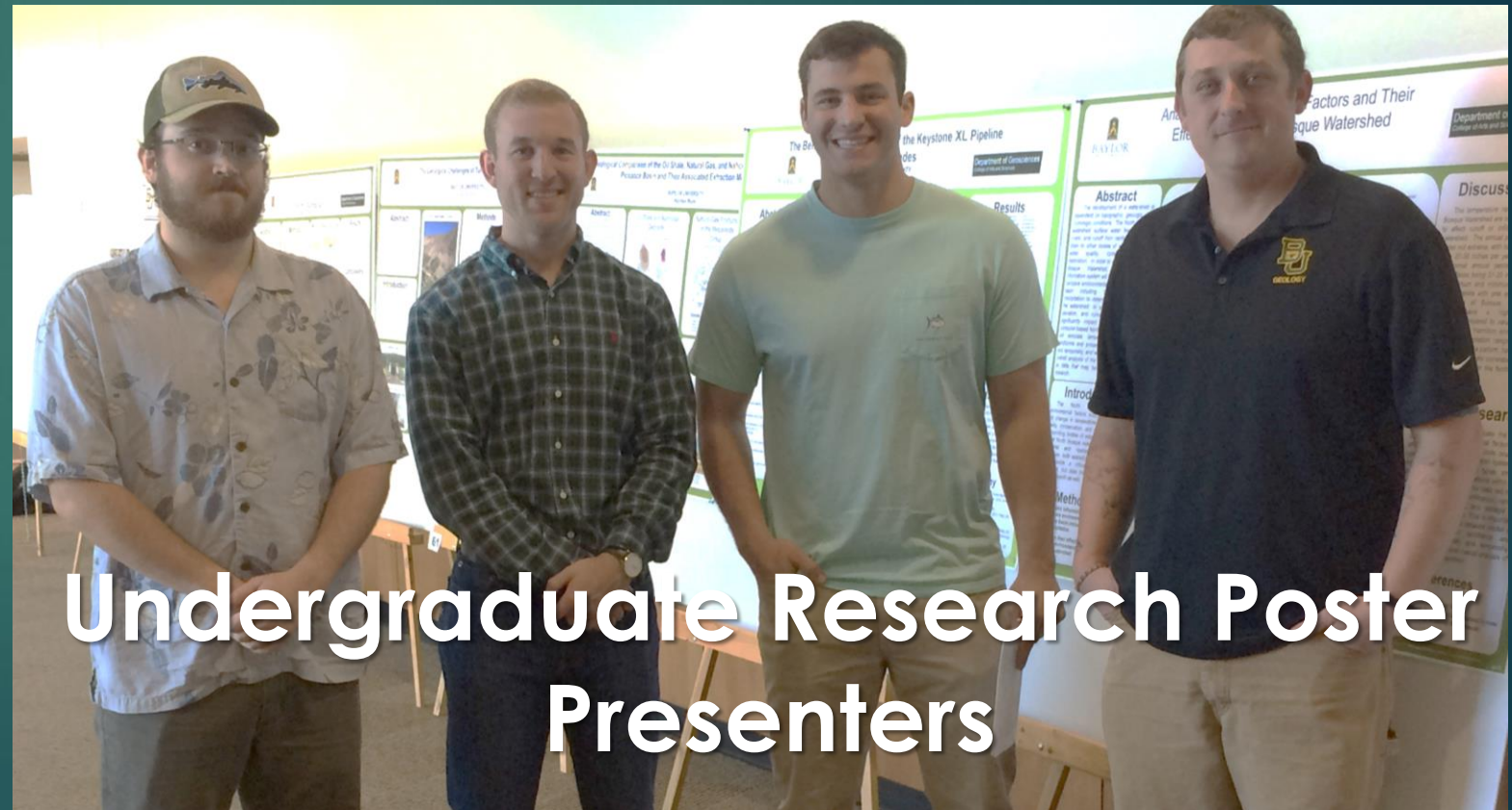


Classroom Lessons From Geoscience Undergraduate Research and Presentations



Department of Geosciences
College of Arts and Sciences

WAYNE HAMILTON AND JOE YELDERMAN JR,
BAYLOR UNIVERSITY
MONDAY 10-23-17

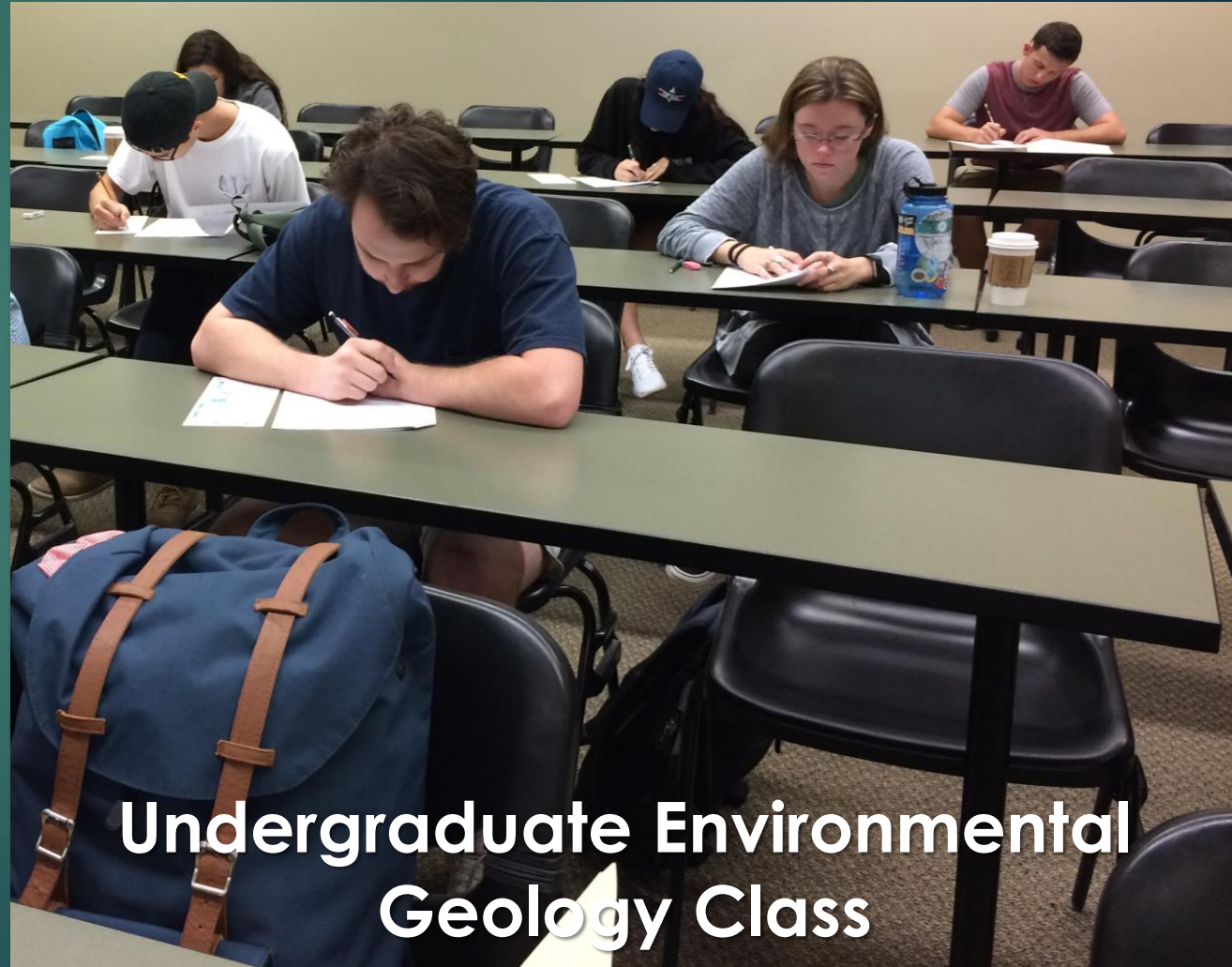


Presentation Overview

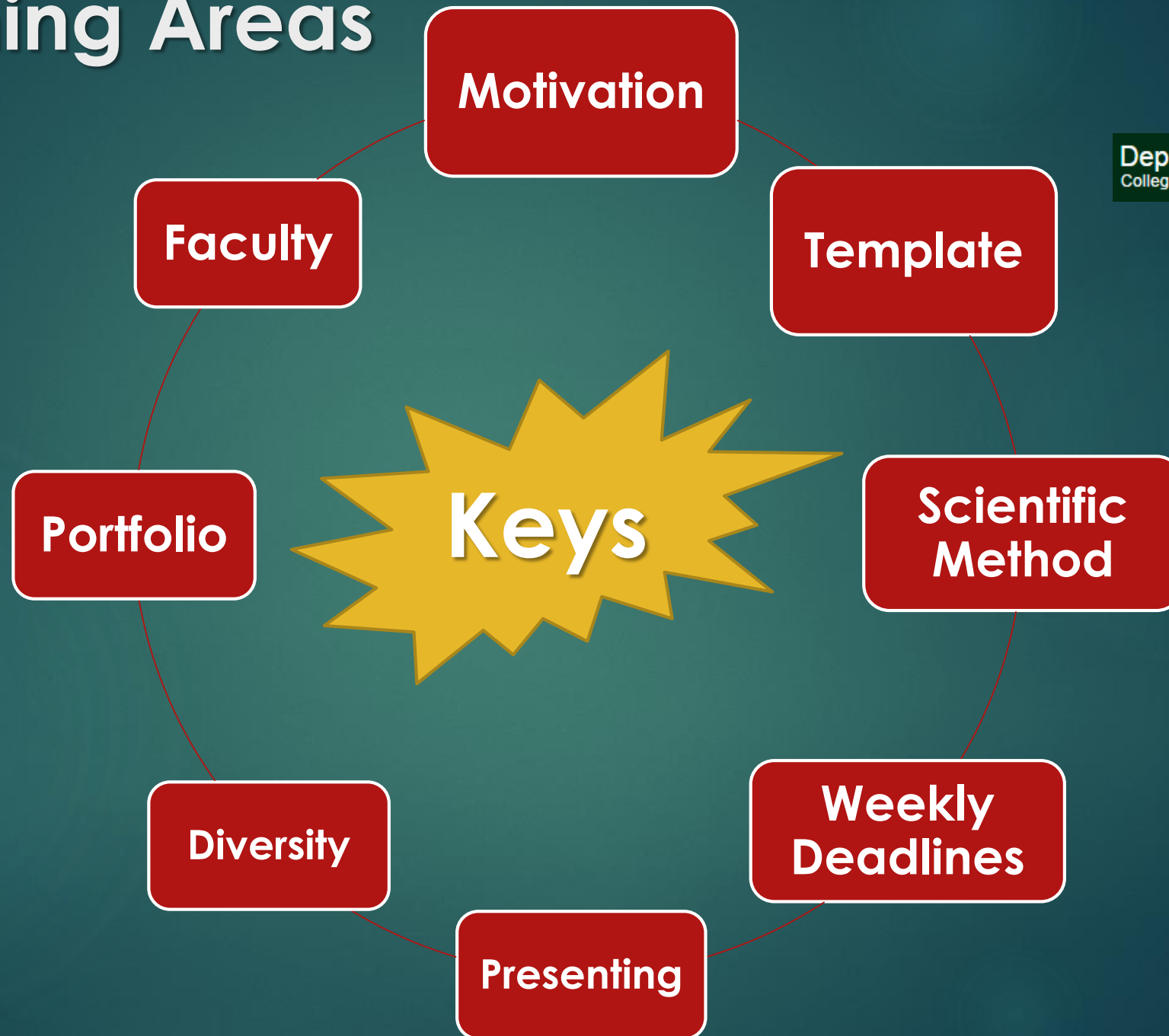


Department of Geosciences
College of Arts and Sciences

