

Statistics for 2020 TCRSF

At TCRSF, 472 students registered for projects & 189 for papers = 661 student registrations (555 unique students)

TCRSF projects, 283 students presented 216 HS projects,
189 students presented 171 middle school projects,
472 total students presented 387 total projects

TCRSF papers: 13 middle school students competed with 12 middle school papers (1 team paper) and
176 high school students competed with 152 high school papers (24 team papers: two 3-person
team and 22 2-person teams).

189 total students competed with 164 total research papers (total of 21 2-person papers & 2 3-person
paper).

The Minnesota State Science and Engineering Fair and the tri-state North Central Regional Junior Science and
Humanities Symposium were held virtually in 2020. National JSHS 2020 is also virtual.

Competing at state from TCRSF: (projects, not students; team project counts as one)

Middle school: 74/195 projects = 38% of middle school projects at state were from TCRSF

High School: 85/165 projects = 52% of high school projects at state were from TCRSF

(but TCRSF students won 61% of all state HS awards)

Total of 159 /360 total projects at state = 44.2% of all state projects were from TCRSF

State canceled the middle school research paper competition in both 2019 & 2020, TCRSF recognized 10
papers as state worthy middle school research papers

Competing at Tri-State JSHS for high school papers: 36/176 papers = 20.5% of all HS papers to advance

Our TCRSF students competed extremely well at the Minnesota State Science and Engineering Fair. TCRSF
students earned many awards at state. 3 of the 5 HS students sent to ISEF from state were from TCRSF. 10
HS students on 8 projects advanced to ISEF from TCRSF and another 4 HS students on 3 HS projects
advanced to ISEF from state! That means 14 students from our 4-county metro area are finalists at the 2020
International Science and Engineering Fair (ISEF).

22 students middle school students advanced from TCRSF (top 10% of each affiliation) and **5 TCRSF
students** advanced from the state science fair to compete in the **National Broadcom MASTERS** (grades 6-8)
competition, with national winners announced in the fall. We had **2 students** earn **national semifinalist** status
in Broadcom MASTERS **(two of the top 300 in the nation) in 2018**. Minnesota had only 1 semifinalist in
2019.

At the Tri-state (MN, ND, & SD) North Central Regional Jr. Science & Humanities Symposium (JSHS, research
paper competition), TCRSF students earned several awards, including **1st, 2nd, 3rd, & 4th place. 4 out of the 5
research paper winners that advanced to National JSHS this year are from TCRSF.**

Vaughn Hughes, Minnetonka HS, with his presentation of his paper entitled *Using Environmental
Enhancements to Increase Vitamin-C Production in Spinacia oleracea in Varied Agricultural Environments*
Won \$2000 scholarship at North Central Regional JSHS

Mina Mandic, St. Paul Academy, with her presentation of her paper entitled *Exploring the Wonders of the
Early Universe: Green Pea Galaxies and Light Flux*
Won \$1500 scholarship at North Central Regional JSHS; and **won \$12,000 scholarship at national JSHS
(1st place in Physical science at nationals!)**

Quentin Xander Hughes, Minnetonka HS, with his presentation of his paper entitled *An Active Role for
Machine Learning in the Diagnosis of Atrial Fibrillation*
Won \$1000 scholarship at North Central Regional JSHS

James Clinton, Nathan Rockafellow, Breck School, with their presentation of their paper entitled *Spudfinder
6500: Creating a radar-based system for pre-harvest potato yield mapping, year two*

At ISEF (International Science and Engineering Fair – the best in the world!), TCRSF named 8
projects (10 students) to compete and 3 more of our projects (4 more students) were named to ISEF
from state for a total of 14 TCRSF students as finalists at ISEF. Sadly, ISEF did not feel they could
do the competition virtually, so for the first time ever, ISEF, scheduled for May 10-16 in Anaheim,

California, was held as a conference and exhibition. The Society for Science declared that all finalists are still to be considered alumni of the program. Each of the finalists IS an international finalist. One special awards organization chose one of our projects to receive a special award based on their project presentation video and material. See below.

ISEF Finalists 2020:

Milan Jostes, Stillwater Area HS, *Developing FourS 2.0 - A Web Hosting Software That Uses Encrypted Quick Response Code to Reduce Violence in Schools*

Bingsheng "Andrew" Guo, Mounds View HS, *Re-engineering a centrifuge force microscope (CFM) to enable the study of induced crystal nucleation in hypergravity*

Eric Feng, Mounds View HS, *The Time Course of Murine Cardiomyocyte Maturation*

Mani Chadaga and Akshay Nambudiripad (team), St. Paul Central HS, *Development of WALTER: A Route Planning System that Analyzes Accident Data to Determine Fast, Simple, and Safe Driving Routes*

ISEF 1st Place Engineering Award, from Sigma Xi, The Scientific Research Honor Society

Anindita Rajamani, St. Paul Highland Park HS, *Privacy-Preserving Ubiquitous Activity Recognition with Wearable Sensors*

Abigail Roh and Samantha Detor (team), Breck School, *Searching the Shadows: Using shadows in aerial imagery to classify trees by genus for urban tree management, Year II*

William Sepesi, Minnetonka HS, *A Machine Learning Approach to Pokémon Battling*

Quentin Xander Hughes, Minnetonka HS, *An Active Role for Machine Learning in the Diagnosis of Atrial Fibrillation*

And Finalists additionally chosen at state:

Anthony Chen, St. Paul Academy, *The Effects of Short Term Radiofrequency Electromagnetic Radiation on Diatom Photosynthetic Productivity*

Mina Mandic, St. Paul Academy, *Exploring the Wonders of the Early Universe: Green Pea Galaxies and Light Flux*

Byron Jia and John Cardwell, Breck School, *Evaluating Ecosystems: Using Drones and Boats to Improve Water Health Assessments*

Broadcom MASTERS National Semi-Finalists 2020:

The top 300 middle school students were selected from a pool of 3,476 entrants throughout the United States. These students scored in the top 10% of their affiliated science fair to enter nationals. TWO of our students are Top 300 national semi-finalists this year!

Maggie Banks, Stillwater Middle School, *Currently Knocking on Wood: Toward a Biodegradable Piezoelectric Transducer from Rochelle Salt and Wood*

Maddy Schilling, Murray Middle School, *How Does the Type of Ice Melt Affect the Death Rate of Freshwater Amphipods?*