

science IMPACT

SUMMER 2015: VOL. 4, NO. 2



**CARNEGIE
SCIENCE
CENTER**

One of the four Carnegie Museums of Pittsburgh



Julia Pacilio, of PPG Industries, explains conductive inks at Carnegie Science Center as a part of the Science Communication Fellowship, which brought scientists into dialogue with the general public.

Science Communication Fellowship Bridges Gap Between Scientists and the Public

The majority of Americans – 56 percent – say they don’t know a scientist, a statistic referenced by the National Science Foundation.

Americans also aren’t talking much about science. Only 36 percent say that science and technology issues are part of their conversations with family and friends “very often” or “quite often,” according to a report of 2014 Science and Engineering Indicators, published by the National Science Board.

Perhaps scientists find it difficult to explain their technical work to other colleagues, let alone the general public.

A new program at Carnegie Science Center aims to help close that communication gap

by bringing regional scientists into dialogue with everyday museum visitors.

Carnegie Science Center’s new Science Communication Fellowship both trains scientists to speak to the public and offers a benefit to visitors. For two days in April, a dozen scientists made Carnegie Science Center their laboratory through the Science Communication Fellowship.

Science Center visitors had a chance to learn first-hand from the scientists about conductive inks, mechanical engineering, and genetics.

The new program turned scientists into science ambassadors. Local scientists applied for the competitive fellowship, learned how to communicate their work to

an audience of laypeople, and then brought their demonstrations to visitors at Carnegie Science Center.

“The Science Communication Fellowship humanizes scientists, and it bridges the gap between what people think scientists are and what they really are,” said **Jason Brown**, Carnegie Science Center’s Director of Science and Education. “Plus, it provides that spark of inspiration to both children and adults.”

Brown trained the scientists to create materials and activities that would resonate with Science Center visitors. The Science Communication Fellowship is based on the Pacific Science Center’s Portal to the Public program, funded by the National Science Foundation.

“It’s gratifying to see [kids] understand the work I do... and to realize that this could be a career.”

As a chemist studying coatings at PPG Industries’ Coating Innovation Center in Allison Park, **Julia Pacilio** wanted to share her research with students. The Science Communication Fellowship gave her that opportunity and guided her in how to explain the science to a lay audience.

Pacilio ultimately developed a demonstration about the field of conductive inks.

“It gets kids interested. It’s so gratifying to see them understand the work I do every day and to realize that this could be a career for them as well,” Pacilio said.

(Story continues on page 4)

directors' note



One of the wonderful byproducts of our newly developed Carnegie STEM Excellence Pathway (see story, pg. 3) is the strong sense of collaboration we've built with the diverse team of educators, both at the K-12 and university levels, who served on the advisory panel to build the Pathway rubric. We convened this grassroots group – which included principals, teachers, professors, superintendents, a curriculum specialist – even the director of the local Arts Education Collaborative – to work together to develop a practical tool that both well-resourced and fiscally challenged schools and school districts can use to improve their STEM education. The result has been truly amazing: Even before formal implementation of the Pathway has begun, we can proudly report that more than 137 “Pathway Partner” schools or school districts in nine states and the District of Columbia, representing *more than 2 million students*, are using this tool. That's the power of collaboration.

While the success of the Carnegie STEM Excellence Pathway in its first 18 months has exceeded what we imagined, we've known for a long time that collaboration is the key to making a difference. Before we announced our then-new Chevron Center for STEM Education and Career Development in 2011, we had worked diligently internally to articulate four conceptual pillars that we felt were essential to our region in “moving the needle” in STEM education: *great teaching, inspired learners, a committed community, and collaboration*. We knew then – as we know today – that Carnegie Science Center cannot make a difference without the help of others. And no one else can do it alone either – not a single corporation or school district or educator, no matter how well-intentioned. It takes a team.

Another realization set in: We at the Science Center were in a unique position to convene the various diverse groups of STEM stakeholders to work together. So that's exactly what we did. We brought together a STEM Advisory group that includes representatives from corporations, Pre-K-12 education, higher education, the Allegheny Conference, the Pittsburgh Technology Council, and STEM-focused groups like the Math and Science Collaborative, ASSET STEM Education, and Junior Achievement.

