Sunday Evening Workshops
6:00–9:00 pm

Beauty and Joy of Computing (CS Principles) on edX
Dan Garcia, Tiffany Barnes, Sean Morris and Josh Paley
The Beauty and Joy of Computing (BJC) is an introductory computer science curriculum
developed at UC Berkeley (and adapted at the University of North Carolina, Charlotte and NC
State), intended for high school juniors through university non-majors. It was used in two of the
five initial pilot programs for the AP CS Principles course being developed by the College Board
and the National Science Foundation. Our overall goal is to support the CS10K project by
preparing instructors to teach the AP CS Principles course through the BJC curriculum. In this
workshop, we will share our experiences as instructors of the Beauty and Joy of Computing CS
Principles course at the university and high school level, provide a glimpse into a typical week of
the course with hands-on activities, and share details of the 2015-2016 edX SPOC course that
teachers could use in their classroom.

Embedding Computer Science in Science Classes–Grades 6-12
Paige Prescott, Maureen Psaila-Dombrowski
During this three-hour workshop, attendees will explore how models can be developed and used
to allow teachers and students to investigate STEM topics through scientific inquiry and
computational thinking. Using modeling and simulation in the STEM classroom not only allows
students to more fully explore the scientific concepts being taught, they also learn computer
science concepts and programming thus preparing the student to pursue a more formal computer
science class in the future. In addition, the Next Generation Science Standards (NGSS) inclusion
of Computational Thinking Skills and modeling into the curriculum opens the door for the
introduction of computer science at an early age. Two programming environments, StarLogo
Nova and Netlogo, will be used to demonstrate the broad applicability and flexibility that computer
models and simulations, allows both the teacher and the student.

The Internet and Creativity & Global Impact: Two Modules for the New AP CS
Principles Course
Richard Kick, Andrew Kuemmel and Lien Diaz
This workshop focuses on content in two curriculum modules for AP Computer Science Principles
(CSP) developed by the College Board. They highlight instructional approaches for teaching
concepts about 1) the Internet; and 2) the interplay between creative aspects of computing and
impact of computing on society. The Internet module activities allow students to construct their
own solutions to problems similar to some that the builders of the Internet faced. The topics in the
Creativity and Global Impact module were chosen because they have rich potential for increasing
interest with students, especially those from underrepresented demographics, and because they
present instructional challenges for instructors new to AP CSP. Participants will learn detailed
concepts addressed in the AP CSP course and will receive classroom materials from each of the curriculum modules. These modules serve as exemplary resources for teachers.

**Media Computation in Python**  
*Mark Guzdial and Barbara Ericson*  
Come to a hands-on introduction to Media Computation in Python, which is a proven and engaging approach to teaching computing concepts. In Media Computation students write programs to manipulate media: pictures, sounds, and text. In Media Computation you can mirror a picture to create art or reverse a sound to look for hidden messages. Media Computation has been used successfully for over 10 years to teach introductory programming at the college and high school level. Media Computation can be used to teach basic computing concepts such as variables, loops, conditionals, string manipulation, and arrays.

**Monday Morning Workshops**  
9:00 am – 12:00 pm

**Supplement Conventional Teaching with Online Google Tool**  
*Afrin Naz, Amit Deutsch, Shahed Mustafa and Dr. Mingyu Lu*  
This workshop is on applying Google tools (such as Course Builder and Hangouts) to deliver online instructions. The proposed teaching methodology does not intend to replace conventional face-to-face instructions; rather, it offers supplements to conventional teaching with enhanced capacity and flexibility. All the software tools covered by this workshop can be readily downloaded from the Internet and are free of charge. The attendees will learn the software tools through plentiful hands-on exercises. Specifically, they will learn how to create online interactive instructions, how to record video tutorials with regular webcams, how to perform online assessment, and how to address students’ online questions effectively. The attendees do not have to possess any prior experience in online teaching. *Attendees need to bring their laptops to the workshop.*

**Code.org’s K-5 Courses**  
*Katherine Apone, Kiki Prottsman and Evelyn Zayas*  
Have you been looking for computer science curriculum for your K-5 students? Code.org has developed three courses to introduce and engage students in computer science education at the elementary school level. During this workshop, you’ll learn about Code.org’s Courses 1, 2 and 3, which are a mix of two kinds of lessons: online and unplugged. In online lessons, students write programs on the computer to achieve certain goals or express their creativity in more open-ended environments. In unplugged lessons, educators lead classroom activities that teach computer science concepts without the use of a computer. In this workshop, you’ll also model activities from the curriculum and discuss equitable practices for K-5 educators while getting a glimpse of how Code.org runs their PD sessions for teachers around the country.

