Combatting Truth Decay

A Practical Taxonomy for Describing Disinformation of Science

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Taxonomy of Disinformation

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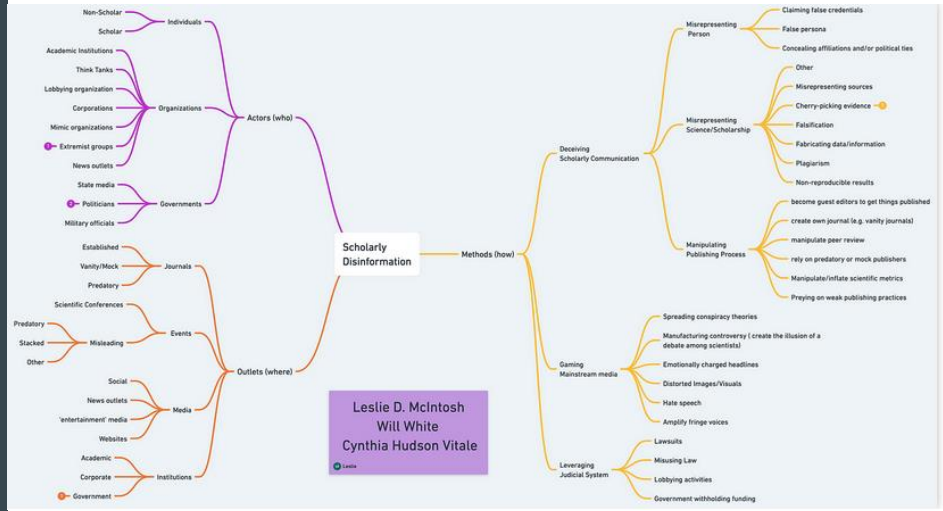


Why a Taxonomy

- Enable clear **identification, quantification, and discussion of disinformation** activities and tactics.
- Provide policymakers with a **standard language to develop policies and practices**
- Give journalists a **structured understanding** of improper scientific conduct

And we could not find a

taxonomy on disinformation*

*The majority of results concern the detection of misinformation and disinformation through algorithmic models, with the majority concentrated on social media (Bani-Hani, et al., 2021).

Manipulating Scientific Information

Identify
Classify
Understand

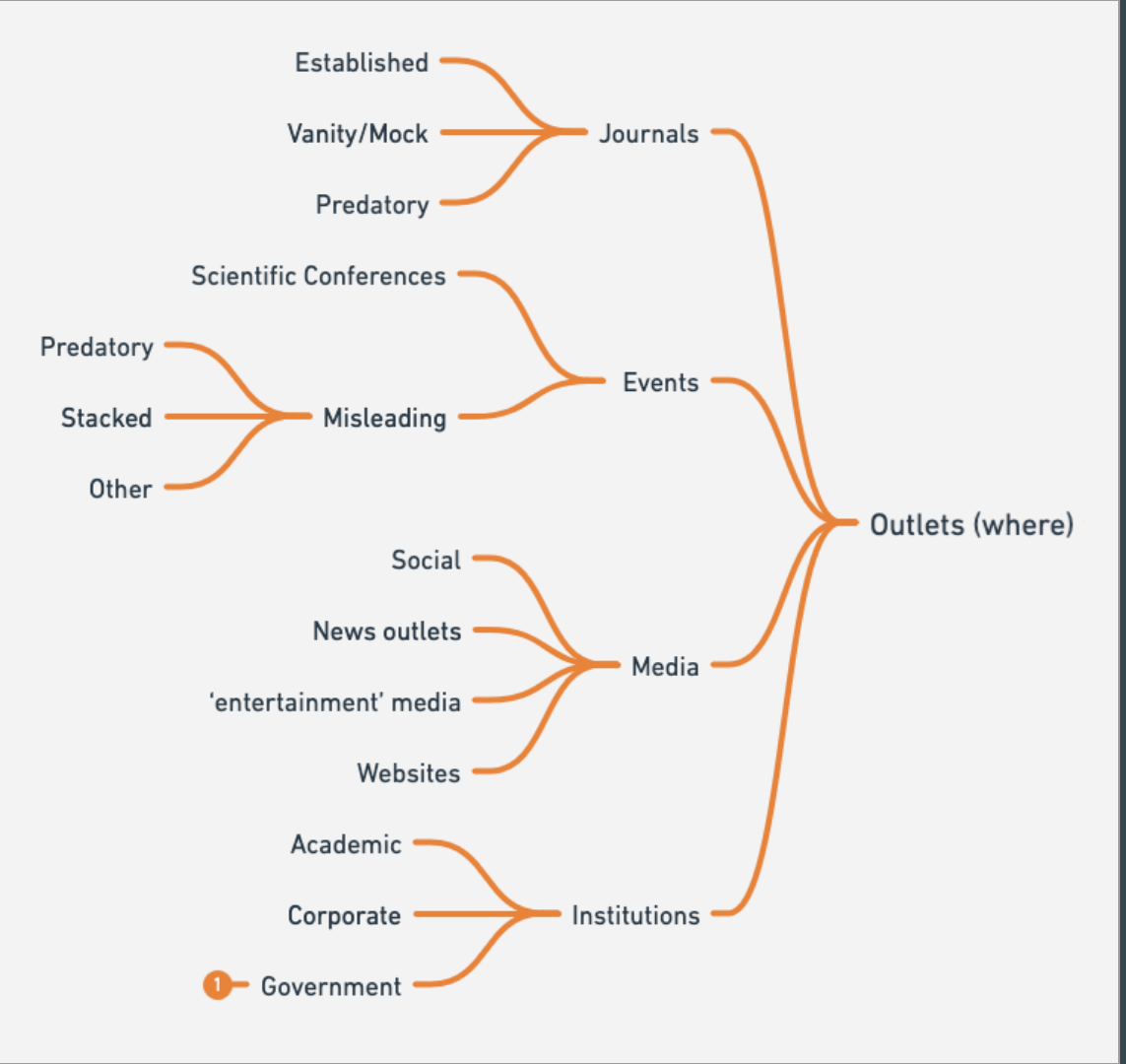
1. What are the identifiers of scientific manipulations? How do scientific manipulations manifest?
2. Through what entities do scientific manipulations manifest? What are the platforms/mechanisms through which scientific manipulations manifest?
3. What entities are being leveraged for scientific manipulations? Through what methods are they being manipulated? Who are the actors? Why do they do it?
4. How do we classify scientific manipulations? (‘Science’ being defined in the classical sense.)

