

6th Annual University of Pittsburgh Cancer Institute (UPCI) Academy Final Report 2014



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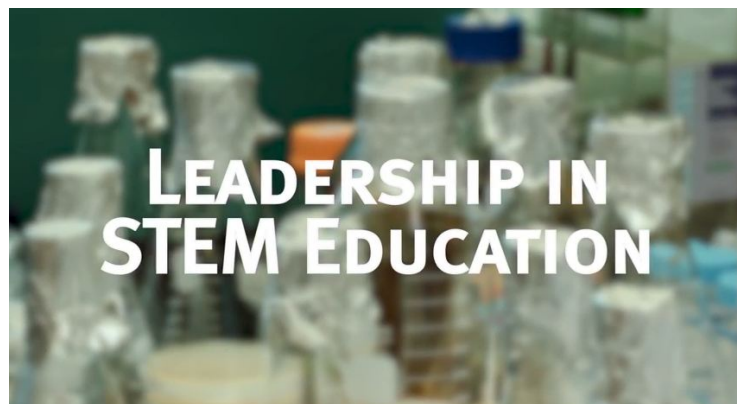
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University of Pittsburgh Cancer Institute (UPCI) Academy Final Report 2014

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Our Logo: The World and the Crab: The etymology of the word "cancer" is crab, just like the zodiac sign. It is from the Latin term originally meaning "a crab" and, later, "malignant tumor." The Greek physician Galen, among others, noted the similarity of crabs to some tumors with swollen veins. Given the international influence of the Academy, our logo, showing the world and the underlying crab, is meant to demonstrate that we are engaging the best and brightest from around the world to deal with cancer in our programs.

I. INTRODUCTION



The 6th Annual University of Pittsburgh Cancer Institute (UPCI) Academy was successfully completed following eight weeks (June 16 to August 8, 2014) of experiential and didactic activities designed specifically for high school students. Over the course of its history, The UPCI Academy has received support from UPCI, UPMC, Bayer Material Sciences, the Queen's Hospital of Honolulu, the

UPCI Volunteer Office, and the National Cancer Institute (NCI). After the pilot program in 2009, the Academy was federally funded by the NCI to continue in the summer of 2010 as a supplement to UPCI's P30 Cancer Center Support Grant. In 2012, the Academy received funding for ten additional scholars under-represented in the Biomedical Sciences (UBs) by the Doris Duke Charitable Foundation (DDF) to launch the DDF Academy for Clinical Research, which was fully integrated into the UPCI Academy in 2013. We were refunded for another year by the DDF in 2014 and attended their meeting in New York City in the Fall of 2014 with other sites funded through their [Clinical Research Experiences for High School Students](#). By 2013, the UPCI Academy had grown to become an internationally recognized STEM program that provided approximately 60 high school students, mainly rising seniors and juniors, with unique and complex scientific research learning experiences. Scholars now spend eight weeks over the summer participating in intensive studies in an individual mentor's research laboratory; witnessing cameo appearances from professionals in clinical cancer care and basic research; taking field trips to local organizations dedicated to scientific advancement; and attending weekly didactic sessions led by qualified graduate students, medical students, postdoctoral fellows, and faculty. This last year, the UPCI Academy Program Director, Dr. Michael T. Lotze,

received the Carnegie Science Center Award for Leadership in STEM Education. In 2015, the UPCI Academy was one of three finalists for Coro Pittsburgh's Martin Luther King, Jr. Award for Distinguished Organizational Leadership.

II. OBJECTIVES

The UPCI Academy has designed specialized curricula to help prepare high school students, primarily rising seniors and juniors, to further their studies in science, technology, engineering, and mathematics (STEM) and to consider careers in cancer care and research. Through an eight-week immersion in our dedicated laboratories with qualified faculty mentors (**see Appendix A**), scholars showed (1) an increased knowledge of STEM careers in cancer care and research, (2) a deeper understanding in cancer biology and therapeutic strategies, and (3) enhanced development of research and communication skills, what we call "science as a performing art."

The summer program operates from federal and foundation grants; institutional support; donations from grateful patients, in-kind support from local companies and organizations; and the commitment of University of Pittsburgh faculty and staff. We do not charge an application or registration fee, and we do not charge tuition for entrance into our program. Program curricula is taught and supervised by faculty in expert areas of research; postdoctoral fellows; administrative and research staff; and graduate and medical students. Our main goal for scholars is to provide them with innovative ways in which to explore the exciting, complex fields of cancer and, thereby, identify a career pathway in which they can contribute to a future that places them on an accelerated trajectory for their science.

III. PROGRAM SITE OVERVIEWS

Since its inception in 2009, the Academy has expanded from only one site at the Hillman Cancer Center to six distinct sites located throughout the University of Pittsburgh campuses and one site in Germany:

- Cancer Biology (**CB**): Hillman Cancer Center, Shadyside
- The Women's Cancer Research Center (**WCRC**): Magee-Womens Hospital, Oakland
- Computer Sciences, Biology and Biomedical Informatics (**CoSBBI**): UPMC Shadyside, Shadyside
- Tumor Immunology (**TI**): University of Pittsburgh, Oakland
- The Center for Health Equity Research and Promotion (**CHERP**): VA Pittsburgh Healthcare System, Oakland
- Drug Discovery, Systems and Computational Biology (**DiSCoBio**): University of Pittsburgh, Oakland.
- Center for Integrated Oncology Cologne/Bonn Academy (**CIO**): Cologne, Germany

Each site was well-equipped with dedicated faculty, staff, and facilities to provide our scholars with the opportunity to complete hands-on, experiential research in a variety of specialized areas of cancer, oncology, and medicine. Below are detailed program descriptions for each site.

Cancer Biology (CB): Shadyside

Scholars at the CB site are introduced to key concepts in cancer biology such as tumor suppressors and oncogenes; cell signaling and growth factors; the role of metabolism and disordered mitochondrial mechanisms; the role of inflammation in cancer; the tumor

microenvironment; and tissue invasion/metastasis. Under the guidance of a faculty mentor, scholars are fully immersed in a research project that involves designing and performing experiments to analyzing and presenting data. In addition to hands-on experience in the laboratory, scholars attend a comprehensive series of didactic lectures on cancer biology presented by program academic staff using the 2nd Edition of Robert Weinberg's *The Biology of Cancer* textbook. Dr. Weinberg, now at MIT, was a graduate of Taylor Allderdice High School here in Pittsburgh. These are supplemented with presentations from clinicians and researchers from across UPCI disciplines focusing on clinical care, career options, and career preparation as well as tours of clinical and research facilities at UPCI, UPMC Shadyside, and the Biomedical Science Tower (BSC) III on the University of Pittsburgh campus. By the end of eight weeks, scholars gain an understanding of the biological processes that contribute to tumor development and survival; current cancer care approaches and therapeutic strategies; and of the multitude of career paths available in biomedical research.

Computer Sciences, Biology and Biomedical Informatics (CoSBBI): Shadyside

The Computer Sciences, Biology and Biomedical Informatics (CoSBBI) site was hosted by the Department of Biomedical Informatics (DBMI) and the Division of Pathology Informatics at the University of Pittsburgh Shadyside Campus. It provided a hands-on introduction to the application of software and computational techniques to clinical and research problems. Biomedical Informatics covers a wide range of topics including genomic and proteomic data mining; pharmacogenomics; image analysis; interface design; natural language processing; machine learning; and biosurveillance. CoSBBI scholars participated in a crash-course in biomedical informatics, a computer programming boot camp, and intensive collaboration with a faculty mentor on an ongoing research project. Scholars had the opportunity to submit their project abstracts for inclusion in a published paper describing the summer's activities and were considered for submission to the high school program at the annual meeting of the American Medical Informatics Association (AMIA).

