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Creating a Foundational STEM + Sustainability Curriculum for High Schools in Chicago (Resource Exchange)

Gabrielle Grace Hershey
Gabriel Louis Anderson
Savannah Svedman
Grant Miller
Samantha Lynn Lakin, Illinois State University
Jeritt Williams, Illinois State University

Jeritt Williams is an assistant professor of Engineering Technology at Illinois State University, where he teaches applied industrial automation and robotics.

Dr. Jin Ho Jo

Dr. Jin Ho Jo is an Associate Professor of Technology at Illinois State University, teaching in the Renewable Energy program. Dr. Jo is the program coordinator and also leads the Sustainable Energy Research Group at ISU. Dr. Jo is an honors graduate of Pu

Allison Antink-Meyer, Illinois State University

Allison Antink-Meyer is a pre-college science and engineering educator at Illinois State University.

Dr. Matthew Aldeman, Illinois State University

Matt Aldeman is an Associate Professor of Technology at Illinois State University, where he teaches in the Renewable Energy and Engineering Technology programs. Matt joined the Technology department faculty after working at the Illinois State University Center for Renewable Energy for over five years. Previously, he worked at General Electric as a wind site manager at the Grand Ridge and Rail Splitter wind projects. Matt's experience also includes service in the U.S. Navy as a nuclear propulsion officer and leader of the Reactor Electrical division on the aircraft carrier USS John C. Stennis. Matt is an honors graduate of the U.S. Naval Nuclear Power School and holds a B.S. in Mechanical Engineering from Northwestern University, a Master of Engineering Management from Old Dominion University, and a Ph.D. in Mechanical and Aerospace Engineering from the Illinois Institute of Technology.

SUPERCHARGE

Creating a Foundational STEM + Sustainability Curriculum for High Schools in Chicago (Resource Exchange)

STEM-based University Pathway Encouraging Relationships with Chicago High schools in Automation, Robotics and Green Energy

SUPERCHARGE was proposed by Illinois State University faculty from the areas of STEM and STEM education, and accepted for funding by the National Science Foundation. This weekly after school program and curriculum is set to be deployed across four school years to four participating Chicago Public Schools (CPS).

Scan to access the sample curriculum!

Year 1: Energy and Climate

+Introduce students to technical and robotic applications, using the micro:bit, to further explore their understanding of relationships between energy consumption, environmental systems, and sustainability.

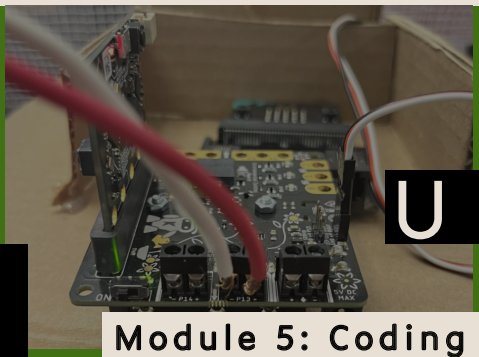
+Increase the knowledge and interest CPS students have for pursuing STEM pathways and careers, particularly those related to sustainable and renewable energy systems, robotics, and technology.

Grade level: 9-12

Duration: (32) Weekly Activities 75 min. each

Gabrielle Hershey, Gabriel Anderson, Julian Schmitt, Savannah Svedman, Grant Miller, Samantha Lakin, Jeritt Williams, Jin Jo, Allison Antink Meyer, Matthew Aldeman

SUPERCHARGE



UNIT 1

Module 1: Introduction and Temperature
1.1.1 Mission of SUPERCHARGE
1.1.2 Calculating Carbon Footprint
1.1.3 Hot & Cold: Using IR Tools to Measure Temperature in Your School
1.1.4 Investigating Thermal Properties of Materials

Module 2: Water and Its Impact
1.2.1 Microgreen Madness
1.2.2 Automated Irrigation
1.2.3 Water Quality
1.2.4 Harvesting Microgreens

Module 3: Air in our Neighborhoods
1.3.1 Introduction to Air Quality: Buildings to Communities
1.3.2 Kitonik Air Quality (AQ) Board Data Collection
1.3.3 Air Quality Data Logging and Visualization
1.3.4 Particulate Matter and Air Quality

Module 4: Electricity
1.4.1 Lights, Camera, Action
1.4.2 DC Motors
1.4.3 Red Yellow Green
1.4.4 Speed Racer

UNIT 2

Module 5: Coding and Data Analysis
2.1.1 Measuring Magnetic Fields
2.1.2 Analyzing Pressure and Humidity
2.1.3 Advancing into the micro:bit
2.1.4 Motors and Magnets

Module 6: Wind and Rain
2.2.1 Our Windy City
2.2.2 Wind Foils and Torque
2.2.3 Wind Foils and Speed

Module 7: Weather Station Applications
2.3.1 Construction of the Weather Station
2.3.2 Wind Speed Variance
2.3.3 Solar Irradiance
2.3.4 Soil Permeability and Rainfall

Module 8: Weather Station Projects
2.4.1 Withstanding Wind
2.4.2 Agriculture and the Environment
2.4.3 Shading
2.4.4 Weather Station Data Collection

Contact:
supercharge.isu@gmail.com
Dr. Matt Aldeman- Associate Professor
maldema@ilstu.edu (309)438-0644
Jeritt Williams- Instructional Assistant Professor jjwilli@ilstu.edu (309)438-0199