



PennState
Cancer Institute



PennState
College of Engineering
**ARCHITECTURAL
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PennState
College of Education



RET SYMPOSIUM 2020

On July 31, 2020 our Summer 2020 Research Experience for Teachers fellows presented their summer research during the RET Symposium. We encourage those of you that were unable to attend the symposium to watch the recorded presentations included on the following pages. Thank you for your support of our teachers and your interest in our program.

[Opening Remarks](#)

Dr. Kathy Hill, Director of CSATS

[Closing Remarks](#)

Dr. Kathy Hill, Director of CSATS

2020 RET Fellows

Building RET

Adria Bondanza

Mentor: Dr. James Freihaut



Title: *Interaction Between Energy Use and the Indoor Environment*

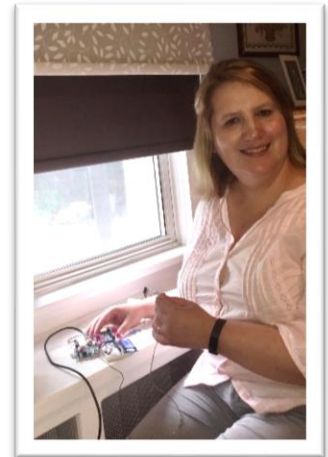
Description: Most people look for ways to make buildings more energy efficient, if for no other reason than to lower monthly energy bills. However, many measures that improve energy efficiency can negatively affect indoor air quality. Since most people spend 90% of their time indoors, building health is extremely important. How can we both use less energy and improve air quality?

Ann Czeponis

Mentor: Dr. Julian Wang

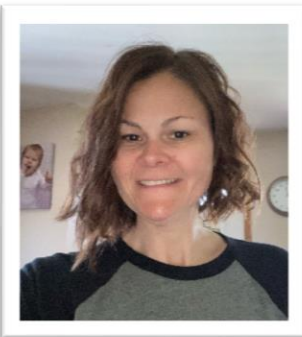
Title: *Testing and Expanding Upon In Situ Measurement of Window Efficiency*

Description: This project contributed to the development of a reliable instrument for in situ measurement of window efficiency. The Arduino sensor, designed by Dr. Julian Wang and Yanxiao Feng, measures U factor, solar transmittance and visible transmittance of in situ windows. I standardized the construction of a home build sensor and tested the sensor for its reliability and accuracy in measuring window efficiency in various conditions. In addition, I researched a method of using the sensor to also determine if an in-situ window has an emissivity coating.



Lindsey Dahl

Mentor: Dr. Julian Wang



Title: *How can a cost-effective Arduino sensor platform be used to measure in situ window properties?*

Description: I worked with Dr. Julian Wang from the Archilambda Lab at Penn State and PhD candidate, Yanxiao Feng, to build an Arduino sensor that they have designed. The platform measures U factor, solar transmittance and visible transmittance of in situ windows. I used this tool to test the efficiency of various windows and worked on researching the possibility of adding an affordable spectrometer to the platform so that in the future emissivity could also be measured.

Alice Flarend

Mentor: Dr. Gregory Pavlak

Title: *Examining Future Climate Readiness of Typical Residential Buildings*

Description: Climate change puts additional demands on building systems to maintain comfort at an affordable cost. An interactive library was developed to examine the energy needs of residential buildings with varying insulation amounts, window designs and HVAC system efficiencies under different future climate scenarios.



Kelly Light

Mentor: Dr. Richard Mistrick

Title: *Circadian Lighting: To what extent can the WELL standards be met by Daylighting?*

Description: Circadian lighting is essential to the health and well-being of human beings. The International WELL Building Institute has developed standards for circadian lighting to provide optimal benefits to the occupants of a specific type of space within a building. My research focuses on how well those standards can be met by Daylighting alone.



Michael Lowry

Mentor: Dr. Houtan Jebelli

Title: *Unifying the Science Classroom: Using Game Software to Explore Mars*

Description: In this session I will explore how science educators can use a game design platform, Unity Hub, to create authentic Martian environments. Through the use of powerful visualization tools supplemented with individualized coding scripts, the game platform can be transformed into a sophisticated exoplanet Geographic Information System (GIS). The resulting designed landscape is then evaluated for the potential as a landing site for a NASA Martian robotic rover.





Andrew Walton

Mentor: Dr. Nathan Brown

Title: *Optimizing Building Design and Glazing for Energy Reduction*

Description: This project focused on understanding the early design implications of considering building energy goals through the implementation of dynamic facade materials and building geometry optimization.

Phil Wood

Mentor: Dr. Houtan Jebelli

Title: *Developing a 3D model of Earth's Atmosphere using the Unity Interface*

Description: Learning to use the Unity engine interface to create 3D environments is a multi-step process. This summer research placement focused on creating a virtual 3D experience of Earth's atmosphere for students to gain a new perspective about the science phenomenon associated with the atmosphere. This virtual experience will serve as a springboard to immerse middle school students in learning to create their own digital 3D model using the Unity engine.



Genetics Research RET



Janet Magargal

Mentor: Dr. Shaun Mahony

Title: *Effects of transcription factor FoxA1 on mouse embryonic stem cells*

Description: I was welcomed into Dr. Mahony's lab of computational biologists who develop bioinformatic tools for understanding biological processes of gene regulation. In this experience, I learned about the general technology of various tools and techniques required to analyze large amounts of genomic data. My research problem was designed to use computational tools to analyze a new transcription factor, FoxA1, to look for its DNA preference, motif, and identification of expressed genes. The specific problem I addressed during my research experience was: "When FoxA1 is introduced into mouse stem cells, can it activate liver specific genes?"

Penn State Cancer Institute RET

Dan Bondanza

Mentor: Dr. Jennifer Moss

Title: [Objective and subjective income and their effects on cancer prevention](#)

Description: We studied various factors and their effect on cancer screenings and cancer rates. Women were surveyed on various topics and testing kits will be sent out and evaluated to compare individual variables and best practices for women and communities to take moving forward.



ASSIST RET



Justin Bush, 2nd year CSATS RET

Mentor: Dr. Vijay Narayanan

Title: [Developing a Multi-Channel Image Classification Model](#)

Description: In this project, we developed and compared the relative effectiveness of a multi-channel image classification model against a single-view model for fine-grain classification of bird species. We achieved an 11% increase in accuracy using the multi-channel model.

CSATS Faculty and Staff

Kathy Hill, PhD

Director and Associate Professor of Science Education

Matt Johnson, PhD

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Assistant Professor of Education
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Tiffany Lewis

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