



UNIVERSITY TRANSPORTATION CENTER FOR

# RAILWAY SAFETY



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# RailwaySafety.utpa.edu

- UTC Railway Safety Consortium Institutions – Successful Partnership
- Research Efforts – Fall 2013 to Present
- Educational and Outreach Activities
- Professional Development Activities
- UTCRS Achievements and Impacts



# Consortium Institutions

- University of Texas-Pan American (UTPA-Lead)
  - Research Focus: Mechanical Components Safety
- Texas A&M University (TAMU)
  - Research Focus: Railway Infrastructure Safety
- University of Nebraska-Lincoln (UNL)
  - Research Focus: Railway Operations Safety

# Keys for Successful Center Operation

- Complimentary areas of research with a strong emphasis on one or more transportation related fields
- Complimentary B.S., M.S., and Ph.D. degree programs
- Mutually beneficial partnerships with appropriate federal, state, local, and private entities leading to products and solutions addressing industry needs
- Effective partnerships with state and local school districts
- Effective communication and equitable distribution of funds among consortium members that optimizes the commitment level of all parties involved in the center
- Build upon, optimize, and enhance already existing facilities, infrastructure, and institutional resources
- Effective collaborations across departments and colleges

# Research Activity – Fall 2013 to Present

- Research Covers all aspects of railway safety: physical systems; operations and planning; and human factors
- 18 Projects to date
- 30 Bachelor's
- 15 Master's
- 9 Doctoral
- 2 Journal Articles
- 8 Conference Papers
- 2 Master's Thesis
- 4 Senior Design Projects



# Research Experience for Undergraduates (REUs)

- In 2014: 8 students  
(2 men, 6 women)
- In 2015: 12 students  
selected (4 men, 8  
women)
- All historically  
underrepresented



# UTCRS Summer Camps

- Summer 2014: the camps served **700 students** (300 elementary, 300 middle school, and 100 high school students) from over 130 schools representing 26 school districts in the Rio Grande Valley (RGV).
- Summer 2015: committed camp enrollment is **1000 students** (450 elementary, 425 middle school, and 125 high school), again distributed among RGV school districts.



# Elementary Students

- 3<sup>rd</sup>-5<sup>th</sup> grade students took part in inquiry-based activities to learn about science and engineering concepts in relation to transportation safety.
- Students designed and built a magnetic levitation train system to explore dynamic motion concepts and safety measures to prevent collisions.