- ▶ **Geosciences Research Lessons Learned**
 - ▶ What **Worked**: Eight Learning Areas
 - ▶ **Improvements**: Four Key Thoughts
 - ▶ **Baylor wide** undergraduate research
- ▶ **Conclusions**
 - ▶ Key Learnings and Next Steps

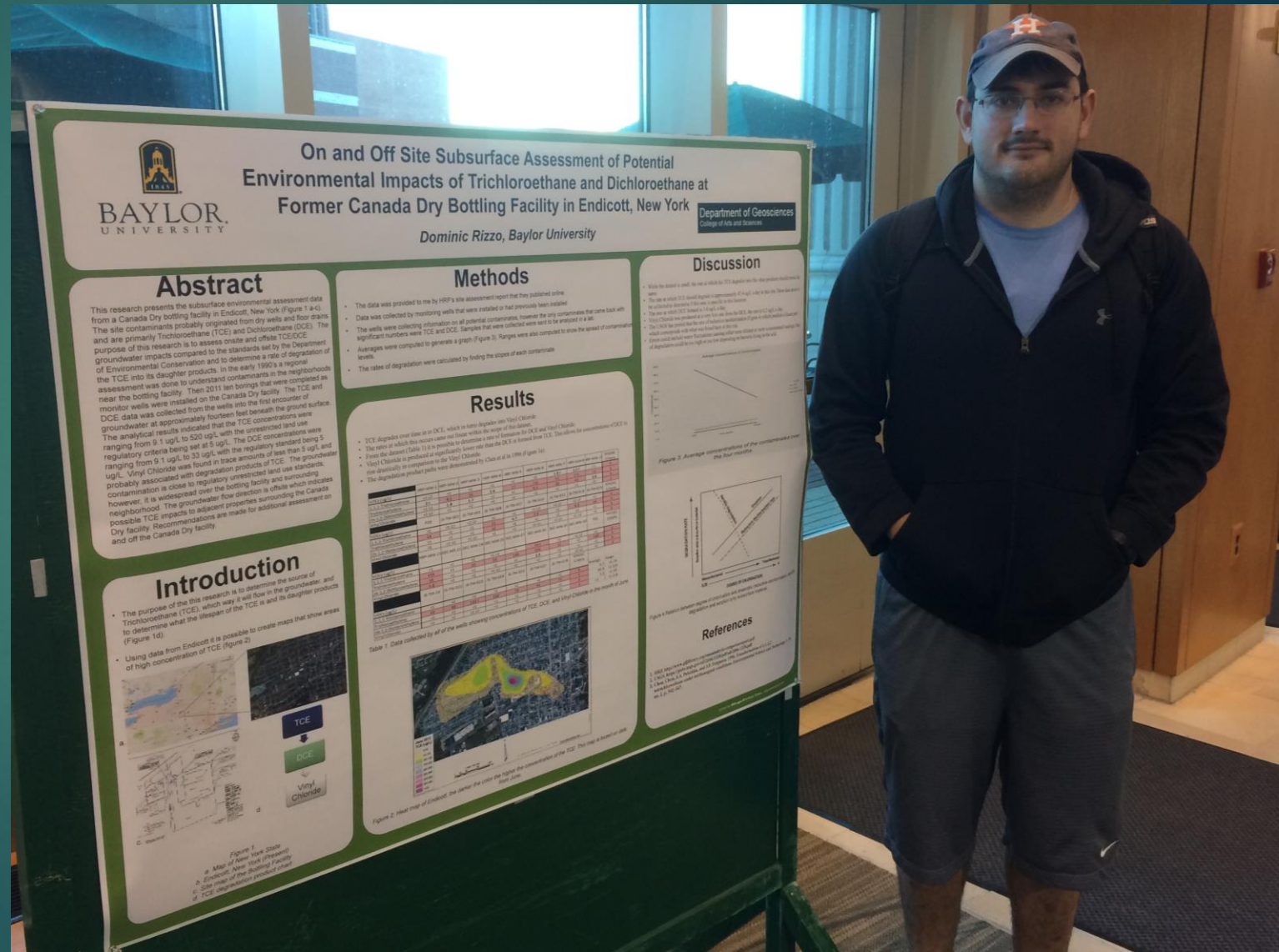


Eight Learning Areas



Motivation

- ▶ Student's Topic
- ▶ Discussed teacher
- ▶ Weekly Updated
- ▶ Displayed
- ▶ Evaluated



