

Naval Air Warfare Center Aircraft Division Patuxent River, Maryland

Education Outreach Program

Speakers Bureau

Beginning in school year 2010-2011, the Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland, is introducing a *Speakers Bureau*.

Through the Speakers Bureau, educators may request speakers to visit their classroom to present lessons on a variety of Science, Technology, Engineering and Math (STEM) subjects. Typical subject areas include chemistry, physics, calculus, algebra, trigonometry, biology, computer science and engineering. The speakers will reinforce and enhance classroom lessons by providing examples of how STEM disciplines are used in the real-world. In most cases the speaker can work with the teacher to tailor age appropriate lessons. To request a speaker from the list below, complete the Services Request Form and e-mail to Kathryn.glockner@navy.mil. The form is available at the Education Outreach Website <http://www.ndep.us/LabsPax.aspx>. Topics not specifically listed may also be requested and the Education Partnership Coordinators will attempt to identify a speaker to meet your needs.

We are pleased to add the Speakers Bureau to our list of program offerings. We hope that by providing students the opportunity to engage first hand with scientists and engineers they will gain a better understanding of STEM subjects and perhaps be inspired to pursue careers themselves in the exciting world of science and engineering.

Kathy Glockner
Education Partnership Coordinator
Naval Air Warfare Center, Patuxent River, MD

Attachments:

- (1) List of Topics
- (2) Speaker Fact Sheets

Naval Air Warfare Center Aircraft Division Patuxent River, Maryland

Speakers Bureau

Speakers Bureau			Maryland VSC Alignment Grades 4-8					Core Learning Goals Grades 9-12			
Curriculum Connection	Topic	Speaker	4	5	6	7	8	9	10	11	12
All STEM	Capt. David Gleisner <i>Vice Commander, Naval Air Warfare Center Aircraft Division</i>	Pax River "101" ...p.1			✓	✓	✓	✓	✓	✓	✓
All STEM	Various Speakers	Science, Technology, Engineering and Math (STEM) Careers...p.2			✓	✓	✓	✓	✓	✓	✓
All STEM	Various Speakers	What's an Engineer?...p.3	✓	✓	✓	✓	✓	✓	✓	✓	✓
All STEM	Matthew Wilkinson <i>M.S. Biophysics B.S. Physics, Biochemistry, Cell Biology</i>	The Confetti Fuze...p.4	✓	✓	✓	✓	✓	✓	✓	✓	✓
Science	Heidi Moore <i>B.S., Aerospace Engineering M.S. Aeronautics, Astronautics, Space Systems and Propulsion</i>	Putting the "I" Back in Science Fair...p.5			✓	✓	✓	✓	✓	✓	✓
Astronomy	Dr. Jerri Tribble <i>PhD, Physics M.S., Chemistry</i>	What if the Sun was the Size of an Orange?...p.6	✓	✓							
Biology Physics	Dr. Jerri Tribble <i>PhD, Physics M.S., Chemistry</i>	Optics of the Eye and Eye Dissection Lab...p.7				✓	✓	✓	✓	✓	✓
Calculus	Dr. Linda Mullen <i>PhD, Electrical Engineering</i>	Sensor Performance Modeling...p.8								✓	✓
Chemistry	Sherry Williams <i>B.S. Chemistry</i>	Alternative Fuels...p.9						✓	✓	✓	✓
Engineering	Heidi Moore <i>B.S., Aerospace Engineering M.S. Aeronautics, Astronautics, Space Systems and Propulsion</i>	Engineering Design Process...p.10			✓	✓	✓	✓	✓	✓	✓
Engineering	LCDR Doug Crane <i>B.S. Aeronautical and Aeronautical Engineering M.S. Aeronautical Engineering USN Test Pilot School</i>	Aircraft Design, Building, and Test Flying...p.11	✓	✓	✓	✓	✓	✓	✓	✓	✓
Forces of Flight	Greg Mabry <i>B.S., Computer Engineering</i> or Ken Cahill <i>B.S. Aerospace Engineering</i>	The Case of the Challenging Flight (NASA Science Files™)...p.12	✓	✓							

