

Class Project
Astronomy 191, Fall 2009
MWF 1-1:50pm
Instructor: Gregory Rudnick

Science is not just about discoveries and research. To be a good scientist it is important that you can stay abreast of the influx of knowledge into your field and be able to communicate effectively with your peers, both about your own work and about that of others.

In a society in which science is playing an ever increasing role it is imperative that each of you also become proficient at some of the same skills that we as researchers are required to develop.

In this course one of my goals is to help you learn how to understand current events in astronomy and to be able to communicate them effectively to your peers. As part of this you should be able to analyze different pieces of information on a given topic and synthesize them into a coherent message using your own words. These skills will serve you throughout your life, as the ability to critically view information and distill its core meaning is more important than ever before in an age where we are bombarded with information, not all of it reliable or consistent.

Complementary to the ability to analyze and interpret data is the ability to communicate it effectively to others. Scientists tend to do this by giving oral presentations and writing articles. Few of you are planning on becoming professional scientists and your favored way of communicating may be very different than my own. If that is the case, it is fine, great even. What is important is that you learn how to clearly communicate information in whatever way that you can do it best. In this project you will have to exercise your critical thinking skills and discover how you can communicate your astronomy knowledge as effectively as you can.

This assignment has two parts, which I describe below. Each part has its own requirements and due dates. *Please read all of the instructions carefully and let me know sooner rather than later if you have any questions.*

General Project Description: You will develop a way to communicate some of the newest work being done in the search for extrasolar planets to **your friends or family members**. As a starting point I will give you four articles about new developments in each of four general methods used to detect extrasolar planets. These methods are: doppler detection, astrometric detection, transit detection, and direct imaging. You will need to read these articles, read up on the related techniques, and address at least the following questions, although you are also encouraged to discuss additional points that you find interesting:

- How does each technique work?
- What kind of planets will each technique be best at and worst at detecting, and why?
- How does the new development improve our ability to search for new extrasolar planets?

- How do the different techniques complement each other, especially given the new capabilities?

A summary of the articles is **not** what I am looking for here. I am looking for you to synthesize the information into a coherent message, touching on the points I mentioned above.

In addressing these questions you will have **complete** freedom to choose how you want to communicate. You can sing it and give me a CD, you can make a sculpture, paint a painting, make a diorama, write a poem, dazzle me with your elegant prose, make a movie or documentary, write a program to computer program, whatever you think will be the best way for you to communicate.

Part 1

Description: The purpose of this part of the project is to make you develop the basis for your presentation now instead of waiting until the last minute. In this way you may be able to anticipate problems, start thinking about their solution, and produce a more polished finished product. I will read through these plans and provide general suggestions to the class based on the quality of the submitted work. This feedback will hopefully aid you in the completion of the project (see Part 2 description).

Read the four articles that are available on Blackboard under “Course Documents ⇒ Class Project ⇒ Articles.” Devise a plan for how you will address the four previous questions and what media you will use to communicate it. Remember that your explanation should be appropriate for family members or friends.

Due date: November 11th at the beginning of class. There will be a 20% late deduction for every day that the project is late. Assignments handed in after 1pm on Nov. 11th will be counted as late.

What has to be handed in: No more than two double-spaced typed pages (not including references) that describes your plan. This plan should include:

1. A brief description of your method of communication and of how it will be used to convey your message. This should include a brief accounting of how each of the questions will be addressed in your project and some examples what you might do.
2. Why you think this method of communication is a good choice.
3. A discussion of any difficulties that you foresee in implementing your concept, especially those that are specific to your chosen method of communication. *Every communication attempt has potential pitfalls.* It is not acceptable to say that you foresee no potential problems.
4. You must have at least two additional references that supplement those that I gave you. These must be reputable and from different sources, e.g. they cannot both be from wikipedia. It is up to you to decide on whether a source is reputable but you may ask me for assistance

in determining this. You should indicate in the text with footnotes what reference is appropriate to each piece of text.

It is not intended for this first part to represent your final work in every detail, but rather to be a thoughtful draft of your proposed project. That being said, the effort you put into this now will save you work down the road. To put it one way, in this part I decide how well you can formulate your idea, in the next part I will judge how well you can execute it.

