# RECORD OF ACADEMIC ACHIEVEMENT

The Evergreen State College - Olympia, Washington 98505

OFFICIAL TRANSCRIPT DOCUMENT

Stern, Lindsey Sarah — A00428918

Last, First Middle — Student ID

## DEGREES CONFERRED:

Bachelor of Science — Awarded 10 Jun 2022

## TRANSFER CREDIT:

| Start | End | Credits | Title |
|---|---|---|---|
| 09/2018 | 06/2019 | 44 | **Naropa University** |
| 09/2019 | 08/2020 | 46 | **Portland Community College** |

## EVERGREEN UNDERGRADUATE CREDIT:

| Start | End | Credits | Title |
|---|---|---|---|
| 01/2021 | 06/2021 | 32 | **Marine Biodiversity**<br>**5 - Invertebrate Biology*<br>**4 - Marine Vertebrate Biology and Evolution*<br>**2 - Marine Botany*<br>**4 - Marine Conservation Biology*<br>**4 - Marine Conservation Problem Solving*<br>**5 - Marine Paleobiology*<br>**4 - Marine Biology Lab and Fieldwork or Marine Biology Virtual Lab and Fieldwork*<br>**4 - Research Project: Gull Feeding Behavior at an Artificial Food Source* |
| 06/2021 | 09/2021 | 8 | **Field Ornithology**<br>*4 - Ornithology*<br>*4 - Avian Research Methods* |
| 06/2021 | 09/2021 | 4 | **Introduction to Scientific Illustration**<br>*4 - Introduction to Scientific Illustration* |
| 09/2021 | 12/2021 | 16 | **Vertebrate Zoology: Animal Systems, Evolution, and Ecology**<br>**4 - Zoology: Vertebrate Diversity and Evolution*<br>**6 - Zoology: Comparative Anatomy and Physiology*<br>**4 - Vertebrate Ecology and Behavior*<br>**2 - Final project: Crow Vocalizations and Behavior* |
| 01/2022 | 03/2022 | 15 | **Plant Ecology and Physiology**<br>**6 - Plant Ecology*<br>**6 - Plant Physiology*<br>**3 - Scientific Writing* |
| 01/2022 | 03/2022 | 1 | **Undergraduate Research with E. Thuesen**<br>**1 - Symbiosis Research* |
| 03/2022 | 06/2022 | 14 | **Symbiosis**<br>**5 - Symbiosis*<br>**3 - Symbiosis Lab*<br>**4 - Ecophysiology*<br>**2 - Symbiosis Seminar* |
| 03/2022 | 06/2022 | 4 | **Senior Seminar**<br>*4 - Reflective Writing* |

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## Cumulative

184 Total Undergraduate Credits Earned

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I began my collegiate education thinking that I wanted to be an artist. I was lucky enough to get accepted into one of the best art schools in the country but quickly learned that I didn't want to be a career artist. I decided that a year off of school would benefit me, so I joined the Naropa LeapYear travel program and got the opportunity to travel through Latin America. It was during this travel experience that I realized that my true passion was in learning about the natural world. When I returned to the United States, I attended Portland Community College and took necessary prerequisites for a science degree before I transferred to Evergreen. Since then, I've been able to expand my knowledge of the natural world immensely, despite the challenge of learning online due to the COVID-19 pandemic.

In Marine Biodiversity, I acquired knowledge about the various marine invertebrate and vertebrate taxon over the course of two terms. With that we also discussed the conservation issues associated with protecting marine environments while taking into consideration the groups of people these efforts may affect. I also learned how to formulate a testable research question and execute a successful research project.

While I am most passionate about birds and other vertebrates, my experience at Evergreen has given me the opportunity to branch out and dive deep into the workings of other ecological sciences. Over the summer, Field Ornithology taught me about the anatomy, evolution, and research methods associated with my favorite group of organisms: birds. In this course, I explored the basics of point counts, sound recordings, and bird banding.

Vertebrate Zoology focused intensely on the evolution and anatomy of vertebrates. I formed a strong understanding in this course of how organisms evolved the adaptations that made the transition to land possible. This one the first class that I got to attend in person labs, which proved to be extremely useful. Through the use of study skins and specimens, I learned how to identify and describe the anatomical features, and the evolutionary purpose, of many vertebrate parts.

Plant Ecology and Physiology opened my eyes to the complex world of plants. I learned just how different the world of a botanist is compared to a zoologist. During this term, I also began a two-quarter- long research project in which I looked at the specificity of Rhizobia, a bacteria that fixes nitrogen from within the root nodules of leguminous plants. While this project was not successful due to a variety of reasons, I did gain the experience of working individually in a lab, using chemicals in a safe manner, preparing agar plates and test tube slants, growing bacterial colonies, and using an autoclave.

My final term at Evergreen consisted of taking Symbiosis, which sought to explore the relationships between organisms. The broadness of this course allowed me to look into organisms that I may have otherwise overlooked such as lichens, parasites, coral symbionts, and bacteria. All life, as I have come to understand, is interconnected through symbiosis, and my view on the world has been changed because of this insight.