Life Science	Don Statter <i>B.S. Geology</i>	The Living Sea...p.13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physics	Dr. Jerri Tribble <i>PhD, Physics</i> <i>M.S., Chemistry</i>	Introductory Reflection, Refraction and Lasers...p.14	✓	✓	✓							
Physics	Brian Nowotny <i>B.S., Mechanical Engineering</i>	Engine Propulsion...p.15	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physics	John Daley <i>B.S. Electrical Engineering</i>	Human Systems Dynamic Testing...p.16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physics	Dr. Frank Narducci <i>PhD, Experimental Quantum Physics</i>	Lasers and Laser Cooling of Atoms (Lectures and demonstrations including Laser Cooling, Light interferometer, Liquid Nitrogen, Gravity Measurement, Magnetic Field (solenoid, inductance))...p.17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physics	LCDR Doug Crane <i>B.S. Aeronautical and Astronautical Engineering</i> <i>M.S. Aeronautical Engineering</i> <i>USN Test Pilot School</i>	Basic Radar Theory...p.18	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physics	Dr. Linda Mullen <i>PhD, Electrical Engineering</i>	Lasers and Optics...p.19			✓	✓	✓	✓				
Physics	Ron Harney <i>B.S., Aerospace Engineering</i> <i>M.S., Mechanical Engineering</i>	F=MA...p.20					✓	✓	✓	✓	✓	✓
Physics	Jason Collins <i>B.S., Mechanical Engineering</i>	Team America Rocketry Challenge – Model Rocketry Fundamentals...p.21						✓	✓	✓	✓	✓
Physics	Dr. Jerri Tribble <i>PhD, Physics</i> <i>M.S., Chemistry</i>	Laser Interference and the Speed of Light...p.22							✓	✓	✓	✓

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Science, Technology, Engineering and Math
(Grades 6-12)

Topic: Pax River “101”

Speaker: CAPT David Gleisner
Vice Commander, Naval Air Warfare Center Aircraft Division

This presentation provides students an overview of “Pax River”. The Naval Air Warfare Center Aircraft Division has extensive operations at the Patuxent River Naval Air Station. The research, development, test and evaluation performed at Pax River are critical elements in maintaining the current force and developing the Navy’s aviation capability for the future.

The presentation includes a short history lesson followed by an overview of the various aircraft and facilities on the air station and the work performed by the many military members and civilian scientists and engineers who work there.

The presentation is recommended prior to a base visit.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Science, Technology, Engineering, and Mathematics (Grades 6 through 12)

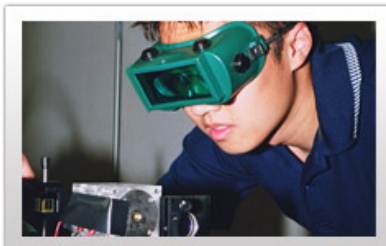
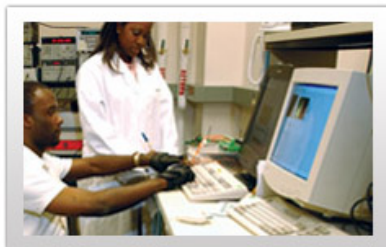
Topic: STEM Careers

Speaker: Various

Naval Air Station Patuxent River is one of three facilities that comprise the Naval Air Warfare Center, Aircraft Division. The other facilities are located in Lakehurst, New Jersey, and Orlando, Florida. The mission of NAWCAD is to support research, development, test and evaluation of aircraft and unmanned air vehicles, weapons and all other equipment related to Navy and Marine Corps air power.

The test facilities and laboratories located at “Pax River” are manned by a team of highly skilled and professional engineers, mathematicians and scientists. These individuals hold degrees ranging from Bachelor’s to PhDs in disciplines such as aerospace, chemical, electrical and mechanical engineering, chemistry, physics and math.

Invite one of these speakers into your classroom to talk to your students about their chosen career field...why and how they got there, their college experience, and the exciting work they perform at Pax River.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Science, Technology, Engineering and Math
(Grades 4-12)

Topic: What's and Engineer?

