



MSAP
GROWING ROOTS IN SCIENCE

Monell Science Apprenticeship Program

Summer 2023 Program

Impact Report



Get to Know Us

Meet Mayssam.

She is the winner of the Monell Center's 2023 Sense-Sational Science Award. In October Mayssam had the opportunity to give a talk to some 100+ scientists and industry leaders, confidently presenting the results of her 8-week-long scientific project completed during the Monell Science Apprenticeship Program last summer. This might not be an extraordinary feat for one of the expert scientists at the Monell Center, but Mayssam is just 17 years old. She is still in high school! We're not sure where you were at 17, but we venture a guess that you had not yet reached this level of achievement and career exploration.



This is the Monell Science Apprenticeship Program.

Program Introduction

The Monell Science Apprenticeship Program (MSAP) is a hands-on immersive summer internship for high school and undergraduate students. Continuously running for 42 years, MSAP was founded on the principles of training the next generation of scientists and STEM (Science, Technology, Engineering, and

Medicine) professionals. MSAP has evolved over the years to have a more deliberate focus on students within the Philadelphia community and students currently underrepresented in the sciences. A cornerstone of the program is providing a full-time salary for the eight weeks in order to break down a barrier that often obstructs access to science in under-resourced communities. This is only possible due to the many generous donations we receive each year.

As you read this Impact Report, you will learn more about the program, about the 2023 cohort of apprentices, and how you can participate in bringing this important bench science experience to students to enrich our community.

42

Number of Years Monell has hosted the Monell Science Apprenticeship Program

92%

Percentage of alumni reporting an interest in a science-based career

265+

Number of alumni with whom we are still in touch

7

Number of years the winner of the MSAP 'Sense-ational Award' has presented their work at the Monell Corporate Sponsors Meeting

5

New Program Connections made In 2023

Program Overview

Mayssam's journey at Monell began last fall when her teacher introduced her to the Monell Science Apprenticeship Program. Because we have a long and rich history, we have a committed group of teachers and professors who refer their students to us through word of mouth and now a growing group of schools and organizations with whom we work in a regular and targeted way.

Mayssam immediately connected with the idea of doing bench science and was one of 86 students who completed the application. Mayssam's application went through a rigorous review by the program committee and a group of faculty mentors. Mayssam became 1 of only 15

students moved onto the interview phase. Over the course of three days, student applicants rotated through half hour rounds of interviews with up to three labs; meeting with both potential mentors and lab staff. For the 2023 cohort of Apprentices, hereby referred to as SAPlings, we chose ten exemplary students and matched them with a mentor and lab team.



2023 SAPling High Schools

West Catholic Preparatory High School
J.R. Masterman Laboratory and Demonstration School
Springfield High School
Northeast High School
Great Valley High School
Esperanza Academy Charter School

2023 SAPling Colleges

The University of Pittsburgh
University of Georgia

Mayssam and her fellow SAPlings joined the Monell scientific community on June 20th to begin their 8-week working relationship with PhD- and MD-level scientists and highly skilled lab staff. Week one is all about orientation, tours, and meeting the team. Students then quickly move on to formulate their hypothesis, conduct research, collect data, analyze their outcomes and ultimately collect their findings into a presentation.

In addition to their lab work, throughout the summer, Mayssam and the other SAPlings attended a number of team building activities including seminars, journal clubs, and enrichment activities that we've learned over the years enhance the overall experience and provide excellent complementary soft skills needed for the workforce. The program concluded with a Capstone Symposium where Mayssam and all of the SAPlings gave a live talk, presenting their project to scientists, family, and community members and where the winner of the Sense-Sational Science Award is named.

Recruitment & Field Trips



Chemosensory Science Discussion
Dr. Stephanie Hunter and Dr. Bob Pellegrino

We also made changes to the application itself, steering clear of unfamiliar terms such as curriculum vitae so that language itself is not a barrier to entry.

The results have been extraordinary. In our first year, the applicant pool immediately rose to 53% from underrepresented groups compared to 39% the previous year. And, the applicant pool grew to 85% from applicants in high school compared to 76% the previous.

Today, our goal is that 80% of our students are underrepresented in the sciences. We can now proudly say that In the past 5 years, we have surpassed this ambitious diversity recruitment goal: 87% of our students are from target backgrounds.