Women's Cancer Research Center (WCRC): Oakland

UPCI Scholars placed at the WCRC were exposed to various aspects of research in women's cancers. Their research projects centered on critical questions in breast and ovarian cancers utilizing patient samples and animal models. The scholars were exposed to class-based didactic courses; high-impact, peer-reviewed journal article presentations; extensive research programs in individual mentors' laboratories; and a number of visits to clinical and core support components of the Magee-Womens Hospital of UPMC and the University of Pittsburgh. The cancer-focused coursework and journal article presentations were designed to provide the scholars with a rigorous introduction to the complexity of cancer but, at the same time, help them better understand the lab projects they were working on under the direction of the faculty mentors.

Scholars' knowledge of the fields relating to women's health and cancer increased significantly in depth throughout the summer as they participated in (1) a weekly didactic lecture or journal article presentation, (2) a laboratory experience with a dedicated MWRI faculty mentor, and (3) cameo experiences which included tours and guest lectures. These components of the WCRC helped scholars to gain a greater appreciation for the breadth of the oncology field and how it translates to innovations and progress in women's health.

Tumor Immunology (TI): Oakland

The TI site introduces rising high school juniors and seniors to basic concepts in immunology as well as the dynamic interaction between the immune system and cancer. Scholars are introduced to research in areas of cancer immunology where they explore basic mechanisms underlying initiation of immune responses to cancers by defining key components of an immune response (e.g., T-cells, NK cells, B-cells, antibodies, dendritic cells) and elucidating aspects of novel immunotherapies for cancer. They are assigned to work with a mentor in a laboratory to develop a hypothesis-driven research project which includes experimental design and data analysis. In this setting, scholars are exposed to cutting-edge technologies in flow cytometry, microscopy, protein biochemistry, immunological assays, and animal models of cancer among others. Laboratory research is complemented with didactic sessions and other scholarly activities inclusive of program-wide activities. The aim is to prepare scholars for career opportunities in science, medicine, and general areas of cancer immunology. At the end of the program, scholars are expected to understand major concepts in immunology, cancer, and related fields in biology, thus giving them a firm grasp of current efforts to develop successful cutting-edge immunotherapies for cancer.

The Center for Health Equity Research and Promotion (CHERP): Oakland

In conjunction with the Tumor Immunology Site, the UPCI Academy re-instated the Center for Health Equity Research and Promotion (CHERP) program in 2014 in order to promote our commitment to students in our local communities. CHERP faculty members and staff were valuable participants in our program three summers ago and agreed to serve as a program site again this year. Led by Michael J. Fine, MD, MSc with coordination by Dr. Susan L. Zickmund within the Veterans' Affairs Research Center, CHERP educators applied the Tumor Immunology Syllabus for their didactic component. CHERP is now located in new quarters at the VA Hospital on the Oakland campus and will engage scholars in cutting-edge studies designed to discern the origins and develop solutions for disparities in health care. This program site was designed specifically for scholars who are interested in working with researchers on clinical research projects focusing on areas such as health care disparities, delivery of health services, and quality and equity of care. Two scholars completed this program in 2014.

Drug Discovery, Systems and Computational Biology (DiSCoBio): Oakland

The Drug Discovery, Systems and Computational Biology (DiSCoBio) site on the Oakland campus introduces rising high school juniors and seniors to the emerging fields of research that use both computational and experimental approaches to answer fundamental questions in cancer biology and related disciplines including computational structural biology (studying how proteins move and interact with each other); drug discovery (theoretical and experimental designing and testing of candidate drug compounds); genomics/bioinformatics (analyzing large data sets of sequencing and other data); image analysis/informatics (training a computer how to “see” and analyze biological image data); and systems biology (tackling biological questions using an integrated, holistic approach). In addition to having a primary research experience in one of these fields, scholars learn about the fundamental concepts in each of these “new biologies” and gain hands-on training in the tools and techniques central to these disciplines. Professional development activities complement the research and didactic training to prepare scholars for careers in science and/or medicine. Scholars are placed in an immersive, challenging, and fulfilling experience in a fast-growing area of cutting-edge biomedical research.

IV. RECRUITMENT

The UPCI Academy faculty and staff have created a large network of contacts locally, nationally, and internationally who work with us to identify and recruit a diverse group of high-achieving high school students. A central goal of our program is to continue the recruiting of academically successful students who come from economically, socially, or educationally disadvantaged backgrounds as well as those who are underrepresented in the Biomedical Sciences (UBs). In the past, students were accepted from local high schools in Pittsburgh and surrounding communities as well as Hawaii, New Jersey, Virginia, Minnesota, Texas, Vermont, New York, North Carolina, Maryland, and even as far as Germany and Kazakhstan.

Local. We have established a strong relationship with the **Pittsburgh Public School (PPS) District** from which we have recruited students. Consisting of four major high schools (grades 9-12) and five schools grades (6-12), PPS is the largest of 43 school districts in Allegheny County and the second largest in Pennsylvania. In the secondary schools alone (grades 9-12), 6912 students are enrolled in PPS. According to the most recent demographic district data, 55% of those students are African-American, 37% are Caucasian, 2% are Asian, and 1% is Hispanic. Approximately 70% of the graduates go on to enroll in higher education. Seventy-one percent of PPS students (grades K-12) are eligible for free or reduced-price lunch. Our program has seen many PPS students participate and successfully complete our summer high school program. We will continue to actively recruit from these local high schools.

The **Pittsburgh Science & Technology Academy (SciTech)**, located on the Oakland campus, is part of PPS (one of the five schools with grades 6-12). We have recruited widely within this school and have accepted several students each summer. The curriculum at SciTech is designed specifically for students with an interest in science, technology, engineering, or math. Recent school highlights show that over 75% of students scored proficient or advanced in reading and math (STEM). Additionally, racial disparity in both math and reading achievement has declined at SciTech in recent years. Dr. Edwina Kinchington, a science teacher at SciTech, has been an important resource as we expand our outreach and recruit more disadvantaged and minority scholars.

We have also reached out to and connected with a number of urban schools immediately surrounding the University of Pittsburgh Shadyside and Oakland campuses, expanding our applicant pool to include high-achieving students who may come from low-income households or are ethnic minorities. We continue to reach out to the many private schools in the immediate Pittsburgh region such as Winchester Thurston, The Ellis School, Shadyside Academy, Oakland Catholic, Pittsburgh Central Catholic, and Sewickley Academy. We have many applicants and participating scholars who are enrolled in these private academies, and a number of them who maintain a scholarship for enrollment based on academic excellence.

Regional. We have established a number of relationships with regional, suburban school districts who have been committed to spreading the word about our program to their students and where we have visited to speak directly with students about the opportunities our program provides. School districts outside of the City of Pittsburgh including Hampton, Fox Chapel, North Allegheny, and Upper St. Clair are all schools which have a high number of students interested in pursuing fields in cancer research, medicine, and science.

National. National interest continued in 2014 with applicants from Vermont, Texas, New York, Minnesota, Maryland, Virginia, Utah, and New Jersey. We have also continued our unique partnership with the Jack Kent Cooke Foundation (JKCF), a private, independent foundation

established to help exceptionally promising scholars with modest family means reach their full potential through education. The foundation's scholarship and direct service programs support the education of approximately 650 remarkable scholars from throughout the country each year. This past summer, our program hosted two out-of-state scholars under the JKCF's Young Scholars Program to spend the summer in Pittsburgh. We hope to expand the number of participating JKCF scholars next summer to five or more. We will work with the JKCF Education Director, Rebecca Cullen, as well as JKCF educational advisors to help identify qualified students and facilitate their attendance and residence in Pittsburgh for the duration of the eight-week program.

