Unifying Data Science

Nick Eubank

By the end of this class, you will be able to:

1. Understand how data science tools relate to one another using a unified conceptual framework,
2. Answer causal questions
   Does X cause Y?
3. Execute a data science project from conception to delivery

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$\Rightarrow$ Development of new tools occurred *within* each silo.

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  - CS likes to classify things and make predictions, don't care how model works
  - Social scientists like to make causal statements, don't care about predictive power

Blind Men and the Elephant

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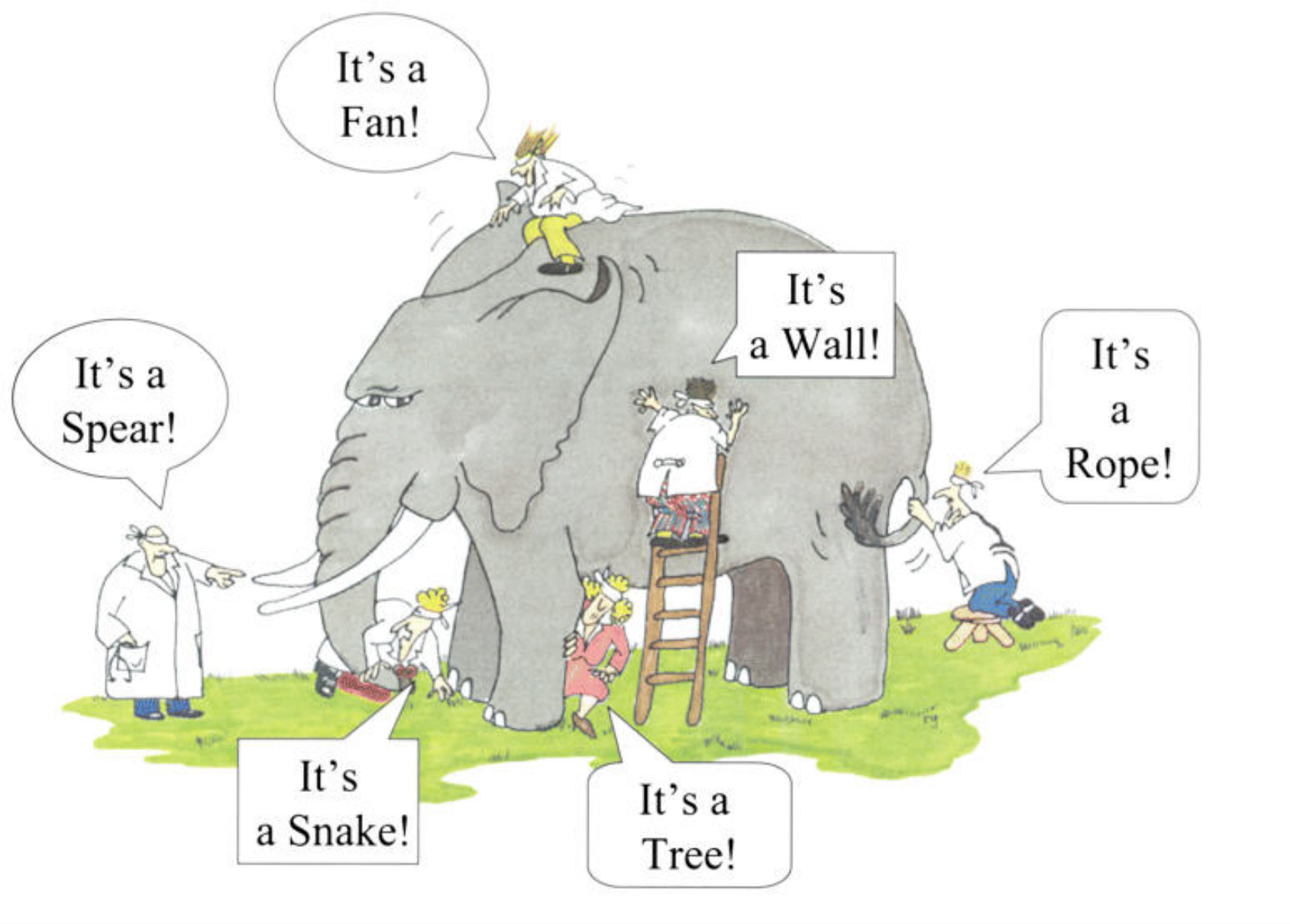