What a powerhouse this group is! At a recent meeting, they engaged enthusiastically in an intense discussion about how to raise the common voice for STEM education in this region; how to support STEM educators; how to assure that STEM education is available to early learners; and how to engage broader and more diverse constituencies in STEM. It's all part of a longer-term strategic plan for our Chevron STEM Center – and STEM education in our region – that we at Carnegie Science Center are leading.

We proudly and passionately embrace our role as conveners – as collaborators. As the aphorism goes: “No one can whistle a symphony. It takes a whole orchestra to play it.” We are grateful for the support and dedication of our regional STEM education “orchestra.”

Ron Baillie and Ann Metzger
Henry Buhl, Jr., Co-Directors



One of the four Carnegie Museums of Pittsburgh

One Allegheny Avenue
Pittsburgh, Pennsylvania 15212
412.237.3400

CarnegieScienceCenter.org

Carnegie Science Center delights, educates, and inspires through interactive experiences in science and technology. By making science both relevant and fun, the Science Center's goal is to increase science literacy in the region and motivate young people to seek careers in STEM (science, technology, engineering, and math).

The Science Center also serves as a town square for community dialogue on science and its social implications and seeks to showcase regional science and technology advances.

One of the four Carnegie Museums of Pittsburgh, the Science Center is Pittsburgh's premier science exploration destination, reaching more than 700,000 people annually through its hands-on exhibits, camps, classes, and off-site education programs.

Ron Baillie

Henry Buhl, Jr., Co-Director
BaillieR@CarnegieScienceCenter.org

Ann Metzger

Henry Buhl, Jr., Co-Director
MetzgerA@CarnegieScienceCenter.org

Jason Brown

Director of Science and Education
BrownJ@CarnegieScienceCenter.org

Alana Kulesa

Director of Strategic Education Initiatives
KulesaA@CarnegieScienceCenter.org

Linda Ortenzo

Director of STEM Programs
OrtenzoL@CarnegieScienceCenter.org

Science Impact is available online at
CarnegieScienceCenter.org/Publications.

©2015 Carnegie Science Center



Dr. Melanie Kerber, superintendent of Blackhawk School District in Beaver County, speaks to Congressmen Mike Doyle and Keith Rothfus about the Carnegie STEM Excellence Pathway, while an attendee listens.

Science Center Takes Carnegie STEM Excellence Pathway to DC

A standing room-only crowd on Capitol Hill in March learned about the Carnegie STEM Excellence Pathway, which is reaching more than 2 million students in 2,000 schools across the nation.

The Congressional briefing, “Rethinking STEM Education: A Bold New Pathway For America's Future,” earned bipartisan support from honorary co-hosts Congressman Keith Rothfus (R, PA-12) and Congressman Mike Doyle (D, PA-14). Reps. Rothfus and Doyle spoke at the event, discussing the value of STEM education.

“an exciting and innovative initiative...that has promise to transform STEM education across the nation.”

Carnegie Science Center Co-Directors Ann Metzger and Ron Baillie presented the STEM Excellence Pathway to about 100 guests representing U.S. Senate and House staffers, the National Science Foundation, the Department of Energy, the Department of Education, National Oceanic and Atmospheric Administration, NASA, National Geographic and others.

The Pathway provides a rubric for each Pathway partner to assess its own school's, or district's, performance in six areas of STEM education: instructional practices, teacher qualifications, curriculum, assessment and demonstration of skills, family engagement, and real-world connections.

Designed to help schools adopt best practices in STEM education, the Pathway includes a process and tools for assessing current STEM programming and creating a practical plan for improvement.

Schools evaluate themselves on key criteria pertinent to quality STEM education. Then, up to three areas are prioritized and a timeline and action plan to address goals is formulated and implemented. This process is repeated to create long-term strategic improvement. The Pathway is non-punitive and envisioned as a long-term, goal-oriented, encouraging approach.

“The Carnegie STEM Excellence Pathway is an exciting and innovative initiative from Carnegie Science Center that has promise to transform STEM education across the nation,” Science Center Co-Director Ann Metzger said. “Those who attended the briefing were quite impressed with the work we're doing here in Western Pennsylvania.”

