



2021

ANNUAL REPORT



**Bay Area Science and
Engineering Fair**

sponsored by:
Primary Fluid Systems Inc.



A Challenging Year

This year, the Bay Area Science and Engineering Fair (BASEF) celebrated its 61st Fair. 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 levels. Many of our BASEF alumni have become world-class researchers, doctors, engineers, and successful business owners in their pursuits of excellence!

For the second year in a row, BASEF adapted to the global pandemic and successfully held an online fair for nearly 160 students representing 132 projects. As always, we were thrilled with the caliber of projects that students submitted and presented online. From topics related to mask wearing and the pandemic, to global climate change and health, our students thought locally and globally about how to use science to enhance day to day living.

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 each and everyone involved for their support. Year after year, you are helping BASEF and our community to inspire young people to positively impact the world through science, technology, engineering and mathematics, as well as providing opportunities for the students to further their reach in showcasing their innovations and discoveries.

“If at first you don’t succeed, try two more times so that your failure is statistically significant”

- Unknown

2021 BASEF Co-Chairs

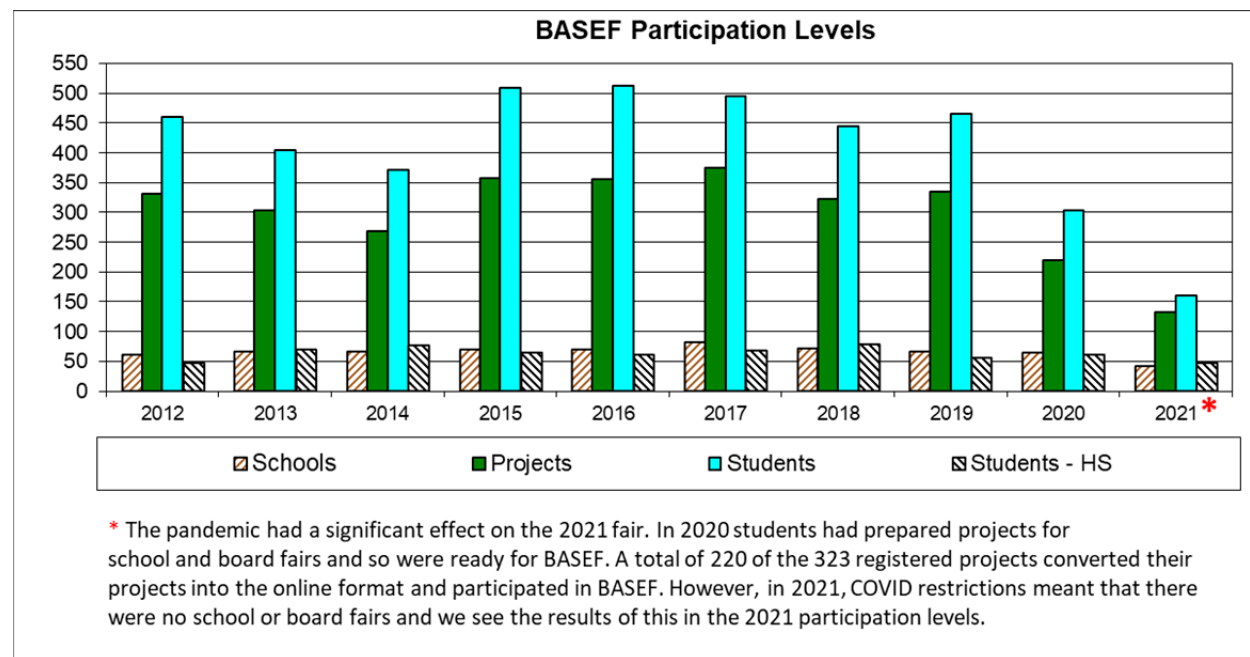
Dana Bee & Dan Bowman

BASEF 2021 Annual Report

Results

2021 Participation

- 133 projects
- 161 students
 - 113 grades 7 & 8 27 grades 9 & 10 21 grades 11 & 12
 - 91 female students 70 male students
- 43 schools



