Challenge X 2007
Final Outreach Report

Team: The University of Tennessee

Name of Outreach Coordinator: Scott Curran

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Dedicated Outreach Coordinator (Y/N): N

If no, please list other role the O.C. has on your team: Exhaust Team

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II. Outreach Activity Executive Summary

The Team Tennessee outreach program for year three focused on sustainable mobility education, team branding and community awareness. The Year Three outreach program was a major focus for the team especially when compared to the year 2 outreach program. The major changes in the outreach program included a branding campaign with the renaming of the Equinox as the Revolution X. The team received outreach grants and external funding for variety of outreach material including brochures, posters, team pens, team mugs and shirts. The team was also able to get the brochures translated into German, Dutch and French. A dedicated core group of team members made the increased number of outreach events possible. The team had many successful youth education events including a presentation about the basic physics behind hybrid vehicles to two high school physics classes. Other events included a day of alternative fuels and hybrid introduction to troops of girl scouts which culminated in giving them a design challenge using the SAE A World in Motion balloon vehicles. The team competed in two regional SCCA Solo 2 autocrosses during year three. The presentations from these and other events were posted to the website and videos from the autocross and the Balloon Toy races were all posted to You Tube.

The third year of competition also resulted in many new outreach partners including the East Tennessee Clean Fuels Coalition, and the UT Biodiesel program. These partnerships allowed the team to magnify the focus of alternative fuels and hybrid education.

The team was able surpass the requirements for each category except the sponsor outreach category in which we met the minimum requirements. The team did not get to do everything they had planned including the dean ride and drive which had to be canceled due to a conflict. The number of sponsor outreach events was lower than the team would have liked due in part to a misunderstanding of what constituted as a sponsor outreach thanks to the wording of the Fall workshop presentation which defined a sponsor outreach event as “An event that is held either for or in conjunction with one or more of your sponsors”. This wording would have given the team a total of three sponsor outreach events. The team was very happy with the results as presented in table 1.

Table 1. Outreach event summary

<table>
<thead>
<tr>
<th>Outreach type</th>
<th>Minimum Events</th>
<th>Completed Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Relations</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Youth Outreach</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Community Outreach</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Sponsor Outreach</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

The Success of the Team Tennessee outreach was due to a core group of passionate and dedicated students who helped out the many extra outreach events the tyrant of an outreach coordinator demanded of them. We also feel that commercial quality team logos, brochures, posters and the pens helped out a lot. The Tennessee outreach program benefited from team members that were skilled with Photoshop, web authoring tools, as well as logo development and layout design tools. Teams without such members would do well to find graphic arts and marketing students to help out the monumental task of public relations. Teams also can not afford to not use web community or Web 2.0 tools such as You Tube, Face Book, and blogs. Many of the groups that are targeted by outreach and education campaigns are frequent users of such sites and tools. These tools also allow teams to reach massive audiences never before possible. The importance of an outreach coordinator dedicated to the task cannot be stressed enough. It is even more important to have team members who understand the importance of outreach and are dedicated to helping the cause.
## III. Outreach Activity Detail

**A. Media Relations (Requirement of 5 media hits)**

*Please list each media hit. Please provide copies of any media clips in the Appendix.*

<table>
<thead>
<tr>
<th>Media Type</th>
<th>Media Outlet and Reporter’s Name</th>
<th>Date</th>
<th>Location</th>
<th>Coverage Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>WATE Channel 6 News, Melissa DiPane</td>
<td>November 12, 2006</td>
<td>Knoxville, TN</td>
<td>Challenge X</td>
</tr>
<tr>
<td>Television</td>
<td>Fox News*</td>
<td>November 12, 2006</td>
<td>Knoxville, TN</td>
<td>Challenge X</td>
</tr>
<tr>
<td>Print</td>
<td>Oak Ridge Observer, Courtney Hackworth</td>
<td>November 16, 2006</td>
<td>Oak Ridge, TN</td>
<td>SCCA Auto Cross</td>
</tr>
<tr>
<td>Web article</td>
<td>WATE.com, Melissa DiPane</td>
<td>November 12, 2006</td>
<td>Knoxville, TN</td>
<td>UT students work on fuel efficient SUV</td>
</tr>
<tr>
<td>Print Article</td>
<td>TN Engineer, Kim Cowert</td>
<td>Spring 2007 Edition</td>
<td>Knoxville, TN</td>
<td>UT Driving Development of Alternative Fuels and Hybrid Vehicles</td>
</tr>
</tbody>
</table>

*A copy of the Fox news story could not be located.*
**B. Youth Outreach (Requirement of 3 events)**

