



May 31, 2019

Karlene Fine, Executive Director  
North Dakota Industrial Commission  
600 East Boulevard Ave Dept 405  
Bismarck, ND 58505

Re: Grant Application for AUG Field Trip - Promoting Student Interest in Geology and Geological Engineering

Dear Ms. Fine,

Enclosed is a grant application requesting the North Dakota Industrial Commission and the Oil and Gas Research Council to help fund the AUG Field Trip - Promoting Student Interest in Geology and Geological Engineering. This application is submitted on behalf of the Association of UND Geologists, for a funding support of \$ 5,300.00.

The Association of UND Geologists (AUG), a student organization, want to organize and run a 3-day field trip to western North Dakota. This field trip is intended to expose non-geology and non-geological engineering undergraduate students to the fascinating and exciting field of geology and geological engineering in a non-classroom setting. Participants will be exposed to the various fields within the discipline and the possibilities that a degree in Geology and Geological Engineering offers. With this, our goal is to increase the interest in the field of geology and thereby increase enrollment of Geology or Geological Engineering students at University of North Dakota.

Please find additional information and outline of proposed field trip among the following pages. If you have any questions, please contact me at [marie.bergelin@und.edu](mailto:marie.bergelin@und.edu) or 704-898-3018.

Sincerely,

Marie Bergelin  
Vice President, the Association of UND Geologists

Enclosure

## Oil and Gas Research Program

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North Dakota

Industrial Commission

## Application

**Project Title: AUG Field Trip - Promoting Student Interest in Geology and Geological Engineering.**

**Applicant: Association of UND Geologists**

**Principal Investigator: Marie Bergelin**

**Date of Application: May 31, 2019**

**Amount of Request: \$ 5,300.00**

**Total Amount of Proposed Project: \$ 10,600.00**

**Duration of Project: 7/20/2019 - 9/13/2020**

**Point of Contact (POC): Marie Bergelin**

**POC Telephone: 704-898-3018**

**POC E-Mail Address: marie.bergelin@und.edu**

**POC Address:**

Leonard Hall Room 217

81 Cornell St Stop 8358

Grand Forks, ND 58202 - 8358

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## **Abstract**

**Objective:** Increase interest and enrollment in Geology and Geological Engineering (GGE) among incoming freshmen and sophomores through a 3-day student organized field trip to western North Dakota.

**Expected results:** Increase number of students enrolled in the GGE program at University of North Dakota (UND)

**Duration:** July 1, 2019 – September 13, 2020

**Total project cost:** \$ 10,600.00

**Participant:** The Association of UND Geologists (AUG), a student organization within the Harold Hamm School of Geology and Geological Engineering (HHSGGE), as well as any freshmen and sophomores interested in the topic of geology and geological engineering that are enrolled at UND.

## Project Description

Western North Dakota offers a wide variety of geology and earth science related attractions and work sites where geology and geological engineering is used every day. We propose to take advantage of this and use the exciting geology to attract more students to our Geology and Geological Engineering (GGE) programs at the University of North Dakota (UND). This proposal outlines a 3-day field trip to show participants just how exciting many aspect of geology are: such as petroleum geology, petroleum geology, sedimentology, stratigraphy, paleontology, geomorphology, slope stability, and more.

The overall goal of this proposed field trip is to expose students to the fields of geology and geological engineering in a fun and exciting non-classroom setting, in order to increase interest in the field of geology and increase the enrollment of GGE students here at the Harold Hamm School of Geology and Geological Engineering (HHSGGE). This will help provide more geologists to support North Dakota businesses and industry. A secondary benefit will be that some students, even if they elect not to become majors, will be exposed to the geology of North Dakota and to the importance of oil and gas production to our state.

It is common for students to pick geology as a major after being introduced to the topic during their freshman year in college, as has previously been observed here at the HHSGGE. However, we are currently seeing a decline in students interested in our GGE program. Even after taking *GEOL 101 (Introduction to Geology)* as a science elective, few students express interest in geology or geological engineering as a major.

