

# LEONARD GELFAND CENTER FOR SERVICE LEARNING AND OUTREACH

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*He thoroughly enjoyed the class –every aspect of it!  
For me, it was a real pleasure to pick him up after  
class each day, because he was so excited to tell me  
about what you had done in class.*

*~Parent of a Gelfand Outreach Student*

## Carnegie Mellon University



## Gelfand Outreach Summer Classes

*Classes were developed by Carnegie Mellon University Faculty and Staff*

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



For more information:

412-268-1863

[www.cmu.edu/gelfand](http://www.cmu.edu/gelfand)

## 2016 Summer Series Offerings

All classes are held at CMU Oakland campus, are \$325\*, and run from 9am-noon.

\*Scholarships are available, please contact the Gelfand Center for information

\*\* For more detailed course descriptions visit: [www.cmu.edu/gelfand](http://www.cmu.edu/gelfand)

Class Name	Dates	Grades	Brief Description**
Green Engineering	June 20-24	6-8	Explore where stuff comes from, how they're designed and what happens to it when we're done with it.
Robotics Program & Design	June 20-24	6-8	Design and build desktop mobile robots as a team using LEGO® pieces and the MIT Handy Board. Will your robot be able to dance, navigate through a maze and follow a line?
Simple Machines	June 20-24	3-4	Work with a partner to build a simple motorized machines from the LEGO® Motorized Machine Kit. Explore concepts in engineering and physics along the way!
Science and Engineering Sampler	June 27-July 1	3-5	Visit labs and spaces at Carnegie Mellon to discover how scientists and engineers do cutting-edge research on campus. Demonstrations and hands-on activities will be included in your exploration.
Junk Bots	June 27-July 1	K-2	What are robots? What makes robots work? Explore how engineers build machines and make robots. Design your own using household items.
Anatomy & Robotics	July 11-15	5-7	Learn anatomical concepts of muscles and bones. Make a life-sized model of an arm and program a circuit board to make your model move.
Alice for Beginning Programmers	July 11-15	3-4	Use Alice, a programming software designed at Carnegie Mellon to learn basic programming concepts and create your own animated movie or game!
Anatomy & Robotics	July 18-22	5-7	Learn anatomical concepts of muscles and bones. Make a life-sized model of an arm and program a circuit board to make your model move.
Robotics Program & Design	July 18-22	6-8	Design and build mobile robots as a team using LEGO® pieces and the MIT Handy Board. Will your robot be able to dance, navigate through a maze and follow a line?
All STEAM Ahead!	July 25-29	K-2	Create, discover and learn with Science, Technology, Engineering, Arts and Math (STEAM). Examine how things work. Explore, investigate, and perform experiments to understand our world.
Finch Programming	July 25-29	4-5	Learn Scratch programming language. Write and code programs to move a Finch robot. Choreograph the robot to movie with lights and music, navigate through a maze, play a game and more!
Research @ CMU	July 25-29	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.

Please contact Pam Piskurich at (412) 268-1863 or [GelfandCenter@andrew.cmu.edu](mailto:GelfandCenter@andrew.cmu.edu) for Gelfand Outreach registration questions.

FITT Camp, offered by the Carnegie Mellon University Athletic Department, is an extended day option for students attending a morning Gelfand Outreach class. For FITT Camp details, contact Pattye Stragar, at [pls@andrew.cmu.edu](mailto:pls@andrew.cmu.edu) or (412) 268-1235.

Please see below for expanded Summer 2016 Gelfand Outreach class descriptions. These classes were developed by Carnegie Mellon University Faculty and Staff

#### GREEN ENGINEERING - June 20-24, (9am-noon)

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. Grades 5-8. Cost \$325

#### ROBOTICS PROGRAMMING AND DESIGNING - June 20-24, (9am-noon), July 18-22, (9am-noon)

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. Grades 6-8. Cost \$325

#### SIMPLE MACHINES - June 20-24, (9am-noon)

Do you enjoy building things? Would you like to build a motorized simple machine? You will work with a partner and the LEGO© Motorized Machine kit to build machines that move in different ways. The machine you will make will help you to understand how things work. Motions, forces, transfer of energy and the principles of basic machines will be studied through hands-on activities with the LEGO© models. Pulleys, gears and motors will be used to complete daily challenges. Grades 3-4. Cost \$325

#### SCIENCE AND ENGINEERING SAMPLER - June 27-July 1, (9am-noon)

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. Dr. Hallinen will help the students to summarize the information that they have learned and to make connections between the research activities and the content that they are learning in school. Grades 3-5. Cost \$325

JUNK BOTS - June 27-July 1, (9am-noon)

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! Grades K-2. Cost \$325

ANATOMY AND ROBOTICS - July 11-15 (9am-noon), July 18-22 (9am-noon)

Here's a class 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 Hummingbird circuit board (created at Carnegie Mellon University and available at BirdBrain Technologies) 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! Grades 5-7. Cost \$325

ALICE FOR BEGINNING PROGRAMMERS - July 11-15, (9am-noon)

Learn computer programming skills using Alice, a software program designed at Carnegie Mellon that you can download at home. Learn the steps needed to create a computer program as well as programming concepts such as loops and conditional statements. Create your own animated movies and video games! Prerequisites: some familiarity with using a mouse and Windows. Grades 3-4. Cost \$325

ALL STEAM AHEAD! - July 25-29, (9am-noon)

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. Grades K-2. Cost \$325

FINCH PROGRAMMING - July 25-29, (9am-noon)

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. Grades 4-5. Cost \$325

RESEARCH @ CMU - July 25-29, (9am-noon)

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. Grades 6-8. Cost \$325