Overview/Introduction

What is Taphonomy?

My major professional development goal for my sabbatical was to take time to research taphonomy. Taphonomy is the study of the decay process, from recently dead organism to fossilization. Fitting with my scientific and teaching background, I was most interested in the effects of scavengers on the decay process. Lane started a taphonomy facility January 2019 under the advisement of my colleague, Dr. Jeanne McLaughlin. Prior to being hired as a full-time faculty in the Anatomy and Physiology course sequence, Jeanne taught in the Anthropology Department and continues to be a practicing forensic anthropologist. Most people are familiar with the "Body Farm" at the University of Tennessee, which conducts research applicable to forensic anthropology and the variables that affect human body taphonomy. Most forensic experts use research from this location in criminal investigations, but since local weather, scavengers, site-specific plant communities, and other variables affect the decay process, it is well-known that the Tennessee research is not as accurate for crime scenes in other locations. Smaller facilities are opening up, but there is no coordinated research facility west of the Rocky Mountains. The University of Oregon anthropologists are interested in studying taphonomy in outdoor situations, but lack the land holdings. Lane has land. Jeanne served as a liaison and recruited a Senior Honors thesis student, Cheyenne Duncan, to conduct the first outdoor taphonomy research project in January 2019. To date, we have used pig heads and whole bodies as the best proxies for humans, but we envision a future using donated human remains to more accurately collect data to inform regional forensic investigations.

Since 2013, the students in the third quarter biology majors course Principles of Zoology (BI 213Z) have been conducting student-designed research projects. We have a growing database of vertebrate locations and behaviors on the main Lane campus. I did not have any background on what types of vertebrates would interact with a decaying animal body, so the sabbatical provided time to immerse myself into the small-but-growing body of research in this area. I constantly consider how research can be translated into student projects in BI 213Z, especially local, contextual topics. It doesn't hurt that all people are intrinsically fascinated by taphonomy. They may not all want to collect the data, but we are all curious about what happens to an organism once it dies.

What is research?

I started teaching full time at Lane Community College in Fall 1996, after a year of part time experience. In the sciences, we have a slightly different structure to the lower-division courses, splitting the science majors (biology and other majors requiring introductory biology knowledge) from the general education/AAOT "science with lab" courses. Philosophically, I struggled with how I should design these two levels – how much overlap in content and skills? Nationally, not every college or university splits their introductory science courses up like this, but most of my colleagues agree that all students need to practice science. Biology education research supports that the more students ask their own questions, particularly ones that the instructor does not know the answers to already, the more students gain in science identity. As we face multiple global crises with discussions including scientific research, all people should be familiar with the basics of research, its limitations, and how consensus is built.

For the past two years, I have coordinated student research at Lane. The UO Undergraduate Research Symposium has been increasingly invitational to Lane students presenting and more faculty are integrating research into the curriculum. As part of the Honors classes, I was exposed to the variety of definitions of research outside of my familiar home of science. I argue that many classes at Lane do some form of research, but have not formally defined these projects as research. Community college faculty and students also tend to view what we do as the introductory, basic background content and skills, and not have the facilities, the budgets, or the intellectual preparation to conduct "Research." That view is changing, and the change is being supported at the national level by the National Science Foundation and other federal agencies and professional societies. By changing the mindsets of everyone associated with community colleges, more students will get research experiences and be able to apply their coursework to understanding the world better. So I ask people, "Tell me about the first time you did research." Everyone can relate to this as a time they solved a problem, probably in an area that resonated with their natural curiosity, be that sociology, dance, biology, diesel mechanics, etc.

The Plan

I proposed to use my Fall 2020 sabbatical to learn more about wildlife research, in particular game camera work and the zoological components of forensic taphonomy. I also proposed to make the game camera data we do have more publicly available through a web site. Finally, I wanted to interview Lane alumni from my zoology courses in their workplaces. I knew from previous sabbatical recipients that plans never go as laid out in your application and most of us are overly ambitious. I was not atypical and given the 9 months between the end of my sabbatical and writing this report, I feel like it was an academic lifetime ago.

Reality

My colleague and lead researcher for the taphonomy facility (Jeanne McLaughlin) became ill while in Kirghizstan, so I needed to stick a little closer to home on a semi-daily basis to assist in

the last quarter of decomposition data. I learned the decomposition scoring protocol and collected data to pool for the project. I caught up on the research on scavengers and forensic taphonomy by reading "Forensic Taphonomy and Ecology of North American Scavengers" and scavenger guild research papers. I can now make the case for the need to budget a manager position for a future taphonomy facility.

