Motivating Young Americans to Pursue Robotics Technology

With Support From

- University of Maryland Baltimore County
- SURVICE Engineering
- Maryland State Senator Nancy Jacobs
- NJ FTC
- iCNRG FLL
- Silverpop, Inc.
- Creative Kids at Home
- Leavitt's Freight Service
- Home Education Resources
- Pace Academy
- Custom Direct
- Nehemiah Communications
- The Better Hour
- Broadway Appraisals
- Madonna Veterinary Clinic
- Consolidated Printing
- Enktesis, LLC
- Numerous FIRST Teams

Marco Ciavolino
Founding Mentor for TechBrick
Marketing/Communications & Technology Consultant
*enktesis, LLC
Forest Hill, Maryland

Why Would You Be Interested in Teaching Young People Robotics?

Because we need bright, innovative, young engineers to create and maintain our future technologies.

- Good engineers and technologists are raised before they are taught. The penchant for mechanical and conceptual disciplines comes from a lifetime of involvement.
- For the past five years we have coached robotics teams under programs offered by FIRST.

FIRST programs grow engineers and technologists.

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Why Are You Hearing About This at NDIA?

The Programs/Products You Support Will Require Young, Smart, Capable Engineers

- We will show a program with more than 200,000 participants world-wide.
- We will show you a program that doubles or triples a student's interest in science and technology.
- We will show you a program that will bring to your future projects the talent you need.
- Some NDIA divisions are already working with FIRST, we need the rest of you to consider involvement.

The programs are offered through US FIRST… What is US FIRST?

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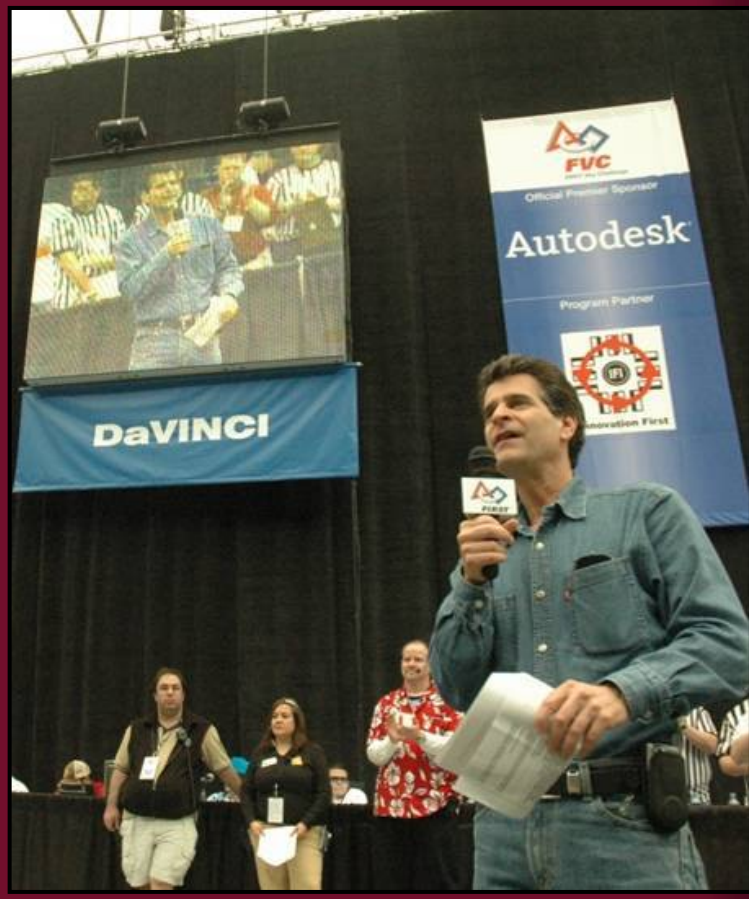
What is US FIRST?