I am grateful that I came to Evergreen as a student who knew what she wanted to pursue, but my experience at Evergreen still provided me with a diverse environmental science education, despite most of it being online. If anything, learning through the pandemic provided me with a unique opportunity to become adaptable and good at problem solving. It has also made me eager to keep learning about the natural world. This passion for knowledge is something that I will always be grateful for. Overall, my time at Evergreen has been unlike any educational experience I could have imagined for myself.

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## March 2022 - June 2022: Senior Seminar

4 Credits

**DESCRIPTION:**
Faculty: Sandra Yannone, Ph.D.

Senior Seminar provides an opportunity for students in their final quarter at Evergreen to reflect on their education, its overall shape, construction, and meaning, with an eye toward both the present and the future. Students participate in series of reflective in-class writing workshops and exercises to support them in revealing and articulating their education from different vantage points and perspectives. Students will explore interdisciplinary connections across their own studies as well as their classmates' and consider what it means to have a liberal arts education in the 21st century. They will conduct an individual transcript review, produce an annotated bibliography of significant texts, and generate reflections that feed into the drafting, revising, and editing of their final Academic Statement.

**EVALUATION:**
Written by: Sandra Yannone, Ph.D.

Approaching the completion of a remarkable undergraduate experience, Lindsey (Lin) arrived to Senior Seminar eager to dive into the work of reflective writing. Lin attended class with an eye and ear toward learning about how to develop the academic statement and how to utilize specific writing techniques to strengthen each successive draft.

Lin completed the assigned readings and contributed robustly to our class seminars. Lin modeled active, engaged listening and respectful responses that amplified the texts and provided further insights. In other words, Lin came ready to learn from and with the community. Lin also incorporated the information gained from assigned reading in our main text, *A Guide to Writing Your Academic Statement.* Utilizing this text supported critical discernment regarding the numerous narrative choices a writer could make in shaping an academic statement for inclusion in a student's transcript, the major writing assignment over the quarter. Lin developed a working draft and continued to revise with intention throughout the quarter.

In addition to class discussions and in-class writing activities, Lin anchored small group work productively, participating in collaborative peer review sessions of classmates' statements. Lin worked at refining feedback utilizing popular education and liberatory writing pedagogies. When I asked for a volunteer to help model editing techniques, Lin jumped at the chance to have her work critiqued in front of the entire class. She took stock of comments offered and asked clarifying questions that supported further revision and editing for her work. This attitude of active engagement contributed to the communal atmosphere of our virtual community significantly.

As I reflect on Lin's metacognitive learning this quarter, I'm reminded of what William Cronon, educator, says about the necessity of the liberal arts: "A liberal education is about gaining the power and the wisdom, the generosity and the freedom to connect." Every aspect of this student's engagement in Senior Seminar was emblematic of connecting to achieve transformative power and wisdom while supporting peers to accomplish the same, all hallmarks of the Evergreen education Lin sought to attain and has now achieved.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4**

4 - Reflective Writing

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## March 2022 - June 2022: Symbiosis

14 Credits

**DESCRIPTION:**
Faculty: Lalita Calabria, Ph.D. and Erik V. Thuesen, Ph.D.

Students in this junior/senior level program studied the biology of symbiotic associations through lectures, readings, laboratory sessions, and seminar topics taken from the primary literature. The phenomenon of symbiosis was examined at organismal, physiological, cellular, biochemical, molecular, and ecological levels. Characteristics that define the integration between the host and symbiont of many different specific associations were investigated and included the following topics: alga-invertebrate, N-fixing bacteria-plant, chemoautotrophic bacteria-animal, mycorrhizae, lichens, endophytes, parasitology, gut microbes, bioluminescence, and evolution through symbiosis. Ecophysiological aspects of these relationships were highlighted. Each student was required to give a short in-class presentation using PowerPoint on a specific symbiotic relationship. Students' understanding of topics covered was assessed through three in-class quizzes, a take-home essay quiz, and a final oral exam. In seminar, students were each responsible for presenting a research article from the primary scientific literature.

Developing experimental and observational laboratory skills was a significant focus of the program. Weekly laboratory sessions (~6-7 hours per week) included the isolation and pure culture of *Rhizobium* spp. followed by inoculation and nodule growth on *Trifolium* sp.; $CO_2$ consumption/ evolution measurements of a lichen symbiosis using an infrared $CO_2$ probe; field and lab observations and identification of lichens and mycorrhizae; culturing and morphotyping of plant endophytes; DNA isolation, PCR and sequence-editing and alignment to identify *Symbiodinium* spp. from corals; isolation and identification of helminth ova from dog feces; and microscopy observations of parasites of humans and other vertebrates. Students kept their laboratory notes compiled in a binder that contained the results of their experimental laboratory work and their descriptive observations in the lab. Laboratory results were presented in worksheets, posters, and short reports.

