

# **UCSD StudentTECH 2020**

## **College-Level Engineering for High School Students**

Sponsored by the San Diego Supercomputer Center, University of California, San Diego

### **Engineering: 3D CAD Modeling**



## **College-Level Engineering: Fusion 360 CAD Modeling Software: Dream It! Design It! Build It!**

Monday - Friday, August 3-7, 2020

Class meets at the University of California, San Diego from 8:30am - 3:00pm.

### **Course Overview**

3D Computer-Aided Design (CAD) modeling is a critical tool used in many Engineering applications and disciplines. Today's professionals can model almost anything from common household items to planes, trains, and automobiles to homes, buildings, and bridges and even to replacement body parts for injured or disabled people and animals. It allows for quick modifications and iterative designs.

Autodesk Fusion 360 is one of the newest 3D CAD modeling tools in the AutoCAD® family. 3D modeling is technology for design and technical documentation, replacing manual drafting with an automated process. Used by architects, engineers, and other professionals, 3D CAD software precisely represents and visualizes objects using a collection of points in three dimensions on the computer.

Students will be introduced to the basics of 3D CAD Modeling and learn how to use this tool. No prior experience is required – key concepts will be explained and modelled for all students. Each day, more features and techniques will be covered allowing students to make increasingly creative and complex parts. Students will work independently on their models at their own pace, but collaboration and peer assistance will be encouraged at all times. On the afternoon of the final day, each student will present a summary of their best work to celebrate their accomplishments with their peers.

### **Course Goals and Learning Outcomes**

- Learn the basic concepts and vocabulary associated with 3D CAD Modeling.
- Learn to use Autodesk Fusion 360 to model various commonly known items.
- Learn to create documentation for the parts and assemblies created.

### **Structure**

San Diego Supercomputer Center StudentTECH Workshop 2020

This course is primarily a hands-on, exploratory class where 16 students will use basic 3D CAD modeling skills to develop their own designs. Each day, students will be presented with basic instruction about various modeling techniques and the use of Fusion 360. Students will use their accumulated skills to build increasingly creative and complex designs, and all students will be encouraged to share things they learn with each other as they work. Students will present their best work with each other on the final afternoon to celebrate their accomplishments!

While students are invited to bring their own laptops to class, the UCSD lab will have all necessary hardware and software installed for their use each day.

### **Topics to be covered during the week**

- Module 1:**     -Introduction to 3D CAD Modeling concepts and terms  
                  -Review of general sketching, extrusions and holes  
                  -Using dimensions and basic constraints
- Module 2:**     -Adding custom curvature to our models  
                  -Adding more complex work planes  
                  -Using other 3D features
- Module 3:**     -Creating assemblies of multiple parts  
                  -More advanced part design
- Module 4:**     -Creating basic exploded presentations and simulations
- Module 5:**     -Basic drawings and documentation  
                  -Celebrate our best work!

### **Prerequisites:**

- Must be a high school student in grade 9-12 (upcoming fall semester).
- A basic understanding of computers.

**Instructor:** Bob O'Neill [San Diego Computer Science Teachers Association]