



BASEF



2024

ANNUAL REPORT

BAY AREA SCIENCE AND ENGINEERING FAIR

sponsored by:
Primary Fluid Systems Inc.



**Big ideas ...
Infinite possibilities**

**Bay Area Science and
Engineering Fair**

c/o
143 Hyde Park Ave.,
Hamilton ON,
L8P 4M8

basef@basef.ca
<https://www.basef.ca/>

Registered Charity #
11895 1565 RR001

Land Acknowledgement:

The Bay Area Science & Engineering Fair (BASEF) acknowledges its presence on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the “Dish with One Spoon” wampum agreement.

The catchment area of BASEF is home to many Indigenous Peoples from across Turtle Island. We respect the longstanding relationships with local Indigenous communities, the Mississaugas of the Credit First Nation and the Six Nations of the Grand River. BASEF recognizes that we must do more to learn about the rich history of this land so that we can better understand our roles as residents, neighbours, partners and caretakers. For more information, visit www.native-land.ca.

OUR MISSION:

BASEF inspires young people to positively impact the world through science, technology, engineering and mathematics. BASEF provides opportunities for students to showcase their innovations and discoveries.

Student images provided by BASEF.

Cover image and page side images provided by:
<https://pixabay.com/>

BASEF 2024 Annual Report



A Year of Rebuilding

This year, the Bay Area Science and Engineering Fair (BASEF) celebrated its 64th year. Since 1961, the fair has provided a platform for tens of thousands of students in grades 7 – 12 to showcase their passion for science, technology, engineering, and mathematics, with opportunities to progress to national and international competitions. Many BASEF alumni have moved on to become world-class researchers, doctors, engineers, and successful business owners in their pursuits of excellence!

The 2024 fair saw a continuation of the post-covid rebuilding of the fair. We had 340 students representing 258 projects competing, a 20% increase from 2023. But the fair is more than just increasing numbers. The quality has been outstanding, with exceptional results at the national and international levels. Going forward, we look forward to the development of this new wave of students as they continue their science fair journey.

Students, parents, teachers, committee members, volunteers, judges, and, of course, our sponsors and benefactors all contribute to the wonder that is BASEF, and we are thankful to everyone involved for their support. Year after year, you inspire young people to positively impact the world through science.

We would also like to send a special thank you to Hillfield Strathallan College for their support in hosting the fair. The facilities are excellent, and the staff went out of their way to ensure a successful fair.

2024 BASEF Co-Chairs

Dana Bee & David Reed

BASEF 2024 Annual Report

From the Judge-In-Chief

Merit judging is key to the success of BASEF. Merit Judges include university faculty and scientists, industrial engineers and scientists, representatives of private research centers and agencies, medical professionals, senior graduate and undergraduate university students as well as many retired professionals and community members. This diversity of backgrounds provide valuable perspectives when evaluating the projects.

On Judging day there were 127 Merit Judges in attendance to judge 258 projects. What a great time was had by both the judges and the student participants. Here are a few comments from participants:

“the highlight of my experience was presenting my project to the judges. They were very supportive and enthusiastic”;

“the judges were so kind and understanding, they took the time to listen to our project with deep interest and ask questions that kept us on our feet.”

A new Merit Judging Form was introduced in 2024 consisting of three criteria – Scientific Thought (45%), Scientific Communication (50%) and Student Engagement (5%). The new form was well received by the judges and participants with the new Student Engagement mark allowing for the recognition of the participants motivation and creativity.

A sincere thank you to each merit judge and category chair for sharing their scientific expertise and supporting all student participants.