A multi-day field trip to the Olympic Peninsula focused on natural history and symbiotic associations in coastal marine and temperate rainforest ecosystems. Students worked in teams to develop field-based research questions and then carried out data collection and data analysis, culminating in video research presentation.

Textbooks used in this program:

*Symbiosis: an introduction to biological associations* (Paracer and Ahmadjian, 2000, Oxford University Press)

*I contain multitudes: The microbes within us and a grander view of life* (Yong, 2016, HarperCollins)

**EVALUATION:**
Written by: Erik V. Thuesen, Ph.D. and Lalita Calabria, Ph.D.

Lindsey (Lin) met most of the major learning objectives for this program and made progress in understanding the biology of symbiosis. Lin’s performance on in-class and online quizzes indicated a solid understanding of the topics covered. Lin did a very good job on the final oral comprehensive exam at the end of the quarter displaying both breadth and depth. Her best answers were to questions about *Symbiodinium*-coral symbioses, ruminant microbiomes, and worm parasites.

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During our field trip Lin was an active participant in field investigations of marine and terrestrial ecosystems. Lin worked with a partner to complete a video research project on skunk cabbage-pollinator symbiosis. The final video presentation was very good and included footage and still images collected in the field and lab along with reference to scientific literature related to their topic. The video was accompanied by an information rich narration and a written summary describing the natural history and ecology of the symbiosis.

Lin's laboratory notes were mostly complete and well-organized. Her illustrations of fungal symbioses and animal parasites were good with many labels and annotations. Her notes on experiments were detailed and included drawings and observations. Lin's laboratory report on lichen respiration contained the main results and calculations. She attempted to put her work in the context of the primary literature.

Lin participated during seminar making relevant contributions to discussions. Lin deepened skills in interpreting primary scientific papers from a critical perspective by leading a successful discussion on the paper "Symbiotic polyDNA virus of a parasite manipulates caterpillar and plant immunity." Lin gave a lightning talk on the Hoatzin and its microbial gut symbionts. Her presentation covered some relevant material from the primary literature including symbiont transmission and benefits to host. Overall, Lin worked hard this quarter and made great contributions to our learning community.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 14**

*5 - Symbiosis
*3 - Symbiosis Lab
*4 - Ecophysiology
*2 - Symbiosis Seminar

* indicates upper-division science credit

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## January 2022 - March 2022: Undergraduate Research with E. Thuesen

1 Credits

**DESCRIPTION:**
Faculty: Erik V. Thuesen, Ph.D.

Rigorous quantitative and qualitative research is an important component of academic learning in the sciences. Research design, data acquisition and interpretation, written and oral communication, collaboration and critical thinking skills were developed in this upper-division program. It was designed to provide a venue for advanced work in biology, either through participation in some aspect of an ongoing research program or through independent study of topics of interest to the student. This program can be taken for 1-16 credits per quarter. The research conducted by the student generally lasts multiple quarters and can function as a capstone of their academic work at Evergreen.

**EVALUATION:**
Written by: Erik V. Thuesen, Ph.D.

Lindsey had a very good quarter working on a project to fine tune methods for growing rhizobia nodules in the laboratory. She isolated *Rhizobia* from various plants and grew up pure cultures of the bacteria. She then inoculated lentils to grow the plants in environmental chambers.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 1**

*1 - Symbiosis Research

* indicates upper-division science credit

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## January 2022 - March 2022: Plant Ecology and Physiology

15 Credits

**DESCRIPTION:**
Faculty: Lalita Calabria, Ph.D. and Dylan Fischer, Ph.D.

This program focused on the study of individual plants from the cell to the organismal level (physiology), the interactions among plants (community ecology), and the physiological interactions of plants with their environment (ecophysiology). Students learned field and laboratory methods for studying plant community ecology and plant physiology including vegetation sampling methods, methods for measuring plant growth, photosynthesis, water-stress, plant traits, and tree water-use. In laboratory, students also learned how to measure phenology, seedling germination, clone propagation, leaf area and specific leaf area, plant stomatal density, plant cell and tissue structure, and how to conduct allelopathy assays. Plant ecology lectures were supported by the primary literature and the book *Cottonwood and the River of Time* by Stettler. Plant ecology lecture topics included plant communities, competition and facilitation ecology, succession, population genetics, community genetics, and the potential effects of large-scale disturbances, such as climate change, on plant communities. Physiology lectures were supported by the text *Introduction to Plant Physiology* by Hopkins and Hüner. Lecture topics in physiology included water relations and water pressure, plant growth and development, photosynthesis, plant hormones, and secondary metabolism. Students applied what they learned to better understand current research in the broader fields of ecophysiology, global change, and restoration ecology.

Local day trips to temperate rainforests, coastal habitats, and prairies, allowed us to do hands-on observations in plant physiology, plant restoration, and the plant ecology of diverse environments.