Carnegie Science Center directors and partners discussed ways the Carnegie STEM Excellence Pathway is making a

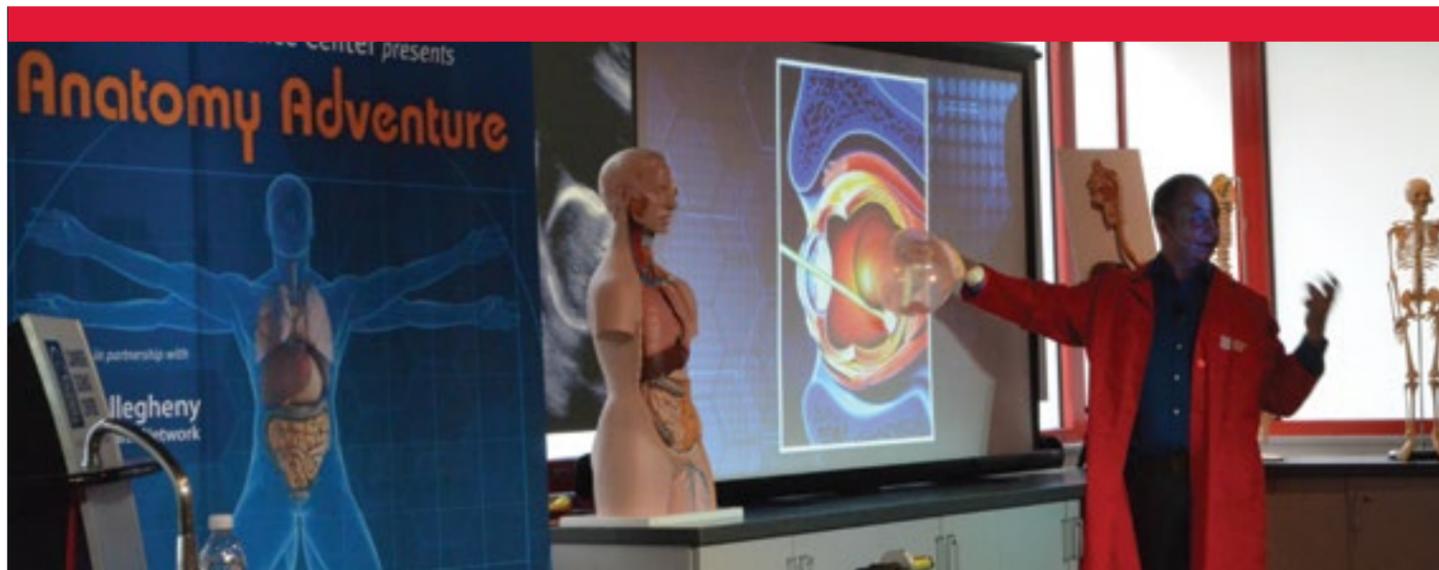
real difference in communities around the country. Carnegie Science Center's Chevron Center for STEM Education and Career Development in Pittsburgh has become a national leader in STEM education.

Dr. Melanie Kerber and Martha McCabe both spoke at the briefing about the value of using the STEM Excellence Pathway and how they applied it in different ways at their respective organizations. Kerber is Superintendent of the Blackhawk School District in Beaver County; McCabe is Manager of STEM Initiatives at the Kansas City STEM Alliance in Missouri.

Other speakers, including Mary Murrin of Chevron and Bud Rock of the Association of Science-Technology Centers, addressed the dire STEM workforce gap from the perspective of corporations, educators, and the science center community.

“The STEM Excellence Pathway is a grassroots effort that will not necessarily require more funding or prescribed solutions. What it will require is looking at STEM education differently,” Science Center Co-Director Ron Baillie said. “This model is valuable to all schools, both well-resourced and under-resourced, as the nation faces a STEM workforce gap.”

Funding for Carnegie STEM Excellence Pathway has been made possible through generous support from The Heinz Endowments.



Mike Hennessy, Science Center education program developer, gives the audience a sneak preview of the Anatomy Adventure Science on the Road show, debuting in schools this fall. Here, he's demonstrating how lasers can be used in eye surgery.

