

UPDATE: 3/13/18 - NEW Class Added!

**MAKING GAMES, ANIMATIONS, AND
EVERYTHING IN BETWEEN**, GRADES 6-8

9am - noon, July 16th-20th

Learn how to make animations, interactive projects, and basic games using The Wick Editor. Students will explore digital illustration, the principles of animation, programming, planning out games and animations, and sharing their work on the web. Each student will have opportunities to complete daily challenges as well as to bring their own ideas to life. After the workshop students will be familiar with advanced features available at www.wickededitor.com. No experience required!



Luca Damasco likes making things that help people make things. He has a background in Computer Science and Art, and focuses on developing accessible creative tools for artists and students. Luca has worked for Riot Games as a Technical Artist, contributed to The Processing Foundation's Python mode project, and co-created WickEditor.com. Currently, Luca is a Masters student in the Human-Computer Interaction Institute at Carnegie Mellon University.



Zach Rispoli is a toolmaker, game developer and digital illustrator interested in the creation of digital artifacts and culture as a way of learning. He works to make creative processes such as animation and game creation more accessible through free and easy-to-learn tools. Zach is the co-creator of WickEditor.com along with Luca Damasco.

Please continue to the following pages for additional class listings.

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

All classes are held at CMU Oakland campus, \$325 for 3-hour courses, \$650 for all-day courses.
*To apply for scholarship funds, please submit a copy of the first page of your IRS 1040 tax form from 2016.

ALL STEAM AHEAD, GRADES K-1

9am - noon, June 25th-29th



All aboard! Create, discover, and learn with Science, Technology, Engineering, Arts, and Math. In this course, students will be sampling the different parts of STEAM, making connections between the things around us and how they work. Explore the different states of matter, gravity, sound waves, and more! Use science, technology, engineering, arts, and math to make predictions, design and run experiments, and make conclusions that help us to understand our world.

Christa Romanosky is a current fellow at the Provincetown Fine Arts Work Center. Romanosky holds an MFA from the University of Virginia, and bachelor's degrees in psychology and creative writing from Carnegie Mellon University. She has been teaching STEM classes through Gelfand Outreach since 2014, and has been an educator in the arts for over ten years.

ANATOMY & ROBOTICS, GRADES 5-7

9am - 4pm, July 16th-20th

Back by popularity this class is packed with so much "muscle" we needed to make it a full day class! This class is for the aspiring physician, scientist or roboticist! Learn the anatomical concepts of the bones and muscles that make up the human arm. Dissect a chicken wing to see the components and how it functions. Discuss extension and flexion of the arm and how the elbow and wrist move. Diagram the muscles and bones and make life-sized models. Program a circuit board and make your arm model come to life. Use servos, LEDs, and sensors as you apply robotic technology to make your anatomical model move in a very realistic way. When science meets technology you will be amazed -- we're not twisting your arm!

Since 2010 Dr. Terry Richards has been a mentor for the Girls of Steel robotics team (FRC(r) 3504) and since 2012 she has been the FIRST® Robotics Program Coordinator at Carnegie Mellon University (CMU). Leading the team's FIRST(r) LEGO(r) League (FLL) program, she offers summer camp and team experiences for the high school girls to mentor middle school boys and girls in all aspects of FLL skills – research, robot, and core values. In 2015 Terry received a National Center for Women & Information Technology (NCWIT) Educator Award. Terry has a B.S. in Chemistry (Simmons College) and a Ph.D. in Biological Sciences/Biochemistry (CMU).



COOL CHEMISTRY, GRADES 3-5

9am - noon, July 9th-13th



Students will participate in hands-on activities and demonstrations. Emphasis will be placed on fundamental chemistry concepts such as the three states of matter, chemical bonding, covalent bonding, dehydration reactions, hydrolysis, polymers, density, buoyancy, molecules, acids and bases. Make polymer pop, dance colors and much more! Participate in activities and get ready to get messy!

Yaniv Tivon is a graduate student at the University of Pittsburgh in the Department of Chemistry pursuing a Ph.D. in chemical biology. He received his bachelors from Rutgers University where he studied chemistry with a focus on organic synthesis. His current research involves the synthesis and utilization of modified DNA to study and inhibit cancer pathways. Yaniv's goals include teaching how to provide logical explanations to chemical phenomena and manipulate them based on that knowledge.

DISCOMBOBULATED MACHINES, GRADES 3-4

1pm - 4pm, June 25th-29th

In this class, students will learn about simple and complex machines and how we use them in everyday life. Students will use their engineering skills to explore, create, design, transform, and disrupt everyday objects/machines to determine other purposes and uses. Students will explore malfunctioning machines in hands-on activities and learn how engineers solve problems. Students will be presented with real-life engineering complications and will work to create solutions by thinking like engineers. Students will use a set of provided materials and supplies to build prototypes of their solutions.

Christa Romanosky is the instructor of this workshop. Please see her biography on the previous page.

ENGINEER YOUR WORLD, GRADES 5-7

9am - noon, July 23rd-27th

How does a bike become a bike? Or a computer become a computer? What happens when we're done with them? We will explore where "stuff" comes from and where "stuff" goes. Along the way, we'll see how green engineers involved in designing these products reduce the impact they have on the environment. Favorite activities in this class include taking apart objects such as radios and phones and building structures using newspapers.