Students all contributed to four major class-wide research project including: 1) a greenhouse experiment examining tree budburst in response to different soil types, 2) a maple-sap tapping experiment where we tapped more than 30 trees for maple syrup and analyzed sugar content and volume among different trees, 3) a plant traits experiment combining class data with a global database for plant traits, and 4) a native plant germination experiment examining seedling germination potential in local forest soils. Student contributions to these projects were assessed in a final paper and presentation at the end of the quarter.

Skill-building in scientific writing was an emphasis throughout the program. Students completed weekly writing exercises and class discussions focused on analyzing scientific papers and how to improve them. These activities were anchored in the text *Writing Science* (Schimmel 2011). Students also worked in groups to develop, write and present a research proposal. Students presented their proposals at the end of the quarter.

**EVALUATION:**
Written by: Lalita Calabria, Ph.D. and Dylan Fischer, Ph.D.

Lindsey's (Lin) learning in plant ecology was evaluated based on performance on weekly quizzes, exams, labs, a research proposal, and completion of a research project that worked with a dataset collected by the whole class. In weekly quizzes in plant ecology, Lin's performance was generally passable. In a final open-book exam with an opportunity for extensive essay responses, Lin's performance was passable. Our weekly labs provided an opportunity to put theory into practice and contribute to larger class-wide research. In this work, Lin's performance was passable.

Lin developed a basic understanding of the material covered in plant physiology lectures based on open-book weekly quizzes. The final exam showed improvement with a better understanding of the concepts covered. Lin completed most plant physiology labs and participated in all quarter-long plant physiology

experiments. Lin participated in a series of allelopathy and anti-microbial bioassays focused on staghorn fern *Platycerium bifurcatum* with a lab partner, but did not contribute to the lab report which made it difficult to assess learning.

A final research paper and presentation allowed students to work with a quarter-long dataset collected by the whole class. Lin's group worked on an analysis of maple sugar sap (xylem water) production in winter, related to the ecological position of multiple trees, abiotic variables, and tree size. The group found an especially strong patterns where they had much more sap production for trees grown in the open (8-times more sap produced in open trees compared to trees in a dense stand!). They did not see a close correlation between sap flow and precipitation, but patterns with freeze-thaw temperatures were obvious. Sugar concentration in the sap was high early in the season and declined through time in all trees. They also found no relationship with size of tree, using 24 trees, across tree ages and locations. Trees were tapped for 10 weeks, and the group kept consistent logs of data and even produced some maple syrup! The final presentation was very good, and nicely detailed. The final paper was very good too.

Lin completed weekly *Writing Science* exercises.

Lin's group research proposal investigated translocation of pickleweed (*Salicornia pacifica*) as a means of preserving coastal ecosystems in the Pacific Northwest. They did a great deal of research to define their question and support their proposal. Lin's group took advantage of faculty and peer feedback on revisions and each of the several drafts documented significant improvements. Lin was a collaborative and engaged member of the research team. Their final proposal and presentation were both very good.

Overall, Lin leaves the program with increased knowledge and skills in plant ecology and physiology, as well as, scientific writing and communication.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 15**

*6 - Plant Ecology
*6 - Plant Physiology
*3 - Scientific Writing

* indicates upper-division science credit

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## September 2021 - December 2021: Vertebrate Zoology: Animal Systems, Evolution, and Ecology

16 Credits

**DESCRIPTION:**
Faculty: Alison Styring, Ph.D. and Amy Cook, Ph.D.

In the program Vertebrate Zoology, we explored the evolution, ecology, anatomy and physiology of vertebrates. Learning goals for the program included: develop a detailed understanding of the ecology, behavior, and evolutionary history and relationships among the vertebrates, develop a detailed understanding of functional morphology and ecomorphology, improve quantitative and communication skills, and improve skills in critical thinking, field methods and library research. Student learning occurred through labs, fieldwork and lectures. This work was supported by the following texts: *Wildlife Ecology, Conservation, and Management* by John M. Fryxell, Anthony R. E. Sinclair and Graeme Caughley and *Vertebrates: Comparative Anatomy, Function, and Evolution* ($8^{th}$ Edition) by Kenneth Kardong.

Lab and field activities provided students with the opportunity to develop a number of hands-on skills. In labs students worked with a variety of vertebrates in the form of fluid specimens, skeletons, a prepared skins. The focus of these labs was vertebrate taxonomy, evolutionary biology, and the relationship between morphology and ecology. Field exercises emphasized observation of vertebrate behavior, field identification of both vertebrate species and the main plant species that make up the communities in which they live, and techniques in field ecology, and maintaining a formal field journal. In exercises surveying squirrel middens, gathering data on gull demographics, and assessing snags as wildlife trees, students learned techniques in measuring forest characteristics, practiced sampling techniques, and gained skills in field identification.

Students developed and carried out a final research project over the course of the quarter. This project could be strictly literature-based or incorporate a field compoenent. The learning goals of the project included: clearly demonstrating a student's learning in vertebrate biology; demonstrate innovative learning through the development of a research idea and the synthesis of available ideas to address that idea; demonstrate information literacy by communicating, organizing and synthesizing information from primary literature sources to support learning; and practice and demonstrate a student's ability to develop novel questions/hypotheses and use what they have learned to answer/test them and analyze the patterns that they found.