There are many reasons why students might choose to study geology. However, we know from past personal experience that major motivators are the experience of working outdoors and the curiosity about how Earth works. However, students taking our geology introductory class are not being exposed to geologic concepts in real-life setting, but rather through textbooks and laboratory assignments. Therefore, during the next two years, the Association of UND Geologists (AUG), a student organization, proposes to organize and run a 3-day weekend field trip for undergraduate students to be exposed to examples of North Dakota's geology and the major role the oil and gas industry plays in the state. These field trips will take place in September, two weeks after classes have started.

Our goal is to take about 20 students on this trip. We will recruit participants from (1) students enrolled in *GEOL 101 (Introduction to Geology)*, offering them an optional opportunity to explore concepts in the field as discussed in the course, (2) first or second year undergraduate students, who have not declared a major yet, and (3) any student who find Earth's processes interesting, but are unaware of the possibilities and jobs that a geology degree offers.

This field trip will solely be organized and lead by GGE graduate and undergraduate students, as a student to student learning experience, which has multiple benefits. (1) Students participating on the trip would be introduced to geologic concepts in a more relaxed and hands-on setting than that of a classroom, which often leads to more interest and better information retention; (2) GGE students will be given the opportunity to share their knowledge of geology with others, increasing both their confidence and experience with geologic material; and (3) students participating on the trip would experience multiple students' perspectives on geology, rather than only a professor's, which increases learning and critical thinking. If the trips are successful, we will continue to organize these trips in the future.

## **Destinations**

The fieldtrips will take place in Western North Dakota where we hope to tour an active drilling rig as well as a producing well site. We will camp at the North Unit of the Theodore Roosevelt National Park in the heart of the Little Missouri River badlands where the students can climb on rock outcrops and observe the geology and paleontology first hand.

The following are the proposed highlights of the fieldtrip:

- A tour of the Neset Consulting Services facility and a lecture on oil and gas drilling and production, careers in mudlogging and other aspects of the oil and gas industry, the importance of the oil industry to the state of North Dakota.
- A tour of an actively drilling oil rig.
- A tour of a producing oil well site.
- Slope stability problems in the badlands and the problems it creates for roads, pipelines, transmission lines, and other types of infrastructure. Highway 85 just to the east of the North Unit of the Park has been closed, rerouted, and repaired several times in the last 40 years because of landslides.
- Sixty-million-year-old rocks are well exposed throughout the Theodore Roosevelt National Park and the badlands of western North Dakota. These rocks contain plant and animal fossils indicating they were deposited at a time when North Dakota had a subtropical climate. Rivers, lakes, and swamps were the dominant landforms and crocodiles, turtles, fish, and small mammals were the dominant creatures. Students will



be able to observe the rocks both inside and outside of the Theodore Roosevelt National Park.

- For the past fifteen years the ND Geological Survey has been offering public fossil digs in North Dakota. One of those public fossil dig sites is just East of Medora. The students will visit the Medora fossil quarry and students will have the opportunity to discover crocodile, turtle, and other fossils.

### **Standard of success**

The number one measure of success will be the number of students involved and, in particular, the number who decide to major/minor in geology or geological engineering. But there will be other benefits of this project that are not quantifiable. Spreading knowledge of the field of geology and earth science in general is important, as is showing North Dakotans how geology and, in particular, oil production are impacting their everyday lives. Ideally, this project will also provide more geologists to support North Dakota's agencies and industries.

Additionally, all members involved with the organization and implementation of the field trip will have a post-trip meeting, which will involve discussion of which aspects of the trip went well, and which aspects should be improved for the following year's field trip.

## **Background/Qualifications**

For the past years, AUG, along with the HHSGGE faculty, have been responsible for planning an annual geology spring break trip. These spring break trips give geology students the opportunity to explore real-life examples of geological features in some of North America's most spectacular regions, providing knowledge and learning opportunities in a fun and exciting non-classroom setting. For example, the Spring 2019 trip, with Professor Dexter Perkins, included visiting and camping in nine different national parks through Southern and Eastern Utah, observing and discussing each major formation within the Grand Staircase, and exploring many of its structures such as: bedding planes, faults, tilting, gulches, goblins, arches, slots, etc. Many of the current GGE seniors and graduate students have participated in these geology spring break trips, as well as class field trips, during their years at UND. Our plans for the proposed 3-day field trip are based on the knowledge and experience we have from these past successful geological field trips.

