

## Wrangell Mountains Summer Program

### Summer, 2021

In the fast-changing world, even the most remote landscapes are rapidly evolving, posing new challenges to researchers, natural resource managers, and residents. Alaska’s Wrangell Mountains are a “natural classroom,” and over the course of our summer program, students learn how ecology, geology, policy, human activity, and climate change impact the landscape of the Wrangell Mountains and beyond. Our team-taught interdisciplinary curriculum will provide the knowledge, skills, and abilities to tackle the important environmental questions of the future. The remote setting will foster individual and group responsibility and build students’ confidence in backcountry travel and field research.

The partnership between The Evergreen State College and the Wrangell Mountain Center has created a synergistic, experiential learning opportunity for our students in one of the most remote regions of the United States.

#### Faculty:

- Dylan Fischer, Ph.D., Member of the Faculty, Forest Ecology, Evergreen State College
- Peter Impara, Ph.D., Member of the Faculty, Geography, Evergreen State College
- Molly McDermott, Ph.D. Candidate, Wildlife Biology, University of Colorado
- Ken Tabbutt, Ph.D., Member of the Faculty, Geology, Evergreen State College

The faculty will be teachers, mentors, and guides throughout the quarter. The student-to-faculty ratio is less than 5:1. Our faculty have a wide range of expertise across ecology, biology, and geology. Associated faculty have expertise in linked social and ecological systems, and management/policy. The faculty will rotate in and out of the program following the schedule below:

	Weeks						
Faculty	1	2	3	4	5	6	7
Tabbutt	X	X	X	X			
McDermott	X	X	X	X			
Impara				X	X	X	X
Fischer				X	X	X	X
Backcountry							

In addition to the core faculty, several associated faculty will provide support in the way of workshops and lectures.

- Ben Shaine, Ph.D., Resource Faculty, Public Park Policy, The Evergreen State College
- Tim Bartholomaus, Ph.D., Assistant Professor of Geological Sciences, University of Idaho
- Sophie Gilbert, Ph.D., Assistant Professor of Wildlife Ecology, University of Idaho

Local artists, homesteaders, historians, naturalists, and park staff will provide guest lectures. Professional backcountry guides will teach backcountry skills and accompany students during the four weeks of backcountry travel.

**Contact Hours:** Students and faculty will be in close contact, meeting every day throughout the course with the goal of fostering a learning community; the central goal is to encourage integration of learning and collaboration. The interdisciplinary focus, a fundamental value at Evergreen, will engage students in “big questions” through common reads and program activities.

There will be “check-ins” where students will have individual meetings with faculty to discuss their progress. All students will write reflective self-evaluations and meet with the faculty at the end of the program to discuss their academic achievements.

**Class Meetings:** This program involves instruction every day of the seven weeks with two days off. Faculty and staff will work directly with students 6-10+ hours a day and are available for extra help and advising before and after scheduled activities. Typically, scheduled activities start each day at 9am, with breaks for meals. Evenings include scheduled activities, including guest lectures, structured study time, and workshops. When in the backcountry or at a field site, activities may start as early as 4am or end as late as 10pm (e.g., for wildlife observation).

Although lectures will be an integral component of the academic work, experiential and active learning will be emphasized. Workshops, seminar, observation, and collaborative research will be utilized to engage the students in the Wrangell landscape. A wide range of writing, including field journals, critiques, reflective essays, and research reports will be assigned.

**Course Credit:** Students will receive credit for three upper-division (junior-senior) “courses” although the content of these will be linked because of the interdisciplinary focus of the instruction. We will integrate teaching and learning through both formal situations (lectures and seminars) and field studies. This program is offered by Evergreen State College through the Summer School program.

*Natural History of Alaska (4 quarter hours)* – A natural history of Wrangell-St. Elias ecosystems, including an introduction to scientific, social-scientific, and arts-based research methods for field studies. Introduction to Wrangell-St. Elias species identification, ecosystem characteristics (including geologic formations), disturbance and critical field skills such as generating and refining inquiry questions from on-site observations, assessing and optimizing methods, interpreting data, presenting findings, and placing research in a broader context through field journaling and scientific writing.

*People and Place (4 quarter hours)* – An examination of relationships among cultural groups and the environment and issues of sustainability. Students will write creatively about protected areas, the imaginative process integrates literary, social and natural sciences. Employing regional case studies, students will assess historical and contemporary thought and use of protected lands, and outcomes of different environmental policies and land/wildlife management, including human and natural consequences.

*Field Research: Dynamic Landscapes (8 quarter hours)* – This course emphasizes faculty-mentored undergraduate field research. Research methods and data analysis will be introduced during the first backcountry trip in the second week of the program. This practical experience will prepare students to conduct their

own small-group research project during the second, three-week backcountry trip.

Four or five different projects that are within the expertise of the faculty will be offered. Students will be challenged to define scope and methods compatible with a remote backcountry research site when investigating environmental questions using the scientific method. Extended field research may focus on flora, fauna, biotic communities, disturbance, ecological relationships, glaciology, hydrology, geomorphology, and landscape evolution at selected sites within the park. Climate change and disturbance will be a theme throughout the various research projects.