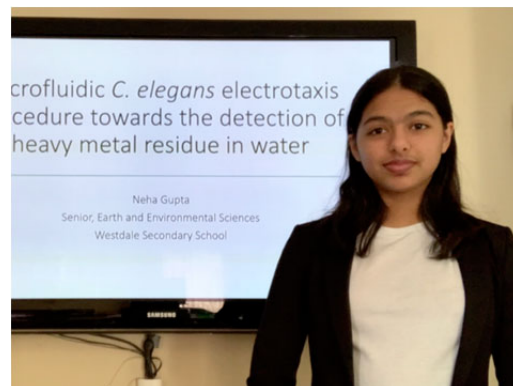
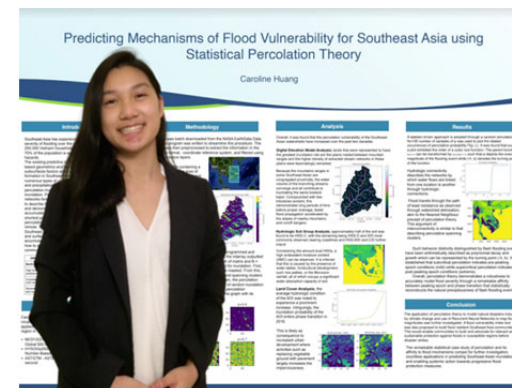
Best In Fair Pinnacle Awards

FIRST - **Caroline Huang**

Primary Fluid Systems Pinnacle Best in Fair

"Predicting Mechanisms of Flood Vulnerability for Southeast Asia using Statistical Percolation Theory"

Abbey Park High School, Halton District School Board



SECOND - **Neha Gupta**

Primary Fluid Systems Pinnacle Second Best in Fair

"Microfluidic C. elegans electrotaxis procedure towards the detection of heavy metal residue in water"

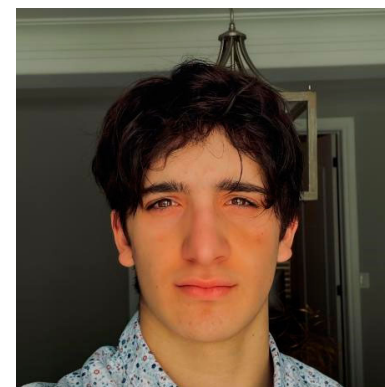
Westdale Secondary School, Hamilton-Wentworth District School Board

THIRD - **Joseph Saturnino**

Primary Fluid Systems Pinnacle Third Best in Fair

"FS-HIVE MRK 9: An Autonomous Swarm Robotics Fire Suppression System"

Bishop Ryan Secondary, School, Hamilton-Wentworth Catholic District School Board



BASEF 2021 Annual Report

CELEBRATING 61 YEARS OF SCIENCE EXCELLENCE!

Awards Merit and Special

Merit Awards

Sponsored by Primary Fluid Systems Inc.

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 216 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 receives 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 85 students; a total of \$8,200 in cash and \$85,000 in scholarships:

Gold – 9 projects by 11 students

Silver – 30 projects by 36 students

Bronze – 31 projects by 38 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.

47 Special Award donors provided 188 special awards

\$30,000 in prize money

Scholarships worth \$14,500

Total awards given out in excess of \$150,000

BASEF 2021 Annual Report

International Fair Team



As an affiliated fair, BASEF may send four high school projects to the Regeneron International Science and Engineering Fair (ISEF). Congratulations to the BASEF 2021 Regeneron ISEF Team.

Becca Barbera	<i>Diffusion Mechanism of Pu+3 in Sedimentary Repository Conditions: Ab Initio Molecular Dynamics Study</i>	Cathedral High School, HWCDSB
Rylan Donohoe and Julia Seymour	<i>Microwave Irradiation with Submerged Ultrasonication: A Novel Lignocellulosic Pretreatment Method</i>	St. Ignatius of Loyola Secondary School, HCDSB
Neha Gupta	<i>Microfluidic C. elegans electrotaxis procedure towards the detection of heavy metal residue in water</i>	Westdale Secondary School, HWDSB
Caroline Huang	<i>Predicting Mechanisms of Flood Vulnerability for Southeast Asia using Statistical Percolation Theory</i>	Abbey Park High School, HDSB
Joseph Saturnino	<i>FS-HIVE MRK 9: An Autonomous Swarm Robotics Fire Suppression System</i>	Bishop Ryan Secondary School, HWCD

BASEF 2021 Annual Report

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.

