

Science, Humans, & Nature: A Southern Appalachia Story

LaRoy Brandt
Department of Biology
Cumberland Mountain Research Center

Thomas Mackie
Abraham Lincoln Library & Museum

Lincoln Memorial University
Harrogate, TN

LMU

School of Mathematics & Sciences
LINCOLN MEMORIAL UNIVERSITY



Cumberland Mountain Research Center
LINCOLN MEMORIAL UNIVERSITY



Science, Humans, & Nature: A Southern Appalachia Story

- **SENCER-ISE: Partnership Champions Award**
- **Why Lincoln Memorial University?**
- **Partner “Bios”**
- **Project Development & Evolution**
- **Implementation**
- **Evaluation**
- **Lessons Learned**
- **Future Directions**

SENCER-ISE: Partnership Champions Award

- support for cross-sector partnerships between places of informal learning and higher education institutions



Why Lincoln Memorial University?



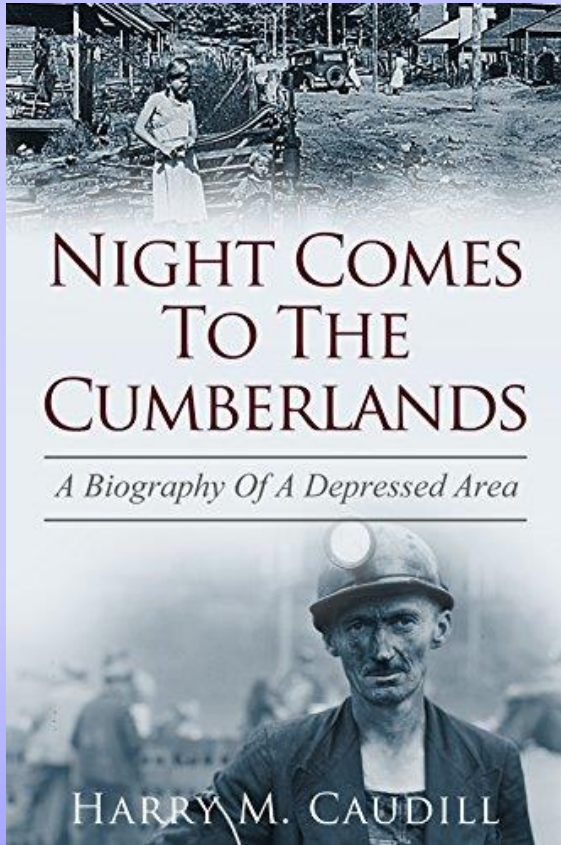
Why Lincoln Memorial University?



Why Lincoln Memorial University?

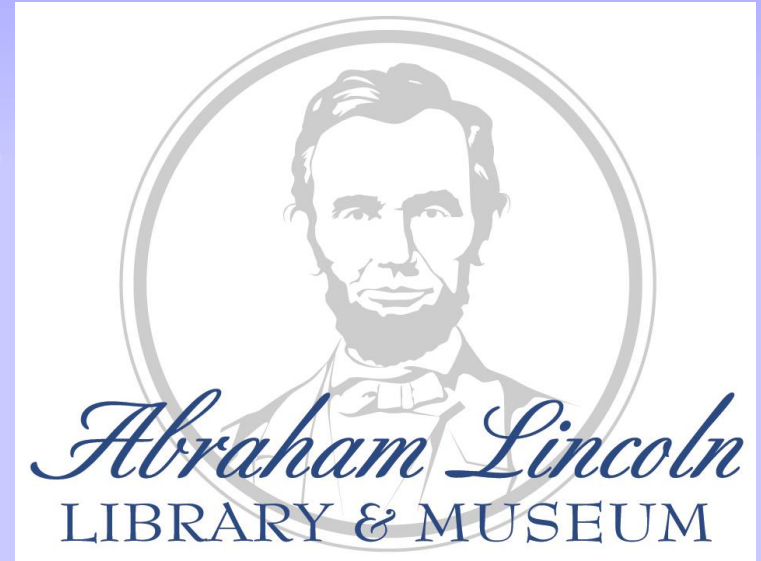


Why Lincoln Memorial University?



