

A graphic showing four overlapping rectangular panels. The first panel is labeled "SCIENCE" and shows a Bohr-style atomic model. The second is labeled "TECHNOLOGY" and shows a person wearing a VR headset. The third is labeled "ENGINEERING" and shows a rocket launch. The fourth is labeled "MATH" and shows a chalkboard with mathematical formulas like $E=mc^2$ and Σ .

AIAA CCS Guest Lecturer Program for Brevard County's Schools

Pete Warren
K-12 STEM Program Coordinator
Cape Canaveral Section
American Institute of Aeronautics & Astronautics

Aug 23, 2013

AIAA in Brief

- ▶ With more than 35,000 individual members and 90 corporate members, the American Institute of Aeronautics and Astronautics (AIAA) is the world's largest technical society dedicated to the global aerospace profession
- ▶ Created in 1963 by the merger of the two great aerospace societies of the day, the American Rocket Society (founded in 1930 as the American Interplanetary Society), and the Institute of the Aerospace Sciences (established in 1933 as the Institute of the Aeronautical Sciences), AIAA carries forth a proud tradition of more than 75 years of aerospace leadership
- ▶ Locally, the AIAA Cape Canaveral Section consist of over 300 members in the space coast area

AIAA Mission, Vision & Core Values



- ▶ AIAA's mission is to address the professional needs and interests of the past, current, and future aerospace workforce and to advance the state of aerospace science, engineering, technology, operations, and policy to benefit our global society
- ▶ AIAA's vision is to be the shaping, dynamic force in the aerospace profession – the forum for innovation, technical excellence, and global leadership

Excellence

We expect nothing less than perfection in all we do. The critical consequences of our work and the impact to society at large drive our passion for overcoming risk.

Community

We bring together a diverse community to collaborate and share information and insights among pioneers, practitioners, future generations, staff and partners to enable personal, professional, and business growth.

Leadership

We lead the global aerospace community into the future with visionary inspiration and the talent of our membership.

Knowledge

Our profession requires lifelong learning, and knowledge that is wide and deep. We must inspire future generations to continue the quest for broad and profound understanding.

Integrity

We conduct all activities honestly, truthfully, and ethically. We treat everyone with dignity and respect.

AIAA and STEM



**AIAA STEM K-12
Committee**

- ▶ From our knowledge core value, our profession requires lifelong learning, and knowledge that is wide and deep
- ▶ *We must inspire future generations to continue the quest for broad and profound understanding*

Cape Canaveral Section (CCS) of the AIAA



- ▶ The AIAA Cape Canaveral Section 300+ members includes highly educated, trained and experienced Science and Engineering professionals
- ▶ Brevard County School's STEM program can benefit from AIAA's core value to *inspire future generations to continue the quest for broad and profound understanding*
- ▶ We have identified key section members to support a STEM outreach program to help Brevard County's Middle & High Schools reach their 2013/14 K-12 STEM goals.
 - We can introduce both Space Systems and Engineering, Technology and Applications of Science – Engineering Design to students as defined in the Next Gen Science Standards

Next GEN Science Standards

- ▶ The Next Generation Science Standards for States includes 2 key disciplinary core ideas (DCIs) related to AIAA's scope of interest
 - Earth and Space Sciences (ESS)
 - Engineering, Technology and Applications of Science – Engineering Design
- ▶ The AIAA's CCS guest lecturer program is design to increase student awareness & understanding of these 2 DCIs, by partially addressing the standards for Space Systems and providing a real-world example of STEM in application

Space Systems Next GEN Standards

HS.Space Systems

HS.Space Systems

Students who demonstrate understanding can:

- HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.** [Clarification Statement: Emphasis is on the energy transfer mechanisms that allow energy from nuclear fusion in the sun's core to reach Earth. Examples of evidence for the model include observations of the masses and lifetimes of other stars, as well as the ways that the sun's radiation varies due to sudden solar flares ("space weather"), the 11-year sunspot cycle, and non-cyclic variations over centuries.] [Assessment Boundary: Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.]
- HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.** [Clarification Statement: Emphasis is on the astronomical evidence of the red shift of light from galaxies as an indication that the universe is currently expanding, the cosmic microwave background as the remnant radiation from the Big Bang, and the observed composition of ordinary matter of the universe, primarily found in stars and interstellar gases (from the spectra of electromagnetic radiation from stars), which matches that predicted by the Big Bang theory (3/4 hydrogen and 1/4 helium).]
- HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.** [Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.]
- HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.** [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]

