

***BadgerBOTS Robotics***  
***Team 1306***  
***Chairman's Award 2006 Application***

**Team Number** 1306  
**Regional Selection** Wisconsin Regional

**Executive Summary**

**Team Name** BadgerB.O.T.S.

**Corporate/University Sponsors**

GE Healthcare, Thermo Electron, TomoTherapy, Anchor Bank, PTOs of Huegel, John Muir, Glenn Stephens, and Orchard Ridge Elementary and Jefferson Middle Schools.

**Briefly describe the impact of the program on team participants (500 characters)**

Robotics has taught us to change our focus from ourselves to others, from pure outreach by talking about what we do, to the development of opportunity for others to participate directly in our programs. We have learned that we are at our best when we take responsibility for gaining knowledge and skills, when we commit to solve a problem or complete a task. We know ourselves better than before, and can choose a path for our future that is realistic and that serves our goals.

**Give role model examples for other teams to emulate (500 characters)**

As a team we focus on expanding opportunities for others through fund-raising and mentoring. We created a 10 day robotics summer camp and sponsor two full scholarships based on need; started 5 FLL teams (8-10 for next season); and have grants pending for a Mobile Robotics Technology Lab and for 3 Tech Club kits to extend our program into the school and after-school settings. We step up and volunteer... to mentor, to host a tournament at the last minute (FLL state this year)—whatever is needed.

**Describe the impact of FIRST on your team and your community (500 characters)**

Robotics has allowed us to come to know ourselves and to make informed decisions about what we need to do to accomplish our goals. Through grants we brought the Project Lead the Way curriculum into our high school this year and promoted it to the point that it is funded for next year across all four of our high schools. We obtain the funding to donate equipment to programs in our schools. We created a FLL kickoff rookie refresher used for 41 Kansas City teams. We build and share.

**Teams innovative methods to spread the FIRST message (500 characters)**

We started a two-week, themed, BadgerBOTics Robotics summer camp experience. We started 5 FLL teams and are expanding the program. We are creating a Mobile Robotic

Technology Lab for use by 12 FLL teams, teachers for classroom instruction, and for a summer camp on the road. We are creating 3 Tech Club kits to support after-school, recreational, non-competitive STEM area explorations. Videos promote each of our programs. We hold open feedback and revision meetings for each of our programs.

### **Strength of your partnership**

Over the last three years we have greatly expanded our connections to business, university, and community partners to help in developing our programs. We have drawn mentors from major local businesses, UW-Madison graduate students in engineering, and numerous teachers, parents, and even former parents who helped to fund-raise and mentor our programs. Many of our students have stayed in touch with, or even work for, their mentors after they graduate from our program.

### **Communication methods and results**

We make almost 100 school informational presentations per year, do robotics demonstrations at the FLL regional and at local events, attend two summer activities fairs and produce an external mass mailing to 450 local companies and an internal mass mailing to 15000 elementary and middle school students. We speak at PTO meetings for each of our feeder schools and hold feedback and revision meetings for our programs.

### **Other Matters of Interest**

#### **Photos 4 1mb**

#### **Essay 10000 characters**

The three year history of the BadgerBOTS robotics team is one of responsiveness to student and community needs. In our first year we focused on the robot—designing the mechanical and electrical systems, programming, testing, and revising. When we weren't building, we were out in the community making presentations to school groups and at evening gatherings of students, teachers, and parents. This dual focus was effective and earned us the Rookie All-Star Award. But it wasn't enough for us as students... there was more to be gained from this experience.

Our emphasis during the second and third year of our program shifted toward being inclusive of every interest group (animation, Inventor, web, etc). Through it all, our emphasis has remained the same... challenge ourselves to do more, do better, make an impact not on ourselves, but instead on those around us. This past year, our program has transformed itself into a year-long program that involves training for us, training for teachers at our outreach schools, a summer camp, and LEGO League for five of our elementary and middle schools.

The experiences we gained have demonstrated to us the impact of becoming experts at a skill (or area of knowledge) and the pride that we can take when we share our leadership, communication, and mentoring abilities with others. Robotics for us has become not just

another activity; it is a call to service. While we have gained personally from the access to resources, training, experiences, scholarships (including the WPI full ride!) and career education, our greatest pride has been the changes that we have made in our lives, our schools, and our community.

When we were a rookie team, everyday was a scramble to survive. It was huge to have other teams to emulate in terms of how they structured their team, raised funds, etc..

During our second year we felt that we had figured out how to manage ourselves and the high school level program, but that was really all that we were doing, serving ourselves.

What we realized is that all of the community outreach, presentations, demos, videos, etc had accomplished was... well, not enough. We had created the inspiration and the interest, but we hadn't created the means to participate.

We now develop infrastructure and content that allows active participation in science, technology, engineering, and mathematics (robotics) programs in parallel and in conjunction with the demos and presentations. Last year we started a summer camp program for upper elementary and middle school age students. Within weeks of advertising the camp it became obvious that there was plenty of interest, but also barriers to participation mainly in the form of limited family income. This time, we identified the challenge early enough to do something about it. By unanimous vote we established two full scholarships for the summer camp. In the first year of the camp both of these scholarships were utilized.

