

Rigorous - Educational - STEM Focused - Hands-on - Fun

All Gelfand Outreach Fall Saturday Series Classes are \$50 per class.

BROWNFIELDS ARE LIKE TRANSFORMERS, GRADES 6-7 9am - noon, September 19th

Brownfields are usually ugly. Old steel mills, gas stations, or abandoned dry cleaners are examples of brownfields. Have you visited the Waterfront or Sand Castle? These are industrial sites that have been converted to business or recreation areas. Brownfields can be transformed from contaminated to productive. We must be sure the space doesn't pose a threat to people who will work, play or live there. You will learn the history of some Pittsburgh brownfields and study soil contamination and chemicals that could be left behind. We will explore the hydrologic cycle, how groundwater might become contaminated, and the geology which determines the potential for contamination.



Melinda Angeles interned at the Western Pennsylvania Brownfields Center at Carnegie Mellon University for three summers. Her interest in urban redevelopment grew as she developed age-specific educational materials about brownfields. In 2010, she graduated with Bachelor and Master degrees in Environmental Studies with a focus on the Urban Environment at the University of Pennsylvania with the thesis, "Teaching Methods Using Brownfields as a Platform." She has close relationship with the Brownfields Center and is assisting with research.

BUG-BOTS, GRADES 1-2 9am - noon, September 19th and November 14th

Bounce your way into the exciting world of robots! Explore motion, power, electricity, and robots. Discover the way motors and batteries operate. Discuss robots and bugs and then create a robot, explain how it moves, and take the robot home to share with your family and friends! Parents are invited into the class at 11:45 for a Bug-Bot parade of all the class creations.

Pamela J. Piskurich is the program director of the Gelfand Center for Service Learning and Outreach. She teaches a variety of classes for the GO Saturday Series Program and conducts the GO Summer Series Classes. Pam has a master's degree in education and is a certified secondary mathematics teacher and taught for ten years in public school. She has been working at Carnegie Mellon University coordinating and developing curriculum for outreach programs for k-12 students for the past 18 years.

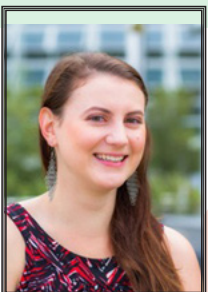


BUILDING UP! GRADES 3-5 9am - noon, September 19th

From concept sketch to building, skyscrapers must be designed with geometry and physics in mind. Learn the math, science, and design behind skyscrapers. Work as a team and work individually to add to Pittsburgh's skyline. How can a new skyscraper be inspired by geometry found in native Pittsburgh plants?

REIMAGINING HOUSES, GRADES K-1 9am - noon, October 17th

Factors such as time and location play a role in shaping the look and feel of a home. What shapes can we find in local Pittsburgh houses? Can we use these shapes and forms to inspire our own dream house designs? Learn how to create drawings and models of buildings to make your own unique architectural language and house design. Recycled materials, such as cereal boxes, will be used so students are inspired to use items in their own home to make architectural creations!



Samantha Carter is the director of CMU's Architecture Explorations outreach program and has expanded program offerings and ties lessons directly to current architecture trends and the expertise of Pittsburgh architects. Her goal is to provide an architectural foundation for youth; fostering appreciation of the built environment, encouraging creative expression and critical thought, and inspiring civic responsibility. Samantha graduated from Carnegie Mellon University's School of Architecture in 2011, with a Bachelor of Architecture and a focus on sustainable design, participatory design, and K-12 education. Samantha completed a thesis designing adaptable learning corridors in schools and taught summer camps at the Carnegie Museum of Art.

CSI CMU: DNA DETECTION, GRADES 10-12

9am - noon, October 17th

This class will focus on the use of synthetic molecules being developed in Carnegie Mellon's Center for Nucleic Acids Science and Technology (CNAST) for the detection of DNA, which is important for forensic analysis and medical diagnostics. The class will consist of a combination of lecture presentation, hands-on activity and data analysis. Students will learn about the properties of DNA and synthetic analogues and how these properties are leveraged by scientists to solve problems that affect many people.



Dr. Bruce Armitage is a Professor in the Department of Chemistry and Co-Director of the Center for Nucleic Acids Science and Technology (CNAST) at Carnegie Mellon University. The unifying theme of the research conducted in his laboratory is molecular recognition, i.e. the ability of one molecule to bind to another with high affinity and selectivity, usually through an ensemble of weak interactions. Molecular recognition is the basis for most biological processes and is playing an increasingly important role in materials science and nanotechnology. Chemists are uniquely qualified to work in this area, given their expertise in studying and manipulating molecular-scale phenomena.