Over the last few years we made substantive changes to our recruitment process so that we attract applicants well-aligned with the values of the program. This means more targeted efforts towards schools and organizations with deep commitment to diversity, equity, inclusion and belonging and with direct access to students underrepresented in the sciences. We did this through a series of field trips to the Center that included talks by scientists, hands-on demonstrations, and tours of the Center. Participating schools included Freire Charter School and Esperanza College's Girls Chemistry Club. Topics included age-appropriate scientific content such as "the difference between taste and flavor" and "why we taste and smell differently from one another."

This strategy allows students to get an immersive experience with science and visualize the experience they could potentially participate in, should they choose to apply.



PTC Demonstration
Dr. Ha Nguyen

Mentor Training

As much effort that has been put into the recruitment of student participants has also been put into mentor training over the last few years. We now include two pre-program sessions aimed at preparing mentors with specific age-appropriate tools to guide high school and undergraduate trainees in the lab. The goal is to ensure their success and provide a positive experience throughout the program.

The first session,, led by co-directors Drs. Paul Breslin and Joel Mainland, utilizes the HEART model of mentoring which includes specific weekly expectations and timelines of apprentices and mentors. For instance

Week 1: Before the end of the week, check in with each student. Do they have materials to read? Do they know what experiment they will be running? Do they have a place to sit and work? Is their commute reasonable? Have they completed CITI/IACUC training? Is someone training them in basic wet lab/software techniques?

Week 2: Pilot experiment

Week 3: Begin data collection

Week 4: Student explains to YOU why their research is important

Week 5: Outline capstone presentation

Week 6: Close data collection, work on presentation

Week 7: Complete presentation slides, practice delivery

Week 8: Record presentation, edit, wrap-up

Dr. Breslin posed the four questions that MSAP Capstone presentations will center on: What is the scientific question to be answered? What methods will be learned throughout the program? How do those methods help answer that scientific question? And arguably the most important question: Why? Why is this an important contribution to science and how can it be communicated to any audience? With only eight weeks to complete a project, these questions form the framework by which students can work through the scientific method.

A second mentoring session invited all of Monell to participate in an interactive workshop entitled **“Creating a Culture of Belonging: Empowering Students to Thrive”**. LaShundra McCook, M.Ed., Aim Academy’s Coordinator of Diversity, Equity, Inclusion & Belonging, formally of the Philadelphia School District, came to Monell for a two hour seminar. Aiming to begin the conversation with Monell mentors on how to empower their labs to create an environment where students feel included and valued.



Please mark your calendar for the upcoming training seminar

Creating a Culture of Belonging: Empowering Students to Thrive



LaShundra McCook, M.Ed.

Coordinator of Diversity, Equity, Inclusion & Belonging
AIM Academy

Please join us in person in the Monell Library

Date: Thursday 6/15/2023

Time: 10:00 AM - 12:00 PM ET

[Click here to Add to Google Calendar](#)

LaShundra McCook, M.Ed
AIM Academy

Inspiring Seminar Series

The MSAP Summer Seminar Series provides a unique opportunity to learn about exciting science projects and perspectives and expand one's scientific network. Speakers were chosen directly for their inspiring career trajectories and impact on the scientific community.

"Talking Science: How Your Voice Influences Science Literacy"

Derrick Pitts of the Franklin Institute, has been a long time participant. He is a charismatic speaker who connects well with his audience and provides the knowledge and experience that comes from a longstanding career in STEM. He challenged the students to reimagine what a scientist looks like and places significant value on having the opportunity to share his knowledge with so many.



"The Real CSI"



Kelly Knight, Associate Professor of Forensic Science and Director of FOCUS Programs, at George Mason University presented her work on forensic science and her unexpected journey into, not only academia but, the criminal justice system. Professor Knight organizes and supports programs dedicated to supporting those under represented in sciences throughout their undergraduate experience.

"My Evolution: Finding passion in a STEM career"

Dr. Roshell Muir, Director of the office of Urban Health Equity, Education and Research at Drexel University's College of Medicine shared her journey from infections diseases to health equity research to mentoring medical students and the road in between. Dr. Muir is an enthusiastic and well spoken speaker who encourages students to network and explore all of their options.



