



# SOMERS HIGH SCHOOL SCIENCE RESEARCH

# SOMERS HIGH SCHOOL SCIENCE RESEARCH FOUNDATION

## Somers Science Research Foundation – Newsletter

Welcome to the Somers High School Science Research Foundation newsletter. The goal of this publication is to keep members informed and to provide the opportunity to learn more about the program, the students, and their work. Each newsletter will feature student biographies, important dates or deadlines, and other news.

### Student Research Showcase

We are proud to highlight our Science Research participants.

#### Melissa Amante



I joined Science Research as a sophomore with a distinct interest in the field of Genetic Psychiatry. I found a mentor at the Stony Brook University Hospital department of Psychiatry and spent 3 weeks interning there. Although not doing research in my original field of interest, I completed a project on neuroimaging in Schizophrenia. My findings indicated that a previously unexplored area of the brain differed in patients with Schizophrenia compared to healthy controls, and that the size of this area was associated with auditory hallucinations. My interest in auditory hallucinations developed because they are one of the leading causes of suicide in Schizophrenic patients.



Throughout my junior year, I competed with this project, placing 2<sup>nd</sup> at the Tri-County Science Fair, and was awarded a spot at the GENIUS Olympiad international

competition. Behind the scenes, I had not given up on my original ambition, and continued the search for a mentor in the field of Genetic Psychiatry. I struck gold with a mentor in the Psychiatric and Neurodevelopmental Genetics Unit at Massachusetts General Hospital. There I completed a 12-week remote internship where I looked at the association between perceived parental closeness and depressive symptoms in adolescents. My research could be used to identify protective factors against depression.

I will continue my work in this lab both throughout high school, and in college. Beyond college, I plan on pursuing a career in medical research, and specializing in Genetic Psychiatry.

### Family and Community Q & A

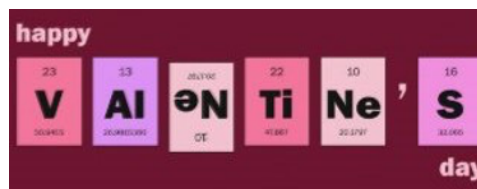
A new monthly feature will include a section to answer questions from families, students, and community members. Please submit your questions using the Google Form below and they will be answered in the following newsletter edition. There is a lot to learn about the program and we hope to be able to answer any questions you may have.

**Q&A Google Form:** <https://forms.gle/1bW7seLkr8aL3hPZA>

### Gift Giving with a Purpose!

You can show support for our science and research community by conveniently shopping online at Unique Design Creations for gifts! The Somers Science Research Foundation has teamed-up with Unique Design Creations to provide a win-win fundraising solution. You shop for family, friends and business associates anytime during the year, Unique Design Creations will give back 10% of the sale to the Somers Science Research Foundation.

To make a purchase and support SSRF, simply go to <https://www.uniquedesigncreations.com/> select and purchase any gift items and during check-out indicate in the drop-down that you want to support Somers Science Research. After your purchase, Unique Design Creations will automatically give 10% of your purchase to SSRF.



## Students Dates to Remember

### WESEF Practice Night

**Monday, March 8th at 7:00 p.m.**

The WESEF practice night is dedicated for juniors and seniors who will be competing at WESEF to practice their presentations and receive feedback. The students will present 7-8 minute PowerPoint presentations in breakout rooms on Zoom followed by a short question and answer session. We are looking for parents, friends, family members, etc. to join us in providing students feedback, you do not need a background in science to provide constructive feedback.

Zoom Link:

<https://somersschools.zoom.us/j/96918441648?pwd=TE9DUWdaUmVNT0FIWmMwdkVsNGdWdz09>

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### Upcoming Competitions

**WESEF- March 15 – 17th, 2021  
as a virtual event between 5-9pm**

**WESEF** is the Westchester Science and Engineering Fair and is a local symposium affiliated with the Regeneron International Science Fair serving budding scientists in Westchester & Putnam counties. Students deliver formal presentations of their scientific accomplishments in a poster forum to professional researchers in the local area. Students prepare a poster detailing their projects which, in most cases, have involved complex research conducted under the guidance of a professional researcher in their field of interest. Finalists of WESEF will attend the Regeneron International Science & Engineering Fair, where they will compete against the top high school research students from the USA and 40 additional countries.