**EVALUATION:**
Written by: Amy Cook, Ph.D. and Alison Styring, Ph.D.

Lin (Lindsey) took advantage of the learning opportunities presented in the program. Lin attended class regularly, completed assignments, though many were submitted late, and earned full credit.

Lin demonstrated an good understanding of concepts relating to vertebrate evolution, form and function as well as important principles of vertebrate ecology including population processes. Lin's work on quizzes and assessments was consistently good to very good.

Lin's work in the lab and the field showed in-depth integrative learning. Lin's field and lab journal was fairly well-organized, but was turned in late. Through field and lab work, Lin demonstrated a good understanding of vertebrate functional morphology and anatomy as well as field methodologies in several disciplines including ecology, ornithology and animal behavior.

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Lin's final project was a group project focused on documenting crow behaviors and vocalizations. The paper provided some review of the literature on crow vocalizations but the information from the literature review did not lead clearly to a research question that was answerable with a field project. The group did collect a dataset of behaviors and vocalizations and the final paper generally met the learning objectives of the project. The group presented their work and, to some degree, provided a more clearly outlined overview of the study design. The slides in the final presentation were visually pleasing and informative.

Over the course of this program Lin developed a considerable knowledge base of the biology, behavior, anatomy and physiology of vertebrates as well as methodologies that scientists use to study vertebrates. Lin was a consistent member of the learning community and effectively worked with others on program activities.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 16**

*4 - Zoology: Vertebrate Diversity and Evolution
*6 - Zoology: Comparative Anatomy and Physiology
*4 - Vertebrate Ecology and Behavior
*2 - Final project: Crow Vocalizations and Behavior

* indicates upper-division science credit

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## June 2021 - September 2021: Introduction to Scientific Illustration

4 Credits

**DESCRIPTION:**
Faculty: Sharon Birzer, MFA

An introduction to the practice of natural science illustration was complemented by online critique sessions allowing students to discuss and respond to each other's work. We worked on building observational and visual interpretation skills while exploring illustration using a variety of techniques, including graphite, pen and ink, colored pencil, and watercolor. The focus of this fundamental class has been *drawing*, from gestural sketching to precision rendering of illustrations for scientific purposes. Each student was given the opportunity to render selected subjects in a variety of demonstrated techniques. Students could choose to illustrate natural history objects from their personal collections or from online bone databases, for example. Students created three final projects to be displayed in an exhibit in the Lab buildings on campus at the end of the class, as well as a virtual exhibit. Our work was conducted remotely, using Canvas and Zoom.

**EVALUATION:**
Written by Sharon Birzer, MFA

Lindsey, who goes by Lin, choose to illustrate a clam shell, *Mollusca sp.,* and in stages they created very finely rendered, detailed and accurate illustration of *Mollusca* using skilled stippling techniques in pen and ink.

For Lin's watercolor specimen project, Lin chose Pitcher plant, *Sarracenia sp*. and rendered *Sarracenia* painted accurately and beautifully, including a complicated root system, using layers of watercolor paints. The watercolor work also had several supporting assignments including a scaled line drawing, a value study and a color palette specific to their chosen plant.

Lin also created a finely detailed and realistic rendering of American Crow Skull, *Corvus brachyrhynchos,* in colored pencil, showing both the top and side views. The result was a striking portrait and the use of the paper tone with black and white values of the subject worked together very well to create form. This project which had several supporting assignments including a scaled line drawing, and a color palette specific to their chosen plant.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 4**

4 - Introduction to Scientific Illustration

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## June 2021 - September 2021: Field Ornithology

8 Credits

**DESCRIPTION:**
Faculty: Alison Styring and Daniel Froehlich

Field Ornithology was an 8-credit program focused on birds as a unique group of terrestrial vertebrates and as the focus of conservation-oriented research, restoration, and monitoring. This program was intended to foster the development of foundational knowledge of avian biology as well as strong bird identification and natural history skills. This was a hybrid program with online components that included electronic documents covering weekly readings, lectures, and assignments, video lectures and tutorials, and quizzes. We met in-person once a week to learn specific field methods that are widely used in field studies. Weekly web-meetings were designed to support learning of textbook material and field identification and to undertake analytical approaches to understanding the field data we would collect during in-person field workshops.

Students learned about key elements of avian biology important to understanding the evolution and ecology of birds. Avian biology topics drew from readings from two current textbooks: *The Handbook of Bird Biology* (3rd edition, Lovette and Fitzpatrick) and *Ornithology* (4th edition, Gill and Prum). Topics included: avian evolution, taxonomy, and patterns of diversity; the biology of bird vocalizations and avian communication; the anatomical systems of birds and how they are adapted for flight; feathers and avian molt ecology; and avian life histories and population biology. Textbook learning was supplemented with readings focused on the concept of integrity including: data integrity, procedural integrity and institutional integrity within the scientific community as a whole societal endeavor. This was linked with the concepts of reputation, diversity, equity, and inclusion. Learning in this area of the program was assessed via weekly quizzes.

