AST 494 / AST 591 — Astrophysics Seminar — Fall 2010

ASTRO 2010: Astrophysics of the Next Decade: ``New Worlds, New Horizons in Astronomy and Astrophysics''

Meeting Time: Friday 12:15 — 1:30 PM (First meeting: Fr. Aug. 20 12:15 PM)

Room: PSF 226
SLN: 86255 for AST 494; 71125 for AST 591
Instructor: Prof. Rogier Windhorst
Website: http://windhorst591.asu.edu/ or http://windhorst494.asu.edu/

If SESE server down, use:
Website: http://www.asu.edu/clas/hst/classes/ast591/ or http://www.asu.edu/clas/hst/classes/ast494/

Rogier Windhorst: **Office:** PSF 246/248
Off-hours: Mo: 4:20-5:20 pm
E-mail: Rogier.Windhorst@asu.edu (response time = a few days)
Phone: (480) 965-7143 or 3029 (response time = immediately)

Scroll down to table of Fall 2010 Seminar and Journal Club presentations and presenters

Course Objectives:

The aim of this course is to introduce you, the students, to a series of short seminal papers and on more recently published work in the general area of this semester's broad topic. The emphasis is on the development of scientific method and theory, and on the latest scientific discoveries, rather than just on new measurements or incremental improvement in a particular technique.

Course Topic for this Semester:

On Friday August 13, 2010, the **National Academy of Sciences (NAS)** issued the report of a two year long study, called the (2010) **``Decadal Survey of Astronomy and Astrophysics''.** The Decadal Survey of Astronomy and Astrophysics was charged to survey the field of space- and ground-based astronomy and astrophysics and to recommend priorities for the most important scientific and technical activities of the decade 2010-2020. The principal goals of the study were to carry out an assessment of activities in astronomy and astrophysics, including both new and previously identified concepts, and to prepare a concise report that will be addressed to the agencies supporting the field, the congressional committees with jurisdiction over those agencies, the scientific community, and the public. Given the tremendous interest in this transformational report, we will focus this semester's **AST 494/591 Journal Club** on the scientific impact of this report on the field of Astronomy and Astrophysics this decade and beyond, and hence on its impact on your future careers. The Decadal Survey of Astronomy and Astrophysics Report is also available on the **National Academies Press site,** but if you don't want to pay for it, it's available for free **here (85 Mb!).** The 225 page report is summarized in the following **PDF Presentation (0.63 Mb).** Here is a 1-page summary of the Decadal Survey Report :)

The Decadal Survey committee was asked to consider (1) the acquisition, analysis and interpretation of observations of the cosmos, including technology development and new facilities needed, as well as the computational and theoretical framework for understanding the observations; (2) the extent of the common ground between fundamental physics and cosmology as well as other areas of interface with adjacent scientific disciplines, as appropriate; and (3) the federal research programs that support work in the field of astronomy and astrophysics, including programs at the National Aeronautics and Space Administration **(NASA)** , the National Science Foundation **(NSF)** , and selected aspects of the physics programs at the NSF and the Department of Energy (**(DOE)** . Only physics topics with a strong overlap with astronomy and astrophysics were within the study charge. In addition, only ground- and not space-based solar astronomy was to be considered.1 Direct detection of dark matter was also excluded from prioritization.

Course Requirements:

During this semester's Journal Club, students will present oral reports on the selected papers in class at the rate of one 50 minute or two ~25 minute presentations per week. Each student will be responsible for one long or two short reports, except that undergraduates who are not majoring in SESE/astrophysics, physics, or closely related sciences may suffice with one ~25 minute presentation, and/or leading the discussion of other presenter's papers during the semester. Oral reports by senior graduate students, postdocs, and others not enrolled in this class, is on a voluntary and as-time-permits basis only, but there usually are several times slots available throughout the semester to do so.

The report on each paper should consist of a general introduction covering the scope of the paper and where it fits within the larger field of research of which the paper is part, followed by a more detailed summary of the paper and a discussion of its impact. This includes a summary of the assumptions made in the papers, the new observational data obtained, the reduction and analysis procedures applied to the data, the reliability and completeness of these procedures, and the reliability and relevance of the new scientific results presented in the paper. Each presentation is followed by time for questions and answers, and subsequent discussion, in which especially the students who take this class for a grade will engage. Your grade will be based on your active participation in this class, and on the quality of your presentation.

