

Northrop Grumman Education Outreach

Partnerships with Educators

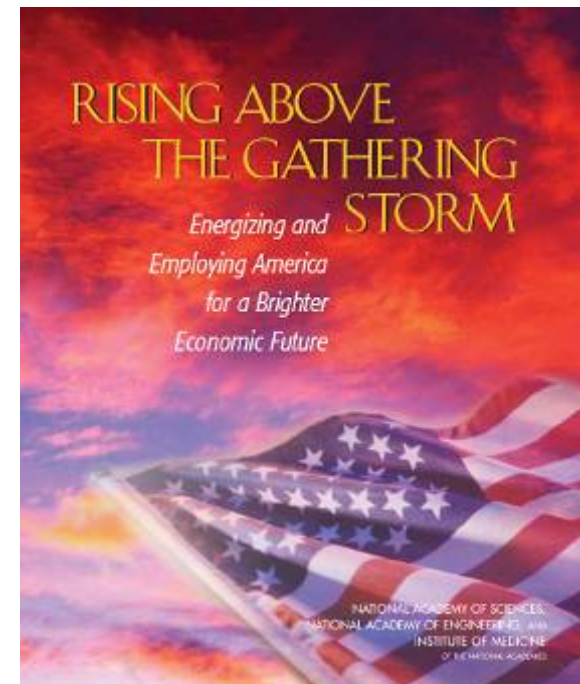
2/27/08

Steve Smalley
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Northrop Grumman Corporation

Welcome

America's leadership in the global economy and high quality of life and opportunity stem from engineering and technology research. Innovations in these areas fuel economic growth, fortify national security systems, improve healthcare, and safeguard the environment. But sustaining American preeminence in these areas will prove difficult without a highly trained workforce and technologically literate citizenry.

One reason more students are not choosing to study engineering in college and pursue careers in engineering is that they are relatively uninformed about the field of engineering. Many students simply do not know what engineering is or what an engineer does. Unlike police detectives, doctors, lawyers or even master chefs, engineers are rarely depicted in television shows or in movies. Survey research indicates that most parents, teachers and school counselors do not discuss engineering as a possible career with students because they also do not know much about engineering or what engineers do.



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Many programs of varying structure

- **DiscoverE**
 - 19 years, engineers week
- **WORTHY**
 - 10 years, focused on city
- **TEAACH**
 - Third year, teacher coordinated
- **SMART CART**
 - 4 years, University partnership
- **FIRST LEGO League**
 - UMBC/MSDE partnership
- **PLTW**
 - Third year, multiple levels
- **Other Programs**
- **Various Grass-roots programs**



PLTW Multi-dimensional Program

- Well established, National program
- Embraced by MSDE, thousands of students in MD
- Project oriented, experiential learning
- Well developed curricula and course progression
- Credited, specific teacher training
- In class program has large reach and extensive time with student
- Northrop Grumman has been providing Mentors to specific classes at local schools
- Recently began working with UMBC and PLTW at national level to help set strategy
- Improves both initial entry into higher education technical programs, and retention



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FIRST Lego League

- **New Program**
- **Executive, State, and Partner (UMBC) supported**
- **NGC Focus on feeder schools for proposed STEM academies**
- **Sixteen NGC Mentors + UMBC Students**
- **Small, Less-expensive program**
- **Significant commitment from Volunteers**
- **Requires lots of coordination**
- **University partner helps a lot**
- **Northrop Grumman Sponsored State Finals (Big, fun event)**
 - 90 teams, hundreds of kids



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TEAACH Program

- Custom program targets Middle School teachers
- Goal is to train teachers to make engineering more approachable, and talked about in the classroom.
- 4-day teacher training during the summer
- Provide example of “Hands-on, engaging” activity
- Provide Panels of engineers – to put a face on engineering
- On-going teacher/engineer relationships



