

14th Biennial Conference on University Education in Natural Resources

Inclusive Natural Resources Education

Abstracts



Host: University of Nebraska-Lincoln



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Keynote Speakers

[Agenda Here](#)

KEYNOTE SPEAKERS



Bryan Dewsbury
Florida International
University



Joe Dauer
University of
Nebraska-Lincoln



Lisa Pennisi
University of
Nebraska-Lincoln



Sara Bombaci
Colorado State
University

Wednesday, March 23:

Sense of place — Developing a culture of inclusion in the natural sciences

Bryan Dewsbury
Florida International University

How do natural resource students organize and make sense of a flood of biology concepts?

Joe Dauer
University of Nebraska-Lincoln

Thursday, March 24:

Neurodiversity in our classrooms

Lisa Pennisi
University of Nebraska-Lincoln

Advancing inclusion in natural resources education: Insights from a decade of research and practice

Sara Bombaci
Colorado State University

Wednesday, March 23: Diversity, Equity and Inclusion

1:00pm-4:25pm Central Time, Room A

A survey of diversity and diversity initiatives in university fish and wildlife programs

Nancy E. Mathews*, Joshua Benes, Lisette P. Waits, John Carroll

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Rubenstein School of Environment and Natural Resource

University of Vermont

The National Association of University Fish and Wildlife Programs conducted a diversity and equity survey of students and faculty in 2020. Twenty-six of the 38 member institutions responded to the 75-question survey including 3 minority serving institutions. At the tenure track faculty level, 29% were women, 6% were BIPOC and 5% were international. These percentages were considerably higher for faculty lecturer positions (53%, 12%, 13% respectively). Among undergraduate, MS and PhD students, 49-55% were female whereas only 9-21% were BIPOC. Seventy-seven percent of respondents indicated that their University core curriculum requirements included a DEI related course but only 8% had a departmental specific DEI course requirement. Only 27% of programs specifically included DEI efforts in annual performance, and only 58% had a DEI committee at the unit level. Eighty-one percent of programs had initiatives to recruit under-represented students. Overall our results indicate a need for continued focused efforts on DEI initiatives in university fish and wildlife programs.

Update of enrollment trends in natural resources degree programs through the pandemic

Tara L. Bal*, Terry L. Sharik, Peter Ziegler, Deelan Jalil, Andrew Meeks

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College of Forest Resources and Environmental Science

Michigan Technological University

Since the pandemic in 2020, there have been reports of significant college enrollment declines nationwide generally across all disciplines, especially for women and underserved minorities. Here, we update enrollment trends (demographic data and academic areas) in Natural Resources (NR) from 2015-2021, focusing on the 80 National Association of University Forest Resources Programs (NAUFRP) member-institutions. We include all institutions so far reported (~30%, n=25) through fall 2021 to the USDA sponsored FAEIS program. Total NR enrollments slightly increased in 2020 from 2019, but decreased in 2021, though they are still higher than 2015. Some institutions report increased enrollment through 2021, contrasting with nationwide declines. As we continue to see pandemic impacts on enrollment trends, continual support for underserved students is necessary. Having well-documented enrollment data that may indicate NR fields are not experiencing declining enrollments to the same degree as other academic fields may increase administrative support for these programs.

Diversity among faculty and students in Fish and Wildlife Programs from 2005-2020

Lisette P. Waits*, Luvia N. Cajas-Cano, and Kerry L. Nicholson

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Fish and Wildlife Sciences

University of Idaho

The lack of gender, racial, and ethnic diversity among faculty and students has frequently been highlighted as an area of weakness for natural resource education. We conducted a survey of diversity among students and faculty in university fish and wildlife programs from 2005-2020. Results revealed that gender diversity has increased substantially at the undergraduate and graduate levels from lows of 37% female to greater than 50% at the undergraduate and MS level and 46% at the PhD level in 2020. Racial diversity also increased at all degree levels but remained substantially below the US average. At the faculty level, increases were also detected in gender diversity over time, but women were still underrepresented and most underrepresented at the full professor (27%) and department head levels (13%). Racial diversity among faculty was very low (<15%) and showed only small increases over time. Efforts and programs to increase diversity will also be reviewed.

Decoloniality, Anti-Racism, and Anti-Oppressive Praxis in the Natural Resources Classroom

Madhusudan Katti

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Department of Forestry and Environmental Resources

North Carolina State University

The study of natural resources is rooted in colonial frameworks of science deriving from the history of European colonization of much of the world. This field of research is also shaped by histories of systemic racism and other forms of oppression resulting in exclusionary practices that have erased indigenous knowledges. Natural resources classrooms reflect these underlying systemic biases in both curricular choices and non-inclusive teaching methods. We cannot achieve meaningful change towards truly inclusive natural resources education without dismantling the legacies of colonialism, systemic racism, and oppression in science. I will share five approaches towards making the natural resources classroom a more decolonial, anti-racist, and anti-oppressive space where diverse perspectives are empowered to engage with learning and research in ways that identify and overcome systemic biases. The 5 shifts in praxis, illustrated with examples, include: 1) decolonizing your mind, 2) knowing history, 3) decolonizing access, 4) decolonizing expertise, and 5) ethical and inclusive teamwork.

Using Native American Teachings to Decolonize Pedagogy

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Forestry and Natural Resources

North Carolina State University

In this presentation, attendees will learn three Native American teachings and how they might apply these to decolonizing their pedagogy and altering the power structures within their curriculum. The teachings presented come from North American Nations, primarily the Oceti Šakowij or the Great Sioux Nation. The presenter will explain these teachings - interconnectedness, circularity, and authenticity - within the context of teaching and learning by drawing from personal experiences and experts in the field. Using autoethnographic data, the presenter will show how the application of these principles led her to (1) create personal “rubrics,” (2) integrate diverse voices in curriculum development, and (3) design circular assignments. Attendees will acquire a new perspective with which to approach their pedagogy and curriculum, as well as examples of how to put this perspective into practice.

Toward an inclusive historical narrative for natural resource management in the US

Bridget B. Baker* and Nia Morales

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IFAS Department of Wildlife Ecology and Conservation

University of Florida

Creating a more inclusive field of natural resource management and conservation is critical to equitably and justly respond to modern social and environmental changes in the US. Educators must re-frame and expand the traditional, historical narrative of natural resource management, as a necessary step toward the long-term sustainability and equity of the field. This presentation will highlight narratives and contributions (e.g. Traditional Ecological Knowledge) stemming from historically excluded groups that can be incorporated into the natural resource curriculum to broaden views of human-environment relationships. An additional goal is starting a dialogue about: 1) how to effectively present aspects of the origin of the natural resources profession (e.g. ties to the American Eugenics Movement, discriminatory land acquisition practices, exclusionary wilderness ethic), while not dismissing the contributions of people traditionally emphasized; and 2) additional ideas and resources for featuring women, BIPOC, and environmental justice in the history of natural resources management.

Embedding Intercultural Competency Skills into Natural Resources Courses

Elizabeth A. Flaherty* and Elizabeth L. Karcher

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Department of Forestry and Natural Resources

Purdue University

Natural resource professionals work, negotiate, and collaborate with people from a diversity of backgrounds and cultures. To prepare for their future careers, undergraduate students need exposure to relevant examples of how cultural perspectives and worldviews influence their own decisions and actions as well as those of stakeholders, colleagues, collaborators. Because students over-estimate their intercultural effectiveness, intentional mentoring and training within courses will prepare them to successfully negotiate cultural differences, recognize their own cultural rules and biases, improve their understanding of verbal and non-verbal communication, and develop an awareness of differences in conflict resolution styles. With limits on credits in undergraduate curricula, adding courses in cross-cultural competency is rarely possible. Therefore, embedding activities into curricula allows students to develop these skills while learning course content. We will provide multiple examples of small-scale activities that can be embedded into existing courses to develop intercultural skills.