Students also worked to learn and improve their avian identification skills in the field. The emphasis was on learning common species of local birds and observing/documenting their distinguishing traits. Students demonstrated their learning via weekly submissions of eBird checklists (ebird.org) as well as individual observations of species via an iNaturalist project (iNaturalist.org).

Students gained experience with commonly used field methods via five assignments. Each assignment introduced students to a field method via readings, videos, and in-person instruction. The methods included: (1) monitoring species presence using autonomous field recorders, (2) point counts (with distance sampling) and associated habitat surveys, (3) observation and quantification of foraging behavior, (3) bird banding, and (4) study of birds using indirect observation (signs of presence such as prints, scat, and pellets). Each field method was linked to an assignment that provided them with the opportunity to enter their data into spreadsheets, analyze their data, and interpret their findings.

Students synthesized their learning via a final project in which demonstrated the links between the various components of the program and provided the student with the opportunity to showcase their skills and learning. Students wanting to delve further into avian biology and field research undertook an optional upper division science credit project in which they designed a study from question to field design to analysis and scientific report-writing. The research project provided students the opportunity to gain more experience in an area of their interest and practice skills and field methods, analysis, and scientific communication.

**EVALUATION:**
Written by: Alison Styring and Daniel Froehlich

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Lindsey Stern demonstrated some effective learning in this program. Lindsey's learning and understanding of avian biology was excellent as assessed by weekly quizzes. Lindsey also provided thoughtful insight and commentary on the larger issues of science, society, birding, and inclusion. The quizzes for the second and third weeks of the program were submitted late but the submissions became more timely as the program progressed.

For the field identification component of the program, Lindsey demonstrated an ability to master the online components while completing the assignments more focused on identifying the birds present than documenting them. Lindsey's submissions showed a strong foundation in identification of birds and excellent growth in the ability to find and identify new species from week to week, demonstrating effective use of field guides and online resources for support and to incorporate advice from prior submissions. During the first weeks of the program, the submissions were between 5-11 days late. Timeliness of submission improved later in the program.

Lindsey's work in the field methods component of the program was fair with a growing attention to detail as demonstrated in documentation of field notes and acoustic recordings. Lindsey also submitted spreadsheets, graphs, and written interpretations that were well-organized and demonstrated a fair foundation in avian research methods. Much of the work in this component of the program was submitted late, which had a compounding effect on the subsequent assignments.

Lindsey discussed the work that was done studying crow behavior for a final project. However, no project work was submitted.

Lindsey has some very good skills in observation of birds and a clear passion for them as well. With improvements in submitting work on time and responding to feedback, Lindsey stands to do well in a path focused on the study of animals.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 8**

4 - Ornithology
4 - Avian Research Methods

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## January 2021 - June 2021: Marine Biodiversity

32 Credits

**DESCRIPTION:**
Faculty: Amy Cook, Ph.D., Erik Thuesen, Ph.D., and Trisha Towanda, M.E.S

The primary goal of the program was to provide students with a comprehensive background in marine biology including marine botany, invertebrate and vertebrate biology, marine conservation biology, and marine paleontology. The work in the program emphasized skill development in identification of marine organisms to several different taxonomic levels, critical thinking around recognizing the connections between a species morphology and its ecology, and refining understanding of key principles in conservation biology. A synthetic view of marine life at wide-ranging temporal, spatial and biological scales was emphasized throughout.

Student learning was supported by the development of presentations to the class in winter quarter on a specific species, a conservation issue, and a scientific paper. These assignments deepened students' understanding of concepts that were discussed in lectures and provided them with practice in navigating and reading the primary literature. The presentation on a scientific paper supported a seminar discussion that the student led. In spring quarter a series of Conservation Case Studies further supported students' understanding of problem solving in marine conservation. Working in pairs or groups of three, students examined and summarized a marine conservation issue and presented at least two positions of stakeholders in that issue. The class as a whole commented on and discussed both the summary and the presentation of positions. A final assessment assignment asked students to read a paper that described at problem solving from an interdisciplinary perspective and to apply concepts from that paper to the problem of ocean acidification. The key learning goals of all of these exercises were for students to engage in deep critical thinking and problem solving around conservation issues.

In both winter and spring quarter students kept a Lab/Field Notebook in which they completed a series of assignments. COVID-19 precluded some students doing work in the lab and field so the Notebook assignments included dissections carried out at home, virtual dives and fieldwork, and in-person field and lab work. These assignments emphasized the development of observation skills, the accurate recording of observations, and reinforcement of concepts discussed in the lectures and readings.

In spring quarter, each student carried out an individual research project. At the beginning of the quarter, they submitted a project proposal for review by the faculty. The project could be field-based, lab-based, a literature review, or an in-depth biography of the research career of a particular scientist but had to demonstrate the student's mastery of some of the concepts discussed in class and their ability to navigate, summarize, and analyze the primary scientific literature on a specific topic. Students presented their projects in a research paper at the end of the quarter.