Maria Chzhen and Renny Wang	How Do Sleep Positions Affect Dreams In Teenagers?	Westdale Secondary School, HWDSB
Morgan McCourt	Maskteria: Determining wearing time & bacterial contamination of masks with & without toothbrushing	Oakville Christian School, IND
Harini Karthik and Chen, Echo	Aerodynamic Performance and Structural Engineering of Helicopter Seeds for Wind Turbines (HeliSpin)	Garth Webb Secondary, School HDSB
Lauren Dorricott	Reading Retention: Screens vs Paper	Calvin Christian School, (Hamilton) IND
Mitchell Clapperton	Reducing Wakes to Save Our Lakes – Optimizing Hull Design Using Computational Fluid Dynamics	Westdale Secondary School, HWDSB
Vihaan Vashishtha	Can we grow plants on Mars?	W. H. Morden Public School, HDSB
Paul (Kyum) Lee	Development of a 3d Cursor for Robotic arm Programming Optimization	Westdale Secondary School, HWDSB
Brenton Wang	Angry Birds and Kinematic Physics	St. Andrew Elementary School, HCDSB
Louis Low	Does Annoying Repetitive Sound Have an Influence on Training Effectiveness?	Canadian Martyrs Elementary School, HCDSB
Ali Haider	Using CRISPR to Diagnose and be used for Therapeutic Purposes for COVID-19	Hillfield Strathallan College, IND
Kadhir Ponnambalam	Investigation of the Efficiency of Water Vapor Collection from Air of Various Household Materials	Hillfield Strathallan College, IND
Jeffrey Klinck	A Novel Innovation to Aid People with Deafness via Haptic Feedback Relative to Surroundings	Oakville Trafalgar High, School HDSB
Amy Harrison	The Future of Xenotransplantation	King's Christian Collegiate, IND
Arianna Mastrotonardo	Determining the Knowledge, Attitudes, and Practices of Adolescents to the COVID-19 Pandemic	King's Christian Collegiate, IND
Sabrina Mogus	ViQ: A Wearable Sonic Vibrotactile Stimulation and Cueing	Garth Webb Secondary School, HDSB



Comments from the Judge-In-Chief

For the second year, the judging of student projects occurred electronically - students conducted research and performed experiments, submitted reports, and created videos. Projects were reviewed upon submission by a panel of BASEF committee members and students were allowed to (re)submit any components that were missing or could not be opened.

To address issues when judging remotely three Question and Answer Zoom meetings were held for merit judges. These sessions provided an opportunity for judges to interact with each other and with the judging committee. Questions were answered and tips were shared by the Judge in Chief, Category Chairs, and 2020 merit judges. Additionally, a new Judges Training video was prepared and available to all merit judges on the BASEF website, which outlined the online judging process. Feedback from the 2020 judging led to a few changes to the project criteria and judges' score form.

I was both impressed and grateful for the overwhelming response from our call for judges – over 216 individuals registered. Because of the large number of merit judges, all projects were judged a minimum of 4 times, most were judged 5 times.

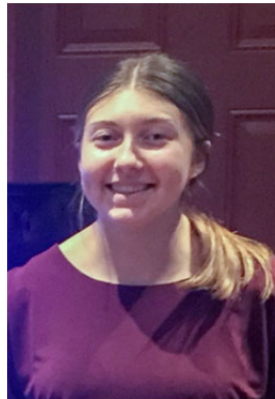
A sincere thank you to each judge and category chair for sharing their scientific expertise and supporting all student participants. Once again, I am humbled by the commitment of these volunteers. Let's hope we can get back to an in-person fair in the near future!

Donna Stack-Durward,

BASEF Merit Judge In Chief

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:



Maya Clapperton



Mitchell Clapperton



Sabrina Mogus

Outreach Program

The Infinite Possibilities Teacher Grant Program was piloted in 2021. Teachers of science and technology classes in Grades 4 to 12 in publicly-funded school boards were eligible to receive \$1,000 to be used to enhance in-person experiential science & technology learning activities. Sixteen grants were awarded.

"I was able to purchase a variety of equipment for my Grade 7 Electricity and Chemistry units. Among the items I obtained were motors, battery holders, test tubes and PH indicators all used to support in-class science learning activities. Very much appreciated. Thanks!"

Allison Cannon, Halton District School Board

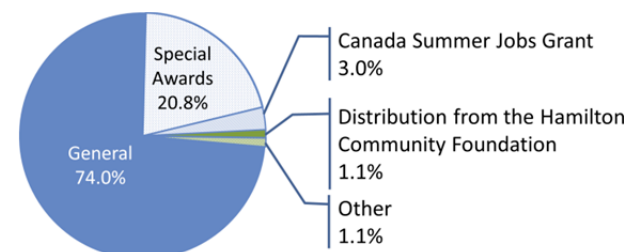
BASEF's Student Bursary program was also offered again. Students in financial need who were nominated by their teachers received \$30 grants each to help defray the cost of their project. . This program encourages students to participate in project-based science and to complete a project.