Please use the chart to provide a list of all of your youth outreach. Also provide a written description below with additional details for each youth outreach activity listed. Please number your events below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
<th>Location</th>
<th>Audience</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engineers Day</td>
<td>October 24, 2006</td>
<td>Knoxville, TN</td>
<td>Various Students, 700+</td>
<td>Various, much of the team helped</td>
</tr>
<tr>
<td>2. Knoxville Catholic High School Presentation</td>
<td>November 10, 2006</td>
<td>Knoxville, TN</td>
<td>High School Physics Class, 30+</td>
<td>Shaun Hinds, Courtney Lindwurm, Scott Curran, Sean Peterson</td>
</tr>
<tr>
<td>3. UT College of Engineering Sneak Peak</td>
<td>March 22, 2007</td>
<td>Knoxville, TN</td>
<td>High School Students, 50+</td>
<td>Scott Curran, Shaun Hinds, Jesse Dalton, Courtney Lindwurm</td>
</tr>
<tr>
<td>4. Linden Lego Club</td>
<td>March 30, 2007</td>
<td>Oak Ridge, TN</td>
<td>Elementary School Students</td>
<td>Courtney Lindwurm, Shaun Hinds, Sean Peterson</td>
</tr>
<tr>
<td>5. Girl Scout Alternative Fuels Conference</td>
<td>March 31, 2007</td>
<td>Knoxville, TN</td>
<td>Girl Scouts</td>
<td>Scott Curran, Courtney Lindwurm, Corey Mullen, Shaun Hinds, Sean Peterson</td>
</tr>
</tbody>
</table>
1. **Youth activity name:** Engineers  
   **Day Date/Time:** 10/24/06  
   **Location:** UT Knoxville Engineering Campus  
   **Team participants:** Challenge X Team Members  
   **Audience:** Students (various levels, 100+ students at Challenge Booth and over 700 students were present at the event)  
   **Activity description/details:** Equinox Tour, Question and Answer sessions  
   **Key Messages Covered:** How Hybrids Work, Challenge X program, Biodiesel use  
   **Any measurable results:** Yes, lots of questions, interest in future Challenges from High School seniors interested in Engineering  
   **Photos:** Seen Next Page

![Figure 1, Youth Outreach 1. Large Group of students listening to the advanced features of the Equinox.](image1)

![Figure 2, Youth Outreach 1, Pictures from Engineers day.](image2)
2. **Youth activity name:** KCHS Physics Presentation  
**Date/Time:** 11/10/06  
**Location:** Knoxville Catholic High School Physics Classes  
**Team participants:** Shaun Hinds, Courtney Lindwurm, Scott Curran, Sean Peterson  
**Audience:** Mr. Butler’s Physics Classes  
**Activity description/details:** Two presentations on the Physics of HEV’s were given followed by a tour of the hybrid Equinox.  
**Key Messages Covered:** Physics of vehicle modeling & simulations, how hybrids work, types of hybrids, UT’s Challenge X program  
**Any measurable results:** Lots of questions and an engaged audience, gave away 13 UT pens to students that answered physics questions relating to hybrids.  
**Photos:** Seen Next Page

![Figure 3. Youth Activity 2. Shaun Hinds giving the first lecture of the day.](image)

![Figure 4. Youth Activity 2. Pictures from the KCHS presentations](image)
3. **Youth activity name:** UT College of Engineering Sneak Peak
**Date/Time:** March 22, 2007 12:-2:30
**Location:** The University of Tennessee
**Team participants:** Scott Curran, Shaun Hinds, Jesse Dalton, Courtney Lindwurm
**Audience:** High School Seniors being recruited by the College of Engineering
**Activity description/details:** 2 presentations about the ChallengeX program with a walk around and question and answer period with the Equinox
**Key Messages Covered:** Importance of Engineering in reducing emissions and improving fuel economy
**Any measurable results:** 3 students asked how they could become involved in ChallengeX as freshman at UT

**Photos:**

Figure 5, Youth Activity 3. Jesse Dalton answering questions from a High School senior and his dad.

Figure 6, Youth Activity 3, Shaun Hinds giving a brief explanation of the IPT.
4. **Sponsor event name:** Linden Lego Club  
**Date/Time:** March, 30 2007  
**Location:** Linden Elementary School, Oak Ridge, TN  
**Team participants:** Courtney Lindwurm, Shaun Hinds, Sean Peterson  
**Audience:** Elementary School Students involved in the lego club.  
**Event Description/details:** Students were given a brief presentation on the Challenge X program and why alternative fuels and hybrids were good for the environment. The students were then lead in the SAE AWIM Jet Toy building activity. The students built and raced the “alternative fuel vehicles” at the end of the day.  
**Key Messages Covered:** Biofuels and Hybrids  
**Any measurable results:** The AWIM activity generated a lot of positive comments and we also were asked some good questions about alternative fuels. The team was invited back for another presentation.  
**Photos:** The event was so busy there were no pictures taken.

![Figure 7. AWIM Jet Toy Logo](image-url)
5. **Sponsor event name:** Girl Scout Alternative Fuels Conference  
**Date/Time:** March 31, 2007  
**Location:** The University of Tennessee, Knoxville  
**Team participants:** Scott Curran, Courtney Lindwurm, Corey Mullen, Shaun Hinds, Sean Peterson  
**Audience:** East Tennessee Girl Scout troupes  
**Event Description/details:** Girl Scout troupes from the region were invited to alternative fuels conference at UT. The Girl Scouts were given a presentation on hybrids and how they help fuel economy and why biodiesel is a good alternative fuel. Using what they learned in the presentation the Girl Scouts were lead in an activity to get to a destination in the way the created the least pollution. After lunch they were then lead in an AWIM Jet Toy activity with a race at the end. The Race was uploaded to You Tube. The Activity books were given to all participants at the end of the day.  
**Key Messages Covered:** Benefits of hybrids and biofuels.  
**Any measurable results:** Great thank you letters from the troupes!  
**Photos:**  

