

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

*Scholarship funds are available through gifts from several Carnegie Mellon alumni. Please see page 8 to learn more.*

**ADDITIVE MANUFACTURING, GRADES 6-8**

*9am - noon, March 24th*

Engineers create many of the products that you see and hear about every day, often using computers to draw, analyze, re-design, and manufacture these products. This introduction to additive manufacturing (AM) includes a brief history of AM processing, a discussion of and technical fundamentals of current AM processes including additive fabrication of parts on Cube Pro maker machines, subtractive fabrication of parts via laser cutting and an introduction to direct metal additive manufacturing used in aerospace and other industries. The students will also tour the newly renovated MakerWing of Hamerschlag Hall.



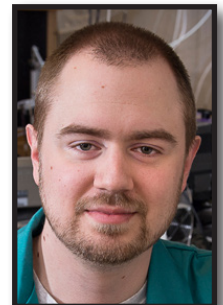
*Dr. Beuth's research interests are in the area of solid mechanics and manufacturing. Much of his research relates to his expertise in the areas of thermomechanical modeling of manufacturing processes, fracture mechanics, and the mechanics of coatings and layered materials. His current research includes work in three areas. One area currently being investigated relates to Mechanics of Electron and Laser Beam-Based Additive Manufacturing Processes, which are automated processes for directly building three-dimensional parts or features, layer-by-layer, via electron beam- or laser-based deposition. These processes are also referred to as direct digital manufacturing or solid freeform fabrication and offer an alternative means for fabricating metal parts for aerospace and medical implant industries.*

**AMAZING ATMOSPHERE, GRADES 4-5**

*9am - noon, January 27th*

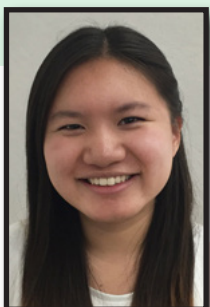
Do you know why the sky is blue? This workshop will teach you all about our atmosphere and our climate system. Have you ever explored the topic of climate change? We will talk about why climate change is important and what we as a community can do to make our world a better place. We will do a number of fun hands-on activities exploring cloud formation and light scattering.

*Michael Polen is a 5th year Ph.D. student in the Mellon College of Sciences Department of Chemistry and works as a member of the Center for Atmospheric Particle Studies at Carnegie Mellon University (CMU). He is a former president of the Future Leaders of Science at CMU, which performs science outreach at local schools in the Pittsburgh region. Michael's current research focuses on the impact of wildfires and prescribed fires on cloud formation and precipitation. He earned his Bachelors of Science in Chemistry at Widener University in 2013.*



**ARCHITECTURE OF SOUND, GRADES 3-5**

*9am - noon, January 27th*



Have you ever noticed different places where your voice echoes, or places where the sound is very hushed? Learn about the science of acoustics, and how sound can change depending on the shape of a room or its materials. Brainstorm your own ideas for a soundspace, then build a model of it!

*Kelly Li is a student at Carnegie Mellon University currently studying architecture with an interest in design and education. She has previous experience teaching students ages five through thirteen at Carnegie Mellon's School of Architecture Saturday Sequence, Carnegie Museum of Art, Summer Dreamers Academy at Faison, and Hunakai Studio of Fine Arts. Her goals include teaching others about how the creative design process can begin to positively influence the environments around us.*

## BUG-BOTS, GRADES K-2

9am - noon, March 24th

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.

*Christopher George is a sophomore Electrical and Computer Engineer at Carnegie Mellon University (CMU). He has an intense interest in education, which has led to the creation of a number of personal papers delving into topics about how and why students learn, and what the most effective means of education are. He has been a teaching assistant for the Fundamentals of Programming and Computer Science class at CMU. He also currently volunteers for a group called Teknowledge, which focuses on creating a curriculum and outreach program through Carnegie Mellon to support local high schools and teach computer science and programming.*



## COOL CRASH (BIO) CHEMISTRY, GRADES 3-4

9am - noon, March 24th



Students will participate in hands-on activities and demonstrations. Emphasis will be placed on fundamental chemistry and biochemistry concepts such as density, solubility, and DNA. Make lava lamps, extract strawberry DNA and much more! Participate in fun 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.*

## CSI AT CMU GRADES 5-6

9am - noon, February 24th

DNA is the genetic material that is present in nearly all forms of life. (Some viruses rely on RNA instead of DNA.) The process of detecting and “reading” DNA is essential to medical diagnostics (as in determining whether a patient has a bacterial infection or is susceptible to a genetic disease such as cancer) and forensics (for example, crime scene investigations). This course will introduce students to the biology of DNA, applications of DNA detection, and a technology developed at Carnegie Mellon for DNA detection.