Dates for the presentations(s) by each student will be assigned within the first week of the first class — on a first come, first serve basis. The choice of paper to discuss will be up to the student, but certain restrictions and requirements will apply (see also *Tips.*, below). I'll be happy to discuss your choice of a particular paper, and offer suggestions when you are in doubt as to what is best.

Journal Club Presentations:

The majority of the work for this class will revolve around computer-based presentations (i.e., HTML, PDF, Power Point, etc.). A laptop computer running Redhat 9, or CentOS Linux, or MAC O/S (with Mozilla browser, Acrobat PDF Reader, and OpenOffice for PPT files) will be available in the classroom to give the presentation, but students are encouraged to bring and use their own Windows, Linux or Macintosh laptop should they have one. If you use a Macintosh, remember to bring a DVI to VGA adapter ("dongle").

At least one week before their scheduled presentation, each student should provide me with the reference to a paper of their choice. I will place a link on the class web-page to an electronic version of this paper (PDF/Postscript), so all other students can download and read it, formulate questions, and thus participate in the discussion of that paper during class.

If you prepare a PowerPoint presentation and do not plan to use your own laptop, send your presentation no later than the afternoon preceding class to me by e-mail as an attachment so I can check that it displays properly (Windows' proprietary fonts, e.g., math symbols, often don't!).

After you finish your presentation, Email the PDF or PPT file to me, and I will place all presentations and papers on this website, so they can be accessed later. For your selected paper(s), it is imperative that you Email me the titles and links ONE WEEK BEFORE your talk, so that the papers can be read by all well before the class starts. From experience, students will learn a lot less if they don't read the paper before it is being discussed. Both papers and presentations will be available via links in the Table below that contains this semester's TENTATIVE Journal Club schedule (this Schedule is subject to change throughout the semester!).

Tips for finding a suitable paper:

Papers that had/have a large impact will be cited by many other authors. Papers with few or no citations, or mostly self-citations by the authors, are *not suitable* for discussion. Papers are required to (1) have been peer reviewed, and preferably be already published a peer reviewed journal and (2) have at least 3 citations by researchers other than the authors of that paper. In general, discussion of a paper that recently appeared on 'astro-ph' is discouraged, unless the "Comments" give a *specific* volume/issue of the peer-reviewed journal, where such paper is scheduled to appear and/or the citation requirement is satisfied. (This semester we will be a bit more lenient on these rules, given the very recent nature of the new Hubble data that is coming in).

For a 50 min presentation, a single 4 or 5-page ApJ Letters are not suitable, but two related ones might well be. Typically, papers should be the equivalent of 8–10 pages in a main journal (multi-page tables or atlases of figures, and the list of references don't count).

Although not a complete depository of all scientific literature in astronomy and astrophysics, astronomy has nonetheless a very large, full-text digital library: the **NASA Astrophysics Data System (ADS)** (**http://adsabs.harvard.edu/abstract_service.html**). The best astronomical preprint server is on: **http://xxx.lanl.gov/find/astro-ph**).

A full text, printable version of this paper may be obtained by clicking on the "F" link (or by clicking on the full reference link or "A" link, and following the links on the abstract page that it opens). Often, there is also a "G" that points to GIF-format scans of each page of the paper, or an "E" that points to an HTML version (both may come handy to extract/retrieve a digital version of a figure, table or equation to insert in your presentation). To check whether a paper has a sufficient number of citations, one can click the link marked "C".

You are encouraged to consider choosing papers that you find based on --- or that are closely related to the main topics in --- the Astro 2010 Decadal Survey Report. If you are not certain what paper to choose for this semesters Journal Club, or need some more background information, please browse some of the papers and references in the figure captions of the Decadal Survey Report, or find the corresponding journal papers by the relevant first authors or topic on: **ADS** or on: **LANL/astro-ph/arXiv.**

Course Schedule and Guidelines:

The following is the TENTATIVE schedule of AST 591/494 presentations. During the first day of classes, we will discuss the program and syllabus for the semester. Each student who signed up for AST 591/494 will be asked to volunteer for a time slot to give a presentation on a paper, and/or lead its discussion.

Since we may have both graduate and undergraduate students signed up for this class this semester, we have the following guidelines:

(a) All graduate students that take this class for credit will make one 50 min presentation on a significant paper related to the Astro 2010 Decadal Survey.

(b) Volunteer graduate students NOT taking the class for credit may present one of their own dissertation papers (even before it has been refereed), as long as they put its relevance in the context of the Decadal Survey Report.

