

**Mississippi State University  
Challenge X Outreach Team  
Update #1**  
*Kick-off through November 30, 2004*

## Community Outreach:

- **Challenge X Overview to Rotary Club**

**Key Participants** – David Oglesby, Team Leader; Dr. Marshall Molen, Principle Faculty Advisor

**Time and Date** – June 21, 2004

**Location** – Starkville, MS

**Audience** – Starkville Rotary Club. Approximate attendance – 70

**Key Message** – General overview of Challenge X and MSU's participation in the contest. The purpose for this presentation was to build area awareness about Challenge X.

- **Challenge X Overview to Dynetics**

**Key Participants** – David Oglesby, Team Leader; Matthew Tucker, Thrust Leader; Christopher Whitt, Thrust Leader; Kiran Solanki, Thrust Leader; Dr. Joe Picone, Faculty Advisor; Tommy Thompson, Thrust Leader

**Time and Date** – July 30, 2004

**Location** – Dynetics Headquarters, Huntsville, AL

**Audience** – Dynetics is a relatively small technology company. Approximate attendance - 4

**Key Message** – General overview of Challenge X and MSU's participation in the contest. The purpose of the presentation was to solicit support for our Challenge X Team.

- **Challenge X Overview to Mississippi Congressional Delegates**

**Key Participants** – David Oglesby, Team Leader

**Time and Date** – September 10, 2004

**Location** – Center for Advanced Vehicular Systems, MSU

**Audience** – Staff of Congressman Roger Wicker; Mr. John Keast, Chief of Staff; Mr. Aubert Kimbrell, Legislative Director; Mr. Esrkin Wells, Mississippi Legislative Assistant.

**Key Message** - General overview of Challenge X and MSU's participation in the contest. The purpose for this presentation was to build Mississippi awareness about Challenge X.

- **Challenge X Overview and Tour for Nissan VPs**

**Key Participants** – David Oglesby, Team Leader

**Time and Date** – October 18, 2004

**Location** – Center for Advanced Vehicular Systems, MSU

**Audience** – Mississippi Nissan employees, including: Dr. Jim Morton, Senior VP, Administration and Finance; Tracey Woodard, Senior Manager, Government Relations; Dr. John Calandro, Director, Human Resources and Administration, Nissan Technical Center; Dr. Marty Fuller, MSU Director of Government Relations; other MSU faculty and staff.

**Key Message** – General overview of Challenge X and MSU's participation in the contest. The purpose for this presentation was to build area awareness about Challenge X.

- **Presentation to Engineering Dean's Development Council**  
**Key Participants** – David Oglesby, Team Leader; Justin Crapps, Business Manager; Tommy Thompson, Thrust Leader; Christy Burton, Safety Coordinator  
**Time and Date** – October 29, 2004  
**Location** – Center for Advanced Vehicular Systems, Mississippi State University  
**Audience** – Mr. Hines Brannan, Retired Managing Partner, Accenture; Mr. Rodger Johnson, President & CEO, Knology Holdings; Mr. Buddy Faulkner, President, Advanced Sales Institute; Mr. Earnie Davenport Jr., Retired Chairman and CEO, Eastman Chemical Company; Mr. Carl Ray Furr Jr., Retired Executive Vice President, Engineering Associates/Pickering; Mr. Jack Hatcher, Retired Chairman & CEO, Robertson-Ceco; Mr. Hunter Henry, Retired President, Dow Chemical; Mr. Dave Swalm, Retired Chairman & CEO, Texas Olefins; Mr. Tom White, President, H.C. Price Co.; Mr. Vess Johnson, Sr. Vice President, Silicon Metrics; Mr. Bill Berry, Executive VP Exploration & Production, Conoco Phillips  
**Key Message** – General overview of Challenge X and MSU's participation in the contest. The purpose for this presentation was to build area awareness about Challenge X.
- **Challenge X Overview to DRS, Inc.**  
**Key Participants** – Dr. Marshall Molen, Principle Faculty Advisor, along with four Electrical and Computer Engineering senior design students  
**Time and Date** – September 30, 2004  
**Location** – Huntsville, AL  
**Audience** – DRS, Inc. company key employees.  
**Key Message** - The purpose of the visit was to discuss battery management and solicit them as a sponsor. DRS, Inc. has considerable experience in hybrid military vehicles.
- **Challenge X Overview to U.S. Army National Automotive Center**  
**Key Participants** – Dr. Marshall Molen, Principle Faculty Advisor  
**Time and Date** – November 8, 2004  
**Location** – Center for Advanced Vehicular Systems, Mississippi State University  
**Audience** – Mr. Michael J. Letherwood and Mr. Thomas B. Udvare of Detroit U.S. Army National Automotive Center.  
**Key Message** – General overview of Challenge X and MSU's participation in the contest. The purpose was to provide information about the contest to possibly gain national sponsorship.
- **Challenge X Overview to Mr. Rodger Johnson, CEO of Knology**  
**Key Participants** – David Oglesby, Team Leader  
**Time and Date** – November 12, 2004 11 a.m.  
**Location** – Center for Advanced Vehicular Systems, MSU  
**Audience** – Mr. Rodger Johnson  
**Key Message** - General overview of Challenge X and MSU's participation in the contest. The purpose for this presentation was to build awareness in surrounding business about Challenge X.