Founded by Dean Kamen

- *FIRST* was founded in 1989.
- To inspire young people's interest and participation in science and technology.
- Provides accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering, and math, while building self-confidence, knowledge, and life skills.



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For Inspiration and Recognition of Science and Technology

This is without a doubt one of the most engaging and challenging programs available.

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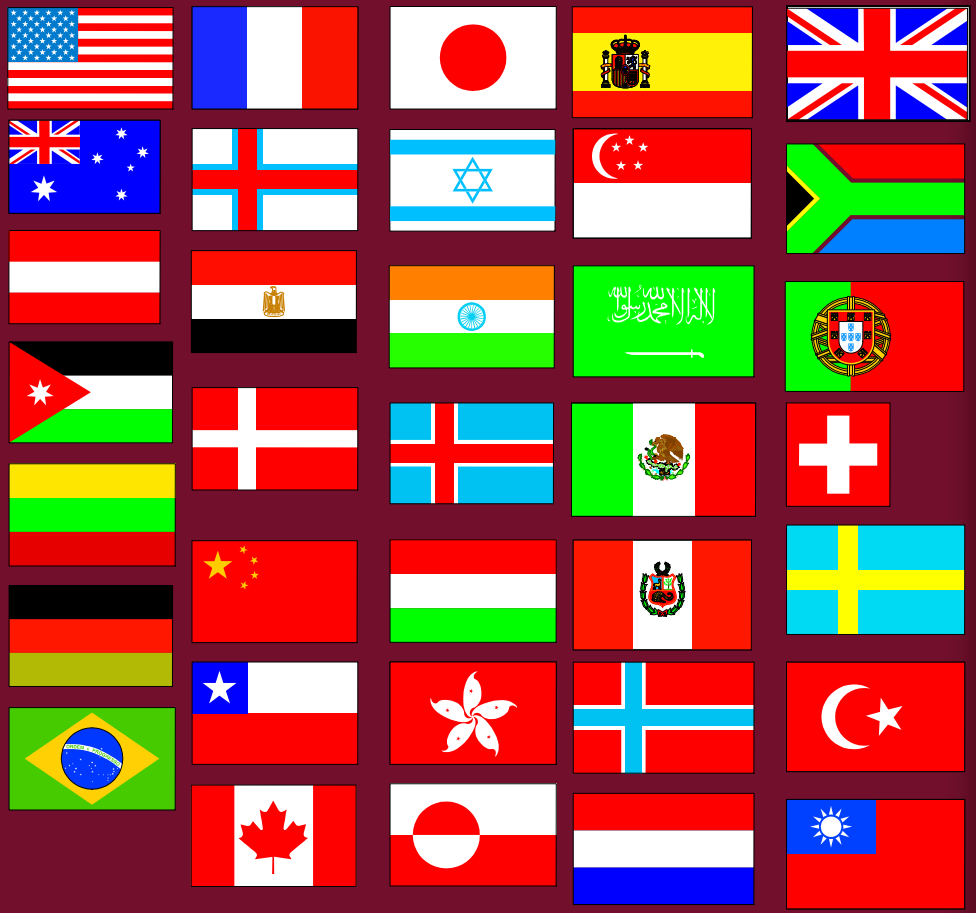
Who is Involved?

Global Participation 2007

- 156,000 Students
- 12,000 Robots
- 44,000 Mentors
- 28,000 Event volunteers
- 39 Countries
- 1000's of Corporate Sponsors

Millions of lessons learned…



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What are the Programs?

JFLL JR. FIRST LEGO® League	FLL FIRST LEGO® League	FTC FIRST Tech Challenge	FRC FIRST Robotics Competition
For ages 5-8	Ages 7-15	Jr. High – HS	High School
Uses the annual theme for project-based work.	Uses annual themes to engage young students in applied research.	Uses a mechanical challenge combined with real-world teamwork and cooperative efforts.	
Based on standard science project materials	Based on LEGO Mindstorms NXT or RCX Robotics Systems.	Based on an advanced robotics system.	
Up to 6	Up to 10	Up to 10	As many as needed.

