

# AST12700 - STARS (2020)

**Lectures Tu/Th 2:40-4:00pm (Chicago time, UTC-5)**

**Prof. Damiano Caprioli** (he/him/his)

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Office Hours: Tuesdays 10-11AM & Thursdays 5-6PM UTC-5

Elements such as carbon and oxygen are created in fusion reactions at high temperatures and pressures in the deep interiors of stars, conditions that naturally arise in stars like the Sun. This course will outline the physical principles at work and the history of the development of the key ideas: how nuclear physics and the theory of stellar interiors account for how stars shine, why they live for such long times, and how the heavy elements in their cores are dispersed to form a new generation of stars. Gravity assembles stars out of more diffuse material, a process that includes the formation of planetary systems. The course shows how, taken together, these physical processes naturally lead to the ingredients necessary for the emergence of life, namely elements like carbon, nitrogen, and oxygen, and planets in stable orbits around long-lived stars. The course features quantitative analysis of data; any tools needed beyond pre-calculus algebra will be taught as part of the course.

**Required Text:** Searching for the Oldest Stars, by Anna Frebel.

ISBN 976-0-691-16506-6 available in the Bookstore and Seminary Co-op

## Teaching Assistants:

- Clarke Esmerian, [cesmerian@uchicago.edu](mailto:cesmerian@uchicago.edu)
  - Zoom room: <https://uchicago.zoom.us/j/9481106198?pwd=UEdITEYyM1BoVnIwWmNtRmtIbnpRZz09>
  - Office Hour: Friday 10:30am-11:30am CDT
- Adina Feinstein (she/her), [afeinstein@uchicago.edu](mailto:afeinstein@uchicago.edu)
  - Zoom room: <https://uchicago.zoom.us/j/7080717933?pwd=NmFLbGQ2ZWtoUkVYMTZRMUNIM3ZPd09>
  - Office Hour: Tuesdays from 9-10am CDT
- Ian Holst, [holst@uchicago.edu](mailto:holst@uchicago.edu)
  - Zoom room: <https://uchicago.zoom.us/j/97908514796?pwd=QldZRiXNOMk8veDJEQGMzckNCVnVLdz09>
  - Office Hour: Wednesdays 1-2pm CDT

- Jazmine Jefferson (she/her), [jjefferson1111@uchicago.edu](mailto:jjefferson1111@uchicago.edu)
  - Zoom room: <https://uchicago.zoom.us/j/93008640342?pwd=MFZCVmlIMmJKZ1NwNy9ITmFFNkNtUT09>
  - Office Hour: Wednesday 10am-11am CDT

See also [Lab Syllabus](#) by: Brent Barker, teaching support manager for labs

## Goals (as in the course catalog):

1. To instill the confidence to be a life-long learner in areas involving numbers, scientific concepts, and technology;
2. To develop an ability to evaluate strengths and weaknesses of arguments based on the use of data, technical claims, and scientific theories;
3. To gain an understanding of the intellectual beauty of the subject, that is, understanding why some people devote their lives to the field;
4. To master at least one area in real depth.

## Format

Lectures will be delivered via Zoom. We will use interactive tools for real-time questions and assessments. Additional reading and homework will be assigned weekly.

*The default is synchronous attendance to lectures.* Slides will be posted on Canvas, along with extra materials and lecture videos for asynchronous learning, in order to limit the issues for students in (very) different time zones.

Please let Dr. Caprioli know if you anticipate having hard time following classes in real time.

The tools that will be used are (others may be added):

[Zoom.us](#): Web conferencing;

[Piazza.com](#): Virtual gathering place (piazza, pronounced “pyahttsah” = “place” in Italian) for sharing questions/answers. Rather than emailing questions to the teaching staff, we encourage you to post your questions -and search for answers- here (<https://piazza.com/class/kf9rtbmqzce459#>);

[PollEverywhere](#): Real-time question/poll interface. Links will be provided during classes.

Please mark your **attendance** as you enter the lecture (link will be provided). If you miss a lecture, please get any related material from Canvas and follow up with your TA about the key points.

# Assignments and Collaboration

Except when stated otherwise, assignments are due on **Friday at 5pm UTC-5**.

Group work on the assignments is encouraged. **Collaboration** is sharing of ideas, as you teach one another.

Each person must use *their own words in each submission*, and give credit to those who collaborated on the work (i.e., add the names of collaborators to each submission). Phrases that appear on multiple students' work will result in no credit and proportional disciplinary action. If we are concerned that what you turned in does not represent your own understanding, but rather someone else's, and thus represents plagiarism, then we may mark a zero for that lab report, a failing grade for the course, and file a student conduct complaint with the Dean of Students.

## Exams and Grades

The real-time exams will be:

- Midterm exam (**Thursday, Nov 5:** 2:40pm-4:00pm UTC-5)
- Final exam (**Tuesday, Dec 8:** 1:30pm-3:30pm UTC-5)

The final grade will be calculated as:

- 40%: Assignments
- 30%: Labs
- 20%: Final exam
- 10%: maximum between Midterm and Final score.

The **lowest assignment or lab score will be factored** out of the grade.

The grade of **assignments turned in late will be decreased by 10% per day**.

Example: if the deadline is Friday 5pm, the grade is reduced by 10% between Friday 5:01pm and Saturday 5pm, 20% between Saturday 5:01pm and Sunday 5pm, and so on).

## Feedback

We want to gather feedback from you about how the course is going for you, and how we might adapt it as we go. We welcome direct feedback to any of the contacts listed above. You can also submit anonymous feedback at the following link: <https://forms.gle/oRmnDNDBLygqfpot5>

## Accessibility

The University of Chicago is committed to ensuring equitable access to our academic programs and services. Students with disabilities who have been approved for the use of academic accommodations by Student Disability Services (SDS) and need a reasonable accommodation(s) to participate fully in this course should follow the procedures established by SDS for using accommodations. Timely notifications are required in order to ensure that your accommodations can be implemented. Please meet with me to discuss your access needs in this class after you have completed the SDS procedures for requesting accommodations. Phone: (773) 702-6000  
Email: [disabilities@uchicago.edu](mailto:disabilities@uchicago.edu)

## Recording and Deletion Policies

The Recording and Deletion Policies for the current academic year can be found in the Student Manual under [Petitions, Audio & Video Recording on Campus](#).

- Do not record, share, or disseminate any course sessions, videos, transcripts, audio, or chats.
- Do not share links for the course to those not currently enrolled.
- Any Zoom cloud recordings will be automatically deleted 90 days after the completion of the recording.