Seminar Topics

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Three Groups

- Philosophy of Science
- Good Scientific Practice
- Emergence / Communication

Philosophy of Science

- Read the wikipedia page on “Laplace’s demon”. Present and discuss the concept to your peers.
- Present a historic philosophy of science (e.g., ancient Greek, Roman, Medieval, etc.)
- Present the philosophy of science from a classical culture (old Chinese, classical Arabic, Maia/Inca, Inuit, Proto-Indo, etc.)
- Read the paper

  “I. F. Sbalzarini, A. Mezzacasa, A. Helenius, and P. Koumoutsakos. Effects of Organelle Shape on Fluorescence Recovery after Photobleaching, Biophysical Journal 89(3) 1482-1492, 2005.”

  and discuss why and where models and simulations were used. What structural properties of the system prompted their use?
- Find examples of scientific institutions were historic inventions and break-throughs were made. Discuss and compare their working atmosphere.
- Present your expectations how work in science is different or similar to work in industry and in arts. Try find concrete examples.
- What is the difference between how knowledge is discovered and how it is acquired/learned? How can one help the other?
- Discuss the physical limits of computation (Bremermann Limit and related concepts) and provide examples.

Good Scientific Practice

- Discuss and compare different measures of scientific productivity and bibliography. What are their pros and cons? What do they actually measure?
- Read the “Guidelines for Safeguarding Good Scientific Practice” of TU Dresden and discuss their contents. What do you think of them? What are they inspired by?
- How would you judge the quality of a scientist if you were in an evaluation panel? Propose ways and argue for them.
- Find cases of confirmed scientific misconduct in the news/media archives online and present some of them. Discuss their severity and judge the appropriateness of the measures taken.
- Find cases of alleged abuse/mobbing in science in the news/media archives online and present some of them. Discuss their severity and judge the appropriateness of the measures taken.
- Present examples of situations from academic life (student - teacher situations, project team situations, etc.) that could be critical and explain different possible behaviors
- Take a paper from the internet that uses or presents software and discuss/analyze how it does that. Is there anything to be improved?

Emergence/Communication

- Discuss disciplinary differences in what constitutes an invention. Include concrete examples.
- Present examples of interrelations between realizations, explanations, and design.
- Which parts of discovery do you think can be automated using data mining or machine intelligence? Which not? Why?
- Discuss the concept of creativity. What does it emerge from? What does it enable in science? What social and organizational measures foster it?
- The classification of emerging phenomena is not fixed and depends on our state of knowledge and understanding. Present examples where novel insight has led to class shifts in history.
- Present examples of emergence of different types and discuss why you classified them that way
- Take a scientific paper from the internet and discuss the structure and architecture of its text, in particular of the introduction
- Take a scientific paper from the internet and analyze its literature list. Is anything missing? Are the cited examples good?