CEE 179S/279S—Seminar: Issues in Environmental Engineering, Science and Sustainability

Seminars from leading faculty and researchers covering a broad range of important issues of the day.

Meets: Thursdays, 430 to 530PM, Shriram 104 & a discussion hour time and place to be determined (probably in Shriram 104 following the seminar)

Instructor: Sandy Robertson, Y2E2 Room B-23, Office hours: Monday 3:30-5PM & by appointment sandrob@stanford.edu

TA: Benjamin Kranner; bkranner@stanford.edu Office Hours by appointment

Seminar Schedule

June 29	***Poisoned Water***; *NOVA documentary, 2017*
July 6	***Assessing Risks and Opportunities in a Changing Climate***; *Katharine Mach*; Director, Stanford Environment Assessment Facility
July 13	***Tales from the Interface: Fun with Fluid Mechanics and Biology***; *Jeff Koseff*; Professor, Stanford Department of Civil & Environmental Engineering
July 20	***How Cutting Greenhouse Gas Emissions Improves Our Water, Air, and Health***, *Rob Jackson*; Chair Stanford Department of Earth System Science
July 27	***Agricultural Expansion and Tropical Deforestation: Exploring the Causes and Impacts;*** *Elsa Ordway*; Ph.D. student Environmental Earth System Science, Stanford
August 3	***Dam Infrastructure & Safety in the U.S. - Post-Oroville; A Stanford Perspective***; *Martin McCann*; Adjunct Professor Stanford Department of Civil & Environmental Engineering
August 10	***The Ideal and the Real with Regard to Environmental Collaboration: A Political Science Perspective***; *Bruce Cain*; Professor, Stanford Department of Political Science
August 17	***The California Water System and its Transition into the 21st Century***; *Newsha Ajami*; Director of Urban Water Policy, Water in the West, Stanford

Course Requirements

For 1 unit—Attend 7 seminars. Write a 1 page critique for each of 2 of the seminars and, for 2 other seminars participate in the discussion session for the seminar.

For 2 units—complete 1 unit requirements; give a 15 minute presentation on an environmental or sustainability topic of the student's choosing.

Seminar attendance: To get attendance credit for any given seminar students need to sign in and **must** refrain from using **any and all** electronic devices (phones, tablets, laptops, etc.) during the presentation. If an electronic device is **on the desk** in front of you or **in your hands** you will be assumed to be using the device and will not receive attendance credit.

Critiques: Single spaced, 12 point font, one inch margins; roughly 1 page (~500 words). Critiques may include a brief (2 or 3 sentences) review of what was covered in the talk (and associated readings), but the primary focus should be on your thoughts on, and reactions to, what was presented and/or what you read. Topics you might cover include:

a. Were your beliefs/understandings confirmed/contradicted?
b. Were the arguments, figures, tables, etc. well constructed, convincing?
c. Did the talk and paper complement each other; were the viewpoints contradictory?

Critiques are due on the Thursday following the talk covered in the critique. Students may give Dr. Robertson a hard copy or email him an electronic version.

Discussion sessions—There will be a (roughly) one hour discussion section each week on the week's seminar. The time and place for the discussions will be determined at the first meeting of the class. It is likely that the session will occur immediately following the lecture

Presentation: Student identifies a sustainability/environmental topic of interest; builds an understanding of the topic, and, during the last week of classes (at a time and place to be determined, gives a 15 minute oral presentation on what (s)he has learned. The student will discuss the proposed topic with Dr Robertson on or before July 21st. On or before August 4th the student will discuss what (s)he has learned to date, planned approach, and references to be used.

Readings

There will typically be one or more readings listed for each seminar. You should read at least one of each week's readings prior to the seminar.

For many of the readings you will be given a URL where you can access the reading (for some of the readings you must be on Stanford's internet system). For others go to Canvas and download them from the appropriate folder inside of "Readings".

Week 1-- Poisoned Water

Scientific American Corrosion video
https://www.scientificamerican.com/video/corrosive-chemistry-how-lead-ended-up-in-flint-s-drinking-water1/

Chemical & Egineering News--*How Lead Ended Up In Flint's Tap Water*
http://cen.acs.org/articles/94/i7/Lead-Ended-Flints-Tap-Water.html

New York Times—Events & Timeline Flint Water Crisis
https://www.nytimes.com/aponline/2017/06/14/us/ap-us-flint-water-timeline.html

https://www.nytimes.com/interactive/2016/01/21/us/flint-lead-water-timeline.html

New York Times—Criminal charges
June 2017
https://www.nytimes.com/2017/06/14/us/flint-water-crisis-manslaughter.html

December 2016
https://www.nytimes.com/2016/12/20/us/flint-water-charges.html?action=click&contentCollection=U.S.&module=RelatedCoverage&region=Marginalia&pgtype=article