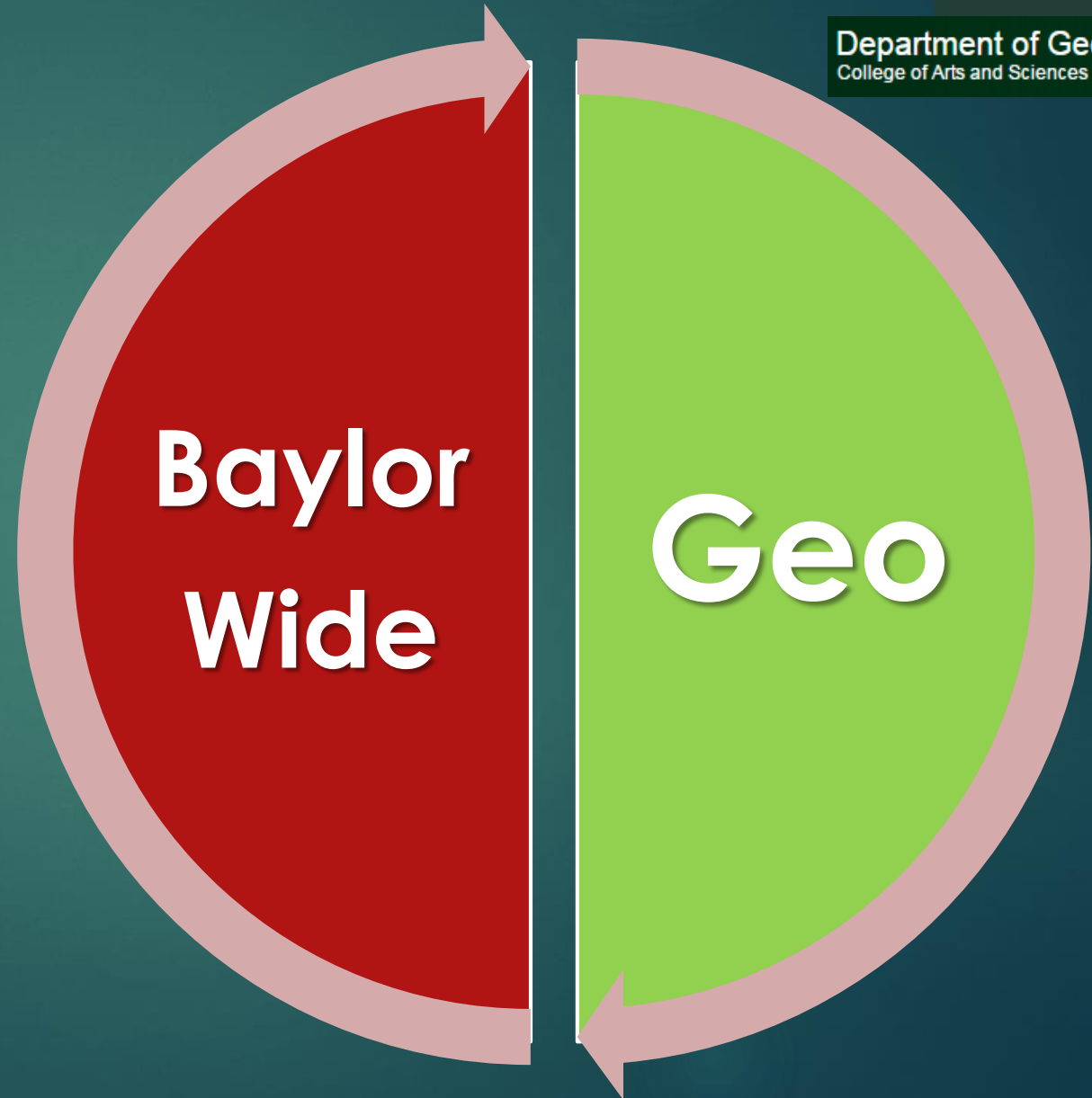
Baylor's Undergraduate Research



Department of Geosciences
College of Arts and Sciences

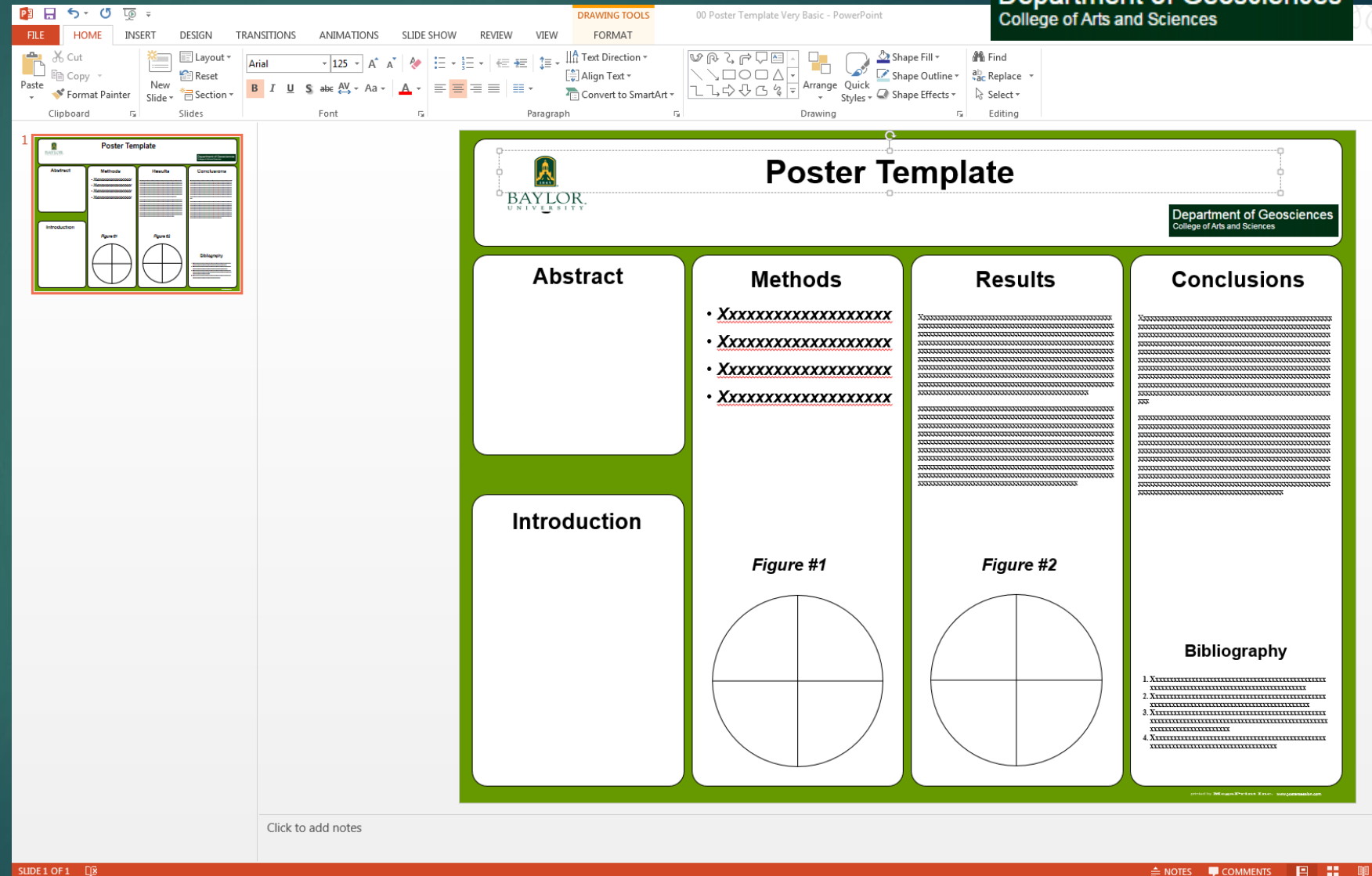
Other Undergraduate Disciplines

1. Economics
2. Engineering
3. Communications
4. Religion
5. Family and Consumer Sciences
6. Modern Foreign Languages
7. Statistics
8. Family and Consumer Sciences
9. Health, Human Performance and Recreation
10. Physics
11. Psychology
12. Chemistry



Template

- ▶ Starting Point
- ▶ Key Areas
- ▶ Just Start
- ▶ Works for Most Projects
- ▶ Compare and Contrast
- ▶ Format Challenges
- ▶ Best Practices




The screenshot displays a PowerPoint slide titled "Poster Template" within a presentation window. The slide itself has a green border and contains the following sections:

- Header:** Baylor University logo and "Department of Geosciences College of Arts and Sciences".
- Abstract:** A large empty box for abstract text.
- Methods:** A box containing four lines of placeholder text, each starting with a bullet point and "XXXXXXXXXXXXXXXXXXXX".
- Results:** A box containing multiple lines of placeholder text.
- Conclusions:** A box containing multiple lines of placeholder text.
- Introduction:** A large empty box for introduction text.
- Figure #1:** A circular placeholder divided into four quadrants.
- Figure #2:** A circular placeholder divided into four quadrants.
- Bibliography:** A box containing a numbered list of four placeholder entries.