What I Actually Accomplished

OSTA

To support and promote the taphonomy facility for student research, we hosted a session at the Oregon Science Teachers Association meeting hosted by Lane October 11, 2019. I returned to campus to co-present with Cheyenne Duncan. Cheyenne graduated from the University of Oregon in 2019 and was instrumental in raising funds to build the fence and buy the initial pig heads. Cheyenne did this as part of an Honors Thesis. The K12 teachers were fascinated by the decomposition and weather data collected through July 2019. At least two of the teachers who attended are also College Now faculty for Lane. We want a future facility large enough to invite interested community partners to help conduct research so this workshop is part of a plan for future expansion of the facility.
https://oregonscience.org/event-3317410

Fall 2019 Decomposition Data Collection

The first pig heads were deployed in January 2019. A continuation of the study with the deployment of fresh heads for the Fall 2019 season seemed a logical activity. We now have a preliminary dataset of decomposition of fresh pig heads for all four seasons: January, March, June, and October 2019. I turned this into an unanticipated part of my sabbatical to assist in data collection and monitoring. It enabled me to collect more game camera photos for future use with the BI 213Z student research projects, which turned out to be very fortuitous when Lane's classes became remote situations due to the coronavirus Spring 2020. FYI: decomposition does not follow a linear process as described by the scoring guides emerging from forensic anthropology research. Local weather patterns and exposure (e.g. grassy field vs. blackberry thicket) greatly affected the visual decomposition categories, as well as the insect interactions. For instance, rain will reverse the mummification process of the surface tissues. While insect larvae activity (bot flies) is higher in warmer weather, these often-used indicators of time-since-death were also present in winter months at Lane's location.

NABT conference

Because I was not constrained by my teaching schedule, I took advantage of conference travel and went a day early to the annual National Association of Biology Teachers conference, held in Chicago IL November 14-17. I serve this professional association in several capacities and have attended the conference every year since 2010. I served as President in 2014 and continue service on the Nominations Committee and Introductory Biology Taskforce. On my free day prior to the start of the conference I spent time in the Chicago Art Institute. I found myself not only appreciating the opportunity to immerse myself in another discipline, but because I was

assisting in data collection on decomposition, I had developed a search image for signs of decomposition and skeletal remains. It turns out that artists are fascinated by death and decomposing things. This might be a reflection of objects posed for a still life painting naturally decaying during the process of painting. I found portrayals of dead humans in paintings of religious and war subjects. In either case, dead humans and animals were easier to obtain and pose. It was fascinating to compare the painted objects to the decomposition scales I was using in the field at the Lane taphonomy facility. See my photos at the end of this report. https://nabt.org/files/galleries/NABT2019ProgramGuide_web.pdf

I am involved with two projects that conducted workshops at the NABT conference. I am on the Introductory Biology Taskforce and on the advisory board for the Quantitative Biology at Community Colleges grant project.

The NABT Introductory Biology Taskforce met two other times in the latter half of 2019. The first meeting was hosted by the Howard Hughes Medical Institute (HHMI) in Chevy Chase Maryland August 7-9. This was a pilot faculty PD event to model how to unpack the national guidelines for biology competencies from the 2011 Vision and Change document. My role was to facilitate a working group on quantitative biology skills. Our next meeting was December 13-15 2019. People who experienced the pilot workshop gathered in regional groups to plan to take the workshop back to introductory biology instructors in their region, spanning high school (AP Bio mostly) to colleges and universities. This work critically bridges the continuum that is the proverbial elephant in the room of introductory biology: is the AP Biology experience truly equivalent to the first-year biology in higher ed institutions? My work as the liaison for College Now for much of my time at Lane helped convince me that in some ways the high school classes have advantages. They may require recent biology, chemistry, and mathematics prerequisites that they can be fairly confident that their students have taken within a given time limit. Community college instructors often start the year with students composed of broad backgrounds and skills. University classes tend to be more homogenous with recent high school graduates. But we are all expected to move students to the same end point for content and skills.

NSF/AACC summit

November 20-22, 2019 I attended the Community College Undergraduate Research Experience (URE) Summit held in Washington D.C., cohosted by the National Science Foundation (NSF) and American Association of Community Colleges (AACC). 120 attendees (majority from community colleges) actively discussed what exists and what is needed to support undergraduate research experiences at community colleges. For the last two to three years I have been meeting regularly with the Honors and PTK coordinator (Ce Rosenow) and Jennifer Frei to build more undergraduate research experiences across Lane. I both contributed our experiences from the Science Division and listened to students, faculty, and administrators at community colleges across the country who conduct undergraduate research experiences in both the sciences and humanities. Pandemic and perennial budget crises aside, Lane is close to the infrastructure needed to coordinate and highlight undergraduate research experiences, which is a high-impact practice when it comes to equity and retention. Lane has also been in collaboration for the last

two years with the UO's Undergraduate Research Symposium. I greatly expanded my national community college undergraduate research network and plan to use that in the near future in my role as interim undergraduate faculty coordinator for undergraduate research. https://www.aacc.nche.edu/programs/advanced-technological-education/community-college-undergraduate-research-experience-summit/

Research

I used my non-teaching time to continue research into scavengers, scavenger guilds, and their roles in forensic taphonomy. This is a relatively under researched area, particularly due to local variations and contexts that affect decomposition. We use game camera traps to record animal activity in and around the taphonomy facility. Students in my Winter term 2019 BI 103 course recorded a bobcat, grey foxes, and racoons outside the facility. Students in Spring term 2020 BI 213Z course used the collection of game camera photos from January 2019 through May 2020 to ask questions, look for data, and present their findings at the 2020 Science Undergraduate Research Day (virtual this year).