ENGINEERING 101, GRADES 5-7

9am - noon, October 17th

What is engineering and how do engineers design new systems and products? Engineering marvels are all around us, and are essential parts of our everyday lives. In this class we will explore the engineering design process and how engineers overcome challenges of mechanics, environment, and change. Students will face an engineering challenge, design and test a solution, and more importantly "redesign" to improve on the original idea. Students will see how fundamentals of math and science are used in the engineering design process as well.

Dr. Deanna H. Matthews is Associate Department Head for Undergraduate Affairs and Assistant Teaching Professor in Engineering and Public Policy (EPP), and Education Director and researcher in the Green Design Institute (GDI) at Carnegie Mellon University. In her role in EPP, Dr. Matthews oversees the undergraduate programs. In the GDI, an interdisciplinary research center that focuses on the intersection of environmental and economic issues, her research centers on the development and deployment of the Economic Input-Output Life Cycle Assessment tool, examining energy life cycles of new products, corporate environmental management, and educating general populations about energy-environment issues. As Education Director, she oversees education and outreach initiatives for the GDI. She is the coordinator and instructor of outreach programs to K-12 students and teachers in school settings and informal educational events. She received her B.S.E. in Civil Engineering from Duke University (1994) and her M.S. (1995) and Ph.D. (2001) in Civil and Environmental Engineering from Carnegie Mellon University.



IT'S A MATERIAL WORLD, GRADES 5-7

9am - noon, November 14th



What is materials science? Materials science is the study of "stuff." Materials are everywhere -- from your clothing to your computer to the appliances in your home. Explore the world of materials by learning about how scientists use the properties of materials to engineer products we use every day. Students will explore the different categories of materials, learn about the basic building blocks and experiment with new materials with hands on demonstrations.

Dr. Neetha Khan is the director of the MS program in Materials Science and Engineering. She teaches a course focusing on developing professional skills for graduate students. Dr. Khan has a PhD in Materials Science from the University of Delaware and a B.A. in Chemistry from Franklin and Marshall College. She has been working at Carnegie Mellon University, developing materials science curriculum with k-12 teachers for the past 6 years.

IT'S IN YOUR DNA, GRADES 3-5

9am - noon, November 14th

Have you ever wondered why your hair is brown or why your friend's eyes are green? It's in your DNA! In this course, students will be introduced to the importance of DNA and its heredity function. They'll explore the structure of this double-stranded molecule through a hands-on building activity. Did you know that even some of your favorite foods have DNA? Students will examine the DNA of fruits such as strawberries and bananas. They will explore how scientists can use basic information about DNA to create new medical advancements.

Melinda Sager has been a graduate student in Dr. Patricia Opresko's Lab at the University of Pittsburgh since May of 2014. She's also a member of CNAST at CMU. Her research focuses on DNA damage and repair at telomeres in the presence of genotoxic agents. Melinda received her Bachelors of Science in Biology degree from Robert Morris University in 2014 and also has an Associate of Arts in Early Child Development from BCCC.



SCIENCE OF EVERYDAY THINGS, GRADES K-2

9am - noon, November 14th

Did you ever wonder how soap gets your hands clean? How does a light bulb work, and how do new light bulb technologies save so much energy? Cars get us from place to place, but how does liquid gasoline make a car move? These scientific and engineering questions are around us all of the time, and in “Science of Everyday Things” we will take the time to answer them. Kids from K-2 will have the chance to learn at their skill level the chemistry, physics, thermodynamics and other engineering properties of phenomena all around them through discussions, experiments and design. This class will excite kids about science and technology while teaching them how to investigate the world around them using the scientific method to develop new ideas and hypotheses. Help us produce the next generation of great scientists and engineers!



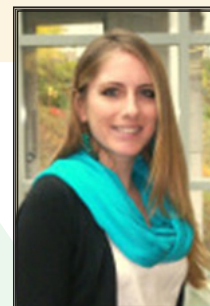
Dr. Kris Noel Dahl is an Associate Professor in the Departments of Biomedical Engineering, Chemical Engineering and Materials Science and Engineering at Carnegie Mellon University. Her group is interested in structure and mechanics of materials inside cells including the nucleus and cytoskeleton. By studying these structures, it is possible to provide insight into cell function and adaptation including stem cell differentiation, cancer metastasis and interactions of cells with nanomaterials. Dr. Dahl received her BS degree from Carnegie Mellon in 1998, and Ph. D. degree in Chemical Engineering under the supervision of Professor Dennis Discher at University of Pennsylvania in 2004. She performed her postdoctoral fellowship in Cell Biology at Johns Hopkins University before joining Carnegie Mellon in 2007. She is a recipient of a Whitaker Fellowship and NIH Post doctoral Fellowship for her training. She received an NSF CAREER award as well as a Young Investigator Award from the World Congress of Biomechanics.