In early fall we started our first five sponsored LEGO League teams at our feeder schools. The program directly impacted more than 70 students, 10 team coaches (teachers and parents) and many actively involved parents. The last major innovation that we have made this year is to include a student, parent, and teacher feedback and revision process in every one of our programs. The sharing of ideas has made a huge impact, changing what we will do in our future camps and for our FLL teams and defining new projects that we are now pursuing (see the *Innovations* section). It is our belief that behind the technology, the software, and the activities are people. The program must always be about providing them with an experience that is interesting, inspiring, and life altering in a significant and positive way.

The BadgerBOTS FIRST robotics program has changed the culture of our lives and of our schools. On a personal level we have grown to realize that it is far more worthy to work hard and innovate to the benefit of others than it is to do the same for ourselves. In a sense, this is because the program so clearly and consistently communicates the two key words of graciousness and professionalism. We have all come to understand that to live these ideals changes the world around us, and repays us ten-fold in the end. As students we have gained an understanding of the world of science, technology, engineering, and mathematics (STEM). This has allowed us to make informed decisions to either participate (or not) in the world of professional STEM. Our recent graduates have been extremely happy with the business, marketing, computer programming, mechanical, electrical, aeronautical engineering, and nutritional science and physical education degrees that they are pursuing. Robotics has given us the insight into ourselves that was essential for helping us to decide who we desired to become.

For our community, BadgerBOTS and FIRST robotics have made a huge impact leading to the implementation of the 'Project Lead the Way' curriculum in our school this year, and district wide implementation at the high school level for next year. Last year the

BadgerBOTS program donated four new computers and access to our Inventor software to our applied technology classroom, so that a Project Lead the Way IED lab could be created. This year we donated three more computers to the Memorial High School physics program to support its research and video fieldtrip projects.

BadgerBOTS developed FLL kickoff materials that were shared with the national office and were used for a rookie team refresher for 41 teams in the Kansas city area. We provide volunteers for our regional competition and offered to host the state tournament with just 4 weeks notice! (an original site finally committed) In 2006 we committed to host our regional.

BadgerBOTS promotes the idea that it is "Hip to be Techie". We provide avenues to participate that are competitive for the self-selected and highly motivated, in the regular classroom for all, and for the interested but non-competitive student as well (see Innovations section). BadgerBOTS is the mechanism through which we have been expanding both the depth and the breadth of STEM area education in our district.

In our first year of participation we did the easy things... handouts, video, school presentations and demos. We went the extra mile to do the science and fun nights at our feeder schools. But really, we created the buzz but didn't deliver the goods. Our second year was the time to "get it done".

During BadgerBOTS second season we created a two-week long summer camp for upper elementary and middle school students. The camp was full service with a space theme, t-shirt, daily snacks, a fieldtrip to a manufacturing plant that uses robots, and a culminating tournament. This summer we will serve 24 campers per session and are optimistic that there will be sufficient interest to support two camp sessions.

In our 2nd year we also implemented a LEGO League mentoring program. We obtain the financial sponsorship and provide the teaching, mentoring, and logistical support necessary to run the FLL team. We started 5 teams in our feeder schools and all successfully completed the season - one even qualified and participated in the state tournament! This year we are expanding the program to serve 8 to 10 schools.

In response to our feedback and revision meetings, we wrote grants to implement two new programs. The Mobile Robotics Technology Lab is a wireless computer lab of 12 laptops with printer, data projector, RoboLab software and 12 LEGO robotics kits. It will serve FLL teams in the fall, be available for checkout by trained teachers in the spring, and will allow our summer camp to go on the road. The project will provide combined FLL and teacher trainings in the spring. Another project creates three Tech Clubs. Tech Clubs provide LEGO robotics components, RoboLab software, and four themed mission board sets. As a result 16 students in three schools at a time can pursue their STEM area interests in a recreational and low pressure setting. Students can participate over 4 years without repeating a theme.

We impact our school by donating equipment. We provide the proof of how important these programs are. Our actions led to PLTW being implemented in our school and now throughout our district. This makes a huge impact on the entire student population of Madison.

We are lucky to have mentors from the Madison Metropolitan School District, GE Healthcare, TomoTherapy, TDS Metrocom, the UW-Madison engineering schools, and parents. The program makes an impact in their lives. Many continue their support after their child graduates. Many volunteer their time and talent throughout the year. Our

mentors share their time, energy, expertise, and reputations to make the program better. Many of our students ask the mentors to write their primary letter of recommendation for college admission and scholarships. A number of our students have worked with, or for, the mentors after graduation.

Through our projects we are effectively and persistently working with our school, the school district, our feeder schools, the students, teachers and parents to continue to develop, refine and expand our programs.

Our primary means of communicating our programs to the schools and public has been to make presentations in schools, do demonstrations at after school programs, promote our summer camp and LEGO League through two summer activities fairs and a newspaper advertisement, and through two mass mailings to businesses and every elementary and middle school student in the district (18,000 students). We hold feedback and refinement meetings for each of our major programs. These meetings are open to parents, teachers, and business community representatives. We maintain a website, produce videos, support an email listserve and make a weekly presentation by subteam to the entire team during the FIRST robotics season.

**electronic signature mentor and student**