Speaker: Various Speakers with Engineering Degrees

This comprehensive overview will expose students to the difference between a scientist and engineer and provide examples of the types of work that engineers do. Various engineering disciplines including aerospace, chemical and electrical engineering will be discussed. The presenter will also provide tips on college preparation and how students can create their own pathway to a career in science, technology, engineering or mathematics.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

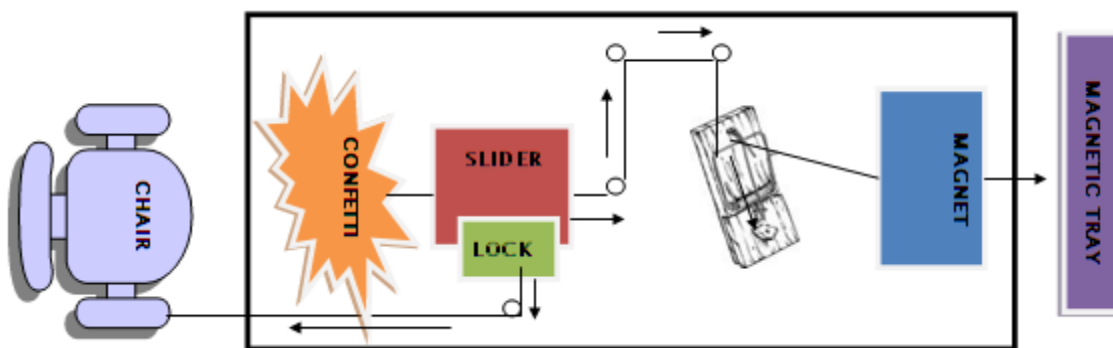
Curriculum Connection: Science, Technology, Engineering and Math
(Grades 4-12)

Topic: The Confetti Fuze

Speaker: Matthew Wilkinson
M.S. Biophysics
B.S. Physics, Biochemistry, Cell Biology

This presentation will introduce students to general principles of fuze design. Through presentation and exhibition, students will learn basic fuze concepts, and will be introduced to the four components of the modern fuze: the target-detecting device, detonator, safety and arming device, and lead. Using a large model constructed of everyday materials, students will experience the roles of these components and their purpose in weapon function, safety, and reliability.

For the more advanced student, a mathematical discussion of probability and fuze reliability may supplement the demonstration.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Science (Grades 6 through 12)

Topic: “Putting the “I” Back in Science Fair”

Speaker: Heidi Moore

B.S. Aerospace Engineering

M.S. Aeronautics, Astronautics, Space Systems and Propulsion

GCEN Helicopter Engineering

Program presents and reviews the process for choosing a science fair project topic that is innovative, timely, personalized and relevant to grade level. Presentation discusses how research ties into the project development, how to write a hypothesis, how to pare down potentially massive projects into manageable efforts and how to make the project personal. Details about local school, county level and international level science fairs are also provided.

The Power Point portion of this presentation is located in the student section of the Education Outreach website: www.ndep.us/LabsPax.aspx.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Astronomy (Grades 4 through 5)

Topic: What if the Sun was the Size of an Orange?

Speaker: Dr. Jerri Tribble, PhD, Physics; MS, Chemistry

Dr. Tribble has prepared a class participation demonstration to introduce the scale of our solar system. This demonstration and the accompanying lecture materials cover the planetary orbits and motions and how these produce our days and seasons. This is geared towards 4th grade but is easily adjusted for slightly older or younger classrooms.

The primary demonstration involves student volunteers holding a familiar object close to the correctly scaled size (e.g. sun as an orange, and the earth as a seed..., etc.). The class will need to walk to a playing a field so that each body of the scaled solar system can step out to the correct scaled position (scaled out to Mars at least, it's not usually possible to get all of the planets in).

The classroom discussion at this age level usually affords lots of interesting questions about news and observations of the sky. Dr. Tribble has enjoyed questions from 4th graders about everything from star explosions to black holes.