New BodyTech Initiative to Explore Anatomy, Medical Science

Carnegie Science Center and Allegheny Health Network (AHN) have announced a new partnership to develop **BodyTech**, a dynamic, three-pronged health and science educational program for the region. The initiative includes the BodyStage live demonstration theater at Carnegie Science Center, currently offering programming about nutrition, body systems, and medical technologies; a new traveling science show, Anatomy Adventure, which will bring dynamic, interactive lessons on the heart, the brain, and laser surgery to schools throughout the region beginning in fall 2015; and BodyWorks, an exhibit now in development and slated to open in fall 2016 at the Science Center. AHN has provided funding for BodyTech. Experts at AHN have been assisting with content for all three Body Tech initiatives. ■



Tony Farah, Chief Medical Officer at Allegheny Health Network, speaks to media about the plan for the new BodyWorks exhibit at Carnegie Science Center.



Children discover the science behind culinary chemistry during the Science Center's Science Communication Fellowship event.

Science Communication Fellowship Bridges Gap Between Scientists and the Public

(...continued from page 1)

A demonstration from the Community College of Allegheny County focused on culinary chemistry. Science Center visitor **Kate Evans**, of Allison Park, noticed how the experiment held the attention of her children, more than learning from a textbook would.

"Having young children, it's really fabulous because that's how they learn – hands-on experiments," she said.

The Science Communication Fellowship days at the Science Center weren't just a hit for visitors.

"The scientists really enjoyed it," Brown said. "They don't get a lot of opportunities to talk about what they do – especially to kids."

Scientists represented many local organizations, including Carnegie Mellon University, the University of Pittsburgh, the National Energy Technology Laboratory, PPG Industries, Community College of Allegheny County, and Diamond Kinetics.

The program will continue in the fall with a new cohort of scientists. ■

GRANTS & AWARDS

- **Chevron** has renewed its support of the Chevron Center for STEM Education and Career Development with a three-year commitment totaling \$900,000 (2015–2017).
- With a three-year commitment totaling \$150,000, **NOVA Chemicals** has renewed its support of the Chevron Center for STEM Education and Career Development.
- **Jack Buncher Foundation** has awarded the Science Center a \$40,000 grant to fund a free public day in August 2015.
- A grant of \$108,000 from **Claude Worthington Benedum Foundation** will support Carnegie Science Center in continuing to provide Early Learner programming in the state of West Virginia.
- A \$613,986 grant from **The Heinz Endowments** will enhance and expand the Carnegie STEM Excellence Pathway project.

BOARD SPOTLIGHT



Chip Burke

Chip Burke knows first-hand how Carnegie Science Center sparks children's interest in learning. His Carnegie Science Center experience began as a visitor bringing his children to the museum.

These days, his children are teenagers and adults, and he's a Carnegie Science Center Board member.

"Technology is changing so fast, and science is so critical," Burke said. "Science education and sparking that interest in kids is something that the Science Center does superbly well. And they combine important learning with fun."

As Chairman of the Grable Foundation, Burke is dedicated to improving the lives of the region's children. The foundation provides grants to children-focused organizations.

The foundation has long supported the Science Center in STEM programs, such as SciTech Days and Carnegie STEM Girls, and exhibits.

"Carnegie Science Center sees more children than any other museum in the region, and it combines both fun and learning, which spark creativity in children," he said. "The quality of the staff is truly unparalleled."

Through his work with Grable, Burke became interested in the Science Center's Board.

"I've enjoyed the friendships on the Board and working together with a great group of people," he said. "We've had a long tenure of people who have been both exceptionally bright and really truly committed to the Science Center."

A Pittsburgh native, Burke earned a bachelor's degree in psychology from Kenyon College and a master's degree in French literature from Bowling Green State University. Before working at Grable, Burke was a teacher in West Virginia and Pittsburgh.

He and his wife Carole live in Fox Chapel and have five children: Charlie, 22; George, 21; Sam, 18; Amy, 16; and Griffin, 14.



Carnegie Science Center invited the 1,700 Intel International Science & Engineering Fair students to enjoy an evening of scientific fun at the Science Center in May.

Three Local Students Awarded for Work at International Science Fair

Three Pittsburgh-area students won awards at the Intel International Science and Engineering Fair (ISEF) held in Pittsburgh in May.