- **Challenge X Overview and Team Update at CAVS Seminar Series**

**Key Participants** – David Oglesby, Team Leader

**Time and Date** – November 12, 2004, 3 p.m.

**Location** – Center for Advance Vehicular Systems, Starkville, MS

**Audience** – MSU faculty, staff, and students. Approximate attendance – 70

**Key Message** – The purpose of this presentation was to build internal awareness of Challenge X and give updates on the team's progress. See Figure 1.



*Figure 1. David Oglesby speaks at CAVS Seminar Series.*

- **Presentation to Public Relations Class to Recruit for Outreach Team**

**Key Participants** – Justin Crapps, General Business Manager

**Time and Date** – November 16, 2004 11 a.m.

**Location** – Mississippi State University Campus

**Audience** – Introduction to Public Relations class and Dr. John Forde, head of the communications department. Approximate attendance - 88

**Key Message** - Overview of Challenge X and description of the goals and tasks for the outreach team and express need for outreach coordinator. The purpose of this was to generate more campus awareness of Challenge X and to recruit students for involvement.

- **Challenge X Overview to Missile Technology**

**Key Participants** – Dr. Marshall Molen, Principle Faculty Advisor

**Time and Date** – November 18, 2004

**Location** – Center for Advanced Vehicular Systems, Mississippi State University

**Audience** – Dr. Jim Bradas and Mr. Al Killen of Missile Technology, Army Aviation and Missile Command

**Key Message** – Overview of Challenge X. The purpose of this presentation was to solicit support and help in Challenge X.



## Media Coverage:

- **Article in Starkville Daily News**  
**Summary** – Overview of Challenge X and MSU’s involvement in it. Discussed issue of reducing petroleum use and how students will work to solve that. *See Appendix A for full text article.*  
**Date** – May 12, 2004  
**Audience** – Starkville, MS area, approximately 8,000 readers daily.
- **Article in Friday Facts, Mississippi Development Authority Newsletter**  
**Summary** – Two page article covering Mississippi State University’s acceptance in Challenge X, key student participants, and expectations of the Challenge X project. *See Appendix B for full text article.*  
**Date** – May 21, 2004  
**Audience** – The newsletter is distributed to Mississippi Development Authority staff, economic and community development professionals, legislators and other interested parties statewide.
- **Radio Interview on Lazer 96.1, Local Radio Station**  
**Summary** – Interview on local radio station with Dr. Marshall Molen, Principle Faculty Advisor, and Bob Kirkland, CAVS Business Development Officer. Interview was a general overview of Challenge X and MSU’s involvement in it. The purpose was to increase area awareness of Challenge X. *See Appendix C for full audio recording.*  
**Date** – May 28, 2004 8:30 a.m.  
**Audience** – Radio station audience of Starkville and surrounding area. Station area covers central Mississippi and Alabama.
- **Article in Momentum, Mississippi State University Alumni Newsletter**  
**Summary** - Article appeared in Momentum, MSU’s alumni newsletter, covering MSU’s involvement with Challenge X. Also highlighted student thrust leaders. *See Appendix D for full text article.*  
**Date** – Fall 2004 edition  
**Audience** – MSU alumni, faculty, and staff.
- **Article in Mississippi State University Cooperative Education Newsletter**  
**Summary** – Article announced Mississippi State’s acceptance into the Challenge X competition, and outlined goals of the competition. Also highlighted key Challenge X students who participated in cooperative education. *See Appendix E for full text article.*  
**Date** – Fall 2004 Issue  
**Audience** – Cooperative Education students, faculty, and staff.