**EVALUATION:**
Written by: Amy Cook, Ph.D., Erik Thuesen, Ph.D., and Trisha Towanda, M.E.S

Lindsey (Lin) took full advantage of the learning opportunities offered in the program and clearly met the learning objectives in organismal biology, marine conservation, and marine paleontology.

Lin demonstrated a firm grasp of marine organismal biology. In both assignments and exams she showed a good understanding of marine botany, including the ecology and biomechanics of macroalgae and algal life cycles. Her quizzes and exams demonstrated a very good comprehension of invertebrate biology including taxonomy, feeding, morphology, and life history. This was also evident in her presentation on the pyrosome, *Pyrosoma atlanticum*, in which she confidently and accurately described the taxonomy, biology, and ecology of this species. In her assignments, exams, and lab/field notebook in

spring quarter, Lin showed a detailed understanding of the taxonomy, behavior, and functional morphology of a variety of marine vertebrates including fishes, marine reptiles, and marine mammals. She deepened her skills in interpreting primary scientific papers in this field by leading a successful seminar discussion on the paper, “Effects of prey characteristics on the feeding behaviors of an apex marine predator, the California moray (*Gymnothorax mordax*)” (Diluzio, 2017) in winter quarter.

Lin brought her understanding of organismal biology to the marine paleontology portion of the program, developing a detailed insight into invertebrate phylogeny and evolution from the Cambrian through the Silurian and how this evolution influenced the ecology of marine systems in the Paleozoic. On the final exam in spring quarter Lin provided a very good discussion of the Mesozoic Marine Revolution that included a clear description of the interaction of predator diversification and prey diversification and a detailed discussion of how this influenced the marine ecology of the time including trophic interactions and the shift from an epifaunal to infaunal lifestyle in several lineages.

Lin’s learning in marine conservation was clearly evident in her exams, her presentation to the class, and her work with the Conservation Case Studies. She showed a solid understanding of the interactions among a species’ biology, including population genetics, its life history, and its sensitivity to environmental conditions and how these influence conservation efforts to protect it, On the final exam she provided a particularly well-thought-out discussion of the design and effectiveness of a Marine Protected Area for the protection of the smalltooth sawfish. Lin’s winter quarter presentation on Tufted Puffin monitoring project at Haystack Rock, Oregon provided a well-researched description of the history of the Oregon coast populations of puffins and the findings of the monitoring program.

Lin was a thought-provoking participant in Conservation Case Studies. In self-assessment, she reported that her contributions added depth and clarity to the discussions of problems in conservation. I agree and add that the questions that she posed successfully stimulated additional discussion among her peers. Lin worked with two other students to present a case study on the controversies surrounding shark fishing. They bravely accepted the challenge of making the first presentation of the quarter and with only three days' notice. They wrote a very good synopsis of the issues and offered provocative questions for the group to ponder. Lin made a fine presentation that clarified the issues and prompted class discussion.

In the final conservation assignment, Lin identified the basic concepts of the article, “A revisited conceptualization of plastic pollution accumulation in marine environments: Insights from a social ecological economics perspective” (Gattringer 2018). Her conclusion accurately identified and summarized several of the author’s key points. Lin was less successful at applying the core concepts of the article to the problem of acidification. The majority of her essay was a discussion of the problem of ocean acidification, rather than an analysis of the problem through the lens of her previous conclusions. Lin will need to invest in additional study and practice to be able to identify the most important elements of a theoretical argument and apply them thoughtfully to a practical problem.

Lin’s lab/field notebook was well organized. She provided good descriptions of the sites “visited” on the virtual field trips, including an underwater park in Puget Sound, a kelp bed in California, and a dock fouling community in Bamfield, British Columbia. The discussions of the ecology, behavioral, and the taxonomy of the organisms she observed clearly applied concepts she learned in class to her observations. Lin’s entries for both at-home dissections and virtual dissections were illustrated with accurate, detailed, clearly labeled drawings and notes on the observations she made during the activities. These entries demonstrated a firm grasp of invertebrate and vertebrate anatomy and ecomorphology. Overall Lin’s notebook reflects her strong observation skills and ability to provide a clear, detailed record of those observations.

Lin’s final project in spring quarter focused on the behavior of gulls feeding on a novel food item. Lin designed an experiment using pizza to look at the feeding and social behavior of Western Gulls at an

artificial food source. She clearly demonstrated her understanding of formal behavioral observation protocols and her ability to carry out those protocols. Her project paper was well organized and Lin's writing is characterized by a smooth narrative flow and a confident, professional tone. This project demonstrated Lin's ability to develop an idea, do background research in the primary literature, carry out a research project, and reflect on her observations through scientific writing.

Over the course of this quarter Lin has significantly expanded her view of marine biology and her understanding of the core ideas of this field. She needs to continue to work on getting assignments in on time but her performance in the program reveals her as good critical thinker with the ability to pull together ideas from a wide variety of sources.

