Astronomy 330

HW#9 due tonight.

Next Week Presentations:

Ryan Olliqes & Elias Kontos

Music: *Center of the Universe*- The Spills

Online ICES

- ICES forms are available online.
- I appreciate you filling them out!
- Please make sure to leave written comments. I find these comments the most useful, and typically that's where I make the most changes to the course.

Presentations

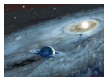
- **Emily Hayes & Dan Carson**: Extraterrestrial Depiction in Today's Society
- **Kevin DeHoff:** Interstellar Space Travel

Drake Equation

That's 4.2 Communicating life/century

Frank Drake








$$N = R_* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$$

N	R_*	f_p	n_e	f_l	f_i	f_c	L
# of advanced civilizations we can contact in our Galaxy today	Star formation rate	Fraction of stars with planets	# of Earthlike planets per system	Fraction on which life arises	Fraction that evolve intelligence	Fraction that commun-icate	Lifetime of advanced civilizations
	9 stars/ yr	0.29 systems/ star	1.03 x 0.22 = 0.23 planets/ system	0.46 life/ planet	0.3 intel./ life	0.52 comm./ intel.	yrs/ comm.

L-ing it

- We are talking about the amount of time that an advanced civilization (averaged over time) can communicate.
  - They may not want to for long periods of time
  - They may give up
  - They may be killed off
  - They may run out of resources
- Solving our energy problem (cheap energy) will give the largest lifetimes.

What is L?

- How long on **average** can an advanced civilization exist?
- Again, we only have a sample of 1 from which to discuss. What is our civilization's lifetime?
  - Short Term (100-1000 yrs)
    - Give up on communication due to budgets.
    - Depletion of resources.
    - Population.
    - War.
  - Long Term (10^5 to 5 x 10^9 yrs– age of galaxy is 10^{10} yrs and we took half of that to evolve)
    - Stellar Evolution.
  - Don't forget the random volcano, asteroid, or supernova.
  - Still in many cases an advanced civilization may be prepared for many of the issues!