

**Ay31**  
**Writing in Astronomy**  
**Spring 2019**

**Instructor: Prof. Andrew Howard**

**Class Meetings: Cahill 219**

**3-4pm Fridays**

**[astro.caltech.edu/~howard/ay31s19.html](http://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

e.g., ApJ, Nature, Science

research funding proposals

e.g., NSF, NASA, Private Donors

topical reviews

e.g., ApJ, ARAA, Nature, Science

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)

# Tentative Schedule

<u>Week</u>	<u>In Class</u>	<u>On your Own</u>
Week 1 - April 5	Introductory All-class meeting	
Week 2 - April 12	All-class meeting	
Week 3 - April 19	All-class meeting - <b>Outline due</b>	
Week 4	No class meeting	<b>Meet one-on-one with instructor to review outline</b>
Week 5 - May 3	All-class meeting - <b>First Draft due</b>	
Week 6	No class meeting	<b>Meet one-on-one with instructor to review first draft</b>
Week 7 - May 17	All-class meeting - <b>Second Draft due</b>	
Week 8	No class meeting	
Week 9	No class meeting	
Week 10	No class meeting - <b>Final Paper due Wed. June 5</b>	

# 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

1. Scientific Writing and Communication (Third Edition): 2017, Angelika Hofmann  
—helpful at all career stages

2. The Craft of Scientific Writing: 1996,  
Michael Alley  
— 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

# Common Questions

- Can I choose 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.

# Basics

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](mailto:ahoward@caltech.edu)) with above three points

Note: this class will explore possible choices and discuss presentation style

# Good Writing Example — An Abstract

## 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  $0.5^\circ$  of a single plane, suggesting that the planet formed within a circumbinary disk.