, School of Emerging Technologies, Towson University speaking on "Using Mathematics to Catch Criminals". Discussed will be improved mathematical algorithms for the geographic profiling problem, which is the problem of estimating the location of a serial criminal's home base from the known locations of the crimes. Hope to see you there!

UPCOMING SSS ACTIVITIES

Date	Location	Event
Oct 22&30	HCC, Chesapeake Center Dining Hall	Future Educators Association
Nov TBD	Youth Benefit ES	SSS Modules
Feb 4	Fallston MS	STEM & Beyond
Feb 11	Edgewood MS	STEM & Beyond
Feb 25	Patterson Mill MS	STEM & Beyond
Jun 2&3	Southampton MS	Environmental Fair

Micah Dailey Awarded STEM Scholarship by the Senior Science Society Foundation, Inc.

Micah Dailey, a 2014 graduate of the Science and Math Academy, Aberdeen High School, has received a Science, Technology, Engineering and Mathematics (STEM) Scholarship in the amount of $1,000 from The Senior Science Society Foundation, Inc. (SSSF). Micah is attending Johns Hopkins University to pursue a degree in molecular biology.

APG Federal Credit Union is a proud supporter of the STEM outreach efforts of the SSSF. Earlier this year APGFCU contributed $5,000 to the SSSF in part to fund STEM Scholarships. This was the first STEM scholarship presented by the combined organizations.

The Senior Science Society and the Senior Science Society Foundation, Inc.: Aren't They One and The Same?

Not quite. Senior Science Society (SSS) is an unincorporated, membership-based, self-supporting, organization operating under the auspices of the Harford Community College (HCC). The SSS activities are limited to direct support of HCC programs. At times the Senior Science Society is involved in other science / mathematics / engineering activities outside of the HCC purview, for which additional, non-membership based funding, is desired. Such activities might include working to bring the Maryland Science Center to Harford County Elementary Schools, or supporting STEM teacher education, or giving a scholarship to a non-HCC student (as pictured to the left). The Senior Science Society Foundation, a 501(c)(3) organization, is the mechanism for that funding. As one would expect, the SSS Foundation maintains a cooperative relationship with the SSS. Bruce Burns is the current SSS Foundation president.

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Senior Science Society Demonstration Modules

1. Momentum and Impulse - The Egg and I
Presents the concepts of designing constraints to allow an egg to survive sudden accelerations. The students are safety engineers and the egg is the crash test dummy. Students will break into teams to conduct dynamic experiments by dropping eggs in small packages they design in an attempt to have their egg survive impact on a hard surface. Presuming success of some teams in the drop experiment, and given sufficient time, they will move on to a vacuum launcher where the egg will experience a more challenging environment. Typically used for grades 4 to 8.

2. Things that Fly - Birds, Planes, and More
Presents the world of flight. First, we experiment with air - what is it made of, how big is a molecule, how many are there, what do they have to do with flying? Then the nature of flying will be discussed along with some fun demonstrations using balloons, model planes, and mechanical birds, along with things from nature. Students will learn about thrust, lift, and drag as it pertains to the aircraft they see in the skies every day. Used in grades 1 to 8.

3. Mechanical Advantage: Lift 30 pounds with a single finger
Presents the concepts of simple machines that are used every day to build the world we live in. What are they and how are they used. Where can you see them around you? Experience the ability of pulleys, levers and hand cranks to make things easier. The students measure the mechanical advantage of various concepts themselves. Students try lifting each level of mechanical advantage. Typically used for grades 3 to 8.

4. Chemical Properties of Matter
Presents what chemists do, demonstrating some of the physical properties of matter such as the electrical conductivity of solutions and the light scattering properties of suspensions of very fine particles. A chemical reaction will also be examined. While the instructor will perform some parts of the module, a student assistant, if available, can perform the physical experiments. Typically used for grades 5 to 8

5. Civil Engineering: Bridge Building
Describes the typical duties of a civil engineer such as design of complex roadways and structural analysis of bridges. The new I-95/Baltimore Beltway interchange will be discussed in detail and the results of computational models will be shown. The characteristics of support structures will be presented using a hands-on model of a simple truss bridge and/or students will be arranged in teams for the construction and testing of model bridges of their own design. Typically used for grades 5 to 8.

6. Civil Engineering: Earthquakes
Describes the typical duties of a civil engineer, then this model variant focuses on earthquakes. This element includes a presentation to enable understanding of seismic waves, their consequences, and design approaches for structures to minimize damage from earthquakes. The consequences of such an event are examined. Typically used for grades 7 or 8.

7. States of Matter
Extends the understanding of gasses, liquids, and solids by demonstrating the kinetic theory of matter using a model of hard spheres and a dynamic visualization. We will find out what makes solids, liquids and gasses take the shapes they do, and examine how temperature, pressure, and volume cause matter to boil, condense, and crystallize. We will look at the different forms of matter from very cold to hot and show how nature does what it must do. The interactive part involves investigating the nature of atom and molecules from a simple model put together by the student. Typically used for preschool to 8th grade.

8. Cataclips
Presents a description of accuracy versus precision, and how each can be estimated mathematically. Students then proceed to a hands-on launch exercise using pennies catapulted via a binder clip towards a target on a paper grid. Impact locations are measured and the data are then entered into a computer for display. The module is highly interactive, with the students forming teams and engaging in the experimental process to include the gathering and manipulating data. Typically used for grades 4 to 8.

9. Fun with Triangles
Students are introduced to various types of triangles. Angles and side lengths of small and large triangles are measured using various instruments to demonstrate how larger distances can be determined using ratios of lengths of smaller similar triangles. A sample problem is presented showing how a stranded camper can estimate how wide a river is using a small right triangle to see if he can swim back to camp. The students are then broken into teams and presented with a challenge to measure the height of some distant object in or outside the classroom. Typically used for grades 4 to 8.

10. The Sweet Sound of Music
Demonstrates how the sound of music is made, and how is it changed so that it sounds best. The interactive presentation show how this is done from the production of music in instruments, to the listening of the sound in concerts, at home, and in everyday life. Students learn how you hear, how to make good music better, and even how bad music can be made to sound good through amplifiers, filters, and the listening environment. Typically used for grades 3 to 8.

At upcoming General Membership Meetings, we will "highlight" some of our modules, as many members have not seen most of them. In addition, we want to show the members who have not yet developed a demonstration, the ease with which they can be developed and the range of subject matter that may be presented.