In the Robotics and Intelligent Machines category, **Mihir Garimella**, 15, of Fox Chapel Area High School, won the second place award for his project titled, "Biologically Inspired Flying Sensor Platform for Autonomous Emergency Response."

In the Systems Software category, student team **Suvir Mirchandani**, 16, and **Konrad Urban**, 16, both of Fox Chapel Area High School, won the fourth place award for their project titled, "Automated Illustration of Text to Improve Semantic Comprehension."

The students also won special awards from several groups, ranging from the Association for the Advancement of Artificial Intelligence to the European Organization for Nuclear Research.

Anna Wan, of Pittsburgh Allderdice (in Pittsburgh's Squirrel Hill neighborhood), also competed at ISEF with a project titled, "Targeting Hippo-Regulated Cell Polarity in Breast Cancer."

The students were selected for the international competition based on their projects submitted at Carnegie Science Center's Pittsburgh Regional Science & Engineering Fair in March. More than 1,000 students participate in the regional science fair each year. ■

PARTNER SPOTLIGHT

John Paul President and CEO, Allegheny Health Network



John Paul has served the western Pennsylvania community for more than four decades as a leading health care executive who has played a pivotal role in establishing the region as a mecca for outstanding medical services, pioneering research programs, and educational institutions. He has led the development and growth of Allegheny Health Network since 2011. The Network today comprises eight hospitals, multiple Health + Wellness Pavilions, comprehensive home and community based health services, more than 2,100 affiliated doctors, and a research institute.

MISSION:

Allegheny Health Network is a comprehensive, integrated healthcare system dedicated to improving health and promoting wellness in the community, to advancing the frontier of medicine through pioneering research, and to educating the next generation of healthcare providers, innovators, and leaders.

In what ways has AHN supported Carnegie Science Center?

Allegheny Health Network and the Science Center are partnering to develop an innovative, multi-faceted health and science educational program for the western Pennsylvania region called BodyTech. The initiative includes a new exhibit at the Science Center called BodyWorks that will be unveiled in 2016, the BodyStage live demonstration theater that opened last summer, and a new traveling health science show for area school children, called Anatomy Adventure, which will hit the road this fall. We are really excited to support the Science Center in this unique and promising endeavor that will help educate more young people in our region about healthy living and promote greater interest in the health sciences.

Why is a STEM-prepared workforce important to AHN?

Our region's and country's outstanding health care and academic institutions have long been at the forefront of discoveries and innovations in the health sciences that have revolutionized medicine and dramatically improved the public's health. Our capacity to continue leading the world in this critical field and to meet the growing health care challenges that face our communities will depend upon how successful we are at cultivating and developing the expertise in science, technology, engineering, and math that drives ingenuity and progress in our industry. From our physicians and nurses, to our clinical engineers, genetic scientists, information technologists, medical physicists and technicians, STEM education is the foundation of virtually every health-related career that enables us to fulfill our mission.

Why does AHN see value in its support of Carnegie Science Center?

Allegheny Health Network has a long and distinguished history of educating and developing some of our country's most talented and pioneering health care professionals, from our undergraduate medical education programs and leading residency and fellowship training programs, to our nursing education programs, schools for respiratory care and medical technology, and our nationally recognized Simulation Treatment and Academic Research Center. By supporting and working with the Science Center to create BodyTech, we are taking another important step to fulfill this vital part of our mission. This exciting partnership represents an investment in our children and in the future health of our region.

Do you have any personal favorite exhibits or activities at the Science Center?

As a sports enthusiast and a longtime health care executive, I'm naturally partial to the Highmark SportsWorks® and the BodyStage, presented by AHN. But there really is so much to like and value about the Science Center and its incredibly diverse array of educational programming for children. The new H2Oh!: Why Our Rivers Matter exhibit, for example, is sensational, as are the roboworld™ and SpacePlace exhibits and the many amazing films in the Rangos Omnimax Theater. Carnegie Science Center is a wonderful asset to our community, a place that captures and captivates the minds of young people like none other. We are extremely honored to help further advance that impressive legacy.



Carnegie Science Center Co-Director Ron Baillie, Event Chairman Ruppert Russoniello of Eaton, Allegheny County Executive Rich Fitzgerald, and Science Center Co-Director Ann Metzger at the Carnegie Science Awards reception.