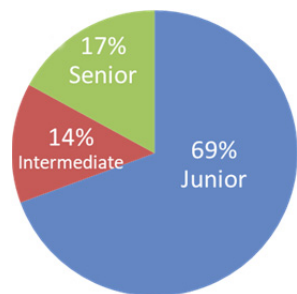
Donna Stack-Durward

BASEF Judge in Chief

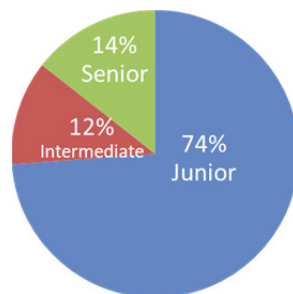
Results

2024 Participation

258 projects



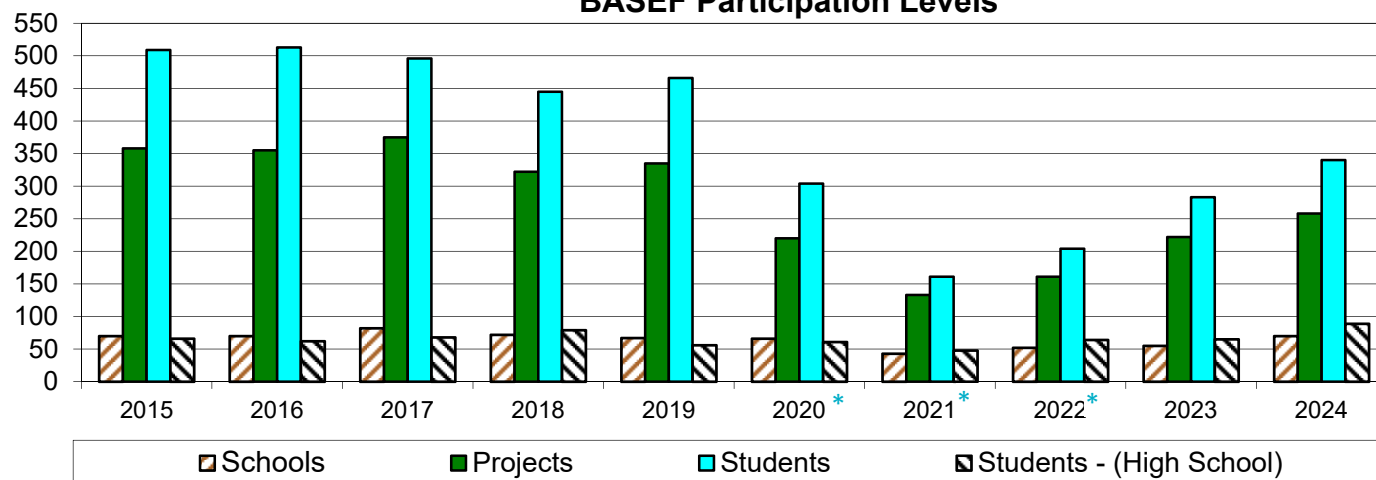
340 students



**70 schools from
7 school Boards**

French Public
Grand Erie Public
Halton Catholic
Halton Public
Hamilton-Wentworth
Hamilton-Wentworth Catholic
and several Independent/Private Schools

BASEF Participation Levels



* The 2020, 2021, and 2022 fairs were online fairs.

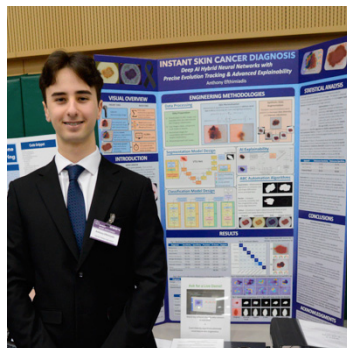
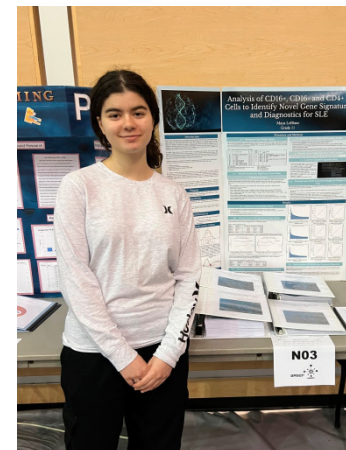
Best In Fair Pinnacle Awards