Centering Equity in Environmental Education: Place-based Online Learning at Unity DE

Daniel J. Chin* and Brian Nail

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Instructional Design

Unity College

Online environmental science programs are well-positioned to address many of the structural inequities associated with traditional campus-based programs. Historically, environmental science education has emphasized campus-based learning and local field research. This model is predicated upon various forms of socioeconomic and environmental privilege. The increasing demand for online programs is producing a new approach to environmental science education. Our own backyards—should we even have them—have conservation needs that affect us directly and underscore local community issues with grassroots solutions. Unity's DE's effort to expand access to environmental science through place-based online learning offers a solution to the problem of inequitable access and impact. We introduce case study courses that exemplify a place-based approach to instructional design that centers environmental equity. A conservation curriculum is incomplete when it does not motivate students to reckon with the systemic and structural issues that contribute to conservation challenges in their communities.

Environmental Justice in a Conservation of Natural Resources Course

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Fisheries, Wildlife, and Conservation Biology
North Carolina State University

Environmental Justice issues pervade conservation issues. I have incorporated Environmental Justice (EJ) into a Conservation of Natural Resources class that I teach each fall. I've received some interesting anecdotal feedback from students on EJ and it makes me curious about their understanding and perception of EJ as it relates to the conservation of natural resources. I would like to understand how much students know about EJ before they come to class and the role they see EJ playing in conservation of natural resources. This study assesses those perceptions both at the beginning of our class and the end of our class. I conducted a survey of the students in FW 221 Conservation of Natural Resources at the beginning and the end of the Fall 2021 semester. The survey included a questionnaire focused on prior knowledge of EJ and student perceptions of the role EJ plays in natural resources conservation. Demographic data such as gender, race, major, and academic year were also collected. I analyzed the data to look for trends in knowledge and perceptions of EJ in natural resources.



Photo: [Platte Basin Timelapse Project](#)

Wednesday, March 23: Online and Virtual Learning; Technology

1:00pm-4:25pm Central Time, Room B

Online student engagement: Is it possible, and do they want it?

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Wildlife and Fisheries Resources
Clemson University

Fostering student engagement can be challenging, particularly in online courses. Fortunately, a myriad of web-based tools allow professors and students to engage with each other and the content in meaningful ways. But, how do students respond to these tools? Do they value engagement with their peers, their professors, and the content? Does more engagement lead to greater enjoyment and perceived learning gains? We surveyed over 100 graduate and undergraduate students in Natural Resource courses to determine how they responded to a variety of engagement tools, including Canvas text discussions, Flipgrid video discussions, and Perusall collaborative annotations. So, what works and what doesn't? What should you include in your own course design to best reach your students? Join us to find out– the results may surprise you!

A Qualitative Exploration of Professor-Student Interactions, STEM Learning Challenges and Student Adaptation Decisions during COVID-19 Pandemic

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Applied Science and Technology
North Carolina A&T State University

The COVID pandemic transformed STEM learning environments across U.S. institutions. The purpose of this nationwide research is to develop theories explaining learning experiences and decisions of STEM students during the pandemic. Purposive sampling engaged 63 students from six U.S. institutions through one-hour zoom interviews. NVIVO qualitative analysis software is used for constant comparative analysis. Coded transcripts revealed a key theme - Professor-Student Interactions. The presence of negative professor-student interactions worsened student learning challenges. To minimize the impact of these challenges on STEM grades, research participants make effective adaptation decisions to minimize negative impacts. Many STEM students relied on both professor and non-professor generated resources to improve learning and performance. Insights from lessons learned in this study are discussed for potential replication in STEM communities for improved adaptability and resiliency during future pandemics. Future research will quantify the effect of these interactions on STEM performance.

Perceptions of Students and Instructors Regarding Rapid Shifts to Online Learning: Preparing for the Future

Mary Bowne, Jessie Henricks, Melissa Wuellner*, and John Howard

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Biology

University of Nebraska at Kearney

In March 2020, the outbreak of COVID-19 disrupted the current educational system by requiring all college courses be delivered online. We used an online survey to identify both instructors' and students' perceptions of faculty preparedness to make the rapid shift to online learning. We also assessed the use of various technological resources and issues that arose when online teaching was fully implemented. Results indicate fairly high satisfaction rates of faculty's thoughts on preparedness and access to technological resources and tools. Quantitative measures indicated students were fairly satisfied with the transition to online learning. However, qualitative comments indicated otherwise. Results also showed that most students used laptops as their primary instructional tool, but nearly half of students noted they also used their smartphone. Results from this research can help instructors and universities better prepare for any similar rapid shift to online learning due to university closures.

Shiny: Bridging the Real and Virtual Worlds to Learn Sampling Design

Wade Tinkham* and Justin Ziegler

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Forest and Rangeland Stewardship

Colorado State University

Information is the currency of decision-making in natural resource management. Many students entering the workforce begin by executing inventories designed by someone else but quickly are expected to generate sampling designs themselves. At its core, sampling design requires understanding how population variability and sampling effort interact to determine precision. Truly grasping this requires looking at many populations and typically many more populations than a class in natural resources sampling can expose a student to. To increase student exposure to the variables controlling a sampling design (e.g., sampling unit, sample size, location selection, sampling intensity, etc.), I integrated an intensive research dataset into an R Shiny virtual teaching environment to explore different sampling designs. This presentation walks through three classroom activities for simulating random, systematic, and stratified sampling designs to help students understand sample precision and how sampling design impacts the Law of Large Numbers and Central Limit Theorem.

Remote field experiences in wildlife and forestry: Three ready-made activities

Keely Roen*, Emily Thomas*, and Mike Eckley*

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Wildlife Technology

Penn State University - DuBois Campus

The Pennsylvania State University – DuBois Campus is home to a two-year associate degree program in Wildlife Technology. This technical program is known for hands-on experiences and field training in wildlife and forestry. Like other universities around the world, Penn State adopted a virtual format for part of 2020 and 2021. Our program adapted to this transition by developing a series of field experiences and remote labs that could be completed at home. This presentation will highlight one activity from each of three core courses: Wildlife Techniques, Animal Identification, and Silviculture. We will provide an overview of individualized deer pellet counts, community science bird and amphibian surveys, and assessing forest conditions through fixed-radius inventory plot sampling, all of which can be modified for a variety of courses in natural resource curricula. We will provide participants with all assignment materials and documentation upon request.

Authentic Climate Change and Genetics Research in the Virtual Classroom through Stakeholder Collaboration

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Fish and Wildlife Sciences

University of Idaho

The virtual classroom provides challenges, but it is well suited for collaboration and student-led research experience without classic geographic barriers. At University of Idaho, two programs provided students with authentic research experiences and professional network building across universities and stakeholder groups. In the first, students created species distribution models under multiple climate change projections on species identified as needing models to be completed by Idaho Fish and Game collaborators. This resulted in technical reports and presentations. The second program was part of the international Landscape Genetics Distributed Graduate Seminar. In this course, students from four countries participated in an optional group project which focused on novel landscape genomics research on Chinook salmon in collaboration with the genetics lab at the Columbia River Inter-Tribal Fish Commission. This work has since been published in Ecology and Evolution.