The presentation window shows the "DRAWING TOOLS" ribbon active, with various drawing and formatting options visible. The status bar at the bottom indicates "SLIDE 1 OF 1".

Template



BAYLOR UNIVERSITY

Feasibility Study for Development of Sensor Array to Record Spatiotemporal Seabed Current Conditions in Real-Time

Micah Gonzales, Baylor University

Department of Geosciences
Arts and Sciences

Abstract

Currently, there is little empirical data of real-time seabed current conditions. In an attempt to gather evidence, researchers have been placing bottom sensor arrays in areas of concern. However, these areas also happen to be heavily used by the fishing industry (which is why they are important). This has caused a high rate of sensor loss, and thereby a loss of crucial data. The sensor arrays provide for forecasting of seabed conditions, allowing for engineering to prevent failure of infrastructure placed on the seabed and fisheries management. Real-time monitoring of seabed conditions can improve forecasts of environmental hazards like pipeline failures, erosion events and harmful alga blooms. The purpose of this project is to show to the feasibility of filling the gaps in the data regarding real time seabed current conditions. This will be done through utilizing a low-cost and effective way of recovering data collected in these high risk areas.

Problems

No Empirical Data

Methods

Currently there is little empirical spatiotemporal data of true bottom current conditions along the zone. Use

Introduction

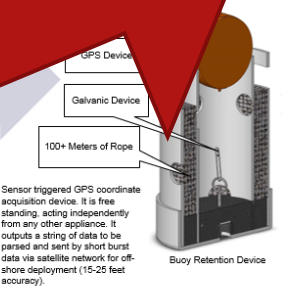
- Purpose: Accurately model seafloor currents in order to forecast erosion.
- Problems: Because of lack of empirical data, current modeling uses a lot of data. While a high resolution wind field and current data is available, the 60m depth is not.

Conclusions

- Based off the experimental results the feasibility test stood true.
- The bottom lake currents were accurately portrayed by the seahorse (tilt sensor) in Lake Superior; therefore, this device would be able to work in offshore coastal waters such as the Gulf of Mexico and other marine areas.
- The low profile buoy retention device was able to withstand longline fishing activity and remained environmentally friendly to it's surroundings but was moved off the drop point by shrimp trawlers.
- The prototype of the GPS tracking device was able to give accurate coordinates of the devices location within three to four meters.
- Prototype passes submergence test but needs further development to increase battery lifespan.
- Overall the feasibility test proved to be successful in gathering empirical data of real-time seabed current conditions.
- While minor adjustments need to be made it has shown to be most feasible.

References

- [1] B. F. D'Elia, M. K. Howard, and R. C. Reid, Seasonal variation of wind-driven current in the Texas-Louisiana continental shelf. *Geophysical Research Letters*, 21 (1994), 1071-1073.
- [2] J. A. Chant, J. Chant, L. S. Brown, and N. Quinlan, Application of the British Columbia Oceanographic Research Institute's Oceanographic Research Vessel, 41 (2014).
- [3] D. L. McKee and P. J. Smith, On the Structure and Dynamics of the Outer Bottom Boundary Layer. *Journal of Physical Oceanography*, 5 (1975), 587-597.
- [4] N. G. Valle-Levin, Time and space-scale processes and coastal upwelling in circulation in the Gulf of Mexico. *Observations and Models*, Eds. V. Burgas and A. Valle-Levin. *American Geophysical Union Geophysical Monograph* 181 (2005), 289-314.
- [5] C. K. Rienecker and G. L. Verrill, Some effects of suspended sediment deposition on an oceanic bottom boundary layer. *Journal of Geophysical Research*, 86 (1981), no. C5, 4161-4172.





BAYLOR UNIVERSITY

Feasibility Study for Development of Sensor Array to Record Spatiotemporal Seabed Current Conditions in Real-Time

Micah Gonzales, Baylor University

Department of Geosciences
Arts and Sciences

Abstract

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- [2] J. A. Chant, J. Chant, L. S. Brown, and N. Quinlan, Application of the British Columbia Oceanographic Research Institute's Oceanographic Research Vessel, 41 (2014).
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- [5] C. K. Rienecker and G. L. Verrill, Some effects of suspended sediment deposition on an oceanic bottom boundary layer. *Journal of Geophysical Research*, 86 (1981), no. C5, 4161-4172.



Progress Each Week

Scientific Method



Department of Geosciences
College of Arts and Sciences

Abstract

Purpose

Introduction

Data

Interpretation

Conclusions

Each Week We'll
Focus on each part
of your poster

You'll present class
to keep current


Abstract Due Before
Research Completed

Tension or Balance: Each
Section Vs Overall View

Scientific Method

- Details
- Provided Sections
- Explanation
- Guidance
- Discuss Each Week

File Edit View Favorites Tools Help
Suggested Sites Web Slice Gallery



How to Write a Paper in Scientific Journal Style and Format




Table of Contents On-Line Resources Home

The Structure, Format, Content, and Style of a Journal-Style Scientific Paper

| [Table of Contents](#) | [FAQs](#) | [PDF Version](#) |

| [Rationale](#) | [Sections](#) | [Section Headings](#) | [Title](#) | [Authors and Affiliation](#) | [Abstract](#) | [Introduction](#) | [Methods](#) | [Results](#) | [Discussion](#) | [Acknowledgments](#) | [Literature Cited](#) | [Appendices](#)

Why a Scientific Format?

The scientific format may seem confusing for the beginning science writer due to its rigid [structure](#) which is so different from writing in the humanities. One reason for using this format is that it is a means of efficiently communicating scientific findings to the broad community of scientists in a uniform manner. Another reason, perhaps more important than the first, is that this format allows the paper to be read at several different levels. For example, many people skim [Titles](#) to find out what information is available on a subject. Others may read only titles and [Abstracts](#). Those wanting to go deeper may look at the [Tables and Figures](#) in the [Results](#), and so on. The take home point here is that the scientific format helps to insure that at whatever level a person reads your paper (beyond title skimming), they will likely get the key results and conclusions.

[Top of page](#)

The Sections of the Paper

Most journal-style scientific papers are subdivided into the following sections: [Title](#), [Authors and Affiliation](#), [Abstract](#), [Introduction](#), [Methods](#), [Results](#), [Discussion](#), [Acknowledgments](#), and [Literature Cited](#), which parallel the experimental process. This is the system we will use. This website describes the style, content, and format associated with each section.

← → B http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWsections.html#sections
File Edit View Favorites Tools Help
Suggested Sites Web Slice Gallery

The Sections of the Paper

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The sections appear in a journal style paper in the following prescribed order:

Experimental process	Section of Paper
What did I do in a nutshell?	Abstract
What is the problem?	Introduction
How did I solve the problem?	Materials and Methods
What did I find out?	Results
What does it mean?	Discussion
Who helped me out?	Acknowledgments (optional)
Whose work did I refer to?	Literature Cited
Extra Information	Appendices (optional)

Section Headings:

Main Section Headings: Each main section of the paper begins with a heading which should be **capitalized**, **centered** at the beginning of the section, and **double spaced** from the lines above and below. **Do not underline the section heading OR put a colon at the end.**

Example of a main section heading:

INTRODUCTION

Subheadings: When your paper reports on more than one experiment, use subheadings to help organize the presentation. Subheadings should be **capitalized** (first letter in each word), **left justified**, and **underlined** OR **underlined**.

