

# 2006 Programs

MAINE'S SOURCE FOR ENGINEERING AND PROGRAMMING EVENTS

## UPCOMING EVENTS

**April 17<sup>th</sup>-21<sup>st</sup>, 2006**

Vacation Engineering/Robotics camp for 9-14 year olds

**April 29<sup>th</sup>, 2006**

Spring Robot Track Meet, USM

**May 6<sup>th</sup>, 2006**

Spring Robot Track Meet, MMA

**May –September, 2006**

Registration for FIRST LEGO League

**July-August, 2006**

Summer camp programs:

Beginner and Advanced sessions  
Orono, Bangor, Portland, Augusta

**September-December, 2006**

FIRST™ LEGO® League Season

**September-November, 2006**

Teacher workshops, TBD

**December 2<sup>nd</sup> & December 9<sup>th</sup>**

Southern FLL Tournament

Northern FLL Tournament

## EDUCATIONAL MATERIALS

**NEW Learning Modules available from Maine Robotics**

For the past several years we've been working on having easy to use (for the kids AND the adults) learning modules. These are double-side, single page,



laminated, self-taught modules that teach and demonstrate the basics of building robots and programming them.

Each module covers a topic that we know from experience is important to building good robots. Most include the programming tips or example programs for use with the projects listed.

Our first bundle of 10 is now available for sale and can be found on our website. The 10 topics are:

1. Building a Robot
2. Building a Pivot Wheel
3. Using Gears, Part I
4. Using Gears, Part II
5. RoboLab Basics
6. Turning your robot
7. Using a Touch Sensor
8. Using a Light Sensor
9. Line Following
10. Using a Rotational Sensor

They will be available as a pack of ten (one each) or for purchase as a ten pack of a single module. With each purchase we include free, the teachers guide for that unit(s) to help even a novice engineer start working with the children and the robots.

We were expect our second ten pack out by the end of the calendar year but are now awaiting release of the new NXT-RoboLab programming language from LEGO.

## WORKSHOPS

### Introduction to LEGO® Robotics and RoboLab Workshop

This workshop is designed to familiarize teachers, coaches, and parents with the LEGO® MindStorms product; the RoboLab programming system; and introduce the different programs sponsored by Maine Robotics.

No prior experience is necessary; however it is highly encouraged that you bring a laptop with you. We have some, but not enough for all participants. All other equipment is included.

0.6 CEUs available

### Advanced Programming in RoboLab

This workshop continues where the introductory workshop leaves off. The workshop assumes you have worked with RoboLab but need more instruction on the more advanced programming elements.

The workshop covers containers (variables), timers, loops, forks, subroutines, event management, and RCX to RCX communication.

0.6 CEUs available

### Introduction to RoboLab Investigator

Designed for novice and experienced robot builders this workshop focuses on using the Investigator portion of RoboLab. Did you know that you can use the RCX for real time data acquisition? Did you know you can use it for data logging?

We also introduce the major sensors and attendees collect data and develop plans for using the system for collection of prime data in classroom settings.

0.6 CEUs included

## CAMP PROGRAMS

### Our Vacation and Summer Camps Programs



Each year since 2002 Maine Robotics Director Tom Bickford has been working with children as part of a summer camp program. In 2005 there

were a total of 141 camper weeks, with each week being a 5 day, 6½-7 hour program.

Camps were operated in Orono, Bangor, and Readfield. In 2006 we expect to have camps in Portland as well.

This program gives children the opportunity to work with adults who specialize in engineering, computer sciences and are also educators skilled at mentoring the inquisitiveness of the youth.

### **STATE WIDE PROGRAMS**

#### **The FIRST™ LEGO® League Tournament**

The FLL is a rapidly growing international program designed to foster an interest in science. FIRST means For Inspiration and Recognition of Science and Technology and was founded by famed US inventor Dean Kamen. It was first piloted in 1998 and Maine has been a part of the program since 2000. In 2005 there will be close to 45,000 children across North America participating in the program, making the FLL one of the largest, and certainly one of the fastest growing programs of its kind.