BASEF 2021 Annual Report

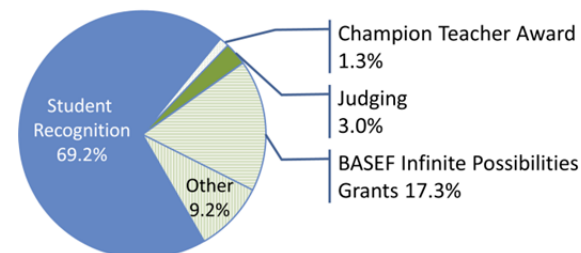
Financial Summary

Financial Highlights – Statement of Operations For the year ended August 31, 2021 (unaudited)

Revenue	2021	2020
General	\$ 106,767	\$ 69,793
Special awards	30,050	25,670
Canada Summer Jobs Grant	4,264	-
Distribution from the Hamilton Community Foundation	1,506	1,442
Raffle proceeds	-	1,285
Other	1,652	2,726
	<u>\$ 144,239</u>	<u>\$ 100,916</u>



Summary of Expenses	2021	2020
Student recognition	\$ 64,067	\$ 63,417
BASEF Infinite Possibilities Grants	16,000	-
Champion teacher award	1,191	610
Judging	2,774	1,192
Outreach	-	611
Other	8,548	2,178
	<u>\$ 92,580</u>	<u>\$ 68,008</u>
Excess of Revenue Over Expenses	<u>\$ 51,659</u>	<u>\$ 32,908</u>





Disbursements to Students	2021
CWSF trips	\$ 16,770
ISEF trips	5,390
Merit awards	7,880
Participation awards	1,967
Prize expenses	2,673
Special awards	29,387
	<u>\$ 64,067</u>

Other Expenses	2021
Administrative	\$ 1,604
Bank charges	236
Marketing & publicity	644
Professional fees	1,800
Wages and benefits	4,264
	<u>\$ 8,548</u>

Sponsors & Charitable Donors



BASEF 2021 FAIR SPONSORS		
Title (\$25,000+)  Primary Fluid Systems Inc.		
Diamond (\$10,000+)	Platinum (\$5,000+)	Gold (\$2,500+)
 ArcelorMittal <small>DOFASCO HAMILTON</small>	Enbridge Hamilton & District Heavy Construction (HAND) Association The Hamilton Spectator McMaster University Mohawk College	Imperial Oil Taylor Leibow Accountants & Advisors
Silver (\$1,000+)	Bronze (\$500+)	
Bay Area Health Trust Burlington Hydro Halton DSB Hamilton-Wentworth Catholic DSB Hamilton-Wentworth DSB Hillfield Strathallan College NSERC Ontario Power Generation Posner Metals	CareGo First Ontario Credit Union Halton Catholic DSB Hamilton Amateur Astronomers Hamilton Chamber of Commerce Hamilton Community Awareness and Emergency Response (CAER) Hamilton Pakistani Physicians Association	Hamilton Police Retirees Association Mantecon Partners Nikola Tesla Educational Corporation Optimist Club of Stoney Creek Rotary Club of Hamilton AM Society of Tribologists & Lubrication Engineers – Hamilton Chapter WALTERFEDY
	Friends (\$250+)	
	Conservation Halton Electrical Construction Association of Hamilton NewAE Technology Inc.	Hamilton Association for the Advancement of Literature, Science and the Arts Talkit.ca Inc.

BASEF 2021 CHARITABLE DONORS*			
* In addition to the donors listed, BASEF also has donors who wish to remain anonymous.			
Banting & Best Level (\$1000+)	Bondar Level (\$500+)	Polanyi Level (\$200+)	McGill Level (\$50+)
Peter Child Interprovincial Corrosion Control D.E.N.M. Engineering Masters Insurance (Hamilton) Mike and Sue McNally	Lanhack Consultants Tom and Roslynne Crawford PBX Investments Peter and Susan Olynyk	Helen Barton Dan and Debbie Bowman Dr. Nicola Simmons Steven and Kathy Brent Renato and Enza DeTina Paul and Pamela Lakin John and Eleanor O'Flynn	Jim Casey Linda Millar Donna Stack-Durward Norman Young



**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 RR0001

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 the students.

Images on pages 2 to 11 provided by:
<https://pixnio.com/>
<https://www.pxfuel.com/>

BASEF 2021 Annual Report

CELEBRATING 61 YEARS OF SCIENCE EXCELLENCE!