Ay31
Writing in Astronomy
Spring 2019

Instructor: Prof. Andrew Howard
Class Meetings: Cahill 219
3-4pm Fridays
astro.caltech.edu/~howard/ay31s19.html
Practical experience in types of writing expected of professional astronomers

• manuscripts for professional journals
• research (grant) proposals
• observing time proposals
• topical reviews
• popular science articles
• technological assessments/reports
• poster presentations of research
• referee reports, recommendation letters, employee performance reviews
Each directed at different audience
Each in different format

- Manuscripts for professional journals
- Research funding proposals
e.g., NSF, NASA, Private Donors
- Topical reviews
- Popular science articles
e.g., Scientific American

Above are most likely formats for this class
(but not exhaustive)
Course Description

• In consultation with instructor, each student will **choose a format and topic** and **write** an original piece.

• **Outlines and drafts** will be required at intervals during the course.

• Each student must find a research **mentor** familiar with the selected topic.

• Outlines/drafts must be **reviewed by mentor and course instructor**

• Final versions due in time for seniors’ work to be graded (Commencement)
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<tr>
<th>Week</th>
<th>In Class</th>
<th>On your Own</th>
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<tr>
<td>Week 1 - April 5</td>
<td>Introductory All-class meeting</td>
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<tr>
<td>Week 2 - April 12</td>
<td>All-class meeting</td>
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<td>Week 3 - April 19</td>
<td>All-class meeting - Outline due</td>
<td>Meet one-on-one with instructor to review outline</td>
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<td>Week 4</td>
<td>No class meeting</td>
<td>Meet one-on-one with instructor to review first draft</td>
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<td>Week 5 - May 3</td>
<td>All-class meeting - First Draft due</td>
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<td>Week 6</td>
<td>No class meeting</td>
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<td>Week 7 - May 17</td>
<td>All-class meeting - Second Draft due</td>
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<td>Week 8</td>
<td>No class meeting</td>
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<td>Week 9</td>
<td>No class meeting</td>
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<td>Week 10</td>
<td>No class meeting - Final Paper due Wed.</td>
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<td>June 5</td>
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Other Course Requirements

• Attendance and participation in class meetings
  (an absence requires instructor’s permission)
• Interactions with selected science mentor
• Individual meetings with course instructor
• Evidence of progress towards completion of the writing assignment, including submissions of outline and drafts as scheduled
• On time submission of completed assignment

Grading: dependent on all of the above
Grading

[10%] - Attendance/Participation
[5%] - Outline
[15%] - First Draft
[20%] - Second Draft
[50%] - Final Paper
Books

   — helpful at all career stages

   — very basic; some material will be included in summaries for this class, but a good starting point for everyone
Getting Started

Choose: FORMAT TOPIC MENTOR

A) FORMAT: papers for professional journal telescope proposals topical reviews popular science articles technological assessments/reports

B) TOPIC: Astronomical Topic

C) MENTOR: Expertise in Topic
• Can I chose a non-astronomical topic?  
  *No.*

• Can I write my senior thesis for this course?  
  *No. Separate project needed.*

• How should I select a topic?  
  *Discussion later. Also, see resources on course webpage.*
How to Find a Topic

• Scientific papers on current research
• A review of area of astronomy you are curious about
• A popular article on some astronomical question
• Telescope proposal to acquire data on which you did a prior research project/SURF
• If you have a potential scientific mentor, discuss possibilities with them
• Etc.
Write appropriately for your audience
Understand what you are writing about
Use precise language
Give sufficient (and not too much) background
Explain your motivation (and perhaps goals)
Describe methods, assumptions, results
Draw conclusions and evaluate their validity
Consider broader implications (briefly)
Before Next Class

1. Have format in mind
   — decide on audience; read Chapter 1 of Hofmann or Alley

2. Have a possible astronomy topic

3. Think about/approach possible mentors

4. By the night before class, send an email (ahoward@caltech.edu) with above three points

Note: this class will explore possible choices and discuss presentation style
Kepler-16: A Transiting Circumbinary Planet

We report the detection of a planet whose orbit surrounds a pair of low-mass stars. Data from the Kepler spacecraft reveal transits of the planet across both stars, in addition to the mutual eclipses of the stars, giving precise constraints on the absolute dimensions of all three bodies. The planet is comparable to Saturn in mass and size and is on a nearly circular 229-day orbit around its two parent stars. The eclipsing stars are 20 and 69% as massive as the Sun and have an eccentric 41-day orbit. The motions of all three bodies are confined to within 0.5° of a single plane, suggesting that the planet formed within a circumbinary disk.