Abraham Lincoln Library & Museum

- **Origin as storage/display of donated books, manuscripts, firearms, uniforms, and a variety of other items**
- **Mid 1970s KFC Colonel Harland Sanders provided funding to build the Museum**
- **Currently, one of the largest collections of Lincolniana and Civil War Memorabilia in the US**



LMU School of Math and Science

- LMU has about 1800 undergrads
- ~ 1/3 are STEM



Cumberland Mountain Research Center

- **Founded in 1990 to foster and support ecological and environmental research, and provide public outreach and informational resources to our region.**



SENCER-ISE Project

Development & Evolution

- 1. Unique environmental/human history of our region**
- 2. Capitalize on recent institutional changes**
- 3. 'teach-them-to-teach'**
- 4. Provide students opportunity to utilize apply content knowledge through interpretive programs as conservation ambassadors.**
- 5. Emphasize current and historical human-nature interactions**
- 6. Past is prologue**

Too Many Ideas

Human and Wildlife Interactions

Bears in My Backyard

Deer are Eating My Rose Bushes

Historical Changes in Forest Structure

Dealing with the After Effects of Mining on the Environment

The Importance of National Parks in Conservation

Human Geography and the Wilderness Road

History of Animal Populations and Conservation

Environmental History of the Cumberland Gap

The Impact of Westward Expansion on the Forest Species Composition

Dealing with the Spread of Kudzu

Abraham Lincoln's Influence on Modern Conservation and Environmental Policies

Abraham Lincoln's Connections with the Environment

Deforestation in Support of the Civil War

The Legacy of Coal Mining in the Cumberland Gap Region

Final Project Framework

- 1. Provide specialized ‘crash’ course training for participating LMU students**
 - a. History of Appalachia – Dr Michael Toomey**
 - b. Human Geography and Environmental History of Cumberland Gap – Dr Jessey Gilley**
 - c. The Art of Effective Interpretive Programming – Dr Thomas Mackie**
- 2. Students develop and practice programs – Dr LaRoy Brandt**
- 3. Offer all day educational events to local middle schools – used award to pay for transportaion**
- 4. Visitors rotate through three programs**
 - a. Appalachia Biodiversity Past and Present**
 - b. Natural History of Southern Appalachia emphasizing importance of water**
 - c. Human Environmental History of Cumberland Gap Past and Present.**

Outreach Events

27 Sept 17 & 6 April 18

School	Location	Grade Level	Number of Students
October Visiting Day			
Robbins Elementary	Robbins, TN	6	22
Fairview Elementary	Huntsville, TN	6	20
Springdale Elementary	Tazewell, TN	6	20
Lafollete Middle School	Lafollete, TN	7/8	23
April Visiting Day			
Powell Valley Middle School	Harrogate, TN	7/8	60