- **Article in *ECE Network*, Mississippi State University Electrical and Computer Engineering Department Newsletter**

**Summary** – Two page article in newsletter covering an overview of Challenge X project, Mississippi State’s acceptance into the competition, and summary of Challenge X goals. Included pictures and interviews with students and faculty involved, and a picture of the 2005 Chevrolet Equinox. *See Appendix F for full text article.*

**Date** – Fall 2004 Issue

**Audience** – Electrical and Computer Engineering department faculty, staff, students, and alumni.

## Website:

- As part of the Challenge X program, a website for the Mississippi State team has been constructed and is currently being redesigned by a Mississippi State Graphic Design student to add aesthetic value. To view the site, click here:  
[www.cavs.msstate.edu/projects/challengex](http://www.cavs.msstate.edu/projects/challengex). *See Appendix G for a layout of the Mississippi State site.*

The Mississippi State site consists of two levels: a general public level where all public information will be posted and a password protected level where internal information, memos, and reports are posted.

The content contained in the general public level of the site consists of:

- 1.) Team update reports
- 2.) Information about the Challenge X competition taken from the Challenge X rules
- 3.) Mississippi State Challenge X Newsletters
- 4.) Mississippi State Challenge X sponsors
- 5.) Team leadership information including pictures and biographies
- 6.) Chevrolet Equinox Pictures

The Mississippi State Challenge X home page is also linked to:

- 1.) ChallengeX.org ([www.challengex.org](http://www.challengex.org))
- 2.) ChallengeX.org competition sponsors page ([www.challengex.org/sponsors/index.html](http://www.challengex.org/sponsors/index.html))
- 3.) Gmability site ([www.gm.com/company/gmability](http://www.gm.com/company/gmability))
- 4.) Mississippi State Bagley College of Engineering ([www.bagley.msstate.edu](http://www.bagley.msstate.edu))

As the Mississippi State Challenge X site is redesigned, a media page outlining media materials will be added to the general public level of the website.

# Appendix A

## MSU student engineers to compete in automobile design challenge

For the Daily News

Mississippi State is among 17 universities named Tuesday to participate in a groundbreaking student engineering competition that could significantly impact the future design of automobiles and other vehicles.

The sponsoring U.S. Department of Energy and General Motors Corp. announced the teams chosen for the three-year project, "Challenge X: Crossover to Sustainable Mobility," during a conference of the Society of Automotive Engineers Government and Industry in Washington, D.C.

"Reducing petroleum use is vital to our nation's long-term energy security," said DOE acting undersecretary of energy David Garman, noting teams were selected through a competitive proposal process in 2003.

The university teams will re-engineer a 2005 Chevrolet Equinox with three basic goals: reduce energy consumption, decrease emissions, and maintain the performance and utility features of the compact SUV, which already provides competitive fuel economy.

Year one, starting this summer, will focus on modeling, simulation and testing of the powertrain and vehicle subsystems. In years two and three, students will integrate their advanced powertrain and subsystems into the Chevrolet Equinox.

"This is indeed one of the most exciting projects in which we have had the opportunity to participate," said Marshall Molen, principal faculty adviser for the MSU team, and distinguished professor of electrical and computer engineering.

"This will represent an oppor-



tunity for engineering students, both undergraduate and graduate, to participate in the development of a hybrid-electric vehicle," he added.

Students will be expected to follow a design procedure similar to that employed by GM engineers, and will be evaluated from that perspective, he said.

"We will soon see a radically different vehicle that will have superior performance and efficiency while being more friendly to our environment, without compromising on vehicle size or comfort," said Molen. "Some

estimate that within the next five years, one-half the cost of an automobile will be electronics."

Among MSU officials joining Molen at the Washington news conference were Provost Peter Rabideau, Bagley College of Engineering Dean A. Wayne Bennett and Don Trotter, vice president for strategic initiatives and interim director of the university's Center for Advanced Vehicular Systems, which will provide support for the MSU students. Michael Mazzola, who heads CAVS, alternative power systems thrust, and CAVS business development officer Bob Kirkland also participated in the event.

"Challenge X focuses on goals that are critical for our society — achieving fuel efficiency, reducing dependence on foreign petroleum and good stewardship of our environ-

ment," said Trotter. "It provides an exciting opportunity for students to apply their previous learning to solve real-system problems. CAVS intends to provide the best environment in the country for our students to compete."

