Monell Science Apprenticeship Program

Summer 2022 Program

Impact Report

Monell Chemical Senses Center

2022 Apprentices
Overview

The Monell Center is proud to report on the 41st annual Monell Science Apprenticeship Program (MSAP). MSAP is an immersive eight-week internship designed to inspire career exploration in the sciences. We provide students with a high-quality, hands-on research experience in a professional laboratory environment. In alignment with Monell’s overall commitment to diversity, equity, inclusion, and belonging, the program aims to increase participation by groups traditionally underrepresented in the sciences. This mission is deeply rooted in a commitment to the Philadelphia community and to training the next generation of scientists and STEM (Science, Technology, Engineering, and Medicine) professionals.

Apprentices (also known as SAPlings) joined the Monell scientific community for eight weeks (June 21 - August 12, 2022), working directly with PhD- and MD-level scientists and highly skilled lab staff and technicians. The 2022 class was our first fully in-person program since the beginning of the COVID-19 pandemic. Learnings from the last few years helped to inform the following program changes to improve the experience of our apprentices:

• Pre-program mentor training sessions were introduced, focusing on how to support students from a background different than their own, creating an inclusive environment, and providing shared structure and checklists across mentors.
• Supplemental enrichment programming was added and expanded including a mid-program field trip to increase group cohesion.
• A hybrid (Virtual and In-person) Capstone Symposium was organized offsite at the Quorum in Philadelphia. SAPlings were asked, for the first time, to give live presentations in front of an audience including leading members of academia, industry, and government.

265+
Number of alumni with whom we are still in touch

92%
Percentage of alumni reporting an interest in a science based career

41
Number of Years Monell has hosted the Monell Science Apprenticeship Program

6
Number of years the winner of the MSAP ‘Sense-ational Award’ has presented their work at the Monell Sponsors Meeting

100+
Applications received for Summer 2022
Each SAPling is matched with a full-time scientist and works closely with that mentor and lab staff on an independent research project. Mentors, in conjunction with Monell’s Human Resource Department, are responsible for ensuring that apprentices receive appropriate training and follow all safety procedures.

Apprentices become part of the lab staff and attend and contribute to lab meetings and other routine virtual and in-laboratory activities. Many mentors meet with their apprentice at least once a day to answer questions and provide guidance, with a minimum of two one-on-one meetings per week.

As supervisors, mentors answer daily activity questions, assist with day-to-day problem solving, and regularly check in with their apprentices to guide them through lab procedures and data analysis. Other lab members, such as postdoctoral fellows and lab technicians, contribute to SAPlings’ overall mentorship throughout the eight weeks.

Providing apprentices with proper supervision and resources ensures that they have a complete understanding of the hypotheses and research objectives of their individual projects and of the mentor’s larger research program. The Capstone Symposium — where the apprentices present their research — reflects this comprehensive understanding, which is critical to learning and understanding.

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**Student Metrics**

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<th>High School Students</th>
<th>Returning Students</th>
<th>Underrepresented in the Sciences</th>
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<tr>
<td>75%</td>
<td>33%</td>
<td>92%</td>
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### 2022 SAPling High Schools

- Constitution High School G.W.
- Carver High School Of Engineering & Science
- JR Masterman Laboratory and Demonstration School
- Middlesex County Academy
- Northeast High School
- Philadelphia High School for Girls
- West Potomac High School

### 2022 SAPling Colleges

- Haverford College
- Lehigh University
- Wesleyan University

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“Every brilliant experiment, like every great work of art, starts with an act of imagination.”

-Jonah Lehrer

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MONELL CENTER
ADVANCING DISCOVERY IN TASTE AND SMELL
Well Rounded Mentorship

A fundamental part of science education is learning to collaborate, communicate, and tackle problems with broad impact. These core values are exemplified by providing activities outside of the individual laboratory experience. We offer a seminar series to expose SAPlings to a wide range of careers in STEM, including research, industry, and higher education. Journal Club, organized by our postdoctoral fellows, featured in-depth discussions of select scientific articles. Each selected article was presented by one of the apprentices, allowing for an equitable and interactive discussion. Also included in our programming were lectures on science communications and networking. Taken in tandem, this programming was designed to prepare our SAPlings to present their research projects and share their results at the Capstone Symposium and beyond.