Additional Practice Event with J Frank White Academy, LMU Campus – 20 students

28 LMU students directly impacted

27 Sept 17

TEX TURNER ARENA

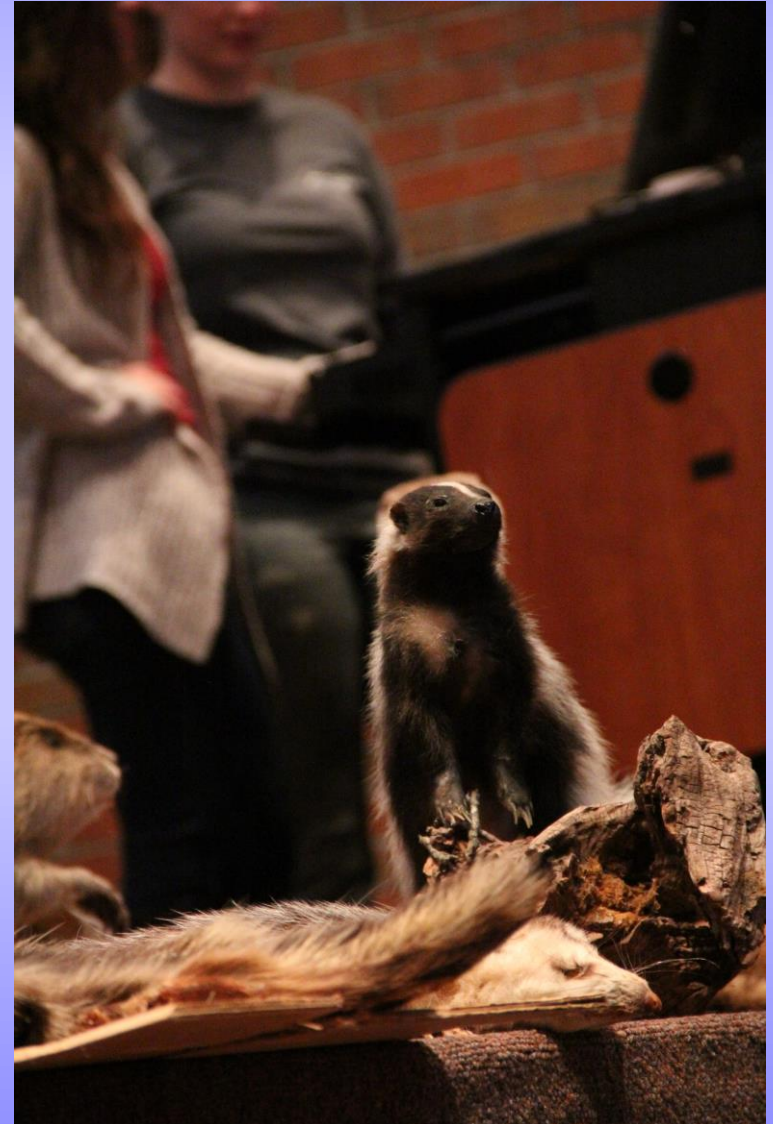


LNU

6 Apr 17



Appalachia Biodiversity Past & Present



Appalachia Biodiversity Past & Present



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Natural History of Southern Appalachia

water emphasis



Human Environmental History of Cumberland Gap Past & Present





Project Evaluation

Overall Success

7 LMU student received training

28 LMU students involved with project

Reached >150 middle school students

Fostered potential for future efforts

Student Assessment of Learning Gains (SALG)

The Class Overall

HOW MUCH did the following aspects of the class HELP YOUR LEARNING?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
The instructional approach taken in this class	7	4.14	0.90	0	0	2	2	3	0
Addressing real-world issues	7	4.71	0.49	0	0	0	2	5	0
The interplay between science and civic issues in this class	7	5.00	0.00	0	0	0	0	7	0
Learning how real science is done	7	4.57	0.53	0	0	0	3	4	0
Using scientific methods	7	4.00	0.82	0	0	2	2	2	1
The pace of the class	7	4.14	0.90	0	0	2	2	3	0

Class Activities

HOW MUCH did each of the following aspects of the class HELP YOUR LEARNING?	N	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Presentations/lectures from course instructor(s)	7	4.14	0.90	0	0	2	2	3	0
Discussions in class	7	4.14	0.90	0	0	2	2	3	0
Group work in class	7	4.43	0.98	0	0	2	0	5	0
Individual work in class	7	4.43	0.98	0	0	2	0	5	0
Using scientific methods	7	4.00	0.82	0	0	2	2	2	1
Gathering data in labs or in the field	7	4.40	0.45	0	0	0	3	2	2
Analyzing data	7	4.50	0.41	0	0	0	2	2	3
Summarizing findings and results	7	4.00	0.82	0	0	2	2	2	1

Student Assessment of Learning Gains (SALG)

Assignments, graded activities and tests

HOW MUCH did each of the following aspects of the class HELP YOUR LEARNING?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Completing written assignments (individual or group)	7	4.50	0.41	0	0	0	2	2	3
Preparing for and making oral presentations (individual or group)	7	5.00	0.00	0	0	0	0	5	2
Participating in group/team projects	7	5.00	0.00	0	0	0	0	7	0
Reviewing material in-class before tests	7	-	-	0	0	0	0	0	7
Preparing for and taking tests	7	-	-	0	0	0	0	0	7
The fit between class content and tests	7	-	-	0	0	0	0	0	7
The mental stretch required by tests	7	-	-	0	0	0	0	0	7
The way the grading system helped me understand what I needed to work on	7	5.00	0.00	0	0	0	0	3	4
Receiving feedback on my work	7	4.71	0.49	0	0	0	2	5	0

Student Assessment of Learning Gains (SALG)

Class Resources

HOW MUCH did each of the following aspects of the class HELP YOUR LEARNING?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Class readings	7	-	-	0	0	0	0	0	7
Notes and presentations posted by the professor	7	4.33	0.94	0	0	2	0	4	1
Materials (excluding the professor's notes and presentations)	7	5.00	0.00	0	0	0	0	4	3
Visual resources used in class (i.e. PowerPoint, videos, slides, models, demonstrations)	7	4.33	0.94	0	0	2	0	4	1

The information you were given

HOW MUCH did each of the following aspects of the class HELP YOUR LEARNING?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
How the different parts of the course, such as class work, labs, readings, and other assignments relate to each other	7	4.71	0.49	0	0	0	2	5	0

Student Assessment of Learning Gains (SALG)