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What are the Programs?

JFLL: Junior FIRST LEGO League

- Based on LEGO Education Kits.
- 2-6 Students.
- Thematic Challenges.

JFLL
JR. FIRST LEGO® League

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What are the Programs?

FLL: FIRST LEGO League

- Based on LEGO Mindstorms NXT or RCX Robotics Systems.
- 4-10 Students.
- Thematic Challenges: 4 Parts.

FLL
FIRST LEGO® League

power puzzle
NANO QUEST
OCEAN ODYSSEY
MISSION MARS
No limits
CitySights!
ARCTIC IMPACT
DANGER VOLCANIC PANIC!
FIRST CONTACT

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What are the Programs?

FTC: FIRST Tech Challenge

- Based on advanced robotics systems.
- 2-10 Students.
- Uses a mechanical challenge combined with real-world teamwork and cooperative efforts.

FTC
FIRST Tech Challenge

QUAD QUANDARY

Hangin'-A-Round

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What are the Programs?

FRC: FIRST Robotics Competition

- Based on advanced robotics system.
- 10-60 Students.
- Uses a mechanical challenge combined with real-world teamwork and cooperative efforts with mentors and sponsors.

FRC
FIRST Robotics Competition

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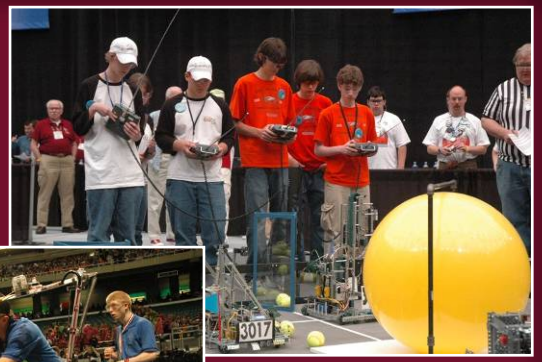
What are the Programs?

International Competition

- 10,000 students
- 6000 mentors
- 1000's of volunteers
- 3 Programs
  - ✓ FLL, FTC, FRC



What are the Results of This Work?

The Numbers

- Steady Growth and Involvement

JFLL – JR. FIRST LEGO® League
3 Years
1000 Teams

FLL – FIRST LEGO® League
10 Years
10,000 Teams

FTC – FIRST Tech Challenge
4 Years
1200 Teams

FRC – FIRST Robotics Competition
14 Years
1400 Teams

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What are the Results of This Work?

Colleges: More than 100 Colleges Offer Scholarships

Colorado State University-Pueblo
Arizona State University
ASME
Boston University
Clarkson University
Cleveland Institute of Art
College for Creative Studies
Colorado Technical University-Denver
Daniel Webster College
DeVry University
Drexel University
Eastern Michigan University
Embry-Riddle Aeronautical University
Fairleigh Dickinson University
Ferris State University
Florida Atlantic University
Florida Institute of Technology
Georgia Institute of Technology
Grand Valley State University
Hampshire College
Henry Ford Community College
Hofstra University
Idaho State University
Illinois Institute of Technology
ITT Technical Institute (combined)
Kansas State University
Lake Superior State University
Lawrence Technological University
Marquette University
Massachusetts Institute of Technology
Mercedes-Benz USA LLC
Michigan State University
Michigan Technological University
New Hampshire Technical Institute
New Jersey Institute of Technology
Northeastern University
Ohio State University
Olin College of Engineering
Oregon State University
Pennsylvania College of Technology
Phil Clancy Scholarship
Polytechnic University
Purdue University/Delphi Corporation
Raytheon Company
Rensselaer Polytechnic Institute
Rochester Institute of Technology
Schoolcraft College
Society of Women Engineers
Southern California Regional Robotics Forum
Spring Arbor University
Temple University
University of Arkansas-Little Rock
University of California-Davis
University of Central Florida
University of Delaware
University of Denver
University of Hartford
University of Illinois-Chicago
University of Kansas
University of Massachusetts Lowell
University of Michigan/Delphi
University of Minnesota
University of Missouri-Kansas City
University of Nebraska-Lincoln
University of New Hampshire
University of Rochester
University of South Carolina
University of Southern California
University of Toronto
University of Waterloo
Virginia Commonwealth University
Washington State University
Washtenaw Community College
Wayne State University
Wisconsin Lutheran College
Worcester Polytechnic Institute
Kettering University