![Figure 8, Youth Activity 5, Girl Scout enjoying the RevolutionX](image1)

![Figure 9, Youth Activity 5, AWIM Jet Toy competition using the alternative balloon power](image2)
6. **Sponsor event name:** Linden Elementary Presentation  
**Date/Time:** April 30, 2007  
**Location:** Linden Elementary School in Oak Ridge, TN  
**Team participants:** Shaun Hinds, Jesse Dalton, Courtney Lindwurm, Wes Owen and Tony Saylers and Daniel Cohen  
**Audience:** Large group of students.  
**Event Description/details:** The team was invited back to Linden Elementary to give a much larger presentation.  
**Key Messages Covered:** The benefits of alternative fuels and hybrids.  
**Any measurable results:** As always great questions and a very nice thank you letter from the students.  
**Photos:**

![Figure 10](image1.jpg)  
*Figure 10, Youth Activity 6. Jesse Dalton gives a brief introduction to why hybrids improve gas mileage and Daniel Cohen gives out Activity Books*  

![Figure 11](image2.jpg)  
*Figure 11, Youth Activity 6. Students Asking questions during main presentation*
C. **Community Outreach (Requirement of 3 events)**

*Please use the chart to provide a list of all of your community outreach activities since your last outreach report. Also provide a written description below with additional details for each community outreach activity listed. Please number your events below.*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
<th>Location</th>
<th>Audience</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Make Orange Green Kickoff</td>
<td>September 9, 2006</td>
<td>Knoxville, TN</td>
<td>Local Media, UT Students and Staff</td>
<td>Shaun Hinds, Scott Curran, Sean Peterson, Benjamin Campbell</td>
</tr>
<tr>
<td>2. 2006 Alternative Fuels</td>
<td>October 12, 2006</td>
<td>Kingsport, TN</td>
<td>Area high school students, local community &amp; community officials</td>
<td>Shaun Hinds, Scott Curran, Sean Peterson, Jesse Dalton, Courtney Lindwurm</td>
</tr>
<tr>
<td>Training Consortium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. SCCA Monthly Meeting</td>
<td>November 7, 2006</td>
<td>Knoxville, TN</td>
<td>SCCA Club &amp; General Public</td>
<td>Shaun Hinds, Sean Peterson</td>
</tr>
<tr>
<td>4. SCCA Auto-X</td>
<td>November 13, 2006</td>
<td>Oak Ride, TN</td>
<td>Local Community &amp; Automotive Enthusiast</td>
<td>Shaun Hinds, Scott Curran, Courtney Lindwurm</td>
</tr>
<tr>
<td>5. Heska Amuna Presentation</td>
<td>December 20, 2006</td>
<td>Heska Amuna Synagogue, Knoxville Tn</td>
<td>45 adults and Children from the Synagogue</td>
<td>Shaun Hinds, Scott Curran</td>
</tr>
<tr>
<td>6. OR ASME Presentation</td>
<td>February 13, 2007</td>
<td>Oak Ridge TN</td>
<td>27 Engineers</td>
<td>Scott Curran, Shaun Hinds, Courtney Lindwurm</td>
</tr>
<tr>
<td>7. EURCA</td>
<td>March 29, 2007</td>
<td>Knoxville, TN</td>
<td>UT Students + Staff, EURCA Judges,</td>
<td>Scott Curran, Jesse Dalton, Daniel Cohen, Chooie Ong, Will Brookshear, Corey Mullen, Deepak Deean</td>
</tr>
<tr>
<td>8. 4th Annual Run for Clean Air</td>
<td>April 14, 2007</td>
<td>Knoxville, TN</td>
<td>300+ Runners</td>
<td>Scott Curran, Sean Peterson, Shaun Hinds, Jesse Dalton</td>
</tr>
<tr>
<td>9. Earth Fest</td>
<td>April 21, 2007</td>
<td>Knoxville, TN</td>
<td>10,000 + People</td>
<td>Scott Curran, Sean Peterson, Shaun Hinds, Jesse Dalton, Courtney Lindwurm</td>
</tr>
<tr>
<td>10. Bristol AutoX</td>
<td>April 22, 2007</td>
<td>Bristol, TN</td>
<td>100 + Racers</td>
<td>Shaun Hinds, Sean Peterson, Courtney Lindwurm, Scott Curran</td>
</tr>
<tr>
<td>11. Thailand Demo</td>
<td>April 30, 2007</td>
<td>Knoxville Tn</td>
<td>15+ Students and Faculty</td>
<td>Shaun Hinds, Sean Peterson, Courtney Lindwurm, Wes Owen, Daniel Cohen, Tony Saylars</td>
</tr>
</tbody>
</table>


