Monell Science Apprenticeship Program

Science Prevails

Summer 2020 Program
Report to the Community

Monell Chemical Senses Center

2020 Apprentices
The Monell Center is proud to report on the summer 2020 Monell Science Apprenticeship Program (MSAP). Now entering its 40 year, this six-week internship continues to inspire young people to pursue science education and careers in the biomedical sciences by providing apprentices with high quality, hands-on learning experiences in a professional laboratory setting.

Our mission is to provide Philadelphia area students — especially those from groups underrepresented in the sciences — opportunities to engage in scientific discovery through laboratory-based biomedical research. 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.

The MSAP Executive Committee is committed to providing each student with a unique summer internship experience. Unlike other internships, MSAP employs a mentor-apprentice model that is designed to provide SAPlings with high quality technical training, science education, and accessible role models who can help guide apprentices in their academic and professional pursuits.

The 2020 application pool was impressive and made the committee’s job of selecting candidates a challenge. We received 220 applicants and accepted a total of 8 apprentices (also known as SAPlings). These high school and undergraduate students joined the Monell scientific community for six weeks (June 22 - July 30, 2020), working directly with PhD- and MD-level scientists and highly skilled lab staff and technicians.

Because of the extraordinary circumstances of 2020, all apprenticeships were completed entirely remotely. Our heartfelt congratulations to this year’s SAPlings who persevered and achieved success given the unusual challenges of learning and experiencing science online.

Hannah, High School Junior

| Number of apprentices that have participated in MSAP | 350+ |
| Number of alumni with whom we are still in touch | 250+ |
| Percentage of alumni reporting that MSAP influenced their career path | 89% |
| Number of donors for the 2020 Monell Science Apprenticeship Program | 26 |
| Number of Years Monell has hosted the Monell Science Apprenticeship Program | 39 |
| Total applications received for Summer 2020 | 220 |
| Number of years the winner of the MSAP ‘Sense-ational Award’ has presented their work at the Monell Sponsors Meeting | 5 |
The Committee carefully matches each SAPling with a full-time scientist mentor, and apprentices work closely with the primary investigator and lab staff on an independent research project.

Apprentice success hinges on quality education and training, and 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 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 with the principal investigator.

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

Through this process, SAPlings gain 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 critical thinking.

“Science is more than a school subject, of the periodic table, or the properties of waves. It is an approach to the world, a critical way to understand and explore and engage with the world, and then have the capacity to change that world…”

-President Barack Obama

“If we want more STEM graduates, then we must promote ideas, language, people, and programs that demonstrate relevance and foster a sense of belonging.”

-Barbara McAllister, Director of Strategic Initiatives and Planning, Intel Corporation
It is our great pleasure to thank those who made the 2020 Monell Science Apprenticeship Program possible. Organizations, agencies, and individuals who donated to MSAP 2020 are listed below.

### Monell Circle ($1,000+)

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<td>Richard L. Berkman</td>
<td>John Labows</td>
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<td>Paul Breslin</td>
<td>The Christopher Ludwick Foundation</td>
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<td>Kathleen Dorries</td>
<td>The Wawa Foundation</td>
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### Other Donors

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<td>Donna Antonucci</td>
<td>Rachel Poole</td>
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<td>Joel Mainland</td>
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<td>Emily Mayhew</td>
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**Support MSAP**
Name: Angelina (Shae)
School: Bristol High School
Lab: Reisert Lab
Mentor: Dr. Federica Genovese
Project: Analysis of the electrophysiological responses to trigeminal odorants in the olfactory epithelium

Name: Shahaadah
School: Philadelphia High School for Girls
Lab: Mainland Lab
Mentors: Dr. Joel Mainland, Dr. Emily Mayhew, Kelsie Little
Project: Which Sensory Method Gives the Best Resolution?

Name: Grace
School: River Hill High School
Lab: Zhang Lab
Mentors: Dr. Yali Zhang, John Mack
Project: Fruit Flies & How They Taste

Name: Sarah
School: Linden Hall School for Girls
Lab: Zhang Lab
Mentors: Dr. Yali Zhang, John Mack
Project: Fruit Flies & How They Taste
**Tahlia**
**School:** The Workshop School  
**Lab:** Mainland Lab  
**Mentors:** Dr. Joel Mainland, Dr. Emily Mayhew, Kelsie Little  
**Project:** Which Sensory Method Gives the Best Resolution?