FIRST - **Maya LeBlanc**

Primary Fluid Systems Pinnacle Best in Fair

“Analysis of CD16+, CD16- and CD4+ T Cells to Identify Novel Gene Signatures and Diagnostics for SLE”

Abbey Park High School, Oakville



SECOND - **Anthony Efthimiadis**

Primary Fluid Systems Pinnacle Second Best in Fair

“Instant Skin Cancer Diagnosis: AI Hybrid Neural Networks with Precise Evolution Tracking”

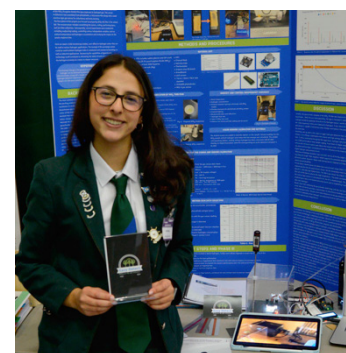
Oakville Trafalgar High School, Oakville

THIRD - **Alia Wahban**

Primary Fluid Systems Pinnacle Third Best in Fair

“Redefining the Landscape of Hydrogen Safety using Innovative Gasochromic Technology”

Hillfield Strathallan College, Hamilton



BASEF 2024 Annual Report

CELEBRATING 64 YEARS OF SCIENCE EXCELLENCE!

Awards: Merit and Special

Merit Awards

Presented by ArcelorMittal Dofasco G.P.

Merit awards recognize the tremendous amount of thought and effort that has gone into the projects entered into BASEF. They are a result of an extensive judging process undertaken by over 127 volunteer merit judges who have come from educational institutions, local governments, business and industry in our regions.

All participants in BASEF were eligible to win Merit Awards. Each merit award winner received a cash prize and a \$1,000 entrance scholarship that may be used toward first year tuition at either Mohawk College or Sheridan College.

Merit awards were earned by 151 students; a total of \$8,660 in cash and \$151,000 in scholarships:

Gold – 14 projects by 18 students

Silver – 39 projects by 45 students

Bronze – 69 projects by 88 students

Special Awards

Special Awards are donated by families, individuals, companies, organizations and groups to recognize deserving projects that deal with topics of interest to the donor.

50 Special Award donors provided 145 special awards

\$26,200 in prize money

Scholarships worth \$14,500

Total awards given out in excess of \$200,000



International Fair Team



As an affiliated fair, BASEF may send up to five high school projects to the Regeneron International Science and Engineering Fair (ISEF).

Anthony Efthimiadis
Oakville Trafalgar High School,
Oakville

"Instant Skin Cancer Diagnosis: AI Hybrid Neural Networks with Precise Evolution Tracking"
First in category, "Robotics and Intelligent Machines"

Alia Wahban
Hillfield Strathallan College,
Hamilton

"Redefining the Landscape of Hydrogen Safety using Innovative Gasochromic Technology"
First in category, "Energy: Sustainable Materials And Design"
Alfred University Full Tuition Scholarship

Maya LeBlanc
Abbey Park High School,
Oakville

"Analysis of CD16+, CD16- and CD4+ T Cells to Identify Novel Gene Signatures and Diagnostics for SLE"
Fourth in category, "Biomedical And Health Sciences"

Lily Song
North Park Collegiate and
Vocational School, Brantford

"Talk to the Hand"

William Xu
Dundas Valley Secondary
School, Dundas

"Accessible microscopy! A cellphone microscope for high-resolution, large FOV, and high-speed imaging"

National Fair Team



Thanks to the generous support of its sponsors, each year BASEF selects students to represent our region at the Canada-Wide Science and Engineering Fair.

Note that **all** participants received a **Western University Entrance Scholarship**.

