



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

Summer 2019 Series Classes - Carnegie Mellon University

Scholarship funds are available through gifts from several Carnegie Mellon alumni. Please see the information below learn more.

Program Overview

The Gelfand Outreach Summer Program is designed to illuminate, encourage, and motivate our future scholars through week-long classes in science, technology, engineering, math, and arts. We value hands-on learning, creating, collaborating and sharing ideas. We understand the importance of providing opportunities for our young learners in Pittsburgh and surrounding communities. Our Summer Series enables local students to explore science, engage in experiments using the scientific method, build prototypes, and so much more.

Instructors

CMU faculty and staff design our Gelfand Outreach classes to spark learning and enthusiasm in the fields of science, technology, engineering, math, and arts. We introduce young learners to their cutting-edge discoveries in research at CMU. Gelfand Outreach teachers are scientists and educators who understand the significance of early STEM education for our youth. We partner with members of the Carnegie Mellon University community to present these exciting summer courses for K-9 students. For more information about each instructor see the brief biography following the course description.

Application Process

Classes are open to students in grades K-9. Parents register online and students are assigned to classes in the order in which we receive the registrations. Students may take one or more classes.

Location

Classes are held on Carnegie Mellon University's campus in the Oakland neighborhood in Pittsburgh, PA.

Daily Schedule

9 am – Noon or 9 am - 4 pm weekdays (See the schedule on page 7 for details.)

On Friday, the last day of the program, we invite parents and siblings to attend the class for a presentation. Class will meet at the usual beginning time but will stop early for the presentation. You will have a chance to tour your child's classroom, visit informally with teaching staff, and meet other Gelfand Outreach parents.

GO After Class Care - Full Day Option

After Care is an extended day alternative for students attending a morning GO class at Carnegie Mellon University. Students will participate in recreational activities such as sports, hikes/trails/ tours, board games, card games, Frisbee and other outdoor/indoor events. Students should bring a nut-free, brown bag lunch and their own water bottle. This care is provided from noon to 4:00 p.m. on Monday-Thursday of the GO morning class.

Cost

Classes are \$325, 9 am-noon daily, unless otherwise noted. The cost of the optional Monday - Thursday After Class Care program is \$80. All fees must be prepaid. Payment is expected when a child is accepted to guarantee their spot in class.

Financial Aid

Scholarships, limit one class per child are available. To qualify you must submit a copy of the first page of your IRS Tax Form 1040 from the past year. We are able to award scholarships through a gift provided by Carnegie Mellon alumnus Bernard Meisner and other donors to support students in Gelfand Outreach classes.



Dr. Coty Jen

AIR AND CLIMATE GRADES 3-5

July 15th-19th

The air we breathe is filled with millions of tiny dust particles and gas molecules emitted from trees, wildfires, cars and thousands of other sources. These particles and gasses affect climate, visibility, and our health. This hands-on workshop will explore the different ways dust particles form in the atmosphere to create smog and clouds. We will investigate how particles in the air impact the Earth's climate. Dr. Albert Presto will also give a tour of the mobile air quality lab and explain how we do air pollutant monitoring.

Dr. Coty Jen is an assistant professor of Chemical Engineering at CMU. She is a member of the Center for Atmospheric Particle Studies. Her research focuses on how nanoparticles form and grow in the atmosphere and ultimately impact the environment. Her group designs and builds instruments for measuring the composition of 1 nm particles formed from manmade pollution and biogenic emissions. Her previous research examined the millions of organic compounds emitted during wildfires and how these compounds impact human health and air quality. Dr. Jen completed her B.S. in Chemical Engineering at Columbia University, M.S. in Chemical Engineering at University of Minnesota- Twin Cities, Ph.D. in Mechanical Engineering at University of Minnesota- Twin Cities, and postdoc in Environmental Science, Policy, and Management at University of California, Berkeley.



Brittany Sines

ALL STEAM AHEAD GRADES 3-5

June 24th-28th

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.

Brittany Sines has been studying in the field of early childhood education and development over the past 5 years. Earning her degrees at Point Park University, she is a dual certified PA educator and has taught students from ages 3 to 14. She currently works at the Environmental Charter School, at which she incorporates arts and science into every learning opportunity. She was the physical education teacher and associate preschool teacher at the Carnegie Mellon University Children's School. Brittany is dedicated to building genuine connections with students in order to role model compassion and empathy, enabling her students to enjoy life and become productive members of their communities.