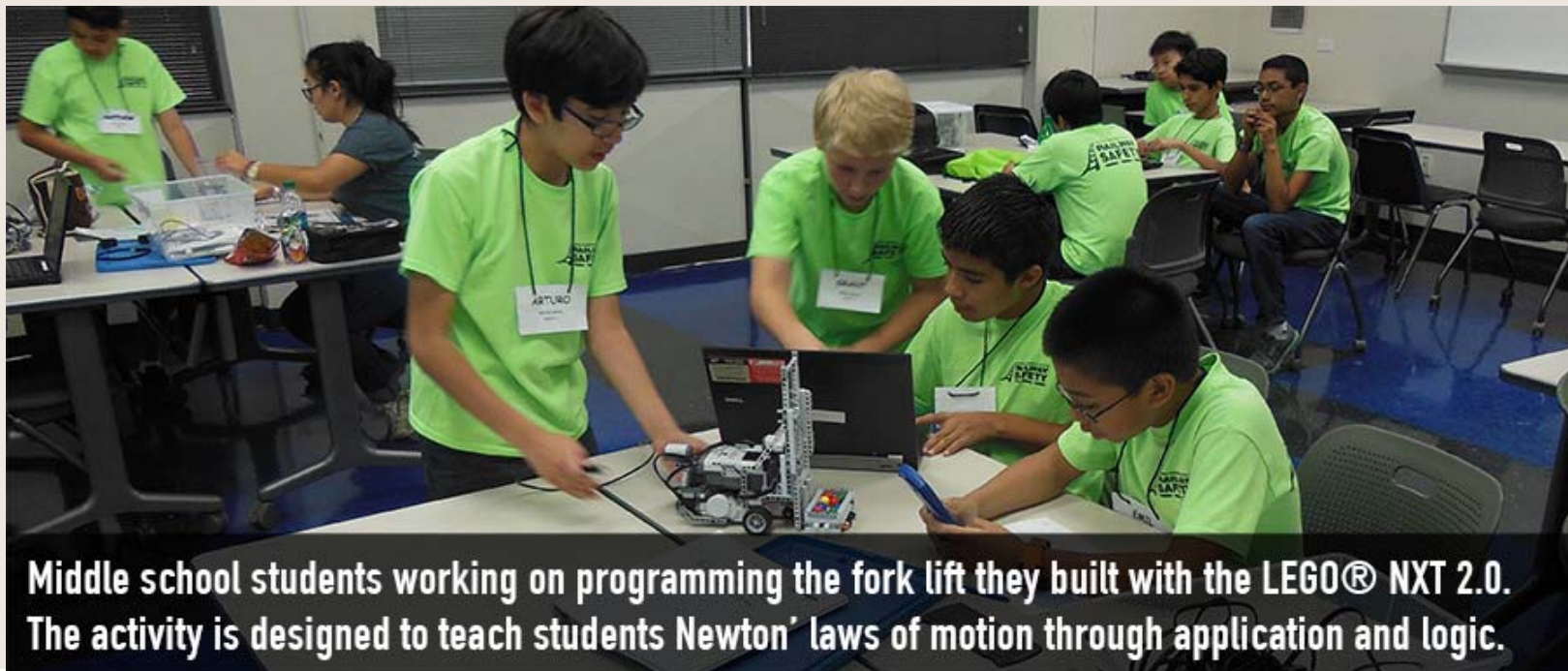


Elementary camp participants discuss their daily lesson plans with UTCRS director Constantine Tarawneh.



# Middle School

- 6<sup>th</sup>-8<sup>th</sup> grade students learned about transportation engineering and railway safety through project-based curriculum focused on robotics.
- Students built and programmed various types of vehicular robots designed to obey traffic lights and railway safety signs and signals.



**Middle school students working on programming the fork lift they built with the LEGO® NXT 2.0. The activity is designed to teach students Newton' laws of motion through application and logic.**

# High School

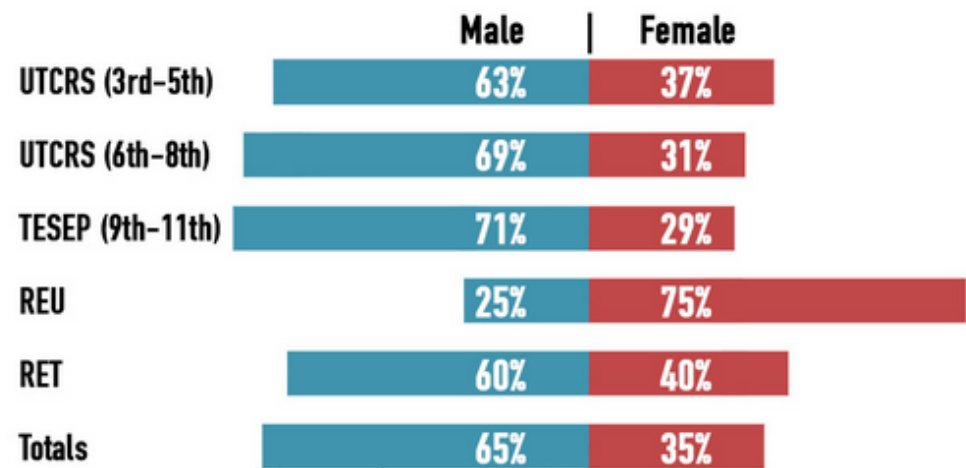
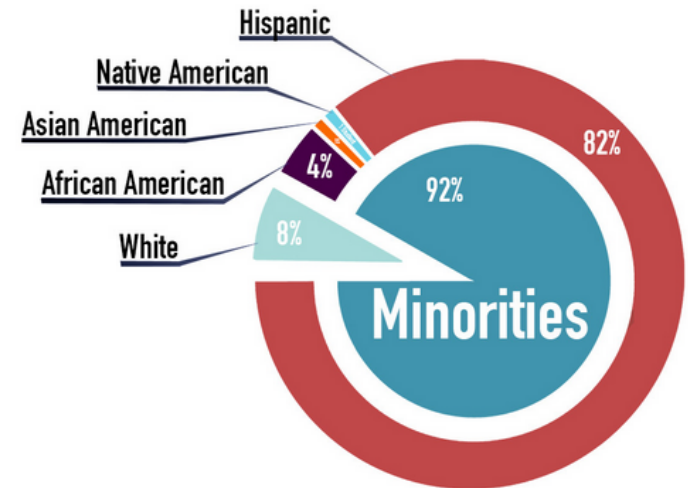
- 9<sup>th</sup>-12<sup>th</sup> grade students took part in a number of challenging competitions that included designing and programming an efficient vehicular robot as part of collaborations with TexPREP and an NSF-STEP grant.



TESTP students work in a joint-effort to construct the Castor-Bot that will later be programmed for the final competition.

# UTCRS Achievements and Impacts

- A major goal of the UTC for Railway Safety is to encourage students from groups traditionally underrepresented in transportation to consider careers in transportation-related fields. The summer camps supported this goal as there were approximately 700 camp participants, of which over 80 percent were Hispanic and over 35 percent were female.



# Research Experience for Teachers (RETs)

- In 2014: 66 K-12 STEM Teachers
- In 2015: 85 K-12 STEM Teachers



# Questions