"Career Progression in Academia and Industry:

A Not So Linear or Planned Path and Why I am Thrilled It Happened That Way"

Dr. Michelle Cardel, Senior Research Director at Weight Watchers and Professor at the University of Florida College of Medicine shared her transition from academia to industry., emphasizing the multiple pathways can scientists can take.



"Studying the Neurobiology of Multitasking (in Fruit Flies)"

Dr. Osama Ahmed, a former SAPling himself, brings our program full circle— demonstrating that this experience is only the beginning and the bright future of opportunity awaits. Dr. Ahmed is now an Assistant Professor and Weill Neurohub Term Assistant Professor at the University of Washington.



Workshops

We provide team building and skill building workshops throughout the summer. This type of professional development is an important aspect to the program if we are to build the soft and hard skills needed to persevere in a STEM career. Below are a sample of workshops offered.



Dr. Kang-Hoon Kim
Molecular Biology Rotation

Introduction to Taste, Smell, and Nutrition

Dr. Federica Genovese, Monell Research Associate, introduced SAPlings to the basics of taste and smell science and real world application of it to public health.

Mandatory Laboratory Safety Training

Long-time science communicator and Lab Manager Chris Maute, EdM, makes lab safety training fun and interesting while covering important topics from chemical safety, fire prevention and proper procedures/protocols.

Scientific Rotations

In addition to seminars and workshops, SAPlings had the opportunity to rotate through a variety of scientific topics and techniques including nutrition, neuroscience, molecular biology, and coding.

Connections that Count: Building Your Networking Skills

This 90-minute workshop hosted by Dr. Susan Knox of Your Edvantage (YourEdvantage.com) and importantly a program alumna, equipped SAPlings with essential skills to build relationships and succeed in future endeavors. Goals included; Discovering the power of networking as we explore strategies for expanding your network and creating meaningful connections; Learning how to develop a strong personal brand that effectively communicates your strengths and interests and Enhancing communication skills through interactive activities and role-playing exercises, ensuring confident engagement in conversations and interviews.

Science Communication

Monell Communications Specialist Ahmed Barakat, walked us through the process of transforming our scientific findings into a story, a story that can be shared across many audiences. Stories were shared as students enjoyed their complimentary waffle bar breakfast.

How to Read a Paper

Monell Postdoctoral Fellow Dr. Stephanie Hunter led a special workshop on how to read a peer reviewed journal article. SAPlings were able to practice their newfound skills, not only within their own research, but in attendance of two journal club meetings.

How to Present Your Science

MSAP Co-director, Dr. Joel Mainland walked SAPlings through the process of creating a scientific presentation in preparation for the students' Capstone Symposium. Students then recorded their presentations as a rehearsal for the live event and to document and share with college admissions offices and others.



Ahmed Barakat
Science Communication Workshop

Community Connection

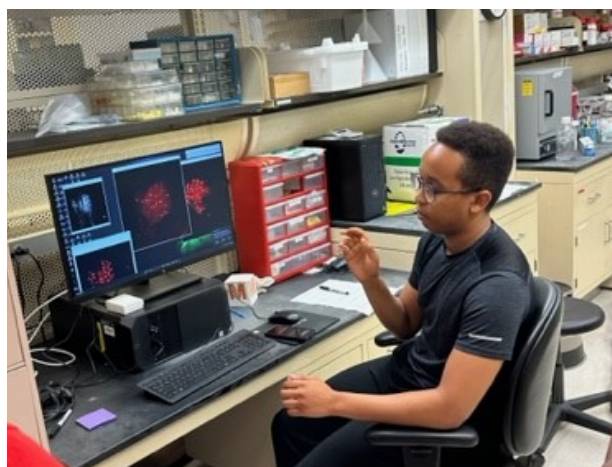


Dr. Alan Arujo demonstrates microscopy

SAPlings Reel, Emmanuel and Mebelyn led tours and demonstrations of their projects to groups of visitors. They explored brain imaging, smell mapping and mouse models of feeding behaviors. Visitors concluded their stay with a capsaicin soup tasting, expertly conducted by second year SAPling and last year's Sense-Sational Science winner, Candelaria.

Peer Group Demonstrations

For this exercise, students were tasked with becoming the demonstrators instead of the trainees. SAPlings led a series of science demonstrations for incoming student groups: Girls Inc and College of Physicians Stem Scholars who visited Monell for the day. In this way, the stage is set for SAPlings to also grow into science communicators and one day to become mentors themselves.