*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.*



## DISEASE OUTBREAKS, GRADES 7-9

\*\* 9:15am - 12:15pm, February 24th

Students interested in biology, join us in a CMU Biology Lab. Class will take place in the Mellon Institute located on Bellefield Avenue in Oakland. In this class, you will track a SIMULATED disease outbreak. You will perform an ELISA or enzyme linked immunosorbent assay to determine if you have been exposed to a contagious “disease”. The ELISA uses antibodies to detect the presence of a disease agent, for example, viruses, bacteria or parasites in your blood or other bodily fluid. You will then track the disease back to its source. You will learn how an ELISA works, and learn about the field of Immunology. It is important to emphasize that this is a SIMULATED lab, that is, you are NOT working with any pathological agents that cause disease. Because you will be in an actual biology lab, students must wear closed-toed shoes and follow the safety rules in the lab. Lab coats, goggles and gloves will be provided.



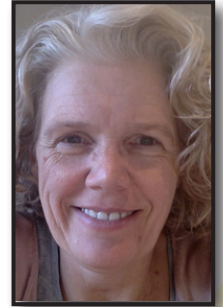
*Dr. Carrie Doonan is the Director of Undergraduate Laboratories and Teaching Professor in the Department of Biological Sciences at Carnegie Mellon University. She was educated at Chatham College (BS) and the University of Connecticut, (Ph.D) and began her teaching career at Carnegie Mellon University in 1993. Her primary area of focus involves the teaching and administration of a range of experimental laboratories in the department. She is responsible for writing and developing experimental units, training of junior faculty and teaching assistants and is actively involved in all aspects of the undergraduate program. Dr. Doonan has adapted many of her curricular innovations for use in K-12 outreach and has been invited to present this work at regional and national forums. She served as a Biotechnology Institute National Biotechnology Teacher-Leader in 2003 and 2005 and was awarded the Julius Ashkin Teaching Award in the Mellon College of Science in 2000. She was also awarded the Mark Gelfand Award for Service Learning and Outreach in 2011.*

## DIVERSITY IN THE OCEAN, GRADES 7-9

\*\*9:15am - 12:15pm, February 24th

Have you ever wondered about the types of animal diversity there is in the ocean? How do scientists know what animals are there, and how might this be changing over time and in response to climate change? In this workshop you will have the opportunity to get some hands-on experience on how scientists work to understand the ocean. You will examine marine invertebrate life cycles and the diversity of marine larvae. You will use tools of molecular biology, extract DNA and use a high-powered microscope to examine the specimens. This class takes place at the Mellon Institute located on the corner of Bellefield and Fifth Avenues. Because you will be in an actual biology lab, students must wear closed-toed shoes and follow the safety rules in the lab. Lab coats, goggles and gloves will be provided.

*Dr. Veronica Hinman is a Professor in the Biology Department at CMU. Growing up in Australia, she spent time exploring the sea near her home, camping and fishing with her family. This has given her a lifelong fascination with nature, and in particular life in the oceans. Dr. Hinman earned her bachelors and PhD degrees at the University of Queensland in Australia, specializing in Molecular Marine Biology. She was a postdoctoral fellow at Caltech. Her research uses several marine organisms (e.g sea stars and sea urchins) to understand how diversity evolves and also understand some of the fascinating properties that these animals have, including the ability to completely regenerate their arms. She teaches a class on the Evolution and History of Life for freshmen at CMU.*



## ENGINEERING 101, GRADES 5-7

9am - noon, March 24th

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.*

## GENES YOU'RE ALWAYS WEARING, GRADES K-2

9am - noon, April 28th

Have you ever wondered what makes you...you? Explore DNA, genes, biology and heritability. Discover the reason behind your connected earlobes and widow's peak. Choose the genes to create your own creature and take your knowledge home to share with your family and friends!