Allarakhia, Imran W. H. Morden Public School, Oakville	<i>"LiquiViz: Adaptive AI for 3D Object Detection and Semantic Segmentation in Vision Impairment Devices"</i> YSC Excellence Award - Bronze (Junior)
Alsaadi, Bahaa Al Deen Al-Falah Islamic School, Oakville	<i>"Bits to Bedside: An Ingenious Exploration of Machine Learning in Triage Assessments"</i> Mount Allison University Entrance Scholarship YSC Excellence Award - Silver (Intermediate)
Alsaadi, Zena Al-Falah Islamic School, Oakville	<i>"Bits to Bedside: An Ingenious Exploration of Machine Learning in Triage Assessments"</i> Mount Allison University Entrance Scholarship YSC Excellence Award - Silver (Intermediate)
Budz, Evan Charles R. Beaudoin Public School, Burlington	<i>"Virtual Lifeguard: A Novel AI Approach to Drowning Prevention"</i> Canadian Artificial Intelligence Association Gwyn Morgan & Patricia Trottier Foundation Youth Can Innovate Award (Junior) S.M. Blair Family Foundation Award (Junior) YSC Challenge Award - Digital Technology (Junior) YSC Excellence Award - Gold (Junior) YSC Platinum Award - Innovation (Junior)
Gendy, Marly King's Christian Collegiate, Oakville	<i>"Investigating Techniques to Treat Cystic Fibrosis Using Gene Therapy"</i>

National Fair Team cont'd

LeBlanc, Maya Abbey Park High School, Oakville	<i>"Analysis of CD16+, CD16- and CD4+ T Cells to Identify Novel Gene Signatures and Diagnostics for SLE"</i> Carleton University - Faculty of Engineering & Design, Faculty of Science Entrance Scholarship (Senior) Dalhousie University, Faculty of Science Entrance Scholarship (Senior) Mount Allison University Entrance Scholarship University of New Brunswick Canada-Wide Science Fair Scholarship (Senior) University of Ottawa Entrance Scholarship (Senior) YSC Excellence Award – Silver (Senior)
Li, Yuewen W. H. Morden Public School, Oakville	<i>"CRISPR-Mediated Knockout to Improve PDAC Prognosis through TME Disruption"</i> YSC Excellence Award - Bronze (Junior)
Nagasaki, Kibo Mentor College, Mississauga	<i>"Bye-Bye Haber–Bosch"</i> Carleton University - Faculty of Engineering & Design, Faculty of Science Entrance Scholarship (Senior) Dalhousie University, Faculty of Science Entrance Scholarship (Senior) Mount Allison University Entrance Scholarship University of New Brunswick Canada-Wide Science Fair Scholarship (Senior) University of Ottawa Entrance Scholarship (Senior) YSC Excellence Award - Silver (Senior)
Naidu, Mithru Narayan W. H. Morden Public School, Oakville	<i>"LiquiViz: Adaptive AI for 3D Object Detection and Semantic Segmentation in Vision Impairment Devices"</i> YSC Excellence Award - Bronze (Junior)
O'Dell, Oscar King's Christian Collegiate, Oakville	<i>"Snake versus Slime: Who can build the better network?"</i>
Pacifici, Nico St. Mary Secondary School, Hamilton	<i>"The PrepStep: A Mobile Health Platform to Detect Ventricular Cardiomyopathy in Athletes Using AI"</i> Mount Allison University Entrance Scholarship Statistical Society of Canada Award (Intermediate) YSC Excellence Award - Silver (Intermediate)