The principle investigator, Marie Bergelin, has a background that provides experience leading a student field trip. Marie Bergelin was a science teacher at Excel Academy of Southwest Chicago High School for a year, where she taught Biology, Environmental Science, and Aquaponics on a daily basis. Currently, Marie is a second year PhD student at HHSGGE. She is the teaching assistant for *GEOL 101L (Introduction to Geology Lab)* and *GEOL 311 (Geomorphology lab)* and has assisted on multiple field trips, such as 2018 and 2019 spring break trips, as well as the geomorphology class field trip. In the past academic year, Marie has acted as the Vice President of AUG and is remaining in the position for the upcoming year.

Marie will be assisted by two other AUG members, each of whom are experienced instructors who have taught classes or laboratories at UND.

In order for this trip to be interesting and successful, all trip organizers and leaders will be required to investigate and understand the geology of Theodore Roosevelt National Park and western North Dakota. They will also become knowledgeable about the specific geology at each destination in order to give the participants a great learning experience.

Of course, as we plan and carry out our plans, we will involve the faculty of the HHS GGE who have either conducted research or taken classes on field trips to western North Dakota and Theodore Roosevelt National Park.

## **Management**

As principal investigator, Marie Bergelin will be managing and leading all activities and meetings of the proposed student field trip. Additionally, members of AUG will assist with planning of the field trip details.

## Timetable

The timetable below is for the Fall 2019 field trip. We will develop a similar timetable for the following Fall 2020 trip.

### **Preparation** (July 20 – September 2, 2019)

The preparation will include;

- Reservation of campsites and vehicles
- AUG officer meetings to plan the trip and to plan outreach and promotion strategies.

Outreach and promotion: August 22 – September 2, 2019 (Fall semester start)

- We will promote the field trip in lower level geology classes including *GEOL 101 (Introduction to Geology)*, *GEOL 102 (The Earth Through Time)* and *GEOE 203 (Earth Dynamics)*
- We will advertise the fieldtrip through a booth during Freshman Orientation activities.

Information Meeting: September 4, 2019

- Informational meeting for all students attending the trip.

## Fieldtrip Itinerary

*September 6, 2019*

- 11:00 am: Depart Grand Forks
- 4:15 pm: Arrive at Neset Consulting Services facilities in Tioga, ND
- Lecture on the North Dakota oil and gas industry and a tour of the facilities (two hours).
- 6:30 pm: Depart Neset Consulting Services
- 8:30 pm: Arrive at the North Unit of the TR Park
- Set up camp and prepare supper.

*September 7, 2019*

- 7:00 am: Cook breakfast.
- 8:00 am – 9:00 am: Students looking at rocks in the park.
- 9:00am – 3:00pm: Tour of oil well and production facilities (lunch between stops).
- 3:00pm – 4:30pm: Observe landslides along US Highway 85 near the park. Noting inclinometers and survey pins.
- 4:30pm – 6:00pm: Students are pointed out geology along the Cap Rock Coulee trail.
- 6:00pm: Prepare supper.

*September 8, 2019*

- 7:00am: Cook breakfast.
- 8:00am: Depart for gas plant near Fairfield.
- 8:45am: Stop and discuss gas plant west of Fairfield.
- 9:15am: Depart for South Unit of the Theodore Roosevelt National Park.
- 10:00am – 1:00pm tour South Unit of the Park and have lunch.
- 1:00pm – 3:00pm: Students dig for fossils at the NDGS fossil quarry.
- 3:00pm – 5:00pm: Depart for Mandan.
- 5:00pm- 5:45pm: Stop at overlook on west side of Mandan and discuss the history of the Mandan refinery and have supper.
- 5:45pm: Depart for Grand Forks.
- 10:15pm: Arrive at UND.