International. The UPCI Academy has recently focused efforts on recruiting selected international scholars into the program, reflecting strategic partnerships of UPCI. In recent years, we have had students from Kazakhstan and one from Germany participate in the program. We hope to expand our international recruitment efforts in the future. Our standards remain high for recruiting high-achieving students as well as developing relationships with educational and community organizations both worldwide and nationwide. These relationships will ensure that culturally/ethnically diverse students have the opportunity to succeed within our program. We aspire to have approximately 5-10% of our positions filled by individuals from outside of the United States.

Getting the Word Out. We will continue partnerships with local organizations and programs such as Bayer Material Sciences and the University Of Pittsburgh Office Of Diversity (Director, Paula K. Davis). Our contacts in the Office of Diversity provide our scholars with unique opportunities to participate in shared activities, namely diversity training, with the University of Pittsburgh School of Medicine Summer Premedical Academic Enrichment Program (SPAEP). Two open houses were offered during the winter of 2014 to prepare applicants, parents, and teachers for the Academy. The open houses gave applicants a chance to better understand the application process and learn more about program site curricula, activities, academic goals and program expectations. We reached out to local urban and suburban schools, guidance counselors, and teachers to advertise the open houses as well as encourage potential candidates to apply. Faculty from each program site attended to speak in person with students and parents. Informational open houses will be conducted in early 2015 as well.

Working closely with our advisory committee members, we will collaborate with the PPS Science Curricula Department to advertise our program to rising seniors and juniors in local high schools. As we have done in the past, we plan to visit various science classes within PPS high schools to talk about our program and identify eligible, high-achieving scholars for 2015. Laurie Heinreicher from Hampton School District has served as our liaison for recruitment and advertising among suburban school districts. We have made additional contacts through Allegheny County and the Pittsburgh Promise to raise awareness about STEM education and how our programs are uniquely designed for high school students who desire an immersive, intensive, hands-on experience in basic science and translational research.

Local and Community Support. As has been the case for the past five years, we could not have completed such a successful program without the continued support of our local communities and leaders. We receive current in kind or financial support from Bayer Material Sciences, the University of Pittsburgh Cancer Institute (UPCI), the Office of Science Education Outreach – University of Pittsburgh, Pittsburgh Public Schools, SciTech Academy, the Fund for Advancement of Minorities through Education (FAME), Family House – Neville, UPMC, and Ayoub Woodworks.

V. PROGRAM LEADERSHIP



Michael T. Lotze, MD



Megan Houlihan



Joseph C. Ayoob, PhD



Michael Becich, PhD



Robert J. Binder, PhD



Michael Fine, MD



Michael Hallek, MD



Steffi Oesterreich, PhD

Program leadership consists of University of Pittsburgh faculty and staff, many of whom have been active in the program for the last several years. New faculty mentors and labs are identified and added each year as our program grows. Key personnel, including administrators and block leaders, are listed below, and the full list of faculty mentors can be found in **Appendix A**. Additionally, we recruit many graduate, undergraduate, and medical students to serve as teaching mentors who conduct weekly tutoring sessions so that all scholars have the opportunity to manage assigned coursework in an appropriate and timely manner. Offering a one-on-one experience with scholars consistently leads to an overall better understanding of the material and more interactive didactic sessions and experiences in the laboratory.

PERSONNEL (see Appendix A for full list of program faculty).

Name	Title	Site	Role
Michael T. Lotze, MD	UPCI Academy Program Director; Site Director; Instructor	CB	Provided overall logistics and support for the program. Developed funding requests and interactions with outside agencies and promoted the expansion of the current program.
Megan Houlihan	UPCI Academy Program Administrator	N/A	Recruited scholars and provided student support. Coordinated guest speakers, tours, application and recruitment development, advisory meetings, and overall program management. Coordinated the NCI trip.
Guanqiao Li	Academic Administrator	CB	Developed curriculum for the Hillman site. Oversaw didactic sessions. Served as assessment consultant and instructor. Worked daily with scholars on developing research projects and laboratory experiments.
Juraj Adamik, PhD	Block leader	CB	Oversaw curriculum for two weeks in the Hillman site. Developed strategies for the pre-test.
Sandra Gibson, BS	Block leader	CB	Oversaw curriculum for two weeks at the CB site. Developed post-test and intermittent surveys during the Academy.
Wenqian Wang	Block leader	CB	Oversaw curriculum for two weeks in the Hillman site. Helped develop classroom materials.
Steffi Oesterreich, PhD	Site Director	WCRC	Took an active role in the education of the scholars in the biology of women's cancer. Helped organize the social activities of the program, as well as a team-building exercise for the scholars. Accompanied scholars on the NCI trip.

Tiffany Katz, PhD	Academic Administrator	WCRC	Developed curriculum for the WCRC site including a scientific techniques boot camp. Oversaw didactic sessions. Served as assessment consultant and instructor. Worked with scholars on developing research projects, laboratory experiments, and preparing posters and presentations. Worked with the UPPDA and the office of Science Education Outreach to provide training on mentoring techniques for mentors.
Joseph Ayoob, PhD	Site Director; Instructor	DiSCoBio	Recruited scholars. Provided student support. Prepared schedule, tours, advisory meetings, and program management.
Michael Becich, MD, PhD	Site Director	CoSBBI	Oversaw the CoSBBI curriculum and research projects.
Joyeeta Dutta-Moscato, MS	Instructor	CoSBBI	Developed curriculum and coordinated the didactic sessions for CoSSBI.
Robert Binder, PhD	Site Director	TI	Designed and implemented the Tumor Immunology program including all didactic and research activities.
Michael Fine, MD	Site Director	CHERP	Coordinated didactics with the TI site. Evaluated disparity assessments and their remedy.

BLOCK LEADERS

- CB: Juraj Adamik, PhD; Sandra Gibson, BS; Guanqiao Li; and Wenqian Wang
- CHERP: Susan Zigmund, PhD
- CoSBBI: Joyeeta Dutta-Moscato, MS
- DiSCoBio: Joseph Ayoob, PhD; Timothy Lezon, PhD; David Koes, PhD; Mark Schurdak, PhD; Administrators: Kelly Gentile, BS and Leah Russell, BS
- TI: Robert Binder, PhD; Lauren B. Kinner, BS; Abigail Sedlacek, PhD; Arianne Wilson, BS; Lea Umfrey, BS; Kelly Maers, BS
- WCRC: Tiffany Katz, PhD; John Skoko, PhD; David Boone, PhD

Activities Coordinators / Resident Advisors

All Activities Coordinators and Resident Advisors were University of Pittsburgh undergraduates who participated in the Inaugural Honors College - Health Sciences (HCHS), co-directed by Dr. Edward Stricker, Dean of the Honors College and Dr. Michael Lotze.

These fellowships support University of Pittsburgh undergraduate students on the Oakland campus who are planning to pursue a career in one of the health-related fields. The HCHS Summer Research Fellows receive a stipend for the summer (mid-May through early August) that enables them to dedicate themselves full-time to conducting an independent research project under the mentorship of individual faculty members in any of the University of Pittsburgh Health

Sciences Schools. This program is closely aligned with the Breckenridge Program of the University of Pittsburgh which is also within the Honors College. Dr. Theresa Hastings led the weekly summer research review presentations and mentor presentations.

