

## **OLLI West Winter Term,**

### **DETAILED Syllabus – revised 2/13/2019**

Please go to [http://denverclimatesstudygroup.com/?page\\_id=24](http://denverclimatesstudygroup.com/?page_id=24) for revisions/updates

## **Earth's Climate: Past, Present and Future; Concerns and Solutions**

### **Wednesdays 1:00 - 3:00 from Jan 23<sup>rd</sup> - Mar 13<sup>th</sup>, 2019**

**Facilitator:** Paul Belanger: [pebelanger@glassdesignresources.com](mailto:pebelanger@glassdesignresources.com); 303-249-7966

If you are unable to attend the first session, please notify the facilitator by email or phone.

**Classroom Assistant:** TBD

**Course description – 4<sup>th</sup> time:** go to [http://denverclimatesstudygroup.com/?page\\_id=24](http://denverclimatesstudygroup.com/?page_id=24)

- to find UPDATED class description from this version (it will be labeled “updated”)
- references,
- links
- and the slides and weekly updates as we go along

**Class Type:** Illustrated Lectures/Discussion

I used to lead a field trip to National Ice Core Lab located at USGS in Lakewood, <http://icecores.org/>. Due to distance I can only offer coordination with the facility for those interested on a non-class day – see me first class day.

**Materials Fee:** None

**Strongly recommended reading:** read or be familiar with concepts presented in the following book:

*What We Know About Climate Change* by Kerry Emanuel, 2nd Edition 2012, 120 pages — An outline of the basic science of global warming and how current consensus has emerged.

#### **1. Wednesday 1-3, January 23<sup>rd</sup> :**

##### **Introduction/Key principles of climate change**

- The difference between weather and climate
- Climate system: feedbacks, cycles and self-regulation (climate, not government)
- What determines Earth's climate
- Might start Earth's past and finish next week

#### **2. Wednesday 1-3, January 30<sup>th</sup>:**

##### **Earth's past**

- Earth's deep past before the Cambrian (600 MaBP): hot and cold
- Earth's past: Cambrian onward: mostly hot-house Earth; 100s to 1000s parts per million (ppm)
- Climate trend in the Cenozoic – the last 65 million years; proxy data from 3600ppm to <200 ppm.
- More recent past: 180-280 part per million; how do we know – empirical data. Preview of next week's field trip

- Today: 410 ppm and growing ~3ppm/year

**3. Wednesday 1-3, February 6<sup>th</sup>:**

**Earths present and future - ocean acidification, rates of change & modeling**

- Recap climate variables; proxies
- Rates of change: analogs and various comparisons to the past
- Ocean Acidification
- IPCC Fifth Assessment report (AR5): <http://www.ipcc.ch/report/ar5/>
- The Pope's encyclical: google it or go here [http://denverclimatesstudygroup.com/wp-content/uploads/2014/10/2015.05.24-papa-francesco\\_20150524\\_enciclica-laudo-si.pdf](http://denverclimatesstudygroup.com/wp-content/uploads/2014/10/2015.05.24-papa-francesco_20150524_enciclica-laudo-si.pdf)
- other links - see email
- 20 minutes of NOVA "Decoding the Weather Machine"

**4. Wednesday 1-3, February 13<sup>th</sup>:**

- Models, physics and what do they tell us
- Skepticism vs. Denial:
  - i. 5 Characteristics
  - ii. List of videos that might be useful:  
<https://skepticalscience.com/denial101x-videos-and-references.html>
  - iii. Denial 101x: here's a link to a newly available self-paced version of the course I took in April and May: <https://www.edx.org/course/making-sense-of-climate-science-denial-2>
- Industry statements past and present
- Ice coring – see next week list if time permits

**5. Wednesday 1-3, February 20<sup>th</sup>:**

- Antarctic ice cores
- Arctic Ice cores
- What the data tells us

**Solutions Part A: – start of discussion onward (see below)**

**6. Wednesday 1-3, February 27<sup>th</sup>:**

A work in progress – how can we achieve solutions needed

**Solutions Part A (continued):**

- Climate Intervention Proposals aka Geoengineering:
  - Solar Radiation Management (SRM)
  - and Carbon Dioxide Removal (CDR)
- Economics:
  - economics of doing nothing vs. the economics of mitigation: Lomborg, Stern, Nordhaus
- **Game changers for taking Carbon out of the atmosphere:** existing technologies/promise, but at what cost? (One might be surprised).
- Biochar vs. BECCS solutions

**7. Wednesday 1-3, March 6<sup>th</sup>:**

Welcome to the Anthropocene

**Guest speaker, Bob Raynolds: The Anthropocene**

## **8. Wednesday 1-3, March 13<sup>th</sup>: Solutions, part B; conclusion**

- It's not about climate change as much as sustainability
  - **Game changers: Energy solutions**
  - Urban heat islands
  - Food security
  - Population growth; potential refugee issue of climate change
  - Your carbon footprint; what can YOU DO
  - Wrap-up
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### **Books/Materials:**

- 1) see above for strongly recommended read before class---easy read
- 2) Other Optional reading – see suggestions at bottom of the OLLI page I have for y'all at  
[http://denverclimatesstudygroup.com/?page\\_id=24](http://denverclimatesstudygroup.com/?page_id=24)

*Don't Even Think About It: Why Our Brains are Wired to Ignore Climate Change* by George Marshall 2014, 272 pages. Both available from Amazon, Barnes & Noble, Tattered Cover in book, e-book, or audible forms.

- 3) Slides, links, and additional resources posted on the OLLI class link at  
<http://www.denverclimatesstudygroup.com/>.

- 4) Handouts

### **Websites on climate change:**

- <http://www.skepticalscience.com/>
- <http://www.realclimate.org/>
- **The difference between Weather vs. climate:**  
[https://www.nasa.gov/mission\\_pages/noaa-n/climate/climate\\_weather.html](https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html)
- **Difference between Climate change and global warming:**
- <https://www.skepticalscience.com/climate-change-global-warming.htm> with this video: <https://youtu.be/HAF9jl6fupA>
- Full list of videos you may wish to review at your leisure:  
<http://www.skepticalscience.com/denial101x-videos-and-references.html>

Some links I'd like you to investigate:

- <http://www.nybooks.com/articles/archives/2015/jun/04/new-solution-climate-club/> and
- <http://carbon-price.com/wp-content/uploads/2015-01-04-Nordhaus-ClimateClubAEA-v2-slides.pdf> (30 slides, Jan, 2015)
- <http://citizensclimatelobby.org/>

and others that I'll be updating on class web page

### **Mike Nelson links:**

**About Mike Nelson** <https://cires.colorado.edu/events/creative-climate-communications-7news-mike-nelson>