1. **Community event name:** Make Orange Green Kickoff  
**Date/Time:** 9/9/2006  
**Location:** Knoxville Tennessee  
**Team participants:** Shaun Hinds, Scott Curran, Sean Peterson, Benjamin Campbell  
**Audience:** Local Media, UT Students and Staff  
**Activity description/details:** Booth w/ question and answer sessions, Equinox Tours, and Challenge X program information during the Universities commitment to environmentally friendly technologies  
**Key Messages Covered:** Challenge X, Equinox specific hybrid implementation, general hybrid information.  
**Any measurable results:** General interest in the Challenge and GM  
**Photos:** See Below

![Figure 12. Community Event 1. Shaun Hinds interviewed by reporter about the Hybrid Equinox.](image)

![Figure 13. Community Event 1. Jonathan Overly asks questions about the UT Challenge X program.](image)
2. **Community event name:** 2006 Alternative Fuels Training Consortium  
**Date/Time:** 10/12/2006  
**Location:** Kingsport, Tennessee (Eastman Facility)  
**Team participants:** Shaun Hinds, Scott Curran, Sean Peterson, Jesse Dalton and Courtney Lindwurm  
**Audience:** Area high school students, local community members & community officials, Eastman Chemical employees.  
**Activity description/details:** Showcase of the Equinox Hybrid as a biodiesel hybrid vehicle during the alternative fuels consortium hosted by the East Tennessee Clean Fuels Coalition  
**Key Messages Covered:** The Challenge X Program, Equinox specific hybrid implementation and technology, the benefits of biodiesel and hybrid technology.  
**Any measurable results:** General interest in Challenge X and GM, great questions about the Cobasys battery pack from the chemists at Eastman.  
**Photos:**

![Figure 14. Community Event 2. The team showing off the Vehicle](image1)

![Figure 15. Community Event 2. Jesse Dalton hosting the wheel of clean air](image2)
3. **Community event name:** SCCA Monthly Meeting  
**Date/Time:** 11/7/2006  
**Location:** Knoxville, Tennessee  
**Team participants:** Shaun Hinds, Sean Peterson and Deepak Deean  
**Audience:** SCCA Club and General Public  
**Activity description/details:** Display w/ question and answer sessions, Equinox Tours, and Challenge X program information  
**Key Messages Covered:** Challenge X, Equinox specific hybrid implementation, general hybrid information, Bio-Fuels.  
**Any measurable results:** General interest in the Challenge, GM, and hybrid technology. The most difficult questions to answer ever! Invitation to race again at future ETR-SCCA autocross events.  
**Photos:** See Below
4. **Community event name:** SCCA Auto-X (Oak Ridge Autocross)  
**Date/Time:** 11/13/2006  
**Location:** Oak Ridge, Tennessee  
**Team participants:** Shaun Hinds, Sean Peterson and Courtney Lindwurm  
**Audience:** Local Media, UT Students, Local Community & Automotive Enthusiasts, Auto-X competitors  
**Activity description/details:** Display w/ question and answer sessions, Equinox Tours, and Challenge X program information, rides  
**Key Messages Covered:** Challenge X, Equinox specific hybrid implementation, general hybrid information.  
**Any measurable results:** Interest in Challenge X, GM and Bio Fuels. Large collection of vehicle data, including: lateral and longitudinal accelerations, as well as noise and in car video footage  
**Photos:** See Below

![Figure 17. Community Event 4. Shaun Hinds cornering hard with five passengers!](image)

![Figure 18. Community Event 4. Shaun Hinds explaining how the Ballard IPT was installed in Year 2](image)
5. **Community event name:** Heska Amuna Earth Fair Presentation  
   **Date/Time:** 12/20/2006  
   **Location:** Heska Amuna Synagogue, Knoxville, TN  
   **Team participants:** Shaun Hinds, Scott Curran  
   **Audience:** 45 adults and Children from the Synagogue  
   **Activity description/details:** Alternative fuels and hybrid technology  
   **Key Messages Covered:** Benefits of biodiesel and fuel economy with hybrid  
   **Any measurable results:** Great questions from the kids!  
   **Photos:** next page

![Figure 19, Community 5. Shaun Hinds giving a presentation at Heska Amuna](image19.png)

![Figure 20. Community 5, Booth set up at Heska Amuna](image20.png)
6. **Community event name:** Oak Ridge ASME Presentation  
**Date/Time:** Feb 13, 2007 – 5:00pm – 7:00 pm  
**Location:** Super China Buffet, Oak Ridge, TN  
**Team participants:** Shaun Hinds, Scott Curran, Courtney Lindwurm  
**Audience:** 27 Engineers and friends of the Oak Ridge National Lab  
**Activity description/details:** 1 hour presentation on the ChallengeX program and the technical achievements of the team.  
**Key Messages Covered:** Alternative fuels and hybrid technology, Benefits of biodiesel and fuel economy with hybrid, engineering challenges faced including packaging and NVH  
**Any measurable results:** Long question and answer period (20 minutes)  
**Photos:**

Figure 21, Community 6. Scott Curran giving the OR ASME an explanation how a DPF reduces particulate matter from diesel exhaust.

