



SENIOR RESEARCH

Senior research is the crown jewel of a student's four year academic experience at MMSTC. This semester long, cross curricular project includes a bound research paper, 20 minute oral presentation to staff and peers, and a science symposium where projects are presented and defended to industry professionals. It requires MMSTC seniors to demonstrate the academic, laboratory, time management, and cooperative skills that they have gained over the course of their time at MMSTC. This year's category winners demonstrated an exceptional mastery of these skills.



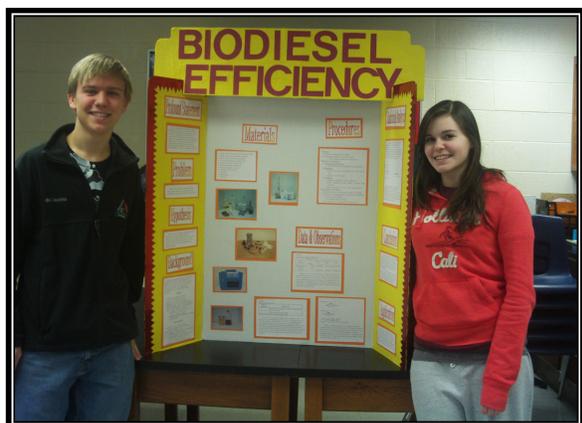
Physics 1st Place/Grand Prize Winners

Ryan Kreiter - Sterling Heights High School
Nate Pedder - Sterling Heights High School

The Answer to Running-Related Knee Injuries

Running has been a popular hobby and sport for the past half century. However, studies show that at least one in every three runners every year is injured, and 42% are knee-related injuries. The research conducted attempts to answer the question: what running form is best for the knees?

To answer this question, thirty runners ran over a force plate which was held firmly in the ground. Each runner ran over the force plate with and without shoes and using a forefoot-strike and heel-strike form. The resultant forces were measured to determine the rate of loading, a value determined by the initial slope of the force-time graph and measured in bodyweights to nullify the runners varying masses. The results showed that running with shoes and using forefoot-strike form resulted in the lowest rate of loading. This research is relevant in assisting athletes, primarily long-distance runners, in the understanding of their running techniques so that the appropriate actions may be taken to aid in the prevention of knee injuries.



Chemistry 1st Place Winners

Rebecca Donovan- Warren Mott High School
Eric Walton- Lake Shore High School

The Effect of Waste and Raw Canola Oil on the Heat of Combustion of Biodiesel

This experiment investigated whether the type of vegetable oil, raw or waste canola oil, used to produce biodiesel influences the heat of combustion of the fuel. Fuels with higher heats of combustion are more fuel efficient. They produce more heat to push the pistons of a diesel engine quickly and smoothly. Researchers produced biodiesel from raw and waste canola oil. A bomb calorimeter was used to find the heat

of combustion of the two fuels. Results showed that there is a significant difference in the heat capacities of raw canola biodiesel and waste canola biodiesel. The biodiesel produced from the raw canola oil had the greater heat of combustion meaning it was the more efficient fuel. With this research, people who use biodiesel to run their cars can determine which type of biodiesel would be more efficient.



Biology 1st Place Winners

Alexa Morrison – Warren Mott High School

Jessica Chapman– Warren Woods Tower

The Effect of Non-Expired and Expired Cephalexin on the Growth of *Escherichia coli*

The object of this experiment was to study the effects of non-expired and expired Cephalexin on the growth of the *Escherichia coli* (*E. coli*) bacteria. Diluted *E. coli* was grown in Petri dishes of laurel broth mixed with either expired or non-expired Cephalexin. These dishes were then put in an incubator so the *E. coli* could grow and the resulting colonies counted. A two-sample *t*-test showed that the average number of *E. coli* colonies was significantly less in expired Cephalexin than in non-expired Cephalexin. These results can be applied to the real world because it shows that the Cephalexin is still just as effective, or even more effective, after its expiration date. If the Cephalexin has not degraded after its expiration date, then due to its continued effectiveness, it can still be used even after the printed date. Due to this research, Hospitals and Pharmacies can consider keeping and using antibiotics after the expiration date.

WELCOME TO THE FAMILY!