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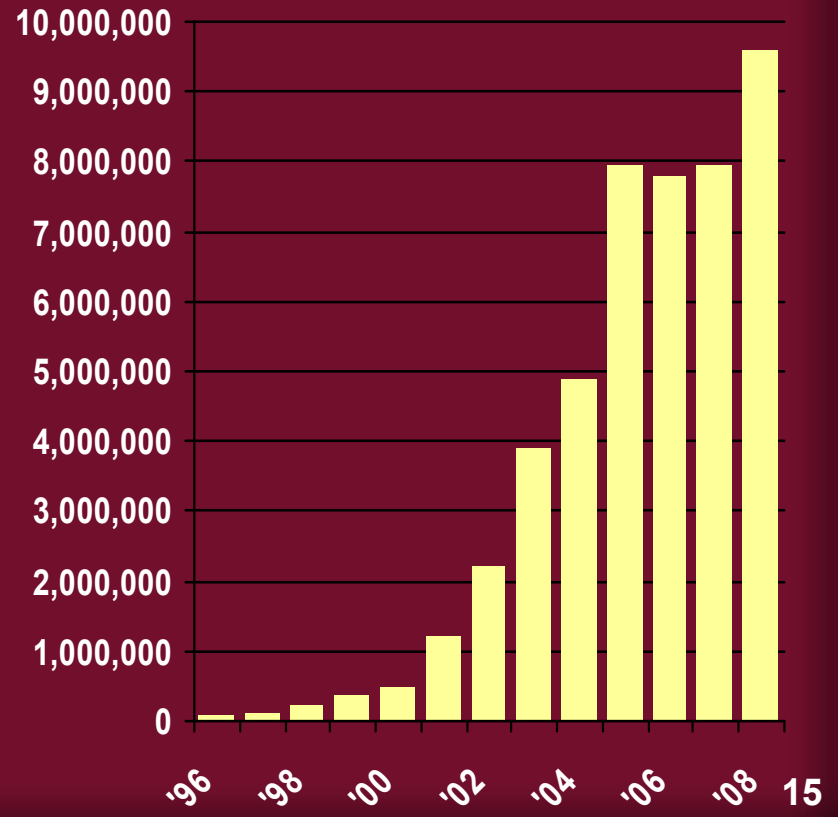
What are the Results of This Work?