The final week of the program focuses on project synthesis, finalizing reports, and oral presentations. Throughout this wrap-up week there will be frequent meetings with the project advisor for advice, editing, help with analysis and critiques of the students' work.

**Readings:** A Course Reader will be provided to students in advance of the program or upon arrival. Readings include selections from academic primary literature, book chapters, technical reports, and environmental planning documents. Field guides and textbooks supplement our field activities and are an integral part of our program. We will carry a shared reference library of these on all activities and backcountry trips.

### **Program Overview**

The study area is in the center of the world's largest international complex of protected wilderness. With glaciers and meltwater streams flowing from 16,000 foot peaks, canyons deeper than Yosemite, spruce-forested valleys, and a region experiencing extensive climate change disturbance, there are plenty of opportunities to learn and explore. The study area is continuously altered by glaciation, volcanism, erosion, and ecological succession, making it an ideal natural laboratory in which to examine Alaska's dynamic landscapes.

Our team-taught, interdisciplinary program focuses on understanding geophysical, biological, and cultural change in this rapidly evolving setting. We learn about the politics of Alaska's lands and contemplate our personal role in wildlands preservation. During backcountry field investigations, we will gain an understanding of geologic time, hydrology, geomorphic processes and what it means to be both self-reliant and a member of a community.

Hiking up from the valley floor, we will examine successional changes in the glacier-edge environment and ecological characteristics in the alpine habitat of Dall's sheep, brown bear, and mountain goat. Additionally, we will study the adaptations of plants and animals to the stresses of a sub-arctic existence and see first-hand the effects of climate change on the landscape.

Alaska's parks are uniquely mandated to allow continued traditional use by their local rural residents. During the summer, students will discover the passionate connections people have to the Wrangells, both as a home and a park. We will examine the dilemmas a gateway community encounters as it works to sustain an Alaskan bush lifestyle in the face of an increasing pace of change brought about by tourism and other human activities. Through writing and discussion, team members will reflect on

relationships between culture and landscape, and on how those relationships influence land use and management.

Faculty will mentor students as they propose, design and conduct collaborative natural or social science research projects in the backcountry. Students will identify key questions and develop systematic methods of investigation that are compatible with the remote location. The goal is to foster a sense of excitement and ownership that comes with field research. The final week of the program will find students organizing, synthesizing, and presenting their findings in both a written and oral report. By the end of the program, each student will gain firsthand knowledge of the natural history of a complex wilderness and an enriched appreciation of the continuity of life in the north.

The summer program consists of four chronological phases:

*Phase I: Introduction*

Introduction to people, place, program, and expectations during the first days of the program. There will be an emphasis on developing a learning community and understanding individual and group responsibilities.

*Phase II: Landscape-Pieces, Patterns and Processes*

Students will learn to observe and interpret the landscape. Faculty will provide tools to begin a more detailed look at the land and its life including botany, geology, wildlife, history & culture, management policy, and ecological relationships, with guided exploration of the landscape using tools we have provided. This intensive section covers the first two weeks of the program, beginning in McCarthy and continuing on an initial week-long backpacking trip. Workshops on field methods, journals, map and scientific literature interpretation, and backcountry skills will be emphasized. Students will participate in a faculty-designed research project during the first backcountry trip to familiarize the students with research methods and data interpretation.

*Phase III: Projects*

Students will work in small groups on one of a set of diverse projects facilitated and mentored by faculty. A week of preparation in McCarthy will precede the three week backcountry trip (program weeks four, five and six). During week three while preparing for the extended backcountry trip, students will work in small groups to create research proposals. Lectures, workshops, seminars, and faculty presentations continue during this period as well.

*Phase IV: Final Synthesis, Presentation and Evaluation*

During the final week, students assemble findings into formats conveying data, concepts and experiences, presented orally and in writing to the group and other interested parties (often including local land managers, visiting researchers and community members).

## **Learning Objectives**

Following this program, students should have working knowledge of and experience in:

**1. The ecosystems of South-central Alaska in terms of flora, fauna, and ecological processes, including threats, conservation, and ongoing change.**

Species identification is essential to managing and understanding the communities in this region and for identifying any change over time. Through a series of lectures, workshops, and assignments students will learn techniques for keying out and confirming identification of plant and animal species using field guides and taxonomic keys. In a series of field excursions, lectures, readings and discussions, students will learn basic ecological concepts, and be able to identify community types and the processes that underlie community development and change.

**2. *The geologic history and processes at work in the Wrangell Mountains on multiple spatial and temporal scales, including glacial processes, hydrology and tectonic processes.*** Tectonics, glaciation, erosion, and volcanism are exposed and active in the Wrangell Mountains, making these mountains a natural field laboratory for learning geologic concepts and processes. Through lectures, field observations, and workshops using field guides and geologic maps, students will become familiar with common rock types found in the Wrangell Mountains and their origin. They will learn to identify and interpret glacial, hydrological, and geomorphological features and utilize field methods to measure stream discharge and channel morphology. Other topics covered in lectures, field excursions, readings, and discussions include: glacial processes, glacial formations, plate tectonics, geologic evolution of the region, and erosion processes. Students will see examples of all these processes in action during our backcountry trips, giving students insights into the dynamic nature of geologic processes over time and across spatial scales. Students will also be introduced to ongoing field research.