Molen said the facilities and technical expertise available at CAVS make it possible for the Mississippi State team to compete on a national scale.

"MSU students will be using the most advanced computational tools in their design and will have modern automotive tools and instruments available in the CAVS laboratory," he said.

Also participating in the Washington announcement were overall MSU project student leader David Oglesby, a mechanical engineering graduate student from Columbus; and

See 'Design' page A-5

## Design

from page A-1

Christy Burton, an engineering major from Starkville and one of the authors of MSU's Challenge X proposal.

Justin Crapps, a senior mechanical engineering major from Florence, Ala., will coordinate the work of four technical groups within the MSU team. Those groups will be led by Kiran Solanki, a mechanical engineering graduate student from India; Philip Conley, an electrical engineering graduate student from Meadville; Patrick Shad Haynes, a senior mechanical engineering major from Blue Mountain; and Lindsay Assumption, a senior mechanical engineering major from South Africa.

"These student engineering competitions give the partici-

pants a major leg up when they enter the work force," said Bob Larsen, director of the Center for Transportation Research at Argonne National Laboratory, which manages the Challenge X program.

Tom Stephens, group vice president for GM's Powertrain Division, said, "Challenge X is a mechanism for demonstrating and expanding the progress that can be made when government, academia and the industry work together toward a common goal — sustainable mobility."

Other institutions selected to field teams in the competition included:

Michigan Technological University, Ohio State, Penn State, Rose-Hulman Institute of Technology, San Diego State, Texas Tech, University of Akron, University of California, Davis, Michigan, Tennessee, Texas at Austin, Tulsa, University of Waterloo, Wisconsin-Madison, Virginia Tech and West Virginia.

## Appendix B

### MISSISSIPPI INVESTORS CONFERENCE

The Mississippi Small Business Development Centers will host an inventors conference, 'Learn to Earn from Your Invention,' Saturday, June 5, 2004 at the Mississippi Polymer Institute at the University of Southern Mississippi in Hattiesburg, Mississippi. The program begins at 8:00 a.m. and concludes at 4:15 p.m.

The cost is \$25 with advance registration. No advance payment is required. At the door the cost is \$45 without pre-registration. Advance registration must be made by May 26.

To register or for more details call, or E-mail or write:

MSBDC State Office  
University of Mississippi  
B 19 Jeanette Phillips Drive  
University, MS 38677-1848  
Phone: 800.725.7232 (in MS only) or 662.915.5001 or E-mail:  
msbdc@olemiss.edu.

If you have a product or an organization or business display, the fee will be \$35. Contact MSBDC State Office to register for a booth. All displays must be approved and registered in advance.

The conference is hosted by the Mississippi Small Business Development Centers. The Mississippi Development Authority is a co-sponsor.

### MSU STUDENT ENGINEERS TO COMPETE IN AUTOMOBILE DESIGN CHALLENGE

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DOE Acting  
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**"Challenge X focuses on goals that are critical for our society--achieving fuel efficiency, reducing dependence on foreign petroleum and good stewardship of our environment."**

Don Trotter,  
Vice President for Strategic  
Initiatives and Interim  
Director of the Center for  
Advanced Vehicular  
Systems, Mississippi State  
University

The university teams will re-engineer a 2005 Chevrolet Equinox with three basic goals: reduce energy consumption, decrease emissions, and maintain the performance and utility features of the compact SUV, which already provides competitive fuel economy.

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Other institutions selected to field teams in the competition included: Michigan Technological University, Ohio State, Penn State, Rose-Hulman Institute of Technology, San Diego State, Texas Tech, University of Akron, University of California, Davis, Michigan, Tennessee, Texas at Austin, Tulsa, University of Waterloo, Wisconsin-Madison, Virginia Tech and West Virginia.

## **S**WAYKOS NAMED DIRECTOR OF CENTER OF HIGHER LEARNING AT STENNIS SPACE CENTER

The University of Southern Mississippi has chosen an experienced earth scientist and veteran naval officer to take the helm at its Center of Higher Learning at the John C. Stennis Space Center.

Capt. Joseph W. Swaykos comes to Southern Miss from the U.S. Naval Academy in Annapolis, Md., where he is chairman of the Oceanography Department.

## **Appendix C**

**Click here to hear a recording of the broadcast**





## Appendix D



### THE CHALLENGE OF



Challenge X - the name elicits a sense of mystery or excitement. For the students involved, it invokes both of those feelings.