Please hand in the assignment on paper in class. Please make sure that your name and ID are clearly legible on your assignment.

How much will this account for the total project grade? 40%

Grading: This assignment will be graded using the rubric below. The assignment will be given a score of 0-4 in each of the indicated areas. The total assignment grade will consist of the sum of these components. The table only goes down to 1 but a 0 will be given if performance in a given area falls below the level one expectation.

	4	3	2	1
Use of appropriate evidence	At least two reputable and relevant sources are selected and cited.	At least one relevant and reputable sources are selected and cited.	Sources are either not reputable or irrelevant	Sources are neither reputable nor relevant
Identifies and summarizes potential problem	Identifies an important and relevant potential problem in the chosen method of communication. States it in a clear and appropriately focused way.	Identifies a relevant potential problem in the chosen method of communication. States in a clear and somewhat focused way.	Identifies a somewhat relevant potential problem in the chosen method of communication. States in a general way that may lack focus	Identifies a potential problem that is too general or trivial.
Addresses methodology of how to translate technical details into terms understood by a layperson	Has a well developed and suitable methodology. Gives sufficient concrete examples	Has a generally developed and somewhat suitable methodology. Gives adequate or somewhat general examples.	Has a methodology that is either not specific or not suitable. Gives adequate but general examples	Has a methodology that is too general and not suitable. Gives few examples.

	4	3	2	1
Addresses why this particular mode of communication was chosen	Thoughtful explanation of how method uses the student's relevant personal strengths. Discussion of why the method will be especially effective at translating the concepts.	Explanation of how method uses the student's personal strengths. Discussion of why the method will be effective at translating the concepts.	Explanation of why method was chosen. General or irrelevant discussion of why the method will be effective at translating the concepts.	No discussion of why method was chosen or no discussion of why method will be effective.

Class Project - part 2 description
Handed out after Part 1 is completed

This document gives a more detailed description of part 2 of the class project.

Please read all of the instructions carefully and let me know sooner rather than later if you have any questions.

You will develop a way to communicate some of the newest work being done in the search for extrasolar planets to **your friends or family members**. You have already read the four articles on Blackboard, found two additional sources, and submitted a proposal on how to execute your project. In Part 2 you will need to put your money where your mouth is and execute your proposal.

In completing this project keep in mind that you should use the six sources (four from me and 2 from you) to address *at least* the following questions, including any others that you may find interesting:

- How does each technique work?
- What kind of planets will each technique be best at and worst at detecting, and why?
- How does the new development improve our ability to search for new extrasolar planets?
- How do the different techniques complement each other, especially given the new capabilities outlined in the four main articles.?

A summary of the articles is **not** what I am looking for here. I am looking for you to synthesize the information into a coherent message, touching on the points I mentioned above.

In addressing these questions you will have **complete** freedom to choose how you want to communicate. You can sing it and give me a CD, you can make a sculpture, paint a painting, make a diorama, write a poem, dazzle me with your elegant prose, make a movie or

documentary, write a program to computer program, whatever you think will be the best way for you to communicate.

Your performance on the project will not only be based on your presentation, but also on the accuracy of your information, and most importantly your ability to synthesize the content, implications, and limitations of the various techniques into a well-understandable whole.

Due date: December 7th at the beginning of class. There will be a 20% late deduction for every day that the project is late. Assignments handed in after 1pm on December 7th will be counted as late.

Group work: It will be possible to work in groups of no more than 3 people and hand in a single assignment for the group. This is not required, but is just an option if you feel that group work would enable you to execute a better project. See below for specific details regarding the group option.

What has to be handed in:

1. Your project, in whatever form is appropriate. Projects must be clearly labeled with the name and ID of the person submitting them. You may firmly attach your name and ID to the project if you do not wish to write on the project yourself. Digital projects should be brought to me on a CD or sent to me by e-mail if they are less than 10MB. Lists of references used should also have your name and ID attached.
2. All necessary references. All projects must include any references, including acknowledging the copyright for any materials that were used in the project, e.g. songs, artwork, film clips. The references may be included as part of the project or submitted on a separate sheet of paper. You are welcome to seek assistance from people outside the class for, e.g. access to certain software, advice on presentation, etc. It must be completely clear, however, that the work is your own. If you consult someone outside of the class you **must** include in your references a description of who they are and how they assisted you.
3. Only needed for group projects: If you do your work in a group, the names and ID members of all members must be submitted with the project. In addition, each member of the group will need to hand in **separately** a description of what they specifically did on the project. These should **not** be read by the other members in your group and give you a chance to be honest about what **your** contributions were. If it is clear to me that work was equally shared then all members will receive the same grade. I reserve the right to decrease or increase the grades of individual group members if I feel that the work was not shared appropriately.

