

Center for Pre-College Outreach

Annual Report.2010



www.mtu.edu/precollege

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I am pleased to present to you the 2010 Michigan Technological University Center for Pre-College Outreach Annual Report.

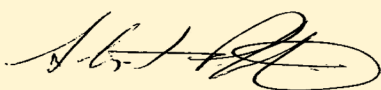
Science, technology, engineering, and math (STEM) education is an extremely important topic in our country right now. Some of tomorrow's most important careers—those in engineering, healthcare, alternative energies, and more—will require individuals who are thoroughly educated in STEM. And yet student interest in these areas, as well as understanding about career opportunities, is on the decline. There is currently a call to redefine STEM education, to change the way it is taught so that students engage with it.

Michigan Tech's Center for Pre-College Outreach is answering that call. Recently formed in an effort to meet the growing demand for dynamic K-12 STEM outreach, the Center encompasses a variety of Michigan Tech initiatives both old and new. The Center is comprised of five distinct divisions:

- **Summer Youth Programs**—Offering more than fifty weeklong summer camps and career and adventure explorations in business, computing, engineering, arts and humanities, leadership, outdoor and environmental studies, and science and technology; plus scholarship programs for academically talented and/or underrepresented students.
- **MIND TREKKERS**—An innovative new STEM road show featuring off-campus events and large-scale outreach initiatives meant to bring the mystery and excitement of science, technology, engineering, and math to young students.
- **College Access**—Operating the Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP) as well as the Michigan College Access Network/Keweenaw College Access Network.
- **Data Collection and Assessment**—Collecting K-12 student data from participants in outreach efforts across campus, and ultimately creating a database for streamlined communication to students from the cradle to college.
- **Fundraising**—Initiating, cultivating, and sustaining partnerships with supporters who share the same mission of pre-college STEM programming and outreach.

Enclosed you will find detailed information about several of our initiatives—Summer Youth Programs; the Women in Engineering, Engineering Scholars, and National Summer Transportation Institute scholarship programs; and our MIND TREKKERS road show. We've included 2010 demographic data, program highlights, benchmarks, and results.

I hope you'll take this opportunity to learn more about our ever-growing STEM outreach efforts and the positive, lasting effects our programs have on youth of all ages. If you have questions, please don't hesitate to contact me at 906-487-2219.



Sincerely,
Stephen Patchin
Director, Center for Pre-College Outreach
Michigan Technological University

Summer Youth Programs

YOUTH PROGRAMS EVALUATION HIGHLIGHTS

In 2010, participants had the opportunity to choose from **more than seventy** different explorations. Our most popular courses included forensic science and CSI, general engineering, and backpacking on Isle Royale. Other explorations, such as blacksmithing, remain popular year to year.

BY THE NUMBERS

62% of program participants were from groups traditionally underrepresented in science, technology, engineering, and mathematics (STEM).

51% of participants were female.

90% of participants said they would recommend their exploration to others.

90% of participants rated their classroom experience as good or excellent.

87% of participants rated their hands-on activities experience as good or excellent.

90% of participants were inspired to learn more about the subject covered.

27% of participants had previously attended a Youth Programs academic program in a previous year.

82% of participants stated they would be interested in returning to a Michigan Tech Summer Youth Program next year.

77% of participants stated they would consider Michigan Tech as an option during their college search.

95% of participants would recommend their program to a friend.

“Coming here was one of the best decisions I have made. Being at Michigan Tech was a great experience and I have enjoyed my stay here. I met a lot of people and made new friends. Not everyone gets that chance and I feel very lucky to be here.”

—Gabriela, Grand Rapids, Michigan

“Thank you for this great opportunity at Michigan Tech. In this one week, the program has not only equipped me with some tools for life, but has tipped my choice of college. The wonderful people that are here, the staff and helping professors, have shown me that this is where I would like to further my education.”