Dr. Terry Richards

ANATOMY & ROBOTICS GRADES 5-7

July 15th-19th - 9am-4pm

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! **COST: \$625.00**

Dr. Terry Richards has been a mentor for the Girls of Steel robotics team (FRC(r) 3504) since 2010, 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).



Dr. Deanna
Matthews

ENGINEER YOUR WORLD GRADES 5-7

June 24th-28th

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. Deanna 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.

FINCH PROGRAMMING GRADES 3-5

July 8th-12th

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.

Brittany Sines is the instructor for this class. Please see her biography on page 2.



Christa Romanosky

JUNK BOTS GRADES K-2

July 22nd-26th

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 a current Tulsa Artist Fellow. She has had previous fellowships with the Provincetown Fine Arts Work Center and James Merrill House, with much of her writing integrating science and health-related topics. 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.



Jennifer Lang

KITCHEN CHEMISTRY GRADES K-2

June 17th-21st

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 four years. Prior to that Jennifer taught Chemistry at Vincencian 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.



Dr. B. Reeja Jayan

LEARN ENGINEERING @CMU THROUGH MINECRAFT GRADES 4-7

July 11th - 10am-4pm (NOTE: This is a 1-day, 5-hour workshop)

THIS WORKSHOP IS FOR STUDENTS WHO ARE FAMILIAR WITH MINECRAFT AND HAVE A MINECRAFT ID. THE TIME WILL NOT BE SPENT TEACHING THE GAME, BUT WILL FOCUS ON USING MINECRAFT TO LEARN ENGINEERING.

Learn how real engineers build and launch rockets in Minecraft. What about building a Robot in Minecraft? Imagine the strongest material in the universe. Can Minecraft teach you how to build it? Interested in video games? Do you play Monopoly? Learn how to make your own fun and educational game in Minecraft. Do you collect stones? Did you know Minecraft can build and help you learn about precious stones like diamond? Do you want to become an Engineer @ CMU? Come learn how to do this while playing Minecraft! **STUDENTS WILL NEED TO BRING THEIR OWN NUT-FREE SACK LUNCH. COST: \$125.00**

Dr. B. Reeja Jayan is an Assistant Professor in Mechanical Engineering at Carnegie Mellon University (CMU). She also holds courtesy appointments in Materials Science and Engineering, Chemical Engineering, and Electrical and Computer Engineering departments at Carnegie Mellon. Dr. Jayan received her M.S. in Electrical Engineering and Ph.D. in Materials Science and Engineering from The University of Texas at Austin (UT- Austin), working with Professor Arumugam Manthiram. She was subsequently a Postdoctoral Associate in Chemical Engineering at the Massachusetts Institute of Technology (MIT), working under the supervision of Professor Karen Gleason. Dr. Jayan directs the Far-from-Equilibrium Materials Laboratory (FEMLAB) at CMU. Her multidisciplinary lab harnesses electromagnetic fields to synthesize materials that access regions of the free energy/phase space diagram, hitherto unavailable to conventional synthesis routes. These low temperature processed materials directly grow on flexible, lightweight substrates like fibers, enabling structurally integrated energy harnessing, storage, and sensing. Dr. Jayan is a strong believer in game based learning methodologies that she uses extensively in her undergraduate and graduate courses. Dr. Jayan is a recipient of 2017 Army Research Office (ARO) Young Investigator Award, 2016 Air Force Office of Scientific Research (AFOSR) Young Investigator Award, the Donald L. and Rhonda Struminger Faculty Fellowship, the Berkman Faculty Development Fund, and Pittsburgh Magazine's 40 Under 40 Award.



Luca Damasco

MAKING GAMES, ANIMATIONS, & EVERYTHING IN BETWEEN GRADES 5-7

July 8th-12th

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.wickeditor.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 CMU.

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.



Zach Rispoli

RESEARCH @ CMU GRADES 6-8

July 8th-12th

Students will be introduced to faculty members and graduate students who conduct cutting-edge science, computer science and engineering research at Carnegie Mellon. Through discussions, tours, and hands-on activities participants will learn about studies that are designed to solve societal problems, application of science and mathematics content that they are learning in school, and about pathways to careers in STEM fields.



Dr. Judith Hallinen

Dr. Judith Hallinen is the Assistant Vice Provost for Educational Outreach at Carnegie Mellon University. Dr. Hallinen works with faculty and students at Carnegie Mellon to design and implement programs that share information about university research with external populations, including K-12 educators and students. She has taught in a variety of settings including, but not limited to, teaching kindergarten at the CMU Children's School, science education methods to graduate students at Chatham University, and computer applications to senior citizens. Judith advises Carnegie Mellon students who are interested in pursuing a career in education and teaches a course on education policy. She holds an EDD from the University of Pennsylvania, MAT from the University of Pittsburgh and BS from Carnegie Mellon.



