



# Penn Medicine

## Office of Outreach, Education, & Research

Penn Medicine's Office of Outreach, Education, and Research's 2023-2024 portfolio consists of seven STEM outreach programs, engaging over **4,000 Philadelphia area youth, families, and teachers** in on-campus and school-based experiences.

*Consistent across all projects is our aim to encourage scientific literacy, trust, and knowledge by allowing students to **BECOME** the scientists, not just learn from or about them.*

Our work engaged four institutes/centers; eight departments; and **40+ faculty members** and is always growing. Over **6,000 volunteer hours** have been spent by Penn Medicine faculty, students, and staff to impact those in our own backyard.

Through support from Penn Medicine, the National Institute of Health, the National Science Foundation, and other private donors and foundations, all the programs are **FREE** to Philadelphia public and charter schools and students.

To Learn More Please Visit: <https://www.med.upenn.edu/evdresearch/oer/>

### Specific Program Highlights

**Project BioEYES** is a K-12 science education program which provides classroom-based learning opportunities using live zebrafish. During our weeklong experiments, students raise zebrafish to study life cycles, habitats, genetics, and the many benefits of research. BioEYES is designed to incorporate teacher empowerment and includes hands-on science learning in every school. In the 2023-2024 school year **30 schools, 59 teachers, and 3,122 students** participated in the program. BioEYES also received support from **7 volunteers**, giving a total of **28 hours** of their time in the form



*A graduate student volunteer assists 4th graders with viewing zebrafish embryos under the microscope.*

of in-person school visits and virtual career/research talks. Volunteers came from the labs of Drs. Korb, Shorter, and Wellen as well as other CDB and CHOP staff.

**DrosoPHILA** is a middle and high school program that aims to expand scientific education through interactive experiments. Using Fruit flies as our model organism, we offer students



*Joshua Kouassi, OER Outreach Educator, teaching in a city high school.*

the opportunity to implement the scientific process and analyze their own data. Students investigate concepts of central dogma, neuroscience, experimental design, model organisms, data collection and analysis, and perform three weeks of scientific experimentation. During the 2023-24 school year DrosoPHILA served **6 schools, 11 teachers, 640 students**. We appreciate all those who have contributed to our program's success, including the volunteers from the Bashaw Lab who came out to schools and supported our future scientists!

**Science Olympiad** is a national team competition in which students compete in 23 events pertaining to various fields of science, including earth science, biology, chemistry, physics, and engineering. During the 2023-24 school year Science Olympiad @OER provided monthly coaching and mentoring sessions on campus, virtually, and at city schools. Partnering with **17 schools** (8 middle schools and 9 high schools) **275 students and teachers** took part. Volunteers from Penn's Science Olympiad Undergraduate Program, graduate students, and post-doctoral candidates provided over **200 volunteer hours**.



*Project designed during Saturday mentoring session.*

**Penn Academy for Reproductive Science (PARS)** and the **Penn Academy for Skin Health (PASH)** are workshops for high school students led by clinicians, scientists, and medical student volunteers. These spring programs ignite students' interest in health care and research, with an emphasis on reproductive science (PARS) and dermatology (PASH). The academies run for four consecutive Saturdays and involves hands-on lab investigations, journal clubs, and exercises for students to understand the translation between basic research and the care patients receive.



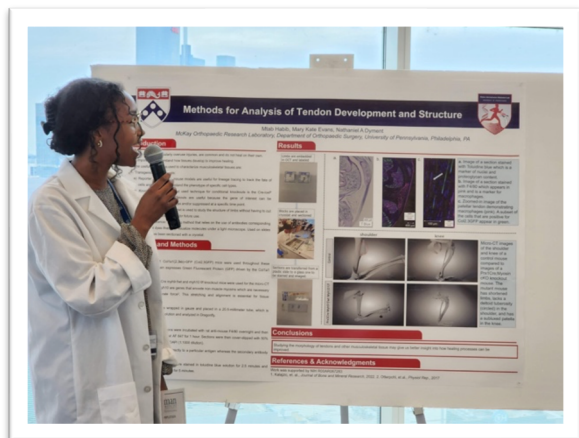
*PARS and PASH high school student researchers*

**PARS** is a high school program led by clinicians, scientists, and medical students from the Department of Cell and Developmental Biology, the Epigenetics Institute, and the Center for Research on Reproduction and Women's Health. PARS incorporates a mix of small-group discussions, demonstrations, and hands-on lab activities to explore current research topics in reproductive health. Topics include: female reproductive anatomy and physiology, fertilization, embryo development, stem cells, genetics, epigenetics, and oncofertility. Student researchers dive into a journal article, discuss ethical decision-making, and prepare for future careers in science and medicine.

**PASH** is sponsored by the Department of Dermatology and the NIH-funded Penn Biology and Disease Resource-based Center. PASH was designed to address inequities in access to STEM opportunities by providing an authentic research-based experience in skin biology and clinical dermatology to Philadelphia high school students, who are often from disadvantaged backgrounds. PASH students are exposed to biological, environmental and social factors that contribute to skin diseases, as well as the diagnostic and laboratory techniques used to study them. For example, participants prepare for biopsies of various skin diseases; culture microbes from their skin and then use sequencing methods to identify their cultured isolates; practice suturing; and participate in a "Diagnosing the Disease" to review the concepts taught.

In spring 2023, **twenty-four** (12 per program) 10<sup>th</sup>-12<sup>th</sup> graders participated in **16 hours** of research preparation through PARS and PASH. Successful completion of these programs

now enabled them to be hired as summer researchers in our OER internship program, described below.



*High School Summer Researcher sharing her project at the Capstone Celebration.*

**OER Summer Research Internship:** This program is the next step for PARS and PASH alumnae who want to pursue STEM career paths through additional instruction and Penn Medicine employment. These students are exposed to the daily life of not only a research lab but a university setting. In addition, their network of research professionals and peers grows. Summer interns participate in weekly journal club, case studies, and shadowing experiences across Penn Medicine. Having opportunities for trainees, post-docs, and staff to get involved in outreach, gain teaching skills, and

ultimately become important mentors to these students are also important reasons to pursue this work. In summer 2023, **5,250 volunteer hours** were spent by **29 Penn graduate students and post-doctoral candidates** mentoring **24 high school** students. All HS students are hired as temporary Penn employees and work in laboratories at the Institute for Regenerative Medicine, Penn Center for Musculoskeletal Disorders, Penn Skin Biology and Diseases Resource-based Center, the Epigenetics Institute, and the Department of Cell and Developmental Biology.