*Dr. Meredyth Wegener is a Special Lecturer in Biological Sciences, with a focus on neuroscience. She earned her B.A. in neuroscience from University of Virginia and her doctorate in neuroscience from University of Pittsburgh. She completed her dissertation after conducting research in adolescence and reward learning using awake-behaving electrophysiology in the laboratory of Dr. Bitu Moghaddam. Meredyth joined the Carnegie Mellon community this fall, and immediately became involved with Gelfand Outreach and Creative Technology Nights or “TechNights”, which specializes in introducing middle-school girls to STEM topics.*



## INSECT DWELLINGS, GRADES K-2

9am - noon, January 27th



Ever wonder where insects live? Is it on a leaf, in a hive, or perhaps in an underground tunnel? In this introductory architecture class you will discover how insects of all kinds live. Explore the structure and habitat which they live within. You will be able to select insects from ants, ladybugs, or even butterflies and then design a home in which your small friend can live!

*Elizabeth Levy is currently a fourth year student in Carnegie Mellon University's School of Architecture. She has taught children K through 7th at the Carnegie Museum of Art, Anvil Art Studio, Camp Invention Program, Phipps Conservatory Discovery Center, and presented Sustainable Living Research to several classes of students in Pennsylvania. She has a background in art, design, and horticulture with interests in Biology, Sustainability, and Education. As a member of CMU's Architectural Outreach Program, Elizabeth's focus is to instill in children the importance of S.T.E.A.M. ideals and introduce architecture at a young age.*

## INTRODUCTION TO MOTION PLANNING, GRADES 6-8

9am - noon, January 27th

Ever wonder how robots are able to move around without bumping into obstacles? How are self-driving cars able to get from their current location to another location? Motion planning is a field of Robotics that develops algorithms to plan motion of a robotic system to move from one point to another. In this class, we will discuss the basics of search-based planning, a specific motion planning method that is used in robotics to address the following question: how can robots efficiently plan a path to move from point A to point B without colliding with obstacles? We will also have a role-play activity where we act out how some of these algorithms find a path. Finally, we will visit the Search-Based Planning Lab to see real-world applications of these algorithms on robots!

*Vinitha Ranganeni is a third year undergraduate student at Carnegie Mellon University pursuing a Bachelor's of Science Degree in Information Systems and Robotics. She is also an undergraduate researcher at Carnegie Mellon University's Search-Based Planning Lab and is advised by Professor Maxim Likhachev. Her general research interests lie in Robotic Manipulation and Motion Planning. Previously, she was an undergraduate researcher in The Personal Robotics Lab where she was advised by Professor Siddhartha Srinivasa and worked on projects with HERB, the Home Exploring Robot Butler. Vinitha participated in several outreach events with children and underprivileged students where she talked about Robotics in general and the specific work both she and her lab are doing.*



## LIQUID SCIENCE, GRADES K-2

9am - noon, January 27th

Normal liquids can do crazy things when you look at them in the right way. Did you ever think you could watch them crawl on top of or below other liquids? Float objects and sink them upon command! Come experiment with acids and bases and discover a magic pitcher that changes between a pink and clear solution in a matter of seconds. As you try out these tricks, learn about cohesion and adhesion in liquids. You've never seen liquids this crazy!



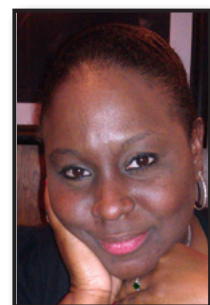
*Subanky Sivagnalingam is currently an undergraduate senior at Carnegie Mellon University majoring in Chemistry with a Biological Chemistry Track. She has previous experience working with children as a tutor at Colfax Elementary School and at the Science & Technology Academy in Pittsburgh. She is currently a DNAZone Technician at Mellon Institute and helps prepare science experiment kits for middle school and high school students in the Pittsburgh area. During her free time, she also enjoys volunteering at events such as Moving 4th in Science and Take Your Kids to Work Day where she can have a positive influence in the community through education.*

## MARVELOUS MACROMOLECULES, GRADES 3-5

9am - noon, April 28th

The existence of life is dependent upon nature's ability to manufacture very large, complicated molecules such as DNA and proteins. The ability of chemists to prepare really big molecules called polymers in the laboratory has revolutionized the manner in which we live. In this workshop, students will explore a variety of polymers, their usefulness, and how to make them in a manner which demonstrates care for the environment. This hands-on workshop will have students working in the lab and participating in lecture demonstrations to explore the amazing world of polymer chemistry.