Using online homework submission logs to analyze instructor performance and student behavior

Karl Ahrendsen* and Keith Foreman
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University of Nebraska-Lincoln

Technology has greatly reduced the burden on instructors of large format introductory courses by allowing automatic grading and feedback on homework problems and quizzes. The data generated from submissions to these platforms provides a rich set of data. Analysis of these logs can lead to better understanding of how students engage with course material in a quantitative way not possible with traditional pen and paper submissions. This talk will discuss the information gained from examining a set of homework submission logs for a series of two introductory physics courses taught over the course of 4 semesters, including data from spring 2020 during which the transition to online learning occurred mid-semester. We will present the results from analyzing this dataset using methods previously published in the literature as well as novel methods. From our analysis, we find that students who self select to frequently work with a partner do not perform significantly different from their peers on exams.

Go Mobile, Fly Drones!

I-Kuai Hung*, David Kulhavy, Daniel Unger, and Yanli Zhang
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College of Forestry and Agriculture
Stephen F. Austin State University

Ever since the first geographic information system (GIS) was developed in Canada for the management and inventory of its natural resources in the 1960s, GIS has become integral in the curriculum of higher education in natural resources. To keep up with the rapid advancement in technology, new components are constantly incorporated in teaching GIS courses so that students are better prepared for their career. This presentation details how mobile GIS was transitioned from proprietary GPS units to smart phones within the Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University and how drones are integrated in multiple courses within the college. Field experiences in using the ever-changing technology during the forestry field station held every summer are discussed. Class projects using drones and 3D printing are also highlighted to demonstrate their use in natural resource management endeavors.

How an online practice tool, ILEX (Identify-Learn-EXplore), helps students learn and practice sight identification skills

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Forestry
North Carolina State University

At NC State, Dendrology teaches students to sight-identify roughly 180 species of Southeastern trees, shrubs, and woody vines using botanical and common names. COVID-19 meant that alternative options for teaching were needed for when field instruction wasn't an option or when students missed class. Over the past year, we developed ILEX (Identify-Learn-EXplore), an online practice tool that uses an extensive photograph database to enable students to study plant species. Users can sort species by leaf features or botanical group and can practice identification by inputting scientific names. Fall 2021 students listed ILEX as the most helpful study tool outside of weekly outdoor labs. While online tools will never substitute field experience, it is clear that ILEX is a strong addition to our teaching tools. Given that it is an accessible online tool, we plan to make some additional revisions and hope to create a public version for anyone who wants to hone their tree identification skills.



Wednesday, March 23: Course Design; COVID Responses

1:00pm-4:25pm Central Time, Room C

How do we teach evidence evaluation and science-informed decision-making in the context of controversial natural resource issues?

Jenny M. Dauer*

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School of Natural Resources

University of Nebraska-Lincoln

Our students will make future decisions about complex natural resources issues in their personal and professional lives. Our hope is that students learn science literacy skills including evaluating evidence and using evidence in decision-making. Classrooms can prepare students to navigate both science and non-science to inform decision-making. In this presentation, the course Science and Decision-making for a Complex World is described. The course uses structured decision-making to give students a method for engaging in evidence evaluation and tradeoffs around solutions to complex natural resource issues. Best practices will be discussed for conversations about controversial issues, like climate change, biodiversity and natural resource conservation. Often controversial issues are tied up in issues of political or social identity. Addressing these issues as an instructor requires close attention to the psycho-social landscape of your classroom to avoid alienating students. Ideas for reducing barriers to engagement in these controversial issues will be presented.

Evaluating the Effectiveness of Readiness Assurance Testing as Part of Team-Based Ecology Instruction

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Ecology/Wildland Resources

Utah State University

Team-based learning (TBL), a student-centered instructional approach gaining popularity in STEM classrooms, uses a process of material exposure and reinforcement to achieve learning outcomes. Students engage with content before attending class. In class prior to lecture, students complete individual (iRAT) and team (tRAT), multiple choice Readiness Assurance Tests (RAT) emphasizing important concepts from the assigned materials. While RAT tests are promising instructional tools because they incorporate content recall, immediate feedback, and peer instruction into a single classroom activity, they are time-intensive to administer. To determine if RAT assessments improved content retention in an introductory wildlife course, we compared student performance on RAT questions repeated on end-of-unit exams to other multiple choice (MC) questions. We also compared RAT and MC scores to overall class performance to determine if TBL is beneficial for students at all levels of academic performance. Our results suggest that TBL approaches merit the investment of instructional time.

Demystifying Dendrology: An online preparation course develops a growth mindset and successful strategies for learning tree identification

Casey Wofford* and Stephanie Jeffries

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Forestry and Environmental Resources

North Carolina State University

Many students taking Dendrology for the first time have not had previous experience with learning plant identification. This can be an early setback in an important course that is required for several undergraduate programs. We developed a four-week, online preparation course to increase student confidence and share successful strategies for learning plant identification. The main focus was on basic vocabulary, use of effective study strategies, and identification of key characteristics within species. Students practiced these skills by learning 30 tree species while using flashcards, guided notes, and our ILEX practice tool. We surveyed students at the end of the preparation course and at the end of the main Dendrology course to assess the effectiveness of this approach. Survey and statistical data show that students who took the preparation course performed better than those who did not. Exposure to different practice strategies and identification tools in the preparation course helps students develop a growth mindset that enhances their success in Dendrology.

Whose “real world” are we preparing our students for? The tension among content, skills, and assessment in a diverse classroom

Christopher Yahnke*, Liesl Erb, Patrice Connors, Laurie Dizney, Hayley Lanier, Liz Flaherty, Jennifer Duggan, and Johanna Varner

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Wildlife Ecology

University of Wisconsin - Stevens Point

Traditional goals of undergraduate classes in natural resources are often content-based, yet developing professional skills, such as those listed by the National Association of Colleges and Employers (NACE), are becoming important outcomes. Further, self-regulation is a vital skill for 21st century students. This involves strategies to achieve goals like the management of academic resources, effort, reactions to external feedback, and products produced. Course-based Undergraduate Research Experiences (CUREs) provide an opportunity to develop such professional skills. Here, we present strategies for how CUREs can help students, with a focus on examples from the Squirrel-Net CURE modules. By participating, students gain a hands-on understanding of technologies and techniques for collecting data from wild mammals, experience with collaboration, goal setting, problem solving and data collection, a familiarity with common statistical software for data analysis, and practice in written and oral communication. These skills directly translate to those used by natural resource professionals.

**Planning for a safe and meaningful studying abroad course within COVID-19 protocols:
Example from a course in Kenya**

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College of Natural Resources- Forestry

University of Wisconsin- Stevens Point

As many colleges and universities in the U.S. are resuming face-to-face instruction, instructors of study abroad courses are hoping to be able to offer international courses and experiences again in 2022 and beyond. I have been offering a 3-week summer study abroad course to Kenya since 2011 through the University of Wisconsin- Stevens Point (UWSP). UWSP students are joined by Kenyan and other African students in my course that focuses on Permaculture and sustainable management of natural resources. Currently I am planning my course for summer 2022. I will explain how we are planning to proceed with safety protocols in place, to be able to offer safe and meaningful study abroad experiences now and into the future.