**Hannah**
**School:** The Philadelphia High School for the Creative and Performing Arts  
**Lab:** Breslin Lab  
**Mentors:** Dr. Paul Breslin, Dr. Linda Flammer, Natasha Rivers, Anilet Tharp  
**Project:** What Makes Salts Taste Salty?

**Saraswati**
**School:** Southwestern Educational Society  
**Lab:** Jiang Lab  
**Mentors:** Dr. Peihua Jiang  
**Project:** Computational genomic analysis of evolution in taste receptor genes in Carnivora and Cetacea

**Maab**
**School:** Central High School  
**Lab:** Ozdener Lab  
**Mentors:** Dr. Hakan Ozdener  
**Project:** Changes in mRNA Levels in Sweet Cells
The Program

To take advantage of this year’s fully remote program, we focused the MSAP experience on engaging in intricate data analysis, science that could be done from home. This was complemented by enrichment activities related to the scientific process that are organized largely by Monell’s postdoctoral fellows.

Activities included discussions of how to read and prepare scientific articles and journal club gatherings featuring in-depth discussions of select scientific articles. This year, rather than having scientists present the articles, we asked apprentices to give these presentations with feedback from mentors.

A team of scientists hosted a series of virtual laboratory rotations to expose the SAPlings to a variety of research skills. These rotations included an introductory lesson to various research disciplines at Monell, an independent data analysis task, and a one hour activity review.

SAPlings also heard lectures on Science Communication and Presenting Science to the Public, designed to better prepare them to create and present their research and results at the Capstone Symposium.