Figure 22, Community 6. Shuan Hinds Giving his part of the presentations
7. **Sponsor event name:** UT Exhibition for Undergraduate Research and Creative Achievement (EURCA)

**Date/Time:** March 29, 2007

**Location:** The University of Tennessee, Knoxville

**Team participants:**Scott Curran, Jesse Dalton, Daniel Cohen, Chooie Ong, Will Brookshear, Corey Mullen, Deepak Deean

**Audience:** UT Students and Staff, EURCA Judges,

**Event Description/details:** The participants listed above entered posters describing the work performed as part of the Challenge X competition.

**Key Messages Covered:** 99% Buyoff and NVH, Advanced diesel engines and aftertreatments, biodiesel, hybrid and controls related to the UT Challenge X program

**Any measurable results:** The team had a lot of compliments on the posters and the project.

**Photos:**

![Figure 23](image1.png)

*Figure 23, Community 7, Corey Mullen and Will Brookshear give EURCA Judge a presentation*

![Figure 24](image2.png)

*Figure 24, Community 6, Daniel Cohen gives the NVH and 99% Buyoff presentation*
8. **Sponsor event name:** 4th Annual Run for Clean Air  
**Date/Time:** April 14, 2007  
**Location:** Knoxville, TN  
**Team participants:** Scott Curran, Sean Peterson, Shaun Hinds, Jesse Dalton  
**Audience:** Over 300 Runners and spectators  
**Event Description/details:** The team brought the Revolution X to the ETCFC sponsored Run for Clean Air. Team members answered questions about the project before and after the event.  
**Key Messages Covered:** The Challenge X project and how biofuels and hybrid technology lead to cleaner vehicles.  
**Any measurable results:** Besides the great response from the community Jessee Dalton got 26th place out of 300 in the race!  
**Photos:**

Figure 25, Community 8, Scott Curran talking about diesel aftertreatments

Figure 26, Community 8. The start of the race in beautiful Sequoya Hills
9. **Sponsor event name:** Earth Fest 2007  
**Date/Time:** April 21, 2007  
**Location:** The Worlds Fair Park in Knoxville, Tennessee  
**Team participants:** Scott Curran, Sean Peterson, Shaun Hinds, Jesse Dalton, Courtney Lindwurm  
**Audience:** Over 10,000 people were at the event, hundreds through the ETCFC/ Challenge X booth.  
**Event Description/details:** The ETCFC invited the Challenge X team to share a booth at the Knoxville Earth Day celebration. Hundreds of people stopped by to ask questions about hybrid vehicles and alternative fuels.  
**Key Messages Covered:** Biofuels, Hybrids  
**Any measurable results:** Tired aching feet from 12 hours of answering questions.  
**Photos:**

![Figure 27, Community 9, Shaun Hinds and Courtney Lindwurm answering questions](image1)

![Figure 28, Community 9, Shaun Hinds using an electric scooter to tell people about the booth](image2)
10. **Sponsor event name:** ETR-SCCA Bristol Auto Cross  
**Date/Time:** April 22, 2007  
**Location:** Bristol Motor Speedway, Bristol TN  
**Team participants:** Shaun Hinds, Sean Peterson, Courtney Lindwurm, Scott Curran  
**Audience:** Over 100 Auto X racers and observers  
**Event Description/details:** The Sheauns were invited back for another East Tennessee Region Auto X. The Revolution X was set up for questions before and after the race.  
**Key Messages Covered:** Performance potential of diesel engines and hybrid power boosts.  
**Any measurable results:** Shaun Hinds received 1st place in the E mod class. and was faster then 12 non SUV race cars. We did so well that were asked never to come back!  

**Photos:**

Figure 29, Community 10, Two fine GM products on the track at Bristol

Figure 30, Community 10, Shaun Hinds first Place E-Mod with the RevolutionX
11. **Sponsor event name:** Thailand Demo  
**Date/Time:** April 30, 2007  
**Location:** Knoxville, TN  
**Team participants:** Jesse Dalton, Shaun Hinds, Courtney Lindwurm, Wes Owen, Daniel Cohen, Tony Saylers.  
**Audience:** 15 + Students and Faculty from Thailand  
**Event Description/details:** Challenge X Demo for students and faculty from Kasetsart University in Thailand.  
**Key Messages Covered:** Alternative fuels and hybrid research at The University of Tennessee  
**Any measurable results:** Great questions and nice gifts from the students.  
**Photos:**

![Figure 31, Community 11, Group Shot around the Revolution X](image1)

![Figure 32, Community 11, Jesse Dalton Giving an overview about the Challenge X program at UT.](image2)
D. **Sponsor Outreach (Requirement of 1 event)**

Please use the chart to provide a list of your sponsor. Also provide a written description below with additional details for each sponsor outreach activity listed. Please number your events below.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
<th>Location</th>
<th>Audience</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETCFC Award</td>
<td>March 11, 2007</td>
<td>Knoxville, TN</td>
<td>ETCFC and Challenge X</td>
<td>Team Tennessee</td>
</tr>
</tbody>
</table>

1. **Sponsor event name:** ETCFC award banquet  
   **Date/Time:** March 11, 2007  
   **Location:** Bridgeview Grill, Knoxville TN  
   **Team participants:** Many  
   **Audience:** Team Tennessee  
   **Event Description/details:** Awards banquet to express the team’s gratitude for the ETCFC’s help over the third year of competition.  
   **Key Messages Covered:** Thanks and application.  
   **Any measurable results:** A happy Jonathan Overly!  
   **Photos:** Could not be found.

