

# Dart Day of Innovation and Creativity *for 7th-12th Grade Students*



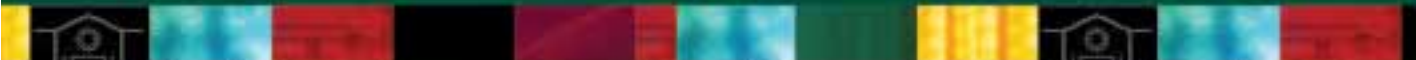
## **Our Future Lies in Some Very Precious Hands...**

At the Dart Foundation, we are committed to developing scientifically literate students in Michigan. We're proud to sponsor the MSU College of Engineering Design Day for pre-collegiate students.

Funded by the Dart Foundation



MICHIGAN STATE UNIVERSITY | College of Engineering



# The Dart Foundation

## Middle and High School Innovation and Creativity Day

**Precollege Student Voting:** During the morning on Design Day all visiting precollege students will be viewing Engineering Projects and voting.

During this time college students will have a chance to interact with “non-engineering” students and demonstrate the underlying principles from their projects. This interaction allows the college students an opportunity to practice explaining engineering concepts to non-engineers. As the precollege students work their way through the wide variety of presentations, they will get an overview of the many different branches of engineering. Additionally, as the precollege students see both entry-level and advanced engineering applications, it allows them to see the natural progression of engineering. Lastly, this session also provides a chance for the precollege students to interact with student organizations within the College of Engineering.



Office for Inclusion  
and Intercultural Initiatives



	Room 1279 Anthony Check in	C.E./M.E. Team Build Room 2243	VEX Robotics Room 2400	1st & 2nd Floor Voting/ project viewing	Center for Highway Pavement Preservation
<b>8:00–8:40</b>	<b>All Schools 1 thru 8</b>				
<b>8:40–9:30</b>		<b>Schools 1 &amp; 2</b>	<b>Schools 5 &amp; 6</b>	<b>Schools 3 &amp; 4</b>	<b>Schools 7 &amp; 8</b>
<b>9:30–10:20</b>		<b>Schools 7 &amp; 8</b>	<b>Schools 1 &amp; 2</b>	<b>Schools 5 &amp; 6</b>	<b>Schools 3 &amp; 4</b>
<b>10:20–11:10</b>		<b>Schools 3 &amp; 4</b>	<b>Schools 7 &amp; 8</b>	<b>Schools 1 &amp; 2</b>	<b>Schools 5 &amp; 6</b>
<b>11:10–12:00</b>		<b>Schools 5 &amp; 6</b>	<b>Schools 3 &amp; 4</b>	<b>Schools 7 &amp; 8</b>	<b>Schools 1 &amp; 2</b>
<b>12:00–12:20</b>	<b>All students in Room 1279 Anthony for the awards ceremony. Lunch will immediately follow.</b>				

<http://www.egr.msu.edu/future-engineer/>  **LIKE US:** <https://www.facebook.com/futurespartanengineers>

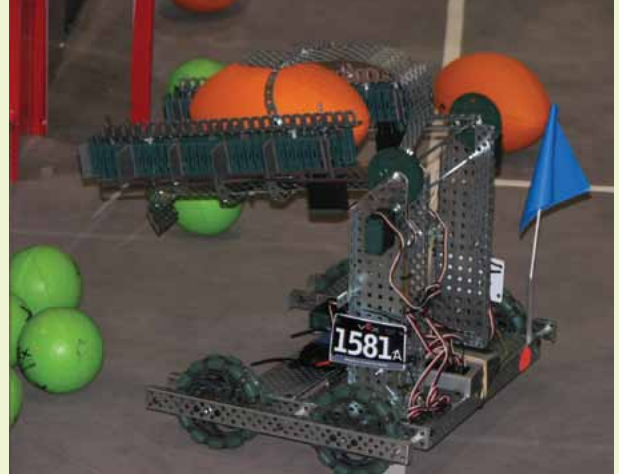
### UNIVERSITY TRANSPORTATION CENTER FOR HIGHWAY PAVEMENT PRESERVATION (CHPP)

The need to protect the massive national highway infrastructure investment is recognized by Congress and clearly cited in the “Moving Ahead for Progress in the 21st Century Act” or the “MAP-21”. The establishment of CHPP is consistent with the U.S. Secretary of Transportation’s strategic goal of “State of Good Repair”. The mission of CHPP is aimed at providing a new platform for accelerating innovation in highway pavement preservation. The center will assist in meeting the increasing

demand for highway pavement preservation research and will further the goal of increasing the reliability and performance of the nation’s highways. Encouraging the best and brightest future engineers pursuing degrees and careers in transportation-related engineering disciplines should be a big priority. This CHPP session will center on showcasing innovative, creative, and fun challenges, as well as opportunities for participating high school students and teachers..

## VEX ROBOTICS

Our team of experts has designed a lab experience to give precollege students an introduction to robots. Students will work in small groups and have a hands-on approach learning to control the VEX robot. They will write programs using Robot C language, and they will program the robot to be controlled by a remote control. Application and discovery of how programming works will be similar to lessons presented in science and math classes. Each team will discover how to adjust their programs based upon the program inputs and actual output (robot performance). During each phase, new challenges will be introduced to engage the students. This will reinforce new ideas and concepts while exposing students to the newly emerging capabilities of student-controlled robotics programs.



## INTERDISCIPLINARY ENGINEERING BUILD

In this build you and your team will be integrating practices from multiple fields of engineering to build and evaluate a support system. Support systems can range from simple beams to intricate bridges composed of gussets, trusses, cables, etc. These types of systems are used throughout Civil, Mechanical and Structural Engineering works. This session will start with a brief introduction to the forces and stresses that act on support systems. Additionally, you will see how digital sensors can read and convey data about these stresses to a computer. We will also look at the computer code that takes this raw data and converts it into a format that can easily be interpreted.

During the build portion of this session you and your team will be given the design constraints for the structure. Utilizing the information learned at the start of the session and the limited materials provided, your team will need to design and then construct a model to be tested. Your finished structure will be placed on one of our

test beds for evaluation. With the help of MSU Engineering students, the results will be collected by a sonic ranging sensor. These data points will be interpreted by the computer program and your team will be evaluated on percent deflection of your support. Throughout this session you will need to listen, learn and utilize your team to be successful. Good Luck.



## MEMBERS OF THE ORGANIZING COMMITTEE SPRING 2014



**Drew Kim**  
MSU Engineering  
Assistant to the Dean  
Recruitment, Scholarships,  
and K-12 Outreach



**Luis Donadoto**  
Assistant Director of  
MSU Engineering  
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**Rachel Esch**  
K-12 Outreach  
Administrative Assisant



**Russ Pline**  
Okemos High School  
and MSU Engineering  
Recruitment and K-12  
Outreach Design Day  
Coordinator



**Samantha Pohlen**  
K-12 Outreach Design  
Student Coordinator



**Bob Watson**  
MSU Engineering  
K-12 Outreach  
LEGO and VEX Robotics  
Coordinator



**Imen Zaabar**  
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