Dr. Parth Vaishnav is an Assistant Research Professor at the Department of Engineering & Public Policy (EPP) at Carnegie Mellon University (CMU). His research is aimed at understanding how new technologies can be deployed to solve society's problems, particularly in the areas of energy and the environment. Parth teaches a course on Climate Science and Adaptation at CMU and runs the US Association of Energy Economics' annual Case Competition. He has a PhD in EPP from CMU. He spent a year at the University of Cambridge, getting a MPhil in Technology Policy. Before that, he worked as a strategy analyst for Shell's natural gas business in Europe. He wants to pursue a career helping people – particularly policymakers – make technically sound, economically sensible, and behaviorally-informed decisions.



FINCH PROGRAMMING, GRADES 3-5

9am - noon OR 1pm - 4pm, July 9th-13th



Learn Scratch programming language and write code to move the Finch robot with the keyboard. Daily challenges will include choreographing the robot to move with lights and music, navigate through a maze, play a game, and more! Students will use sensors and accelerometers to control the Finch while learning Scratch programming.

Alexander Volkov is a final year master's student at the CMU Robotics Institute. His research focuses on enabling robots to naturally interact with their environment. Before coming to Carnegie Mellon, he graduated from Cornell University with a degree in Electrical & Computer Engineering. Above all, he is fascinated by robotic technology and its potential for positive impact on society, and hopes to share his passion with the next generation of STEM students.

JUNK BOTS, GRADES 1-2

9am - noon, June 18th-22nd

What are robots and what makes robots work? Can robots really take over the world? In this class, we'll build different types of robots and learn about batteries, LED, circuits, electricity, and more. We'll explore how engineers build machines and make modifications to our robots to really make them buzz, rattle, and move! Draw and design your own junk bot, bringing it to life with household items! Have fun with science and technology while learning to think like a robotics engineer. The sky's the limit!

Christa Romanosky is the instructor of this workshop. Please see her biography on the first page.

KITCHEN CHEMISTRY, GRADES 2-3

9am - noon, June 25th-29th

Join your fellow scientists as we use everyday ingredients to conduct experiments and learn the science explaining them. Learn about solids and liquids by making your own glop! Learn how to blow up a balloon without using your own breath! Discover how to make a rainbow in milk. Discuss molecules and make your very own molecule model.

Jennifer Lang has taught several Gelfand Outreach courses over the past few years at CMU and has taught Science and Special Education at Kiski Area School District for the last three years. Prior to that Jennifer taught Chemistry at Vincentian Academy and Mount Alvernia High School for 10 years. She attended Saint Vincent College and has a BS in Chemistry and a MS in Environmental Education. Jennifer also has a MS in Special Education from Slippery Rock University.



PICSELS: PICTURES TO SHOW EXTREMELY LITTLE STUFF, GRADES 6-8

9am - noon, June 18th-22nd

Do you wonder how we can see “small” things like cells, microbes, the tiny hairs on bugs and even atoms themselves? We will learn how to “see” the microworld using pixels. During the week we will learn about how we “sense” our macroworld, and how we make machines similar to our smartphones to “sense” microscopic things. This will involve lab exercises where we learn how machines like barcode scanners can “read.” We will learn about the similarities between sound and color because of “waves.” We will learn how smartphones can “see” your face and add fun features to them, like rainbows and dog ears. Finally, we will use what we’ve learned to operate an electron microscope to see small things ourselves, things like cells and microprocessors.



Dr. Yoosuf Picard is an associate research professor of materials science and engineering in the department of materials science and engineering at Carnegie Mellon University. He has a B.S. degree in Mechanical Engineering from Louisiana Tech University, and a Ph.D. in Materials Science and Engineering from the University of Michigan, Ann Arbor. Prof. Picard researches nanoscale materials using advanced electron microscopy methods. He teaches undergraduate and graduate courses on materials characterization methods, as well as a course on energy resources and energy conversion technologies. He also serves as a judge for regional and national science fairs.

ROBOTICS: PROGRAM AND DESIGN, GRADES 6-8

9am - noon, June 25th-29th

This course is an introduction to robot-building and robot-programming. Using LEGO® pieces and the MIT Handy Board, design and build desktop mobile robots, then program them using IC programming language to do dances, follow lines, and “sense” different objects in the environment. Will you be able to program your robot to bowl? Will your robot successfully be able to navigate through a maze without getting stuck? This is a team-based, hands-on course. No experience in robotics is required.

Joe Lang taught the Robotics Programming Design Gelfand Outreach course for the past several years at CMU. Joe has worked as a middle school math teacher for the New Kensington Arnold School District for 12 years. He attended Waynesburg University for his BS and his MS in Instructional Technology.



SCIENCE AND ENGINEERING SAMPLER, GRADES 3-5

9am - noon, June 18th-22nd

Students will visit a variety of labs and spaces at Carnegie Mellon to learn about cutting edge research. Faculty, graduate students and staff in science, engineering and computer science will share information, demonstrations and hands-on activities to help Sampler participants to develop a broader understanding of what it means to work as a scientist or engineer. Students will summarize the information that they have learned and to make connections between the research activities and the content that they are learning in school.



Mr. Donald L. Orlowski is a retired educator with more than 37 ½ years of teaching experience in the sciences and technology. He has been the sponsor, mentor and judge for students in grades 6 -12, at the Pittsburgh Regional Science and Engineering Fair (PRSEF), Intel International Science and Engineering Fair (ISEF) and the Pennsylvania Junior Academy of Science (PJAS) for more than 20 years. He assisted the screening committee for students applying to the Pennsylvania Governor’s School at CMU for 5 years and is a member of the Intel ISEF Local Arrangements Committee. He has attended numerous workshops and seminars sponsored by the Gelfand Center at CMU, as well as those sponsored by such organizations as the Society for Science and the Public, the Spectroscopy Society of Pittsburgh, the Society of Analytical Chemists of Pittsburgh, Carnegie Science Center and those sponsored by other educational institutions and corporations.