This past May, General Motors and the U.S. Department of Energy announced that the Bagley College was one of 17 engineering colleges chosen from more than 38 entrants to compete in Challenge X: Crossover to Sustainable Mobility.

The three year process is a series of competitions designed to acquaint students with leading-edge automotive propulsion, fuels, materials and emissions-control technologies. The first year will be spent in research, modeling and computer simulation to create a crossover powertrain system. "Crossover" refers to the platforms the teams are using. The students will be developing a vehicle built on a passenger car chassis with the body of a truck. If the students fare well, in year two they will "earn their keys" to a Chevrolet Equinox, in which they will install the powertrains they have designed.

"The competition title comes from several sources," explains Kristen de La Rosa, Challenge X program manager with the Advanced Vehicle Technology Competitions of Argonne National Laboratory. "'X' is the symbol used when referring to crossover technology. It also refers to the major math component that distinguishes this competition from others, and

finally, it is the members of Generation X who will be developing this new technology."

One of the most exciting features of the competition is the number of those Generation X students at Mississippi State who are involved.

"The degree of student activity makes this project unique," states faculty advisor Dr. Marshall Molen, who holds the Ergon Corporation & Diversified Technology Distinguished Professorship in Electrical and Computer Engineering. "There are more than 100 students, about 75 percent of whom are undergraduates, participating."

ME graduate student David Oglesby works at the Center for Advanced Vehicular Systems (CAVS) at State and serves as the Challenge X student team leader. Oglesby's past work experience in the area of rotating engine components is with Lunati Cams, Inc., a subdivision of race car components manufacturer Holley.

"Automotive design is my interest," Oglesby says. "It's a new focus for Mississippi State, and this challenge is a great opportunity for me to learn more and do something that may be useful to the future of automobile design."

The Bagley College worked closely with CAVS in making its bid for the Challenge X project. Molen believes the unique capabilities which the research facility has, along with the computational simulation capacity at the Engineering Research Center, was what made MSU stand out in the judges' selection process.

This activity bodes well for all involved. The experience the students acquire will be invaluable for their futures. Just as important is the national recognition that CAVS and the Bagley College will receive. Already automotive companies are taking notice, but a good showing in Challenge X will, no doubt, establish the entities as international leaders in the automotive field. □



Student leaders in the technical thrust areas for Challenge X include (L. to R.) Philip Conley, Justin Crapps, Kiran Solanki, David Oglesby, Tommy Thompson and Lindsay Assumption.

## Appendix E

Text only (publication not printed yet)

### **Co-ops Compete in National Auto Design Competition... Challenge X**

MSU has earned bragging rights as being one of only 17 universities in the nation chosen by the U.S. Department of Energy and General Motors Corporation to compete in a three-year project, :Challenge X: Crossover to Sustainable Mobility.”

A 2005 Chevrolet Equinox will be re-engineered with three goals as the focus: reducing energy consumption, decreasing emissions, and maintaining the current performance and utility features of the Equinox, a fuel-efficient compact SUV. Distinguished professor of electrical and computer engineering, Dr. Marshall Molen is the principal faculty advisor for the MSU team.

David Oglesby, a mechanical engineering graduate student and completed co-op for federal Mogul-Moog Automotive, is the overall MSU project student leader.

Coordinating the work of four technical groups is Justin Crapps, who completed his co-op terms with Eaton Aerospace and Georgia Pacific-Monticello and served as a charter Co-op Ambassador. Other completed co-ops leading two of the four groups are electrical engineering graduate student Philip Conley (Georgia Pacific-Monticello) and Mechanical Engineering senior Shad Haynes (Outokumpu Heatcraft).

Justin spoke for the leaders of the competition, “Being successful in the Challenge X competition will require a highly motivated and professionally developed group of students. After participating in the Cooperative Education Program, students are more than prepared to take on a highly technical engineering task such as Challenge X and succeed.”

*MS State Cooperative Education Newsletter, Fall 2004 Issue*

# Appendix F

Vol. 1 No. 2

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Fall 2004

## Crossover to Sustainable Mobility – CHALLENGE X

*Can we have a comfortable, safe ride AND use less fuel and lower exhaust emissions?*

A team of engineering students from Mississippi State, and 16 other universities, will compete over the next three years to find an answer to that question. Challenge X is a competition sponsored by automotive and electronics industries and the governments of both the U.S. and Canada, beginning in March of 2004 and culminating in the Summer of 2007.

