Scientific methodology

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A lecture course to be delivered in January 2024

(in-person, IPC PAS)
- registration not required -

Summary:
1. Observation
2. Question
3. Hypothesis (special correlations/causes vs effects)
4. Experiment (verification/falsification)
5. Data analysis (numbers)
6. Conclusions
7. Communication

Experiment (must be)
1. Planning of experiments
2. Estimation of relevant parameters (numbers)
3. Blank samples
4. Control experiments
5. Calibration
6. Repetition of previous experiments or gold standard experiments
7. Careful preparation of samples
8. Repeatability/reproducibility of experiments
9. Error estimates (precision, accuracy, human errors)

Common errors in scientific methodology
- in questions/hypothesis/planning/experiments/error estimates/conclusions and communication.

The exam: take any of the above points and present it in front of all taking as an example your research (10-15 minutes presentation). Tell a story about a mistake in scientific methodology and how you found it and removed it.