National Fair Team cont'd

Qazi, Daniyal W. H. Morden Public School, Oakville	<i>"From Pixels to Predictions: A Deep Learning Method to Detect Pneumonia in Chest X-Ray Images"</i> YSC Excellence Award - Silver (Junior)
Qazi, Zayn W. H. Morden Public School, Oakville	<i>"From Pixels to Predictions: A Deep Learning Method to Detect Pneumonia in Chest X-Ray Images"</i> YSC Excellence Award - Silver (Junior)
Saravanan, Rakshan Ancaster High, Ancaster	<i>"The Electrocorpulgraph: Can AI change auscultation?"</i> Mount Allison University Entrance Scholarship YSC Excellence Award - Bronze (Intermediate)
Simmons, Cordelia North Park Collegiate and Vocational, Brantford	<i>"Hydroplaning Detection and Prevention Using an AI Neural Network"</i> Carleton University - Faculty of Engineering & Design, Faculty of Science Entrance Scholarship (Senior) Dalhousie University, Faculty of Science Entrance Scholarship (Senior) Mount Allison University Entrance Scholarship University of New Brunswick Canada-Wide Science Fair Scholarship (Senior) University of Ottawa Entrance Scholarship (Senior) YSC Excellence Award - Silver (Senior)
Tan, Siqi W. H. Morden Public School, Oakville	<i>"CRISPR-Mediated Knockout to Improve PDAC Prognosis through TME Disruption"</i> YSC Excellence Award - Bronze (Junior)
Zhang, Sam White Oaks Secondary School, Oakville	<i>"A Two-Modal Robot for Adaptability in Diverse Environments With Rolling Locomotion and Walking Gait"</i> Carleton University - Faculty of Engineering & Design, Faculty of Science Entrance Scholarship (Senior) Dalhousie University, Faculty of Science Entrance Scholarship (Senior) Mount Allison University Entrance Scholarship University of New Brunswick Canada-Wide Science Fair Scholarship (Senior) University of Ottawa Entrance Scholarship (Senior) YSC Excellence Award - Silver (Senior)

Student Advisors

Every year, students apply to volunteer as student advisors to our BASEF Organizing Committee. We thank this year's student advisors for all their input:

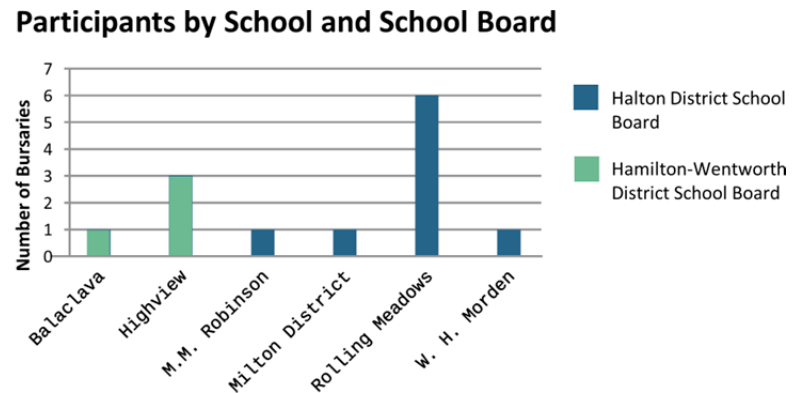
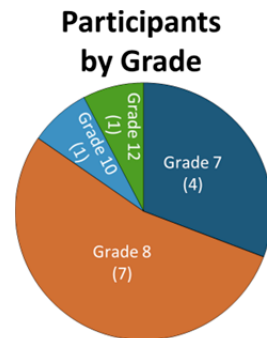


Nico Pacifici

Isabella Lopes

Bursary Program

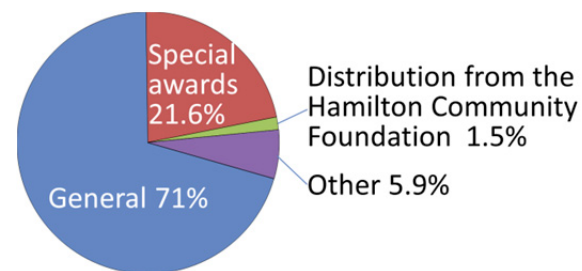
The BASEF Bursary Program helps students in need of financial assistance to start or complete their science fair project.