**3. *The cultural, political, and management history within the Wrangell-St. Elias region, including native and homesteader perspectives, policies governing use (federal, state, local), and local community involvement.*** Following introductory lectures on the cultural, political, and management history in the Wrangell Mountain region, students will have the chance to meet many local residents who may have very different perspectives on sustainability, management, and policy. One highlight of the project is often a visit with a local homesteader who has lived an Alaskan subsistence lifestyle in the area for over 25 years. Students gain additional insight into the political and management history through discussions and numerous readings (focused during the second backcountry trip).

**4. *Designing a field research project, collecting field data, managing, synthesizing, and presenting interpretations of this data to peers, faculty, and the public both in writing and in presentation.*** Students gain significant experience in conducting research through a field project that is the culmination of this course. Students are mentored through the research process by a faculty advisor, through workshops, and through working with a small group of their peers. The skills learned in this project are transferable to other fields (and to their future careers): working well within a group, taking and using feedback, managing, synthesizing and interpreting information, presenting interpretations in oral presentation and in written form.

**5. *Critical reading, discussion, and evaluation of primary literature in ecology, geology, and social science.*** Throughout this course we rely on primary literature in lieu of a textbook. Therefore, students gain a significant amount of experience reading and critically discussing primary literature. Following an introductory lecture and workshop on “how to read a scientific paper,” students read at least one piece of

primary literature each day during our backcountry trips, learning over time and with practice where to focus their attention to be able to critically evaluate the work. Each reading is debriefed with a group discussion, ensuring that students have understood the work and are able to critically evaluate it. By the end of the course when students are well-practiced in reading primary literature, less time in discussion is devoted to comprehension and more discussion is devoted to critical evaluation.

**6. Basic theoretical concepts of wildness vs. wilderness, management vs. preservation, sustainable development and environmental sustainability, and the practical applications of these concepts in conservation and human experience.** Students will gain knowledge and appreciation for the differences among these concepts and their usage in the popular and the primary literature. These concepts are frequently encountered throughout this course in readings, discussions, and visits with local experts. Issues surrounding their influence on conservation and management are discussed frequently throughout the course.

**7. Field observation skills, including methods for documenting and sharing findings in multiple formats.** Field observation skills are an integral part of good science and promote understanding of the world. Through directed learning of geology and ecology in the region, students will gain experience observing the world around them and become able to identify changes and disturbance. Following an introduction to skills of observation and various techniques of recording and presenting information (e.g., natural history sketching, journaling and species account techniques), students will gain experience in presenting natural history observations and utilizing observations as a basis for scientific inquiry. These topics will be addressed through classroom lecture and discussion, course readings, field activities, visits with local experts, exposure to ongoing research, extended backcountry excursions, and field research projects. The course generally progresses from faculty-led instruction in the beginning (i.e., more lectures and readings) to student-led critical evaluation, analysis, and synthesis in the end of the course. Our overarching goal is to have students able to leave the course not only with extensive knowledge about this particular region, but also broader skills and understanding of ecological, geological, and social sciences that allow students to critically evaluate information in other settings in their future lives and careers.

**Additional Expectations** (Expectations of an Evergreen Graduate):

1. *Articulate and assume responsibility for your own work.* This includes timely attendance, completion of work and progress toward a more advanced understanding of topics; taking initiative in group work by leading or contributing in a respectful manner; being prepared for seminar, workshops, or other endeavors.
2. *Participate collaboratively and responsibly.* A thriving learning community is crucial for the success of the program. Students will be expected to fully engage members of collaborative work groups and support the learning of others through leadership and cooperation.
3. *Communicate creatively and effectively.* Listening objectively to others so as to understand and accept a wide variety of viewpoints; develop a genuine interest in the experiences of others; produce written work and oral presentations that successfully convey ideas appropriate to the assignment and audience.

4. *Demonstrate integrative, independent, critical thinking.* Complete a research project designed to integrate multiple disciplines, interpret data, and develop methods and strategies for tackling problems.
5. *Apply qualitative, quantitative and creative inquiry to practical and theoretical problems across disciplines.* Develop the ability to approach a research problem from several different modes of inquiry; interpret and make judgements about data and validity of conclusions.
6. *Demonstrate depth, breadth and synthesis of learning.* Apply the personal frame of reference you develop as a result of the field program in order to make sense of the world.

### **Assessment and evaluation**

At Evergreen State College, a student's learning and progress are assessed through narrative evaluations instead of grades. Students will be evaluated by all the faculty on their academic achievement and intellectual growth. Evidence of academic achievement will be based on workshop results, seminar participation, reflective essays, field journals, research project reports and presentations, and a final exam. At the end of the program, students will discuss their academic progress one-on-one with faculty, and they will receive written evaluations of their progress. Students will prepare self-evaluations, discussing their accomplishments, learning environment, new understandings and goals for the future.