Innovative Program Model

The Monell Science Apprenticeship has always been highly innovative because we are the only independent research center devoted to the study of taste and smell.

Apprentices may find themselves exploring fascinating topics such as the role of human taste receptors—not just on the tongue, but in the gut, pancreas, and the brain; the intersecting relationship between sensory nutrition and palatability; or even the use of stem cells to replace damaged or aging smell receptors for those experiencing anosmia. SAPLings are encouraged to envision the potential practical applications of their work; that one day a simple taste or smell test may guide doctors in making personalized nutritional or medical recommendations.

Providing a full-time salary for the eight weeks of programming breaks down a barrier that often obstructs access to science in under-resourced communities. This is a cornerstone of the program and is only possible due to the generous donations we have received.
Funding

IT IS OUR GREAT PLEASURE TO THANK THOSE WHO MADE THE 2022 MONELL SCIENCE APPRENTICESHIP PROGRAM POSSIBLE. ORGANIZATIONS, AGENCIES, AND INDIVIDUALS WHO DONATED TO MSAP 2022 ARE LISTED BELOW.

The Monell Circle ($1,000)

Richard L. Berkman and Toni Seidl*
Andrew Brand**
Paul Breslin
Jim Conmy
Lillian Lee

The Christopher Ludwick Foundation
Shawn Marcell
Rachel Poole
Gary Schwartz
Jenifer Trachtman

The Wawa Foundation

Other Donors

Anonymous (3) Joel Mainland
Donna Antonucci Grace Nejman
Ardis Chapman Christine Paoletti
Sue E. Coldwell Gayan Seneviratna
Kristen Gregory Catherine Tyree-Davis
Deborah L. Hayes Hong Wang
Susan Knox Alyssa Wofford
Andrew Lee Debra A. Zellner

*Many thanks to Richard L. Berkman and Toni Seidl for establishing a family fund to support students in the Monell Science Apprenticeship Program and for your ongoing commitment to the careers of individuals traditionally underrepresented in the sciences.

**Many thanks to Andrew Brand for continued support to the Joseph Brand Memorial Fund that will sponsor a student apprenticeship for many years to come.
I have always been interested in medical research, Monell reaffirmed it."

Amari  
George Washington Carver High School of Engineering and Science  
Kimball Lab  
Mentor: Dr. Michael Napolitano

"I am so grateful for this experience! It's so clear how much hard work and coordination goes into running MSAP and it pays off."

Candelaria  
J.R Masterman Laboratory and Demonstration School  
Dalton Lab  
Mentor: Dr. Stephanie Hunter

"MSAP made me more open to pursuing a career not only in medicine."

Jah'Seek'I  
George Washington Carver High School of Engineering  
Alhadeff Lab  
Mentor: Nathaniel Nyema, M.S

"What I loved most about MSAP is the overall fun that was involved with being at work"

Emily  
North East High School  
Alhadeff Lab  
Mentor: Dr. Samuel Bacharach

*Supported by the Richard L. Berkman and Toni Seidl Family Fund at the Monell Center
"I liked that I was able to pursue an independent research project. I also appreciated the trust and confidence that my supervisors had in me to complete the project and run experiments independently."

Jenny
Wesleyan University
Reisert Lab
Mentor: Dr. Federica Genovese

"I learned that I can handle pressure and more than likely am capable of handling a task. I also learned that integrity and accountability is very important."

Joshua
Lehigh University
Mainland Lab
Mentor: Dr. Robert Pellegrino

"The thing liked most about the MSAP program is the consistent and accurate way research knowledge is translated to us, beginners in the field."

Loza
West Potomac High School
Wang Lab
Mentor: Dr. Hong Wang

"What I like about MSAP is the community I built here. Everyone is so supportive and positive."