The staff of MMSTC has an exciting new face around the halls. **Ms. Tuyen Duddles** has joined the MMSTC team and is looking forward to working with the best students in Macomb County. Ms. Duddles focuses on individual student development and creates her lessons to meet the demanding requirements of today's educational and business community. After undergraduate work at Wayne State University where she earned a degree in Chemistry and English, she is currently nearing completion of her Masters degree from Oakland University. Ms. Duddles' former employment was with EDS and General Motors where she was a Technical Writer and Design Release Engineer. She brings this experience and a vast knowledge base with her to share with the students at MMSTC. When not in the computer lab or classroom, you may find her reading, cooking and spending time with her husband or wired hair terrier Hastings. When asked about her career move to MMSTC, Ms. Duddles replied, "It's the best move I could have made. Being a teacher is so much more fulfilling; I feel that I am doing work that is valuable to the future of our society." The MMSTC teachers, staff and students are very lucky to have such a fine educator join our ranks.

UPCOMING IMPORTANT DATES:

AM Session only 4/1 (Records Day)
Spring Break 4/4-4/8
AM Session only 4/21
NO School 4/22 (Good Friday)

Senior Dinner 4/26
MMSTC Senior Exams 6/1 & 6/2
MMSTC Underclassmen Exams 6/10 & 6/13

University Research Corridor Is Visited by MMSTC Students

Here at MMSTC we have made a commitment to our students that by the time they have graduated they will have had the opportunity to visit and explore the three largest research universities in our state, known as the University Research Corridor (URC). The University of Michigan, Michigan State University and Wayne State University are leaders in bringing talent and leadership in both innovation and collaboration to the state of Michigan. Their goal is to graduate students who will help make the state a better place to live, work, and play.

At MMSTC we strongly feel that by visiting each of these universities the student's will see all the wonderful resources and opportunities that await them when they start applying for college. The visits also compliment the strong emphasis on the research portion of our curriculum and higher education in general.



Each visit is tailored to coincide with the grade level and curriculum being taught that year at MMSTC. The **Freshmen** class visited **Wayne State University** and explored the health science building as well as the school of engineering. The health science visit introduced the students to careers such as pharmacy, physical therapy, nursing, and other life sciences.

Sophomores went to **Michigan State University**. Here they had a chance to see the Cyclotron Laboratory, visit the honor's college, and eat at a residence hall. The **Junior** class went to **The University of Michigan** and started their day off with the physics department. An interactive, fun, and informative lecture was given by Professor Tarle. Each field trip encompassed a tour of the campus, information sessions from various departments, and visits by many of our former alumni.

The future success of our state will be made possible by making a commitment to our students that they see the need to further their education and involve themselves in the many opportunities for research, creativity, education, innovation, and economic growth that the URC can offer. MMSTC is proud of the fact that our annual field trip to each of these universities is an integral part of this initiative.



MICHIGAN MATHEMATICS PRIZE COMPETITION

Over 29 MMSTC students took part in the Michigan Mathematics Prize Competition this past October. This year MMSTC had 5 students qualify to take Part II of the exam. These students are among the top 1000 out of 10,000 in the State of Michigan who qualified to participate in Part II. The exam consists of five challenging problems to which students must provide written explanations for their claims and mathematical proofs of their results. The students with the top 100 scores on the two parts will be invited to an Awards Day program in February. The top 50 will be presented with scholarships ranging from \$250 to \$2,500. The students who qualified for Part II of the exam are seniors:

Sheridan Brown
Genevieve Lee
Nathan Pedder

Kyle Hildebrandt
Tayson Lin



The Instructional Development and Educational Assessment (IDEA) Institute at the University of Michigan is a wonderful program that provides high school students from across Michigan with opportunities to explore science, technology and mathematics. Students can participate in a variety of programs including Science Saturdays, lecture programs, and summer camps. **Ashley Gerebics** (Fraser HS) has been apart of the Science Saturday's Program and summer chemistry camp programs. Science Saturdays (which meets once a month January through April) includes a day of chemistry experiments and touring the campus in Ann Arbor. For more information visit www.ideainstitute.umich.edu.



Capture the Flag

This event came about 6 years ago as a way to lighten the stress of the ongoing senior research projects. Not only that, but the 2010/2011 school year is the first time that the morning and afternoon seniors of MMSTC have been together in the classroom. The goal was to get both sides of Butcher interacting together to make new friends and get to know their classmates. Under the guidance of the math teachers, the teams were divided into the BLACK team and the WHITE team. From there, the senior council of **Juzzlyn Perry**, **Jackie Close**, and **Nate Pedder** organized the rest of the event.

On the chilly morning of October 8th, classes were dismissed halfway into the day. After group photos, both teams were given their colored flags to hide around Butcher Park. The game was a success! Everyone participated and the thought of pressing homework disappeared...at least for a little while. The white team found a way to get out of jail quicker through teamwork, which resulted in their capturing of the first of two flags, thus winning the contest!!!!!! For the after party, students brought in a plethora of snacks and goodies. The hit was a surprise visit from Mrs. Gerling! Everyone wanted the game to last longer, and in a way, it always will. Just ask **Troy Nemeth**.