- Activities Coordinators: Jarrod Ellis; Nicholas Moores
- Resident Advisors: Akshaya Arjunan; Fardeen Mehdi; Hetal Mukeshbai Patel; Rushi Patel

HCHS: <http://www.honorscollege.pitt.edu/hchs-summer-research-fellowships>)

Breckenridge Program:

<http://www.honorscollege.pitt.edu/summer-brackenridge-fellowships>

VI. CURRICULUM

CB GOALS

Specific Aim 1: Awareness of Science, Technology, Engineering, and Mathematics (STEM) Careers in Cancer Care and Research. The primary aim was to motivate high school scholars to continue their study of STEM subjects by introducing them to the many disciplines that are employed by professionals working in a comprehensive cancer center. This was pursued through presentations by professionals recruited to represent the diversity of opportunities in the cancer field, focusing on the roles, skills, and educational backgrounds of cancer team members.

Specific Aim 2: Education in Cancer Biology and Therapeutic Strategies. Our secondary aim was to educate scholars in the biology of cancer as well as the strategies used and under development for its prevention, diagnosis, and treatment. This was pursued through a variety of lectures, textbook readings, and guest presentations.

Specific Aim 3: Development of Research and Communication Skills. Our tertiary aim was to educate scholars in the process of scientific research. We call this process "Science as a Performing Art." This was pursued through scholars' participation in a research project under the supervision of a cancer researcher and preparation of an oral/visual presentation for their peers and mentors describing their research goals, methods, and results.

Specific Aim 4: Participation of Underrepresented Minorities and Disadvantaged Students. The Office of Diversity, Health Sciences (ODHS) and the University of Pittsburgh School of Medicine's Office of Student Affairs/Diversity Programs have played a major role over the past year in helping us to identify and reach out to local talented, disadvantaged youth. These programs and leaders are experienced in supporting scholars who come from disadvantaged backgrounds or are

underrepresented in the Biomedical Sciences. The director of these programs, Paula Davis, has been instrumental in working with us during the application and recruitment processes to create avenues by which scholars can be appropriately paired with a science and/or medicine internship in the following year in the [SPAEP Program](#).



CB SYLLABUS

The syllabus and lecture design were based on R.A. Weinberg's *The Biology of Cancer*, 2nd edition. In order of presentation, the following lectures were conducted at CB:

- Introduction/Evolution of Cancer
- Basic Biology Review
- Overview of Cancer
- Tumor Viruses
- Oncogenes
- Growth Factors
- Cytoplasmic Signaling
- Tumor Suppressors
- Cell cycle/pRb
- Apoptosis/p53
- Immortality/Senescence

- Mitochondria/Metabolism
- Tumorigenesis
- Genomic Integrity/Inherited Defects
- Heterotypic Interactions/TME
- Angiogenesis
- Metastasis
- Immunology Overview
- Tumor Immunology
- Cancer Vaccines/Immunotherapies
- Current Chemotherapeutics
- Drug Development and Clinical Trials

The 14 CB scholars participated in a wide variety of learning activities including didactic sessions, textbook readings, guest speaker presentations, tours of clinical and research facilities, laboratory research, lab meetings, research seminars, discussions, and their own presentations.

CB Cameo Lectures and Tours

- Animal Facility tour – Joe Newsome, MS, DVM, DACLAM
- Bioinformatics – Michael Becich, MD, PhD
- Clinical Psychology – John Schmidt, PhD, LP
- Flow and Imaging Cytometry – E. Michael Meyer
- Genetic Counseling – Miranda Hallquist, MSC, CGC
- Healthcare Disparities – Lyn Robertson, RN, MSN, DrPH
- Mining the Cancer Literature – Natasa Miskov-Zivanov, PhD
- Molecular and Cellular Biology – Richard Steinman, MD, PhD
- Pathology – Sheldon Bastacky, MD
- Radiation Oncology – Brian Karlovits, DO
- Shadyside Hospital Operating Room Observations – Paul Feight, RN, CNOR
- Surgical Oncology – Nicole Schmitt, MD
- Veterinary Medicine – Tara Gaab
- Zebrafish Facility tour – Michael Tsang, PhD

CoSBBI GOALS

Specific Aim 1: Awareness of Careers in Biomedical Informatics. The CoSBBI program introduces scholars to the many career options available in these fields and makes them aware of the incredible rewards available in a career dedicated to health care research in a computational environment. Scholars have opportunities to learn about these careers through a series of visits by those actively working in these areas.

Specific Aim 2: Education in Selected Topics in Biomedical Informatics. Another goal of this site was to introduce scholars to concepts such as genomic and proteomic research; statistical and computational modeling of disease; bioinformatics; and cognitive and translational informatics.

Specific Aim 3: Development of Research and Communication Skills. CoSBBI also focused on the development of research skills through one-on-one interactions with faculty mentors in the development of individual projects. Additionally, the CoSBBI team facilitated the development of scholars' communication skills needed to carry out their projects and to present them to the entire group at the end of the eight weeks.

CoSBBI SYLLABUS

- Python Computer Programming
- Molecular Biology
- Bioinformatics
- Probability and Statistics
- Information Visualization
- Data Mining
- Predictive Modeling
- Pharmacogenomics
- Protein-protein Interactions
- Genome Wide Association Studies
- Cancer Genome Analysis
- Pathology Informatics
- Biosurveillance
- Usability and User-centered Design
- Clinical Decision Support
- LEAN Manufacturing

Textbook: Translational Bioinformatics (PLOS Computational Biology Collection).

CoSBBI scholars participated in a number of learning activities with the overall goal of experiencing research in Biomedical Informatics and its role in cancer research. Students were paired with faculty mentors who guided them through independent research projects. The program kicked off with a week-long computer programming boot camp. The following four weeks of daily didactic sessions covered fundamental concepts and activities on information technology applied to biomedicine and health care. Each didactic session was comprised of one instructional hour led by doctoral, postdoctoral, and medical students followed by one hour of research presentation and discussion led by faculty and industry guests. Lectures in the early weeks covered basics of molecular biology, bioinformatics tools, computational thinking, statistics, and data mining. Later lectures were devoted to specific areas of research.

In the absence of a standard undergraduate level textbook for our field, we selected the recently released compilation, *Translational Bioinformatics (PLOS Computational Biology Collection)*. This online, open-access collection provided chapters crafted by leading experts in topics such as genomics, proteomics, Bayesian inference and decision modeling, and pharmacogenomics. These were complemented with lectures on human computer interaction and issues in technology incorporation for laboratory workflow, biosurveillance, and a lecture on the LEAN manufacturing process management framework to improve healthcare. The classroom sessions were focused on concepts and application. They were designed to encourage scholars' deeper pursuit of the skills relevant to their individual research project. Periodic sessions were held to discuss research progress, presenting a paper, and writing an abstract. During the course of the summer, students went on guided tours of other clinical and research facilities, and they participated in group activities and social events. At the end of the program, all students gave conference-style presentations of their research and participated in a poster symposium as well.

WCRC GOALS

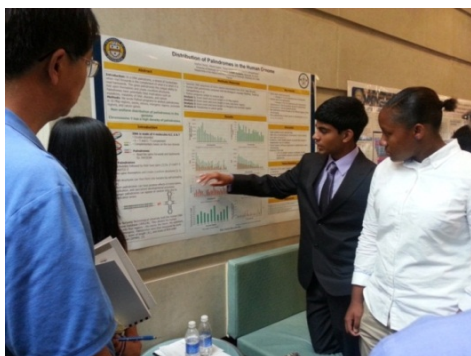
The UPCI Academy's WCRC site tailored its curriculum to cover basic cancer biology and women's cancers followed by high-impact journal article presentations specific to the scholars' research projects. This was achieved using WCRC site-specific instructional staff; site-specific research mentors; and a combination of site-specific and joint content-deepening experiences with the other sites. An ancillary aim was to establish the administrative mechanisms to permit these activities within the Magee-Womens Research Institute (MWRI) while not interfering with the long-running Magee-Womens Hospital summer internship program, which also places high school students within select MWRI research laboratories.