Each fall teams with children from 9 to 14 build, test, and program robots to perform a series of thematic missions on the year's playing field. The teams also research a related topic, prepare, and then present their hypothesis, findings, and recommendations for using robotics to improve a condition they have identified.

For 2005 the theme was "Ocean Odyssey". Oceans provide inspiration, fun, and food. They absorb carbon and generate oxygen, profoundly affecting the global environmental system. A distress call was issued to FIRST LEGO League teams around the world to find solutions that will sustain the health, biodiversity, and productivity of the world's oceans for present and future generations.

The 2006 theme will be "Nano Quest" and focus on the technologies associated with the microscopy world of nano technologies.

Registration for teams starts at the beginning of May and continues through the end of September. If you're

interested you should check out our website and [www.firstlegoleague.org](http://www.firstlegoleague.org) for additional information.

We are already starting to gather our volunteers for this year. So if you are interested in helping out at one of the tournaments just let us know!

#### **NEW for FLL in 2005**

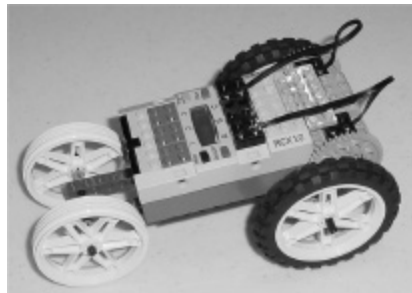
New in 2005 were our two tournaments and a grant from FIRST to help increase the program and number of teams in Southern Maine. We were also happy to make alliances with both the Maine Maritime Academy in Castine and with the University of Southern Maine's School for Applied Science, Engineering and Technology. Thanks to both of these institutions for hosting the event sites!

#### **Maine's Spring LEGO® Track Meet**

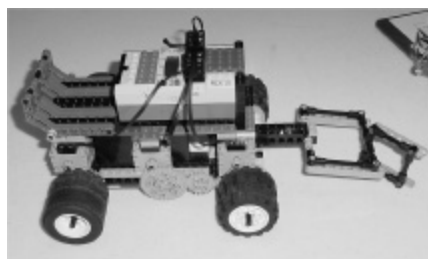
**Our first year offering this program was met by teams from around Maine who came and competed in our 6 track events!**

There were 31 robots and bridges entered into the competition and the competition was fun and fierce!

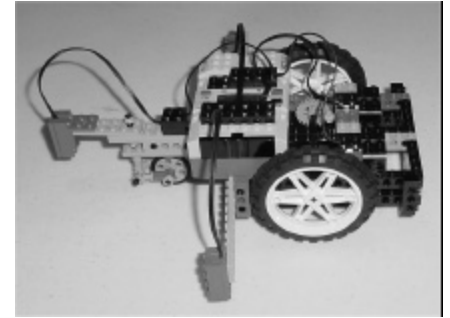
The **fastest robot** went to Lego Motion from Trenton with their 453 gram wheeled robot (2.7 seconds for 15 feet)



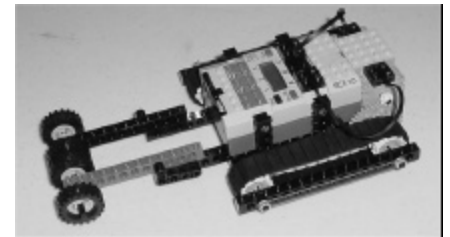
The **strongest robot** went to Bacon Cheddar Ranch from Surry with their 1052 gram, 6-motor wheeled robot. The robot pulled 40 pounds the required two feet in just 16 seconds.



The best **table navigating** robot AND the fastest **line follower** went to the Trenton Lego Lions with their 508 gram robot. All four sides of the table were navigated in just 6.5 seconds! and the line course was run in just 9.5 seconds!



Perhaps one of the most impressive this year was the **slope climbing event**. One of the teams from the Troy Howard Middle School finished first with their 459 gram treaded robot (okay it also had some wheels) by being the only robot that could climb a 70 degree slope. Their robot finished the climb in just 16 seconds!



The last event was the **bridge building competition**. Teams had to span approximately 22 inches and hold up to 60 pounds! This year it went to a young team from Jay Maine. The Jay Mind Builders fielded a bridge that carried all 60 pounds (maximum tested) and won by being the lightest bridge in the event. Their bridge came in at 1747 grams and bested out the #2 bridge by being 1100 grams lighter!