I see the immediate need for an expanded facility so it can be split between lower division and upper division/graduate/research-grade research projects. Right now the facility is limited to the space inside the 50' x 50' area. We can really only conduct one experiment a quarter using organic samples, spaced appropriately from each other and previous remains.

References I read during sabbatical:

Sincerbox, S. N., & DiGangi, E. A. (2017). Forensic Taphonomy and Ecology of North American Scavengers. Academic Press.

Pokines, J., & Pollock, C. (2018). The small scavenger guild of Massachusetts. Forensic Anthropology, 1(1), 52-67.

Alumni Virtual Visits

I turned this portion of my sabbatical into a project that extended into the Spring quarter and our virtual Science Undergraduate Research Day. Due to my responsibilities at the taphonomy facility, I did not get to travel to visit alumni in their workplaces. I did solicit and record several interviews with alumni using Zoom. The links to the videos are at the end of this report. These are unedited as I did not have the time to learn the software and edit the videos, but I think there are some great pieces of advice and stories of bridging their science careers from Lane to graduate school, non-profits, and business.

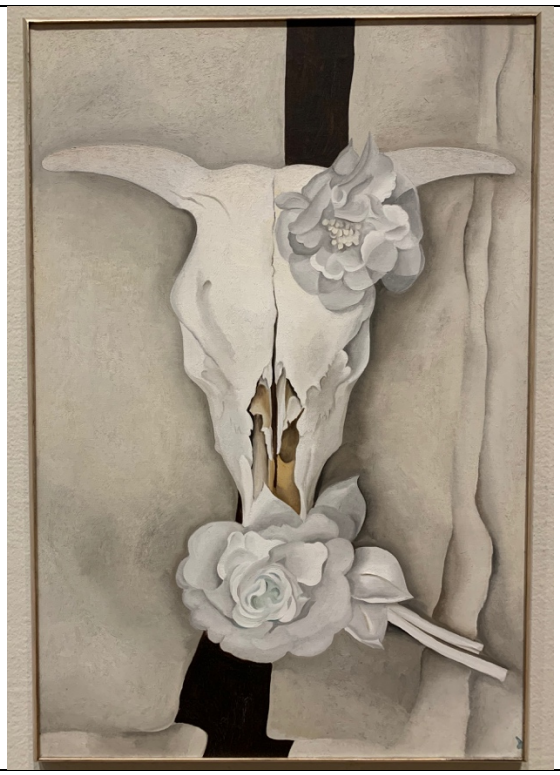
Impacts of My Sabbatical

I don't think the final impacts of my sabbatical will be realized until we are able to meet again in person. It is hard to incorporate new thinking and revise curriculum in the remote teaching mode and in the current high-anxiety world influences. Much of my teaching revolves around the core tenets of involving all students and giving them as much control as possible, with time to recover and learn from their mistakes. While these are not impossible in our current situation, I found that students were highly variable in their ability to focus on a research

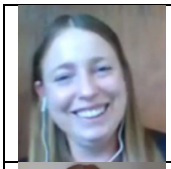
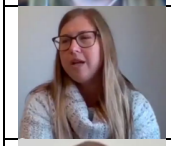
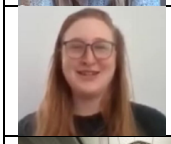
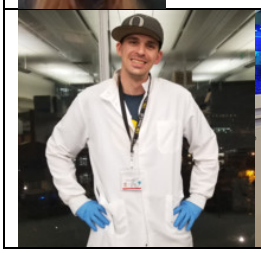
project with a group of other students Spring 2020. In the meantime, I continue to work on a broader vision of undergraduate research experiences at Lane. UO is strengthening their connection to our faculty and students. We will reach a future where I can assist students in conducting their own research projects again. I envision taking advantage of the lessons learned about virtual meetings, workshops, and professional development opportunities and leveraging these into a better experience for Lane faculty and students.

Lane students have the potential to add to the scavenger taphonomy research like the interactions of the small song birds with decaying organisms. Students in Spring 2019 discovered through the game camera photos that golden-crowned finches were actually taking bites out of the edges of the pig heads, a finding that at first surprised me. Then I realized that many of us put out suet blocks to feed birds in our yards. A student research group in 2021 conducted a food choice experiment using suet as one of the options, carrying on this research. With this small example, I hope you can see how Lane students can conduct research that is novel.

Photos of my observations of taphonomy at the Chicago Art Institute



Virtual Lane Alumni Interviews, Spring 2020

	Emily Hamblen alumni interview – wildlife biologist
	Reilly Newman alumni interview - watershed conservationist
	Lauren Burgess alumni interview - pharmacy student
	Youtube link to interview Feature piece on Gina Knox for Lane's website