Make sure that all elements of the project - except the optional group work contribution descriptions (see item #3 above) - are physically or electronically attached to the project to make sure that I don't miss anything when grading.

Important note: Your assignment must be something that I can grade without you being present. If this restriction affects your plans, please talk to me well before the due date so that we can discuss your options.

How much will this account for the total project grade? 60%

Grading: This assignment will be graded using the rubric below. The assignment will be given a score of 0-4 in each of the indicated areas. The total assignment grade will consist of the sum of these components. The table only goes down to 1 but a 0 will be given if performance in a given area falls below the level one expectation. If one field does not have entries in the 4-point column then that field has a maximum score less than four. Your grade will be by your percentage out of 47 points.

Tip: I would strongly advise you to try out your presentation on some of your non-astronomer friends to see if they understand the material to the degree that you expect. If you have to explain many things to them it also implies that I will be confused and it will cost you points.

RUBRIC

	4	3	2	1
Completeness				
explaining how each technique works	All four techniques are described.	Three of the techniques are described.	Two of the techniques are described.	One of the techniques is described.
what kind of planets does each technique best and worst detect?	Described for all four techniques	Described for three techniques	Described for two techniques	Described for one technique
How do the new developments improve our ability to detect extrasolar planets?	Described for all four techniques	Described for three techniques	Described for two techniques	Described for one technique
How do the different techniques complement each other?	Described for all four techniques	Described for three techniques	Described for two techniques	Described for one technique
Quality of analysis				
Limitations and advantages of each technique	Insightfully discusses relevant and supported limitations and advantages	Discusses relevant and supported limitations and advantages	Presents relevant and supported limitations and advantages	Presents limitations and advantages but they are possibly irrelevant and unsupported.

	4	3	2	1
Conclusions on how the techniques complement each other	States a conclusion that is a logical extrapolation from the reading material	States a conclusion focused solely on the reading material. The conclusion arises specifically from and responds specifically to the material.	States a general conclusion that, because it is so general, also applies beyond the scope of the assignment.	States and ambiguous, illogical, or unsupported conclusion.
Organization and synthesis.	Organizes and synthesizes information to reveal insightful patterns, differences, or similarities related to focus.	Organizes information to reveal important patterns, differences, or similarities related to focus.	Organizes information but the organization is not effective in revealing important patterns differences or similarities.	Lists information but it is not organized and/or is unrelated to focus.
use of additional two sources	additional sources are relevant and enhance the information in the 4 core references	additional sources are relevant and duplicate the information in the 4 core references	additional sources are either not relevant or contradict the information in the 4 core references in a way that does not enhance meaning	additional sources are not relevant and contradict the information in the 4 core references in a way that does not enhance meaning
ethical and legal use of information	Students cite sources in an appropriate manner in all necessary locations.	Students cite sources in an appropriate manner in some necessary locations.	Students cite sources in an inadequate manner or only in some necessary locations.	Students cite sources in an inadequate manner and only in some necessary locations.
Presentation				
How well was the information explained	Required information is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding	Required information is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Required information is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/or backgrounds unknown.	Required information is stated without clarification or description.
Use of specific medium to enhance communication.	The chosen medium was executed in a highly polished manner.	The chosen medium was executed with no obvious flaws.	The chosen medium was used in a way that conveyed the meaning of the material but in a somewhat inaccurate or ambiguous fashion.	The chosen medium was not used in a way that allowed the material to be conveyed.

	4	3	2	1
effectiveness of communication for a non-specialist audience	The required information and its implications were communicated in a way that is fully understandable by a non-specialist.	The required information was communicated in a way that is fully understandable by a non-specialist but the implications were only partly understandable	The required information was communicated in a way understandable by a non-specialist.	The required information was not communicated in a way understandable by a non-specialist.