![ETCFC Logo](ETCleanFuels.org)  

Figure 33. ETCFC Logo
E. Website
The Team Tennessee website was completely revamped for year 3. The format was changed to allow easy navigation using feedback from outreach events and website user comments. The format matches The University of Tennessee’s website which allows the site be professional and informative. A static link bar now appears on the left of all pages to allow for easy browsing. The technical content on the webpage was increased to allow for self exploration outside of an outreach event. The team posted educational materials including the outreach posters and the UT Challenge X brochure online for easy access.

![UT Challenge X Homepage](apcsi.utk.edu/challengex)

**Figure 34. UT Challenge X Homepage: apcsi.utk.edu/challengex**

Other features of the website include a search feature in the top right hand corner, and links to internal UT pagers on the bottom left. The bottom right part of the page contains PDF’s of the team brochures in other languages for international guests interested in the program.
The Year 3 website benefited from Web 2.0 content especially from the online video sharing site, You Tube, was also used extensively to share the autocross and other events with a larger audience. The videos are also imbedded in the website which allows for fast loading of video while browsing the Team Tennessee website. The videos also appear on the main You Tube site which allow the team to reach a very wide audience.

Figure 35. Embedded video page on apcsi website
The new website centered on a blog of the year 3 outreach events with descriptions and photos of all the events and pertinent links. Each outreach event received space on the outreach blog for a description and pictures from the event.

Figure 36. Outreach Blog
F. Other

Partnerships

Team Tennessee is very lucky to have partnered with the DOE Clean Cities designee for East Tennessee, The East Tennessee Clean Fuels Coalition run by Jonathan Overly. Team Tennessee has partnered with the ETCFC for many outreach and education events for alternative fuels and hybrid technology.

![ETCFC Logo](ETCleanFuels.org)  
*Figure 37 ETCFC Logo*

Team Tennessee also has three members who make up the UT Biodiesel program in which biodiesel is made from waste cooking oil collected from UTK Dining Services to be used for UTK Facility Services. The students have a wealth of experience in discussing biodiesel application and production and make a great addition to the team.

![UT Biodiesel Logo](UTBiodieselLogo)  
*Figure 38. UT Biodiesel Logo*

The UT Challenge X team leaders are both DOE GATE fellows. Being a GATE center allows Team Tennessee to attract promising graduate students who are interested in hybrid vehicles and automotive engineering.

![GATE Logo](GATELogo)  
*Figure 39. GATE Logo*

The team also made very good use of the SAE A World in Motion activities to engage younger audiences. The Jet Toy activity allowed students to use there own creativity to build and race an alternative powered vehicle in a given amount of time with limited resources. The Jet Toy allows the students to gain some insight into engineering and hopefully get them interested in a career in engineering.

![AWIM Logo](AWIMLogo)  
*Figure 40. AWIM Logo*
Branding
Starting with the first future truck competition, Team Tennessee has named their research vehicles the Evolution and the Evolution II. The name reflected an evolution from traditional gasoline vehicles into a higher form of vehicle that combined alternative fuels and innovative hybrid electric designs. These vehicles were very much research vehicles and were not up to the standards expected for a showroom floor. For the Challenge X competition, Team Tennessee has designed and built a much more refined vehicle that is more a revolution in thought than an evolution of design. The Revolution X is a very well designed vehicle that combines a fuel efficient diesel running a biodiesel blend and utilizing advanced emissions aftertreatments. The diesel is paired with a full hybrid system that combines to form a very powerful yet fuel efficient SUV.

The Revolution X logo uses a University of Tennessee branding campaign that integrates the UT logo into a black Franklin Gothic Heavy font with UT orange for an outline. The X from the Challenge X logo was made UT orange and integrated into the design. The logo has been well received and the team has received many complements on the name on logo design.

Figure 41. Revolution X naming and branding campaign logo

Figure 42. The Revolution X
Figure 43. Competition Polo Shirts
Outreach Materials
The team received funding from a sponsor to print team t-shirts, team pens and team coffee mugs. These items have been very popular. The Shirts were given to major sponsors and team members. The mugs have been reserved for major sponsors and the pens have been a great way to help with brand identity and way to give out the website address.

Figure 44. Coffee Mugs

Figure 45. T-shirts

Figure 46. Pens
The team was awarded an outreach grant to print informative brochures.

**Figure 47. Team Brochure**

The Team Tennessee brochures are handed out at all outreach events and are used to showcase the automotive engineering program at UT. The brochures are also available online for download.

**Foreign Language Brochures**

**Figure 48. German Translation**

The Team Tennessee brochures were translated into French Dutch and German by contacts of the team. These brochures are also available online for download as well.
Activity Books

The activity books were designed for the Girl Scout Alternative Fuels Conference and for handing out at the 2007 Earth Fest. The books containing informative activities about hybrids, alternative fuels, the carbon cycle and other important topics.

