

## Statistics for 2023 TCRSF

In 2023 we returned to an in-person TCRSF after 2 virtual years. TCRSF was again held at the Minnesota State Fairgrounds in the Lee and Rose Warner Coliseum. Our projects were again such high quality that TCRSF was able to send over half our projects to state, held in St. Paul this year.

**At TCRSF, 275 students registered for 255 projects & 151 students registered for 139 research papers = 426 total student registrations – representing 34 schools.** Our area covers the 9 metro counties of Ramsey, Hennepin, Washington, Dakota, Anoka, Chisago, Isanti, Sherburne, and Wright Counties in Minnesota.

The Minnesota State Science and Engineering Fair was held in-person and the tri-state North Central Regional Junior Science and Humanities Symposium was held virtually in 2023. TCRSF won 135 of the 241 awards given at state for projects – which is 56%! Our students did very well! The top prize at state is to be chosen as a finalist to compete at the International Science and Engineering Fair, this year in Dallas, Texas. State chose four projects/5 students (3 individual projects and 1 team project) and all were from TCRSF. Of the alternates named to ISEF, 2 out of 4 were also from TCRSF.

The top 10% of our middle school projects were nominated to enter the national Thermo Fisher Junior Innovators Challenge.

**At ISEF (International Science and Engineering Fair – the best in the world!),** TCRSF named 11 projects (11 students) to compete and 4 more of our projects (5 more students) were named to ISEF from state for a total of 16 TCRSF students as finalists at ISEF. ISEF was held in-person in Dallas, TX in mid-May.

### ISEF Finalists 2023:

All finalists have won Wolfram Alpha Mathematica software for finalists (world's most powerful and all-encompassing computational software), finalist medal, and certificate – and the right to compete in the world's largest and most prestigious pre-collegiate scientific competition, which included an all-expense paid trip to ISEF in Dallas, TX.

**Henry Choi**, grade 11, St. Paul Academy & Summit School, *The Effect of Gefitinib on Cell Proliferation and Invasion in 2D and 3D Cultures of MDA-MB-231 Cells*

**Lakshika Nanda Kumar Reddy**, grade 11, Math and Science Academy, *Detecting Cataracts From Retinal Fundus Using Machine Learning: An AI Approach to Identifying Cataracts Using Convolutional Neural Networks*; **won USAID Third Award Global Health of \$2,000 and Central Intelligence Agency Second Award of \$300.**

**Shreshth Shrivastava**, grade 11, Eden Prairie HS, *Wi-C.A.R.E: Wifi Computer-Assisted Remote Eldercare (Year IV)*

**Sriram Sureshkumar** grade 10, Mahtomedi HS, *Impact of Biochar as soil amendment in increased produce yield (Year 1)*

**Maggie Banks**, grade 11, Mounds Park Academy, *Wood-n't It Be Nice: Toward a Continuous Piezoelectric Charge Pump*

**John Liu**, grade 9, Mounds View HS, *Green Electronics: A Prospective Proof-of-Concept Study*

**Sarah Zamudio**, grade 10, Burnsville HS, *Making Natural Gas from Compost*

**Arreh Jain**, grade 12, Wayzata HS, *Neurological Nuances: Quantifying and measuring the length and spacing of arterioles in the visual cortex using scans from two-photon imaging in vivo*

**Sarah Peterson**, grade 12, Breck School, *Protecting Plants: Investigating the relationship between fertilizers and insect damage in an urban garden*

**Ana Stewart**, grade 12, Minnetonka HS, *The Application of Mushroom Mycelium as a Biomaterial and Leather Alternative*

**Andrew Zhang**, grade 12, Wayzata HS, *Extremal values for the Steiner  $k$ -distance and the Steiner  $k$ -Wiener index*

### **Named finalists from state:**

**Yash Dagade**, grade 11, Eden Prairie HS, *WATT from VAWT : Design of A Novel Vertical Airborne Wind Turbine (VAWT) Clean Energy Farm; won 3<sup>rd</sup> Grand Award of \$1000*

**Muminah Nihaar Mohammed**, grade 11, Al-Amal School, *Unbind the Blind, won 4<sup>th</sup> Grand Award of \$500*

**Karen Nakamura**, grade 12, Math and Science Academy, *Personalization of Deep Brain Stimulation Surgery Pre-Operational Planning: Integration of 7-Tesla MRI Segmentations into 3-D Brain Visualization Platform*

**Rishi Bhargava and Humza Murad (team project)**, both grade 11, St. Paul Academy & Summit School, *Project WASP: Watering Atmospheric Self-Irrigating Planters*

### **Thermo Fisher Junior Innovators Challenge National Semi-finalists 2023:**

Congratulations to **Ethan Finch** and **James Griffiths**! They are top 300 in the nation in the Thermo Fisher Junior Innovators Challenge! Middle school students who scored in the top 10% of all middle school science projects at their regional or state science fairs were eligible to enter the national competition - and Ethan and James were chosen from a pool of 1,828 entrants who were already top 10% projects!

**Ethan Finch**, grade 8, Stillwater Middle School, *Analyzing the Influence of Weather on the Sap Production of Maple Trees To Create a Sap Volume Prediction Algorithm*

**James Griffiths**, grade 6, Minnetonka East Middle School, *The Conductivity of Common Household Drinks: An Analysis of the Correlation Between Vitamin and Mineral Composition and Electrolyte Concentration in Beverages*