Class 8: stats review & common errors

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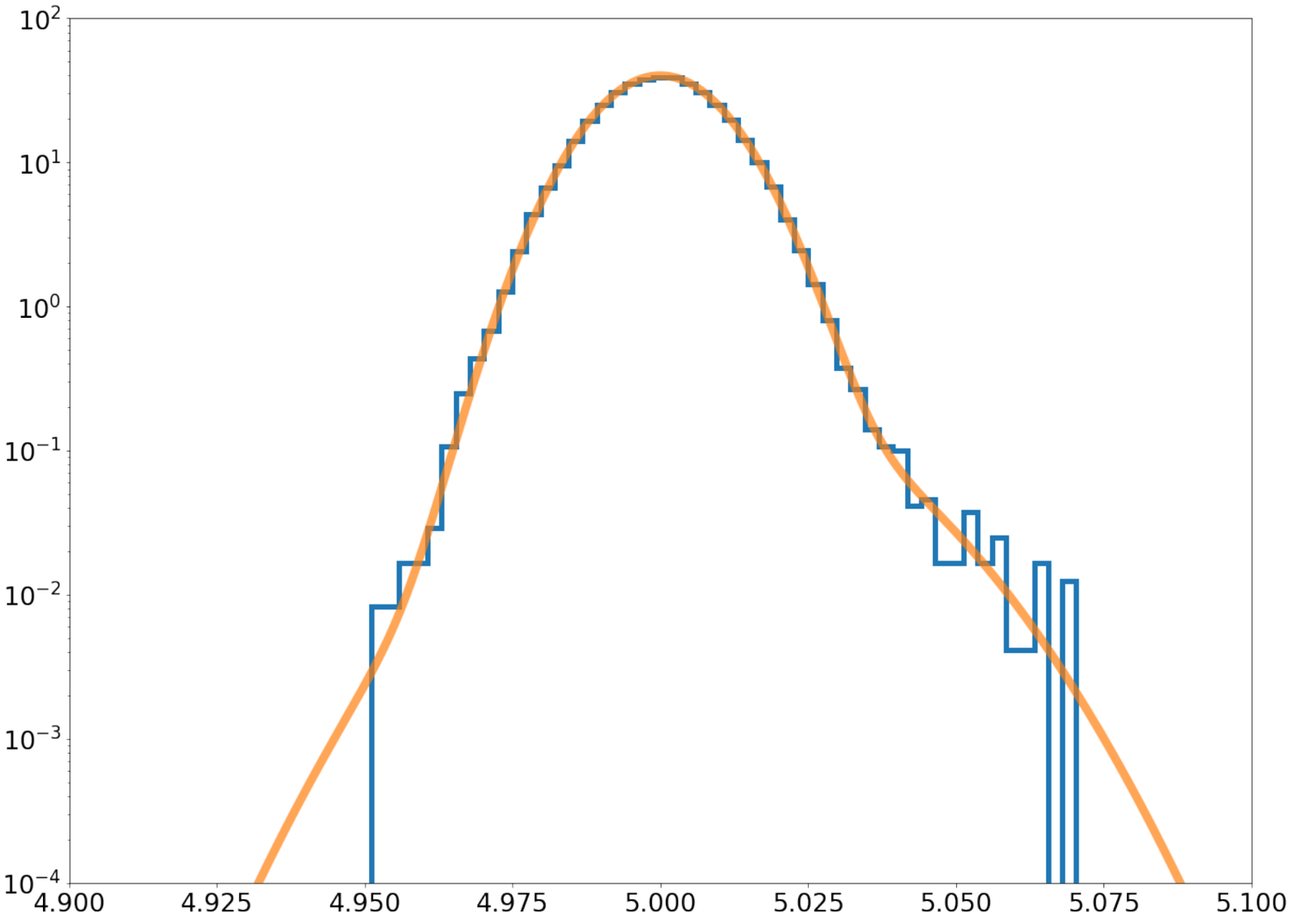
Outline

- Python stats pointers
- Practical statistics & common mistakes
- Working breakouts

Python hints

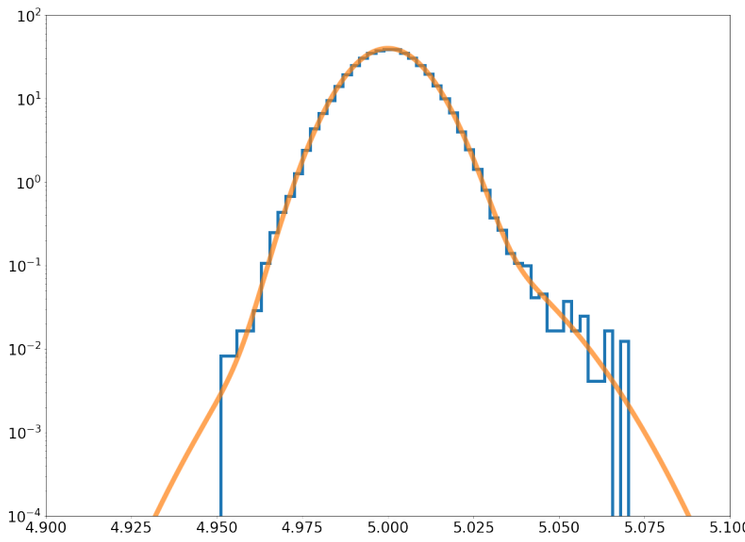
Practical statistics

How much do you care about the tails?



Probably not?

- Look for something bright (high σ); will come back and do σ-stats right if detection marginal.



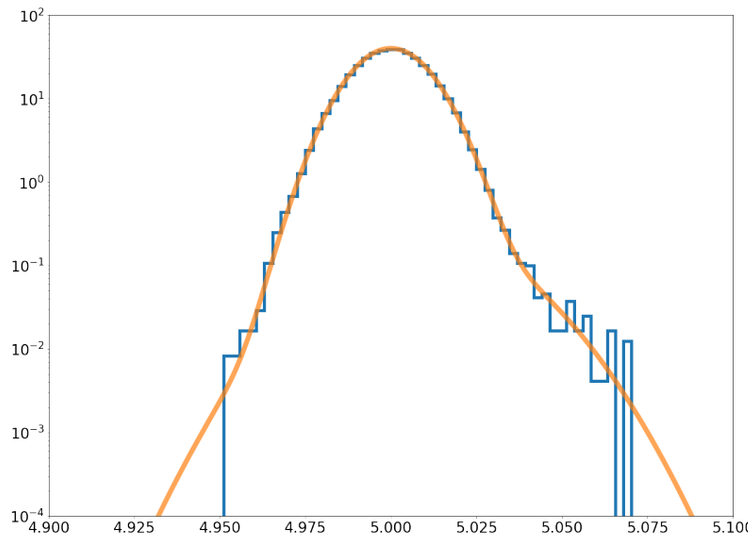
- Just exploring on your own for systematics

- Fighting over 20σ vs. 21σ

  - confidence intervals next week

Probably yes

- Very rare events or very high precision (ν detection; HEP; etc.)
- High trials
- Complicated analyses (non-linear)
  - Effects of cuts in data
  - Machine learning
- Setting upper limits (again next week)



Why are we doing this?

- Know the ‘right’ way
- Conceptually cleaner (think your way through)
- Be explicit about your approximations

Common errors

- Wrong distribution (e.g. normal)
- Wrong question (integral is wrong)
- Wrong (or no) trials factor
- Hidden priors in confidence interval or upper limit