For more detailed information please go to  
<https://www.wesef.org/>.

**NYSSEF- March 11- 17, 2021 Judge scoring; March 22, 2021 Lightning Round participants announced; March 25, 2021 Live Lightning Round**

**NYSSEF** is the International Science Engineering Fair/Society for Science affiliated state fair for New York and is for students in 9th through 12th grades. The top projects from the ISEF Division of NYSSEF will represent the State of New York at the 2021 ISEF.

For more detailed information please go to:  
<https://www.nyssef.org/>.

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## Volunteer Opportunities

The Somers Science Research Foundation is a booster organization that relies on parents and community members to support our program by volunteering their time. We welcome volunteers who want to support our hard-working students. Please email [board@somersscienceresearch.com](mailto:board@somersscienceresearch.com) to learn more about opportunities to get involved.

Currently the board has the following open positions:  
Vice President  
Fundraising Chairperson

A background in science is not required to volunteer. The foundation board meets monthly via Zoom and is a non-profit organization that benefits from community involvement.

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### Tips for finding a mentor

As students begin their journey as student researchers, finding a mentor is an important and sometimes challenging step. Some suggestions for finding a mentor include:

- Don't be shy. Ask everyone and feel free to brag a little about yourself, your project and Somers Science Research in general. Check out what research facilities are in your area and reach out to those that fit your field of study.
- Always assume positive intent from those you reach out to, and follow-up once or twice if you don't hear back immediately.
- Be familiar with the mentor's research, and be specific about why it interests you.
- Friends and classmates may be able to suggest former mentors, so use social media platforms to connect with alumni.

## What's going on in the Science Research classroom this month?

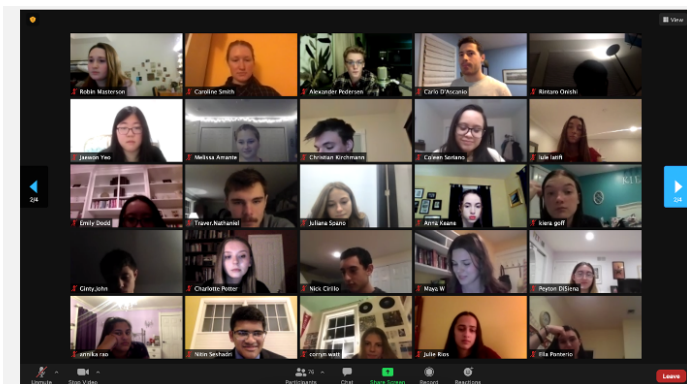
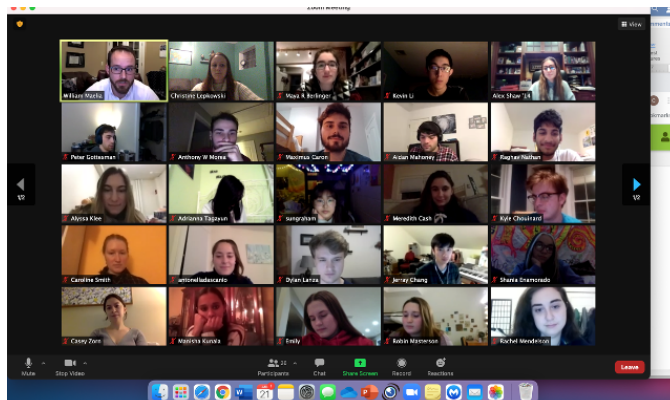
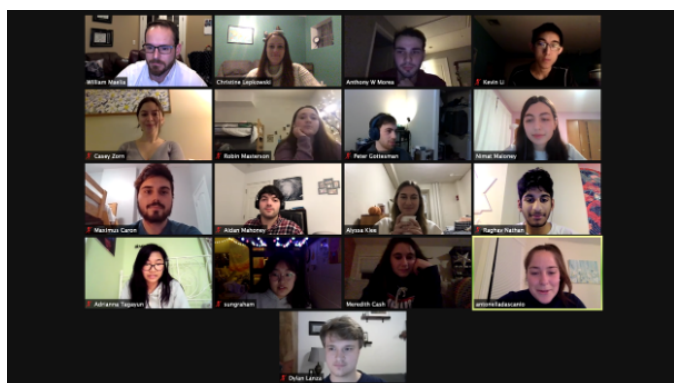
**SENIORS:** Seniors are now shifting from the JSBS competition to WESEF which includes trimming down their presentations to 7 minutes. Students will be practicing their presentations weekly until competition time in early March.