Power Points

The power point presentations from the outreach events have been posted to the UT Challenge X website. This was done after a number of students from our first outreach events requested copies of the presentations.
Posters

The team was awarded ChallengeX outreach funding for two posters for the engine and aftertreatment and another for hybrid and controls. The team printed a poster for the NVH/99% buyoff achievements using team funds. All three posters were entered in the UT Exhibition for Undergraduate Research and Creative Achievement. The posters have been very useful for outreach events.

![Engine Fuel and Aftertreatment Poster](image)

Figure 51. Engine Fuel and Aftertreatment Poster.
You Tube

The team has made successful use of the online video sharing service You Tube. To date the team has uploaded ten videos to the site with the most popular video receiving one hundred and sixty seven views. Three of the videos have received one hundred views or more. The team has received a lot of interest in the autocross events and the You Tube videos have been an excellent way to share the videos.

Figure 52. Screen shot of a You Tube video posted by the team.

http://youtube.com/profile?user=utchallengex
Racing

Two members of the Team, Shaun Hinds and Sean Peterson, are seasoned racers. Under their direction they successfully raced the Revolution X in two Auto Crosses. Of the Auto Crosses that were available the team only missed one race. The team had planned on competing in some local drag races as well but due to a rear sub frame problem we were unable to compete.

Figure 53. Shaun and Sean after the Bristol Auto Cross

Figure 54. In queue for a run at Bristol

Figure 55. Navigating the course at Bristol Motor Speedway
Burning down the Lab

Not generally a good idea to do in the middle of a competition but it did get a lot media hits.

Figure 56. The roof is on fire

Figure 57 KFD Responses

Figure 58. Gratuitous shots of the fire from the front this time.
Thank You Letters

The team was very fortunate to have worked some great groups during outreach events. Below are just a couple of the thank you letters the team received.

Figure 59. Thank you letter from the girl scouts
Figure 60. Thank you letter from the students at Linden Elementary

Reported by: Scott Curran
Date: May 28, 2007
Appendix: Copies of Media Clips

Media Clip 1: WATE Channel 6 News story on UT Challenge X
Reporters came out to the autocross to get footage of the race and interview students
http://video.google.com/videoplay?docid=6110513577842701704

Media Clip 2: Fox News Article

File Not Found
UT Engineering Students Compete in Challenge X

Members of the University of Tennessee student chapter of the Society of Automotive Engineers, along with faculty advisor Dr. Butch Irick (left), gathered around their Challenge X Vehicle. Challenge X is an annual contest sponsored by General Motors that pits engineering students from colleges and universities around the country in a contest to rebuild a stock vehicle. This year’s contest involves rebuilding a Chevrolet Equinox to run as a hybrid vehicle powered by biodiesel and electricity while still maintaining normal safety and comfort standards.

This turbo-diesel engine was installed in a Chevy Equinox by the SAE members. The engine is built to run on biodiesel fuel, as part of the hybrid system used to power the vehicle.

The other half of the hybrid system in the Challenge X vehicle, this electric motor installed by the students underneath the storage space in the back also helps move the vehicle.

Media Clip 3: Tennessee Alumnus Article on page 27 of Winter 2007 issue
This article appeared in the same section as the UT Biodiesel program
UT students design energy saving car, run test in Oak Ridge

BY COURTNEY HACKWORTH

Engineering students from 17 different universities competed in Oak Ridge on Sunday, Nov. 12, as part of a competition to look for innovative ways to make cars more economically efficient.

The competition, known as Challenge X, forces engineering students to think of new ways to produce a more energy-efficient car that can reduce emissions of greenhouse gases and save money on gasoline prices.

Competitors used a vehicle called the GM Equinox. The Equinox is a crossover sport utility vehicle and is a hybrid that can run on biodiesel fuel.

Students work on the car throughout the year in their courses, designing it and tweaking it here and there in order to get the best performance out of the car.

General Motors sponsors the competition and it usually lasts through a three-year phase.

“Year one deals with wheel to wheel evaluation and how much energy was used,” said University of Tennessee graduate student Shaun Hinds.

“Year two is the start of the test phase where we compete in vehicles going 0-60 mph for a quarter of a mile. The drive quality, emission and fuel consumption is measured during this stage,” said Hinds.

In the third stage, finalized vehicles are presented to General Motors, and the company decides if they are ready to sell and if users would actually buy the vehicle from a car lot.

In the competition Sunday, the team from the University of Tennessee competed in a race to measure the emissions and performance of the car.

The team performed well, having a 0.550 second lead after the time trials were finished.

The vehicle also produced no smoke from the tailpipe and was viewed as a success in its ability to reduce the emission of harmful pollutants.

There were two people who rode in the car, Hinds and undergraduate student Sean Peterson. The whole team is composed of five group members, consisting of graduate and undergraduate students in the engineering department at UT.

Along with General Motors, other sponsors of the competition include the U.S. Department of Energy, Argonne National Laboratory and a number of others.

In a time with increasing gas prices and a drop in the sales of SUVs, this program is a good research tool to help encourage new ways of finding different resources to power cars.

“This is an opportunity to improve on designs and get exposure for new cars,” said Hinds.

