Life in the Universe FS18: Topics for Students' Presentations

- Problems in long distance (human) space travel
  - New propulsion technologies (S. Galli)
  - Social aspects?
  - life in zero-gravity (J. Tranquillo)
  - communication

- Prospects for long-term human missions within the Solar systems:
  - Elon Musk's plan to send humans to Mars (F. Blanckarts)
  - What would be the point of a lunar base?

- Testing extra-terrestrial habitats on Earth (L. Forgione)
  - NEEMO, Mars500, Desert RATS experiments

- Future (and proposed) space missions and/or observational facilities to look for life-/bio- signatures:
  - On Europa (K. Nesterov)
  - on Exo-planets

- Solar-system bodies as potentially life-bearing systems:
  - Europa (G. Pompanin)
  - Titan (F. Menti)
  - Enceladus (T. Looser)
  - Mars

- Experiments to search for Life on Mars:
  - Past and present (Viking missions to now) (J. den Brok)
  - Martian meteorites (ALH-64?) 20 years on, include possibly media response at the time to idea of evidence for extraterrestrial life
  - Future in situ experiments on Mars (A. Glücksmann)

- SETI projects (S. Giacomuzzi) :
  - Breakthrough Listen
  - SETI@Home
  - What are the fundamental assumptions behind SETI experiments, and what do they imply (i.e., similar to Drake Eq.)

- Summary of what is known about the exosolar asteroid ('Oumuamua) (B. Strittmatter)

- How good is the evidence for an asymmetry of left- and right- handed organic molecules in nature and where could such an asymmetry come from? (T. Gavaliatsis)

- General physical/planetary processes in the context of life:

    - Terrestrial impacts as a driver of evolutionary change in terrestrial Life vs. other causes of mass extinctions. (A. Pastré)
    - How dynamically stable are planetary systems - our own and in general? what are the implications (c.f. Drake Eq. etc)

- The Earth as a "life-in-the-universe" benchmark: (K. Součková)
    - Extremophiles on Earth
    - Exo-planetary bio-signatures in the Earth atmosphere

- Read and critique "The Black Cloud" by Fred Hoyle (or another similar book) (D. Soyuer)

- Panspermia (T. Dressler)

Students' ideas:

- Fermi's Paradox
    - Why is there no observation of non-terrestrial life?
    - Simulation argument and other things
    - What could be a reason for civilisations to fail?
        - Mainly "why have they not been here?" (travel? conversation?) (J. Goelff)
        - another topic: "GRBs and SNe as a threat to life" (Piran paper etc)(D. Bach)

- Life in possible parallel universes (M. Nicoli)
    - effect of changing fundamental constants (perhaps "Just Six Numbers" by M. Rees). Must go beyond what is said in the classroom.

- Building construction on Mars (B. Schranz)

- [Exosolar] asteroids As water-transport mechanisms? solar-system sample return missions? prospects for detection?
- RNA-world hypothesis (A. Wulff)
- Danger of Radiation (M. Pfitzer)