This is an excellent opportunity for students to get excited about science.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Biology and Physics (Grades 7 through 12)

Topic: Optics of the Eye and Eye Dissection Lab

Speaker: Dr. Jerri Tribble, PhD, Physics; MS, Chemistry

Dr. Tribble has prepared in-class experiments and laboratory demonstrations in the fields of light interaction with matter. Dr. Tribble's work has included over 10 years experience with lasers, laser safety, laser eye protection and vision. Dr. Tribble is currently engaged in research involving ultra short pulsed laser interaction with cameras which includes examples of wave propagation and interference effects.

This presentation explores why our eyes need protection from sun, wind and lasers. Dr. Tribble will provide an overview of the anatomy of the eye, explain how the eye works and what makes it vulnerable to injury.

To enhance the lesson, Dr. Tribble can lead an animal eye dissection lab which permits students to observe the optical and physiological aspects of the eye as an optical system. **Please note the school is responsible for supplying the eye and other necessary materials.**

*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

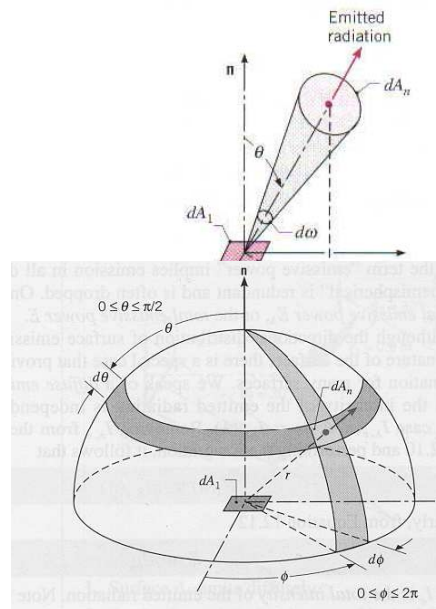
Curriculum Connection: Calculus (Grades 11 through 12)

Topic: Sensor Performance Modeling

Speaker: Dr. Linda Mullen, PhD, Electrical Engineering

Dr. Mullen will explain what a sensor is, and discuss some of the factors that influence sensor performance. She will introduce the concept of light detecting and ranging (lidar) and how lidar is used. Using the example of a Navy aircraft detecting a submarine, Dr. Mullen shows how calculus is used to predict sensor performance. Aircraft height and water clarity are just some of the variables examined in this interactive presentation.

This is an excellent presentation for demonstrating to students how calculus is used to solve real-world problems.



*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

Curriculum Connection: Chemistry (Grades 9 through 12)

Topic: Alternative Fuels

Speaker: Sherry Williams, B.S. Chemistry

In this presentation the students will learn what crude oil is, where it is found, and how it is used. The chemical composition of various fuels will be reviewed. Ms. Williams will discuss the impact that different properties of fuels have on aircraft performance and why it's important for the Navy to test jet fuel to ensure it meets certain specifications. Ms. Williams will discuss why the Navy is investigating alternative fuels for use in aircraft. The benefits and challenges of Biodiesel, Hydrogenation Derived Renewable Diesel, Bioethanol, and Fischer Tropsch alternative fuels will be presented, including how these fuels are derived and their impact on the environment.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Science, Technology, Engineering and Math
(Grades 6 through 12)

Topic: Engineering Design Process

Speaker: Heidi Moore

B.S. Aerospace Engineering;
M.S. Aeronautics, Astronautics,
Space Systems and Propulsion;
GCEN Helicopter Engineering



Program explains the difference between science and engineering, difference between the scientific method and engineering design process and then walks through the details of the engineering design process. Presentation also provides a sample engineering design problem from a Marine Corps helicopter application and takes the students through the specific steps used to solve this problem. Students are able to participate hands-on in this presentation as they take their own data in the classroom and apply that data to find a solution to the problem that will meet the needs of the students in the class. **(Note: Understanding of Pythagorean theorem and/or basic trigonometry is helpful, but not required.)**



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speaker's Bureau Fact Sheet

Curriculum Connection: The Engineering Design Process (Grades 4-12)

Topic: Aircraft Design, Building, and Test Flying



Speaker: Lieutenant Commander Doug Crane, USN
B.S. Aeronautical and Astronautical Engineering;
M.S. Aeronautical Engineering
USN Test Pilot School

Invite LCDR Doug Crane to your classroom for the ultimate show and tell! LCDR Crane is currently redesigning and re-building a small prototype aircraft which he will use to discuss aircraft design, building, and test.