AIAA's Guest Lecture
introduces students to
ESS1-1 through ESS1-3

Our STEM Outreach Program



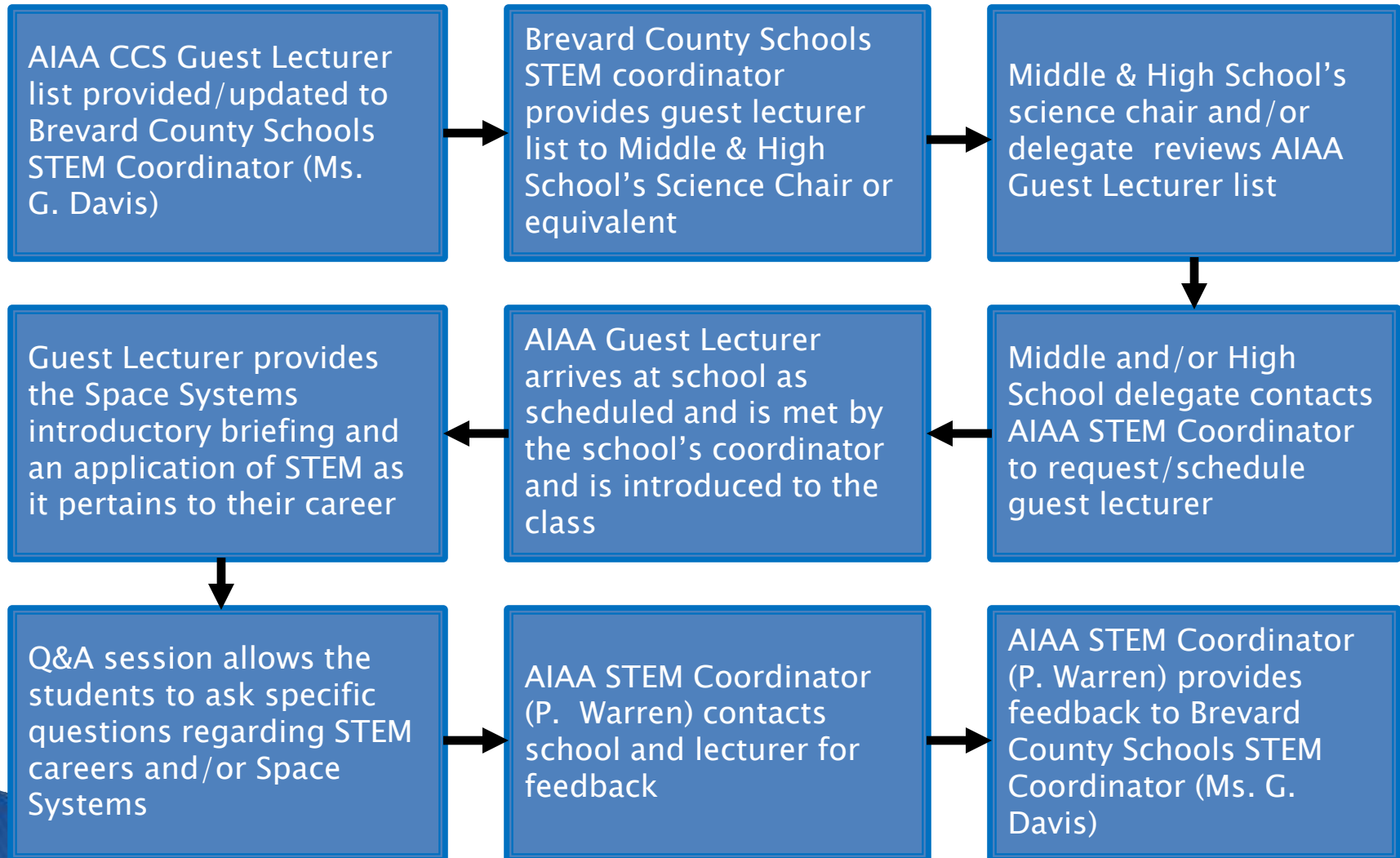
- ▶ Our Guest Lecturers have each committed to spending time in a Brevard Middle & High School class room setting (45 Minutes)
- ▶ During the special guest “lecture”, the lecturer will provide a brief introduction to “Space Systems ” as well discuss the “Engineering, Technology and Applications of Science” as it pertains to their specific career. Following the presentation, the guest lecturer will answer questions students may have regarding careers in Aerospace and/or other Engineering and Science professions
- ▶ Any Brevard County Middle or High School interested in having an AIAA CCS guest lecturer can directly contact the AIAA CCS guest lecturer regarding availability and scheduling.
- ▶ The Space Systems briefing is in MS PowerPoint. Schools will need to provide audio/visual and PC capability to support a PowerPoint slide show.