Specific Aim 1: Education in Cancer Biology and Therapeutic Strategies. Our foremost aim was to educate scholars in the biology of women's cancer and in the strategies currently employed or under development for its prevention, diagnosis, and treatment. This was achieved through a variety of lectures, textbook readings, guest presentations, visits to research core facilities, and most importantly direct mentoring in laboratory research (see Aim 2). An ancillary aim was to provide nuanced understanding of gynecological and breast oncology in the greater context of women's reproductive health.

Specific Aim 2: Development of Research and Scientific Communication Skills. Our second aim, which supported the first, was to provide scholars with hands-on laboratory experience in scientific women's cancer research. This was achieved through participation in a project under the supervision of a cancer researcher (e.g., faculty, post-doctoral fellow or other dedicated laboratory staff). Projects involved literature research and reading on a specific topic; extensive practicum in laboratory bench methods; experiment design and performance; analysis of results; and communication of findings through oral and poster presentations. Specific classes addressed how to read a scientific paper; basics in figure making for presentations; presentation and poster development; and practice seminars for all scholars. All scholars additionally presented a high-impact peer-reviewed journal article for the group.

Specific Aim 3: Establishing Awareness of STEM Disciplines; Fostering Significant Connection to Post-secondary Education or Employment in STEM. Our third aim, which emerged from pursuit of the first two aims, was fostering awareness of and lasting connection to the many science, technology, engineering, and mathematics (STEM) disciplines which are involved in performing cancer research at collaborative research institutes such as UPCI and MWRI. This was achieved by incorporating many diverse researchers, clinicians, and professional staff in oral presentations, laboratory tours, physician shadowing, and/or observation experiences for scholars. This was also supported by the use of near-peer mentors (e.g., undergraduates, graduate students, post-doctoral fellows, and early medical students) as course instructors who could contribute guidance on transitioning to undergraduate STEM education and thereafter to medical school.

Specific Aim 4: Service to Underrepresented Minorities and Disadvantaged Students. An aim of the entire UPCI Academy is to extend this unique scientific experience to minority and disadvantaged students in the Pittsburgh city and region. This has previously been supported through UPCI Academy consulting the University of Pittsburgh Office of Diversity, Health Sciences (ODHS) and the School of Medicine's Office of Student Affairs/Diversity Programs on how best to identify and reach out to local talented, disadvantaged youth. The UPCI-MWRI Pilot has supported this aim by hosting two underrepresented, disadvantaged scholars and by consulting University of Pittsburgh Health Sciences Associate Vice Chancellor for Science Education Outreach, Dr. Joan Lakoski.



WCRC SYLLABUS

Cameo experiences included guided tours of MWRI facilities such as the histology and zebrafish core facilities. The scholars' understanding of women's health with a focus on cancer and oncology was evaluated based on pre-tests and post-tests. The scholars were also expected to discuss their lab's current research by participating in a weekly journal club in which they presented relevant scientific articles. The scholars not only improved significantly throughout the summer in their knowledge of the basic science behind cancer but

also improved in their ability to analyze, share, and present their knowledge to others.

DiSCoBIO GOALS

Specific Aim 1: Educate our scholars in the fundamental theories and practices in drug discovery as well as computational and systems biology through a series of lectures, seminars, demos, and workshops.

Specific Aim 2: Provide an immersive research experience by facilitating individualized projects for each of our scholars.

Specific Aim 3: Prepare and support our scholars for the next step of their careers by providing them with professional development and career preparatory opportunities that will arm them with the necessary tools to succeed in STEM careers or in whatever fields they choose.

DiSCoBio SYLLABUS

We provided a comprehensive curriculum modeled after a typical graduate school program. Our scholars attended specially designed class sessions to introduce them to the major topics related to our program. Topics included Genomics, Computational Structural Biology, Systems Biology, Drug Discovery, Programming, and Bioimaging. Class sessions were a mix of lectures and hands-on activities that taught the scholars fundamental concepts and provided them with opportunities for practical experience with the research tools used in each discipline. A number of enrichment activities also supplemented the didactic activities. Scholars participated in a journal club; attended a seminar series designed specifically for them; toured local research facilities and labs; and presented their work at weekly roundtable meetings as well as at two final symposia at the conclusion of the Academy.

TI GOALS

Specific Aim 1: Understand the basic concepts in immunology with a special focus on the interaction of the immune system and cancer. In this regard, the scholars were simultaneously educated in cancer biology and cancer as a disease. The complexity and dynamism of this interaction were on full display. The goals were to explore how the immune system recognizes cancer cells and shapes the developing cancer. The 3 E's (elimination, equilibrium, and escape) of cancer immunology were entrenched. This was pursued through a variety of lectures, textbook readings, and guest presentations.

Specific Aim 2: Present the concept of immunotherapy. Current and past efforts at using the immune system to eradicate cancer were discussed in depth. The scholars were highly encouraged to bring their most creative ideas for novel approaches for immunotherapy of cancer.

Specific Aim 3: Develop research and communication skills to educate scholars in the process of scientific research. This was pursued through participation in a project under the supervision of a cancer researcher and by preparing an oral/visual presentation for their peers and mentors describing their research hypothesis, goals, methods, results and conclusions.

TI SYLLABUS

Key texts and chapters were used from the latest editions of Weinberg and Hanahan's *Biology of Cancer* and Janeway's *Immunobiology*. In order of presentation, the following lectures were conducted at the Biomedical Science Tower (BST) on the University of Pittsburgh Oakland campus.

- Overview/Laboratory Introduction, Fundamental Biology: Macromolecules
- Basic Anatomy and Physiology, Cell Biology, Molecular Biology, Experimental Model Organisms
- Introduction to Cancer

- Hallmarks of Cancer
- Immunology-Innate: Cells, Systems, Receptors, Effector Mechanisms
- Immunology-Adaptive: Cells, Systems, Receptors, Effector Mechanisms
- Tumors, T cells, and the Immune System
- Immunosurveillance: History and Current Paradigms
- Tumor Antigens: Definition, History, Types, Rejection Antigens, T & B Cell Antigens
- Immune Cells and Cancer: Tregs, MDSCs, DCs, NK, Macrophages, Neutrophils
- Immune Evasion
- Immunotherapy: T cell and Antibody-based Approaches and Other Strategies
- Factors Limiting Effectiveness of Immunotherapy

Besides the laboratory research and didactic sessions, Tumor Immunology scholars participated in other scholarly activities including attendance at guest speaker seminars, tours of clinical and research facilities, lab meetings, and their own presentations at the end of the Academy. The scholars also toured the flow cytometry and microscopy centers, and the zebrafish facility.

CHERP GOALS

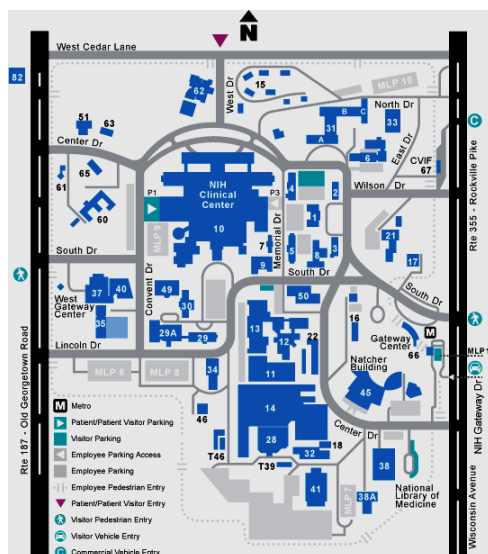
Specific Aim 1: Explore issues of healthcare equity and patient care with scholars. The examined research came from a Patient Attitude Towards Hepatitis Study (PATHS), a mixed-methods study of veterans with hepatitis C. Participants were interviewed with multiple open-ended questions that focused on psycho-social dimensions such as mood, social support, quality of life, satisfaction with medical care for HCV, and attitudes toward antiviral therapy. Using the data from PATHS, scholars were able to perform statistical analysis on negative experiences and stigmatization. Veterans had communicated with their referring provider.