Clue/do

A game of whodunit

Non-Scholar
Scholar
Individuals
Academic Institutions
Think Tanks
Lobbying organization
Corporations
Mimic organizations
1
Extremist groups
News outlets
Organizations
Actors (who)
State media
2
Politicians
Military officials
Governments

Actors (who)

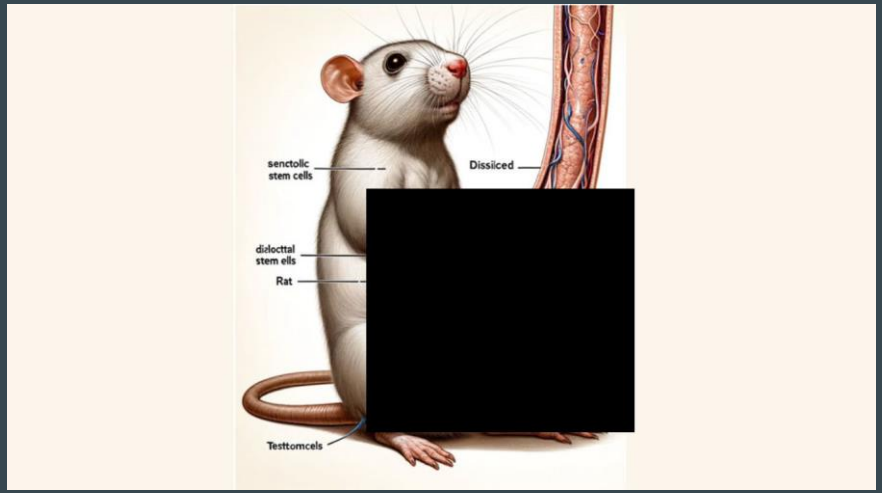


Outlets (where)

Methods (how)

Methods (how)
Deceiving Scholarly Communication
Misrepresenting Person
Claiming false credentials
False persona
Concealing affiliations and/or political ties
Misrepresenting Science/Scholarship
Misrepresenting sources
Cherry-picking evidence
Falsification
Fabricating data/information
Plagiarism
Non-reproducible results
Other
Manipulating Publishing Process
become guest editors to get things published
create own journal (e.g. vanity journals)
manipulate peer review
rely on predatory or mock publishers
Manipulate/inflate scientific metrics
Preying on weak publishing practices
Gaming Mainstream media
Spreading conspiracy theories
Manufacturing controversy (create the illusion of a debate among scientists)
Emotionally charged headlines
Distorted Images/Visuals
Hate speech
Amplify fringe voices
Leveraging Judicial System
Lawsuits
Misusing Law
Lobbying activities
Government withholding funding

The elephant (or rat) in the room: generative AI



Our taxonomy still applies!