Weekly Deadlines



Department of Geosciences
College of Arts and Sciences

Assignments

Timing

40% of Grade

Topic
Agreement
1/24/17



Abstract to
Wayne
1/31/17



Abstract
Submitted
2/7/17



Class
Progress
Updates



Poster to
Wayne
3/21/17



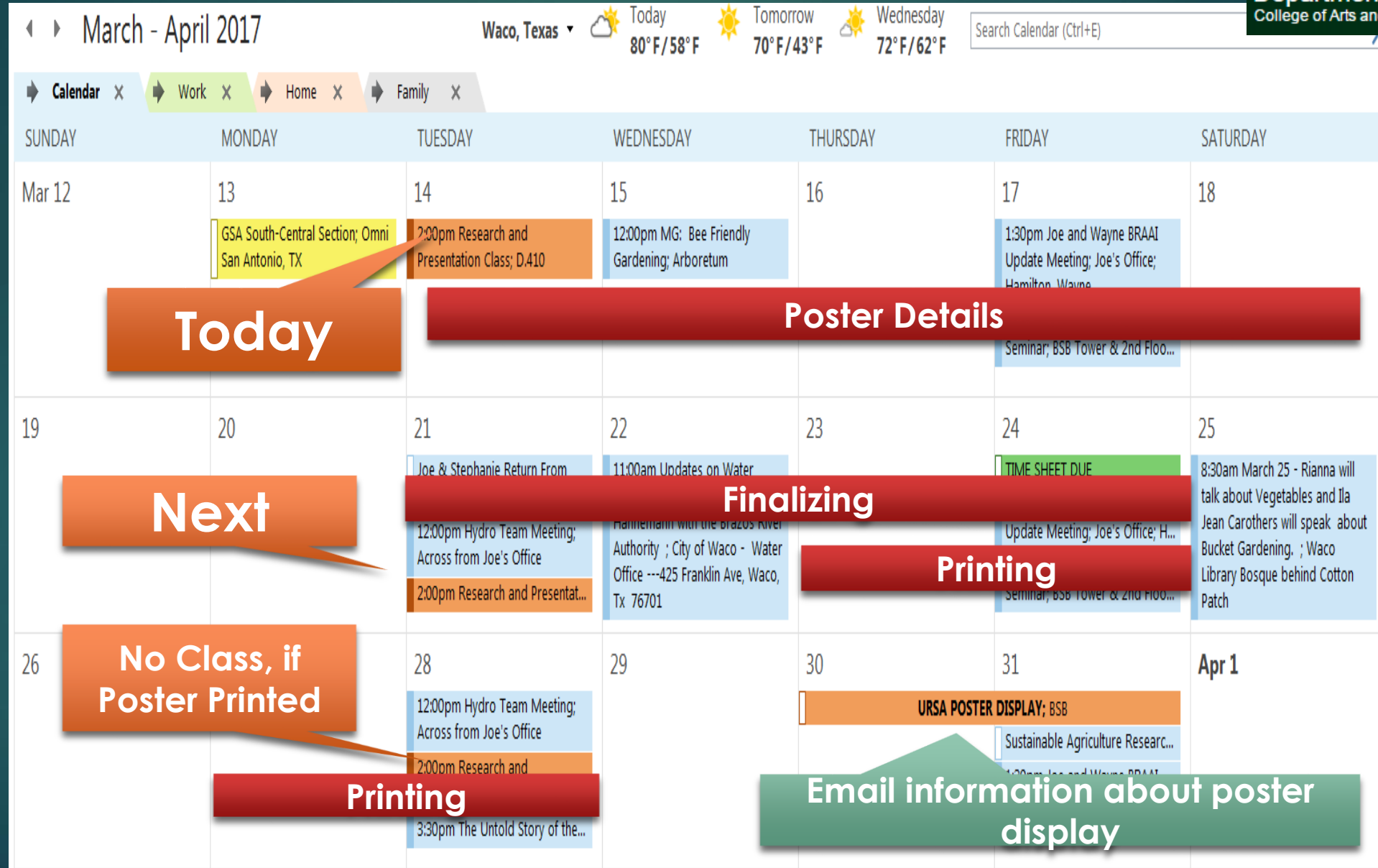
Poster
Displayed
3/29/17

60% of Class Grade

Weekly Deadlines

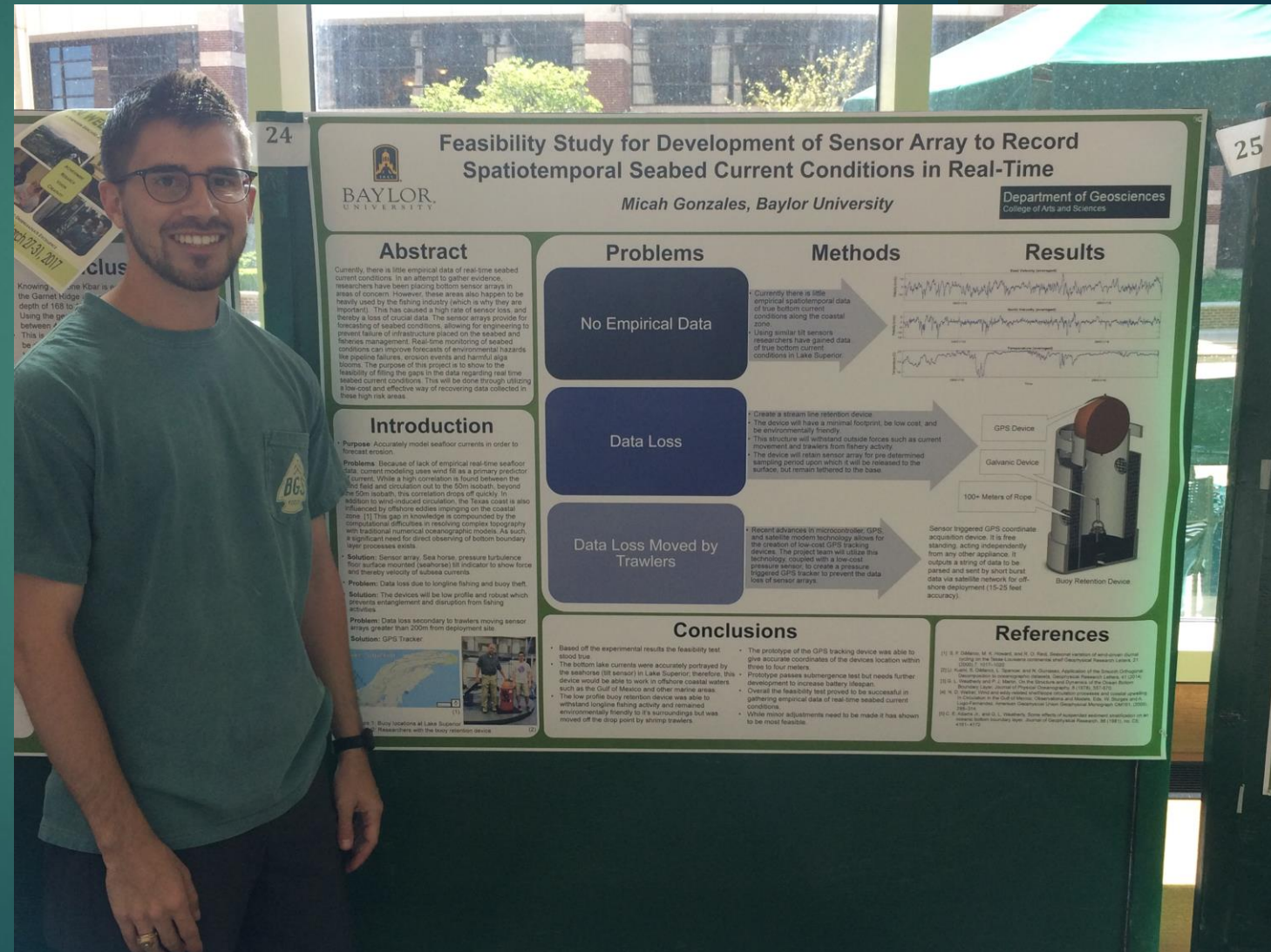


Department of Geosciences
College of Arts and Sciences





- ▶ Each Student To Present
- ▶ Small Class Size: About Ten
- ▶ Peer to Peer Improvement
 - ▶ Like the Work Place
 - ▶ Students Added Things I Missed

