

Welcome to MAE4000

Take a seat in the **front half** of the auditorium

Be sure to sign in with Sabine to register your attendance

Department of Mechanical & Aerospace Engineering

Multiscale Materials Group - solids.uccs.edu



Introduction to MAE 4000 Mechanical Engineering Seminar

Introduction and basics of report writing in \LaTeX

Prof. Brandon Runnels

University of Colorado Colorado Springs

MAE4000 - Mechanical Engineering Seminar

January 18, 2018

Overview



1. Introduction to Research Seminars

2. Getting started with Overleaf

3. Brief Introduction to \LaTeX

4. Guidelines for report writing

Motivation

ATTENDING RESEARCH SEMINARS

In this class you will be required to attend several talks on research in engineering at the graduate level. While many/most of the talks are not necessarily targeted towards an undergraduate audience, attending research seminars is important for many reasons:

- it can **precipitate interest** in engineering topics at the graduate level
- it provides opportunities for future graduate students to **make professional contacts**
- it improves **analytic skills** for analyzing work outside of one's area of expertise



Research seminars are one of the primary means of communication of ideas within the scientific community

Seminar Etiquette

PROFESSIONALISM IN THE LECTURE HALL



You are expected to display professionalism in the seminar hall. Most of our speakers are not compensated for their time and are giving the seminar on a volunteer basis. You owe them your courtesy and attention.

- **Do not** sit in the back. The clipboard will only be passed through the front half of the auditorium.
- **Do not** put your feet up on the chair in front of you, listen to music, talk to your neighbor, etc. You are not in high school.
- **Do not** record seminars or take pictures of slides.
- **Do not** sleep through the seminar.
- **Do** look up the speaker and his/her work beforehand.
- **Do** take notes.
- **Do** ask the speaker questions.
- **Do** talk to the speaker afterwards.
- **Do** email the speaker with questions.

Deliverables

ATTENDANCE, REPORTS, AND QUESTIONS

Credit for this class is given based on the following deliverables:

- **attendance [50%]:** attendance counts for 50% of the final grade. Each unexcused absence incurs a 10% deduction from the final grade. Attendance is taken on an attendance sheet using your 9-digit university ID, so be sure you have it available. The attendance sheet will be passed in the front half of the auditorium only.
- **report 1 [20%]:** The first report is due March 10 and must be based on one of the MAE research seminars given between January 27 and March 3.
- **report 2 [25%]:** The second report is due May 8 and must be based on one of the MAE research seminars given between March 10 and May 5.
- **question [5%]:** Up to 5% course credit is given for questions asked publicly during the seminar Q&A section. Credit for questions must be requested online **within 24 hours of the seminar**. Questions are graded individually and each can contribute up to 5% of the final grade. (For instance, asking two distinct questions that are graded at 2/5 points each will result in a 4% contribution to the final grade.)

Reports and Reviews

GUIDELINES

Up to half of course credit is given by writing reports:

- **content:** review of the technical content of the presentation
- **quality:** professional writing quality is required for full credit
- **latex:** the \LaTeX typesetting system must be used to write the reports (instead of e.g. Microsoft Word)
- **overleaf:** it is recommended to use Overleaf to write all reports
- **format:** a MAE4000 template is available on the course website and must be used for all report submissions

We will discuss technical details and recommendations for report writing in the next sections.

Seminar Questions

RECEIVING COURSE CREDIT FOR QUESTIONS ASKED

5% of your course grade is obtained by asking questions during the Q&A portion of the seminar. You are always free and encouraged to ask any question you want! However, to receive course credit, you must ask specific, targeted, and informed questions that are related to the content of the seminar.

Credit-worthy:

- "You assumed that the crystal lattice is rigid. What effect does this have on your solution?"
- "Why are you using aluminum instead of, say, copper?"

Not credit-worthy:

- "What made you decide to pursue this particular research area as a career?"
- "What are the applications of your work?"

To obtain credit, submit the text of your question to the "Question" assignment on Canvas. **This must be done within 24 hours of the seminar.**

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Cloning a project from the template

LINK ON COURSE WEBSITE

On the course website, click the link for the Overleaf Report Template.

MAE 4000 - Undergraduate MAE Seminar (Spring 20...

