

Term Project Assignment

The goal of the term project is to allow you to focus on a particular problem of interest in planetary science. An example of this would be to resolve the depth and structure of the inferred subsurface ocean on Europa, which would enable future exploration including the search for evidence of extremophile life. The project should consist of three parts:

1. *An introduction to the open question:* This consists of the existing background on your scientific question and can include previous remote or *in situ* observations as well as modeling studies of the phenomenon in question. You should have **at least 3** primary literature sources per group member for this section (2 for undergrads).
2. *A proposal for a targeted mission to answer the above question:* This section takes the above science question and turns it into ‘Scientific Objectives’ for a very focused ‘Mission of Opportunity’ to the solar system object in question. You will be limited to having only 1-3 instruments/experiments to successfully achieve your scientific objective(s), as illustrated using a “science traceability matrix.” You can use current planetary mission payloads as references for selecting your instrument(s). **Note:** This is not a mission design study, so telemetry, power supply, deployment of experiments, and (within reason) weight of the instrument/spacecraft do not need to be planned out systematically.
3. *Basic calculations necessary for successful experimental set-up:* For example, how sensitive does your instrument need to be to make the necessary isotopic ratio measurement? How far apart do your seismometers need to be, and do you need an impactor or is tidally generated seismicity enough to provide your signal? How long do you need to operate? Also include a basic calculation of how long it should take to reach your target from Earth orbit given an ideal launch window, and approximately how soon such a launch window might next occur.

Guidelines:

- By **Friday, September 26**, a representative of each group should email me (CC the other group members) to tell me who is in your group, where you want to send your mission, and a sentence or two on what science question you would like to address. Groups should have no fewer than 2 members, and no more than 4.
- The term project is a group project, meaning you are expected to share work equally within the groups (although of course you can divide up the tasks).
- Each full group should meet with me before Fall Break (i.e., by **Friday, October 10**) to discuss your ideas for how to answer your science question.
- By Friday, **October 31, 2014** you will turn in a 3-page review outlining your science question, objectives and mission approach for review by your peers.
- The full written report submitted by each group should not exceed 20 pages, and should be greater than 10 pages (excluding appendices of calculations and references). It will be due in class the Wednesday before the last week of class (**November 26th, 2014**).
- Each group will give a ~20-minute final presentation during the last week of classes (**December 1–5, 2014**).