For more information on the Challenge X program, visit the UT group’s Web site at apcsi.tennessee.edu/challengex.
UT students work on fuel efficient SUV

November 12, 2006

By MELISSA DIPANE
6 News Anchor/Reporter

OAK RIDGE (WATE) -- With gas prices rising again, you might be considering a switch to a more affordable kind of fuel. A group of students at UT is perfecting a vehicle that could be right up your alley.

On the outside, it looks like any other SUV. But on the inside, it's a fuel efficient, clean emission work of art.

"We switched the engine from gas six cylinder to a four cylinder diesel engine. We are actually running it on biodiesel," says UT student Courtney Lindwurm.

The Chevy Equinox is part of UT automotive research.

Students are working with General Motors in a project called Challenge X, a national competition for engineering students to improve the vehicle by decreasing total energy consumption and emissions while maintaining vehicle performance. It's a three year program.

Seventeen teams from across the country, including UT, are working with the program.

"This project taught me a lot about machinery and how you have to take something with problems fix them and go through it. It doesn't always work the first time," Lindwurm says.

On Sunday, the team captains took their project to an autocross in Oak Ridge. Lindwurm says it's the best way to work out the kinks before the project is completed. "We can see what's wrong and make it the best it can be."

UT's car will go up against 17 others next summer. The competition will be judged by General Motors.

Besides getting a lot of research from the students, General Motors sometimes hires the most talented students.
UT Driving the Development of Alternative Fuels and Hybrid Vehicles

Although alternative fuels may be a "hot topic" at the present moment, the UT College of Engineering has been involved in the development of hybrid vehicles for over 18 years.

Since 1989, UT student teams have scored several first-place wins or have placed in the top rankings of advanced vehicle technology design competitions, sponsored by the Department of Energy (DOE) and the U.S. auto industry. These unique, multi-year programs bring together the resources of industry, government and academia in a cooperative effort to address important environmental and energy-related automotive issues.

Dr. Jeff Hudgins, an emeritus professor in mechanical engineering at UT, initiated the COE's involvement in vehicle design programs and served as faculty advisor to the majority of the student teams until 2002.

The university has received nearly $3.3 million in contracts and resources as a result of participation in the alternative-fuel vehicle competitions.

Dr. D. "Butch" Irick, Hudgins' successor, now serves as faculty advisor to the student teams involved in the most recent competition, Challenge X. The competition is sponsored by General Motors and is now in its fourth year. The students are currently modifying a 2005 Chevrolet Equinox.

"Our goal for the final year of the Challenge X competition is to have a vehicle that is a 99 percent production-ready, bi-fueled electric hybrid. In the end, we want to have an environmentally friendly vehicle that is also acceptable to consumers, the type of automobile that you would buy off a showroom floor," said Irick.

Team Tennessee is composed of seniors in mechanical engineering (MB) and electrical and computer engineering (ECE). The MB students are primarily divided between students interested in machine design versus thermal sciences, while ECE majors are focusing on electronic controls. The group is led by graduate students in mechanical engineering who have past industry and HEV competition experience.

The fourth year of the competition will primarily consist of testing, evaluation and improvements to make the vehicle appealing to consumers, Irick said.

Irick is also the director of the COE's Graduate Automotive Technology Education Program (GATE), established in 1999. The goal of the GATE program is to provide training and a future workforce of interdisciplinary automotive engineering professionals who have experience in developing and commercializing cost-effective, fuel-efficient vehicles.

In 2005, the program received a $625,000 grant from the DOE and the university to assist with updating and expansion of initiatives in the area of advanced hybrid vehicle propulsion and control systems.

"We have a very strong automotive engineering program with both research and teaching," Irick said. "The automotive industry projects that sales of hybrid vehicles will increase by 80 percent over the next few years. We are going to be educating engineers who can help meet the demand for those automobiles."

~Story by Kim Cowart

Civil and Environmental Engineering

While research into energy sustainability and efficiency is important, impacts of energy production on the environment are equally crucial, according to researchers in the Department of Civil and Environmental Engineering (CEE).

"The Air Pollution Group has done quite a bit of modelling with respect to how different kinds of transportation and electricity producing activities will impact future air quality here in the Tennessee Valley," said Dr. Gregory Reed, professor and head of CEE. "Our results show that we either have to achieve extraordinary high levels of pollution control at the source, or we have to change the source, in other words, stop using fossil fuels."

According to Reed, pollution from industry and transportation are the two kinds of energy use that needs to be addressed from an environmental point of view.

"However," said Reed, "other environmental issues exist. If you use coal, the whole business of mining and processing the coal come into play. If you produce electricity from nuclear, the question becomes what are you going to do with the waste. Every technology has its pluses and minuses. We look at how to minimize the minuses and maximize the pluses."

Sustainability is part of the civil engineering code of ethics and the only discipline code of ethics that says engineers should design things to be consistent with sustainable development, according to Reed.

"Civil engineers are ethically bound to look for sustainable options in everything we do," said Reed. "Researchers in the COE are working on the global energy problem at every level in order to contribute solutions to future generations."

"We should push the envelope," said Dr. Wayne Davis, associate dean of research and technology. "We don't know what the future will look like, and we should do a little bit of everything relevant to research in order to influence the future."

~Story by Amanda Womac