



## Clean Energy Technologies: Solar, Wind, and Hydrogen Fuel Cell Power

Students will explore advanced engineering concepts in alternative energy, focused on the future of solar, wind, and hydrogen fuel cell technology. Students will learn about the engineering and science design challenges faced in bringing alternative energy solutions into everyday use. Students will be challenged in the design, construction and testing of a working hydrogen fuel cell vehicle and charging station that integrates wind and solar energy. Students will experience becoming an engineer and joining an engineering team tasked with tackling significant engineering and systems integration challenges. This integrated STEM program is designed around informative work sessions, hands-on laboratory design-build experiences, challenging classroom experiments, and expert guest speakers. Emphasis of this engineering experience is to demonstrate how math, science, and engineering are used to create the designed world.



## Introduction to Machine Learning

This introduction to machine learning is an innovative introduction to core concepts of computer programming and statistics and their application in real-world data analysis. Data Science is built on three interrelated perspectives: inferential thinking, computational thinking, and real-world relevance. Inferential thinking refers to an ability to connect data to underlying phenomena and to the ability to think critically about the conclusions that are drawn from data analysis. Computational thinking refers to the ability to conceive of the abstractions and processes that allow inferential procedures to be embodied in computer programs. In addition to exposure to computer programming and statistical inference in the context of data analysis, the week will involve hands-on analysis of a variety of real-world datasets, and it will touch on social and legal issues surrounding data analysis. This curriculum is geared toward advanced STEM students.

## Fundamentals of CyberSecurity

According to a study into computer security manpower challenges and potential solutions released by the Center for Strategic and International Studies (CSIS), "we not only have a shortage of the highly technically skilled people required to operate and support systems already deployed, but also an even more desperate shortage of people who can design secure systems, write safe computer code, and create the ever more sophisticated tools needed to prevent, detect, mitigate, and reconstitute from damage due to system failures and malicious acts." Northrop Grumman cyber experts will teach Computer Forensics, CyberSecurity fundamentals, and provide invaluable information on CyberSecurity Internships & Careers. The week-long program will culminate with a CyberSecurity Grand Challenge Competition between two student teams. The program encourages both students who are beginners and students who have an intermediate knowledge of CyberSecurity.

## Advanced CyberSecurity Concept/Techniques

Are you ready to take your CyberSecurity skills to the next level? This course is intended for students who have a solid foundation in the fundamentals of CyberSecurity, and will include extensive hand-on lab time. Northrop Grumman cyber experts will lead this course and help students improve their skills and prepare them for the CyberPatriot competitions this fall. Enrollment priority will be given to students who have participated in at least one CyberPatriot season and intend to compete in the 2016-2017 season. This curriculum is intended for students who have had previous exposure to Cyber Security concepts.



*Presented by Northrop Grumman,  
Aurora Public Schools,  
Colorado State University, CU Boulder,  
and Cherry Creek Schools*  
(Open to all school districts and all high school and middle school students)

**July 15 – 19, 2019**

**9:00 am – 3:30 pm**

**8:30 – Monday – Registration**

**Friday 2:00 with awards at 1:00**

**Rangeview High School  
(17599 E. Iliff Ave, Aurora, CO)**

**Online registration March 1 – June 30**

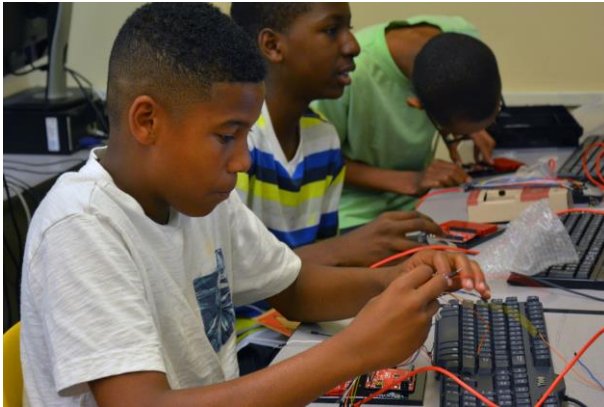
**Cost \$100 – 5 day camp  
<http://stemcamp.aurorak12.org>**



**NORTHROP GRUMMAN**

## Choose Your Hands-on Learning Experience from these Seven Exciting Tracks

- Clean Energy Technologies
- Introduction to Machine Learning
- Fundamentals of Cyber Security
- Advanced Cyber Security Concepts/Techniques
- Programming with Arduinos
- Programming Games in Python



A light breakfasts & lunches included with registration fee. Space is limited to 25 per class. Registration closes June 30<sup>th</sup>.



### Introduction to Programming, with Arduinos

Students will learn the basics of circuits, electricity, engineering and computing using Arduino. Some of the tools we will use are the Processing programming language, the SparkFun Inventor's Kit for Arduino, the LilyPad e-textiles line and the SparkFun RedBot robotics platform. This STEM track is designed to give a basic foundation to start working in a heavily relevant programming and engineering setting.

### Programming Games in Python

Are you thinking about a career in Software Engineering? Software Engineering was rated number one for job satisfaction in a Wall Street Journal article of the 10 Best Jobs of 2012. In this course, you will be introduced to the fundamentals of computer programming which will allow you to get a feel for what it would be like to be a Software Engineer. Some common applications for computer programming include:

- Computer Games
- Analysis of Integrated-circuit simulation results.
- Medical Software
- Anti-Virus Software
- Real-Time Physical Simulations
- High performance image processing/AI software
- High performance aerial and mobile sensor processing



Online registration is required and will be open from March 1<sup>st</sup> thru June 30<sup>th</sup> at

[Http://stemcamp.aurorak12.org](http://stemcamp.aurorak12.org)  
Questions: [rdmills@aurorak12.org](mailto:rdmills@aurorak12.org)

Classes are limited to 25 students, submit your registration as early as possible.