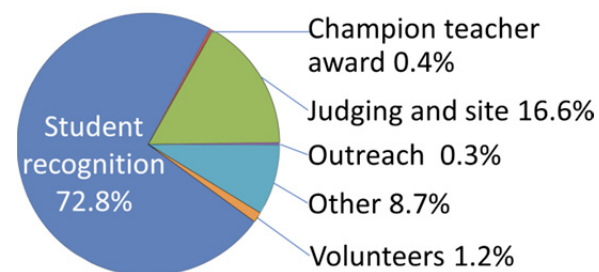
Financial Summary

Financial Highlights – Statement of Operations For the year ended August 31, 2024 (unaudited)

Revenue	2024	2023
General	\$ 85,977	\$ 93,585
Special awards	26,150	28,220
Distribution from the Hamilton Community Foundation	1,868	1,807
Other	7,111	5,297
	<u>\$ 121,106</u>	<u>\$ 128,909</u>



Summary of Expenses	2024	2023
Student recognition	\$ 112,833	\$ 112,417
BASEF Infinite Possibilities Grants	-	27,000
Champion teacher award	648	637
Judging and site	25,693	17,202
Outreach	470	320
Other	13,437	12,400
Personal, protective equipment	-	1,276
Volunteers	1,953	3,112
	<u>\$ 155,034</u>	<u>\$ 174,364</u>
Excess of Expenses Over Revenue	<u>\$ (33,928)</u>	<u>\$ (45,455)</u>





Disbursements to Students

CWSF trips	\$ 43,479
ISEF trips	26,944
Merit awards	8,480
Participation awards	5,804
Prize expenses	1,851
Special awards	26,275
	<u>\$ 112,833</u>

Other Expenses

Administrative	\$ 4,456
Bank charges	171
Marketing and publicity	3,873
Professional fees	2,460
Rent	1,966
Registration	511
	<u>\$ 13,437</u>

Sponsors & Charitable Donors

BASEF 2024 TITLE SPONSOR (\$25,000+)		
 Primary Fluid Systems Inc.		
Diamond (\$10,000+)	Platinum (\$5,000+)	Gold (\$2,500+)
 ArcelorMittal <small>DOFASCO HAMILTON</small>	Alectra Utilities McMaster University Mohawk College	D.E.N.M. Engineering Hillfield Strathallan College Sun-Canadian Pipeline Co.
Silver (\$1,000+)	Bronze (\$500+)	Friends (\$250+)
Bay Area Health Trust Burlington Hydro Canadian Linen & Uniform Service Halton Catholic DSB Halton District School Board Hamilton-Wentworth Catholic DSB Hamilton-Wentworth DSB Ontario Power Generation Taylor Leibow Accountants & Advisors	CareGo Tek Hamilton Police Retirees Association MYSYS Limited NewAE Technology Inc. Society of Tribologists & Lubrication Engineers – Hamilton Chapter Synapse Consortium WalterFedy	Electrical Construction Association of Hamilton Rotary Club of Ancaster AM Talkit.ca Inc.

Charitable Donors*			
Banting & Best Level (\$1000+)	Bondar Level (\$500+)	Polanyi Level (\$200+)	McGill Level (\$50+)
Peter Child Rita Kops	Cathy and Steve Hayman Mantecon Partners Peter and Susan Olynyk	Dan and Debbie Bowman Renato and Enza De Tina Nick & Helen Efthimiadis Paul & Pam Lakin John and Eleanor O'Flynn Dr. Nicola Simmons	Linda Millar Norman Young

* In addition to the donors listed, BASEF also has donors who wish to remain anonymous.

Note: Sponsors donating in-kind services help us provide an exceptional experience for BASEF participants. Key in-kind donations include: Printing, posters, newspaper advertising, trip winners' jackets, photo ID tags, accounting, and web hosting.