—Angelo, Atlanta, Georgia

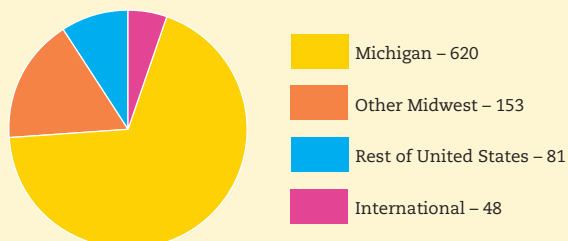




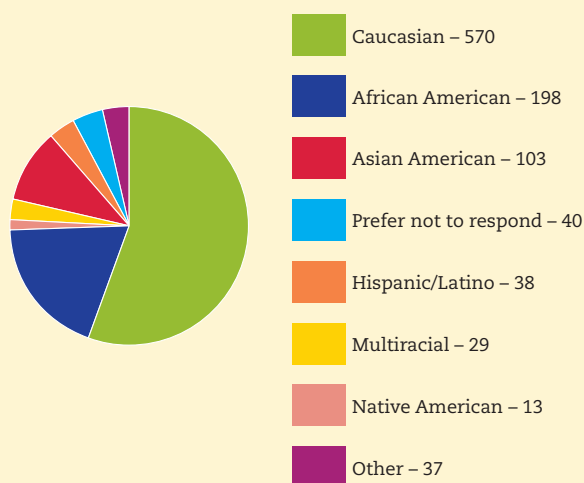
DEMOGRAPHIC INFORMATION

Total participants: 1,299

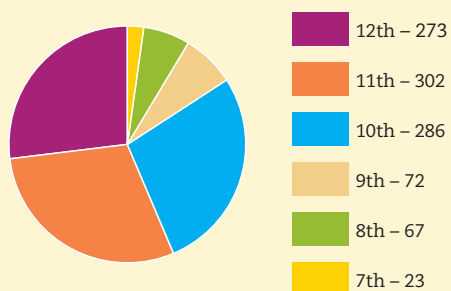
GEOGRAPHIC DISTRIBUTION



ETHNICITY



GRADE, FALL 2010



Women in Engineering and Engineering Scholars Program

2010 Summer Programming

PROGRAM CONTENT

During Women in Engineering (WIE) and the Engineering Scholars Program (ESP) at Michigan Tech, a total of **281** participants:

- Explored different areas and applications of engineering.
- Learned about a wide array of careers in engineering through focused presentations.
- Honed and developed team skills and applied their knowledge about engineering.
- Investigated the many ways engineers can directly impact the quality of people's lives.
- Learned how to be successful in undergraduate engineering programs.
- Became acquainted with college life and extracurricular activities on campus.
- Built networks and friendships while enjoying a variety of recreational activities in the natural setting of Michigan's Upper Peninsula.
- Met role models working in engineering fields.
- Met other students with similar backgrounds and interests.



EVALUATION HIGHLIGHTS

Based on participant evaluations, the students especially enjoyed the hands-on group projects and activity portions of their engineering sessions. Favorite projects included processing hot metal into objects, sand-casting a name plate, learning about sports engineering, making soap from raw materials, exploring renewable energy with wind turbines, and designing a building to withstand an earthquake.

- Percentage of participants who could not have attended without a scholarship
75% WIE | 78% ESP
- Percentage of participants who would recommend their program to others
97% WIE | 97% ESP
- Percentage of participants who had their expectations met by the engineering sessions and projects
89% WIE | 80% ESP

- Percentage of participants who felt more likely to have a future career in engineering after participating in the program
89% WIE | 87% ESP
- Percentage of participants who felt more encouraged to attend college after completing the program
93% WIE | 90% ESP

Students' most memorable experiences included meeting new people, participating in engineering projects, visiting Lake Superior and other evening activities, learning about the various kinds of engineering, and going on field trips to area sights and locations.