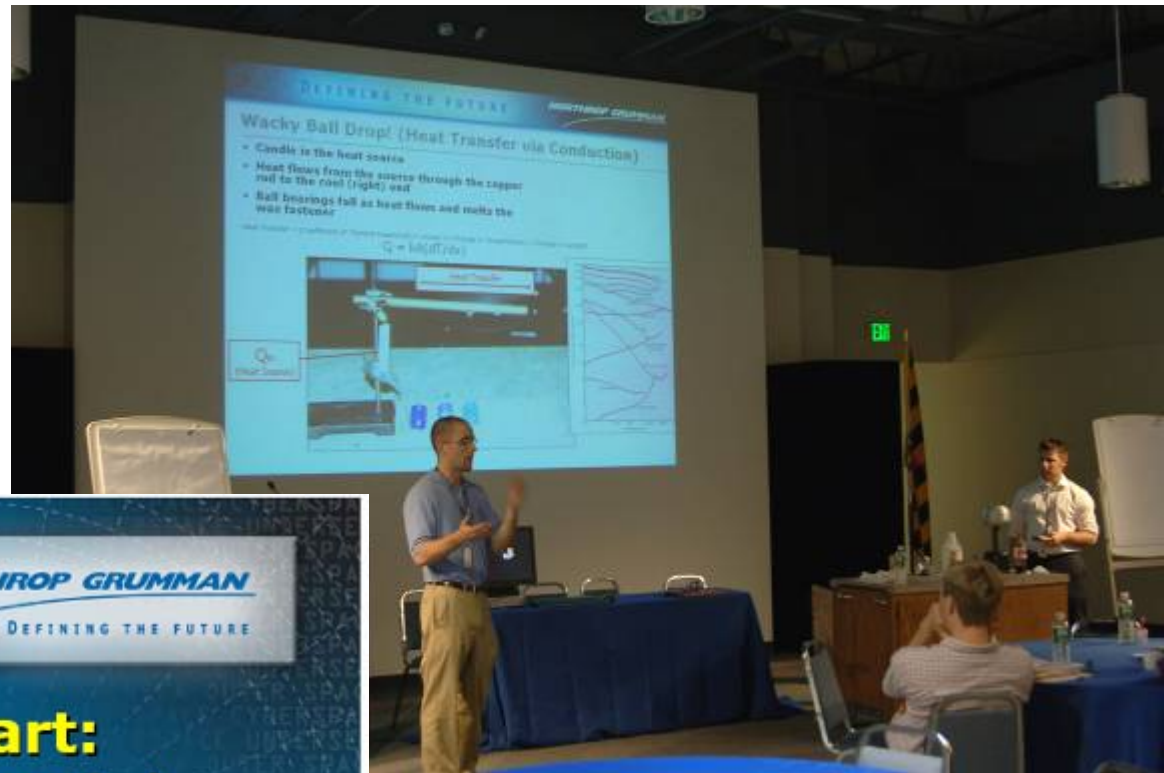
TEAACH Goals

- **Long-term – Increase number of technical degrees granted to US Citizens**
- **Short-term – Aid teachers in creating an engineering friendly teaching environment**
 - Identify teaching opportunities
 - Help recognize high potential students
 - Encourage
 - Expand teachers understanding of engineering principles and careers



SMART CART Curriculum

- Developed lessons
- Demo Materials on-hand
- Independent Volunteers
- Difficult logistics



Ad-hoc presentations

As requested

Primarily local

Broad, brief exposure

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SMART CART

- **Traveling Engineering lab**
- **Fifth & Sixth Grades**
- **Spark interest in Science and Engineering**
- **Learn While having Fun**



Air Pressure

Balloon Rocket

DNA

Ooze

Heat transfer

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WORTHY



- Northrop Grumman initiated program
- Small number of high potential students
- Specifically oriented to engineering/technical sciences
- 2 Mentors per student
- 4-8 hours per month
- Each Mentee works on a year long project for presentation to executive management
- Includes significant college scholarship for each student
- College visits, technical training, summer internships



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DiscoverE History

Discover
ENGINEERING

- National program, sponsored by many engineering organizations
- Educate students and teachers about engineering
- Our 17th year
- Since inception, more than 2300 volunteers will have participated at over 1350 school visits, touching the lives of untold thousands of school children
- This year, 300+ volunteers will visit over 175 schools in communities adjacent to Electronic Systems' facilities nationwide
 - ~125 schools in Maryland in 2006

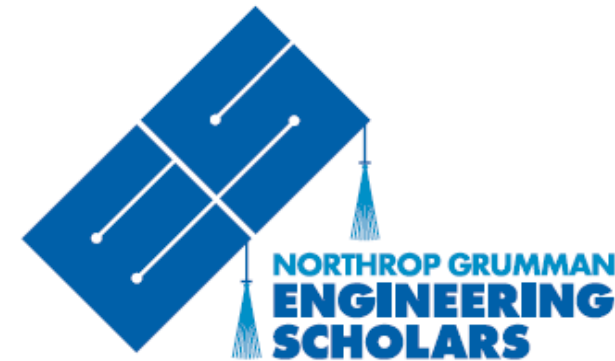
Engineers Week / February 17-23, 2008

ORTHROP GRUMMAN

Many other diverse programs

■ Corporate Scholarships

- 1 \$10,000 Scholarship per county in MD
- National competition for children of employees
- MD Teacher of the Year sponsor



■ Financial / Volunteer support for:

- MESA, AVID, YESS, Junior Achievement, ComputerMania, FIRST HS Robotics, Engineer Girl Website, PLTW, STEP, BEYA, SkillPort USA, MBRT, Sally Ride Festival, Engineer you life website, various professional societies, museums and ceremonies

■ Employee Sponsored

- Science fairs, Robot clubs, Career Days, PALS
- Professional sponsorships NSBE, SHPE, IEEE, AIAA, etc.
- FLL, Scouting Merit Badges
- Etc.

Summary

- **DiscoverE**
 - Broad, Shallow, Nationwide
- **WORTHY**
 - Very Narrow, Very deep
- **TEAACH**
 - Teacher focused, local counties & city
- **SMART CART**
 - Joint Project, local, short exposures
- **FIRST LEGO League**
 - Partnership w/ UMBC
- **PLTW**
 - Broad reach, immersive program
- **Various Grass-roots programs**
 - Employee focused



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Resources for K - 12



RESOURCES

TEACH Engineering Resources for K-12



A. JAMES CLARK
SCHOOL OF ENGINEERING



AN HONORS UNIVERSITY IN MARYLAND



National Science Foundation
WHERE DISCOVERIES BEGIN



ENGINEERING
GO FOR IT!

JETS



Manufacturing
is cool!
for K - 12

Engineer **Your Life**™
Dream big. Love what you do.

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