*Dr. Gizelle A. Sherwood is currently an Assistant teaching Professor at Carnegie Mellon University. She earned her Ph.D. in 2008 where her research focused on the effects of aggregation on the photo-physics of oligomers related to MEH-PPV and CN-PPV. She primarily lectures Quantitative Chemical Analysis laboratories to the sophomore chemical engineering, biology and pre-med students. She is also involved in several outreach programs working with both the Boy Scouts of America and the Leonard Gelfand Center.*



## MECHANICAL ROBOT GRIPPERS, GRADES 6-8

9am - noon, January 27th

The field of Robotics is a combination of mechanical engineering, computer science, and electrical engineering. This hands-on workshop will give students a taste of the mechanical side of robotics. Students will be able to interact with one of the robots developed at CMU called the Multipurpose Mobile Manipulator (MMM). In small groups, students will design a gripper for the robot out of LEGOs, and then test out their design by controlling the robot to see how well it performs specific tasks.

*John Choi likes to introduce himself by saying he is a robot programmed with a singular mission: to effectively engage and inspire the next generation of STEM talent. Having graduated with a Bachelor's degree in Computer Science and Arts at Carnegie Mellon University in 2017, John has over 9 years of experience developing computer simulations using a variety of programming languages and 4 years of experience building robots at CMU. In 2016, as an Innovation Scholar from the Center for Innovation and Entrepreneurship at CMU, John founded an educational technology company called Choitek in Pittsburgh, PA. Choitek's flagship product is the Multipurpose Mobile Manipulator Mk II, (or Megamark for short), an advanced robotics platform designed to be capable of performing a variety of human-size tasks, such as watering plants, playing the piano, feeding pets, delivering coffee, and most importantly, teaching and inspiring students with its easy-to-use and accessible hardware. John Choi volunteered at the Carnegie Science Center, AssemblePGH, Carnegie Mellon's Leonard Gelfand Center, Project Ignite, Robotics Club, several middle and high schools, and was awarded the Gelfand Student Service Award in 2017. John is truly an artist, engineer, and entrepreneur all in one.*



## NANOENGINEERING WITH DNA, GRADES 4-6

9am - noon, February 24th

Did you know that DNA can be used to make tiny nanostructures and nanomachines? Engineers can design structures that are 1/1000th the width of a single hair and these structures will build themselves under the proper conditions. Professor Taylor will introduce students to structural DNA nanotechnology. Students will physically interact with both the chemical structure and mechanics of DNA, acting like nanomanufacturing engineers who treat DNA as an engineering material. They will build DNA double helix models from pasta and then as the focus of the class they will build scale DNA origami models of double helical rafts and nanotubes using pipe cladding and lasercut wooden connectors (using a kit designed by the Taylor lab students).

*Dr. Rebecca Taylor is an Assistant Professor in Mechanical Engineering at Carnegie Mellon University (CMU). She also holds a courtesy appointment in the Biomedical Engineering department at CMU. Prof. Taylor received her B.S.E. in Mechanical Engineering from Princeton University and her M.S. and Ph.D. in Mechanical Engineering from Stanford University. During her doctoral research she worked with Professor Beth Pruitt developing microscale force sensors for studying the mechanics of stem-cell derived heart muscle cells. She was subsequently a postdoctoral fellow in Biochemistry at the Stanford University School of Medicine, working under the supervision of Professor James Spudich. She is the director of the Microsystems and Mechanobiology Lab and her research team uses micro- and nanoscale structures as sensors and actuators for investigating the mechanics of cellular and molecular biosystems.*



## OCEAN LIFE, GRADES K-2

\*\*9:15am-12:15pm, April 28th

Have you ever wondered about the animals that live in the ocean? Do you like exploring creatures of the sea? Join us in an actual marine biology lab located in the Mellon Institute of Carnegie Mellon University. You will see different sea life and learn about them and their environment. Using craft supplies you will be able to create a model of one of the sea creatures to take home!



*Dr. Greg Cary is a Postdoctoral Researcher in the Biology Department at CMU. Greg grew up in Maine and spent many summers exploring and enjoying the beautiful coastline. This sparked an interest in biology, which he pursued as an undergraduate at Colby College studying hormones and the nervous system in shore crabs. Greg studied at the University of Washington for his PhD, where he learned to utilize large datasets and computational tools to address complex biological questions. Greg's research uses sea stars and sea urchins to understand how the genome of each organism encodes the information necessary to build, and in some cases re-build, a complete organism.*

## PERCEIVING THE WORLD THROUGH ROBOT SENSORS, GRADES 4-6

9am - noon, April 28th

Which household chore would you like a robot to do for you? What does the robot need to know about its surroundings to perform that chore? We will explore different sensors and discover the various types of information that they provide. Learn about how robot sensors mimic human sensing capabilities and sometimes exceed them! Build a sensor-actuator loop that reacts to its environment. Learn how machine learning is making it easier for robots to perceive the world around them.