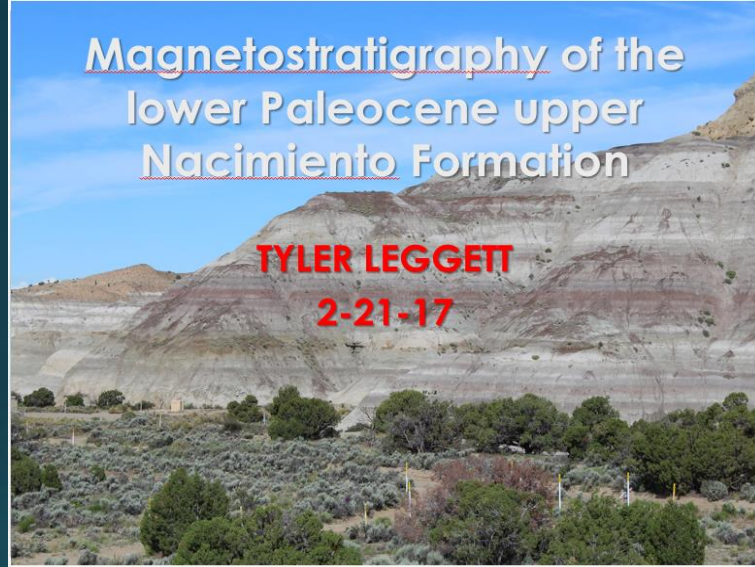


Diversity of Topics

Stratigraphy

Magnetostratigraphy of the lower Paleocene upper Nacimiento Formation

TYLER LEGGETT
2-21-17



Equipment Development

Feasibility Study for Development of Sensor Array to Record Spatiotemporal Seabed Current Conditions in Real-Time

Micah Gonzales, Baylor University
Department of Geosciences
College of Arts and Sciences

Abstract

Currently, there is little empirical data of real-time seabed current conditions. In an attempt to gather evidence, researchers have been placing bottom moored sensors in areas of concern. However, these areas also happen to be heavily used by the fishing industry which is very time and expensive. This has caused a high rate of sensor loss and thereby a loss of crucial data. The proposed array provides low cost, real-time monitoring of seabed currents. By using a network of low-cost sensors, the array will provide a high resolution of seabed currents. The purpose of this project is to show the feasibility of the array. The data will be used to develop a low cost and effective way of recording data collected in these high seas.

Problems

- No Empirical Data
- Data Loss
- Data Loss Moved by Trawlers

Methods

- Currently there is little empirical data of real-time seabed current conditions along the coastal zone.
- Using current 18 sensors, the array will provide a high resolution of seabed currents.
- Create a sensorless bottom moored device.
- The device will have a minimal footprint, be low cost, and be environmentally friendly.
- The structure will withstand outside forces such as current movement and trawling from fishing vessels.
- By using a network of low-cost sensors, the array will provide a high resolution of seabed currents.
- Recent advances in microcontroller (GPS) and wireless sensor technology allow for the creation of low-cost GPS tracking devices.

Results

The array will provide a high resolution of seabed currents. The data will be used to develop a low cost and effective way of recording data collected in these high seas.

Conclusions

The array will provide a high resolution of seabed currents. The data will be used to develop a low cost and effective way of recording data collected in these high seas.

References

1. R. J. ...
2. ...
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Site Assessment

On and Off Site Subsurface Assessment of Potential Environmental Impacts of Trichloroethane and Dichloroethane at Former Canada Dry Bottling Facility in Endicott, New York

Dominic Rizzo, Baylor University
Department of Geosciences
College of Arts and Sciences

Abstract

This report presents the subsurface environmental assessment data from Canada Dry bottling facility in Endicott, New York (Figure 1). The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

Methods

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

Results

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

Introduction

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References

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Compare & Contrast

A Comparison of Water Geomorphic Features on Mars and Earth

Kaitlyn Hoffman, Baylor University
Department of Geosciences
College of Arts and Sciences

Abstract

Mars and Earth are both planets with water. However, the water on Mars is very different from the water on Earth. The water on Mars is very different from the water on Earth. The water on Mars is very different from the water on Earth.

Methods

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

Results

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

Conclusions

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References

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Igneous Petrology

Using Raman Spectrometry to Determine Subsurface Nucleation Pressure and Temperature Conditions of Colorado Plateau, Four Corners, USA

Hayden Johnson, Baylor University
Department of Geosciences
College of Arts and Sciences

Abstract

The Colorado Plateau is a large area of the United States. It is a large area of the United States. It is a large area of the United States. It is a large area of the United States.

Methods

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

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References

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Petroleum Geology

A Case Study of a Horizontal Well Completion Project and Measured Production Changes in a Re-entered Well, Fayette County, Texas

Reed Rightmer, Baylor University
Department of Geosciences
College of Arts and Sciences

Abstract

The Fayette County is a large area of the United States. It is a large area of the United States. It is a large area of the United States. It is a large area of the United States.

Methods

The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site. The data was collected by monitoring wells that were installed at the site.

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Conclusions

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References

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Portfolio



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<input type="checkbox"/>	Auto req ID	Posting Title	Location	City State	▲ Date updated
<input type="checkbox"/>	7840BR	Project Manager	Colton	Colton, CA	29-Sep-2017
<input type="checkbox"/>	7358BR	Geotechnical Engineering Manager	Chattanooga	Chattanooga, TN	28-Sep-2017
<input type="checkbox"/>	7495BR	Geotechnical Senior Project Manager	Orange County	Tustin, CA	27-Sep-2017
<input type="checkbox"/>	7496BR	Environmental Senior Project Manager	Orange County	Tustin, CA	27-Sep-2017
<input type="checkbox"/>	7821BR	Staff Geophysicist	Dallas	Dallas, TX	27-Sep-2017
<input type="checkbox"/>	7823BR	Field Geologist	Orange County	Tustin, CA	27-Sep-2017
<input type="checkbox"/>	6011BR	Geotechnical Department Manager	Louisville	Louisville, KY	26-Sep-2017
<input type="checkbox"/>	6417BR	Staff Geologist	Minneapolis	Plymouth, MN	26-Sep-2017
<input type="checkbox"/>	6953BR	Senior Project Environmental Manager	Midland	Midland, TX	26-Sep-2017
<input type="checkbox"/>	7408BR	Materials Senior Project Manager- Testing and Inspection	Orange County	Tustin, CA	26-Sep-2017
<input type="checkbox"/>	7419BR	Environmental Project Manager	Oakland	Emeryville, CA	26-Sep-2017
<input type="checkbox"/>	7609BR	Senior Staff Scientist	New Orleans	New Orleans, LA	26-Sep-2017
<input type="checkbox"/>	7621BR	Senior Project Manager	Las Vegas	Las Vegas, NV	26-Sep-2017
<input type="checkbox"/>	7637BR	Staff Geotechnical Engineer	Concord	Concord, CA	26-Sep-2017
<input type="checkbox"/>	7752BR	Senior Project Manager	Midland	Midland, TX	26-Sep-2017
<input type="checkbox"/>	7767BR	Senior Project Manager	Fort Worth	Fort Worth, TX	26-Sep-2017
<input type="checkbox"/>	7786BR	Senior Environmental Engineer	Jackson	Ridgeland, MS	26-Sep-2017
<input type="checkbox"/>	5953BR	Project Geologist	Fort Lauderdale	Ft. Lauderdale, FL	25-Sep-2017

Internships & Careers



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ADMISSIONS

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We're different. Like everyone.

More than beautiful brick buildings, technology or national rankings, people make Wake Forest the place it is. People who love challenge as much as they love learning, and the opportunity to engage all of who they are in search of what they were meant to become. Please make yourself at home.