Specific Aim 2: Develop qualitative approaches to examine responses. Rather than focus on quantitative data, CHERP experiments were conducted in an office setting where between 9 AM and 5 PM, scholars worked in cubicles to find the frequency of negative experiences and stigmatization among the patients that participated in the study. They also examined the themes related to those experiences and the factors significantly associated with them. Scholars worked closely with the veterans by frequently talking with them at lunch. This experience gave scholars a unique sense of fulfillment in that they were able to hear from patients themselves about how CHERP activities were making a positive impact on the healthcare environment in which they found themselves.

PROGRAM-WIDE CURRICULA AND ACTIVITIES

While each site modified its curricula and syllabus to explore relevant topics and activities, there were a number of shared events in which scholars from every site participated.

This was the fifth year that our program has visited the National Institutes of Health (NIH) and National Cancer Institute (NCI) in Bethesda, MD. Each scholar was placed in a laboratory on the NIH campus that was dedicated to research similar to that being done by the scholar within the UPCI Academy. Lab assignments were also based on the lab's association with the scholar's faculty mentor at the University of Pittsburgh. We designed this interactive and one-on-one approach to



NIH Campus Map

give the scholars a chance to see how the same type of research is conducted nationally and on a larger scale. The full agenda from July 16, 2014 is as follows:

10:30 Welcome and Opening Remarks

Jonathan Wiest, Ph.D., Associate Director; Office of Training and Education; CCR
Director, Center for Cancer Training, NCI

10:45 Center to Reduce Cancer Health Disparities

11:00 How to Make Cell Death Immunogenic; Dr. Tim F. Greten, M.D., Head

Gastrointestinal Malignancy Section Investigator Thoracic & GI Oncology Branch

12:00 - 2:00 Lunch and CCR Lab Tours

Group I - Endocrine Oncology Branch - 10 - CRC 5840

Group II - Pediatric Oncology Branch - 10 - CRC

Group III – Pathology - 10 - B1 B41

Group IV - Cell Biology - 37 - 2120

Group V - Molecular Imaging Program - 10 - B3 B69F

Group VI - Human Carcinogenesis - 37 - 3060

Group VII – Dermatology - 37 - 4002

Group VIII - Cancer Genetics Branch - 50 - 1408

Group IX - Cancer Genetics Branch - 41 - B624

Group X – National Library of Medicine – 38A

Group XI - Surgery Branch – Building 10, 4th Floor

2:30 – 3:30 Molecular Engineering of Human T cells for Cancer Therapy

Dr. Rimas Orentas, Ph.D., Associate Scientist; Pediatric Oncology Branch

3:30 Closing; Michael T. Lotze, M.D., Director; UPCI Academy

Additionally, each scholar was required to participate in the following activities so that they could be best prepared to perform quality research inside of the laboratory and in a professional setting among colleagues:

- Health Sciences Diversity Awareness Workshop
- Chemical Hygiene Training
- Bloodborne Pathogen Training
- Responsible Conduct of Research Training
- Opening and Closing Receptions and Poster Presentations

VII. EXTRACURRICULAR ACTIVITIES



To create a close-knit community among the scholars, teachers, staff, and faculty, we created a schedule of weekend activities where scholars would sign up on a weekly basis to attend social outings. Originally, social events were planned to give out-of-state scholars who resided in the dorms

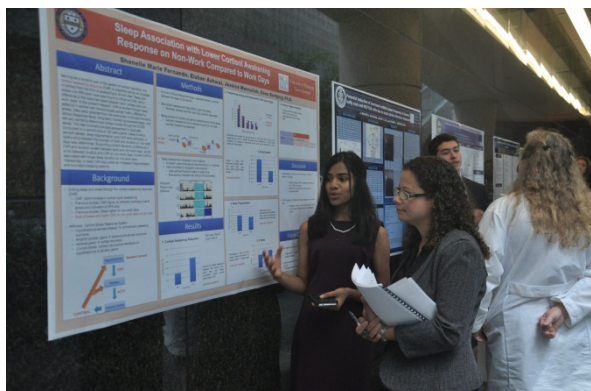
activities to do during their free time. Now, all scholars in the program are invited to attend a number of recreational activities. Past activities include Pirates games; tours of local landmarks such as Fallingwater; trips to Sandcastle Waterpark; group dinners and lunches; free movies at Schenley Park; and a host of other outings. This past summer, Jarrod Ellis and Nicholas Moores, undergraduates in the University of Pittsburgh Honors College-Health Sciences (HCHS), oversaw the social activities including purchase of tickets and coordination of transportation for the scholars. Events in 2014 included cookouts, a visit to the Phipps Conservatory and Botanical Gardens, trips to local museums, and tours of historical sites in Pittsburgh (**See Appendix B**).

Activities were supported by local establishments such as Kennywood, Giant Eagle, Eat 'n Park, The Pittsburgh Riverhounds, and Ayoob Woodworks. We also conducted the second Fun Run to raise funds for Pancreatic Cancer Foundation and an annual talent show, *Science as a Performing Art*.



VIII. CLOSING RECEPTION AND POSTER PRESENTATIONS

The closing receptions and poster presentations took place on Friday, August 8, 2014. In the morning, each site hosted its own ceremony where scholars delivered their oral presentations and faculty mentors had an opportunity to speak about their scholar mentees' work and time in the lab facilities. Following the oral presentations and closing ceremonies, all sites came together at the Hillman Cancer Center atrium to participate in an open house poster session. The entire UPCI community of faculty and staff were invited to see the scholars' posters and talk with them about their individual projects, research findings, and work completed throughout the summer (**see Appendix C**).



We formed a poster review committee consisting of faculty from the UPCI and various departments at the University of Pittsburgh. The judges viewed their assigned posters and ranked them according to experimental methods, scientific thought, analytic approach, and oral presentation.

IX. ASSESSMENT AND FEEDBACK

In order to measure behavioral outcomes, scholars at each site were evaluated at regular intervals by their research mentors and teachers throughout the program using a short survey form. Mentors then reported back to the program director and program administrator with feedback on scholars' enthusiasm, interest, punctuality, understanding of topics, attention to detail in conducting research, ability to follow instructions, compliance with safety standards, grasp of scientific content, and discipline in completing assigned readings. Scholars were also surveyed to assess their overall satisfaction with the program, identifying the program's strengths and weaknesses so that we may continue to improve upon program design for future years. Assessment of program performance was conducted using two methodologies: weekly feedback surveys and cumulative surveys as well as specialized pre- and post-tests given by all sites. Results from both methods are summarized below.

Laboratory Experiences

Scholars believed their laboratory projects gave them hands-on, intensive experience that they had rarely had the opportunity to participate in before. They found that success in their projects and their ability to collect, analyze and communicate data greatly increased over the course of the summer. In future years, we think that it would be helpful to the scholars, faculty members, and post-docs in the lab to have training sessions and early communication about: 1) what is expected in the lab; and 2) goals of the program, and then formulate the best, most efficient way to accomplish these goals in eight weeks. One way to achieve this is to personally introduce the scholar and assigned faculty mentor weeks prior to the start of the program in June so that they have an opportunity to establish a strong dialogue and share research materials and questions. Scholars who cannot meet in person will be able to communicate with their faculty mentor via Skype and email. We also plan to incorporate training sessions in April and May for the faculty and post-docs so that they are best prepared for spending two months as a mentor.

