

G457 / G557 Frontiers in Planetary Science

Fall 2026

CRN 13760 (G457) / CRN 13759 (G557)

MW 13:30-15:10

Location:

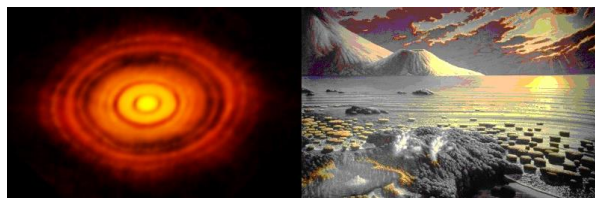
Portland State University

Building & room CH S17

Canvas: <https://canvas.pdx.edu>

Course web page:

<https://web.pdx.edu/~ruzickaa/frontiers/index.html>



Instructor: Alex Ruzicka (ruzickaa@pdx.edu), office CH46/S7

Course Description: This course will focus on areas of active research in the planetary sciences on topics that have not yet made it into the Textbooks. As appropriate for these topics, content will range widely, including aspects of astronomy, geology, and climate. Students will prepare presentations based on one or more research papers. The overriding objectives will be for students to become familiar with current planetary science research; to appropriately engage with their peers and instructor on these topics; and to present suitable content on a topic of their choice.

This version of the course has in-person format, where class activities are integral to learning. Content will be provided through the Canvas learning platform, which can be accessed by using a PSU login at the web address given above.

Outcomes: At the end of this course, students will be able to:

- recognize and interpret current knowledge in planetary science;
- appraise important points from scholarly research papers;
- identify and discuss the main points in scholarly papers sufficiently and/or identify gaps in their understanding of these scholarly papers;
- create a substantive presentation on a topical research area and present it to the class;
- and **for graduate students only**, to plan, organize, and execute a class discussion.

Text: None. Content will be delivered through Canvas and in-class activities.

Exams: None.

Weekly meetings: Two meetings occur each week, in which the instructor will lead a class discussion on one or more research papers. Participation points (attendance and engagement in discussions) will be assigned to students for these meetings.

Homework: To help facilitate readings, homework problems will be assigned for each class. Homework will consist of a very limited number of questions on each paper that is read and discussed. They will be graded on a “check” system (0, check-minus, check, check-plus). These will be due at the start of the class (1:30) on the day the homework is due. Homework can be either turned in at the start of class, emailed to Dr. Ruzicka, or left in Dr. Ruzicka’s mailbox in CH17.

Discussion lead (for G557 students only): Students enrolled for graduate credit will be asked to lead one of the class discussions.

Presentations: Students will prepare a Powerpoint presentation on a topic of their choice and present it to the class. These should be based on one or more research papers and the topics need to be approved in advance by Dr. Ruzicka. Presentations will occur in Weeks 9 and 10 and will take the place of a Final.

Other policies: (a) If you feel you have a disability and need an accommodation, contact the Disability Resource Center (drc@pdx.edu, 503-725-4150). (b) Each student is responsible for all the content covered online and in the weekly meetings. (c) A culture of professionalism and mutual respect is expected. Any incident of discrimination or discriminatory harassment, including sexual harassment, can be reported to the Office of Equity and Compliance, or the Office of the Dean of Student Life. For resources, see <http://www.pdx.edu/sexual-assault/get-help>. The instructor is obligated to report incidents of discrimination, sexual harassment, sexual assault, dating/domestic violence and stalking to the University Title IX Coordinator. (d) Students are expected to follow PSU policies for academic integrity, which means not engaging in academic misconduct; see <https://www.pdx.edu/dos/academic-misconduct>. Examples of misconduct include cheating on an exam, copying someone else's work, submitting for credit work done by someone else, or knowingly and intentionally assisting another student in any of the above. (e) A.I. use is discouraged for any submitted assignment. Students will be evaluated based on the content of papers and judgment of the instructor, not by anything else external to the course, including an A.I.

Grades: Grading is done on a straight scale although curves will be used at my discretion. Grades will be assigned based on scores as follows: 95% or above = A, 90-94.99% = A-, 87-89.99% = B+, 83-86.99% = B, 80-82.99% = B-, 77-79.99% = C+, 73-76.99% = C, 70-72.99% = C-, 67-69.99% = D+, 63-66.99% = D, 60-62.99% = D-, less than 60% = F. I generally do not give "I" grades. This class can be taken Pass/No Pass. If you elect to change your grading option, please inform me in writing. Letter grades will correspond to the standards given in the PSU course catalog.

G457 grades will be determined from performances on:

Class attendance.....	10%
Homework.....	40%
Class discussion engagement.....	40%
Presentation.....	10%

G557 grades will be determined from performances on:

Class attendance.....	10%
Homework.....	30%
Class discussion engagement.....	40%
Presentation.....	10%
Discussion lead.....	10%

TENTATIVE COURSE OUTLINE (see course website and Canvas for changes)

Italicized are longer papers, all others are quite short. HW = homework.

Week / topic	Monday Class1	Wednesday Class2
1 / protoplanetary disks	Sept 28 – intro to class	Sept 30 – Andrews et al. (2018), Fachini et al. (2024), Speedie et al. (2024) HW1 due
2 / solar nebula & exoplanets	Oct 5 – Russell (2018), Taylor (2017), Izidoro et al. (2022) HW2 due	Oct 7 – Winn and Fabrycky (2015) HW3 due
3 / magma oceans & Earth history	Oct 12 – Taylor (2022), <i>Borg and Carlson (2023)</i> HW4 due	Oct 14 – <i>Carlson et al. (2014)</i> HW5 due
4 / Earth plate tectonics & Archean cratons	Oct 19 – <i>Brown et al. (2020)</i> HW6 due	Oct 21 – <i>Pearson et al. (2021)</i> , Hansen (2024) HW7 due

5 / Asteroid breakup & Mars rover missions	Oct 26 – Schmitz et al. (2019), Tomkins et al. (2024) HW8 due	Oct 28 – Grotzinger et al. (2015), Kah et al. (2015), Mahaffy et al. (2015) HW9 due
6 / Titan & Io*	Nov 2 – <i>Hayes (2016)</i> HW10 due	Nov 4* – Davies & Vorburger (2022), Keszthelyi et al. (2022), Matsuyama et al. (2022) HW11 due
7 / Mercury*	Nov 9* – Cartier & Wood (2019), Nittler & Weider (2019), Charlier & Namur (2019) HW12 due	Nov 11 – NO CLASS, Veteran's Day
8 / Pluto* & Habitability	Nov 16* – <i>Moore & McKinnon (2021)</i> HW13 due	Nov 18 – <i>Lineweaver & Chopra (2012)</i> , Komacek et al. (2021) HW14 due
9 / Habitability	Nov 23 – Grasby & Bond (2023), Hoffman & Schrag (2000), Macdonald & Swanson-Hysell (2023) HW15 due	Nov 25 – presentations (if needed)
10	Nov 30 – presentations	Dec 2 – presentations
FINALS	No Final for this course!	

***Topics/dates eligible for G557 students to present & lead**

ACKNOWLEDGMENT OF SYLLABUS RECEIPT:

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CRN 13760 (G457) / CRN 13759 (G557)

I have received a copy of the course syllabus for this class, and the instructor has discussed the contents of this syllabus. By signing this form, I have been marked as a participant in this class (participation is now a formal requirement for PSU).

NAME (please print)

Last First MI

Signature: _____

Date: _____

An email address where you can be reached: _____

Have you had any previous Geology classes (not required!). If so, what and where?

What field are you majoring (planning to major, have you majored) in?

Why did you choose to take this particular class?