Emmanuel explains brain section images



MSAP 2023 Mutter Museum Field Trip

Mutter Museum Field Trip

After the College of Physicians Stem Scholars program to visit Monell, our SAPlings had the chance to visit the Mutter Museum. There, expert Museum Educator Amanda McCall guided the group of SAPlings and trip chaperones through a fascinating tour of medical mysteries and intrigues culminating in a stroll through the medicinal garden.



It is our great pleasure to thank James J. Albrecht for his leadership support and for challenging us to match his contribution. We are pleased to report that, because of Jim's generosity, the following group of donors collectively donated over \$100,000 to support the 2023 Monell Science Apprenticeship Program. Because MSAP is supported entirely by outside donors and grants, you truly make our summer program possible!

The Monell Circle(\$1,000+)

James J. Albrecht
Robert Bedoukian/Bedoukian Research, Inc.
Richard L. Berkman and Toni Seidl*
Andrew Brand**
Gail C. Brand**
Paul Breslin
Dolfinger-McMahon Foundation
Kathleen Dorries
Ellis Trust for Girls
The Christopher Ludwick Foundation
Valentina Parma
Rachel Poole
Nancy Rawson
Gary Schwartz
Spark Therapeutics
Jenifer Trachtman
The Wawa Foundation

Other Donors

Anonymous (2)	Cristian A. Perez
Osama Ahmed	Danielle Reed
Donna Antonucci	Kristina Robold
Carolyn Asbury	John K. Tran
Michelle Cardel	Catherine Tyree-Davis
Ardis Chapman	Matt Wachowiak
Susan Knox	Hong Wang
Richard Murahata	Alyssa Wofford
Grace Nejman	Jiang Xu

*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 the Brand Family for your ongoing support of the Joseph Brand Memorial Fund that will fund a student apprentice for many years to come.

Every effort has been made to ensure the accuracy of this list. If we have misspelled or inadvertently omitted your name please accept our apologies and notify Jenifer Trachtman, jtrachtman@monell.org.

2023 APPRENTICES



Using bell pepper odor to guide healthy snack choices

Candelaria

J.R. Masterman Laboratory and Demonstration School

Dalton Lab

Mentor: Stephanie Hunter

Supported by a gift from an anonymous donor

Determining the neural basis of sugar preference

Nuhamine

West Catholic Preparatory High School Sophomore

Alhadeff Lab

Mentors: Alexandra Vargas & Misghana Ghidewon

Supported by the Richard L. Berkman and Toni Seidl Family Fund



How do vagal sensory nerve fibers influence eating patterns leading to NAFLD

Emmanuel

Springfield High School Sophomore

De Lartigue Lab

Mentor: Alan M de Araujo

Supported by a gift from Robert Bedoukian/Bedoukian Research

Exploring the aversive properties of AgRP stimulation

Emily

North East High School

Alhadeff Lab

Mentor: Samuel Bacharach

Supported by a grant from Spark Therapeutics





When does vagal stimulation stop reducing food intake in a high fat diet?

Mayssam

Northeast High School Sophomore

De Lartigue Lab

Mentor: Arashdeep Singh

Supported by a grant from The Christopher Ludwick Foundation

Using a sweet blocker to suppress aroma perception

Ryan

Great Valley High School Sophomore

Breslin Lab

Mentor: Linda Flammer



Context independent odor recognition in mice

Reel

J.R. Masterman Laboratory and Demonstration School Freshman

Bolding Lab

Mentors: Kevin Bolding and Ian Chapman

Supported by the Joseph Brand Memorial Fund at the Monell Center

Smell discrimination across mice and humans

Mebelyn

Esperanza Academy Charter School Junior

Mainland Lab

Mentor: Bob Pellegrino

Supported by the Ellis Trust for Girls





Olfaction Loss due to Parkinson's Disease using mice models

Chelsea

The University of Pittsburgh Freshman

Wang Lab

Mentors: Hong Wang, Kang-Hoon Kim
and Emma Larsson

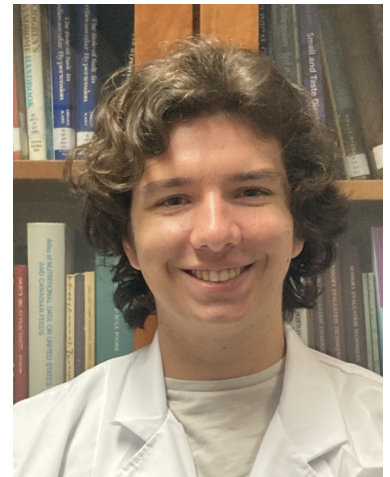
Studying the interaction of chemosensory stimuli in the olfactory epithelium

