



BEST Impact Report 2023 and 2024

Broadening Extension Graduate Student Training at Penn State

Email: mxk1244@psu.edu

Website <https://sites.psu.edu/bestprogram/2024/06/>

TABLE OF CONTENTS

About BEST _____	3
Overview _____	3
Objectives for 2023-2024 _____	3
Leadership Team and Instructors _____	3
Impact Assessment Approach _____	5
Methods _____	5
Participants _____	5
Overall Satisfaction with the Course _____	5
Modules Assessed _____	6
1. Cooperative Extension History and Policy _____	6
2. Stakeholders, Audiences and Applying the Extension Formula _____	6
3. Extension Philosophy, Theory and Approach _____	7
4. Careers in Extension _____	7
5. Extension Program Design and Assessment _____	8
6. Youth Extension _____	8
7. Panel Discussion on Access and Equity _____	9
8. Sustainability and Natural Resources _____	9
9. Forestland Stakeholders _____	10
10. Penn State Extension Resources _____	10
11. Guest Lectures _____	11
Capstone Projects _____	12
Assignment _____	12
Notable Capstone Projects _____	13

ABOUT BEST

Overview

The College of Agricultural Sciences at Penn State offers graduate programs in 18 major areas. With nine academic departments and 67 cooperative extension offices—one in each of Pennsylvania's counties—the college is widely recognized as one of the nation's leading institutions for agricultural research and education. The Broadening Extension through Student Training (BEST) program is a summer training and mentoring initiative for Penn State graduate students. This program is a collaboration among 10 extension faculty members who emphasize the importance of science communication skills for the success of graduate students and the sustainable management of natural resources and agriculture. By bringing graduate students together, the BEST program also fosters connections among faculty from diverse programs, encouraging both new and ongoing collaborations.

Objectives for 2023 and 2024

1. Provide a free, weeklong summer training program for students enrolled in graduate programs within the College of Agricultural Sciences at Penn State.
2. Offer 1-2 independent study credit hours to students who create their own extension-related materials and activities. Participants are paired with an extension mentor to guide the development and delivery of their original extension projects.

Leadership Team and Instructors



Melissa Kreye

Associate Professor of Forest Resources Management
Department of Ecosystem Science and Management

Areas of Expertise:

Social and economic values associated with private forests, including prescribed fire, wildlife, and carbon sequestration.

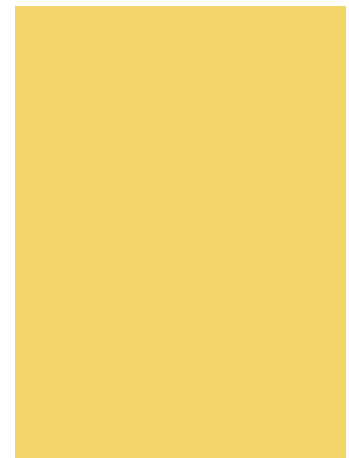


Jesse Kreye

Associate Research Professor, Fire and Natural Resources Management
Department of Ecosystem Science and Management

Areas of Expertise:

Fire ecology, fire behavior and effects.





Allyson Muth

Director, Center for Private Forests
Associate Research Professor, Private Forests Management
Department of Ecosystem Science and Management

Areas of Expertise:

Forest stewardship, private forest landowners, woodland care, collaborative learning, action research, peer-to-peer education.



Sanford "Sandy" Smith

Teaching Professor in Forest Resources and
Natural Resources & Youth Extension Specialist
Department of Ecosystem Science and Management

Areas of Expertise:

Youth and natural resources education, forest stewardship, natural resources volunteerism, private forestland management, connecting youth with nature, forest dendrology and botany.



Calvin Norman

Assistant Teaching Professor of Forestry
Department of Ecosystem Science and Management

Areas of Expertise:

Bioenergy and bioproducts, carbon markets, forest carbon, forest management, forest management for wildlife, forest health, invasive species, prescribed fire, renewable energy, silviculture, wildlife management, wildlife, vector-borne diseases.



Tyler Groh

Assistant Research Professor, Watershed Management Extension Specialist
Department of Ecosystem Science and Management

Areas of Expertise:

Watershed management, water quality, nitrogen cycle, biogeochemistry, conservation practices, soil-water interactions.



Faith Kibuye

Water Resources Extension Associate
Department of Ecosystem Science and Management

Areas of Expertise:

Environmental and aquatic chemistry; fate, transport, and transformation of organic contaminants.