My Research Adventure in Israel

By Tammy Hsia (SHHS, 2010)

“MMSTC, I want to inform you all of a wonderful opportunity. Through the **Detroit Science Fair**, I won an all-expense paid research trip where I conducted biological research at the Weizmann Institute of Science in Rehovot, Israel, one of the world’s forefront research centers.

Seventy-five 18-21 year olds from 20 different countries researched topics in computer science, mathematics, physics, chemistry, and biology, and truly, every individual was a character. The students all had many talents and interests! I was researching a human protein (the 1-8D, found prevalently in colon cancer) with state-of-the-art equipment. Centrifuging was a pastime. Counting cells, splitting cells... Even in college, I doubt I will see such fine equipment for a long time. Down the lane were the animal house and the Ebola/hazardous virus’s research area. Near the dining hall was the mammoth particle accelerator the physics kids were gaping over. At the Weizmann Institute, we felt like we were in our own utopia of science and bliss, learning how to break dance, juggle...

We traveled throughout Israel on the weekends. By the end of the month, I had seen every border of Israel: Egypt, Lebanon, Jordan, and Syria. I swam in the “Med” Sea, bobbed on the Dead Sea, and snorkeled in the Red Sea. I visited the holiest of holy sites I thought imaginable, from where David hid from Saul in Ein Gedi to the site of Jesus’ crucifixion. It was crazy and awe-inspiring. I made lasting friends I still talk to on a daily basis and I truly expanded my horizons. Now, when I travel, I have 20 countries to choose from where I’ll know at least one individual. And it is truly a wonderful feeling. Hello, Azerbaijan, Belgium, Switzerland, Australia, Brasil, Kazakhstan, Spain, Germany, England...I cannot wait for the future.”

ANNUAL SOPHOMORE TRADITION



This past fall, the sophomore class participated in an all day activities and team building camp. Students practiced how to listen to the ideas of others, how to work together to agree upon and accomplish one goal and how to compromise. Students also had a chance to explore and even discover their own academic strengths and weaknesses. The day also gave the morning and afternoon students the opportunity to get to know each other a little better, and cumulatively that is what this sophomore camp is all about.

The day started with brief interviews and introductions of each other, then proceeded to a rotation of different activities such as tie-dying, personality and learning style exploration, and then finally playing “everyone scores” basketball as well as other team building activities.



After lunch, students signed up for certain events in the Mystery Olympics which had them creating original fashion designs, walking down a catwalk, and competing in an eating contest. The highlight of the day was a walk to the bowling alley where the students enjoyed a couple games of bowling. As the day wound down, students reflected upon the day and then made rain -- really. I believe fun was had by all as many students thanked us before they left for the day. To see pictures of the day, go to the slideshow link “Soph Day Slideshow” on Mrs. Cybulski’s homework page at http://www.wcskids.net/mmstc/staff_websites/cybulski.htm .

HOMECOMING --- MMSTC STYLE!**CLASS OF 2014**

On a quintessential Michigan fall day with the damp smell of fallen leaves and a bitter chill in the air, the Class of 2014 hosted the annual MMSTC Freshman Homecoming at Butcher Field.



The AM session Burning Bunnies were hoping determined to beat the unnamed sophomores of 10A. Led by quarterbacks **Martin Jabboury** and **Remon Hossain** with star player **Hunter Montrose** and assisted by **Abby Bault**, **Katelyn Tomasello**, **Kristian Wilks**, and **Steven Prascius**, the 9A Bunnies played the game with much gusto but alas were overwhelmed by the marauding sophomores. The score? We shall not speak of it evermore.

Despite the chill and wetness of the early morning, the Bunnies were not without their fans including the Bunny Marching Band led by conductor **Alex Berdy** and his band members, **Antonio Liccardello**, **Marco Lin**, **Gabrielle Harju**, **Ben Sikorski**, **Justin Lumpkins** and **Alex Wielbinski**. The Bunnies' cheer team, discouraged by the wet slippery grass, cheered on in their hearts. With the end of the game came the welcomed sight of doughnuts and apple cider.



The arrival of the PM session on the playing field came just as the sun reached it's zenith in the sky and so the cold and dampness of the morning evaporated into a glorious fall day, perfect homecoming weather. The 9B Fightin' Einsteins led by coach **Luis Dimech** were ready to school the 9C IPTs led by coach **Conner Roach**. The players took the field enthusiastically and were determined to defend their end zones. The girl Einsteins, **Ashley Meerschaeart** and **Jennie Feldpausch** effectively blocked the

opposing IPTs but quarterback Conner Roach sneaked a few throws by them into the hands of **Max Morgan**, **Anthony Haskett**, **Patrick Osantowske**, and **Tim Jones**. Einstein quarterback Luis Dimech likewise made contact with his teammates **Elton Defrance**, **Naim Cekaj**, **Andrew DeSantis**, and **Ryan Hallock** more times than this writer can remember. It was as if the luck of the Irish and the spirit of Herr Professor combined in some cosmic way to give the Einsteins a close victory.