One of the more popular activities is a seminar series. This series exposes SAPlings to a wide range of STEM-related fields. Because the series was held virtually this year, we opened it to the general public with a particular emphasis on Philadelphia public school students. A full list of speakers follows on the next page.
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| Mon. June 22| 10am – 11am| **Program Kickoff and Welcome**  
Introduction by Paul Breslin, Director of MSAP  
HR overview by Nia Underwood  
Mentors meet with students at 11:00am |
| Tues. June 23| 2pm – 3pm  | **Lecture 1**: Federica Genovese & Emily Mayhew, Monell Postdoctoral Fellows in the Reisert and Mainland Labs  
*Title*: “Introduction to Taste and Smell” |
| Wed. June 24| 2pm – 3pm  | **MSAP Social** – with Trivia Game!                                    |
| Thurs. June 25| 2pm – 3pm | **Enrichment Seminar**: Dolly Al-Koborssy, Monell Postdoctoral Fellow in the Reisert Lab  
*Title*: “How to Read a Paper” |
| Mon. June 29 | 11am – 12pm| **Lab Rotation 1**: Introduction to Psychophysics with Emily Mayhew, Monell Postdoctoral Fellow in the Mainland Lab |
| Wed. July 1  | 10am – 11am| **Lab Rotation 1**: Psychophysics Review with Emily Mayhew, Monell Postdoctoral Fellow in the Mainland Lab  
2pm – 3pm  
**Lecture 2**: Janelle Wellons, Engineer, NASA Jet Propulsion Laboratory  
*Title*: “Journey to the Center of the Universe” |
| Thurs. July 2| 2pm – 3pm  | **Enrichment Seminar**: Raven “the Science Maven” Baxter  
*Title*: “Science Communications” |
| Mon. July 6  | 11am – 12pm| **Lab Rotation 2**: Introduction to Molecular Biology with Nicolle Murphy, Research Specialist in the Mainland Lab |
| Wed. July 8  | 10am – 11am| **Lab Rotation 2**: Molecular Biology Review with Nicolle Murphy, Research Specialist in the Mainland Lab  
2pm – 3pm  
**Lecture 3**: Derrick Pitts, Chief Astronomer, The Franklin Institute  
*Title*: “AD ASTRA: Door’s Open: Are You Coming Through?” |
| Thurs. July 9| 12pm – 1pm | **Special Lunch Lecture**: Matthew Price  
*Title*: “Entrepreneurial Scientists 101” |
|             | 2pm – 3pm  | **Journal Club 1**                                                     |
| Mon. July 13 | 11am – 12pm| **Lab Rotation 3**: Introduction to Immunohistochemistry with Federica Genovese, Monell Postdoctoral Fellow in the Reisert Lab |
| Wed. July 15| 10am – 11am| **Lab Rotation 3**: Immunohistochemistry Review with Federica Genovese, Monell Postdoctoral Fellow in the Reisert Lab  
2pm – 3pm  
**Lecture 4**: Rosemary Trout, Program Director, Culinary Arts & Food Science, Drexel University  
*Title*: "Food Science -- Examples in Baking from Epicurious.com" |
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| Thurs. July 16 | 2pm – 3pm   | **Enrichment Seminar:** Joel Mainland, Associate Member, Monell Chemical Senses Center  
**Title:** “How to Present Your Science” |
| Mon. July 20  | 11am – 12pm  | **Lab Rotation 4:** Introduction to Electrophysiology with Dolly Al-Koborssy, Monell Postdoctoral Fellow in the Reisert Lab |
| Wed. July 22 | 10am – 11am  | **Lab Rotation 4:** Electrophysiology Review with Dolly Al-Koborssy, Monell Postdoctoral Fellow in the Reisert Lab |
| Wed. July 22 | 2pm – 3pm    | **Lecture 5:** Arnaldo Diaz, Adjunct Assistant Professor of Pharmacology, University of Pennsylvania  
**Title:** “Perspectives on Mentoring: How embracing all my identities has shaped me as a mentor” |
| Thurs. July 23 | 2pm – 3pm   | **Journal Club 2**                                                   |
| Tues. July 28 | 1pm – 2pm    | **Lecture 6:** Paule Joseph, Lasker Clinical Research Scholar, NIH  
**Title:** "Becoming a Research Scholar at the National Institutes of Health" |
|              | 1pm          | **Virtual Capstone Symposium**  
*Family and Friends cordially invited* |
| Thurs. July 30 | 10am        | **Wrap-up with Mentors and HR**                                      |
The Capstone Symposium marks the end of the program. SAPlings present the results of their research and learning to family, friends, and fellow scientists at a virtual conference-style presentation session. This year’s remote event was attended by the apprentices’ families, Monell scientists and staff, seminar speakers, donors, and several MSAP alumni.

The Capstone celebrates the apprentices’ accomplishments during a summer full of hard work and discovery. It is a very proud moment for the apprentices, their mentors, and especially their families. Each apprentice created a scientific presentation using the data they analyzed, graphed, and tabulated. The presentations described their hypotheses and results, and SAPlings gave oral presentations in a conference-style environment to the Capstone guests. This year we asked apprentices to record their presentations and this allowed them to have this as a lasting part of the educational portfolio.

For the first time this year, we had a keynote address from Shadrack Frimpong. Shadrack is a 2012 participant in MSAP who went on to graduate from the University of Pennsylvania with honors and to receive Penn’s Presidential Engagement Prize. With the prize, he founded Cocoa360, a healthcare and educational nonprofit in Ghana. He is the recipient of the Queen’s Young Leader Award, the Muhammad Ali Humanitarian Award, and the prestigious Gates-Cambridge scholarship. He credits his participation in MSAP as a major part of his success. His keynote address can be viewed here.

This event 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 tenth annual “Monell Sense-ational Science Award” for best project was chosen by a panel of Monell staff. This year’s recipient was Sarah, who worked in the Zhang Laboratory. Her project was titled, “Fruit Flies & How They Taste”. Congratulations, Sarah!
Monell Science Apprenticeship Program
2020 Executive Committee

Paul Breslin  Director
Katie Leung    Program Coordinator
Joel Mainland  Associate Director
Jenifer Trachtman  Director of Development

Dolly Al-Koborssy  Postdoctoral Committee Members
Genevieve Bell
Federica Genovese
Emily Mayhew