Michela Centinari

Associate Professor of Viticulture
Department of Plant Science

Areas of Expertise:

Wine grape production, grapevine physiology, sustainable viticulture, cold temperature stress.



Paul McFarland

Education Program Specialist
Penn State Extension

Areas of Expertise:

Youth education, 4-H education program.



Adrian Barragan

Associate Research Professor, Extension Veterinarian
Department of Veterinary and Biomedical Sciences

Areas of Expertise:

Transition cow management, dairy cattle reproduction, farm personnel training and performance, dairy production medicine, cow comfort.

IMPACT ASSESSMENT APPROACH

Methods

A self-completion survey was used to gather information about students' experiences. Satisfaction—measured through perceived importance, usefulness, and future intentions—was assessed using 5-point Likert scale agree/disagree questions for each module and the capstone project. Mean scores above 4 indicated a positive impact on the dimensions evaluated. Changes in students' confidence in applying extension methods were also measured as an indicator of future intentions. Confidence levels were assessed using a 10-point Likert scale before and after the course.

Participants

A total of 48 graduate students participated in the BEST training program in 2023 and 2024. Over 90% of participants were awarded a certificate of completion and over half went on to develop extension materials and activities related to their own graduate research.

Overall Satisfaction with the Course

The perceived quality of the course increased by an average of 10% from year 2023 to 2024. Students agreed overall that the event was well organized (mean score 4.4), the location of the training was satisfactory (mean score 4.4), and the speakers were well qualified (mean score 4.8). **Students reported an average 33% increase in confidence in applying extension methods after taking the course.**

Comments about overall quality:

- The program was beyond my expectations, and I'm really satisfied with the discussions we had this week.
- This program was very informative and opened my view of extension. I learned about areas of extension that I did not know about, and it was great to see the whole process from the needs assessment to the evaluation.
- Very impressed with this. I did not know what to expect when I went into the course, and I feel like every speaker, presentation, and activity was necessary. Without knowing much going in, it felt more like an adventure, in a very positive way.
- The organizers/instructors were exceptional, and I am grateful for the opportunity to learn from such a talented group of specialists. I thoroughly enjoyed the group sessions and interactive activities led by the instructors.

MODULES ASSESSED

1. Cooperative Extension History and Policy

Instructor: Jesse Kreye. Most students described the history and policies associated with Land Grant institutions and Cooperative Extension as important (mean score 4.8), useful (mean score 4.7), and many expected to use this information in the future (mean score 4.6).

Comments about the Module:

- I did not know that there is a huge history behind extension before taking this training. Now I am confident enough to at least talk about it. Thank you.
- It's so easy in science to ignore different aspects of history that are really important for understanding how we got to where we are today. Keep this section for the future.
- Neat. I love little history lessons. I especially liked the discussion of HBCU and tribal colleges. I would've liked to see a bit more about institutions adopted into the land grant system - some existed before 1862 but were adopted when the Morrill Act was passed.
- This was extremely a new topic to me. I was not aware about any laws before.

2. Stakeholders, Audiences and Applying the Extension Formula

Instructors: Sanford Smith and Faith Kibuye. This module presented “who” Extension serves and students practiced evaluating the needs and conditions of potential audiences using realistic scenarios. Most students described this module was important (mean score 4.8), useful (mean score 4.3), and expected to use this information in the future (mean score 4.5).

Comments about the Module:

- It is good that they gave us examples of scenarios that one could encounter.
- I think this was one of the most useful sections. I feel more confident in designing content for extension using the formula provided by Sandy and Faith.
- The interactive portion of this section was one of the highlights of the program for me. I was nervous about working in the small groups at first, but it was very encouraging to have Faith come over and discuss the scenario with us.
- The section was very interactive, which helped me understand the importance of considering various perspectives and interests when developing a communication strategy.

3. Extension Philosophy, Theory and Approach

Instructor: Melissa Kreye. This module provided an overview of the servant leadership philosophy used in extension, adult education theory and strategies for engaging people and building knowledge. Most students described this module as important (mean score 4.6), useful (mean score 4.6), and expected to use this information in the future (mean score 4.6).

Comments about the Module:

- This was the most valuable session I have had. Thank you for providing this opportunity.
- I absolutely loved Melissa's approach and philosophy. I love the idea of valuing connection and relationships. This section specifically made me realize extension may be for me.
- This was almost completely new to me, and very interesting. I was familiar with some of the elements of the philosophy behind teaching methods, but this presentation gave me more of a foundation. I also feel that this section was grounded and gave me concrete ways to examine the abstract of leadership and teaching.