Students participate in various hands-on learning activities and learn more about science under the guidance of the instructors.



Marieke Van Der Maelen

ROBOTICS AND THE URBAN ECOSYSTEM GRADES 6-8

June 17th-21st

This camp will be an introduction to mechanical engineering and robotics for teenagers interested in world-building and interactive art. With a unique focus on biomimetics, or the imitation of natural models and creatures, this program is designed to challenge students to critically observe and find inspiration from the natural world. Through the integration of Shape Memory Alloys (SMA), electrical circuits, and paper engineering, students will work together to create a high/low tech universe populated by whimsical robotic creatures. Each student will take home their own moving creation at the end of the camp.

Marieke Van Der Maelen is a 3D modeler and product of the Carnegie Mellon Pre-College Art program. Through CMU, she was exposed to local art conservators, and later pursued a career as an art conservator in Chicago, where she preserved period clothing for the Harley Davidson Museum in Milwaukee, conserved ethnographic textiles from Japan and West Africa, and restored a rare Finn Juhl "floating couch." Her desire to share her knowledge with the next generation as well as connect traditional conservation practices with modern technology led her to bring her work to the classroom where she taught the science behind art conservation to students at the University of Chicago's Charter School System. Her background in art, science and education continue to inform her current research: combining augmented reality with blockchain to redefine how people experience and interact with visual art, culture, and entertainment.



Joe Lang

ROBOTICS PROGRAM AND DESIGN GRADES 6-8

July 22nd-26th

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 has 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 13 years. He attended Waynesburg University for his BS and his MS in Instructional Technology.

SCIENCE AND ENGINEERING SUMMER SAMPLER GRADES 3-5

June 24th-28th

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.

Dr. Judith Hallinen is the instructor for this class. Please see her biography on page 5.



Summer 2019 Series Classes

Classes are \$325.00 each* and are conducted from 9:00AM to noon at Carnegie Mellon University.

Class Name	Dates	Grades	Brief Description
Kitchen Chemistry	June 17-21	K-2	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!
Robotics & Urban Ecosystem	June 17-21	6-8	An introduction to mechanical engineering and robotics for students interested in world-building and interactive art. A focus on biomimetics, or the imitation of natural models and creatures, students make observations from the natural world to create models.
All STEAM Ahead!	June 24-28	K-2	All aboard! Create, discover, and learn Science, Technology, Engineering, Arts, and Math. Students will sample the different parts of STEAM, making connections between the things around us and how they work.
Science and Engineering Sampler	June 24-28	3-5	Visit labs and areas at CMU 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.
Engineer Your World	June 24-28	5-7	Become an engineer and see how green engineers design products to reduce the impact they have on the environment.
Finch Programming	July 8-12	3-5	Learn Scratch programming language. Write and code programs to move a Finch robot. Choreograph the robot to move with lights and music, navigate through a maze, play a game and more!
Research @ CMU	July 8-12	6-8	Students will be introduced to faculty members and graduate students who conduct research at Carnegie Mellon. Discuss, tour, and participate in hands-on activities.
Making Games, Animations, and Everything in Between	July 8-12	5-7	Learn how to make animations, interactive projects, and basic games using The Wick Editor. Explore digital illustration, the principles of animation, programming and planning out games and animations.
Learn Engineering @ CMU thru Minecraft*	July 11 ONLY 10am - 4pm	4-7	For students who are familiar with Minecraft and have a Minecraft ID. The focus is on using Minecraft to learn engineering. Prerequisite: knowing how to use Minecraft and Minecraft ID. Cost: \$125
Air and Climate	July 15-19	3-5	Explore the different ways dust particles form in the atmosphere to create smog and clouds. Investigate how particles in the air impact the Earth's climate.
Anatomy & Robotics*	July 15-19 9am - 4pm	5-7	Learn the anatomical concepts of the bones and muscles that make up the human arm. Program a circuit board and make your model come to life. Cost: \$625
Junk Bots	July 22-26	K-2	What are robots and what makes robots work? Explore how engineers build machines and make modifications to robots. Draw and design your own junk bot, bringing it to life with household items!
Robotics Program & Design	July 22-26	6-8	Build and program robots! Using LEGO® pieces and the MIT Handy Board, design and build robots, and program them using IC programming language to do dances, follow lines, and more.

To apply for scholarship funds, please submit a copy of the first page of your IRS 1040 tax form from 2017.

* Unless otherwise noted.