

# PHY 495 - Physics Seminar

M 3:30-6:15pm

Instructor: Dr. Dylan McNamara

Office: DL 211

Office Phone: (910) 962-2588

Email: [mcnamarad@uncw.edu](mailto:mcnamarad@uncw.edu)

Office Hours: M/W – 10-11am.

## TOPIC SCHEDULE

- Reading science
- Writing science
- Listening to science
- Speaking science

## COURSE ASSIGNMENTS

- Assignments (20% of grade)
- Poster Presentation (40% of grade)
- Final Paper (40% of grade)

## GRADING SCALE

90% - 100% A

80% - 89% B

70% - 79% C

60% - 69% D

Below 60% F

# Science exists because...

...scientists are writers and speakers

- What it takes to learn a skill - “Ishi no ue ni, san nen”
- Have you ever read Newton? Feynman?
- Rules to follow?
- Good and Bad models
- Simplify to the  $n^{\text{th}}$  degree - BORING!
- Journal article
  - Proposal
  - Book
  - Speaking

# READING SCIENCE

## GENERAL SCIENCE JOURNALS IMPACT FACTORS

There are only a handful of general science journals. Britain and the United States founded Nature and Science, and their respective science academies issue their proceedings.

Nature 38.597 (2012)

Nature communications 10.015 (2012)

Scientific Reports 2.927 (2012)

Scientific American 1.478 (2012)

Proceedings of the National Academy of Sciences 9.737 (2012)

Proceedings of the Royal Society

A: Mathematical, Physical and Engineering Sciences 2.378 (2012)

B: Biological Sciences 5.683 (2012)

Science 31.030 (2012)

# READING SCIENCE

## PHYSICS JOURNALS IMPACT FACTORS

Nature Physics 19.352 (2012)

Physical Review Letter 7.943 (2012)

Physical Review (2012):

A: 3.042

B: 3.767

C: 3.715

D: 4.691

E: 2.313

## PHYS OC JOURNALS IMPACT FACTORS

Journal of Fluid Mechanics 2.82 (2016)

Journal of Physical Oceanography 2.345 (2011)

Geophys. Research Letters 4.253 (2016)

# History

1672: In the year 1666...I procured me a triangular glass prism to try therewith the celebrated phenomena of colors...It was at first a very pleasing divertissement, to view the vivid and intense colors produced thereby; but after a while...I became surprised to see them in an oblong form; which, according to the received laws of refraction, I expected should have been circular

1760: Beside the horizontal division of the earth into strata, these strata are again divided and shattered by many perpendicular fissures, which are in some places few and narrow, but oftentimes many and of considerable width. There are also many instances, where a particular strata shall have almost no fissures at all, though the strata both above and below it are considerably broken: this happens frequently in clay, probably on account of the softness of it.

# History

1868: The extent to which a country suffers denudation at the present time is to be measured by the amount of mineral matter removed from its surface and carried into the sea. An attentive examination of this subject is calculated to throw some light on the vexed question of the origin of valleys and also on the value of geologic time

1965: In arid climates the rocks exposed to the blazing sun become intensely heated, and in consequence a thin outer shell expands and tends to pull away from the cooler layer a few centimeters within. Under perfectly dry conditions, however, the stresses so developed are insufficient to fracture fresh, massive rocks. Experiments leave no doubt about this.

2014: Ancient saline fracture waters in the Precambrian continental subsurface, with groundwater residence times ranging from millions to billions of years, provide a previously underestimated source of H<sub>2</sub> for the terrestrial deep biosphere. Until now, little of the information on H<sub>2</sub> in these settings, accessed via underground research laboratories and mines, has been incorporated into global geochemical and biogeochemical models.

# History

- Modern Scientific Writing: Bacon, Boyle, Newton, Royal Society.
- From the Royal Society: Who can behold, without indignation, how many mists and uncertainties, these specious tropes and figures have brought on our knowledge?...We of the Society have therefore been more rigorous in putting in execution the only remedy that can be found for this extravagance;...to reject all the amplification, digressions, and swellings of style; to return back to the primitive purity and shortness...to a close, naked, natural way of speaking...to bring all things as near the mathematical plainness as they can; and preferring the language of artisans, countrymen, and merchants, before that of wits, or scholars.
- *Transactions of the Royal Society* - published lectures

# History

- Note the transition in the actor in the story for rhetorical purposes

1775: I cannot, at the distance of time, recollect what it was that I had in view in making this experiment; but I know I had no expectation of the real issue of it...If, however, I had not happened...to have had a lighted candle before me, I should probably never have made the trial.

1903: The results of the investigation of radio-active minerals...led M. Curie and myself to endeavor to extract a new radio-active body from pitchblende. Our method of procedure could only be based on radio-activity, as we know of no other property of the hypothetical substance. The following is the method pursued for a research based on this property.

1999: We first searched for neurons exhibiting a relatively high rate of spontaneous activity when the animal's eyes were closed. Next we characterized the orientation tuning properties of these neurons and selected the neurons with sharp tuning preference and robust response. We chose orientation tuning...because the majority of neurons in cat striate cortex are tuned for the orientation of bars or gratings.



# Rhetoric

- The tools of scientific rhetoric
  - What did you do?
  - Why did you do it?
  - How did you do it?
  - What did you find?
  - What does it mean?

# Models

- Assignment #1: Find a paper you like and find one you do not like. Bring to next meeting.