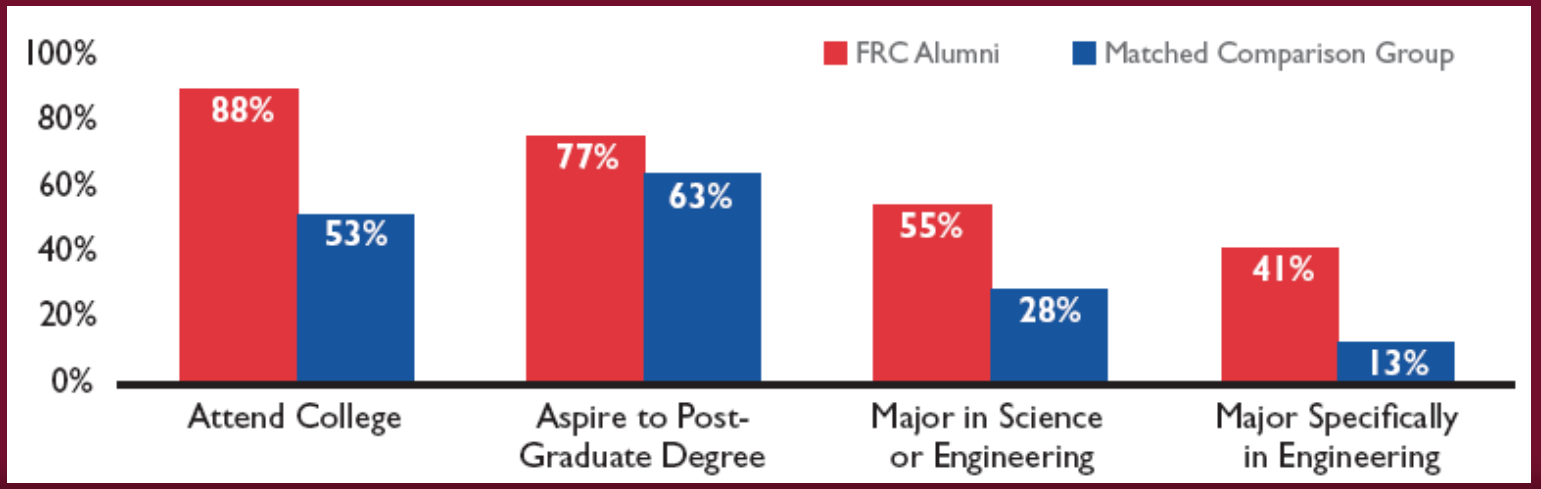
Over $9.5 million in scholarship funds available to *FIRST* participants



What are the Results of This Work For Our Nation?

The Alumni

- *FIRST* Students vs. Comparison Group:
  - ✓ Seek Education in Science & Technology.
  - ✓ Twice as likely to major in science or engineering.
  - ✓ More than three times as likely to major specifically in engineering.



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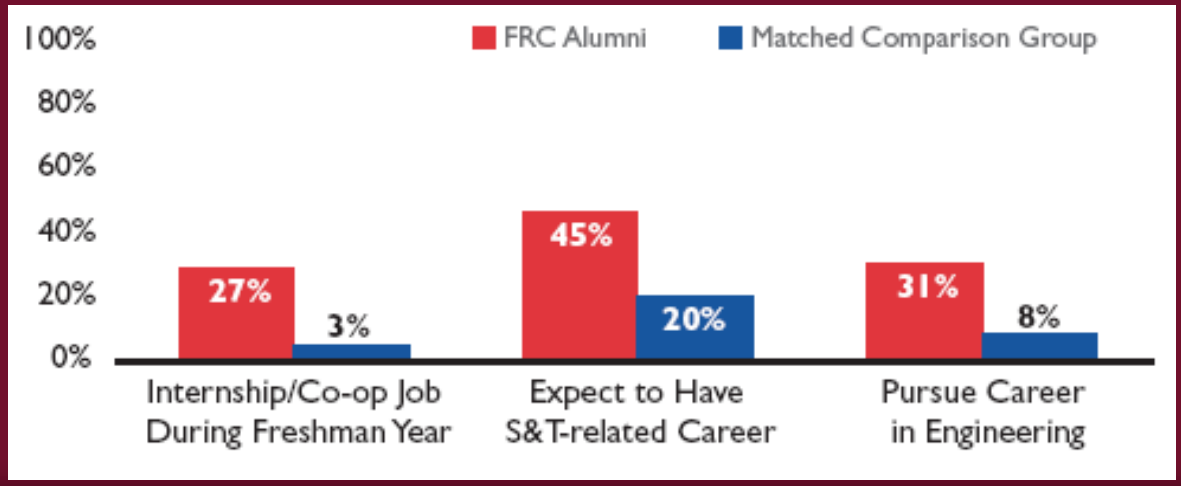
What are the Results of This Work For Our Nation?