Didactic Sessions

Scholars have indicated that lectures could be streamlined into a lesser number of topics covered over the course of the eight weeks. Additionally, scholars would like the lectures to be shorter, but more interactive between scholars and block leaders/teachers.

Specific Feedback from WCRC

The WCRC site conducted fewer didactic sessions this year and felt that the students greatly benefitted from having the extra time in the lab. Next year, we plan to combine lectures with journal club since the journal club, typically, ran shorter than the allotted time. We will have a didactic lecture immediately prior to journal club on a topic which pertains to the journal article assigned. During week one, WCRC scholars received assignments that included a techniques boot camp; a class on how to read a scientific paper; and homework on a review article and a scientific paper pertaining to their specific project. The techniques boot camp covered basic scientific calculations like dilutions and molarity concentrations as well as a hands-on scientific methods lesson on PCR and agarose gel analysis and western-immunoblot. During week two, didactic lectures in basic cancer biology, breast cancer, and ovarian cancer were given as well as a workshop in which each scholar gave a "chalk-talk" on their individual project. Throughout the rest of the summer, each journal club session included a presentation of: 1) the background

in the field from a review article; 2) how the scholars' projects fit in to the field; and 3) the scientific paper assigned during the first week of the summer. These sessions were complimented by cameos each week in animal models of cancer; zebrafish and genetic models; pathology of women's cancer; and genetic counseling. This encouraged even greater interaction between the scholars.

Specific Feedback from DiSCoBio

The DiSCoBio site performed a pre- and post-evaluation aimed at a general assessment of career-oriented and professional development gains obtained on account of the program. This analysis revealed that our scholars made significant gains in the following categories: understanding the role played by computational approaches in science; understanding what it takes to correctly perform an experiment; ability to understand and discuss scientific concepts; and feeling like a scientist.

Reading Materials

We aim to provide scholars with reading materials even before the program begins in the summer so that they are best prepared to get the most out of their eight-week research project. Scholars found roundtable discussions and journal clubs useful in that they helped provide support in learning new topics. While some scholars found certain reading assignments to be challenging or intimidating, overall, they thought that the advanced reading and coursework directly benefitted their positive outcome in the program. The same textbooks have been successfully used for the past five years of the program.

Professional Development Opportunities and Tours

Scholars particularly enjoyed the career cameos and would like to expand these fields to include even more professions in science and medicine. Meeting with faculty and hearing "real life" stories about how these professionals made it into their current roles was considered to be inspiring and relevant. Two suggestions that will be considered for 2015 are having more clinicians meet with scholars in an "open question" format as well as creating panels led by medical students who can talk personally with the scholars about their application process experience. Each year, we have undergraduate admissions counselors meet with the scholars and talk about what to expect academically in college. This has proven to be a great benefit and scholars have requested that in the future we provide more insight into graduate and medical school admissions and academics. Additional clinical shadowing opportunities such as tours to the operating room, which the Hillman scholars participate in each year, were requested by many scholars.

After evaluating the clinical rotations in 2014, the WCRC site plans to incorporate cameos and Q&A sessions with clinical professionals (e.g., pathologists, radiologists, surgeons, and oncologists) in future years. The WCRC expects that this plan will maintain a balance between expanding scholars' knowledge about applying research in the medical field while providing the necessary time in the laboratory for scholars to complete their research projects.

Field Trips and Social Activities

Scholars were very pleased with the variety and number of the different enrichment activities that were made available to them. The social activities were well attended and effectively organized to include as many scholars who chose to participate. The WCRC scholars who were not on-campus felt that they needed more information on the activities in order to better plan to attend the enrichment activities. It was suggested that the entire Academy gather a bit more frequently to better embrace the off-campus scholars into the community.

Follow-Up Evaluation

Both scholars and faculty mentors who participated in the 2014 UPCI Academy have been asked to provide feedback via an electronic survey to determine their overall satisfaction and learning experience from the program. These surveys have been designed to gauge scholars' increased knowledge and interest in cancer careers; the faculty's perception of the scholars' success; and ways in which we can further improve and build upon our program. Scholars are also contacted after their graduation from our program to update us on their academic achievements, plans for which colleges/universities they plan to attend, updates on ongoing projects, and other relevant activities. We track scholars for up to five years to determine the long-term impact that our program has had on their academic and career paths.

We have a dedicated advisory committee made up of local and national advisors who meet annually to discuss the past year's events and plan for the next year's activities. We collaborate on curriculum design, structure of the programs, integration of the activities, and streamlining the most effective method of teaching, which is a process that is worked on throughout the year.

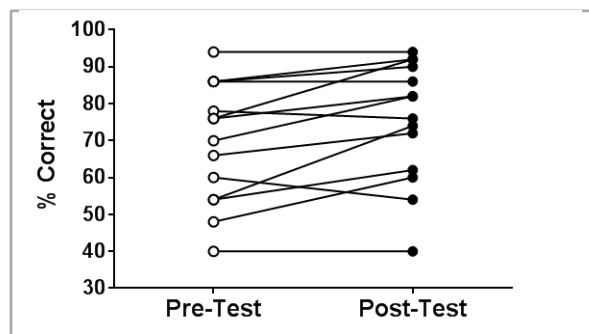
Advisory Committee:

Name	Organization/Company
Ted Frick	Bayer
Rebecca Cullen	Jack Kent Cooke Foundation
Kevin Ashley	LRDC, Pitt
Paula Davis	Office of Diversity, Pitt
Edwina Kinchington	SciTech Academy
Holly O'Donnell	Pittsburgh Public Schools
Brian Corr	Pittsburgh Public Schools
Candi Castleberry-Singleton	UPMC
Laurie Heinreicher	Hampton School District

Examination Results and Improvement

A standard, comprehensive pre-test was given at the beginning of the program. At the end of the didactic lectures, each site conducted their own individual post-test. Some required an extension of the information provided in class. The final scores ranged from 40-100% correct with the majority of scholars vastly improving their performance on the final exam which was considerably more difficult. Below, test scores are displayed for each of the individuals as pre and post plots.

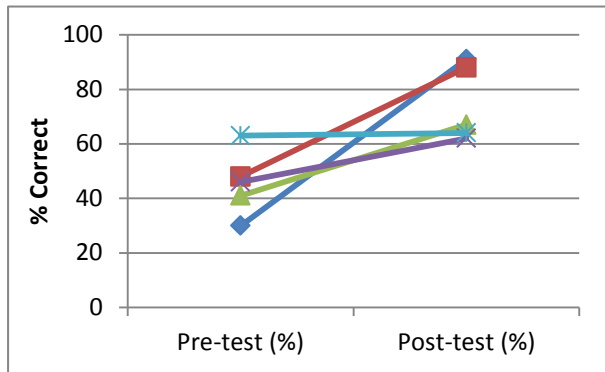
Hillman (CB) Test Scores



With 18 scholars at the CB site, we found that our ability to provide individualized attention was more limited. Still, most of the scholars remarkably improved their scores on the post-test. We found the Weinberg text invaluable for our scholars, keeping them focused and providing an external source in addition to the presented material. This almost certainly has to do with the singular focus on cancer

biology, which suffused all presentations. Next year, we plan on decreasing the number of scholars to about 12.