ENGINEERING GROUP PROJECTS

Engineering group projects included:

- Saponification (making soap)
- Constructing a 4-bit digital counter
- Constructing their own FM transmitter
- Blacksmithing using materials science
- Learning about extreme aerodynamics and human biomechanics using sports engineering
- Testing different wind power mechanical designs, and identifying which are most efficient in many different climate conditions

ENGINEERING SESSIONS

Students participated in projects during their ten different engineering sessions, including:

- Building a motor
- Designing a bridge and testing its strength
- Operating a continuous chemical reactor
- Designing a computer-controlled reaction
- Recreating natural disasters and studying the part that natural components play in their severity
- Thermo mechanical processing of shape memory wire
- Using an Atomic Force Microscope to explore the strength of nanoparticles

“This experience has been so engaging and has supplied me with such a great appreciation and understanding of the engineering field. On a social note, I would like to thank you for giving me the opportunity to meet such great and motivated ladies.”

–Sarah, Rochester Hills, Michigan

“I have been able to gain valuable knowledge and find where my interests in engineering truly lie. I enjoyed living on campus and meeting new people. Being around other students who share my interests was a great experience. The benefit of being able to talk to Michigan Tech students, faculty, coaches, and teachers is immeasurable.”

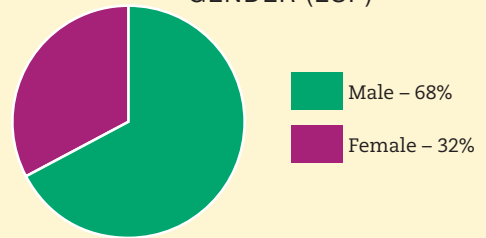
–Jared, Saginaw, Michigan



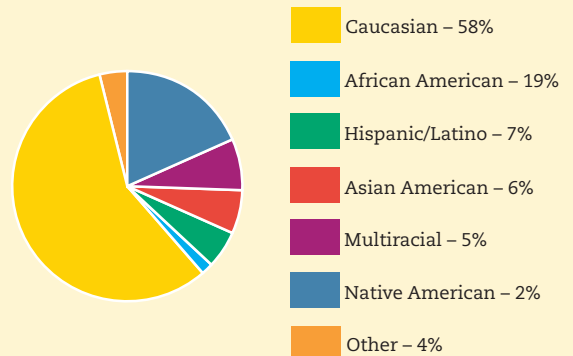
DEMOGRAPHIC INFORMATION

Total participants: 142 WIE | 140 ESP

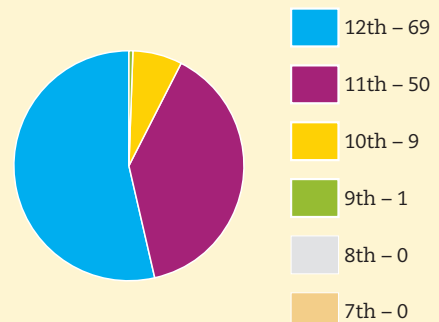
GENDER (ESP)



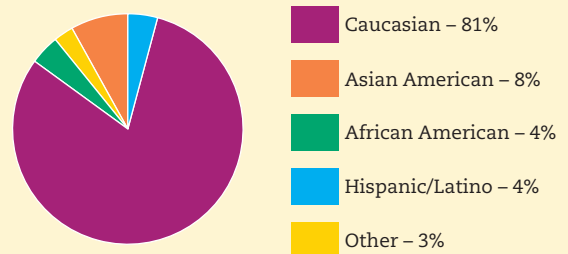
ETHNICITY (ESP)



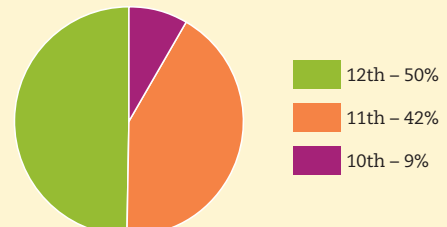
GRADE, FALL 2010 (ESP)



ETHNICITY (WIE)



GRADE, FALL 2010 (WIE)



National Summer Transportation Institute

2010 Summer Programming

PROGRAM CONTENT

During the National Summer Transportation Institute (NSTI) at Michigan Tech, 27 participants:

- Used hands-on activities to explore different modes of transportation, including planes, trains, automobiles, and ships.
- Learned from role models working in transportation fields about topics such as bridge design, airport construction, and snow roads across Antarctica.
- Discovered team skills and applied the knowledge learned about transportation during group projects.
- Went on field trips to local attractions, such as Eagle River, Portage Canal Lift Bridge, and Isle Royale.
- Went on a weekend excursion to Sault Ste. Marie and St. Ignace, Michigan, to tour the Soo Locks, the International Bridge, and the Mackinac Bridge.
- Became acquainted with college life and extracurricular activities on campus.
- Met other talented teens with similar backgrounds and interests.



EVALUATION HIGHLIGHTS

Based on participant surveys, students especially enjoyed the hands-on group projects and field trip portion of the program. Highlights of the program included making new and diverse friends and getting to experience college life first-hand.

79% of participants felt more likely to have a future career in the transportation industry after participating in the program.

83% of participants felt more encouraged to attend college after completing the program.

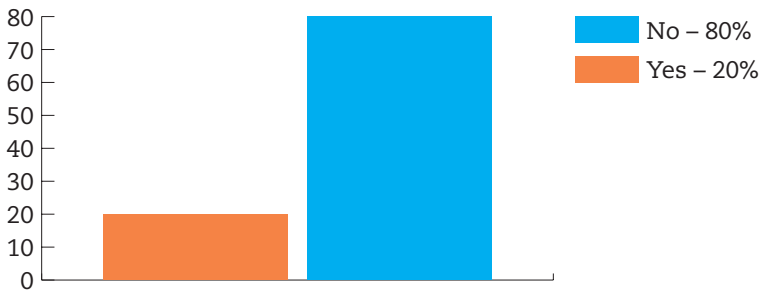
92% of participants agreed that the transportation industry has contributed greatly to solving problems found in the world.

After completing the program, the participants planned to take the following transportation-related courses in high school or college:

- 83% Math courses
- 83% Science courses
- 71% Technology-based courses
- 67% Design courses
- 54% Transportation courses
- 25% Other

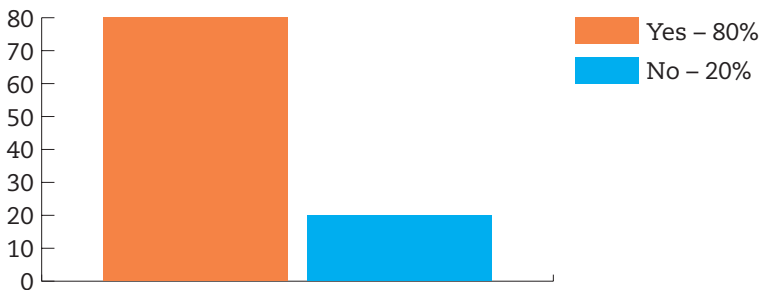
PRE TEST

Do you currently plan on making the transportation industry your career field?



POST TEST

After completing NSTI, are you more interested in a future career in this field?



“My favorite experience was going inside the Mackinac Bridge. I never thought I would get to do something like that. It was great!”

—Mateo, Bayside, New York

“My son came back motivated and excited about all the new things he had learned. He said the instructors were great and he met a lot of new friends. This is one program that I will definitely recommend to other students and parents. Thank you for affording my son the opportunity to explore the field of engineering as it relates to transportation.”

—NSTI Parent

THIS PROGRAM WAS MADE POSSIBLE BY:



University Transportation Center

Materials in Sustainable Transportation Infrastructure

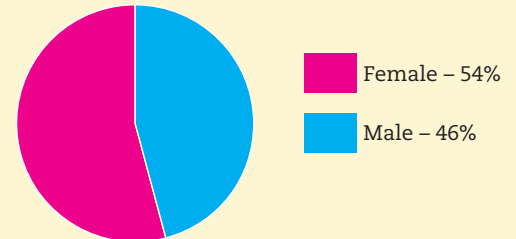
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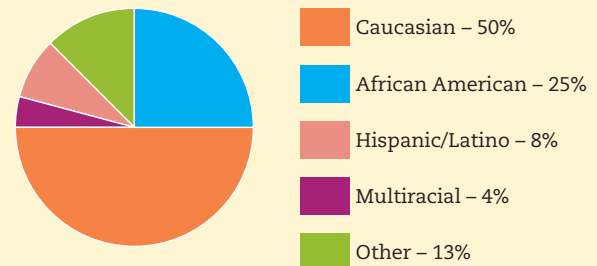
DEMOGRAPHIC INFORMATION

Total participants: 27

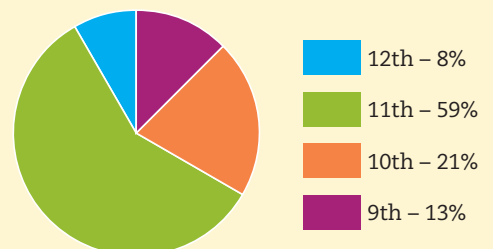
GENDER



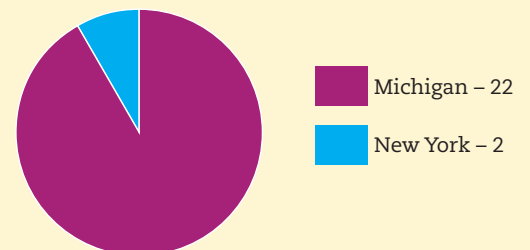
ETHNICITY



GRADE, FALL 2010



STATE



MIND TREKKERS

The MIND TREKKERS road show is Michigan Tech's newest K-12 outreach initiative. With the goal of bringing the excitement of science, technology, engineering, and math (STEM) directly to young students, MIND TREKKERS attends expos and events throughout the region and across the nation to showcase engaging, hands-on experiments and activities. MIND TREKKERS serves as an active pipeline, connecting thousands of prospective students to the Michigan Tech family while engaging in one-of-a-kind opportunities and experiences. MIND TREKKERS is inspiring our next generation of leaders to seek answers, get excited, and question the traditional boundaries of a STEM education.

ON THE HORIZON FOR 2011

[National Engineers Week](#)

Sponsored by Michigan Tech
Feb. 20–26, 2011
Detroit Science Center

[SciQuest](#)

Sponsored by Michigan Tech
March 2011
Detroit Science Center

[Girls Scouts of America](#)

Spring 2011
Jackson, Michigan

[MIND TREKKERS Science and Engineering Festivals](#)

Sponsored by AT&T
May 2–6, 2011
Traverse City, Sault Ste. Marie, Escanaba,
and Iron Mountain, Michigan

"Your booth at the USA Science and Engineering Festival in Washington, DC, this past weekend was the highlight of the whole expo for my first-grade son. Your booth was engaging, and your team was energetic and their excitement contagious.

We visited many other booths throughout our visit, but the Michigan Tech booth beat all the others—including NASA."

—[Letter received from a MIND TREKKER parent](#)





In 2010, MIND TREKKERS visited...

- **The Einstein Project Science Expo**
March 13, Shopko Hall, Green Bay, Wisconsin
3,000+ K-8th grade students
- **F.I.R.S.T. Robotics Regional Competition**
April 1-3, University of Minnesota campus
Minneapolis, Minnesota
126 teams from seven states
3,000+ students and visitors
- **National Boy Scout Jamboree—
Technology Quest**
July 26–August 3, Fort A.P. Hill, Virginia
42,000+ Scouts and Scout leaders
- **Cranbrook Institute of Science—
Cub Scout Science Event**
October 2, Bloomfield Hills, Michigan
2,000+ 1st–5th grade Scouts and parents
- **USA Science and Engineering Festival**
October 23–24, Washington DC
250,000 visitors/day
- **Grand Rapids Griffins Score with Science**
November 10, Grand Rapids, Michigan
3,000+ K-12 students and teachers



MINDTREKKERS.MTU.EDU

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