*Dr. Oliver Kroemer is an assistant professor at the Carnegie Mellon University Robotics Institute. His research interests are in machine learning and robotics, with a focus on learning for grasping and manipulation. Before joining CMU, Oliver was a postdoctoral researcher at the University of Southern California. He received his Masters and Bachelors degrees in engineering from the University of Cambridge in 2008, and he defended his Ph.D. thesis at the Technische Universitaet Darmstadt in 2014.*



## SOLAR ENERGY, GRADES 4-6

9am - noon, April 28th



You've heard that the sun can provide enough energy to power the whole world, but how is that energy harnessed? Why isn't this powerful, renewable, clean energy source used more often? Learn the basics of heat and how solar energy is used today, how a solar furnace can be used to heat your house in the winter and build your own solar hot water heater to take home with you to share. Solar energy, it's hot!

*Kristin Lavery has been the Assistant Director of the Leonard Gelfand Center (LGC) for Service Learning and Outreach since January of 2013. She joined the LGC after completing her Master of Arts in Teaching (grades K-6) at Chatham University in December of 2012. Kristin coordinates tutoring programs in the local Pittsburgh area where CMU students act as after school tutors, or teaching assistant and mentors in classrooms. Kristin also develops activities and workshops for presentation at schools and K-12 STEM related events in the area.*

## STOCK MARKET, GRADES 4-6

9am - noon, March 24th

What are stocks? How do people make decisions about buying stocks? See what it's like to be a stock trader by participating in a stock market simulation. Buy stocks, pay commissions, and trade stocks with your friends. We have a challenge for you: can you invest some "money" and turn it into a whole lot more? Play our game and find out!

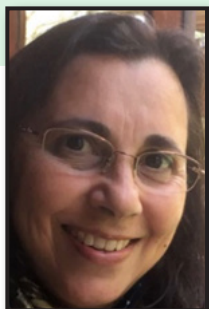
*David Dierker is a Tepper School of Business alumni, graduating with a concentration in finance and business analytics. David currently works as a management consultant out of the Pittsburgh, and also teaches computer programming classes through the Carnegie libraries of Pittsburgh. Mr. Dierker earned his Bachelors and Masters of Civil Engineering degrees from the Johns Hopkins University in Baltimore Maryland. Following graduation, David spent 6 years as an infrastructure adviser helping develop large scale energy and transportation projects for government and commercial clients across the globe.*



## TINY HARD WORKING GUYS, GRADES K-2

9am - noon, March 24th

This workshop will show the students how microscopic organisms can do a fantastic and effective job transforming certain chemical compounds into gasses among other things. We will use the Baker's yeast to produce CO<sub>2</sub> and O<sub>2</sub>. The first is produced by making the yeast eat sugar and the second by attacking the yeasts with hydrogen peroxide. Gases are invisible but we will find ways to demonstrate how they are formed. Our hands-on experiments will involve feeding sugar to the yeasts, preparing fluffy dough, and making a foamy mess with soap water. It will be a lot of fun!



*Dr. Gloria Silva is an Assistant Teaching Professor in the Chemistry Department at Carnegie Mellon University (CMU). Gloria received her B.S. in Organic Chemistry and Pharmacist degrees from the National University of Cordoba (UNC), Argentina. At UNC she was an Assistant Professor with tenure and a Researcher of the Argentinean Research Council. She performed research in Bioactive Natural Products from plants. Gloria and her family moved to Pittsburgh in 2002 and she has been at CMU since. She was involved in research in the field of Bioorganic Chemistry and has been teaching undergraduate and graduate courses since 2008. Her courses have a main focus on Organic Chemistry and courses that teach concepts at the interface between Biology and Chemistry including a course on Food Science.*

## TOURING HISTORY, GRADES 7-9

9am - noon, April 28th

This workshop focuses on learning and gaining a passion about history! The class will start with learning about Alan Turing as a way to bridge the gap between computer science and World War II. Then, we will have a general discussion on the purpose of history, and what interesting historical figures such as Vincent Van Gogh can teach us. Hopefully, you will be more enthusiastic about learning about history, especially within the context of 'important' historical figures! Join us for a historically great time!