SUPER HEROES AND VILLAINS: WRITE AND CREATE CHARACTERS AND THEIR WORLDS! GRADES 3-4

9am - noon, October 17th

Have you ever thought about what kinds of superheroes you WISH existed? Or what types of superpowers you wish you had? Fly, teleport, and rappel into this creative writing class and craft your own unique superhero and the world they are battling to save. We'll work on everything from naming and designing your hero, to creating rules for the world in which they live. You may even want to create a villain instead! Create a short story and use dialogue to share with family and friends. Parents are invited into the class from 11:45-noon to hear about each student's hero.

Christa Romanosky is the high school poetry instructor at Pittsburgh CAPA, and has been working with the Gelfand Center for Service Learning and Outreach for over a year. Christa's lessons focus on cultivating a strong interest for poetry and creative writing in k-12 students by pairing appealing, age-appropriate topics with lessons about craft and writing. She has a Master's of Fine Arts from the University of Virginia, and is a graduate of Carnegie Mellon University.



THE MAGIC OF HEREDITY - DNA, GRADES 10-12

9am - noon, September 19th, November 14th

DNA, or deoxyribonucleic acid, is the hereditary material in humans and almost all other organisms. Nearly every cell in a person's body has the same DNA, and more than 99 percent of the DNA's bases are the same in all people. DNA can pass on information from a generation to the other because it can make copies of itself, a property that in scientific language is called replication. But the DNA integrity is always under attack from environmental agents like skin cancer-causing UV radiation. How is damage to DNA detected and repaired, and what happens if it is not? Students will learn about the basic building blocks of DNA and how DNA can replicate by itself.



Dr. Xiaohong Tan has been working at Carnegie Mellon University for the past 3 years, developing state-of-the-art nucleic acid based probes for human disease diagnosis and therapy. In his latest paper “Label-free Molecular Beacons for Biomolecular Detection” (Anal. Chem. 2014 Oct), Dr. Tan demonstrated that label-free molecular beacons can be used for detection of various biomolecules such as RNA, DNA, and proteins. The big advantage of this probe is that they cost much less than the ones currently used in biomolecule detection. Dr. Tan has a PhD in Chemical Biology from Nanyang Technological University in Singapore.

Bracelets that buzz, scarves that sense, ties that talk, blouses that blink— it's all part of wearable engineering! Students will learn about the rapidly developing field of wearable technology, and will design their own conductive fabrics and simple-to-program electronics. They'll also learn how humans and computers interact to form wearable technology, also known as "soft robotics". This class will inform and excite students about this electrifying subfield of mechanical engineering in our constantly upgrading world.



Dr. Majidi is an Assistant Professor of Mechanical Engineering at Carnegie Mellon University starting September 2011. Prior to joining the faculty, he was a postdoctoral fellow in the Harvard Microrobotics Laboratory (2009-2011) and the Princeton Institute for the Science and Technology of Materials (2007-2009). His experience in solid mechanics and microfabrication is the foundation of his current research in the emerging fields of soft robotics and active multifunctional materials.

PARENT SESSION: HOW TO SURVIVE A SCIENCE FAIR PROJECT

Cost \$15, 9:30am - 11:30am, October 17th

Participating in a science fair is a great way for young people to experience the thrills and challenge of "doing" science. Student participants learn first-hand about the scientific method and they get involved in an in-depth investigation that will challenge their creativity and persistence. It may be difficult for an elementary or middle school teacher to dedicate enough time to help individual students prepare their projects, so it is important for parents to be informed about science fairs. Discuss topics such as: How do you pick a good project? What science fairs are available to students in the Pittsburgh area? How do you sign up for them, and what are the expectations for students? Our presenters are Dr. Conrad Zapanta, Associate Department Head of Biomedical Engineering, Carnegie Mellon, and Dr. Laura Zapanta, Lecturer in Biological Sciences, University of Pittsburgh. Both presenters have experienced science fairs from the perspective of a judge, an organizer and a parent.



Gelfand Outreach Fall 2015 Saturday Series Classes.
Classes are \$50.00 each and are conducted from
9am to noon at Carnegie Mellon University.

September 19th

Bug-bots, Gr. 1-2
Building Up!, Gr. 3-5
Brownfields, Gr.6-7
The Magic of Heredity, Gr. 10-12

October 17th

Reimagining Houses, Gr. K-1
Super Heroes & Villains, Gr. 3-4
Engineering 101, Gr. 5-7
Wearable Computers, Gr. 7-9
CSI CMU:DNA, Gr. 10-12

November 14th

Science of Everyday Things, Gr. K-2
Bug-bots, Gr. 1-2
It's in Your DNA! , Gr. 3-5
It's a Material World, Gr. 5-7
The Magic of Heredity, Gr. 10-12