The airplane is a very simple design (like a sail boat with wings) and non-intimidating for younger students. With it, LCDR Crane can easily show and talk about the engine (how a 2-cycle engine works and the need for a tuned exhaust), drive system (mechanical engineering and applied forces with CAD drawings), fuel system, electrical system, avionics, flight controls (non-traditional on this airplane with flaperons, ruddervators, spoilers, and mechanical mixing), and human factors concepts. It is also a great example of showing the design criteria and tradeoffs made in all engineering design—safety vs. aerodynamics vs. strength vs. weight vs. cost vs. ease of maintenance.

He can also talk about test flying and the build-up process leading to first flight. After the first flight, there continues to be a build up process to expand the flight envelope and map the aircraft performance.

The aircraft is highly transportable in its own trailer and takes about 10 minutes to assemble/disassemble. It can fit through a double door (landing gear on) or 3' door (landing gear removed, increasing assembly time to 30 min). When assembled, it is about 20' long with a 30' wingspan. It will fit in a classroom.

This presentation can be tailored to support curriculum in grades 4 through 12.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Forces of Flight (Grades 4 through 5)

Topic: Case of the Challenging Flight

Speaker: Greg Mabry, B.S. Computer Engineering or
Ken Cahill, B.S. Aerospace Engineering

This is a NASA Sci Files™ program that had previously aired on Public Broadcasting. The teacher is provided a DVD and activity book. The teacher will show the DVD in four sections (about 15 minutes each). Once or twice a week, an engineer will visit the classroom and review the material and conduct an activity that coincides to the DVD. The lesson plan covers the four forces of flight and other flight principles. Lessons are given in four - 1hr lessons. Students will have the opportunity to work with groups and at the end of the four lessons have the opportunity to build and fly their own airplane.



*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

Curriculum Connection: Life Science (Grades 4-12)

Topic: The Living Sea

Speaker: Donald Statter, B.S. Geology

During this presentation Mr. Statter will explain how sonar works and how the Navy uses sonar. He will teach the students about the beaked whale and its unique characteristics that make it different than other whales. Mr. Statter will then discuss the impact of sonar on whales and the particular concerns that exist for beaked whales.

There will be a brief discussion of whale blubber and research involving toxic chemicals in whale blubber. Mr. Statter will also present concerns about biocontaminates and ocean life. The results of studies involving other marine life such as seals, walruses, sea otters or elephant seals will be shared.

The use of graphs will be incorporated into the presentation and Geographic Information System (GIS) issues will be described. This presentation can be tailored for grades 4-12.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 4 through 6)

Topic: Introductory Refraction, Reflection and Lasers

Speaker: Dr. Jerri Tribble, PhD, Physics; MS, Chemistry

Dr. Tribble has prepared in-class experiments and laboratory demonstrations in the fields of light interaction with matter. Dr. Tribble's work has included over 10 years experience with lasers, laser safety, laser eye protection and vision. Dr. Tribble is currently engaged in research involving ultra short pulsed laser interaction with cameras which includes examples of wave propagation and interference effects.



This presentation compliments curriculum on wave interactions. Dr. Tribble answers the questions “What is light?” and “How does light travel?” The concepts of amplitude, wavelength, frequency and energy, velocity, reflection and refraction are explored. This presentation also includes an overview of the anatomy of the eye.

Hands-on activities using a laser ray box and optics demonstration set, as well as a few optics demos using items available at home, can be incorporated into the session.