TURN WHO YOU ARE INTO WHAT YOU'LL BE



REGENT BALLET-DANCING FILMMAKING ACCOUNTANT

OUR PHILOSOPHY

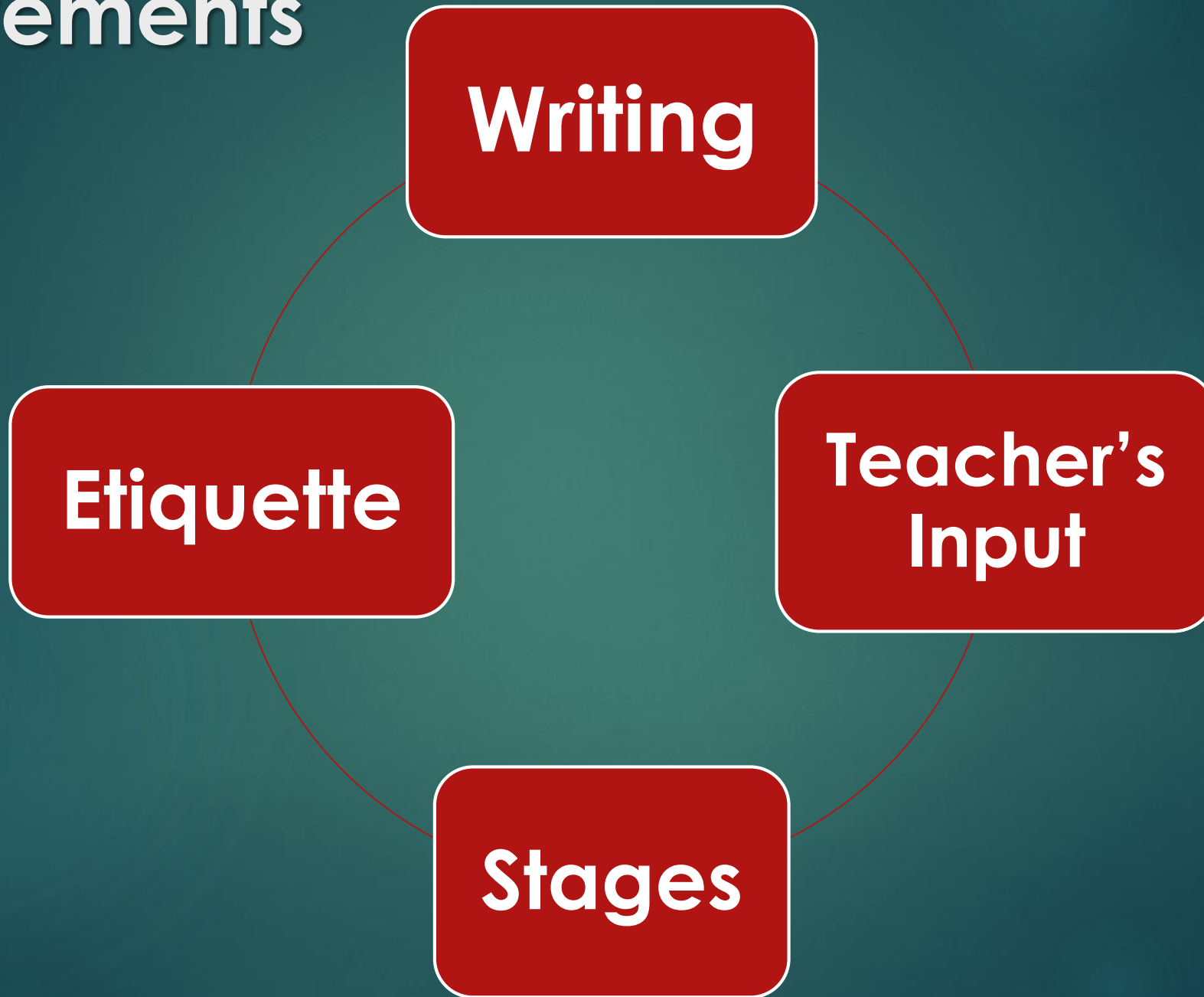
EDUCATING THE WHOLE PERSON

56%

of our students receive

Graduate School

Improvements





BAYLOR UNIVERSITY

- ▶ Most **common problem**
- ▶ Not telling a story
- ▶ Clear and Logical
- ▶ Peer to Peer

Using Raman Spectrometry to determine original PT conditions of

Four Corners is a region encompassing parts of Colorado, Utah, Arizona, and New Mexico, and the introduction of new technology is allowing petrologists to determine original PT (pressure and temperature) conditions of igneous rocks formed in situ. Using a Raman Spectrometer to quantify the deformation of the crystal lattice in encapsulated rutile crystals in garnets not equilibrated to surface temperature and pressure, PT conditions of that inclusion crystal can be calculated and applied to the rocks in which that crystal and others like it were found. When comparing graphs of calculated inclusion crystals to that of the graphs of the same crystal at surface pressure and temperature, the PT conditions of mineral nucleation can be determined. Using the laboratory of Dr. Kenny Befus, 10 garnet crystals with rutile inclusions, both exposed at the surface and trapped in the sub-surface, were used. Assuming the PT of the crystals matches the PT of the rocks in which they were nucleated, preliminary data shows that the Four Corners region was formed at a depth of 10 km and 250 C. The methodology described here can be applied to other areas of the world to assess past history of the locations. The PT method collaborates with other geology data and has application to other regions.

Teacher's Input

- ▶ Coaching but not doing
- ▶ Rewriting and Rewriting
- ▶ Organization
- ▶ Logical

Wayne's comments, 1-31-16

Author: Kolton Sundquist

Post Title:

Abstract

Research in the geological aspects of land use planning is extremely important for the safest and most environmentally conscious development of the natural environment for use in urban building. The implication of safely using natural land for building purposes affects everyone that comes into contact with urban structures around the globe. The research being done involves a specific case study in Malibu, California, in which costal landslides led to the destruction of houses after the cliff side on which they were built had collapsed. In order to confront, contain, and eliminate the problem of losing urban structures due to landslides as a result of poor land use planning, the affected areas must be studied and the geological data collected must be used in the future land use of similar sites. The geological data collected from various sources will then be compiled and studied in order to determine the underlying geological constrains for the region. By studying the affected areas and using geological data collected a conclusion regarding the potential hazards and geological constraints of the area in question can be made. Proper land use planning and preventative measures can then be taken using the geological data compiled on the landslide sites found in Malibu. The resulting conclusions may also be applied to the improvement of land planning on sites with deferring geographical settings but similar geological make up as the case study site.

Did a very quick review...saw this [link](http://www.malibugeology.com/articles.html). Looks like there is enough information for your research topic.
<http://www.malibugeology.com/articles.html>



Wayne Hamilton

Add a title.



Wayne Hamilton

Could these geological inputs apply to more than buildings? For example citing dams, roads, tunnels? Primarily, buildings, but to roads and tunnels for example.



Wayne Hamilton

I like the topic, suspect since it is California there are regulatory criteria for building on slopes. So possibly regulatory input to your research topic.

Also are there maps that would depict past landslides and help with predicting future landslides. Maps and photos add a lot to your poster.



Wayne Hamilton

Can you add any potential hazards here? Keep it brief, but list what you know now.



Wayne Hamilton

Like the "potential hazards" comment above, can you tell me any of the "geological constraints"? Suspect it would be soil or rock type, faults, fracture, groundwater depth...ect.



Wayne Hamilton

Use "similar" instead of deferring. Furthermore I really like learnings being applying to other areas of the USA/globe. That adds to your poster/presentation/paper scope.