Prerna
Middlesex County Academy for Science, Mathematics, and Engineering Technologies
Jiang Lab

*Supported by the National Institute on Deafness and Other Communication Disorders of the National Institutes of Health*
"MSAP went above and beyond my expectations. There wasn't any day that I didn't want to be here."

Patricia
Constitution High School
Parma Lab
Mentors: Edith Adjei-Danquah, M.S., Evan Guerra, M.S.

"I am more interested in pursuing scientific research and enjoyed being able to test human subjects."

Rennie JR.
Masterman Laboratory and Demonstration School
Breslin Lab
Mentor: Dr. Linda Flammer

"Being at Monell, I've grown to love research and have more of an investigative mind so I want to implement research more in my career goals."

Patricia
Philadelphia High School For Girls
Reed Lab
Mentors: Katie Bell, Amy Huang

"I like how I was able to conduct my research project on an independent level, yet have the ability to ask questions when needed."

Katelyn
Haverford College
Wang Lab
Mentor: Dr. Hong Wang
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<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event</th>
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<tr>
<td>Mon. June 20</td>
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<td>MONELL CLOSED- Juneteenth Observed</td>
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<tr>
<td>Tue. June 21</td>
<td>9am – 10:30am</td>
<td>Program Kickoff and Welcome</td>
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<td>- Introduction by Paul Breslin, Director of MSAP</td>
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<td>- Welcome from the Director of the Center @ 9:30am</td>
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<td>- HR overview by Christine Paoletti</td>
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<td>- Group Photo</td>
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<td></td>
<td>- Mentors pick up students at 10:30am</td>
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<td></td>
<td>11am – 4pm,</td>
<td>HR Photos and I-9 document paperwork - Room 216A with Christine Paoletti</td>
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<td>as scheduled</td>
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<tr>
<td>Wed. June 22</td>
<td>10am-11am</td>
<td>Safety Training Session</td>
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<tr>
<td></td>
<td>1pm – 2pm</td>
<td>Lecture 1: Federica Genovese, Monell Postdoctoral Fellow in the Reisert Lab</td>
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<td>Title: “Intro to Taste and Smell”</td>
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<td>Weds. June 22</td>
<td>2pm – 3pm</td>
<td>Social Trivia Event – Apprentices vs. Monellians!</td>
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<td>Thurs. June 23</td>
<td>9am-10am</td>
<td>Enrichment Seminar: Stephanie Hunter, Monell Postdoctoral Fellow in the Dalton Lab</td>
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<td>Title: “How to Read a Paper”</td>
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<td>Fri. June 24</td>
<td>4pm-5pm</td>
<td>Social Event: Ice Cream Social</td>
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<td>Tues. June 28</td>
<td>1pm – 2pm</td>
<td>Lecture 2: Joel Mainland, Associate Member, Monell</td>
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<td>Title: “The Scientific Method”</td>
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<tr>
<td>Weds. June 29</td>
<td>10am – 11am</td>
<td>Rotation 1 – Molecular Biology Review</td>
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<td>Led by: Katie Bell, Research Technician in the Reed Lab</td>
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<tr>
<td>Thurs. June 30</td>
<td>9am - 10am</td>
<td>Enrichment Seminar: Ahmed Barakat, Monell Communications</td>
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<td></td>
<td>Title: “Science Communications”</td>
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<td>Mon. July 4</td>
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<td>Monell closed – Independence Day observed</td>
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<td>Tue. July 5</td>
<td>11am – 12:30pm</td>
<td>Lecture 3: Susan Knox, Program Alumna</td>
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<td>Title: “Personal Statements”, Workshop</td>
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<tr>
<td>Weds. July 6</td>
<td>10am – 11am</td>
<td>Rotation 2 – Psychophysics VIRTUAL</td>
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<td>Led by: May Cheung, Postdoctoral Fellow in the Wise Lab</td>
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<td>Thurs. July 7</td>
<td>11am – 12pm</td>
<td>Journal Club with Edith Adjei-Danquah and Evan Guerra, Research Technicians in the Dalton Lab</td>
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<td>Wed. July 13</td>
<td>12pm – 5pm</td>
<td>Social Event: FIELD TRIP FUN DAY</td>
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<td>Lunch, Perfumology Visit, Skating</td>
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<td></td>
<td>Led By: Robert Pellegrino, Stephanie Hunter, Kianna Price</td>
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### Apprenticeship Schedule

