PennState College of Education | CSATS Center for Science and the Schools | PennState College of Engineering | ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

i-STEAM with CSATS

SSIST

# *Designing Wearable Devices*

**Presented by:**
Matt Johnson (Center for Science and the Schools, College of Education)
Tim Kane (Electrical Engineering, College of Engineering)

December 5, 2019 (9:00 A.M. – 3:30 P.M.)
Penn State University

Wearable technologies are becoming common devices for increasing our quality of life, but designing them requires an understanding of electronics, energy, design, and their potential users. Teachers will learn about different electronics platforms that can be used in the classroom and will learn how designing a wearable device can be used to teach a number of important concepts through an engaging project. Materials used in the workshop will be available for teachers to take this project to their classrooms to engage students in the design process. Teachers will be encouraged to enter their students in the Penn State Wearable Device Challenge, scheduled for May of 2019.

**Target Audience: Teachers of students grades 6-12**
**This workshop is FREE to all educators with ACT 48 (5.5 hours) provided free of charge.**

**This workshop is aligned to the PA Science and Technology Standards, PA Math Standards, and Next Generation Science Standards.**

**A continental breakfast and lunch are provided.**

**Maximum enrollment is 24. Register online now to reserve a spot online today.**
**For more information email Matt Johnson at mjohnson@psu.edu or call 814-863-6607.**

**Sponsored by:**
**The Center for Science and the Schools and National Science Foundation (EEC: 1660483)**

## Pennsylvania Science, Technology, and Engineering Standards

*Grades 6-8*

3.2.6.B2. Describe energy as a property of objects associated with heat, light, electricity, magnetism, mechanical motion, and sound.
3.2.7.B4. Explain how electrical current is produced by the flow of electrons.
3.2.8.B6. Explain how physics principles underlie everyday phenomena and important technologies.
3.4.6.D2. Use computers appropriately to access and organize and apply information.
3.4.7.D2. Select and safely use appropriate tools, products and systems for specific tasks.
3.4.8.D2. Operate and maintain systems in order to achieve a given purpose.
3.4.6.D3. Design and use instruments to evaluate data.

*Grades 9-12*

3.2.10.B4. Describe quantitatively the relationships between voltage, current, and resistance to electrical energy and power.
3.4.10A1. Illustrate how the development of **technologies** is often driven by profit and an economic market.
3.4.10.B1. Compare and contrast how the use of **technology** involves weighing the trade-offs between the positive and negative effects.
3.4.10.C1 Apply the components of the technological design process.
3.4.10.C2. Analyze a **prototype** and/or create a working model to test a design concept by making actual observations and necessary adjustments.
3.4.10.D1. Refine a design by using **prototypes** and modeling to ensure quality, efficiency, and productivity of a final product.
3.4.10.D2. Diagnose a malfunctioning **system** and use tools, materials, and knowledge to repair it.
3.4.12.B1. Analyze ethical, social, economic, and cultural considerations as related to the development, selection, and use of **technologies.**
3.4.12.C2. Apply the concept that engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.
3.4.12.C3. Apply the concept that many technological problems require a multi-disciplinary approach.

## Pennsylvania Math Standards

*Grades 6-8*

CC.2.2.6.B.3 Represent and analyze quantitative relationships between dependent and independent variables.
CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

*Grades 9-12*

CC.HSF.BF.A.1.A Determine an explicit expression, a recursive process, or steps for calculation from a context.
CC.HSF.BF.Modeling