**JUNIORS:** Juniors with completed projects are joining the seniors in preparing for WESEF. They are working on finalizing their presentations and practicing weekly. Juniors who recently secured mentors are working with those mentors to develop their research plan and begin data collection.

**SOPHOMORES:** The mentor search is continuing for our very determined sophomore class, almost weekly we have new students securing mentorship and beginning to design their research. Students who have yet to secure a mentor are diligently emailing authors and research institutions. Additionally, the sophomores are learning the art of project development by identifying a gap in literature and writing an introduction and review of literature to support their research gap. This skill will be very important when they begin developing their own projects, and for some of them, this gap in research may become their future project!

## Highlights from Alumni Night & WR-JSHS Practice Night

On Thursday January 21, 2021 alumni from the class of 2020 reunited at an interactive event with current students and parents. Roughly 30 Somers Science Research Alumni from the class of 2013 through 2019 joined us in our first Alumni Night. It was great to catch up with each former student to see where life has taken them and the great things they've accomplished. Our current students were able to ask questions and receive feedback from our alumni panel regarding topics such as obtaining mentors, college interviews and how participating in the science research program helped in their future endeavors.



The WR-JSHS practice night was a great success! Seniors presented their research in and received feedback for the upcoming WR-JSHS competition. The 12 minute PowerPoint presentations were followed by a short question and answer session. Thank you to all the parents, friends, family members, etc. who joined us to provide the students with feedback.

Introduction | Objectives | Methods/Materials | Results | Discussion | Conclusion | Acknowledgments | References

### Objectives

- To observe and analyze asteroids that occult distant stars
- To derive a shape of the asteroid observed occulting a star
- To refine a pre-existing shape model of an asteroid

### What is Parkinson's Disease (PD)?

- Nervous system disorder predicted to affect 1.2 million Americans by 2030!

**Parkinson's Disease Phenotype**

Created by Emily Dool

Navigation: Introduction | Hypotheses | Methods | Results | Discussion | Conclusion | Future Research | Acknowledgments

### Methods

1. Frequency Analysis      2. Data Analysis      Regression Analysis

- Frequency of demographic variables (age, sex, household life etc.)
- Frequency of 19 Depression Symptoms
- Cross tabulations between parental care/closeness and summed symptoms

Logistic regression run unadjusted and adjusted for biological sex and race, age at interview (child), parental marital status, and parental education

Navigation: Introduction | Review of Literature | Objectives/Hypotheses | Methods | Results | Discussion | Conclusion | References | Acknowledgments

### Methods – Constructing Cloths

- Using templates as a base, I sewed the drag and wing cloths
- I finished the edges using a serger, preventing them from fraying

Photos by Nicholas Cirillo, 2020

Navigation: Introduction | Literature | Research Goal | Methods | Results | Discussion | Conclusion

### Results – Cleaning Habits

Multiple-Choice Questions Responses

Question	Yes	No	Sometimes
In general, have you cleaned more frequently since COVID-19?	48	11	39
Do you check the ingredients when buying cleaning products?	21	16	63
Do you normally wear your mask when you're using cleaning products?	79	21	0
Have you ever been alerted of the effects of cleaning products on human health prior to this survey?	16	21	63
Are you aware of the difference between disinfecting, cleaning, and sanitizing products?	47	21	32
Would you be interested in learning how to make your own alternative green cleaning products?	47	21	32

Graph created by Isabella Pao

Navigation: Introduction/Review of Literature | Objectives | Methodology | RESULTS | Discussion | Conclusion | Acknowledgments

### RESULTS: FINANCIAL STRESS LEVELS

Charts by Erica Joseph

Navigation: Introduction/Review of Literature | Problem | Objectives | Methods | Results | Discussion | Conclusion | Acknowledgments