4. Careers in Extension

Instructor: Calvin Norman. This module provided an overview of the types of careers available within the Cooperative Extension system and the requirements for serving in those positions. Most students found this module to be important (mean score 4.6), useful (mean score 4.6), and expected to use this information in the future (mean score 4.5).

Comments about the Module:

- This section was helpful in expanding my perception of extension. I did not realize there were so many options. It feels like there is a niche for everyone in extension.
- It was very helpful to see real-life examples of what an extension educator schedule looks like and how they count their extension activities and time. It was also helpful to learn that the expectations vary depending on the appointment.
- This part of the workshop is really what shifted my belief in my future in extension. This was a very practical presentation, and I was very glad it was incorporated into the programming. Calvin's presentation was the one that made me think, "Oh, maybe I can do that," and it built from there.

5. Extension Program Design and Assessment

Instructor: Melissa Kreye. This module provided examples of how needs assessment findings and research can be combined to create an impactful curriculum and teaching approaches for target audiences. Most students described this module as important (mean score 4.5), useful (mean score 4.3), and expected to use this information in the future (mean score 4.3).

Comments about the Module:

- Learning about this really helped me start to conceptualize my own extension program for how I may share my research results back with landowners.
- It was interesting to see the different metrics used to measure impact. I also think it was helpful to learn from the instructor that sometimes it is hard to assess the impact and there is not one formula that works for everything.
- I can easily see how a presentation like this is invaluable for early career extension professionals, and it is a great resource for anyone considering this pathway.
- I think this might have been the most important section because the methodology can be applied to many other things.

6. Youth Extension

Instructor: Paul McFarland. This module provided an overview of longstanding youth-oriented programs in Extension (i.e., 4-H) and the value and importance of working with youth. Most students described this module as important (mean score 4.6), useful (mean score 4.5), and expected to use this information in the future (mean score 4.3).

Comments about the Module:

- I appreciated learning about youth programming and wished I had that opportunity growing up. It sounds like a vital and impactful work.
- Paul brought a human element to the conversations and that was great to see. I thought 4-H was only for farm kids, so I was happy to hear that those conversations are changing,
- This section was quite interesting, learning about how youth programs in extension are encouraged in the US. I will be happy to learn more.
- I was glad to hear about this and actually have ideas about how to volunteer with 4-H in the future.

7. Panel Discussion on Access and Equity

Panel: BEST Instructors. This module provided an overview of anti-discriminations laws and federal policies pertaining to access and equity as well as the philosophy of inclusion. Most students described this module to be important (mean score 4.6), useful (mean score 4.5), and expected to use this information in the future (mean score 4.3).

Comments about the Module:

- These discussions opened my eyes to accessibility issues everywhere. I now feel like I will be more mindful in my future planning, and I will ask my audience for their needs so I can accommodate.
- This panel did a good job of explaining how extension addresses DEIBJA in the work, and it seems like things are heading in the right direction.
- This was a very important discussion, and useful for future extension program designs. I appreciate how the panelists elaborated on the DEIBJA, with great examples. This will be a part of me in my future extension works.
- This can be a tough topic, but I think it was handled well. I found the discussion about parity to be particularly useful.

8. Sustainability and Natural Resources

Instructor: Tyler Groh. This module provided an overview of natural resources policy and management (mostly water resource issues) and the role of extension in sustaining those resources. Many students described this module as important (mean score 4.3), useful (mean score 4.2), and expected to use this information in the future (mean score 4.1).

Comments about the Module:

- I did not realize this even existed. Tyler did a great job just raising my awareness to the private vs public natural resources legislature.
- I think water resources are a great system to use to explain the complexities of private v. public natural resources, and it was very clear that Tyler is an expert. This is a subject I feel like I gained a lot of new knowledge on in a short amount of time.
- Learning the boundary between extension and giving legal advice was key.

9. Forestland Stakeholders

Instructor: Allyson Muth. This module focused on the needs and conditions of private forest land stakeholders and challenges in forest management. Many students described this module as important (mean score 4.4), useful (mean score 4.2), and expected to use this information in the future (mean score 4.1).