Aiden

University of Georgia Sophomore

Mainland Lab

Mentor: Federica Genovese




“Find something you think is super exciting in STEM
and go for that.

Don't be intimidated or limited by convention, tradition,
obligation or expectation.”

-Derrick Pitts, Astronomer

Apprenticeship Schedule

te	Time	Event
Mon. June 19		MONELL CLOSED- Juneteenth Observed
Tue. June 20	9am –1:30pm	Program Kickoff and Welcome <ul style="list-style-type: none"> • Introduction by Paul Breslin, Director of MSAP • Welcome from the Director of the Center • HR overview by Scott McKelvey • Occupational Health overview by Donna Kupniewski • Mentors pick up students at 1:30PM
Wed. June 21	10am-11am	Safety Training Session
	1pm – 2pm	Lecture 1: Title: Introduction to Taste, Smell, and Nutrition Federica Genovese, Research Associate
Thurs. June 22	9am-10am	Enrichment Seminar: Title: “How to Read a Paper” Stephanie Hunter, Monell Postdoctoral Fellow in the Dalton Lab
Fri. June 23	3:30pm-5pm	Social Event: Ice Cream Social Jeopardy Led by Robert Pellegrino
Tues. June 27	1pm – 2pm	Lecture 2: Title: Talking Science: How Your Voice Influences Science Literacy Derrick Pitts Chief Astronomer and Planetarium Director for the Franklin Institute
Weds. June 28	10am – 11am	Rotation 1 –Molecular Biology Review Kang-Hoon Kim, Monell Postdoctoral Fellow in the Wang Lab
Thurs. June 29	9am - 10am	Enrichment Seminar: Title: “Science Communications” Ahmed Barakat, Monell Communications Specialist
Mon. July 3		Monell closes at 2PM – Independence Day observed
Tues. July 4		Monell closed – Independence Day observed
Wed. July 5	10am – 11am	Enrichment Workshop: Title: Connections that Count: Building Your Networking Skills Susan Knox, Kenvue Principal Scientist, Edvantage Founder
Thurs. July 6	11am – 12pm	Journal Club Alan de Araujo, Research Associate
Fri. July 7	1pm – 2pm	Lecture 3: Title: The Real CSI Kelly Knight, Associate Professor of Forensic Science, Director of FOCUS Programs, George Mason University
Wed. July 12	12pm – 5p	Social Event: FIELD TRIP FUN DAY Mutter Museum, The College of Physicians 