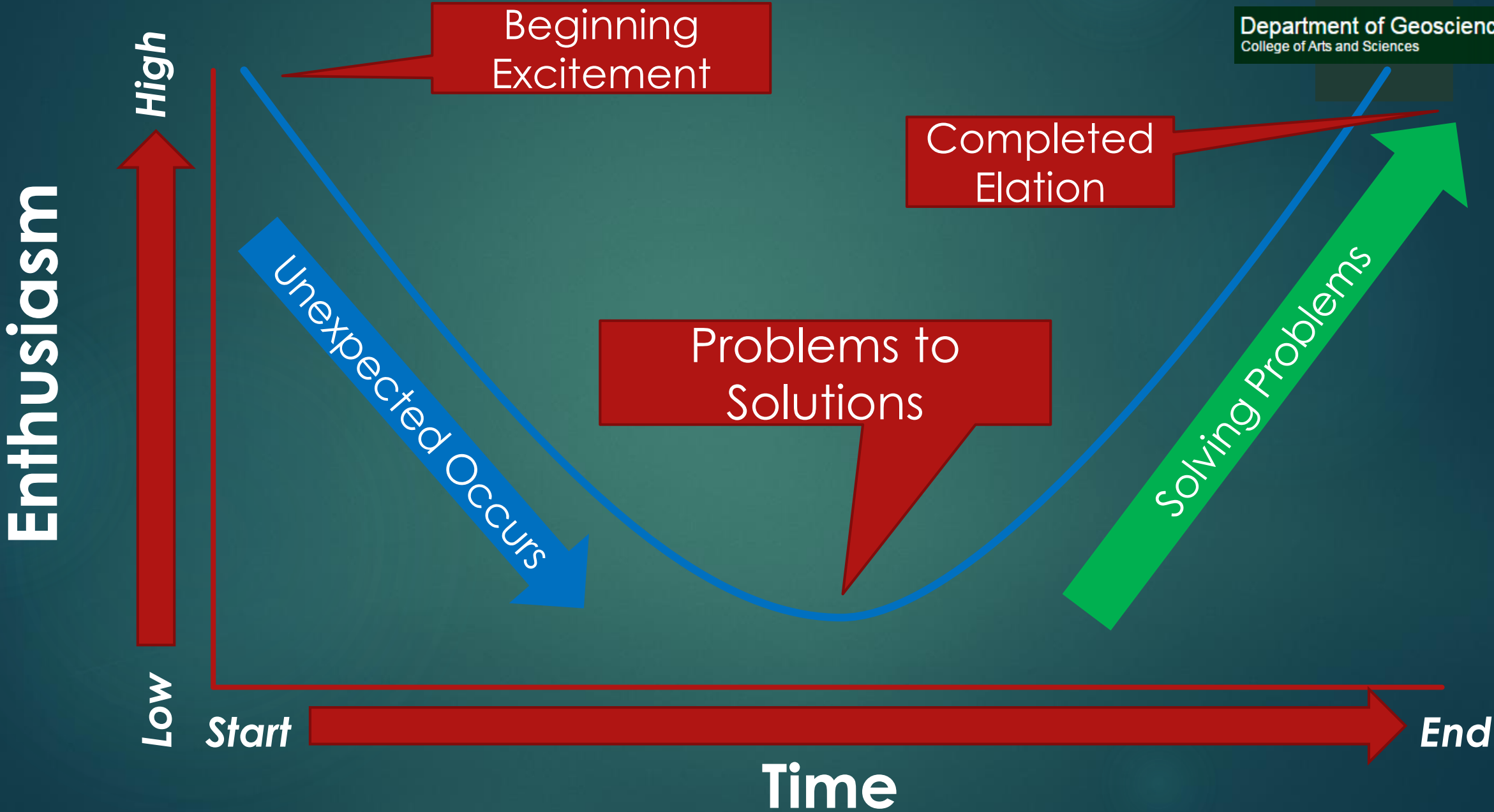


Wayne Hamilton

Research Stages

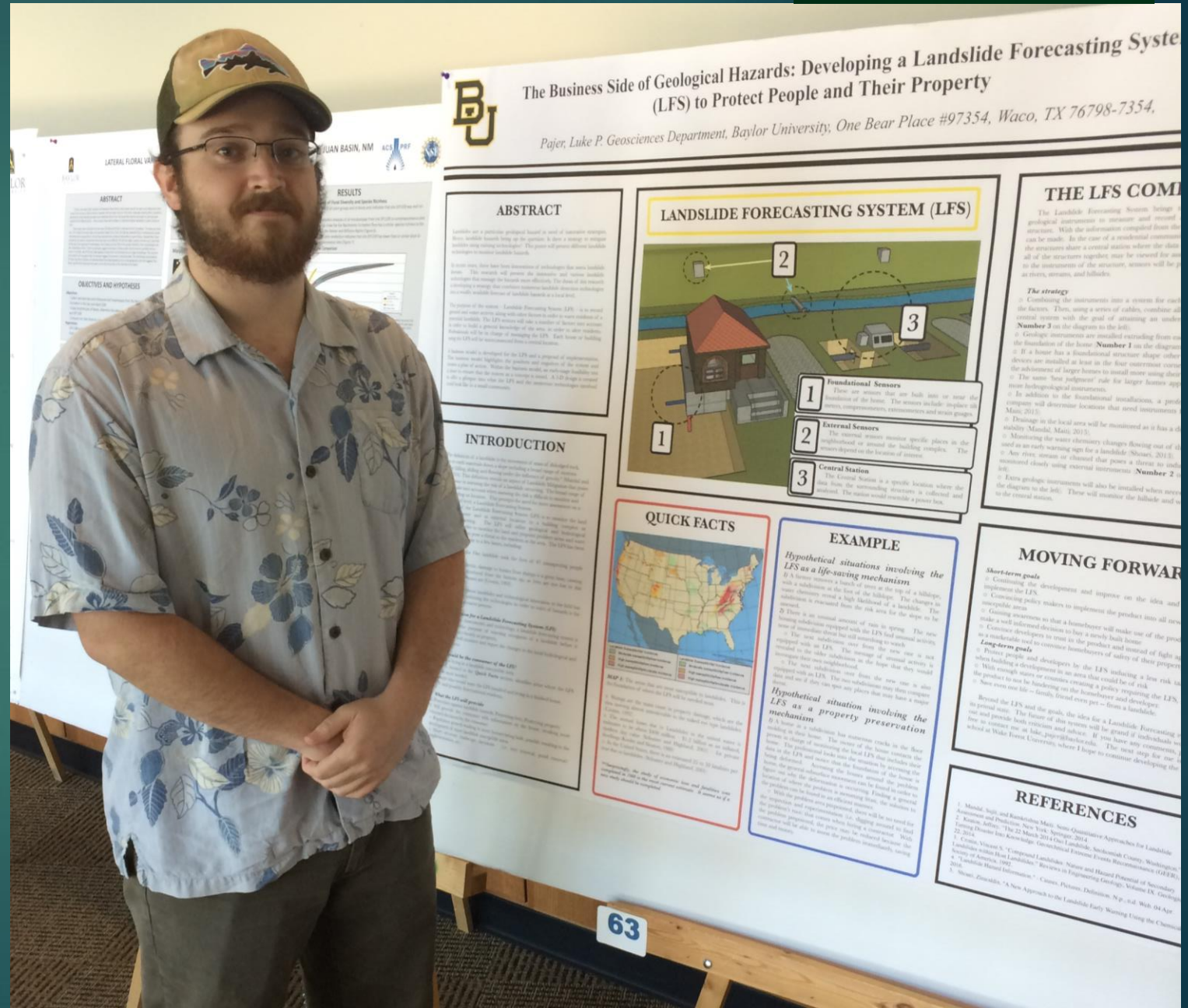


Department of Geosciences
College of Arts and Sciences



Poster “Etiquette”

- ▶ **Dialog** with
 - ▶ Visitors
 - ▶ Non-Geosciences
 - ▶ Faculty
 - ▶ Students
 - ▶ Judges
- ▶ **“Dead Time”** at poster
 - ▶ How to Keep motivated?



Summary



Department of Geosciences
College of Arts and Sciences

- ▶ **Lessons Learning**
 - ▶ Student Motivation
 - ▶ Teacher Leadership
- ▶ **Improvement Areas**
 - ▶ Writing and Rewriting
 - ▶ Etiquette
- ▶ **Long Term Benefits**
 - ▶ Graduate School/Career



Continue the Discussion

**Poster: On the Cutting Edge: Fifteen Years of Impacts on
Geoscience Education**

Monday, October 23, 4:30-6:30 p.m.

Booth 180

Poster 163-12

**TEACHING A SUBSURFACE SIMULATED SUBJECT
OUTDOORS: HOW TO LEVERAGE TIME FOR FIELD
HYDROGEOLOGY**