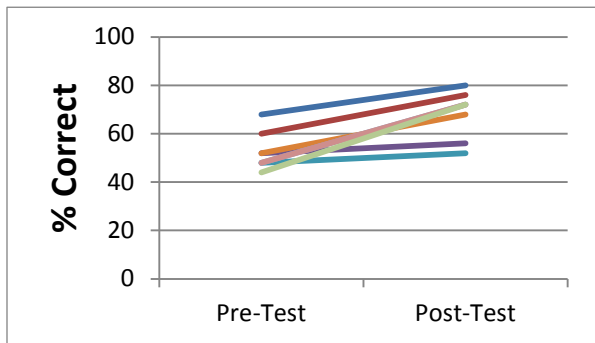
WCRC Test Scores



The WCRC exam incorporated essay questions addressing scientific data as well as multiple choice questions based on the course material. According to our end of course survey, our scholars reported their understanding of women’s cancers at an average of 4.2/5, compared to the average 2/5 at the beginning of the course. The understanding scale was as follows: 1=not much knowledge and 5=much knowledge on

the topic. Scholars’ improved understanding of women’s cancers is clearly demonstrated by the increased scores from pre- to post-test.

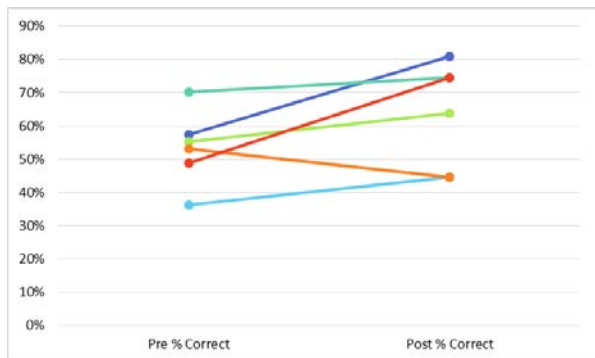
CoSBBI Test Scores



Students in the CoSBBI program came with a background in advanced high school biology, but they varied in their mathematics and computer backgrounds, ranging from no programming experience to proficient in developing simple standalone applications. The students were administered a pre-test on the first day of class consisting of multiple choice questions that covered fundamental topics from biology, genetics, protein interactions, computer science, bioinformatics, and biomedical

informatics. The same test was again administered after the last day of class. All nine students showed improvement in their scores with the highest individual improvement of 64%. Average student performance increased by 32%.

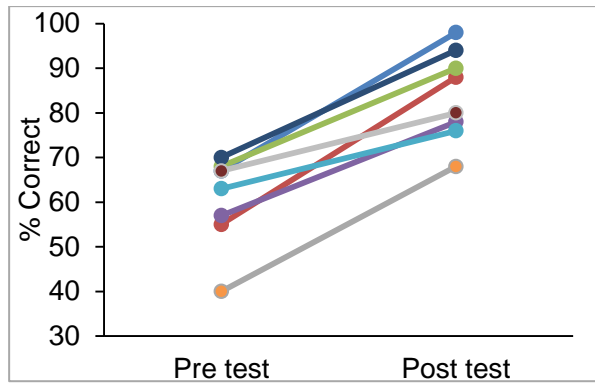
DiSCoBio Test Scores



An exam of 47 questions that covered the breadth of topics at the DiSCoBio site was given to our scholars at the beginning and end of the 8-week program to assess their learning gains. The exam included questions from each of the areas of study in our comprehensive curriculum: Molecular/Cancer Biology, Genomics, Systems Biology, Computational Structural Biology, Drug Discovery, Bioimaging, and Computer Programming. Comparisons of the performances on the pre- and post-tests showed an improvement by 5 out of 6 scholars in the

program (see figure). The pre-test data showed that our scholars were the most knowledgeable in Molecular/Cancer Biology and Bioimaging. The post-test data showed that the students improved the most in the categories of Computer Programming and Drug Discovery.

TI Test Scores



In lieu of a formal standardized test at the beginning and the end of the program, the scholars were examined at the beginning of each class on material covered in the previous session. This encouraged lively debate and allowed the instructor to assess scholar’s progress on an individual basis. While the scholars started the program with different educational backgrounds ranging from no formal biology classes to advanced biology, they all completed the program with outstanding marks in basic areas of immunology and cancer

biology. This final assessment, made on the last week of the program, was made by the site director.



CB 2014

Testimonials:

“Amazing!! I feel like working in the lab taught me a lot more than I would’ve thought. My mentor was awesome and took the time to explain everything.”

“This was my first time working in a lab, and I love it. I learned a lot of techniques that I would not have learned until college.”



CoSBBI 2014

“It was a great experience to meet new people and learn things you would not be able to learn in a class.”

“It was helpful to get real hands-on lab experience so that we could know what it is really like to work in a lab and to figure out if that was the optimal career choice for us.”



DiSCoBio 2014

“It was an amazing experience, and I made great friends at my site.”

“The classes were great!”

“I learned so much. I’ve become more confident in my abilities as a potential scientist/researcher. This program helped me learn what I want to accomplish when I am older.”

“I learned so much about the field of research and how much effort goes into even a small project. I grew as a scientist, became more independent and got a better idea of what I want to pursue.”



TI 2014

“I learned about the existence of a whole ‘new’ field of science and biology. I also learned a lot about cancer and how it can develop.”



WCRC 2014

X. Plans In Progress for UPCI Academy 2015

Since 2009, the program has improved upon its curriculum, organization, and activities aiming to provide its scholars with the best educational opportunities and most diverse exposure to scientific and medical fields. Moving into its 7th year, we witnessed a growing trend of scholars returning to our facilities in the months following the eight weeks of the summer program. Therefore, a decision was reached to uniformly term the program The UPCI Academy as opposed to its former name, The UPCI Summer Academy. While maintaining its original goal as a community-centered program, recruiting the majority of our students from local urban and suburban schools, the UPCI Academy has also begun to recruit qualified students from all over the world. Bringing culturally, ethnically, and socially different teens together in a program such as ours provides a uniquely enriching experience to every student in the program.

The Center for Integrated Oncology-Cologne/Bonn Academy (CIO) will host this program for a second year focusing largely on leukemias and lymphomas. Under the direction of Dr. Michael Hallek and Dr. Cornelia von Levetzow, six laboratories will each host one to two scholars for a four-week program that mirrors the curriculum design at the UPCI Academy.

The Cancer Environment, Bioengineering, Imaging, Genetics (CEBIG) Site, Bridgeside

Following a meeting in August 2014 with Bruce Pitt, PhD, Chairman of Occupational and Environmental Health within the school of Public Health; Sanjiv Shroff, PhD, Chairman of Bioengineering; and Gary Thomas, PhD, from the Department of Microbiology and Molecular Genetics; the decision was made to open up a new site on the Bridgeside campus where their laboratories are located. Laboratories are selected from these departments together with the McGowan Institute for Regenerative Medicine. Here, leading scientists will collaborate to introduce rising high school juniors and seniors to interdisciplinary research that addresses emerging challenges to our understanding the complex roles of the cellular and organismal environment (both internal and external), microbes, and genetics to the onset and progression of cancer. We plan to open this site in the summer of 2015.

New Staff



Lindsay Surmacz
Program Administrator

December 2014 brought the hiring of a new Program Administrator, Lindsay Surmacz. A graduate of Purdue University and a member of Phi Beta Kappa, Lindsay has worked in various capacities in both formal and informal science education for organizations such as Carnegie Science Center (CSC) and ASSET STEM Education. She earned her Bachelor's Degree in Creative Writing and is a regular contributor to the Pittsburgh Post-Gazette's "My Generation" Column, a weekly feature that explores science topics with young readers. At the end of 2014, Lindsay was accepted into Coro Pittsburgh's Women in Leadership Cohort XVIII.

XI. ATTACHMENTS

Appendix A. Faculty Mentors and Scholars

Appendix B. Activities Calendar

Appendix C. Program and Abstract Booklet