

PHYS 171: Planetary & Stellar Astronomy
Friday, October 4, 2019

Interludes I & II: *Instructions*

In the two interludes, you will explore two topics that are outside of the traditional purview of astronomy, physics, and the physical sciences, as well as mathematics and computer science. You will write two short papers, one for each interlude, and make one team presentation for *interlude I* or for *interlude II*.

Papers

You will write two short papers, one for each interlude. The papers should be 5 pages long (double spaced) and include at least one figure (i.e. photo, diagram, image, plot, table). In the case of *interlude I*, this figure must be of your own making, and it should be used to explain and support the arguments and information in your paper (i.e. it is not decoration); you can also have additional figures that are taken from other sources, so long as they are properly referenced in your bibliography (note: these additional figures are not included in the minimum 5 page count). In the case of interlude II, this figure can be of your own making or from another source (and properly referenced in the bibliography). Each student must turn their own distinct paper. Format: 12 point, Times New Roman, 1" margins, 8" × 11" paper hardcopy.

Team presentation

You will participate in a team of four students to study, explore, and develop an interlude topic. Your team will give a short 10 minute presentation on one of the topics. You only need to make one presentation (either for interlude I or for interlude II).

Note: Your paper is expected to be on the same topic as your team presentation (though, if you really want to explore another topic you can). The paper is not a team effort.

Interlude I: Humanity in the Solar System

Presentations: November 4-6.

Paper deadline: November 8.

Definition: *To colonize* (in the context of this topic)

To establish a human presence, i.e. quasi-permanent human settlement (minimum 1 person), or a quasi-permanent outpost with human-originated machines (robot, telescope, factory, spaceship, etc).

Example topics:

0. Your own question/topic.

1. Will we colonize other parts of the solar system? If yes, then what parts of the Solar System and why? (e.g. planets, moons, asteroids, vacuum of space, i.e. space station, etc).

2. Why colonize the Solar System? Is colonization a good idea or a bad idea?
3. How will humans colonize the Solar System?
 - What will be the sequence of the colonization? (space station? → Moon? → Mars? → ???)
 - Will colonization be robotic or human? (robot colonization could work for resource extraction or for doing science; human colonization could be for extra land, freedom, religion, science, tourism, penal colonies, etc.)
4. What are the necessary ingredients for a human (or robot) outpost to prosper and grow, much as Jamestown (and Virginia) eventually prospered and grew?
5. Will colonization proceed by nation state, as a multinational endeavor, or by private enterprise?
6. How will humans organize themselves for space travel over many months or many years? How will humans (or robots) organize themselves at an early settlement/colony? What sort of health, psychological, and sociological issues must be addressed and considered in such situations?
7. What sort of mining and resource extraction opportunities are there in the Solar System? (e.g. asteroid mining, Moon mining, gas mining, energy (solar) extraction, etc) Are these opportunities viable? What is required for them to be viable?
8. How and why will war be conducted in space? Will space be used to attack Earth? Will space wars be over resources, territorial claims, or something distinct to space?
9. What sort of laws and treaties are needed for orderly and just use of space? Will such laws be extensions of national laws? Will international laws be used? Will separate laws specific to space be developed? Will the laws be developed on Earth or by those in the colonies? Who is liable for accidents due to space debris/garbage?
10. If we encounter alien life on another planet then how should it be treated? What if it is located somewhere desirable, or the organism has some desirable feature? Are environmental impact studies useful or necessary when exploring and settling the Solar System?
11. What language(s) will be spoken in a human space colony and will it/they evolve? If so, how will it/they evolve? If not, then why not?
12. In the long term, how do you expect a human colony somewhere in the solar system to evolve in terms of culture and biology?

Interlude II: Space Art

Presentations: December 2-4.

Paper deadline: December 6.

Visual art of scenes in space, on alien planets, in distant galaxies, and on futuristic spacecraft have long been used to inspire awe and imagination in their audiences. Whether a painting of some place in space or a scene in a science fiction movie, visual art scenes have seeded dreams and plans for future human existence and space as the final frontier.

Option 1: In this interlude, you will choose a visual scene, either a picture (painted, computer generated, or other, but not photo) or a very short movie/video clip (no sound) and discuss how it inspires, what it inspires, and why it inspires. You will also discuss the structure of the scene and its message (if any).

Option 2: Alternatively, you can create your own scene (painting drawing, computer generated, etc). The paper would then discuss your own art work. In the case of the team presentation, the artwork could be a joint team effort, or each member of the team could make one of four related scenes; part of the presentation would explain and show how the artwork was created. You will be graded on the quality of the artwork and the paper (and presentation).