What's in it for Brevard Schools?



- ▶ Our guest lecturers have a rich resume of STEM experience and are passionate about Aeronautics and Astronautics
- ▶ Our guest lecturers will encourage students to continue their studies in STEM areas
- ▶ The guest lecturer will provide an excellent introduction to Space Systems & STEM application
 - The AIAA CCS Space Systems introductory briefing will help address a core Next GEN science standard
 - Brevard students will also gain better appreciation of the application of STEM to resolving a “real-world” engineering problem

AIAA Guest Lecture Process Flow



Typical AIAA Guest Lecture



5 Minutes	Guest Lecturer Introduction/Set Up
25 Minutes	Space Systems– Introductory Briefing
10 Minutes	Engineering, Technology and Applications of Science my own story ¹
5 Minutes	Q & A Session

45 Minutes Total

- ¹ • *Specific Application of Science, Technology, Engineering and Math (STEM) as it pertains to a particular Engineering Design or Engineering Problem*
 - Each Guest Lecturer has particular subject matter expertise. The guest lecturer will provide a briefing on a “real-world” project/program, and demonstrate how science and engineering practices are used on that project/program

Space Systems Introductory Briefing



- ▶ Directly ties in with Next Gen standards for “Earth and Space Sciences”
- ▶ The AIAA CCS Space Systems introductory briefing is exciting & geared towards HS students

1. Building blocks...

Matter & Energy & Space & Time

2. The Cosmological Model – Is it still trendy?

3. Earth’s star attraction... the Sun

Guest Lecturer List

Name	Title	Company	Subject Matter Expertise	Contact Information	Email	Virtual Mentor
Pete Warren	Program Manager	Northrop Grumman	Space Systems, UAVs, Payloads	321-271-1301	surfinfinity@yahoo.com	TBD
Tristan Clouse	Safety Engineer	ManTech SRS	TBD	321-960-7614	tristan.a.clouse@nasa.gov	TBD
Dr. Ryan L. Kobrick	Project Manager	Space Florida	TBD	321-730-5301 ext 236	RyanXPC@gmail.com	TBD
Jennifer Holland	Senior Engineer	ManTech SRS	TBD	321-867-9723	jennifer.a.mirenda@nasa.gov	TBD
Jean M. Hill	Safety & Reliability Engineer	NASA	TBD	321-861-7673	jean.m.hill@nasa.gov	TBD
Matthew Zuk	Systems Eng, Intg. & Test	Lockheed Martin	TBD	321-853-9100	matthew.zuk@lmci.com	TBD

Please contact Pete Warren, AIAA CCS STEM Outreach Coordinator for guest lecturer availability

321-271-1301 (c) or 321-726-7689 (w)

Resources for Teachers & AIAA Educator Associates



- ▶ Learning starts with a teacher, a curious student, and fun in the classroom. And AIAA has the programs to help you with:
- ▶ [Classroom Resources](#) – Homework, classroom exercises, games, puzzles, [and more](#).
- ▶ [Classroom Support](#) – a free [Educator Associate membership](#) puts you in touch with scores of engineers in your local community who are willing and able to help in the classroom.
- ▶ [Classroom Grant](#) – The AIAA Foundation provides educator grants for standards-based hands-on inquiry projects that tie to aerospace or engineering. Make your lessons come alive with projects that will inspire and engage your students.
- ▶ [Recognition](#) – The AIAA Foundation recognizes outstanding educators for their accomplishments in exciting K-12 students about math and science and preparing them to use and contribute to tomorrow's technologies.
- ▶ [Engineers as Educators](#) – AIAA Educator Associate members help practicing engineers learn to teach aerospace engineering principles to K-12 students.
- ▶ [Educational Partners](#) -- Innovative programs from AIAA's educational partners are exciting students and teachers alike about math and science.

Point of Contact

- ▶ Pete Warren, AIAA CCS STEM Outreach Coordinator
- ▶ surfinfinity@yahoo.com
321-271-1301 (c) or 321-726-7689 (w)