Bringing the Outdoors Online: Creating Online Field Labs

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Forestry and Environmental Conservation

Clemson University

Field labs, common in natural resource programs, have learning objectives that can be hard to transfer to an online environment. Covid-19 has necessitated the movement of many courses into an online environment; this creates challenges for all courses, but particularly for hands-on or lab courses. To truly teach a field lab online you must let go of the method used in the past and even the method used when you took field courses; the focus must remain on the learning objectives rather than the methods. After multiple semesters creating and delivering successful, engaging online field labs I have created best practices for the three most common categories of field lab learning objectives: 1) data collection techniques, 2) the practice of science using experimental design and writing lab reports, and 3) field tours that expose students to places, people, and phenomena that reinforce concepts taught in course lectures. Many labs combine these three learning objectives, meaning that a combination of approaches will be needed to meet all objectives in each class.

Faculty Perceptions of STEM Student and Faculty Experiences during the Covid-19 Pandemic: A Fall 2020 Qualitative study

Mehdi Lamssali*, Olivia Kay Nicholas, Alesia Coralie Ferguson, Andrea Nana Ofori-Boadu, Angela M. White

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Applied Science and Technologu

North Carolina A&T State University

COVID-19 is a continuing global pandemic causing significant changes and modifications in the ways we teach and learn here in the U.S as well as around the world. Most universities, faculty members, and students modified their learning system incorporating significant online or mixed learning methods/modes to reduce in person contact time and to reduce the spread of the virus. Universities, faculty and students were challenged as they adapted to new learning modules, strategies and approaches. The presentation will discuss inclusive ideas on how COVID-19 has reshaped the STEM education platform in U.S university and discuss multiple thematic subjects obtained from faculty interviews in order to understand new perceptions on STEM student and faculty experiences.

An Emerging Grounded Theory on Mitigating Diminishing STEM-Self Syndrome (DS3) During Pandemics: The Voices of Undergraduate STEM Students.

Andrea Nana Ofori-Boadu*, Mercy Fash, Alesia Ferguson, Angela White

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BUILT ENVIRONMENT

North Carolina Agricultural and Technical State University

The COVID-19 pandemic continues to have negative impacts on STEM learning environments across U.S. institutions. The purpose of this nationwide research is to explain decision-making in STEM students during this pandemic. Purposive sampling engaged 63 students from six U.S. institutions in two interview rounds and 183 students in surveys. NVivo qualitative analysis software was utilized for constant comparative analysis. An emerging theory on mitigating diminishing STEM-self syndrome (DS3) in undergraduate STEM students explains the lack of intrinsic motivation to engage in STEM learning due to the STEM disconnection generated from salient COVID-related experiences. This theory explains how interactions among student risk characteristics, learning disconnections, emotions, and adaptation strategies influence performance. Four STEM student mitigation styles (NAVIGATING, CRUISING, FATIGUED, and DRIFTING) capture how the effectiveness and persistence of adaptation strategies influence performance. Best practices for improved STEM learning and institutional resilience are recommended.

Converting Traditional Labs to Outdoor Individual Labs

Michele D. Larson*

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CTT (presentation on teaching in the LIFE Program at the University of Wyoming in 2020-21)
University of Nebraska - Lincoln

An important aspect of laboratory courses is student collection and analysis of data. Due to the pandemic and the need for online teaching, new strategies and laboratory activities needed to be implemented that still provided students with opportunities to engage in meaningful ways with data collection and analysis. I converted multiple activities from traditional in-person group labs to outdoor labs that could be completed by individual students. In this presentation, I give details on how to convert traditional classroom labs into outdoor labs to allow for safe scientific observations and data collection during a pandemic. I will provide examples on different types of outdoor activities that can be incorporated into biology or other science courses. I will also speak briefly on the use of Program R Statistical Software for data analysis in an online course and go over the issues I encountered when implementing these types of outdoor labs.

Wednesday, March 23: Workshop: Mentoring Students of Color for Success in Natural Resources

1:00pm-1:55pm Central Time, Room D

Mentoring Students of Color for Success in Natural Resources

Erim Gomez

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University of Montana

Participants will learn techniques and mentorships styles to help students of color succeed. They will also learn about unique challenges these students face in college and the natural resources profession. Further, participants will learn to acknowledge their unconscious bias.

Thursday, March 24: Digital Badges; Curriculum Building

10:00am-12:10pm Central Time, Room A

Cobranding Credentials, Unity College's Innovative Approach to Badging

Chris Malmberg* and Doug Studdiford*

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Unity Distance Education

Unity College

Unity College's unique badging structure is designed to multiply the value of our badges by compounding both the learning needs of Unity students and the training needs of partner organizations. Where appropriate, badges are co-branded to reflect both the stamp of approval of partner organizations as well as our own rigorous learning and assessment standards. Unity college students can take courses that earn them badges branded and recognized by industry-leading institutions, such as MetaVRse in the field of Extended Reality Simulation Authoring, while still earning credentials valuable within the broader constellation of Unity pageantry. We will cover how our standards and processes have produced a constellation of learning pathways and certifications that add value to learning by linking directly with the professional sphere. Badge content areas include topics such as leadership and professional skills, XR, or Ocean Justice, with more topics being added frequently.

A Global Assessment of Forest Education

Mika Rekola and Terry L. Sharik

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Department of Forest Sciences

University of Helsinki

A global assessment of forest education in 2020-2021, led by the Food and Agriculture Organization (FAO) of the United Nations with several partners, assessed the educational pipeline from the primary and secondary (P/S) level through technical and vocational (TV) as well as college and university (CU) education, to continuing education. Survey results indicated that forest-related topics were covered very little at P/S levels. At all levels coverage of social and cultural values of forests, especially gender, race/ethnicity, and traditional and indigenous knowledge, was insufficient while the biophysical dimensions of forests were better covered. Students at all levels had limited access to forests. Female CU graduates reported some difficulties in finding a desirable job. Forest education, responding insufficiently to drivers such as climate change and pandemics, is still suffering from a negative image. It needs to better enhance the crucial importance of forests and their opportunities for meeting global sustainability goals.

Assessment of Forest Education in North America

Terry Sharik, Michelle Zeng, and Rocco Saracina

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College of Forest Resources and Environmental Science
Michigan Technological University

A global assessment of forest-related education was undertaken by the Food and Agriculture Organization (FAO) of the United Nations, the International Tropical Timber Association (ITTO), and the International Union of Forest Research Organizations (IUFRO) in 2020-2021, working with six regional partners, including North America (Canada and the U.S.). The assessment spanned the entire educational pipeline from the primary level to continuing education for the forest-related workforce, with input from the published literature, regional experts, and a survey of academic administrators, faculty, students, and practicing professionals in the areas of educational content and competencies, teaching approaches, educational resources and policy, digital readiness, readiness for the next level of education, workplace readiness and employability, and professional development and continuing education. In this presentation we highlight the major findings and recommendations for the North American Region (<https://www.fao.org/3/cb6741en/cb6741en.pdf>).

Strategic Enrollment Management for Renewable Materials

Maller, Michelle

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Wood Science and Engineering
Oregon State University

Wood Science and Engineering undergraduate degree programs in the United States have steadily been losing enrollment over the last 40 years. This particular degree program is not attractive to students, but a very much needed element for the wood products industry success. The department of Wood Science and Engineering (WSE) at Oregon State University has not escaped the loss of enrollment and has struggled for several years to maintain student numbers at a level that is acceptable for the provost. The result has been a series of strategic planning processes in 2009, 2015, and now in 2021. This presentation will outline the steps taken to address low enrollment and the plan moving forward.