*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 4-12)

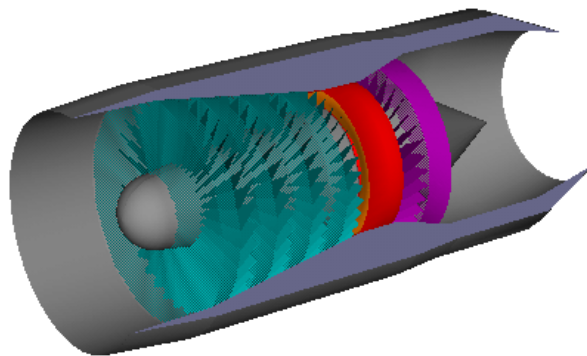
Topic: Engine Propulsion

Speaker: Brian Nowotny, B.S. Mechanical Engineering

In this presentation Mr. Nowotny explains how engines work by discussing four principal propulsion systems: the propeller, the turbine (or jet) engine, the ramjet, and the rocket. The principles of thrust and drag are explored including how different propulsion systems generate thrust in different ways.

Why are there different types of engines? Using Newton's Laws of Motion, Mr. Nowotny describes how different types of aircraft require different engine performance. The impact of excess thrust, engine efficiency, and fuel usage on engine selection are examined.

This presentation can be tailored to support curriculum in grades 4 through 12.



*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 4-12)

Topic: Human Systems Dynamic Testing

Speaker: John Daley, B.S. Electrical Engineering

The Human Systems department uses Anthropomorphic Test Devices (ATDs or “crash test dummies”) in dynamic tests at three laboratories to improve aircrew safety. Instrumentation on the manikin is used to record the forces and accelerations that aircrew would experience.



The **Horizontal Accelerator (HA)** is used to perform crash testing on seats, restraints, helmets, Personal Protective Equipment (PPE) and other crew gear to determine the risk of injury in the event of a crash or hard landing. The HA is capable of simulating crashes in excess of 60 miles per hour.



The **Ejection Tower** simulates the acceleration a pilot will experience from the force of an ejection seat catapult. It is used to verify the performance of gear that will be used when a pilot ejects from an aircraft.



The **Windblast** creates the 750 mile per hour winds that a pilot can encounter after the ejection seat departs the aircraft. Any item that a pilot wears or carries must be shown to be safe in this punishing environment.

Presentations center on crash physics & safety, instrumentation and high speed photography. A **High Speed Video** demonstration can be performed, where a 1000 frame per second digital camera slows action down to less than 1/300th of real time, showing details of motion not visible to the naked eye. Presentations can be tailored for grades 4-12.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 4-12)

Topic: Lasers and Laser Cooling of Atoms

Speaker: Dr. Frank A. Narducci, PhD.,
Experimental Quantum Physics



The Atomic Physics Laboratory is a world class laboratory in which sensors for the next generation of pilots and sailors are developed. This laboratory develops new methodology and builds on ground-breaking scientific discoveries to develop sensors with leaps in the levels of performance (sensitivity, stability, drift, etc). The sensors are based largely on laser cooled atoms (atoms that are within a millionth of a degree above absolute zero) and atom interferometry, where atoms no longer behave like colliding hard spheres, but like waves.

Presentations include (1) a full presentation on the workings of a laser (2) How laser cooling works, how atom interferometers work and how they can be used for naval applications. Demonstrations that can be brought to the classroom include (1) cooling by liquid nitrogen to freeze hot dogs, flowers and balloons to help students understand extremely cold temperatures (2) using a laser to demonstrate concepts of interference by demonstrating vibration detection and piping it to a speaker to “hear” the vibrations. Presentations can be tailored for practically all grade levels. Lab tours can be arranged as well where the students can see for themselves clouds of atoms that are a millionth of a degree above absolute zero.



*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speaker's Bureau Fact Sheet

Curriculum Connection: Physics (Grades 4-12)

Topic: Basic Radar Theory



Speaker: Lieutenant Commander Doug Crane, USN
B.S. Aeronautical and Astronautical Engineering
M.S. Aeronautical Engineering
USN Test Pilot School

The speaker begins with a quick history of the origin, use, and development of radars in the area of air and ship surveillance using Power Point. He then uses the “flash light” analogy to demonstrate how a basic radar works using a dark room, flash lights, and classroom volunteers. Using different types of flashlights, colored lenses, sunglasses, and reflective material, he can teach the concepts of beam pattern (gain), scan pattern, frequency, polarity, and radar cross section. If time and interest permit, he can then teach more detailed concepts such as pulse patterns, electronic protection techniques, “stealth”, and radar jamming theory (these concepts are better for older students).

