Bias, Humans Perception, and the Internet

What are your favorite conspiracy theories?

- Moon landing hoax
- Vaccines cause autism
- Climate change is a hoax
- Chemtrails are a thing
- Politicians are all Reptilian impostors
- 9/11 was an inside job
- Etc., etc., etc. …

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These are Opinions:

- "Star Trek" is better than "Star Wars"
- "Star Wars" is better than "Star Trek"
- Tom Baker was the best "Dr. Who"
- David Tennant was the best "Dr. Who"
- Nobody should put sugar in cornbread
- Sugar in cornbread is terrific
- President Obama is a great president
- President Obama is an awful president

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These are Facts:

- The Earth goes around the Sun
- We landed on the moon
- Vaccines work
- Evolution is the backbone of biology
- Science *works*, dammit…

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Example: Moon Landing (CON)

- No stars in pictures
  - *They are there, but too dim to show up*
- Shadows not black
  - *Lunar surface is very reflective*
- No blast crater after landing
  - *Low exhaust rate in vacuum, very thin*
- Flag waves in vacuum
  - *Motion imparted by astronauts during set-up, no damping effect from air*

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Example: Moon Landing (PRO)

- Still living lunar astronauts (testimony)
- No objection from Soviets (competition)
- If there <u>was</u> a conspiracy, then either:
  - <u>Everyone</u> was involved in the conspiracy:
    - 300,000 participants worldwide and no deathbed confessions? Really?
  - <u>Nobody</u> (except management) was involved:
    - 300,000 bright, highly dedicated engineers who don't know they are supposed to fail, so… …they don't.
- **<u>Artifacts observable</u> on the surface (evidence)**

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What Makes a Fact?

- Evidence!
- Corroboration
- Evidence!
- Independent analysis
- Evidence!

How Answers can be Wrong

- What is 2 + 2 ?
  - 12 (wrong, but in the correct domain)
  - Somewhere between 2 and 6 (not terrible)
  - 3.9…4.1 (actually pretty useful)
  - 3.99…4.01 (even more useful)
  - 3.999999…4.000001 (very, very useful)
  - 4 (correct)
  - Elephant (not even wrong)

If you "believe" something…

- …how do you convince others of its truth?
- …what is the result of being wrong?
- …what would change your mind?
- …if presented with contrary evidence, would you:
  - Change your view?
  - Double-down?

What if *you're* wrong?

- What would change your mind:
  - Nothing! (You are likely a conspiracy theorist)
  - Evidence! (That's thinking scientifically!)

What if *they're* wrong?

- How do you convince someone else:
  - Persuasion, threats, bribes, cajoling…
    - May be effective, but not satisfying
  - Evidence!
    - May be satisfying, but frequently not effective
  - Um, often you can't…

How do you separate Fact from Opinion on the Internet?

- Option #1: Try to find the **least biased site** for the topic under discussion.
  - How do you know?
  - Very hard to do
- Option #2: Try to find the **most biased site** for the topic under discussion.
  - They've dug up the dirt on the opposition!
  - The bias is known and can be subtracted out

Types of Bias

- Confirmation Bias
- Hindsight Bias
- The Bandwagon Fallacy
- False Dichotomy
- "No True Scotsman" Fallacy
- Non-Sequitur
- Ad-Hominem Attacks
- Correlation is not Causality

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Perceptual Bias: **Pareidolia**

- Definition: Perceiving pattern in random data
- Possible evolutionary advantage
- We're *very good* at this:
  – Visual (Elvis in your cornflakes)
  – Auditory (music played backwards)

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