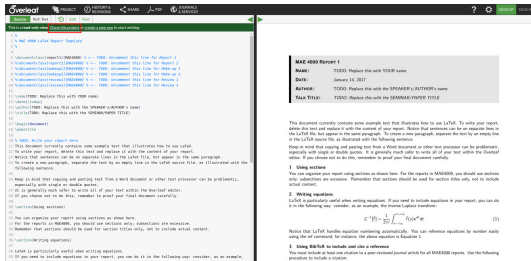


instructor:	Professor Brandon Runnels office - OCSE A431 email - brunnels@uccs.edu office hours - by appointment																		
teaching assistants:	Sabine Zentgraf office - OCSE A351 (Multiscale Materials Office) email - szentgra@uccs.edu office hours - by appointment																		
seminars:	Thursday, 11:00am-12:00pm Centennial Auditorium (CENT 203)																		
questions:	Submit question credit here																		
course materials:	Syllabus.pdf																		
assignments:	Midterm Report																		
	Final Report																		
report template:	Overleaf report template																		
spring 2018 schedule:	<table> <tr> <td>1/18/2018</td><td>Introduction and LaTeX tutorial</td></tr> <tr> <td>1/25/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>2/8/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>2/22/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>3/8/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>3/22/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>4/5/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>4/19/2018</td><td>MAE Research Seminar</td></tr> <tr> <td>5/3/2018</td><td>MAE Research Seminar</td></tr> </table>	1/18/2018	Introduction and LaTeX tutorial	1/25/2018	MAE Research Seminar	2/8/2018	MAE Research Seminar	2/22/2018	MAE Research Seminar	3/8/2018	MAE Research Seminar	3/22/2018	MAE Research Seminar	4/5/2018	MAE Research Seminar	4/19/2018	MAE Research Seminar	5/3/2018	MAE Research Seminar
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4/5/2018	MAE Research Seminar																		
4/19/2018	MAE Research Seminar																		
5/3/2018	MAE Research Seminar																		

Cloning a project from the template

DUPLICATING PROJECT ON OVERLEAF

This will take you to a read-only version of the project.



Click “Clone this project” to create a copy.

You may be prompted to take a “tour” or to create an account – do that if you would like.
The top of the project file is called the “preamble” – edit the lines that say “TODO” and fill in your project information.

```
1 %  
2 % MAE 4000 LaTeX Report Template  
3 %  
4  
5 \documentclass[report1]{MAE4000} % <-- TODO: Uncomment this line for Report 1  
6 %\documentclass[report2]{MAE4000} % <-- TODO: Uncomment this line for Report 2  
7 %\documentclass[makeup1]{MAE4000} % <-- TODO: Uncomment this line for Make-up 1  
8 %\documentclass[makeup2]{MAE4000} % <-- TODO: Uncomment this line for Make-up 2  
9 %\documentclass[review1]{MAE4000} % <-- TODO: Uncomment this line for Review 1  
10 %\documentclass[review2]{MAE4000} % <-- TODO: Uncomment this line for Review 2  
11  
12 \name{TODO: Replace this with YOUR name}  
13 \date{\today}  
14 \author{TODO: Replace this with the SPEAKER's/AUTHOR's name}  
15 \title{TODO: Replace this with the SEMINAR/PAPER TITLE}  
16
```

Example of a completed project

```

1 %
2 % MAE 4000  $\text{\LaTeX}$  Report Template
3 %
4 %
5 \documentclass[report]{MAE4000} % <-- TODO: Uncomment this line for Report 1
6 %\documentclass[report2]{MAE4000} % <-- TODO: Uncomment this line for Report 2
7 %\documentclass[makeup1]{MAE4000} % <-- TODO: Uncomment this line for Make-up 1
8 %\documentclass[makeup2]{MAE4000} % <-- TODO: Uncomment this line for Make-up 2
9 %\documentclass[review1]{MAE4000} % <-- TODO: Uncomment this line for Review 1
10 %\documentclass[review2]{MAE4000} % <-- TODO: Uncomment this line for Review 2
11
12 \name{John Smith}
13 \date{\today}
14 \author{Prof. Charles (Stan) Wojnar}
15 \title{Preventing Solid Rocket Motor Failures by Investigating the Mechanics of Aging in Propellant Relationships}
16
17 \begin{document}
18 \maketitle
19
20 Professor Charles Wojnar from the Department of Mechanical and Aerospace Engineering at the Missouri University of Science and Technology
   presented his work preventing solid rocket motor failures by investigating the mechanics of aging in propellant.
21 Although Professor Wojnar's background is in aerospace engineering, he mentioned that his actual interests lie within the materials
   engineering field, and his most recent research on preventing solid rocket motor failures stems from the need to determine improved ways to

```

note: copying and pasting text into Overleaf is not recommended as programs like MS Word use a different character encoding.

Citations with Bib_T_E_X

USING GOOGLE SCHOLAR TO FIND CITATION

You must include at least one peer-reviewed journal article using Bib_T_E_X. Start by finding your article on Google Scholar:



Web Images More...