## **Budget**

The Association of UND Geologists (AUG) is seeking a total of \$ 5,300.00 in funding, as outlined budget below. This budget anticipates a total of 22 participants, which includes the Principal investigator; Marie Bergelin, 2 assisting AUG member, and 19 undergraduate students. Most of the budget is based on group rates that work well for a group size between 11 and 22 in number. As our goal is to get first- and second-year undergraduate students interested in Geology and Geological Engineering (GGE), we hope to keep this trip cost free for students, and therefore no fees will be charged to the students, and all meals will be provided.

If less funding is received, the following options would need to be considered; (1) Lowering allowed number of students, and/or (2) cancel Fall 2020 field trip.

<b>Founding Request</b>	<b>\$ 5,300.00</b>
Oil and Gas Research Council (NDIC)	\$ 5,300.00
Neset Consulting Services, Inc and at least one oil company (in-kind match)	\$ 4,800.00
North Dakota Petroleum Council (cash contribution)	\$ 500.00
<b>Total</b>	<b>\$ 10,600.00</b>

**Proposed Budget**

<b>Category</b>	<b>Description</b>	<b>Cost</b>
Transportation	<p>2 full size vans, each capable of holding 11 passenger and baggage. Each vehicle cost \$ 0.54 per miles.</p> <ul style="list-style-type: none"> <li>- Mileage, Van 1: 1,398 mi</li> <li>- Mileage, Van 2: 1,398 mi</li> <li>- Total Mileage: 2,796 mi</li> <li>- Total Cost (\$0.54/mi * 2,796 mi): \$ 1,509.84</li> </ul>	\$ 1,510.00
Camp fee	<p>Juniper Campground group fee: \$ 30.00 per night</p> <ul style="list-style-type: none"> <li>- Two nights (2 * \$ 30.00): \$ 60.00</li> </ul>	\$ 60.00
Group meals	<p>Group meals for 22 participants</p> <ul style="list-style-type: none"> <li>- Friday: \$ 8.00 per person</li> <li>- Saturday: \$ 16.00 per person</li> <li>- Sunday: \$ 16.00 per person</li> <li>- Cost: \$ 40 per person</li> <li>- Total meal cost: (\$ 40.00 * 22 participants): \$880.00</li> </ul>	\$ 880.00
Cooking Supplies	<p>One-time purchase for the project.</p> <ul style="list-style-type: none"> <li>- Firewood: \$ 20.00</li> <li>- Camp stove top: \$ 60.00</li> <li>- Cooking pots/tools: \$ 50.00</li> <li>- Cooler: \$ 70.00</li> </ul>	\$ 200.00
Others	<ul style="list-style-type: none"> <li>- Neset Consulting Oilfield Intro Seminar</li> <li>- Tour of Rig Site</li> <li>- Tour of Production Site</li> <li>- Total cost: \$ 2,560.00</li> </ul>	\$ 2,560.00
<b>TOTAL – ONE FIELD TRIP</b>		<b>\$ 5,300.00</b>
<b>TOTAL COST – TWO FIELD TRIPS</b>		<b>\$ 10,600.00</b>

## **Confidential Information**

Not applicable

## **Patents and Rights to Technical Data**

Not applicable



# NESET

6844 Highway 40, Tioga, ND 58852 701-664-1492

June 14, 2019

Marie Bergelin,  
Vice President, that Association of UND Geologists  
University of North Dakota  
Leonard Hall Room 217  
81 Cornell Street, Stop 8358  
Grand Forks, North Dakota 58202-8358

Dear Ms. Bergelin:

Neset Consulting Services, Inc. would be happy to provide the UND fieldtrip group with a presentation on the North Dakota oil and gas industry on September 6, 2019. We would host the group at our office in Tioga and share with them some of the work that we do in the field related geology services. In addition, we can work with you to find an oil company that will allow your group onto a rig site and onto a production site for a tour on September 7, 2019

Please contact me if you have any questions.

Sincerely,



Kathleen Neset  
701-664-1492