Comments about the Module:

- This section was very enlightening because I also had a perception that forest extension mainly dealt with economics. I now realize my original perception could not be further from the truth.
- I found some of the presentation to be quite surprising. It was interesting to hear about the challenges Allyson has faced in this subject and invigorating to hear about programs like the Walk in Penn's Woods. I thought she did an excellent job balancing the good and the not-so-good in this presentation. Allyson was interesting to listen to and I'm curious about more of her work.
- I learned many new concepts during this session for example I was not aware of that the farmers who are having land with woods are known as private forest landowners. this session seems informative to me.

10. Penn State Extension Resources

Instructor: Tyler Groh. This module introduced the types of resources offered through Penn State Extension to educators and faculty to support program delivery. Many students described this module as important (mean score 4.6), useful (mean score 4.5), and expected to use this information in the future (mean score 4.5).

Comments about the Module:

- This was great to show that there is a wonderful community out there to support you and you don't have to do anything alone.
- I did not know about any of the processes that go into the creation of resources, beyond the research that happens far earlier in the process. It makes sense that there are marketing professionals, but it was not something I was actively thinking about when I signed up for this course.
- I liked the walk-through of the Cvent website! It made program planning seem less daunting.

11. Guest Lectures

Presenters in 2024: Michela Centinari and Adrian Barragan. Extension faculty from the college were invited to present about their area of research and how they built their extension programs in Pennsylvania and internationally. Most students were satisfied with the information they received from the guest lectures (mean score 4.5).

Comments about the Module:

- The guest speakers were so wonderful and provided alternative perspectives and approaches to extension.
- I thought the guest speakers were great. They also came across as very trustworthy, and I would want to use them as resources if I was in the field of their expertise.
- Both guest presenters delivered their presentations effectively, emphasizing the importance of using extension as a tool for disseminating research findings to the audience. *They were both clear on the need for understanding the audiences needs before conducting any research.*



BEST Students from pilot program in 2022.

CAPSTONE PROJECTS

Assignment

The capstone project for the certificate of completion required students to develop a program logic model for a hypothetical extension program or event they might consider delivering in a real-world context. Students were encouraged to reflect on how their research could benefit a target audience and to develop key learning objectives with clearly defined short-term and long-term outcomes. Additionally, they described the stakeholders, partners, and resources needed to implement their proposed projects. While students were not required to implement their proposed programs, they had the option to enroll in 1-2 independent study credit hours in the fall to work with a mentor on implementing part or all of their proposals.

Most students reported that they had not previously developed a program logic model before this course (mean score 4.2). They agreed that the weeklong course prepared them to design their own logic model (mean score 4.5), that working in groups on this assignment was helpful (mean score 4.4), and that they planned to use the logic model in the future as part of an extension program, a job application, or a grant proposal (mean score 4.5).

Comments about the Capstone Project:

- This assignment is great idea. Before this training, I did not know anything about extension education and within 4 days I created a program. I feel the capstone project is very important as it allows students to apply their knowledge and provide them a chance to develop their own extension program under expert supervision.
- The logic model was brand new to me and this program gave me all of the resources and information I needed to develop my own. I feel thankful.
- I think this was a great assignment. I believe that by doing the logic model I had a better understanding of the steps need to design a new education program.
- I think the project was interesting and I hope to be able to write an article based upon what I learned about Extension programming.
- I thought the most helpful thing with it was having a group that really wanted to engage, talk about our ideas for a while. I'm more excited to submit my logic model now, and I'm hoping to turn it into something real.

Notable Capstone Projects

- Understanding PFAS Risk in Private Water Wells
- Farm Nitrous Oxide Management Practices
- Understanding the Understory
- Policies and permitting related to renewable energy, biogas and anaerobic digestion
- Transgenics at the butcher block: what to know about GMO byproducts when grocery shopping
- Caring for Your Microbial Livestock: Why Sustainable Practices for Soil Health Work
- Management of the American Grape Berry Moth in Vineyards
- How do cover crops influence my soil microbiome? Opportunities and challenges for farmers to shape their soil microbiomes via cover cropping
- Osmia Cornifrons for Apple Pollination in PA
- Watershed Restoration Practices in Reducing Pesticide Loads in the Halfmoon Creek Watershed
- Enhancing Orchard Growers' Adoption of Precision Herbicide Application Systems for Sustainable Weed Management in Adams County, Pennsylvania

“Extension education is the bridge between knowledge and action, empowering individuals and communities to improve their lives through practical learning and direct application.”

Future Insights:

- Set up website and registration portal further ahead of time
- Provide more peer review on capstone assignment
- Offer a social hour at end of day
- Set up a webinar series
- Promote job listings

This report was prepared by Dr. Melissa Kreye, mxk1244@psu.edu