Google Detectability of delaminations in solid rocket motors with embedded stress sensors

Scholar

Articles

Case law

My library

Any time

Since 2017

Since 2016

Since 2013

Custom range...

Sort by relevance

Sort by date

Showing the best result for this search. [See all results](#)

Article: Detectability of delaminations in solid rocket motors with embedded stress sensors

AQ Le, LZ Sun, TC Miller - *Journal of Propulsion and Power*, 2013 - arc.aiaa.org

A finite element model is used to investigate the effect of delaminations on the rigid stress distribution along the bondline during the cooling process of a solid rocket motor composed of propellant, insulation, and casing. Under the assumption of stress sensors evenly distributed along the circumference of the interface between the propellant and insulation, a relationship is established between the debond angle, the number of sensors, and the ...

Cited by 4 Related articles All 4 versions Web of Science: 3 [Cite](#) [Save](#)

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Cite

Copy and paste a formatted citation or use one of the links to import into a bibliography manager.

MLA Le, Anhduong Q., L. Z. Sun, and Timothy C. Miller. "Detectability of delaminations in solid rocket motors with embedded stress sensors." *Journal of Propulsion and Power* 29.2 (2013): 299-304.

APA Le, A. Q., Sun, L. Z., & Miller, T. C. (2013). Detectability of delaminations in solid rocket motors with embedded stress sensors. *Journal of Propulsion and Power*, 29(2), 299-304.

Chicago Le, Anhduong Q., L. Z. Sun, and Timothy C. Miller. "Detectability of delaminations in solid rocket motors with embedded stress sensors." *Journal of Propulsion and Power* 29, no. 2 (2013): 299-304.

Harvard Le, A. Q., Sun, L. Z. and Miller, T. C., 2013. Detectability of delaminations in solid rocket motors with embedded stress sensors. *Journal of Propulsion and Power*, 29(2), pp.299-304.

Uncover Le AQ, Sun LZ, Miller TC. Detectability of delaminations in solid rocket motors with embedded stress sensors. *Journal of Propulsion and Power*, 2013 Feb 22;29(2):299-304.

BibTeX Endnote RefMan RefWorks

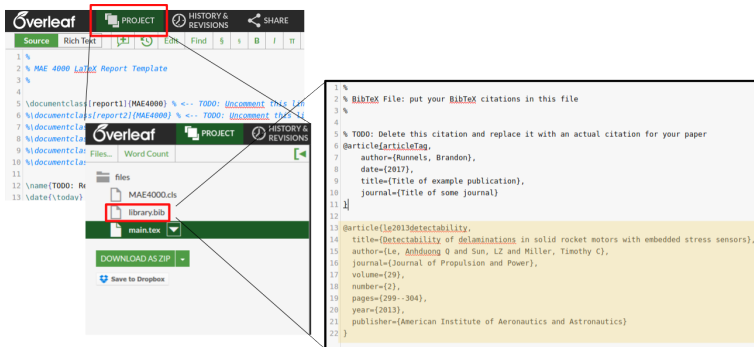
```
@article{le2013detectability,
  title={Detectability of delaminations in solid rocket motors with embedded stress sensors},
  author={Le, Anhduong Q and Sun, LZ and Miller, Timothy C},
  journal={Journal of Propulsion and Power},
  volume={29},
  number={2},
  pages={299-304},
  year={2013},
  publisher={American Institute of Aeronautics and Astronautics}
```

Click Cite→BibTeX and copy the text – this is the “BibTeX entry.”

Citations with Bib_T_EX

IMPORTING BIB_T_EX FILE TO PROJECT

In the overleaf window, open the project pane and open the file “library.bib”



Paste the BibTeX entry into this file.

Citations with BibTeX

CITING A REFERENCE FOR IN-TEXT CITATIONS

The first line in the BibTeX entry is the entry name.

```

13 @article{le2013detectability,
14   title={Detectability of delaminations in solid rocket motors with embedded stress sensors},
15   author={Le, Anhduong Q and Sun, LZ and Miller, Timothy C},
16   journal={Journal of Propulsion and Power},
17   volume={29},
18   number={2},
19   pages={299--304},
20   year={2013},
21   publisher={American Institute of Aeronautics and Astronautics}
22 }
```

To cite this article in your report, use the `\cite{}` command.

```

27 Prior to the work done in this talk, Professors Anhduong Q. Le and L. Z.
   California, Irvine, and Dr. Timothy Miller of the Air Force Research Labo
   Base \cite{le2013detectability} looked at the delaminations that occur al
   rocket fuel articleTag ls.
28 To properly le2013detectability on, evenly distributed stress sensors we
   between the propellant and the insulation within the solid rocket motor.
```

You must cite each reference at least once for it to appear in the bibliography.