As more Americans want to purchase sport utility vehicles (SUVs) to meet the needs of their families, they are also seeking environmentally-friendly transportation that will not cause them to fall victim to increasing gasoline prices. "The MSU team would like to establish MSU and CAVS (Center for Advanced Vehicular Systems) as a top-notch

(1<sup>st</sup> choice) location for research on alternative power systems, alternative fuels, and vehicle design in general," says Philip Conley, one of the principal EE graduate students working on this project.

Challenge X is modeled after the General Motors Global Vehicle Development Process and will closely follow current real-world automotive design and engineering practices.

Participating teams are challenged to re-engineer a GM crossover (between a car and an SUV) to minimize energy consumption, emissions, and greenhouse gases while maintaining or exceeding the vehicle's utility and performance. General Motors will be providing each team with a new 2005 Chevrolet Equinox at the end of year one for the students to implement their designs and install the powertrains they have developed. In addition to the Equinox, teams will receive \$10,000 in seed money from the U.S. De-

partment of Energy and General Motors and up to \$25,000 more in production parts and software from GM, National Instruments, The MathWorks, and Argonne National Laboratory. MSU is also seeking additional sponsorship monies.

During the second and third years of the competition, teams will validate their modeling and simulation tools and use them to control and refine their projects. At the conclusion of each competition year, the teams will meet to undergo extensive judging and evaluation.

According to Dr. Marshall Molen, principal faculty advisor for the MSU team, and Distinguished Professor in ECE, "This will represent an opportunity for engineering students, both undergraduate and graduate, to participate in the development of a hybrid-electric vehicle (HEV).

We've enlisted over 100 students in the Challenge X program."

"Challenge X demonstrates how the government, industry, and academic worlds are working together to find creative approaches and solutions to decreasing total energy consumption and emissions in some of America's most popular vehicles," said David Garman, DOE's Assistant Secretary for Energy Efficiency and Renewable Energy. "Teams will integrate vehicle technologies and appropriate fuels to develop an approach that minimizes total environmental impact and builds on a sustainable transportation future."

Why Challenge X at this time? Rapid gasoline price increases have occurred because of reported crude oil shortages in the past 20 years. Prices of basic energy (gasoline, electricity, natural gas, heating oil) are generally more volatile than prices of other commodities. Consumers are unable to find lower priced fuels as they can find lower priced brands of food products, when prices shift.

*"The most important component is interpersonal communication. With a project of this size with this many people and groups, each interdisciplinary group needs to be aware of the progress (lack of progress) within their group and others. This project has at least 5 groups with an average of 20 members in each group. This, coupled with the fact that there are many faculty advisors, shows that communication is going to be crucial for the success of each group and the project as a whole."*

*Philip Conley*



*Philip Conley*



*Dr. Marshall Molen*



### From SUV/Auto to HEV

General Motors will be providing 17 crossover vehicles and 2 control cars to the Challenge X teams at the end of Year One. The crossover vehicle to be used is the 2005 Chevrolet Equinox, which fits in their lineup below the Trailblazer and seats five passengers. Equinox is named for the celestial phenomenon of March 21 and September 21, when there are equal amounts of day and night. The name is meant to reflect the SUV's versatility and all-weather capability.

Philip Conley, EE graduate student, says, "The nation will be using HEVs in the next 10 years.....they will probably be the only thing on the market, in my opinion." A hybrid electric vehicle (HEV) combines an electric propulsion unit with an auxiliary power unit (APU) employing a non-electric store or source of energy. "While fuel cells and solar cells are not practical enough for widespread use, electric hybrids are a very viable solution for the nation's oil crisis," Conley went on to say.



2005 Chevrolet Equinox

### Teams

The following 17 teams from across North America have been invited to participate in Challenge X: Crossover to Sustainable Mobility

- Michigan Technological University
- Mississippi State University
- Ohio State University
- Pennsylvania State University
- Rose-Hulman Institute of Technology
- San Diego State University
- University of Akron
- University of California, Davis
- University of Michigan
- University of Tennessee
- University of Texas at Austin
- University of Tulsa
- University of Waterloo
- University of Wisconsin-Madison
- Virginia Tech
- West Virginia University

For more information see <http://www.challengex.org>

# Appendix G

## Mississippi State Website Layout