Schedule of Events

Thurs. July 13	10am – 11am	Rotation 2 –Coding Robert Pellegrino, Monell Postdoctoral Fellow in the Mainland Lab
Fri. July 14	10am-11:30am	Girls Inc Shadowing Event MSAP student lead demonstrations
	1:30pm-3pm	College of Physicians STEM Internships Event Seminar and Demonstrations- Monell Library Ha Nguyen, Monell Postdoctoral Fellow in the Reed Lab
Mon. July 17	10-11	Journal Club Sam Bacharach, Postdoctoral Fellow in the Alhadeff Lab
Tues. July 18	1pm – 2pm	Lecture 4: Title: The Scientific Method Joel Mainland, Associate Member, Monell
Wed. July 19	10am – 11am	Rotation 3 – Introduction to Nutrition Arashdeep Singh, Monell Postdoctoral Fellow in the de Lartigue Lab
Thurs. July 20	9am – 10am	Enrichment Seminar: Monell Postdoctoral Fellow Panel Discussion Rebecca Mendez, Postdoctoral Fellow in the de Lartigue Lab Ha Nguyen, Postdoctoral Fellow in the Reed Lab
Tues. July 25	1pm – 2pm	Lecture 5: Title: My Evolution: Finding passion in a STEM career Roshell Muir, PhD, Drexel University College of Medicine
Weds. July 26	10am – 11am	Rotation 4- Introduction to Neuroscience Sam Bacharach, Postdoctoral Fellow in the Alhadeff Lab
Thurs. July 27	9am – 10am	Enrichment Seminar: Title: “How to Present Your Science” Joel Mainland, Associate Member, Monell
Tues. Aug 1	1pm- 2pm	Lecture 6: Title: Career Progression in Academia and Industry: A Not So Linear or Planned Path and Why I am Thrilled It Happened That Way Michelle Cardel, PhD, RD, Senior Director, Global Clinical Research and Nutrition, Weight Watchers Associate Director , Cardiovascular and Metabolic Disease University of Florida
Thurs. Aug 3	1pm- 2pm	Lecture 7: Title: Studying the Neurobiology of Multitasking (in Fruit Flies) Osama Ahmed, PhD Assistant Professor of Psychology, University of Washington
Thurs. Aug 10	9am – 5pm	HR Exit Interviews
Fri. Aug 11	9am – 5pm	Capstone Symposium: Student Presentations <i>Family members and friends are cordially invited.</i> <i>Quorum: 3675 Market St, Philadelphia, PA 19104</i>



Capstone Presentations



Councilmember Jaime Gauthier and 2023 SAPlings

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 throughout a summer full of hard work and discovery.

Each apprentice delivered a presentation of the data they collected, analyzed, and graphed. The conference-style event, held at the Quorum, allowed SAPlings the opportunity to put their newfound 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 2023 Capstone Symposium was attended by the apprentices' families, Monell scientists and staff, seminar speakers, donors, Monell board members, and Monell alumni. This year's event featured a keynote address from Philadelphia Councilmember, 3rd district, Jaime Gauthier.

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 "Monell Sense-Sational Science Award" for best project was chosen this year by a panel of scientists who included: Drs. Ichiro Matsumoto, Peihua Jiang, Patrice Hubert, Ha Nguyen, Maureen O'Leary, M. Hakan Ozdener, Jonas Junge; and alumna Dr. May Cheung, now an Assistant Professor at Brooklyn College.



2023 Sense-Sational Science Award recipient
Mayssam and MSAP Co-Director, Dr. Joel Mainland

Congratulations Mayssam!

A Note from the Co-Director



MSAP Co-Directors, Dr. Joel Mainland (right) and Dr. Paul Breslin (left)
MSAP Coordinator, Tiffany Haydt (center)

Dear Friends:

The third week of June is one of my favorite weeks of the year. I can't wait to meet our cohort of Monell Summer Apprentices, and to introduce them to their mentors and host labs.

In terms of return on investment, I can't think of anything that has more impact. There's nothing more valuable to me than opening students' eyes to science as a vocation and an avocation. What greater experience can there be than being encouraged to follow your curiosity, own a question that no one else has ever asked, and pursue it by testing your hypotheses? Each year, we see how this experience changes our students' life trajectories.

Summer apprentices make us better scientists. Their fresh thinking and novel perspectives force us to examine and explain why our work matters. Ultimately, this makes Monell a very special place, one where mentors know how important it is to guide young minds into science.

Thank you for your part in helping this happen. If you have any questions about MSAP, please reach out to my colleague Tiffany Haydt at academicaffairs@monell.org.

Sincerely,

A handwritten signature in black ink that reads "Paul A. Breslin".

Paul Breslin, PhD
Member, Monell Chemical Senses Center

Special Thank You

The Monell Science Apprenticeship Program is housed within the Monell Center at 3500 Market Street in the University City Science Center. Monell is in Phase I of a building renovation which when complete will improve our laboratory and public space which will positively impact scientists and trainees alike as well as increase our contribution to public health. The Center gratefully recognizes all of our elected officials whose support and advocacy made possible our first Capital Improvement grant through the State Redevelopment Assistance Capital Program (RACP). We offer special acknowledgement of our direct legislative representatives:

U.S. Representative Dwight Evans, 3rd Congressional District
U.S. Senator Bob Casey
U.S. Senator John Fetterman
State Senator Vincent J. Hughes, 7th Senatorial District
State Representative Rick Krajewski, 188th Legislative District
Councilmember Jamie Gauthier, District