*Christopher George is the instructor for this class. Please see his biography on the second page.*

## USE YOUR NOGGIN:LEARN THE BRAIN GRADES 3-4

9am - noon, April 28th

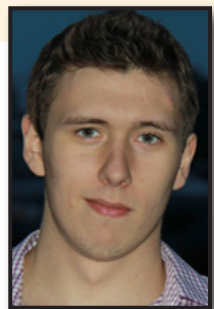
Come explore your brain and senses. In this workshop we will have hands-on demonstrations allowing you to explore your amazing brain in action and see some surprising ways in which your senses get things right and other ways that your senses can be fooled. We will also get to look inside a brain by seeing a pre-dissected real sheep's brain so you can see the ways that your brain is similar to and different from another animal's brain in its structure. You also will get to make a brain and a neuron craft to take home and use to explore more about how your brain and its parts work.

*Dr. DJ Brasier is an Assistant Teaching Professor of Biological Sciences specializing in neurobiology. He was trained in brain physiology and genetics at University of California San Diego and UC San Francisco. He has been teaching neuroscience at CMU since 2012 and involved in community outreach for many years.*



## WEDO ROBOTICS, GRADES 3-4

9am - noon, February 24th



Explore the world of robotics using the LEGO® WeDo kit designed specifically for younger students. Build LEGO® models that feature working motors and sensors, then program them to move and react to the world using an intuitive "drag-and-drop" interface.

*Alexander Volkov is a second year master's student at the CMU Robotics Institute. His research focuses on enabling legged 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.*

## YOU ARE WHAT YOU EAT, GRADES K-2

9am - noon, February 24th

Ever wonder what happens to an apple after you eat it? From bite to breakdown we will track its path. You will discover how food is processed and how we get energy from the nutrients. You will also create a model of the digestive system to take home to savor your experience. Can't you just taste the fun?

*Dr. Rosalyn Abbott is an Assistant Professor in Biomedical Engineering at Carnegie Mellon University (CMU). Prof. Abbott received her B.S. and M.S. degrees in Biomedical Engineering from Rensselaer Polytechnic Institute and her Ph.D. degree in Bioengineering from the University of Vermont. She was subsequently a postdoctoral fellow in the Biomedical Engineering Department at Tufts University working under the supervision of Professor David Kaplan, where she developed adipose and skin tissue engineered models. Her lab at CMU focuses on using tissue engineering to study metabolic regulation during the complex transition of obesity to insulin resistant type II diabetes.*



## SUNDAY 5-Hour Class

### LEARN ENGINEERING @ CMU THROUGH MINECRAFT, GRADES 4-7

10am - 4pm, Sunday, April 29th

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: \$80.00 / Financial aid is available, based on family need.

*Dr. B. Reeya 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.*



### Gelfand Outreach Spring 2018 Saturday Series Classes

Most classes are \$55.00\* each and are conducted from 9:00am to noon unless otherwise noted, at Carnegie Mellon University.

#### January 27th

Amazing Atmosphere, Gr. 4-5  
Architecture of Sound, Gr. 3-5  
Insect Dwellings, Gr. K-2  
Intro to Motion Planning, Gr. 6-8  
Liquid Science, Gr. K-2  
Mechanical Robot Grippers, Gr. 6-8

#### April 28th

Genes You're Always Wearing, Gr. K-2  
Marvelous Macromolecules, Gr. 3-5  
Ocean Life, Gr. K-2, 9:15am - 12:15pm\*\*  
Perceiving the World Through  
Robot Sensors, Gr. 4-6  
Solar Energy, Gr. 4-6  
Touring History, Gr. 7-9  
Use Your Noggin, Learn the Brain, Gr. 3-4

#### February 24th

CSI at CMU, Gr. 5-6  
Disease Outbreaks, Gr. 7-9,  
9:15am - 12:15pm\*\*  
Diversity in the Ocean, Gr. 7-9,  
9:15am - 12:15pm\*\*  
NanoEngineering w/DNA, Gr. 4-6  
WeDo Robotics, Gr. 3-4  
You Are What You Eat, Gr. K-2

#### March 24th

Additive Manufacturing, Gr. 6-8  
Bug-Bots, Gr. K-2  
Cool Crash (Bio) Chemistry, Gr. 3-4  
Engineering 101, Gr. 5-7  
Stock Market, Gr. 4-6  
Tiny Hard Working Guys, Gr. K-2

#### Sunday, April 29th

Learn Engineering @ CMU Through  
Minecraft, Gr. 4-7\*

To apply for scholarship funds, please submit a copy of the first page of your IRS 1040 tax form from 2016.

\*Learn Engineering @CMU through Minecraft is \$80.00.

\*\* Classes are held at the Mellon Institute, on Bellefield Avenue, in Oakland.

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