**CS Principles: Decoded — A Curriculum from Code.org**  
*Baker Franke, Brook Osborne and Brenda Remess*  
Code.org is developing a rich set of instructional resources designed for high school teachers to meet the objectives of the AP Computer Science Principles framework. This workshop will provide teachers materials from the course, including daily lesson plans and instructional guides for an entire school year, along with new software and tools for students and teachers. The session will also give participants a taste of the professional development program designed to support instruction. Code.org’s curriculum is designed to be rigorous, but accessible for both high school students and instructors. This allows adequate time to explore and learn the principles of computing through a series of engaging activities, plugged and unplugged, employing a variety of instructional strategies. Participants will experience lessons, both as students and teachers, in the fashion of the professional development program, which helps teachers prepare lessons from the curriculum in realistic contexts.
Mobile Computer Science Principles: Teaching Computing Through Mobile Technology
Ralph Morelli, Chinma Uche, Pauline Lake and Rachel Martinich
The College Board’s CS Principles (CSP) Project is an effort to develop a language-neutral, breadth-first advanced placement (AP) course in Computer Science. Mobile CSP is an NSF-funded effort to train high school teachers to teach a CSP course that engages students in building mobile apps with App Inventor. The workshop will provide an overview of Mobile CSP training including a hands-on workshop with App Inventor and a representative sample of CSP-based lesson plans, assessment materials, and other resources. Mobile CSP training will be available for free to all teachers in summer 2015 through an online course, which will begin in June 2015. Information about the summer 2015 training will be available on our website. Target audience: Primarily high school teachers, but middle school teachers will also benefit from this workshop. *Laptop required.

Game Design as a STEAM Course
Gary Gongwer
The purpose of this workshop is to gain an understanding of Game Design as a STEAM course by introducing the many aspects of game design that come into play outside of actual programming. You will design a game guided by the “Hero’s Journey”, while making myriad artistic decisions about your game’s design. This process will be complemented by an introduction to “gamification” and the roles of games in society. Attendees will leave with greater familiarity of the process of game design and the layout of a game design course.

Monday Afternoon Workshops
1:00–4:00 pm

Problem Based Learning in Computer Science: A Case Study in Robotics Camp
Joshua Block
Come learn how a school district's robotics camp allowed for true differentiated problem based learning in a computer science setting for grades 5-12. Attendees will experience some of the hands-on problems done in robotics camp and learn how to create a course or lesson where students can acquire content, skills, and receive feedback in a problem based environment. Attendees will leave the workshop having written a student-centered problem and implementation plan for their own classroom.

Physical Computing Activities for the K-8 Classroom
Dylan Ryder
Make Computer Science fun and easy for students by turning computer programming into a hands-on activity. Make a video game controller with tin foil and an old take-out container. Make an electronic door alarm with LEGOs and tape. Make your own Operation-style board game with a cereal box and chopsticks. Make everything from anything! In this workshop you will learn how to implement classroom projects that integrate Science, Technology, Art, and Math together through computer programming and engineering design. We will survey a number of methods and materials that help students explore Computer Science such as Scratch, a drag-and-drop programming language for young learners. We will also use basic physical computing sensors like MakeyMakey, LEGO WeDo, and Make!Sense that allow us to program interactive objects from household materials. Beginner's welcome.

High School CS Breadth in Depth: CSP x ECS x APCSA
Owen Astrachan, Gail Chapman and Don Yandek
Three courses are national exemplars, part of the CS10K/CE21 initiative, recognized by the CSTA standards for high school computer science, and integral to both Code.org and PLTW computer science projects: Exploring Computer Science (ECS), Computer Science Principles (CSP), and AP Computer Science A (APCSA). This workshop, and the information and activities that are part of it are designed to help high school computer science teachers become well- and better-informed about these three courses, the student audiences addressed by each, the content and pedagogical practices embraced in each, and the role that each can play in paths and pathways for both teachers and students. The workshop provides a solid understanding about
how the ECS, CSP and APCSA courses complement each other by using a set of activities that highlight differences and similarities among the courses from both content and pedagogical perspectives.

**Transition to Java Using Alice 3**  
*Donald Slater and Wanda Dann*

This workshop, designed for pre-AP, Introduction to Programming, Programming for Non-majors, and CS1 with transition to Java courses, will introduce the tools in Alice 3. One specifically designed to support the transition to Java, reviewing both the software and the available course materials. The workshop offers hands-on experience programming with Alice3 and Java together. Participants will see how to use Alice3 to build virtual worlds and how to transfer these programs into a Java IDE.

**Data Visualization with R**  
*Bimlesh Wadhwa*

Today, data sets are vast, dynamic, and complex consisting of collections of pictures, sounds, relationships and numbers. This workshop aims to introduce Data visualization tool, R to K-12 teachers to help them prepare future generations for the challenges of visualization and decision-making in our data-centric world. R is a versatile data analysis tool. RStudio is available in open source and runs on all common operating systems or in a browser connected to RStudio Server. This workshop module provides an introduction into the R environment to equip teachers with the knowledge required for introducing it to their students in a data science curriculum, and also to enhance their own skills for intermediate or advanced R workshops. The workshop will also highlight some of the pedagogical decisions surrounding R.