Support for you as an individual learner

HOW MUCH did each of the following aspects of the class HELP YOUR LEARNING?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Interacting with the instructor	7	4.71	0.49	0	0	0	2	5	0
Interacting with TAs or lab assistants	7	5.00	0.00	0	0	0	0	1	6
Working with peers (e.g., on group projects or in study groups)	7	5.00	0.00	0	0	0	0	7	0
Working with a partner	7	5.00	0.00	0	0	0	0	7	0

Your understanding of class content

As a result of your work in this class, what GAINS DID YOU MAKE in your UNDERSTANDING of each of the following?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
The scientific method	7	4.17	1.07	0	1	0	2	3	1
How scientific research is carried out	7	4.33	0.47	0	0	0	4	2	1
The scientific issues and processes discussed in science-related stories in the media	7	4.33	0.47	0	0	0	4	2	1
The connections between science and the civic issues relevant to my community	7	5.00	0.00	0	0	0	0	7	0
How science is related to other disciplines.	7	5.00	0.00	0	0	0	0	7	0
Human history in Eastern Tennessee.	7	4.86	0.38	0	0	0	1	6	0
The environmental history of East Tennessee	7	5.00	0.00	0	0	0	0	7	0
How to explain important scientific information to the general public	7	5.00	0.00	0	0	0	0	7	0

Student Assessment of Learning Gains (SALG)

Increases in your skills

As a result of your work in this class, what GAINS DID YOU MAKE in the following SKILLS?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Distinguishing science from pseudo-science in what I read and hear in the media	7	-	-	0	0	0	0	0	7
Developing research questions that can be addressed by collecting and evaluating scientific evidence	7	4.00	1.00	0	1	0	0	2	4
Planning and conducting a systematic search for data relevant to a specific question	7	4.00	1.00	0	1	0	0	2	4
Determining what is--and what is not--valid scientific evidence	7	4.00	1.00	0	1	0	0	2	4
Finding scientific journal articles relevant to a specific question using library/internet databases	7	4.00	1.00	0	1	0	0	2	4
Extracting main points from a scientific journal article and develop a coherent summary	7	4.33	0.67	0	0	1	0	2	4
Understanding tables and graphs commonly found in scientific texts	7	4.00	1.00	0	1	0	0	2	4
Understanding mathematical formulas and statistics commonly found in scientific texts	7	4.00	1.00	0	1	0	0	2	4
Collecting usable scientific data in a laboratory or field setting	7	4.00	1.00	0	1	0	0	2	4
Working collaboratively with others on a scientific project	7	5.00	0.00	0	0	0	0	3	4
Giving a class presentation based on scientific evidence	7	5.00	0.00	0	0	0	0	5	2
Writing an argument or report using scientific data as evidence	7	5.00	0.00	0	0	0	0	4	3
Interpret complex information and present it effectively to different types of audiences.	7	5.00	0.00	0	0	0	0	5	2
Conduct interdisciplinary research to address a relevant topic/question.	7	5.00	0.00	0	0	0	0	4	3

Student Assessment of Learning Gains (SALG)

Class impact on your attitudes

As a result of your work in this class, what GAINS DID YOU MAKE in the following?	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Interest in science	7	5.00	0.00	0	0	0	0	7	0
Interest in civic issues (e.g., sustainability, pollution, water management, etc)	7	5.00	0.00	0	0	0	0	7	0
Confidence in my ability to understand scientific concepts and procedures	7	4.67	0.47	0	0	0	2	4	1
Confidence that I can do the kind of science we did in this class	7	5.00	0.00	0	0	0	0	6	1
Comfort working with complex ideas	7	5.00	0.00	0	0	0	0	7	0
Comfort asking for help from others (professor, peers, TAs) when working on complex problems	7	4.71	0.49	0	0	0	2	5	0
Interest in taking additional science courses after this one	7	5.00	0.00	0	0	0	0	6	1
Interest in majoring in a science-related field	7	5.00	0.00	0	0	0	0	6	1
Interest in exploring career opportunities in science (including teaching science)	7	5.00	0.00	0	0	0	0	7	0

Student Assessment of Learning Gains (SALG)

Integration of your learning

As a result of your work in this class, what GAINS DID YOU MAKE in INTEGRATING the following?