Week 2-- Assessing Risks and Opportunities in a Changing Climate

Field, C & Mach, K., 2017. *Rightsizing carbon dioxide removal*. Science, 356, p. 706
http://science.sciencemag.org/content/356/6339/706

Hino, M. et al., 2017. *Managed retreat as a response to natural hazard risk*. Nature Climate Change 7, p. 364
https://www.nature.com/nclimate/journal/v7/n5/full/nclimate3252.html

Hallegatte, S. & Mach, K., 2016. *Make climate-change assessments more relevant*. Nature, 534, p. 613
https://www.nature.com/news/make-climate-change-assessments-more-relevant-1.20155

Mach, K., et al., 2016. *A multistage crucible of revision and approval shapes IPCC policymaker summaries*. Science Advances, 2(8), 11p.
http://advances.sciencemag.org/content/2/8/e1600421/tab-pdf

Week 3-- Tales from the Interface: Fun with Fluid Mechanics and Biology

John P Crimaldi , Megan B Wiley & Jeffrey R Koseff. 2002. *The relationship between mean and instantaneous structure in turbulent passive scalar plumes*. Journal of Turbulence, Volume 3
http://www.tandfonline.com/doi/abs/10.1088/1468-5248/3/1/014

C. A. O'Riordan, S. G. Monismith and J. R. Koseff. 1993. *A Study of Concentration Boundary-Layer Formation Over a Bed of Model Bivalves*. Limnology and Oceanography. 38(8), 1712.
http://www.jstor.org/stable/2838447?seq=1#page_scan_tab_contents

Matthew A. Reidenbach, Jeffrey R. Koseff, Stephen G. Monismith, Jonah V. Steinbuckc, Amatzia Genin, 2006. *The effects of waves and morphology on mass transfer within branched reef corals*. Limnology and Oceanography. 51(2), 1134.
http://onlinelibrary.wiley.com/doi/10.4319/lo.2006.51.2.1134/abstract;jsessionid=F1BE7D0CD475F56B979AF816229C198F.f02t02

Week 4—How Cutting Greenhouse Gas Emissions Improves Our Water, Air, and Health

Jackson. R., 2017. *Forget about Climate Change*, Scientific American—video/blog
https://blogs.scientificamerican.com/guest-blog/forget-about-climate-change/

Jackson, R., et al., 2016. *Reaching Peak Emissions*. Nature Climate Change, 6, 7
https://www.nature.com/nclimate/journal/v6/n1/full/nclimate2892.html

Gallagher, M., et al., 2015. *Natural Gas Pipeline Replacement Programs Reduce Methane Leaks and Improve Consumer Safety*. Environ. Sci. Technol. Lett., , 2 (10), 286
http://pubs.acs.org/doi/abs/10.1021/acs.estlett.5b00213

Week 5— Agricultural Expansion and Tropical Deforestation: Exploring the Causes and Impacts

Gibbs, H.K., Ruesch, A.S., Achard, F., Clayton, M.K., Holmgren, P., Ramankutty, N. and Foley, J.A., 2010. *Tropical forests were the primary sources of new agricultural land in the 1980s and 1990*s. Proceedings of the National Academy of Sciences, 107(38), pp.16732-16737.

http://www.pnas.org/content/107/38/16732

2. Tabuchi,H., Rigby, C., and White, J. *Amazon deforestation, once tamed, comes roaring back*. New York Times, 24 Feb. 2017 https://www.nytimes.com/2017/02/24/business/energy-environment/deforestation-brazil-bolivia-south-america.html?mcubz=0&_r=1

3. Henders, S., Persson, U.M. and Kastner, T., 2015. *Trading forests: land-use change and carbon emissions embodied in production and exports of forest-risk commodities*. Environmental Research Letters, 10(12), p.125012. http://iopscience.iop.org/article/10.1088/1748-9326/10/12/125012/meta;jsessionid=9E0FA57B4A1171E795AEB9185D42F8B9.c1.iopscience.cld.iop.org

4. Robbins,J. Deforestation and drought. New York Times, 9 Oct. 2015 https://www.nytimes.com/2015/10/11/opinion/sunday/deforestation-and-drought.html?mcubz=0

Week 6— TBA

Week 7— The Ideal and the Real with Regard to Environmental Collaboration: A Political Science Perspective

Will provide handouts

Week 8— The California Water System and its Transition into the 21st Century

California Water 101:
http://www.watereducation.org/photo-gallery/california-water-101

California's Water:
http://www.ppic.org/content/pubs/report/R_1016WPCBKR.pdf

The Path to Water Innovation:
https://woods.stanford.edu/sites/default/files/files/path_to_water_innovation_thompson_paper_final.pdf