*Do you know a bright, curious student who sees possibilities they can create with science, technology, engineering, and math?*

**That student may be a perfect fit for the Beaver Works Summer Institute, a four-week virtual program that challenges high school students to tackle high-tech projects.**

## In 2022, Beaver Works Summer Institute (BWSI) will offer the following courses as hybrid distance learning opportunities:

**Autonomous RACECAR Grand Prix**
Program the artificial intelligence for a self-driving 1/10th scale car and race it against other teams in an autonomous Mini Grand Prix.

**Autonomous Air Vehicle Racing**
Take autonomous vehicles to a new dimension and make a quadcopter smart enough to race in an obstacle course by itself.

**Autonomous Cognitive Assistant**
Create your own artificial intelligence applications from scratch and customize personal assistants like the Amazon Alexa.

**Remote Sensing**
Students will explore real world datasets ranging from drone imagery of regions to disaster imagery. Students will develop experience in an area of data science that is poised to play a critical role in understanding our world.

**Build a CubeSat**
Design a small satellite for a big science mission. Prototype, demonstrate, and test the components that may get your team's system launched into space with other experimental CubeSats.

**Serious Game Design and Development with AI**
This course will introduce students to the process of game design with the application of Artificial Intelligence to game play. The course will focus on unconventional approaches to understand and address real world programs.

**Embedded Security and Hardware Hacking**
Learn the basics of embedded security and hardware hacking by designing your own secure system and performing security assessments of your classmates' designs to see who can find and fix the most security flaws.

**Medlytics: Data Science for Health & Medicine**
Explore the intersection of data science and medicine to learn how machine learning and big data can help improve health and healthcare.

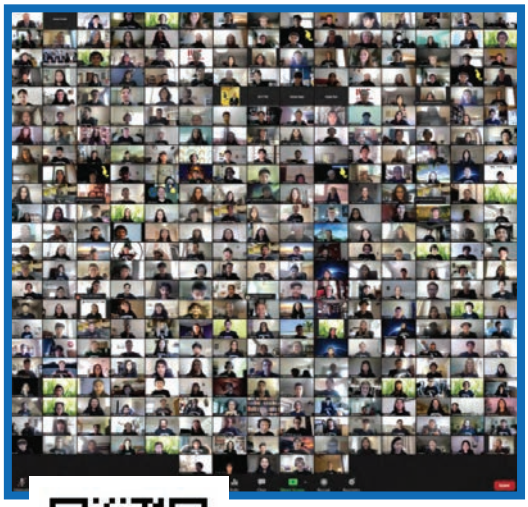
**Designing for Assistive Technologies**
We will tackle real problems faced by people living with disabilities, and learn to work together as a team, stepping through the engineering design process together to come up with personalized and creative solutions.

**Cyber Security in Software Intensive Systems**
Beaver Works Summer Institute will help students learn and understand cyber security. Through projects and challenges will learn about network security and cryptography, learn how to use a fuzzer in finding and fixing software vulnerabilities, and how create a software service that can survive a disruption, and why social engineering and the usability of software are all parts of Cyber Security.

**Underwater Autonomous Vehicle Challenge**
Learn basic hydrodynamics, vehicle control and image recognition. Build a custom underwater vehicle and program it to navigate an obstacle course autonomously.

**Quantum Software**
Beaver Works Summer Institute will offer students a chance to learn about quantum computing and algorithms. Students will learn fundamentals of quantum mechanics that make qubits unique and important to solving hard computational problems and develop algorithms that make use of qubit properties like superposition and entanglement. Students will be able to use quantum computing simulators to test their ideas and algorithms and explore the incredible opportunities with this technology.

**Unmanned Air System Synthetic Aperture Radar**
Don't just fly a drone…build one with a radar collect data on the fly, process it, and use the complete system to sense the world around you in new ways!



*BWSI Class of 2021*

## Students are eligible for the 2022 summer program if:

- They are attending high school in US or US citizen abroad
- They have demonstrated technical ability (evidenced by recommendations from school officials, test scores, coursework, grades, and extracurricular activities)
- They have completed the lessons in the online tutorial for their desired project
- Online course starts February 2022 (prerequisite in order to apply to the July program)
- Virtual BWSI runs July 11 – August 7 2022*

* The dates listed may shift back a few days.

BEAVER WORKS
Lincoln Laboratory | School of Engineering

**To get more information and to apply, visit:**
https://beaverworks.ll.mit.edu/CMS/bw/BWSI
**or email:** bwsi-admin@mit.edu