Fall 2023

ASTR 160: Frontiers of Astrophysics

Topic Project I -- (100 points total) Due November 3, 2023 at 4:59pm ET

Make a Science Video: Explaining Rocket Science to A Wider Audience

Science communication is an important element of actually *doing* science. Science communication is vital to allow non-experts to understand, and often make key decisions, about science policy and funding. We are pretty sure you've watch short videos to help with your coursework, now its time to make your own.

Suggested Topics

The following topics have been covered in class. *The assignment is to create a stand-alone video that can explain one of the topics below to a peer who has not taken ASTR 160 or equivalent class.*

- The significance of Kepler's Laws and an example
- Why and how are LEO satellites boosted in their orbit?
- Why is MEO a relatively empty region of orbital space?
- Which way to position a satellite TV receiver and what are geostationary orbits?
- Why are polar orbits the only way to full map the Earth?
- What is the Rocket Equation and an example
- What is the environment impacts of rocket launches or reentries?
- Why do we need rocket staging?

If you are interested in a different rocket science related idea that is not listed above, please chat with Prof Geha via Ed Discussions.

Video Style and Audience

For this assignment, you will chose a single topic and create a video explanation using a specific style below. The time listed for style is a minimum run time. You are welcome to go over this time, but not over 5 minutes.

1. Explain in 5 Levels of Difficulty (e.g., WIRED videos) [3 min]
   — You can chose 3 levels (or more):
   [child, high schooler, Yale non-STEM, general public]
2. "How to" educational video (e.g., Khan academy videos) [2 min]
3. Draw-My-Life Animation (e.g.,: In a Nutshell or Minute Physics videos) [2 min]

While videos can exceed the minimum runtime above, videos should not exceed 5 minutes.

Video Requirements and Script

The video must meet the run time of your selected style and the rubric criteria. The video must be natively filmed/exported in at least 1080p resolution. YouTube automatically detects the resolution and uploads accordingly. While most iPhone/Android cameras should work fine for filming, we note that students can borrow many tools at Bass Library and at the CCAM for free.

As part of the assignment, please turn in the script for the video. Your video must have clear audio and accompanying subtitles. The easiest way to add subtitles is to use the auto sync option which you can learn to do by following along with this video. In the text box that appears, copy and paste your video script and youtube will automatically time the closed captions to appear.

Submission Guidelines

You will be submitting a PDF file with an embedded link to your video and a written script/storyboard/plot-points section. This PDF will be submitted to Gradescope. Your video will be uploaded to Youtube using your Yale gmail account. If this is your first time uploading to Youtube, please follow along with this video!

Be sure to select the unlisted option if you do not wish to have the video publicly available. Either way, whoever clicks the link in your PDF submission should be able to view your video. PLEASE CHECK TO MAKE SURE! We will not be reaching out to students individually for their video links.

Your video link as well as your selected topic and style should be clearly written at the TOP of your PDF file.

Group Submissions

Projects can be done individually or in groups of 2 students. We will grade group projects to an appropriately higher standard than single person videos. In addition, we require that each group member submit a brief two paragraph statement describing the breakdown of work using this google form. Each group member should submit their own independent statement using this form. Individual projects do not need to use this form.

Grading Rubric

The project is graded out of 100 points. The grading rubric is based on the explanation of the topic, scientific accuracy and use of visuals, overall creativity and engaging style.

1. **Scientific Background and Accuracy** (30 points)

    i. 25-30 (Excellent): The topic is explained correctly even when simplifications are made. The video utilizes clear, accurate, and concise phrasing which aid in explaining the topic. The explanations suggest deep knowledge of the topic.

    ii. 20-24 (Adequate): The video explains the topic, but some language is not clear or appropriate for the chosen audience. Minor errors in explaining the topic.

    iii. 0-19 (Weak): The video is distracting or not cohesive with the topic. Explanations are difficult to understand and/or incorrect

2. **Creativity and Engagement** (20 points)

    i. 15-20 (Excellent):. The video engages the viewer. It uses creative, clever or unique ideas to explain the topic in a way that helps the chosen audience understand the topic. Creative choices are well executed.

    ii. 10-14 (Adequate): The video mostly engages the viewer. It may use creative ideas to explain the topic but these choices could have been better executed.

    iii. 0-9 (Weak): The video does not engage the viewer and/or topics are explain in a way that isn't appropriate or is difficult for the chosen audience to understand. Creative choices are poorly executed.

3. **Technical Details**

    a. **Clarity and Use of Visuals** (20 points)

        i. 15-20 (Excellent): The video is cohesive and helps the viewer learn about the topic. The main points of the video are clear. Excellent use of visuals to aide in explanation.

        ii. 10-14 (Adequate): The video is cohesive, but the main points of the video may be hard to follow. Good use of visuals to aide in explanation.

        iii. 0-9 (Weak): The video is difficult to follow. Visuals do not aid explanation.

    b. **Video Production** (20 points)

        i. 15-20 (Excellent): High quality video production (camera, audio, editing). The video runtime is in line with the rubric.

        ii. 10-14 (Adequate): Good quality video production (camera, audio, editing). The video runtime is largely in line with the rubric.

        iii. 0-9 (Weak): The video production is of low quality. The video runtime is too short (or far too long) according to the rubric.

    c. **Submission and group work** (10 points)

        i. 8-10 (Excellent): The pdf submission is formatted correctly. A script is submitted that is readable and clear. If working in a group, all group members made clearly outlined contributions to the project.

ii. 5-7 (Adequate): The pdf submission is formatted fine and a script is submitted. If working in a group, each group member made contributions to the project, but group project statement is unclear or work appears to be uneven.

iii. 0-4 (Weak): The pdf submission is poorly formatted and/or does not include a script. If working in a group, no submitted group project statement or statement suggests distribution of work was highly uneven.