This topic can be easily modified for any Grade 4 through 12.



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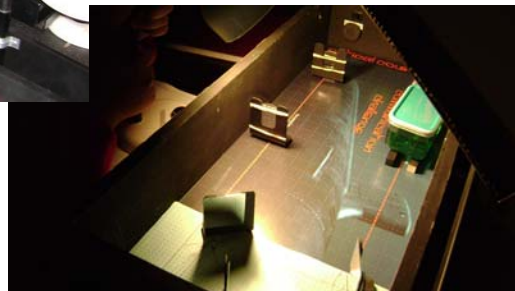
Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 6 through 8)

Topic: Lasers and Optics

Speaker: Dr. Linda Mullen, PhD, Electrical Engineering

This session begins with an introduction to Lasers, including laser safety, reflection, refraction, absorption/scattering, diffraction and measurements of optical power. A hands-on activity follows the presentation where students experiment with transmitting sound using a laser beam. The “optical course” includes a miniature water tank. The students will study the effect on laser power when they add food dyes and Maalox to the water. Students may experiment with their own music on an IPOD or MP3 player to add to the fun!



*Naval Air Warfare Center Aircraft Division
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Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 8 through 12)

Topic: F=MA

Speaker: Ron Harney

B.S. Aerospace Engineering

M.S. Mechanical Engineering

Mr. Harney will explain why steam catapults are used on the Navy's aircraft carriers. He'll use Newton's 2nd Law and the principle of Rectilinear Motion to describe how catapults work. He'll also talk about aircraft design and loads that a nose gear on a Navy aircraft must be able to withstand.

Mr. Harney works in the flight test department at the Naval Air Warfare Center, Aircraft Division. One of the responsibilities of this department is the test and evaluation of the aircraft / catapult interface. He will talk about why these tests are important and how they are performed.

The presentation will end with a discussion of the future of the catapult, which will be powered by electro-magnetic technology.

This presentation is an excellent introduction to steam catapult design and operation prior to a base visit.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 9 through 12)

Topic: Model Rocketry Fundamentals

Speaker: Jason Collins

B.S. Mechanical Engineering

Tripoli Rocketry Association Member

National Rocketry Association Member

– L2 HPR Certification.



This presentation begins with the scientific principles associated with rocketry including Newton Laws of Motion, Center of Gravity and Center of Pressure. Rocket construction techniques, including materials, design, motors, recovery systems and electronics are presented, and common failure modes are discussed.



This presentation can be tailored to support science curriculum in the classroom, or to be used as an introductory activity for teams competing in the Team America Rocketry Challenge. This is an exciting presentation which incorporates the real-world successes and challenges of an experienced rocketeer.

*Naval Air Warfare Center Aircraft Division
Education Outreach Program*

Speakers Bureau Fact Sheet

Curriculum Connection: Physics (Grades 10 through 12)

Topic: Laser Interference and the Speed of Light

Speaker: Dr. Jerri Tribble, PhD, Physics; MS, Chemistry

Dr. Tribble brings an optical board with a basic interferometer, laser (Class 2, red and green) and detectors in order to demonstrate interference at the advanced High school level. This is accompanied by a teacher-led holography lab.

The principles of interference which are demonstrated are the basic wave addition, the actual method and scale of the scanning mirror and how it makes it possible to slow down and scale up the wave nature of light to observe wavelengths that are half the size of an ecoli cell or 1/200 the thickness of paper on a simple oscilloscope. The dependence of the interferogram on input wavelength (red versus green) is demonstrated and the connection to light speed and the use of this by Michelson and Morely in their famous experiment are discussed.

An accompanying holography lab is being developed by Allen Skinner for the first use of this combination in spring 2011. The lab is based on the award winning holography science fair project by Connor Alsheimer, of STEM-8, Spring Ridge Middle School.

Dr. Tribble's current research on ultrafast lasers uses interference in to ways which can be shown in a lab tour on base as an alternative or following the above in-class work.