The Alumni

- Earn Career Opportunities:
  - ✓ Almost ten times more likely to have an internship.
- Expect to Pursue Science & Technology Careers:
  - ✓ More than twice as likely to pursue S&T career .
  - ✓ Nearly four times as likely to pursue career specifically in engineering.



Real-World Results: TechBrick Robotics

Our History

- TechBrick was formed 2004
- First competition in 2005
- Growth from 20-120 members
- Monthly activities
- 30 team participants in 2007-08
  - ✓ JFLL, FLL, & FTC
- Interest continues to grow
- Organized Maryland JFLL Tournament
- Regional seminars on starting a team
- First high school judges for FLL

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Real-World Results: TechBrick Robotics

Monthly Meetings

- More that 120 children registered
- Builds interest for teams
- Creative exercises
  - ✓ Animation
  - ✓ Documentation Tasks
  - ✓ Boat building
  - ✓ Bridge Building
  - ✓ Guest Speakers

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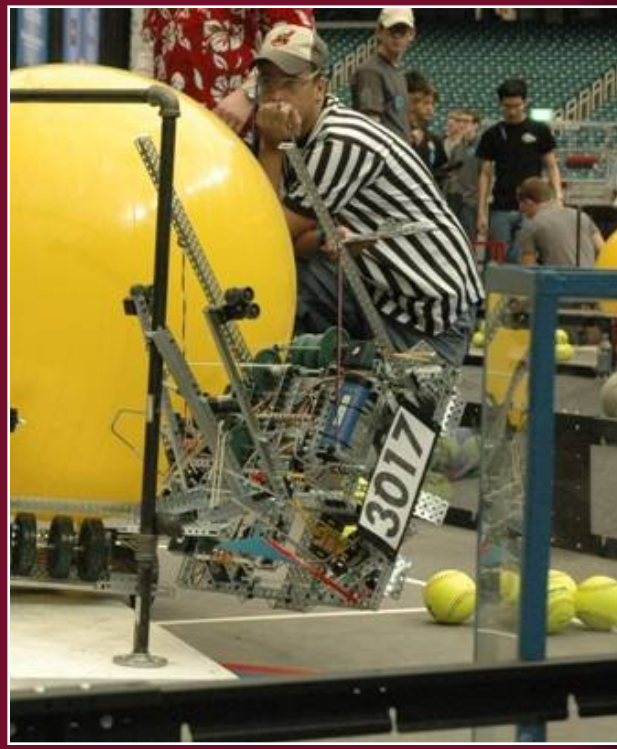
Real-World Results: TechBrick Robotics

Competition Teams: Innovative Solutions

- Light Sensor: Improved by 1200% (FLL)
  - ✓ Using a 'Spider Man Magnifying Glass'
- Sideways Stepping Bot (FLL)
  - ✓ Drive forward, step right and left
- Torque/RPM Discoveries (FLL)
  - ✓ Design to specifications exercise
- Ball and Bar Lifting Bot (FTC)
  - ✓ Capture the primary object
- Ring Lifting Automation Device (FTC)
  - ✓ Pickup rings with materials handling device



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Real-World Results: TechBrick

State Competitions

- UMBC (University of Maryland, Baltimore County)
- TCNJ (The College of New Jersey)
- UD (University of DE)
- CSM (College of Southern Maryland)

Real-World Results: TechBrick Robotics

Award Winning Results

Team Spirit

Innovate Awards

Amaze Award

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Real-World Results: TechBrick Robotics

A Robust Website with Useful Resources

- Team Tips
- Worksheets
- Projects for group work
- Photos and guidelines
- Global traffic

Real-World Results: TechBrick Robotics

Community Service

Local Presentations to Sponsors

SURVICE Engineering Corporation

Library Programs

LEAP Science is Fun! LEARN EXPLORE AND PLAY

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Real-World Results: TechBrick Robotics