(c) UG students majoring in SESE, Physics or closely related sciences, who take this class for credit, may sign up for one 25 min presentation on a Astro 2010 related paper.

(d) UG students majoring in other fields, who take this class for credit, or any student who is auditing this class, may volunteer INSTEAD to lead the discussion on one day during which one of the other students above presents a paper. They may of course also do a 25 min paper presentation, if they so choose.

(e) If there are more students than time slots (likely this semester), two students will present a 25-min presentation of a paper on the Friday(s) after a main Astro 2010 topic is introduced by one of the faculty.

At the end of each class, you will be asked to evaluate the student speaker. Please fill out the Speaker Evaluation Form, and return it to the instructor at the end of the class. Like the real refereeing process in publishing scientific papers, you may remain anonymous. But please be polite in your comments, because you, too, will one day will be judged by your peers!

Strategy and Focus for this semester's Journal Club :)

To focus the discussion on the Astro 2010 Decadal Survey Report, the following ASU faculty have volunteered to introduce each **major** Astro 2010 topic with a 30-40 min presentation on an instrument or facility that they are working on, or are closely involved with. In the subsequent time slots (that same day and/or 1--2 Fridays thereafter) AST 494/591 students will present a **science paper closely related** to this topic. This will help us all to focus this semester on the main Astronomy and Astrophysics science of the next decade:

(1) Rogier Windhorst on the topic of: **the James Webb Space Telescope --- the next NASA Flagship Mission**

(2) Prof. Chris Groppi on the topic of: **TeraHertz Astrophysics, and the Atacama Large Millimeter Array (ALMA)**

(3) Prof. Sangeeta Malhotra on the topic of: **The Wide-Field InfraRed Space Telescope (WFIRST) or the NASA/DOE Joint Dark Energy Mission (JDEM)**

(4) Prof. James Rhoads on the topic of: The next generation ground-based telescopes: **the Giant Segmented Mirror Telescope (GSMT)** ; **the Thirty Meter Telescope (TMT)** ; **the Giant Magellan Telescope (GMT)** ; and **the ESO-Extremely Large Telescope (ELT).**

(5) Dr. Paul Scowen on the topic of: The **ORION** , **HORUS** , and **Star-Formation Camera (SFC)** NASA Mission concepts, and the future of NASA **SMEX** , and **MidEX** explorers.

(6) Prof. Evan Scannapieco on the topic of: **The Large Synoptic Survey Telescope, and the future of Big Surveys**

You will be asked to select/modify the preferred day of your presentation below during the first day of class. The listed days are placeholders on this TENTATIVE SCHEDULE until that time. If students --- who signed up for this class --- do not volunteer on time for a

slot and/or a topic, I will schedule you in one of the remaining slots, in which case you may not get the slot you want.

TENTATIVE Fall 2010 Journal Club Schedule

Date	Presenter(s)/PPT	Paper(s)/PDF	Title(s) + URL's to (PUBLISHED) paper(s)
8/20	Rogier Windhorst	Class philosophy, theme, & rules	Astro 2010 Presentation ; Astro 2010 Decadal Survey Report .
8/27	Rogier Windhorst	Gardner2006SSRv..123..485G Windhorst2006NewAR..50..113W	Gardner, 2006, SSR, 123, 485 ``The James Webb Space Telescope'' Windhorst, R. A. 2006, NewAR, 50, 113 ``How JWST can measure First Light, Reionization and Galaxy Assembly''
9/3	Caleb Wheeler	Science in the JWST era	
9/10			
9/17			
9/24			
10/1			
10/8			
10/15			
10/22			
10/29			
11/5			
11/12			
11/19			
11/26			**Thanksgiving Holiday (no classes)**
12/3			
12/10			**Final exam week (no classes)**

Regular Journal Club topics
class introduction (12:15 PM in PSF-226)

For astronomy classes and other events at ASU this semester, see also:

http://windhorst113.asu.edu/links.html

SESE or Physics Colloquia this semester:

SESE Colloquia — We. 4:10-5:00 pm in PSH-153.

Physics Colloquia — Th. 3:15-4:15 pm in PSF-101.

Particle Physics and Astrophysics Seminar — We. 2-3 pm PSB 243.

Related Astrophysics Seminar schedules and student presentations in semesters:

- **Spring 2010**
- **Fall 2006**
- **Spring 2006**
- **Fall 2005.**

Last updated: Today