	n	Mean	stdev	no help	a little help	moderate help	much help	great help	n/a
Discussing science-related issues informally with friends and/or family	7	4.86	0.38	0	0	0	1	6	0
Discussing civic or political issues informally with friends and/or family	7	4.86	0.38	0	0	0	1	6	0
Reading science-related magazines not required for class	7	5.00	0.00	0	0	0	0	7	0
Critically analyzing scientific findings reported in the media	7	4.17	1.07	0	1	0	2	3	1
Taking PUBLIC action related to scientific or civic issues (e.g., interacting with public officials, working with a student or community group, speaking at public meetings, writing a letter to the editor, etc.)	7	5.00	0.00	0	0	0	0	7	0
Connecting what I know about science to what I learn in my other classes	7	4.71	0.49	0	0	0	2	5	0
Applying my knowledge of science and scientific reasoning to civic and/or social issues	7	5.00	0.00	0	0	0	0	7	0
Using systematic, scientific reasoning to solve problems	7	4.67	0.47	0	0	0	2	4	1
Critically analyzing data and arguments in my daily life	7	4.57	1.13	0	1	0	0	6	0
Voting in elections	7	4.14	1.07	0	0	3	0	4	0

Additional Comments

Question: What one characteristic of the way this class was taught most helped your learning? Please explain why that was so important to your learning.

- The information was given to us in a format that really stuck with me.**
- I learned the most through the interactive portions that required me to give a unique answer and apply what had been taught in the class.**
- There was a lot of hands on learning available. I got to actually perform and practice the skills and I feel like this most helped my learning.**

Additional Comments

Question: What course activity helped you learn the most? Please describe how (or why) it helped you learn.

- The hike with Dr. Mackie was very instrumental in learning how to address certain topics and how to reorganize our thoughts in a way to convey the message to different audiences.**
- What helped me the most was class discussions and presentations. With class discussions, you got to hear every ones opinion while also explaining your own. Hearing things be described differently from my classmates really help me fully understand and grasp concepts.**

Additional Comments

Question: How has your understanding of the subjects changed as a result of the class?

- It opened my eyes to how acceptable people are to wanting knowledge of science in their general area.**
- I did not realize before how important it was that children, especially in the local community, understand the history and environment here. I know see that it is very important that the youth understands and applies it to their own lives.**

Additional Comments

Question: As a result of this course, how has your interest grown in any other activities related to science?

- I am more interested in studying watersheds as a whole after teaching about how their alteration can have many effects.**
- Before this course, I wasn't that interested in doing a lot of work with the public once in my career. But after this course, I definitely want to be very involved in the public and do more outreach programs in the future.**

Additional Comments

Question: In what other ways you have integrated your learning in this class into civic or political areas?

- May watch for environmental issues during political debates and see where the better reasoning is.**
- I have been engaging myself more in events and happenings that are political or having to do with civics.**

Additional Comments

Question: What one thing would you do to improve this course?

- Have more days to show more kids about the history and animals of Appalachia.**
- Opportunities to offer an outreach program to more places and places a little further away.**
- It might also be helpful to get the scientific standards from the teachers before the students come in order to ensure that the presentation is appropriate to their understanding.**

Additional Comments

Question: As a result of this course, how has your interest grown in any other activities related to science?

- This class was focused on building public relation skills and I was glad to have signed up for it because it taught me every day needed skills by involving me in public outreach programs.**
- A skill I learned that isn't listed is how to present material effectively and how to understand your audience. I feel both of these are very important skills to have in my career field.**

Challenges & Lessons Learned

- **Workload philosophy differences between partners**
- **Honesty, trust, and reliability are crucial to success**
- **Loss of critical personnel**
 - **Dr Thomas Mackie resigned as Director of the Abraham Lincoln Library and Museum**
 - **Replaced by Dr Michael Lynch**
 - **Supporting museum staff -- Ms Natalie Sweet**
- **Maintaining communication**
 - **Honest and upfront communication between partners**
 - **Constant need to follow-up with everyone**
- **Project magnitude**

Take Home Message

- **An administrative assistant is a must if your project is in addition to normal faculty responsibilities.**

Future Directions

- **New collaboration with Abraham Lincoln Library and Museum in development.**
 - **Environmental factors influencing spread of disease during the Civil War**
 - **Will include other LMU Biology and Veterinary School faculty**
- **One-Health Initiative**



INAUGURAL
APPALACHIA ONE HEALTH LEADERSHIP EXPERIENCE

**SAVE
THE DATE**

SEPTEMBER 14 - 15, 2018

CENTER FOR ANIMAL AND HUMAN
HEALTH IN APPALACHIA

The poster features a green background with a photograph of a mountain landscape with rocky terrain and green vegetation under a blue sky with clouds. The text is white and bold, providing details about the inaugural event.