## Methodology

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    graph LR
      Dataset --> Data Processing
      Data Processing --> Deep Learning
      Deep Learning --> Model Evaluation
  
```

- Dataset**
  - Alzheimer's Disease Neuroimaging Initiative (ADNI) dataset
- Data Processing**
  - Processed with NumPy, pandas, and scikit-learn
  - 13 clinical, up to 328 MRI/PET features
  - 80-20 random train-test split
  - Grouped into time sequence
- Deep Learning**
  - Deep Learning model constructed with the Keras Python library on the TensorFlow backend
- Model Evaluation**

Introduction - Review of Literature - Purpose - Methodology - Results and Discussion - Applications - Conclusion

## Conclusion

- There were significant correlations between all groups (PROMIS-28, DASS-21, PCS5 Anxiety Symptom Cluster)
- Hypothesis was supported and objective was reached
- Future Steps:**
  - Intervention study
  - Using different screeners
  - Testing for different disorders
  - Broader study to other universities

Introduction Hypothesis/Objectives Methods Results Discussion Conclusion Acknowledgements

also use different screeners of anxiety Since we did only use two and we could test for different disorders like down by relearn 2017

## Results: H<sub>3a</sub>

Country	Water Turnout (%)
USA	~59%
UK	~60%
Germany	~72%
Spain	~59%

- 59% or less: 76.67%
- 60% or more: 61.74%
- Average turnout of 72.19%
- Average water turnout of countries 59% or less was 14.93% higher

Introduction Purpose and Hypotheses Methods and Data Analysis Results Discussion Conclusion References

## Methods- Steps of Investigation

- 4 coverboards placed in each location
- Coverboards were left undisturbed for 2 weeks
- Coverboards were checked every other day
- Air pressure, temperature, weather, and time recorded, after parking at location
- Amphibian and Salamander enclosures where recorded

Coverboards used were 1 by 1 natural wood boards, this was determined to produce the best results by Hines in 2012

Introduction Review of Literature Hypothesis/Objectives Methods Results Discussion Conclusion References Questions

## Results- Hypothesis 1

### Nights of Sleep Lost vs. Trouble Falling Asleep

$R^2 = 0.8133$

Average Number of Nights of Sleep Lost per Month	Average Number of Nights with Trouble Falling Asleep
0	~1.8
1-2	~2.2
3-4	~2.5
5-6	~2.6
7-8	~2.8
9-10	~2.7
10+	~3.1

Introduction Hypotheses Methods Results Discussion Conclusion

## Results - Historical Vaccine Data

Vaccine Status in the United States from 1999 to 2020. Information pertains to the US, Mexico, and Philippines T.C.R. Data Created by PopSci Editors.

Review of Literature Goal Statements Methods Results Discussion Conclusion Future Research

## Support Science Research

The Somers Science Research Program relies on the generous support of our donors in the community. In addition to fundraising efforts by the foundation committee, your contribution will help to support the program by funding events, equipment and travel. Contributions to the SSRF are tax-deductible.

<https://www.somersscienceresearch.com/donations.html>

## Annual Dues

Just a friendly reminder to pay your annual suggested membership donation of \$20 for the year. This can conveniently be done through <https://www.myschoolbucks.com> or via the website at <https://www.somersscienceresearch.com/store.html>. Members are recognized in the program book at the annual Science Research Symposium in May and on a donor poster at the Somers Science Fair in June, as well as on the 'Donations' page of the website. Contributions to the SSRF are tax-deductible.

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## Car Window Stickers are still available.

Please email [WMaelia@somersschools.org](mailto:WMaelia@somersschools.org) to get a sticker at no charge.

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## Somers Science Research Store

Support the program by showing off your Science Research gear! Please take a look at the items available for sale at <https://www.somersscienceresearch.com/store.html>.



## Fundraising Activities

### Amazon Smiles

The Somers Science Research Foundation Incorporated now has an Amazon Smile account so that your everyday shopping can benefit our students. If you specify SSRF as your charity and make [smile.amazon.com](https://smile.amazon.com) your default amazon link (in place of [amazon.com](https://amazon.com)), 0.5% of every purchase you make on Amazon will be donated to the Foundation to benefit our students and their research. Once it's set up you don't need to do anything else!

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## Somers Science Research

Detailed information about the program is available on our website at <https://www.somersscienceresearch.com/home.html>. Some of the information you will find there includes the course overview, timeline, and areas of research. Additionally, you can learn about the foundation, the competitions and access pictures/videos from previous years.