Citations with Bib T_E X

RESULTS

That's all you need to do. The $\text{L}_\text{A}\text{T}_\text{E}_\text{X}$ and Bib T_E X compilers include the reference and the bibliography entry automatically.

temperature dependent degradation of solid rocket fuel. many other studies on solid rocket motor failure have been published recently. Prior to the work done in this talk, Professors Anhduong Q. Le and L. Z. Sun with the University of California, Irvine, and Dr. Timothy Miller of the Air Force Research Laboratory at Edwards Air Force Base [1] looked at the delaminations that occur along bondlines within solid rocket fuel as the propellant cools. To properly analyze this phenomenon, evenly distributed stress sensors were distributed and situated between the propellant and the insulation within the solid rocket motor. The goal of this research was to determine if

References

- [1] Anhduong Q Le, LZ Sun, and Timothy C Miller. Detectability of delaminations in solid rocket motors with embedded stress sensors. *Journal of Propulsion and Power*, 29(2):299–304, 2013.

(If you use Latex for future projects, you can choose from any type of standard bibliography and citation format.)

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Text formatting

PARAGRAPH BASICS

LaTeX is a document processing system that takes text-only source files (.tex files) and generates formatted documents. Here we will take a look at a few examples of how to write LaTeX. The amount you need is minimal for report writing, but may be useful for other projects.

Example of writing plain text:

\LaTeX Code

First line of text, first paragraph.
Second line of text, first paragraph.

First line of text, second paragraph.

Formatted Result

First line of text, first paragraph. Second line of text,
first paragraph.

First line of text, second paragraph.

Note that all lines are lumped into the same paragraph unless separated by a blank line.

Text formatting

NUMBERED AND UNNUMBERED LISTS

Automatically numbered and unnumbered lists:

L^AT_EX Code

Here is a bulleted list:

```
\begin{itemize}
\item Item A
\item Item B
\end{itemize}
```

Here is a numbered list:

```
\begin{enumerate}
\item First item
\item Second item
\end{enumerate}
```

Formatted Result

Here is a bulleted list:

- Item A
- Item B

Here is an numbered list

1. First item
2. Second item

Text formatting

SECTIONS AND SUBSECTIONS

You can use sections, subsections, and subsubsections, with automatic numbering.

L^AT_EX Code

Here is a section:

```
\section{This is a section}
```

Here is a subsection:

```
\subsection{This is a subsection}
```

Numbering is handled automatically.

Formatted Result

Here is a section:

1 This is a section

Here is a subsection:

1.1 This is a subsection

Numbering is handled automatically.

Text formatting

TABLE OF CONTENTS

Tables of contents are handled automatically using the `tableofcontents` command:

L^AT_EX Code

```
\tableofcontents
```

Here is a section:

```
\section{This is a section}
```

Here is a subsection:

```
\subsection{This is a subsection}
```

Numbering is handled automatically.

Formatted Result

Contents

1 This is a section1

1.1 This is a subsection 2

Here is a section:

1 This is a section

Here is a subsection:

1.1 This is a subsection

Numbering is handled automatically.

note: do not include tables of contents in your report

Text formatting

EQUATIONS

Inline equations are written using dollar signs:

L^AT_EX Code

The Pythagorean Theorem states that $a^2 + b^2 = c^2$, a useful result.

Formatted Result

The Pythagorean Theorem states that $a^2 + b^2 = c^2$, a useful result.

You can write numbered equations using the `equation` environment.

L^AT_EX Code

Here's an equation:

```
\begin{equation}
\int_0^1 x \, dx =
\frac{1}{2} x^2 \Big|_0^1
= \frac{1}{2}
\end{equation}
```

Formatted Result

Here's an equation:

$$\int_0^1 x \, dx = \frac{1}{2} x^2 \Big|_0^1 = \frac{1}{2} \quad (1)$$

Other useful equation environments include `align` and `gather`.

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Elements of a report for MAE4000

MOTIVATION FOR THE SPEAKER'S WORK

The body of the report should contain the following elements

- ① Motivation for the speaker's work
- ② Review of the work done prior to the speaker's contribution (state of the art)
- ③ Overview of methodology and key results
- ④ Conclusions/implications of the speaker's work and their future research directions
- ⑤ Critiques or questions regarding the speaker's work

At least one peer-reviewed journal article should be properly cited and included in the references section at the end.

