Vanessa Sun

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vanessa.sun138@gmail.com (personal email)

Education

Massachusetts Institute of Technology (MIT) Sept. 2021 – Present
Switched to S.M. in Earth and Planetary Sciences Aug. 2023 – Present

- Advisor: Arlene Fiore
- Expected Graduation with Thesis Defense: May 2024

Started Ph.D. in Geochemistry Sept. 2022 – Aug. 2023
Advanced Study Program, Took Experimental Atmospheric Chemistry class Sept. – Dec. 2021

Macaulay Honors College at Hunter College, City University of New York Aug. 2016 – Jun. 2021
B.A. in Mathematics (Honors) and Studio Art

- Minors: Political Science, Media Studies
- *Magna cum laude*, Phi Beta Kappa

Research Experience

MIT Feb. 2022 – Present
Graduate Student Researcher, Trends in Earth's Atmospheric Makeup: Pollution of the Air - Chemistry - Climate Connections Aug. 2023 – Present

- Analyzing hydrogen peroxide trends in historical data from Community Earth System Model - Whole Atmosphere Community Climate Model version 6 (CESM2-WACCM6)
- Comparing model results with observational studies on hydrogen peroxide concentrations in the atmosphere

Graduate Student Researcher, MIT Stable Isotope Geobiology Laboratory Aug. 2022 – Aug. 2023
Research Assistant, MIT Stable Isotope Geobiology Laboratory Feb. – June 2022

- Conducted small-scale experiments in a laboratory environment to study the precipitation of carbonates from olivine in supercritical carbon dioxide
- Lab skills: running a chemical line, degassing flasks, thermogravimetric analysis (TGA), powder X-Ray diffraction (XRD), soldering, electronics troubleshooting, Arduino, separating minerals by settling in acetone, magnetic separation (Frantz separator), mineral picking, crushing, & sieving
- Field work: collected gases from geothermal wells at Hellisheiði Power Station in Iceland

National Renewable Energy Laboratory May – Aug. 2022
Wind Energy Atmospheric Science Intern

- Analyzed wind speed, temperature, and solar radiation data from Weather Research and Forecasting (WRF) model to compare with solar energy forecasting model and observational data

MIT Lincoln Laboratory Sept. 2021 – May 2022
Student Technical Assistant, Air Traffic Control

- Wrote Python programs to retrieve atmospheric conditions for contrail formation from model data
- Used image processing methods to identify contrails in satellite imagery and create image collections for model training
- Granted Secret Level Department of Defense security clearance

Lawrence Livermore National Laboratory Jun. – Aug. 2021
Graduate Computing Scholar

- Developed regression model and researched machine learning methods to predict power grid voltages and improve computation time

Youngstown State University/Environmental Collaborative Jan. – May 2021
Mathematical Modeling Project Researcher

- Created mathematical model and interactive map to determine optimal locations to place gaming cameras to track boaters along river
- Led team collection of all datasets to solve the problem
- Managed our team of 3 and discussed progress with the client at Environmental Collaborative weekly

Mathematical Sciences Research Institute (MSRI) Jun. – Jul. 2020
Undergraduate Student Researcher, Mathematical Sciences Research Institute-Undergraduate Program (MSRI-UP) REU

- Worked on team studying automorphism and monodromy groups of modular curves

Employment & Professional experience

Arizona State University/National Aeronautics and Space Administration (NASA) Lucy Student Pipeline Accelerator and Competency Enabler Academy May – Jul. 2021
NASA Proposal Writing and Evaluation Experience Student

- Managed team of nine students to develop a $10,000 concept proposal addressing the needs of NASA's Human Research Program to improve the health and safety of human space travel
- Project placed in the top 6 proposals in the program, among 300+ students

New York Math Circle Sept. – Dec. 2020
Middle School Teaching Assistant

- Gave feedback and guidance to students on problem solving methods
- Led homework review sessions including presentations of solutions
- Organized class materials on Google Classroom for 30+ middle school students

Grants, Funding, and Fellowships

Grants & Funding

Conference funding for organizing the Online Undergraduate Resource Fair for the Advancement and Alliance of Marginalized Mathematicians (OURFA^{2}M^2)
Co-Principal Investigator, National Science Foundation Grant DUE-2230388 ($49,960) Aug. 2022
Informal funding from MIT, Mount Holyoke College, Rutgers University, Rose-Hulman Institute of Technology, the Society for Industrial and Applied Mathematics, Art of Problem Solving, the American Mathematical Society ($16,557.65) Dec. 2021