2015 Carnegie Science Awards Laud Local Innovators

The annual Carnegie Science Awards ceremony in May recognized 20 local pioneers in science, technology, and education. From mapping dark energy to using parks as classrooms to teaching languages to millions worldwide, these innovators are making an impact in our region and beyond. More than 500 guests celebrated the theme of problem-solving, a key component in the work of each awardee. More information about each awardee and videos of their work are available at CarnegieScienceCenter.org/Awards. Allegheny County Chief Executive Rich Fitzgerald provided welcoming remarks emphasizing the importance of science and technology to our region and the importance of inspiring and encouraging young people to become engaged in STEM fields.



Ananya Cleetus, the youngest-ever recipient of the start-up entrepreneur award, accepts her award from Audrey Russo of the Pittsburgh Technology Council. Cleetus founded the tech startup, Magikstra, a social network for ambitious students like herself.



Submit resources to the [STEMisphere Directory](#):

Michele Howard
HowardM@CarnegieScienceCenter.org
412.237.1619

microbits

Science Center Selected to Host STEM Conferences

Carnegie Science Center's national leadership role in STEM attracted local and national attendees to two STEM-related conferences in April, underscoring the Science Center's role as a nexus and hub for STEM.

The Science Center hosted the Pittsburgh Technology Council's annual STEM Summit, titled "STEM 2 Work." The conference brought together educators, entrepreneurs, business leaders, and innovators of all types to discuss ways to enhance teacher professional development, encourage student engagement, and provide learning opportunities in traditional and non-traditional environments.

The Science Center also hosted the Association of Science-Technology Centers' "Science Centers as STEM Conveners" workshop. The intensive two-day workshop was designed to help guide other science centers as they seek community support in their STEM education efforts. The highly engaged participants came from Ohio, Texas, Florida, Missouri, New Mexico, North Carolina, Wisconsin, Massachusetts, and New York.

Science Center Co-Directors **Ann Metzger** and **Ron Baillie** spoke, along with the Science Center's **Jason Brown**, Director of Science and Education; **Alana Kulesa**, Director of Strategic Education Initiatives; and **Linda Ortenzo**, Director of STEM Programs. They discussed Carnegie Science Center's best practices and how to sustain STEM projects over time.

Israel-Pittsburgh STEM Connection Luncheon Focuses on Education

When the mayors of Pittsburgh's two sister cities in Israel visited Pittsburgh this spring, they expressed particular interest in local approaches to education in science, technology, engineering, and math (STEM). So Carnegie Science Center hosted a lunch and roundtable discussion with Mayor **Ron Shani**, from Misgav, and Mayor **Adi Eldar**, from Karmiel.

Also in attendance were several educators from Israel, senior staff members at the Science Center, and representatives from the Pittsburgh Public Schools, the Math & Science Collaborative, ASSET STEM Education, and the Office of Pittsburgh Mayor **William Peduto**.



CARNEGIE SCIENCE CENTER

One of the four Carnegie Museums of Pittsburgh

One Allegheny Avenue | Pittsburgh, PA 15212

Non-profit Org.

U.S. Postage

PAID

Pittsburgh PA

Permit No. 788



Allegheny Regional Asset District



A group of students works together to edit their video at Carnegie Science Center's SMASH JAM Digital Video Workshop before presenting their work in a mini film festival.

At SMASH JAM Workshop, Vision Transforms into Video

Carnegie Science Center's SMASH JAM Digital Video Workshop teaches middle and high school students to transform their ideas about scientific topics into videos – in just a few hours. The intensive workshop is part of the National Science Foundation "Intersections" grant awarded to the Association of Science-Technology Centers and the National Writing Project, then distributed to the Science Center and the University of Pittsburgh's Western Pennsylvania Writing Project. The Science Center has hosted several SMASH JAM workshops for students and for educators. A two-day student workshop was held this

summer, giving students the opportunity for more time to explore the important intersections between literacy and science. During the workshop, participants chose a scientific concept, such as gravity or friction, then communicated that concept through a story using digital video tools.

Not only do students learn about science concepts, they make new friends, explore literacy, and become part of the growing ecosystem of digital badging through Pittsburgh City of Learning. ■