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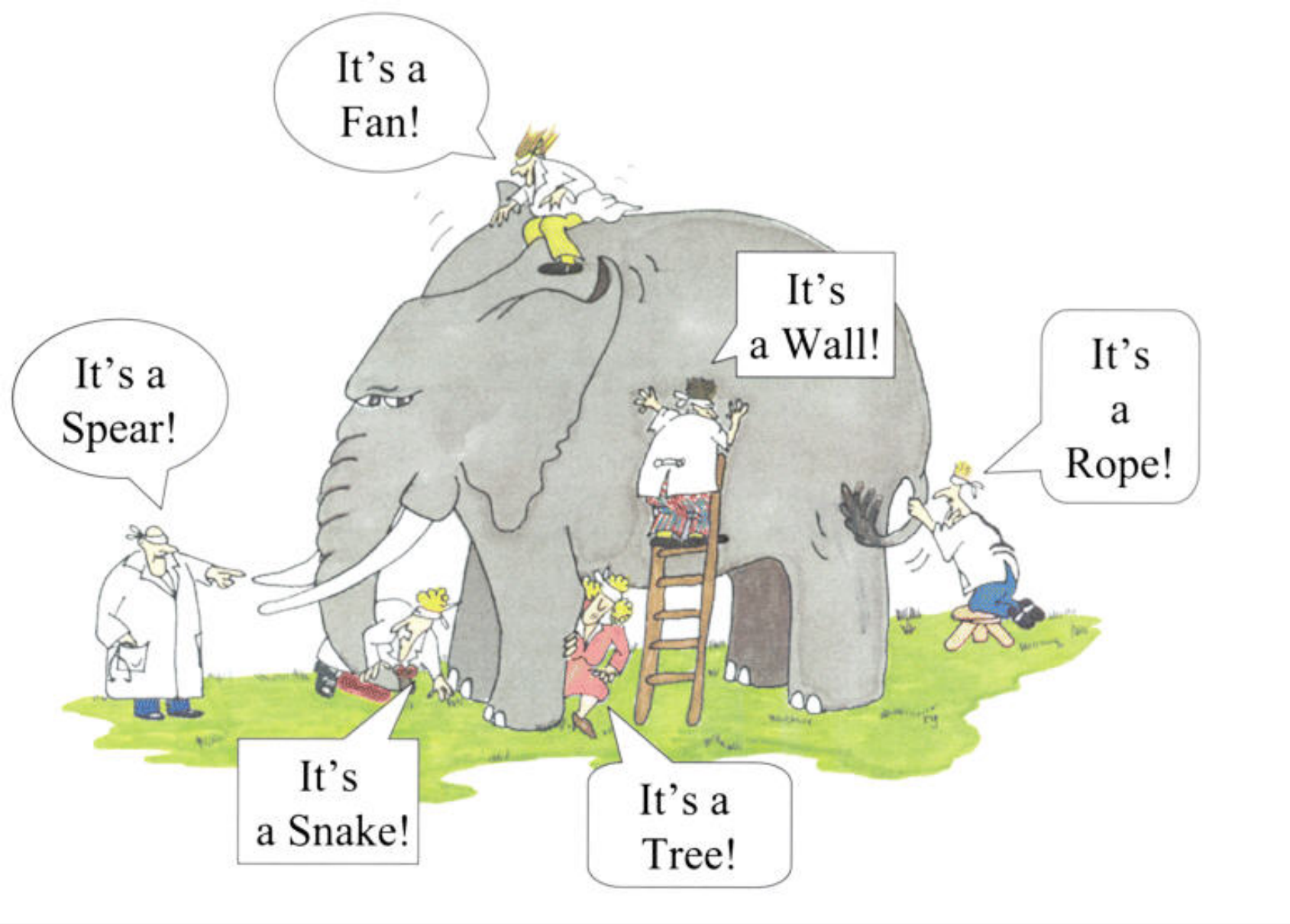

⇒ This is where data science is *now*.

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An effort to unify the development of quantitative methods

$\rightarrow$ Recognize the elephant

This Class

Discipline of learning how best to answer questions using quantitative data.

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- Unsupervised machine learning
- Supervised machine learning
- Range of causal inference techniques
  e.g. experiments, matching, regression, differences-in-differences
- Other approaches to descriptive analysis

This Class

The tool you use should be dictated by the question you seek to answer

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1. Introduce taxonomy of questions
2. Discuss descriptive questions
3. Learn causal inference
4. Discuss prediction

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   Practice generating questions
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   Relative merits of supervised machine learning v. causal methods

Data Science Project

Over semester, you will also develop a data science project from start-to-finish

- Teams of 3-4, grouped by interest and experience
- On topic of your own choosing

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$\rightarrow$ MIDS first-years: Capstone with training wheels

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Zeren Li (TA)

- PhD Candidate in Political Science
- Studies Chinese politics
- Strong background in causal inference and machine learning

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  - If you're deciding whether to take this class, I'd suggest buying *Mostly Harmless Econometrics* and skimming a few chapters to get a sense of material we'll focus on for much of semester.

Things to Know

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- If you don't know git or github, you'll want to learn that early.
  - Data Camp and Practical Data Science tools will be made available
  - Workshops hosted by Library