The track meet is geared toward using more straightforward principles of physics and programming in order to compete in a track meet event.

There is something for everyone and we look forward to the spring 2006 season.

We will work with any interested teacher or group in educating our youth on the basic principles of physics, engineering and programming needed to successfully compete.

The program is good for either experienced FLL teams, or new groups starting out for the first time.

## ***OTHER RESOURCES***

### **Join our Yahoo Group**

Maine Robotics hosts a Yahoo Group for teachers, youth, and coaches interested in getting in touch with each other and building the programs here in Maine. It is open to one and all who want to post discussions, images, etc. about their robots.

Just visit the group at the following link:

<http://groups.yahoo.com/group/mainerobotics>

### **Website for Robotics**

Maine Robotics has enlarged our website since 2004 and since February 2005 we have had over **125,000 hits** and over **15,000 visitors**. The site provides on-line information about our programs and helpful background information and links to other useful sites.

### **Newsletter**

Maine Robotics periodically sends out our newsletter to over 900 schools and people in the State of Maine interested in these programs. Our newsletter is also available on-line, but we believe it is important to provide hard copy for teachers to easily share with their classes.

### **Call for Articles**

Maine Robotics would like to offer this space for coaches, teachers, and professionals who would like to submit articles about how they use robotics in their community, school or business.

Submissions should be 700 words or less and if they include pictures or diagrams they must be original work and belong to you.

Sorry but no pictures of children are allowed. However, pictures and drawings of robots, programs, structures,

tools, etc. are greatly encouraged. Submissions may be through e-mail or post. Visit our website for guidelines for submission  
[www.mainerobotics.org/articles.html](http://www.mainerobotics.org/articles.html)

### **What can these robots do?**

By Tom Bickford

When I first posted this section we hadn't run the Robot Track Meet. I didn't know what to expect I just knew it would be awesome, and it was. Who would have thought a LEGO robot could pull 40 pounds across the floor in just 16 seconds, or that another robot would be able to climb a 70 degree slope.

During summer camps this year we were able to make it up to an illusive 72.5 degrees, but it took many, many, many attempts.

Here are some examples of what they can do.

- They can operate motors and lamps using their output ports
- They can take input from a variety of sensors
- They can log data for short or long periods of time (log the temperature in your classroom every 10 minutes for a day)
- They can utilize pneumatic controls, pumps, and cylinders to do work
- They can talk to each other using IR communications (We had a number of remotely controlled RCX to RCX robots this summer)
- They can talk to the computer (while running) to share information or ask for new instructions
- They can post their information to the web in real time through their computer and make that information available to anyone
- They can be used to model existing or new equipment or test out new concepts. (Idea, model, build, test)
- Use a USB camera and included software to "see" the environment around the robot

#### **What they can't do:**

- Don't submerge them in water
- Don't drop them from any height and expect them to survive

- Pull a 1000 pounds across the floor (at any perceivable rate)
- Bulldoze down a house (unless it is made of LEGOs)
- Run for a year on 6 AA batteries

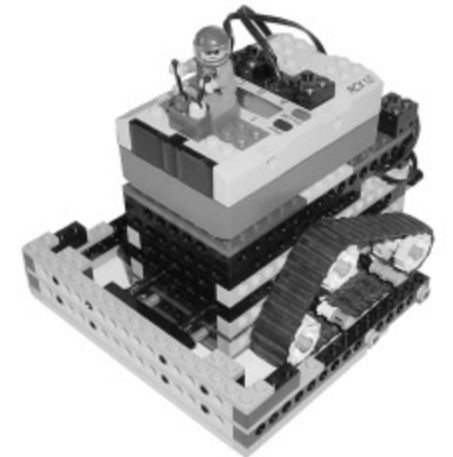
### **Partnering With Others**

Maine Maritime Academy in Castine will be host to the 2006 Northern FIRST LEGO League Tournament and to the Spring Robot Track Meet.