Media and Fun

Adopted Team Members

THE AEGIS — FRIDAY, MARCH 30, 2007 — www.theaegis.com

Robotics team heads for international competition

Five Harford home-schoolers build bots

BY AMBER WOODS

'It's so cool what they do'
—Marco Ciavolino

Featured in Media

Real-World Results: TechBrick Robotics

Focused Children: Good for America…

- Of the 50+ children on teams over the past five years at least half have been encouraged to pursue math, science, and engineering studies.
- Numerous innovations in research, design, and execution.
- Lessons learned in…
  - ✓ Project Management
  - ✓ Processes
  - ✓ Teamwork
  - ✓ Implementation
  - ✓ Competition
  - ✓ Design
  - ✓ Research

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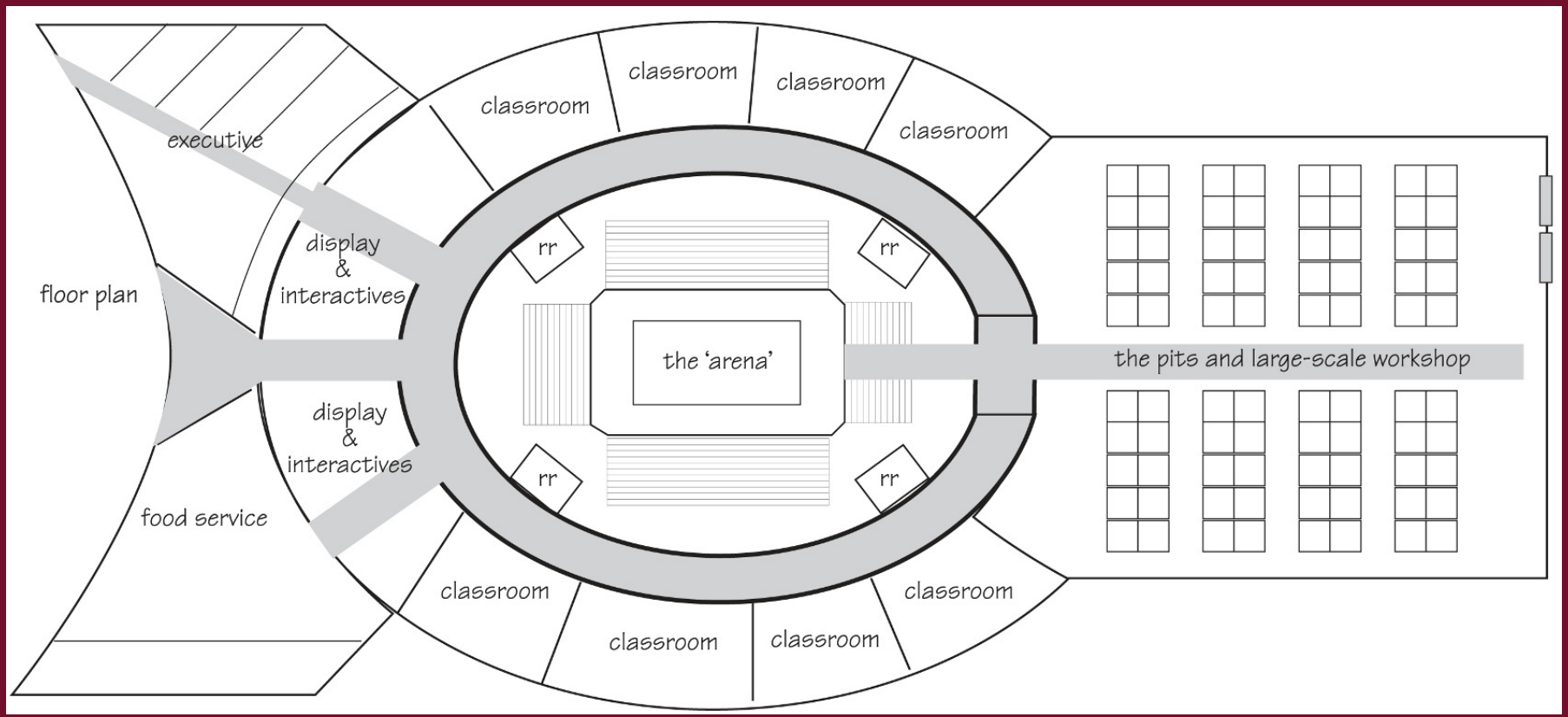
Real World Results: Around The World

Our Experiences Have Been Repeated Around the World

- Thousands of schools and organizations have done exactly the same work.
- Young engineers are now in the workplace or on their way to productive, effective careers.