Developing the Next Environmental Leaders: A Review of Interdisciplinary Team-based Graduate Programs

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Ecosystem and Science
University of Wyoming

The next generation of environmental leaders require education and training linking disciplines and preparing them for collaborative processes. Interdisciplinary environmental graduate programs have incorporated team-based frameworks that combine disciplinary depth and breadth with collaborative capacity development. We reviewed scholarly and grey literature to identify key components and challenges of team-based graduate programs. Emergent themes included: fostering teamwork and communication skills, applied projects, and broadening definitions of success. We present practice-based recommendations around each of these components for team-based environmental graduate programs, including one in development in our own academic unit. Additionally, we are conducting semi-structured interviews with exemplary programs to further uncover best practices. This study will help guide future graduate-level environmental team-based program development for future generations of environmental leaders.

Testing the "Open" Waters: Adopting Open Educational Resources in a Large Enrollment Environmental Science Course

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Forestry and Environmental Resources
North Carolina State University

The COVID-19 pandemic has forced higher education to significantly address existing barriers and social inequities with how students access course materials and educational technologies. Adopting or creating open educational resources (OERs) is one approach in lowering barriers and increasing access. This presentation highlights the changes made to a large enrollment, distance education Environmental Science course to incorporate open education resources and provide a variety of instructional materials. The motivations for adopting OERs, process of identifying quality course materials, transition to alternative learning resources, and challenges encountered will be discussed. In addition, the findings from a survey on student perceptions of the course's OERs and student preferences for types of learning materials will be presented.

Thursday, March 24: Inclusive Teaching and Learning

10:00am-12:10pm Central Time, Room B

Trees Without a Forest: How online teaching tools for Dendrology created a more inclusive learning environment

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Department of Forestry and Environmental Resources

North Carolina State University

Dendrology, a core class for several programs at NC State, teaches students how to sight-identify 160-180 trees with their scientific names, common names, and families. When classes pivoted online in Fall 2020 due to COVID-19, we developed ways for students to learn and practice identification remotely. Online tools included teaching slide decks, a photo practice tool (VL-PI), and a YouTube channel with species identification videos. Students reflected positively on the variety of tools that enabled them to learn and practice tree identification. In Fall 2021, we resumed weekly outdoor field labs, but discovered that students continued to use the resources we had designed for online learning. In particular, our new ILEX (Identify-Learn-EXplore) tool that we piloted in Fall 2021 was very popular. Our conclusion is that flexible learning options enhance this traditional field-based course by creating a more inclusive learning experience for our students, leading to student success.

Lifting each other up: Promoting constructive peer review strategies in a writing course for natural resources management undergraduates

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Sustainable Resources Management

SUNY College of Environmental Science and Forestry

To work productively in a team, natural resources professionals often need to give (and take) feedback. Incorporating peer review of writing assignments into a course can provide students with experience in giving constructive and useful feedback. In addition, students may gain more confidence in talking about their writing with peers and taking feedback on their works-in-progress. However, students may be resistant to the process of peer review or err on the side of making few suggestions to avoid being overly critical. Structured well, peer review exercises can show students how to balance being constructive and being critical in their feedback. In this presentation, I will share some of the challenges and opportunities of using peer review in an undergraduate writing course for natural resources management students, as well as effective strategies for promoting constructive peer review.

Lowering Barriers to Field Course Inclusivity: Enhancing undergraduate comfort in outdoor environments

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Natural Resources
Northland College

Multiple lines of evidence indicate that many students are less prepared for field settings. One of the largest hurdles to enhancing elements of inclusion in field courses is student discomfort. This can be experienced as physical discomfort, which can often be addressed with appropriate training and gear, but also as psychological discomfort as students engage in rural, remote, and unfamiliar experiences. Northland College, a small, rural liberal arts college with a mission committed to field-based experiences and environmental majors, is increasingly working with a diverse student body with diverse histories and exposures to the outdoors. In 2019 Northland created a service center that provides (1) easy and inclusive opportunities for students to engage with the outdoors, (2) training in skills that empowers, and (3) easy access to appropriate outdoor gear. In this presentation, we will provide a case study describing the creation of our Outdoor Pursuits Center, how the center works, successes across multiple natural resources courses, and ways to fund and staff such programs.

A Grounded Theory on Advancing Social Self-Concept and Overlay Career Role Development in Undergraduate AEC Women Through More Inclusive Learning Environments

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BUILT ENVIRONMENT
North Carolina Agricultural and Technical State University

Women are underrepresented in architecture, engineering, and construction (AEC) classrooms and professions. The purpose is to explore AEC professional identity development processes in undergraduate AEC women. Purposive sampling engages 40 research participants from five U.S. institutions. Data collection involves two rounds of interviews, one survey, resume and transcript submissions. Following the Charmaz Grounded Theory approach, NVivo qualitative analysis software is used for constant comparative analysis. An emerging theory explains how social self-concept interacts with learning experiences to advance overlay AEC career development and motivate decisions towards dual program enrollment, minors, electives, specializations, student organization memberships, internships, volunteering, graduate education, entrepreneurship, and employment. Inclusive transformations in AEC learning environments can support overlay role-making. This theory may be applicable to other male-dominated STEM and non-STEM programs.

Student-Centered Cooperative Instruction for Improving Taxonomic Comprehension in Higher Education

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Forestry

Mississippi State University

Traditional approaches in instructing taxonomic-based courses often promote passive learning, which can hinder skill development and course interest. We incorporated Student-Centered Cooperative Instruction (S-CCI) into an undergraduate dendrology course to evaluate its effects on student success. Every week students ($n = 48$) were placed into groups of two to three students and assigned a single tree species to familiarize with. The following week students were expected to independently identify in the field their species and teach it to the class. Other species would also be covered by the course instructor. Comprehensive exams were used to track comprehension. Students were provided with a questionnaire and a post-course survey with Likert statements. Throughout the semester, if a student taught a specific species, they correctly identified that species 66.8%. Post-surveys and questionnaires were overwhelmingly supportive of S-CCI. This study indicates the potential benefit of incorporating S-CCI in undergraduate taxonomic courses.



Thursday, March 24: Experiential Learning; Field Courses **10:00am-12:10pm Central Time, Room C**

Using Multidisciplinary, Conflict-based Experiential Learning To Train Students On How To Address Controversy At The Public-private Land Interface

Keifer Titus*, David Jachowski, Matias Aguerre, Donald Hagan, Gustavo Lascano, and Thomas Scott
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Department of Forestry and Environmental Conservation
Clemson University

Agricultural and natural resource managers face complex problems that involve thinking across multiple disciplines, particularly at the private-public interface in the multi-use landscapes of North America. Here we describe a multidisciplinary, conflict-based experiential learning course we developed to prepare students to address complex issues facing future managers working at the public-private land interface. Using pre and post course surveys and qualitative analysis, we observed that following our course students 1) were more aware of conservation needs and more sensitive to perspectives of various stakeholder groups concerning those needs, 2) embraced complexity and multidisciplinary thinking needed to address management challenges at the public-private land interface and 3) became more comfortable discussing controversial issues with stakeholders and the general public. By embedding students in a charged learning environment with multiple competing perspectives, our course has built a more knowledgeable, empathetic and confident cohort of future natural resource professionals.

Waterfowl and watercolors: enhancing undergraduate students' waterfowl identification skills

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Department of Horticulture and Natural Resources
Kansas State University

I tested if watercolor painting assignments could enhance students' waterfowl identification skills. Students enrolled in my Waterfowl and Wetlands Management course were instructed how to identify waterfowl species and their sex using traditional teaching methods for four weeks. I measured baseline knowledge of students' waterfowl identification skills by administering an unannounced quiz (Pre-Test). Immediately after the Pre-Test, students were provided with foundational watercolor training and given a take-home assignment that involved creating four paintings of seven waterfowl species (two of each sex). I administered an unannounced quiz (Post-Test) immediately after students completed their painting assignments. Average Post-Test scores increased 13.19 points and there was a significant difference in the distribution of Pre- and Post-Test scores. My results suggest that lessons involving student-generated watercolor paintings may enhance student learning. This technique may be useful for other undergraduate science courses that require identification of species or phenotypes.