Fellowships

Dean of Science Fellowship (Full Tuition, Stipend) Covers Fall 2022 – Spring 2024
MIT School of Science, the Office of the Dean for Graduate Education, and the Department of Earth, Atmospheric, and Planetary Sciences

GEM Fellowship PhD Science Fellowship Employer Fellow (Tuition, Stipend) Fall 2022 – Spring 2023
National GEM Consortium & National Renewable Energy Laboratory

University Macaulay Scholar (Full Tuition) Aug. 2016 – Jun. 2021
Macaulay Honors College

Andrew W. Mellon Junior Humanities Fellow Jun. – Aug. 2018
Andrew W. Mellon Foundation & New York Botanical Garden Humanities Institute

Awards and Honors

Registration Scholarship for 2021 SACNAS National Diversity in STEM Conference Oct. 2021
Society for the Advancement of Chicanos/Hispanics and Native Americans in STEM

Lawrence Livermore National Laboratory Computing Group DEI Spotlight Jun. 2021
Lawrence Livermore National Laboratory

Lander Hughes Prize ($800) Jun. 2021
Hunter College Department of Mathematics and Statistics

Dean's List Spring 2021
Fall 2019
Fall 2016 – Spring 2018

Registration Scholarship for 2020 SACNAS Conference Oct. 2020
Society for the Advancement of Chicanos/Hispanics and Native Americans in STEM

Association for Women in Mathematics/Math for America Student Essay Contest Honorable Mention Mar. 2020
Association for Women in Mathematics

HackMIT Top Ten Overall Projects and Assistive Tech Track Winner Sept. 2019
HackMIT 2019 Hackathon

"Best of US Chess 2018 #10" award for top 10 articles written for United States Chess Federation in 2018 Jan. 2019
US Chess (United States Chess Federation)

CUNY Math Challenge Participant and Final Round Contestant Apr. 2018
City University of New York

Publications & writing

Note: In mathematics, authors are listed alphabetically.

4. **Sun, V.** *A low-cost computer and sensors for air quality monitoring.* Nature Reviews Earth & Environment **3**, 293 (2022). doi: 10.1038/s43017-022-00297-6

3. Carbonero, A., Gelb, B., Harris, P. E., Miniño, A., **Sun, V.**, Trent, L., Winger, A. "The Online Undergraduate Resource Fair for the Advancement in Academia of Marginalized Mathematicians." *Practices & Policies: Advocating for Students of Color in Mathematics (Book),* 2021.

2. Carbonero, A., Gelb, B., Miniño, A., **Sun, V.**, Trent, L. Student-Led Academic Community Organizing. Mathematical Association of America Math Values Blog. June 10, 2021.

1. Carbonero, A., Gelb, B., Miniño, A., **Sun, V.**, Trent, L. Advice for Applying to REU Programs (From Recent Participants!). E-Mentoring Network in the Mathematical Sciences - connecting students and mentors, American Mathematical Society Blogs. January 20, 2021.

Presentations & Workshops

Research

Bringing Solar and Wind Closer: A Comparison of Datasets — Dec. 10, 2022
American Geophysical Union Fall Meeting

Bringing DOE Solar and Wind Closer: A Comparison of Datasets — Jul. 25, 2022
National Renewable Energy Laboratory

Locating Contrails in Satellite Imagery — May 6, 2022
MIT Lincoln Laboratory

Gaussian Process Approximation to Improve Power Grid Resiliency — Oct. 2021
2021 SACNAS National Diversity in STEM Conference
Accepted poster, Did not present

Using Gaussian Process Approximation Surrogate Modeling to Protect Power Grids — Aug. 19, 2021
Lawrence Livermore National Laboratory

Boating on the Mahoning River — Apr. 27, 2021
Youngstown State University Math Modeling Final Project Presentations

Calculating Monodromy Groups for Modular Curves — Jan. 6, 2021
Mathematical Association of America Undergraduate Student Poster Session at the Joint Mathematics Meetings

Monodromy Groups for Classical Modular Curves — Oct. 20, 2020
2020 SACNAS - The National Diversity in STEM Conference

Monodromy Groups of Modular Curves — Oct. 10, 2020
National Association of Mathematicians' Undergraduate MATHFest

Automorphism Groups and Monodromy of Classical Modular Curves — Jul. 25, 2020
Mathematical Sciences Research Institute

Misinterpretations and Meanings of the Apple, Carnation, and Dandelion and Their Portrayals in Our Culture — Aug. 17, 2018
New York Botanical Garden Humanities Institute

Expository

Effect of higher-level independent generator outages in composite-system adequacy evaluation — Jul. 21, 2021
Lawrence Livermore National Laboratory, Squirrel Contingency Analysis Reading Group