**SUGGESTED COURSE EQUIVALENCIES (in quarter hours) TOTAL: 32**

*5 - Invertebrate Biology
*4 - Marine Vertebrate Biology and Evolution
*2 - Marine Botany
*4 - Marine Conservation Biology
*4 - Marine Conservation Problem Solving
*5 - Marine Paleobiology
*4 - Marine Biology Lab and Fieldwork or Marine Biology Virtual Lab and Fieldwork
*4 - Research Project: Gull Feeding Behavior at an Artificial Food Source

* indicates upper-division science credit

EVERGREEN

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# EVERGREEN TRANSCRIPT GUIDE

**Accreditation:** The Evergreen State College is fully accredited by the Northwest Commission on Colleges and Universities.

**Degrees Awarded:** The Evergreen State College awards the following degrees: Bachelor of Arts, Bachelor of Science, Master of Environmental Studies, Master of Public Administration and Master In Teaching. Degree awards are listed on the Record of Academic Achievement.

**Educational Philosophy:**

Our curriculum places high value on these modes of learning and teaching objectives:

- Interdisciplinary Learning
- Collaborative Learning
- Learning Across Significant Differences
- Personal Engagement
- Linking Theory with Practical Applications

Our expectations of Evergreen Graduates are that during their time at Evergreen they will:

- Articulate and assume responsibility for their own work
- Participate collaboratively and responsibly in our diverse society
- Communicate creatively and effectively
- Demonstrate integrative, independent, critical thinking
- Apply qualitative, quantitative and creative modes of inquiry appropriately to practical and theoretical problems across disciplines, and,
- As a culmination of their education, demonstrate depth, breadth and synthesis of learning and the ability to reflect on the personal and social significance of that learning.

Our students have the opportunity to participate in frequent, mutual evaluation of academic programs, faculty and students. In collaboration with faculty and advisors, students develop individual academic concentrations.

**Academic Program**

Modes of Learning: Evergreen's curriculum is primarily team-taught and interdisciplinary. Students may choose from among several modes of study:

- **Programs:** Faculty members from different disciplines work together with students on a unifying question or theme. Programs may be up to three quarters long.
- **Individual Learning Contract:** Working closely with a faculty member, a student may design a one-quarter-long, full-time or part-time research or creative project. The contract document outlines both the activities of the contract and the criteria for evaluation. Most students are at upper division standing.
- **Internship Learning Contract:** Internships provide opportunities for students to link theory and practice in areas related to their interests. These full- or part-time opportunities involve close supervision by a field supervisor and a faculty sponsor.
- **Courses:** Courses are 2-6 credit offerings centered on a specific theme or discipline.

The numerical and alpha characters listed as Course Reference Numbers designate modes of learning and are in a random order.

**Evaluation and Credit Award:**

Our transcript consists of narrative evaluations. Narrative evaluations tell a rich and detailed story of the multiple facets involved in a student's academic work. A close reading of the narratives and attention to the course equivalencies will provide extensive information about student's abilities and experiences. Students are not awarded credit for work considered not passing. Evergreen will not translate our narrative transcript into letter or numeric grades.

**Transcript Structure and Contents:** The Record of Academic Achievement summarizes credit awarded, expressed in quarter credit hours. Transcript materials are presented in inverse chronological order so that the most recent evaluation(s) appears first.

Credit is recorded by:

| | |
|---|---|
| **Quarter Credit Hours:** | Fall 1979 to present |
| **Evergreen Units:** | 1 Evergreen Unit (1971 through Summer 1973) equals 5 quarter credit hours |
| | 1 Evergreen Unit (Fall 1973 through Summer 1979) equals 4 quarter credit hours |

**Each academic entry in the transcript is accompanied by (unless noted otherwise):**

- The Program Description, Individual Contract or Internship Contract which explains learning objectives, activities and content of the program, course or contract.
- The Faculty Evaluation of Student Achievement provides information on specific work the student completed and about how well the student performed in the program or contract.
- The Student's Own Evaluation of Personal Achievement is a reflective document written by the student evaluating his or her learning experiences. Students are encouraged but not required to include these documents in their official transcript, unless specified by faculty.
- The Student's Summative Self Evaluation is an optional evaluation summarizing a student's education and may be included as a separate document or as a part of the student's final self- evaluation.

Transfer credit for Evergreen programs, courses and individual study should be awarded based upon a careful review of the transcript document including the course equivalencies which are designed to make it easier for others to clearly interpret our interdisciplinary curriculum. These course equivalencies can be found at the conclusion of each of the Faculty Evaluation of Student Achievement.

The college academic calendar consists of four-eleven week quarters. Refer to the college website (www.evergreen.edu) for specific dates.

This record is authentic and official when the Record of Academic Achievement page is marked and dated with the school seal.
All information contained herein is confidential and its release is governed by the Family Educational Rights and Privacy Act of 1974 as amended.
If, after a thorough review of this transcript, you still have questions, please contact Registration and Records: (360) 867-6180.