Storytelling for environmental science: How Platte Basin Timelapse creates science communicators and storytellers of the future

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Platte Basin Timelapse (School of Natural Resources)

University of Nebraska- Lincoln

The Platte Basin Timelapse project tells stories of the Platte River Basin and the wildlife and people within it using innovative multimedia content. What started as a long-term timelapse documentary project exists today as a learning lab of web-based journalism, art and research fusion, feature films, and science education curriculum. Our team is refining curriculum to develop courses that will enable collegiate students to graduate with an undergraduate minor or master's emphasis in conservation storytelling. Curriculum is focused on six threads: camera technology, image composition, writing skills, field ethics, production techniques, and science communication. Through coordinated courses and hands-on, individual experiences, students develop skills to produce valuable stories about people, places, and the environment. Experiential classes in environmental storytelling are critical to cultivate professionals who are equipped to capture the essence of conservation stories crafted to reach a broader audience.

Gaps in mentor and mentee expectations of a Summer Undergraduate Research Experience

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Forestry and Natural Resources

Purdue University

Summer undergraduate research experiences have potential to catalyze research skills and professional development in undergraduate students and have gained traction in natural resource sciences (NRS) to improve recruitment and retention of undergraduate students from underrepresented groups in these historically white fields. A summer research and extension experience for undergraduates program at Purdue University combined experiential learning with hierarchical mentoring to address environmental challenges and NRS career recruitment. We examined gaps in mentor-mentee expectations in 2019 and 2021. We found that mentees and mentors had gaps in expectations regarding mentorship roles and styles, student autonomy and independence in research, and the iterative nature of science. Our results suggest that enhancing student understanding of the challenges of research, providing pre-program mentor training, and addressing mentor challenges in SURE programs would help fill expectation gaps.

Using the literature circle discussion format to teach conceptual models of soil formation

Judith Turk*

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Conservation and Survey Division, School of Natural Resources

University of Nebraska-Lincoln

Literature circles are student-led, small group discussions. The objective of this study was to assess the impact of literature circles on student engagement and learning outcomes related to conceptual models of soil formation in a pedology course. For various reading assignments throughout the semester, students were assigned to participate in a literature circle or watch a lecture video. The two formats were compared in terms of topics covered, student feedback, and student application of concepts on the final exam. The lecture videos and student discussions covered a similar breadth of material, but often focused on different topics. Students felt that they learned more from the literature circles compared to the lecture videos and demonstrated similar comprehension of the material on the final exam, regardless of how it was taught. Literature circles can be an effective alternative to lectures that help students explore complex conceptual ideas in natural resources science.

Incorporating Citizen Science in the University Classroom - Building Interest and Efficacy for Science and the Environment

Haley E. Smith*, Bradley Allf, Lincoln Larson, Sara Futch, Lisa Lundgren, Lara Pacifici, Caren Cooper

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Fisheries, Wildlife, and Conservation Biology

North Carolina State University

Citizen science resources have the potential to be valuable, low-cost tools for engaging students in the scientific process and may lead to increased interest and efficacy in science and the environment. Using pre-and post-surveys of students in a general-education natural resources course over two semesters at NC State University, we examined changes in students' interest in science and the environment, self-efficacy for science learning, and environmental efficacy before and after a citizen science experience. All students demonstrated a significant increase in their interest in science, with slight increases in all other variables. Non-majors demonstrated greater increases in all variables than majors within agriculture and natural resource fields. Our findings demonstrate that incorporating citizen science experiences into coursework can increase students' interest and efficacy for science and the environment - particularly for majors from other disciplines - and allowing choice and multiple ways of engaging with material can help better achieve these desired learning outcomes.

Thursday, March 24: Workshop: Learning4all - Getting Started with Universal Design for Learning

10:00am-10:55pm Central Time, Room D

Learning4all - Getting Started with Universal Design for Learning

Julia Remsik-Larsen, McKinzie Sutter, and Grace Troupe

Contact Email:

University of Nebraska-Lincoln

Universal Design for Learning (UDL) is a framework that encourages educators to make course design decisions that are based on fundamentals of how people learn. Intentionally designing for how people learn helps ensure the classroom environment meets the diverse needs and abilities of learners. Implementing UDL principles to their fullest takes time, but you can get started with small steps today. In this session, you will be introduced to the fundamentals of UDL and we'll share methods of implementing it in small doses – to gradually incorporate UDL principles into your course materials and instructional approaches. Our hope is that you'll come to this workshop with an assignment or learning module you think could benefit from UDL and leave this session with a tangible idea of which UDL principles could improve the learner experience and how to start the change.

Thursday, March 24: Workshop: Ungrading is More Work and More Rewarding

11:00am-11:45pm Central Time, Room D

Ungrading is More Work and More Rewarding

George Hess, Faith Bradshaw, Jason Delborne, Emma Zawacki

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Forestry & Environmental Resources

North Carolina State University

Alfie Kohn, Jesse Strommel, Susan Blum and others have long been lamenting the downsides of our prescriptive approaches to grading. In this 45-minute panel discussion, you will hear the experiences of two faculty using ungrading as an alternative. Two students on “the receiving end” will contribute their perspectives. Ungrading required more time than traditional grading, but the focus on feedback and reflection rather than points made the work more rewarding and created stronger rapport with students. Ungrading fostered a deeper sense of responsibility and pride - and amazing work - among students who tailored course outcomes to meet goals that are important to them. Students also noted increased motivation as they try to prove to themselves, through self-reflection, that they can do high quality work. Clear communication about how ungrading works, the kinds of work that constitute various final grades, the need to clearly defend a suggested grade, and guided reflection around that defense through the semester helps counter many of the challenges associated with ungrading.

#MyExperience Pre-Recorded Videos

Available 24/7 During and After Conference (see links in program)

#MyExperience: Inclusive teaching and learning, accessible courses, and mental health

Jumbled Judging - Assessing the impact of a new inclusive learning activity at a regional collegiate soil judging competition

Rebecca Young and Judith Turk

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Department of Agronomy and Horticulture

University of Nebraska-Lincoln

Collegiate soil judging contests have been incorporated into curriculum at many universities, providing an opportunity for immersive, experiential learning in soil science. For 30 years (1961-1990), soil judging focused exclusively on individual performance. Since the 1990s, group judging components have been included in most regional and national contests to encourage collaborative learning. In Fall 2021, the North-Central Region incorporated a “jumble judging” component into their contest, in which students competed on teams that included students from 2-3 different universities. Students completed pre- and post-contest surveys, and daily reflection activities to assess the success of this new field learning technique. Overall, students reacted favorably to the opportunity to learn and share ideas, though some expressed reservations about sharing competitive strategies among teams. The jumble judging activity provided an opportunity for the students to network, practice problem solving within a diverse group, and promoted community and development of a soil science identity.

Gaining perspective through a photo essay

Kendra Liddicoat

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College of Natural Resources

University of Wisconsin-Stevens Point

Requiring students to spend an hour outside recreating, reflecting, and taking photos is always a hit in my online Inclusive Practices for Outdoor Professionals class. The associated photo essay assignment prompts them to consider why they chose the activity and location they did, how they felt while outside, how their background influenced their experience, and how someone else might have had a different experience in the same place. Students share great insights and say that they really appreciate being required to do something they enjoy. This #MyExperience Video will share the details of the assignment and how it fits into a course designed to introduce Natural Resource majors to equity, diversity, and inclusion concepts and practices.