The action on the side lines was almost as competitive as that on the field as the IPT cheerleaders led by **Rachel Kloski** challenged the Einsteinettes led by **Erica Kloski** and **Najah Mubashira** to a cheer-off. And the opposing bands took the field enthusiastically at half-time. At the conclusion of the game, the Pretty Technical crowd graciously congratulated the winning team and all acrimony dispelled. Or maybe it was the scent of slightly charred hot dogs and a refreshing cup of chilled apple cider helped ease the pain of defeat?





SENIOR EUCRE

What better way to start off the holiday break than with a secret Santa gift exchange and game of cards? After bottles of iced tea and Starbucks gift cards were exchanged, the card game commenced. Though some students hadn't played this legendary game, in true MMSTC fashion, the 'newbies' were trained expeditiously by their more experienced peers.

After less than 5 minutes, everyone got the hang of it and students were assigned to different tables from a top secret program that **Mrs. Tallman** came across during her days in the army.

Rounds were eight minutes in duration. The pace was fast and furious as **Richard Straus** took the early lead in points. Shouts of, "what's trump?" and "everyone's got a heart!" permeated the commons. Ultimately **Kyle Hildebrandt**, put on a show as he easily score the most points, with three lone hand sweeps in a row. His point total was e^{45} !

While he was rewarded generously with an MMSTC tee shirt, the spirit of the season was evident throughout the proceedings as hugs, good cheer, and even MMSTC alumni helped everyone forget about their research projects on this last day of school in 2010!

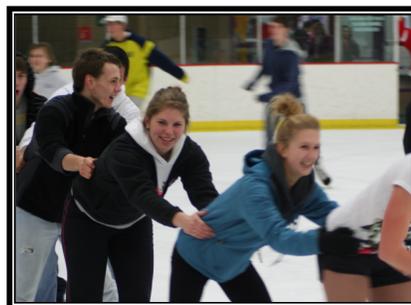


The International Year of Chemistry 2011 (IYC 2011) is a worldwide celebration of the achievements of chemistry and its contributions to the well-being of humankind. Under the unifying theme "*Chemistry—our life, our future,*" The Year of Chemistry is intended to reach across the globe, with opportunities for public participation at the local, regional, and national level and MMSTC is no exception.

The goals of IYC2011 are to increase the public appreciation of chemistry in meeting world needs, to encourage interest in chemistry among young people, and to generate enthusiasm for the creative future of chemistry. In honor of IYC 2011 MMSTC students will be participating in a variety of projects and programs to commemorate this occasion. Students have created mole stuffed animals, participated in a periodic table art exhibition, and submitted movies about they have researched elements to the Chemical Heritage Foundation It's Elemental Competition.

ANNUAL MMSTC ICE SKATING IS A BIG HIT!!

Once again students and staff enjoyed a fun and educational day at the Troy Sports Center at our annual MMSTC Ice Skating Adventure on January 28. After the rigors of senior research, the science fair, and midterm exams, it was a welcome break to relax and have some fun. The connections between math and science and ice-skating are endless, from studies of gravity and friction to changes in state of H_2O to the effects of this physical activity on the neuromuscular system! **Kristen Stadler** (Cousino, 2012) and **Trisha Pasque** (Cousino, 2011) demonstrated their skating skills to the thrill of an appreciative audience. Many students (and even staff!) participated in a spirited game of Broom Ball. It was a wonderful way to finish up the first semester with the entire MMSTC family.





MACOMB MATHEMATICS SCIENCE TECHNOLOGY CENTER

27500 Cosgrove | Warren, Michigan 48092 | www.wskids.net/mmstc

Lauran Hoven, Director of Special Programs
 MMSTC Newsletter Committee: MMSTC staff
 Editor: Christine Kincaid Dewey
 Printing and Distribution: Secretarial Staff



MMSTC MISSION STATEMENT
 The mission of the Macomb Mathematics Science Technology Center, in partnership with families and community, is to create the best innovative environment which fosters excellence and vision in teaching, learning, and discovering the relationships of mathematics, science, technology, and society.

WARREN CONSOLIDATED SCHOOLS

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Strong relationships among all stakeholders, including: teacher-student, parent-teacher, principal-teacher, and superintendent-board member.

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