Professional Development

LaTeX Workshop for Students Participating in Math Research — Jan. 2023
OURFA^{2}M^2 Professional Development Workshops **(Organized and led)**

Undergraduate Research Student Panel — Jun. 7, 2022
Center for Undergraduate Research in Mathematics Professional Development Workshop for faculty **(Invited)**

What I Wished I Knew Before My REU — May 25, 2022
Youngstown State University Beginning Undergraduates' Mathematical research Preparation (REU) **(Invited)**

Applying to REU Programs Workshop — Jan. 2022
OURFA^{2}M^2 Professional Development Workshops **(Organized and led)**

Experiences Panel — Dec. 2021
OURFA^{2}M^2 Conference 2021 **(Organized and hosted)**

Conference Poster LaTeX Workshop — Jul. 14, 2021
MSRI-UP REU **(Invited)**

Making Beamer Slides LaTeX Workshop — Jul. 7, 2021
MSRI-UP REU **(Invited)**

LaTeX Workshop for Students Participating in Math Research — Jun. 2021
OURFA^{2}M^2 Professional Development Workshops **(Organized and led)**

Applying to REU Programs Panel — Jan. 2021
CUNY Research Scholars Program **(Organized and led)**

Career-Building Resources for Students in the Mathematical Sciences — Dec. 19, 2020
OURFA^{2}M^2 Conference 2020 **(Organized and led)**

Diversity, Equity, Inclusion

Lessons from OURFA^{2}M^2 — Mar. 31, 2022
Talk Math With Your Friends Colloquium **(Invited)**

Peer Mentoring and Career-Building Support for Marginalized STEM Undergraduates Workshop — Oct. 30, 2021
11th Annual Out in STEM Conference

Strength in Community: How helping other math students succeed became an integral part of my STEM journey — Jul. 29, 2021
Lawrence Livermore National Laboratory, Cybersecurity Summer Institute Intern Presentations

Student-Led Academic Community Organizing: What's Missing and How to Build It — Apr. 24, 2021
Rose-Hulman Undergraduate Math Conference

Student-Led Academic Community Organizing: What's Missing and How to Build It — Apr. 15, 2021
University of Guam STEM Conference **(Invited)**

Leadership

Lathisms
Selection Committee — Sept. 2022 – Present

- Evaluate 30+ applications and select finalists to receive scholarship

Scholarship Co-Chair — Sept. 2022 – Aug. 2023

- Defined scholarship scope and criteria for establishing scholarship for Hispanic/Latinx mathematics students
- Worked with organization board members to advertise scholarship broadly
- Managed scholarship selection committee for evaluating scholarship finalists and recipients, handling 200+ applications in the scholarship's first year

Asian American and Pacific Islanders in Geoscience — May 2022 – Jan. 2024
Student Branch Leader & Steering Committee Team Member

- Organize social events for geoscience students

MIT Department of Earth, Atmospheric, and Planetary Sciences — Aug. 2023 – Dec. 2023
Sack Lunch Seminar Organizer

- Introduce seminar speakers and moderate discussions
- Coordinate logistics such as communicating with speakers for titles and abstracts, scheduling speaker meetings with faculty and students, and promoting talks to department

COVID Safe Campus Feb. 2023 – Dec. 2023
MIT Campus Ambassador

- Distribute N95 respirators from national organization to members of the MIT community to improve campus COVID safety

OURFA^{2}M^2 Aug. 2020 – Jul. 2023
Founder & Conference Organizer, Communications Committee Chair 2022-2023

- Created student-led conference to share math career resources and opportunities for undergraduate math students (grew from 250+ registrants in 2020 to 800+ registrants in 2022)
- Maintained monthly newsletter on opportunities for undergraduate math students (700+ subscribers)

GeoLatinas Jan. 2022 – Aug. 2022
GeoSeminars Organizer & Host

- Invited speakers and hosted biweekly geoscience seminars

Service & Community Involvement

Peer Review

Reviewer Sept. 2020
Association for Women in Mathematics, "Fifty Years of Women in Mathematics"

Conferences

Volunteer Mar. 2021
Greenlight Climate Festival

Moderator of Plenary Talk and Host for Undergraduate Game Night Mar. 2021
Math for All in NOLA

Volunteer Judge Sept. 2021
HackMIT 2021

Education & Outreach

Letter Writer to Low Income Middle Schoolers Sept. 2020 – Jun. 2021
Letters to a Pre-Scientist

Programs Volunteer Nov. 2019 – Mar. 2020
National Museum of Mathematics