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<tr>
<th>Date</th>
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<th>Event</th>
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| Thurs. July 14 | 9am – 1am | **Enrichment Seminar:** Higher Education Resources  
I Can, I Will, I Must: The Road to a Better Tomorrow  
Led by: Hatef Alavi, Associate Director, Penn First Plus, University of Pennsylvania |
|            |          | Mid-term evaluations for students and mentors July 18th – July 22nd.  |
| Tues. July 19 | 1pm – 2pm | **Lecture 4:** Dr. C. Brandon. Ogbunu, Assistant Professor, Yale University  
VIRTUAL  
**Title:** The Three Biological Selves: Tales of Luck, Success, and Failure |
| Wed. July 20 | 10am – 11am | **Rotation 3 – Introduction to Nutrition**  
Led by: Stephanie Hunter, Postdoctoral Fellow in the Dalton Lab |
| Thurs. July 21 | 9am – 10am | Enrichment Seminar: Postdoc Panel  
Led by: Monell Center Postdoctoral Fellows |
| Tues. July 26 | 1pm – 2pm | **Lecture 5:** Paul Breslin, Director, MSAP  
**Title:** Irritation |
| Weds. July 27 | 10am – 11am | **Rotation 5 - Introduction to Neuroscience**  
Led by: Samuel Bacharach, Postdoctoral Fellow in the Alhadeff Lab |
| Thurs. July 28 | 9am – 10am | Enrichment Seminar: How to Present Your Science  
Led by: Joel Mainland, Associate Member |
| Tues. Aug 2   | 1pm -2pm  | **Lecture 6:** Paul Breslin  
**Title:** Communication |
| Thurs. Aug 11 | 9am – 5pm | **Capstone Symposium:** Student Presentations  
*Quorum: 3675 Market St, Philadelphia, PA 19104* |
| Fri. Aug 12   |          | **Exit Interviews** |
The Capstone Symposium, where SAPlings present the results of their research projects, marks the completion of the summer program. It is a celebration of the apprentices’ accomplishments and hard work throughout a summer.

Each apprentice delivered a presentation of the data they collected, analyzed, and graphed. The conference-style event allowed SAPlings the opportunity to put their new found science presentation skills into practice. Presentations demonstrated understanding of research questions, hypotheses, data, and the impact of their projects within a broader scientific context. The 2022 Capstone Symposium was attended by the apprentices’ families, Monell scientists and staff, seminar speakers, donors, community members, board and advisory committee members, and MSAP alumni.

This year’s event featured a keynote address from Pennsylvania State Representative Rick Krajewski, 144th District, who hailed Monell as “an organization with an important research mission that also sees training the next generation as vital to the economy.”

This Capstone Symposium is an excellent opportunity for apprentices to exercise their science writing and presentation skills and learn how to deliver their results to a diverse audience. Apprentices also learn how to engage in academic exchange by demonstrating that they understand: i) their hypothesis, ii) why their research question was asked, iii) whether their data support their hypotheses, and iv) what this work means in a broader context.

The twelfth annual "Monell Sense-Sational Science Award" for best project was chosen by a panel of Monell scientists: Kevin Bolding, Alan de Araujo, Christopher Maute, Fernanda Ocampos, M. Hakan Ozdener, Paul Wise, and Yali Zhang as well as former International Advisory Council Member Charles Peterson.

This year’s recipient was Candelaria, an apprentice in the Dalton Laboratory. Her project was titled “Capsaicin’s Role in Food Liking and Salt Preference in Individuals with Smell Loss.” Congratulations, Candelaria!