Moving Towards Pandemic-Proofing Courses in Natural Resources Management

Michael K. Crosby*, Jason J. Holderieath, and T. Eric McConnell

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School of Agricultural Sciences and Forestry

Louisiana Tech University

The onset of the COVID-19 pandemic in the United States, coincident with the previous BCUENR, led to the forced adaptation of courses for online delivery in the Spring of 2020. Over the intervening two years, many technologies and modes of delivery have been developed and improved to facilitate meaningful remote learning for university students. In many natural resources programs, data analysis is a large component and without students having a software license to use, alternate modes of access had to be devised by Information Technology personnel. To alleviate this strain going forward, we opted to incorporate alternative software into course offerings. Google Earth Engine and R were incorporated into several courses in conjunction with recorded micro-lectures to facilitate student learning outcomes without (hopefully) overwhelming students with long-run lectures or instructions accompanying new software packages.

The kids are not alright

Dr. Leah Rathbun

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Forestry and Environmental Resources

Natural Resources

This presentation will focus on experiences that faculty have had in regards to student mental health. I will discuss stories from faculty that highlight the urgency around student mental health, the need for additional mental health services on campus, and how this impacts teaching.

Mindfulness minutes: Reducing anxiety in college courses

Rebecca L. Franzen and students in NRES 483/683 Professional Development in Natural Resources

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College of Natural Resources

University of Wisconsin-Stevens Point

With the ongoing pandemic, intensifying political and social divide, and looming effects of climate change, college students are more anxious and stressed than ever. By incorporating just five minutes of mindfulness at the start of class, instructors can help students reduce their stress and be more focused and ready to learn. This #MyExperience video will share the story of one university class. What activities do the students engage in? How do students feel about the experience in the moment? How do the mindfulness moments seem to affect students throughout the week? Hear instructor and student voices regarding the experience and consider how you can help students develop lifelong skills in dealing with stressors.

#MyExperience: Curriculum building

Developing Global Perspectives on Climate, Food, & the Environment using the SDGs

Brianne A. Wolf

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IANR Global Engagement

University of Nebraska-Lincoln

Creating opportunities for students to engage with diverse perspectives around world challenges is critical to the development of innovative and openminded solution-makers. While coursework is fundamental to this development, creative co-curricular activities can supplement to provide students from an array of disciplines the chance to engage with these perspectives (from experts and peers) using the U.N. Sustainable Development Goals as a framework. Virtual and flexible participation options allow for wider access by more students, while the digital credential earned demonstrates valuable, future-ready competencies to employers. By learning from existing open-source online material, live sessions with global and local experts, brainstorming exchanges with peers, plus reflection and application into a final creative product, students can meaningfully explore how to contribute towards the most complex problems of our time. The program encourages expansive thinking and nuanced approaches to “wicked challenges,” while facilitating professional development and network-building for both domestic and international students.

Total station for forestry and geospatial science students

Yanli Zhang*, Daniel Unger, David Kulhavy, and I-Kuai Hung

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Arthur Temple College of Forestry and Agriculture

Stephen F. Austin State University

Knowledge of a property’s location is necessary for students majoring in natural resource management. They need to be able to at least roughly locate the boundary lines and property corners for their sites. Land surveying technology has evolved from steel tape to GNSS integrated total station with millimeter level accuracy. The land surveying class within the Arthur Temple College of Forestry and Agriculture at Stephen F. Austin State University challenges students with historical property plat documents, total station and UAS (unmanned Aerial System) to assess property boundaries. The operation of a total station and the evaluation of surveyed measurements help students to understand land surveying and its related rules and regulations. The required land surveying course fully prepares our students for their professional natural resources career. The land surveying tract is embedded in both the forestry and the geospatial curriculum to assist graduates in solving complex social and natural resource management decision-making.

Syncing Course Objectives to Enhance Student Learning Through a Combined Research Project

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Louisiana Tech University

Students have asked the question, “when am I ever going to use this?,” since time immemorial. In an effort to respond to this and provide students an opportunity to conduct an applied research project, an idea was brought forward to allow students the chance to apply knowledge gained during an academic term. Two courses, Remote Sensing of Natural Resources and Natural Resources Economics, sought to sync course objectives in order to allow students majoring or interested in natural resources assessment and economics an opportunity to have a real-world application of course material. Course material was presented in each course to allow for students to work between the two courses on a combined final project. Students were arranged in teams so that if a student was not taking both courses in the same turn, knowledge transfer could occur via peer-to-peer learning. An open educational resource was developed to facilitate this endeavor.

#MyExperience: Experiential learning, field courses, and global experiences

Diving Into the Deep End of the River: Developing Communication Skills Through Experiential Learning

Heidi L. Adams* and A. Gordon Holley
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Forestry Program
Louisiana Tech University

Students choosing a natural resources major do so because they love the outdoors. They do not realize, however, there’s a major human dimensions component of any natural resources career. Good communication with the public and other natural resource professionals is essential. At Louisiana Tech University, we travel with students every summer to Newton County, Arkansas—home of the Buffalo National River, a recreational area with over a million visitors every year. On this 4-day trip, students develop their communication skills by talking with visitors to the Buffalo National River and surrounding areas. They meet with representatives from the National Park Service, U.S. Forest Service, and Arkansas Game and Fish Commission to learn the value of good communication. This trip is an excellent opportunity for students to learn while doing, which is the best way to develop and strengthen communication skills. They also have some fun of their own while hiking, canoeing, and wildlife viewing!

Educational Outdoor Experiences with Preschool Children-Adapting to Urban Sprawl

Ann Spilker

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Human Dimensions

School of Natural Resources

Environmental education can start as early as preschool through outdoor play and interactions with loose parts materials- open-ended items with no predesigned purpose. Play is a critical aspect of young children's physical, social, and cognitive development. However, wild spaces and outdoor play opportunities are declining as places continue to become urbanized. Because of this, educators must adapt to provide outdoor opportunities within an urban context. One of my thesis projects examines how preschool children's outdoor play with different types of loose parts materials affects their play behaviors. The addition of loose parts in an outdoor space has been found to provoke children's creativity, pro-social behaviors, and ecological awareness. In this video I will share my experiences in collecting data for this project and touch on how different loose parts materials can create exciting stimulation in an outdoor classroom.

Sketching your surroundings: Nature journals as a learning tool

Michael Brunson

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Park Management and Conservation

Kansas State University

The benefits of nature, or field, journaling are numerous. They can force the individual to slow down and take in their surroundings as well as help nurture a more meaningful connection to those surroundings. They can be utilized for scientific observation in addition to finding mindfulness and connecting to one's senses. Nature journals can also be easily applied to a variety of class learning objectives and help connect class content to personal experience. Furthermore, research has shown that nature journaling can enhance students' ecological literacy and environmental awareness. This presentation highlights personal experiences with, and offers helpful tips in, incorporating field journals in an undergraduate natural history course. Artistic talent is not a prerequisite; nature journaling is for everyone!