TechBrick Robotics: Our Dream

A Regional Robotics Center



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TechBrick Robotics: Our Dream

The First National Robotics Center

- A multi-use facility
  - ✓ Ongoing classes
  - ✓ Regional and national robotics competitions
  - ✓ Technology tradeshows
  - ✓ Technology meetings and conferences
  - ✓ Parties and events (themed)
  - ✓ Educator training (CEU)
  - ✓ College Internships
  - ✓ Outdoor space for large vehicles and displays
    - ✓ Robotics 'mini-proving grounds'

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How Can You Help?

These Are Some Of The Attending Companies That Are Already Involved Nationally With FIRST…

BAE Systems
The Boeing Company
Air Force Operational Test and Evaluation Center
Northrop Grumman Corporation
General Dynamics Corporation
Lockheed Martin
Naval Air Warfare Center Weapons Division
Aberdeen Test Center
Edwards Air Force Base
GA Tech Research Institut
Honeywell International, Inc.
Lockheed Martin
Raytheon Company
US Army
USAF

Let's Take a Look at The Benefits of Getting Involved…

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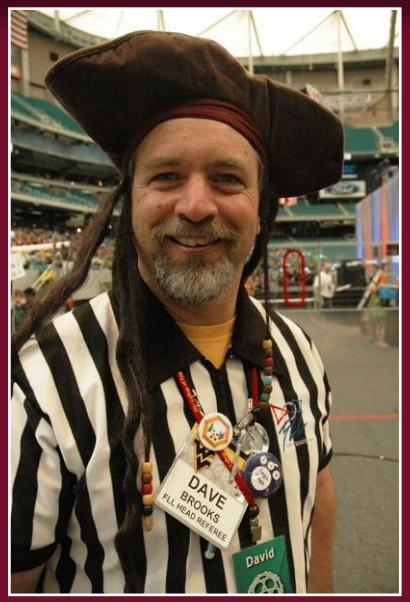
How Can You Help?

Consider the Opportunities

- Supply equipment/parts.
- Offer scholarships.
- Provide facilities for teams and events.
- Assign mentors, volunteers, consultants.
- Create internship opportunities.
- Financial support.



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How Can You Help?

Consider the Benefits To You and To Our Nation

- Strengthens public relations and community relations.
- Builds national technological literacy.
- Creates an incubator for interns and future employees.
- Motivates volunteer opportunities for employees.
- Applied professional development for employees.

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How Can You Help?

Find a US FIRST team in your region and get involved:

- Visit the US FIRST website at www.USFIRST.org to get a full understanding of the program.
- Be a champion for participation within your company or association.
- Start a FIRST program in your child's school.

- If you're from the Aberdeen/Edgewood Area
  - ✓ Consider assisting TechBrick with a corporate sponsorship. Visit www.techbrick.com/support for more information.

Who to Contact…

- Contact Marco Ciavolino for information about The National Robotics Center or TechBrick (marco@techbrick.com, 410-838-8264)

- For information about involvement in FIRST nationally, contact Cindy Randall for information. (crandall@usfirst.org, 603-666-3906 x403)

A Simple Way to Assist Today…

The *iRobot Roomba* is clearly the first successful home robot.
Stop by our booth for a chance to win a Roomba...

Keep your home or office *'Roomba'* clean…

Make a suggested contribution for one or more tickets. Join us at the awards luncheon on Wednesday for the drawing.

Our thanks to iRobot for providing the Roomba

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