University of Southern Maine, School for Applied Science, Engineering and Technology will be host to the 2006 Southern Spring Robot Track Meet and hopefully to the Southern FLL Tournament. We are also working with USM to bring summer camps to the USM-Gorham campus.

Zoey's Room/Platform Shoes and Maine Robotics have worked together and are hoping to build a better collaboration to serve the girls in Maine who are interested in science and engineering.

Maine Robotics has worked for the last two years with Learners Without Borders, an afterschool program serving schools in several Maine communities.



## About Maine Robotics:

Maine Robotics is home to Maine's FIRST™ LEGO® League, Maine's summer robotics and engineering camps for youth, the Spring LEGO® track meet, and the High School Robotics and Programming Competition.

Maine Robotics believes that only by working with Maine's youth from an early age and continuing through their entire educational experience can we expect our youth to successfully grow into the fields of science, engineering, computers, and technology.

Our youth want the experiences, they are ready for the tasks and lives that lay ahead of them, but we as a state and a people must help them realize this potential for their sakes as well as the sake of our state's well being.

Maine Robotics' Director, Tom Bickford, is an educator and an engineer with decades of experience in both the education and science fields. Tom holds degrees in both biology and biomedical engineering and has a background working on state-of-the-art telemedicine systems while at UNC and the UTHSC in San Antonio. Tom has taught at the middle school, high school, and college levels.

Maine Robotics is a Maine non-profit corporation. Board Members include Thomas Bickford (President), Sally Coppus (Learning Without Borders and CBE), and former state representative Tom Sawyer.

**Maine Robotics also can come to your school or facility and provide on-side mentoring and instruction for adults or children (or both). Please contact Tom Bickford for more information**

## Maine Robotics

167 Bennoch Road  
Orono, ME 04473

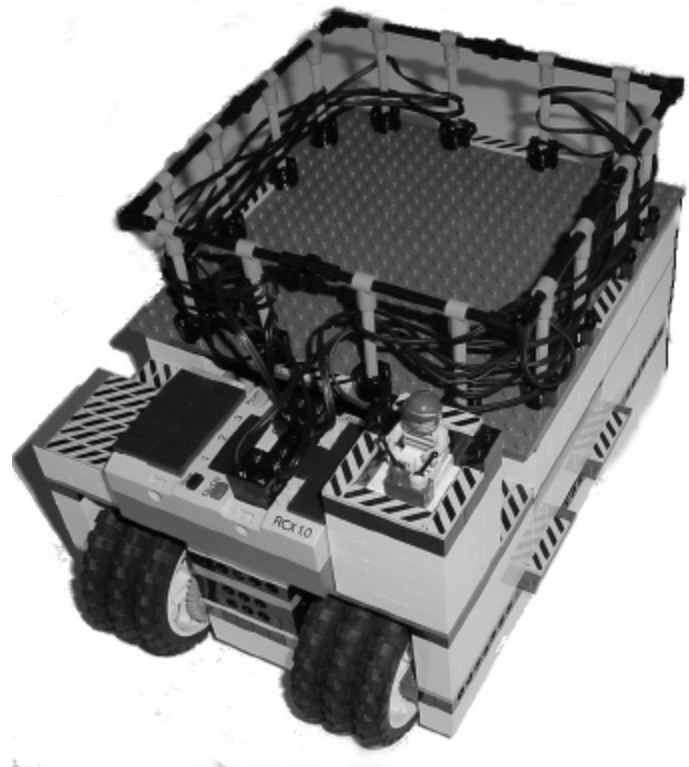
207-866-4340

Tom Bickford, Director  
bickford@mainerobotics.org

**[www.mainerobotics.org](http://www.mainerobotics.org)**

The PowerBot has 4 motors, 12 all-wheel drive tires, and can hold a gallon container on top for ballast. It is driven by a 250:1 gear reduction drive train that can easily pull 60 pounds across the floor (on a cart) but does it very, very, very slowly.

(Send us a picture and description and maybe we can include your robot in a future newsletter!)



A remotely controlled crane powered by the LEGO RCX, programmed on the computer and built by the kids! They built a turntable to distribute the weight, a motorized take up arm and are shown here lifting a weight of LEGO plates (white shown on right)