Experiential Learning in Three Dimensions: Introducing Lidar Remote Sensing to Natural Resource Students

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Department of Fish and Wildlife Sciences
University of Idaho

Remote sensing technologies and techniques including satellite imagery, photogrammetry, and lidar, have become essential across natural resource disciplines. However, natural resource undergraduate students typically receive limited exposure to these technologies and rarely have opportunities to experience them. We offered a one-credit experiential course to wildlife students at the University of Idaho focused on research assessing microsite habitat selection by red squirrels (*Tamiasciurus hudsonicus*). A key feature of this course was introducing students to lidar through an experiential curriculum. In addition to an introductory lecture, students assisted with two days of data collection in the field, including collection of terrestrial lidar data. They also engaged in a lidar "tutorial" for which they were provided lidar data and instructions on basic processing and analysis. Our curriculum demonstrates that even short courses may provide opportunities for experiential learning in remote sensing technologies useful to the career goals of natural resource students.

Interdisciplinary field courses

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Wildland Resources
Utah State University

Experiential learning and field courses are a critical part of undergraduate education in natural resources. These experiences can help students explore new interests and develop critical skills in the profession. Our "Rivers in the American West" course is a 7-week interdisciplinary summer course that covers a wide variety of topics in natural resource management as well as literary and historical accounts of western rivers. A required 5-day wilderness river rafting trip is the cornerstone of the course, where students learn basic outdoor skills, aquatic sampling techniques, and creative nature writing. Students apply course material during our field experience and produce a portfolio of written, oral, and digital products. Our course is in its third year and we hope that sharing our experiences will demonstrate the value of interdisciplinary field courses and that fellow instructors might be able to apply some of our ideas to their own courses.

Speaking Skills for Graduate Students

Larry Nielsen

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North Carolina State University

Giving your first professional talk as a graduate student can be terrifying. But relax, this book has you covered. Larry Nielsen, Professor Emeritus of Natural Resources at North Carolina State University, provides his practical guide to public speaking, specifically designed for graduate students. Learn how to develop, organize, prepare for and give great talks, whatever the audience and situation--but especially for that all-important thesis seminar or first scientific talk. Nielsen is a renowned public speaker, known for his ability to deliver meaningful messages with clarity and humor, whether as a distinguished professor in the classroom, keynote speaker at conferences across the world, or just at the local civic club.

Pop-UP Science: Partnering with County Extension for More Impact

Ensor, Tracy*

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Cooper Center for Academic Resources (formerly Nebraska Extension)

Nebraska Wesleyan (formerly Nebraska Extension)

Reach beyond the classroom to share your expertise and/or student projects with the larger community. Whether you have an Extension appointment or not, this session will provide practical tips and examples for partnering with county extension professionals with the goal of providing research-based science to a public audience.



#MyExperience: Course design

Using K'NEX (a Basic Fun! product) to Visually Demonstrate the Basics of the Completely Randomized Design ANOVA Model

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Forestry

University of Wisconsin-Stevens Point

This short video will demonstrate how one can use pieces from a K'NEX rod and connector building system to visually breakdown a fixed effect Completely Randomized Design (CRD) ANOVA model, namely $\text{Response} = \text{Overall Mean} + \text{Treatment Effect} + \text{Error}$, to aid in student understanding of the ins and outs of that model form, why it works, and the importance of the constant variance assumption therein. I have anecdotally found this demonstration to increase student comprehension of the topic at both the undergraduate and graduate levels throughout the years.

Use of the Snapshot Wisconsin citizen science initiative to engage students in an introductory wildlife course

Bruce Eichhorst

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Department of Natural Resource Management

South Dakota State University

Snapshot Wisconsin is a statewide wildlife monitoring program developed and coordinated by the Wisconsin DNR. Volunteers host trail cameras throughout the year and upload their photos to be stored and posted on Zooniverse, a citizen science web portal. Volunteers then classify the photos to identify animals, thus aiding the WDNR in assessing and understanding trends in the distribution of wildlife populations in the state. In an introductory fisheries and wildlife management course I have students conduct a project utilizing the Snapshot WI portal. Students classify photos, thus aiding them in developing their animal identification skills, and input selected data into an Excel worksheet. After pooling the worksheets from all the students, they then conduct a series of analyses on the entire data set, and finally answer several questions related to the variables they analyzed.

#MyExperience: Technology in teaching and learning

Introducing Students to Different Natural Ecosystems with Drones

Daniel Unger*, David Kulhavy, I-Kuai Hung, and Yanli Zhang

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Arthur Temple College of Forestry and Agriculture

Stephen F. Austin State University

Introducing students to different ecosystems within the confines of a traditional classroom can be a difficult endeavor. Classroom and lab time constraints combined with the physical location of a natural resource-based curriculum at a traditional brick-and-mortar university make exploring different ecosystems difficult. Faculty within the Arthur College of Forestry and Agriculture at Stephen F. Austin State University are introducing students to a variety of different natural resource-based ecosystems by incorporating drone videography into the traditional classroom setting. Faculty during the summer are travelling the United States and recording site specific drone videos of different forest and natural resource ecosystems our students would not typically be able to visit. Upon returning to campus the faculty are incorporating the videos into their GIS coursework as demonstrations of how to use cutting edge spatial science tools to evaluate, quantify, and qualify a variety of natural resources from a distance via remotely sensed data.

Add the DJI Mavic Mini2 Drone to Your Teaching Toolbox

David Kulhavy*, Daniel Unger, I-Kuai Hung and Yanli Zhang

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Arthur Temple College and Agriculture

Stephen F. Austin State University

A combined Drone and Geospatial Science course is taught within the College of Forestry and Agriculture at Stephen F. Austin State University. It starts with drone safety and regulation review, followed by equipment protection and assembly. Then, a flight is setup using DJI Fly app on a mobile device for capturing images and videos. Another setup is a programmed flight using Pix4DCapture app. Following the flight, the images are downloaded and processed using Drone2Map to produce an orthomosaic. Finally, the synthesis and map composition are done in ArcGIS. These techniques are used with DJI Phantom 4 Pro v. 2, DJI Phantom 4 RTK Multispectral drones., In addition, DJI Mavic Mini2 is added, which weights 249 grams and does not come under the FAA regulations for licensing. The importance of drones in society are presented throughout the course and students are ready for their drone license at the completion.

Risk Assessment of Loblolly Pine Winter Storm Damage with Visual and Unmanned Aerial System Ratings

Alexandria Cook, David Kulhavy, I-Kuai Hung, Yanli Zhang and Daniel Unger

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Arthur Temple College of Forestry and Agriculture

Stephen F. Austin State University

Record breaking temperatures and snow fall was recorded during a five-day event from February 14-20, 2021. During the event, broken branches occurred and 78 loblolly and one slash pine adjacent to the Arthur Temple College of Forestry building, Stephen F. Austin State University campus were rated for damage using the CTLA tree hazard method. Two weeks after the snow and ice event, damage was observed around the ATCOFA area as the pine trees turned brown. To complete an assessment of the trees, a orthophotomosaic was created using the DJI Phantom 4 Pro with the Pix4DCapture app. A DJI Mavic Mini2 Unmanned Aerial System (UAS) was used to gather visual assessment data of the damage and was compared to the visual CTLA method. These methods introduced experiential learning into the laboratory experience for UAS urban forest hazard rating.

Students, Please Take Out Your Phones

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Foresters and natural resources managers are increasingly incorporating tablets with cloud-based platforms and applications into their data collection protocols. We have found that it is also beneficial to allow students to utilize their own devices (cell phones) for data collection as they report they have an easier time navigating in the field if carrying additional equipment for field-data measurement. This presentation will focus on taking students through the process of project set-up, deployment, data collection, and analysis during a Global Positioning System (GPS) course and highlight findings. Students were able to collect tree-level measurements and utilize existing allometric equations to calculate volume and prepare a report on their assigned areas.