- **Do not** cite web pages, this seminar series, or unreviewed PDFs.
- **Do not** cite articles that are irrelevant to the work.
- **Do not** directly quote references in your text.
- **Do** cite peer-reviewed articles, books or (sometimes) theses.
- **Do** check to make sure your reference shows up on scholar.google.com.
- **Do** summarize findings in references and use an in-text citation.

All reports must be at least 800 words, excluding title and bibliography. Turn report in on Canvas.

Writing a report in formal scientific style

WRITING WITH DESCRIPTIVE STYLE, NOT NARRATIVE STYLE

Writing a formal report is very different than writing an assignment for English 101. The purpose is to relate information efficiently, rather than to convey feelings or experiences.

Describe the work rather than telling a story about the speaker:

- "Dr. Smith firmly believes that thermoelectrics are an important aspect of materials research"
- "The speaker presents a compelling case that thermoelectrics are an important aspect of materials research"
- "Dr. Smith was always interested in space, and he had the opportunity to study space as an affiliate at JPL"
- "Dr. Smith's professional research interests are focused on space-related applications. His initial contributions to the field were the result of his time as a postdoc at JPL."
- "Dr. Smith and his team decided to investigate the problem of sending a Man to Mars."
- "The purpose of the research is to investigate the feasibility of a manned mission to Mars."

Write questions as statements, not questions or bulleted items:

- "A question I would have for Dr. Smith is, what are the applications of thermoelectric materials?"
- "The talk would have been significantly strengthened by a discussion of thermoelectric material applications."

Writing a report in formal scientific style

EXAMPLE

Original:

Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about the long trek to mars. Even though we do not have the money to go their yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident that we will be "space truckin' " in no time.

Writing a report in formal scientific style

EXAMPLE

Original:

*Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about the long trek to **mars**. Even though we do not have the money to go **their** yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident that we will be "space truckin' " in no time.*

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Improved:

*Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about the long trek to **Mars**. Even though we do not have the money to go **there** yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident that we will be "space truckin' " in no time.*

You must proof-read your work for proper spelling and grammar.

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Original:

*Dr. Smith of the Rocket Propulsion Laboratory (RPL) **talked to us about** the long trek to mars. Even though **we do not have the money** to go their yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. **Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident** that we will be "space truckin' " in no time.*

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Improved:

Dr. Smith of the Rocket Propulsion Laboratory (RPL) **presented his work regarding** the long trek to Mars. Even though **funds do not currently exist** to go there yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. **Dr. Smith's work was relevant and engaging for a broad scientific audience. It is clear** that we will be "space truckin' " in no time.

Avoid first person and personal experience, focus on the work.

Writing a report in formal scientific style

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Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about the long trek to mars. Even though we do not have the money to go their yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident that we will be "space truckin' " in no time.

Writing a report in formal scientific style

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Original:

*Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about **the long trek to mars**. Even though we do not have the money to go their yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? **On the mathematical side of things**, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. **I am confident that we will be "space truckin' " in no time.***

Improved:

*Dr. Smith of the Rocket Propulsion Laboratory (RPL) presented his work regarding **manned travel to Mars**. Even though funds do not currently exist to go there yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? **To provide theoretical background**, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith's work was relevant and engaging for a broad scientific audience.*

Avoid all colloquialisms and idioms, even if referencing the talk directly

Writing a report in formal scientific style

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Improved:

Dr. Smith of the Rocket Propulsion Laboratory (RPL) presented his work regarding manned travel to Mars. Even though funds do not currently exist for this objective, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, primarily the question of economic feasibility. To provide theoretical background, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith's work was relevant and engaging for a broad scientific audience.

Do not write like you talk—keep it formal, not casual, avoid question marks.

Writing a report in formal scientific style

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Dr. Smith of the Rocket Propulsion Laboratory (RPL) talked to us about the long trek to mars. Even though we do not have the money to go their yet, he talked about incremental plans taken by RPL to move towards manned spaceflight. Scientists have to ask themselves many questions, the first one being, is it worth the cost to get people to Mars? On the mathematical side of things, Dr. Smith talked about the rocket equation, which is a basic principle of space flight. Dr. Smith gave an interesting presentation that I personally found fascinating. I am confident that we will be "space truckin' " in no time.

Improved:

Dr. Smith of the Rocket Propulsion Laboratory (RPL) presented his work regarding manned travel to Mars. Even though funds do not currently exist for this objective, RPL is making incremental plans for manned spaceflight. This prompts many questions; primarily the question of economic feasibility. To provide theoretical background, the rocket equation was introduced, which is a basic principle of space flight. Dr. Smith's work was relevant and engaging for a broad scientific audience.

Do not casually tell a story; rather, describe the work formally.

Thank You
QUESTIONS?