Using Midjourney to generate inaccurate figures -> Fabrication

Using ChatGPT to write a paper without crediting -> Plagiarism

Cases

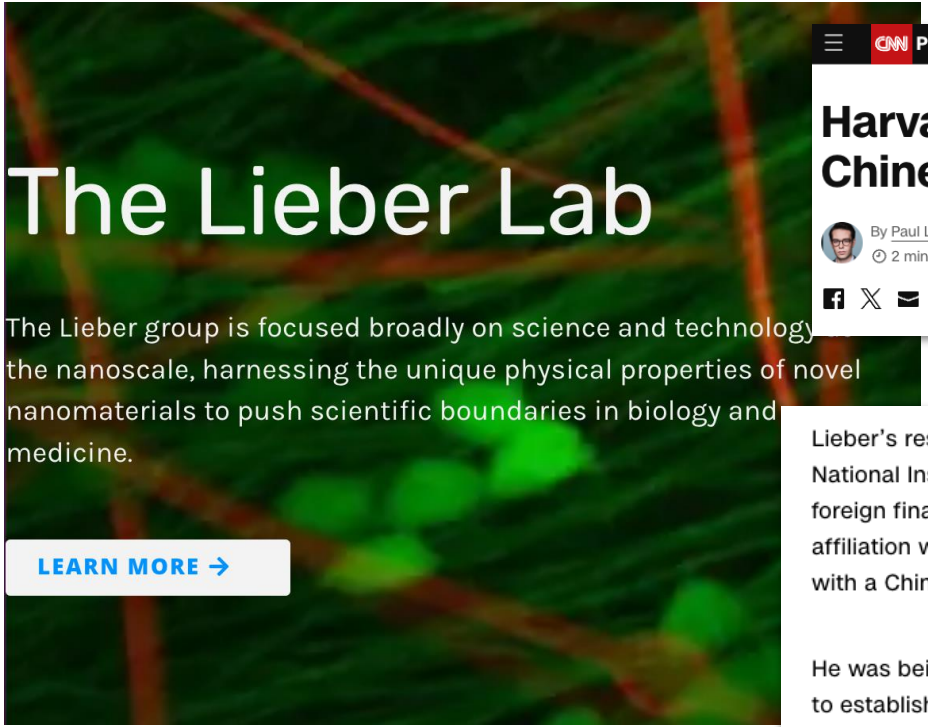
ID	Case Study Short Titles
1	Conference Panel Cancellation
3	Expression of concern for wrong test
4	Undisclosed Affiliations - Dr. Charles Lieber
7	Falsified Data and Stanford president Resignation
11	Withdrawn COVID-19 Preprint on Pharmacological Outcomes
12	Retracted COVID-19 paper misrepresents data
13	Retracted COVID-19 Paper
15	Honesty Researcher Fabricates Data
17	Donor pressure in science (Sokal III)
19	Fraudulent Studies from Medical Professional Joachim Boldt
20	~~Publish~~ing Satire - Sokal Affair

Case 19

Joachim Boldt

Who Scholar
Where Journals-Established
How Fabricating Data

- **Who:**
  German anaesthetist & (formerly) renowned IV therapy expert
- **Where:**
  Peer-reviewed medical journals including *Anesthesia & Analgesia*
- **How:**
  Faked data promoting the use of hetastarches to boost blood volume during surgery
- **Impact:**
  - Endangered patients' lives
  - further investigation revealed colloids increased critically ill patients' death risk –-> hospitals changed clinical guidelines



CNN Politics SCOTUS Congress Facts First 2024 Elections

Harvard professor found guilty of lying about Chinese government ties

By Paul LeBlanc, CNN
2 minute read · Published 10:52 PM EST, Tue December 21, 2021

Lieber's research group at Harvard had received over $15 million in funding from the National Institutes of Health and the Department of Defense, which requires disclosing foreign financial conflicts of interests. The jury found that Lieber had lied about his affiliation with the Wuhan University of Technology in China and a contract he had with a Chinese talent recruitment plan to attract high-level scientists to the country.

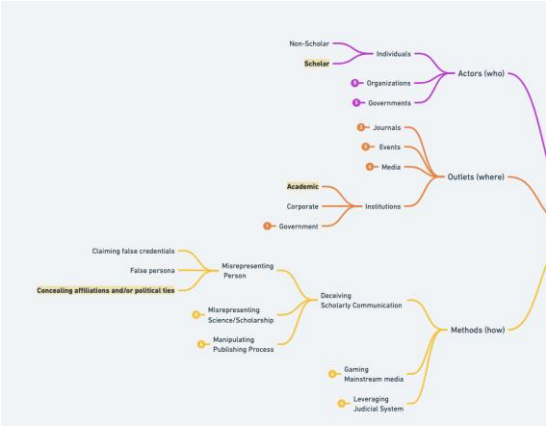
He was being paid $50,000 per month by the Chinese university and given $1.5 million to establish a nanoscience research lab at WUT, the Justice Department said in a news release. Lieberman was specifically affiliated with China's Thousand Talents Program, which the department called "one of the most prominent talent recruitment plans designed to attract, recruit and cultivate high-level scientific talent in furtherance of China's scientific development, economic prosperity and national security."

Case 4

Charles Lieber

Who Scholar
Where Institutions-Academic
Government
How Concealing Affiliations
and/or Political Ties

- **Challenge for Taxonomy:**
  Does this case belong?
- **Reasoning:**
  Lieber intentionally deceived authorities to conceal relationships and work



Case 17

Sokal III

Who ????
Where Journals-Established
How Fake Persona; Fabricating Data

- **Challenge for Taxonomy:**
  What do you do if you don't know one of the categories?
- **Reasoning:**
  Quickly focuses the question to intent

Future Interests

1. How can this be **gamed** or **misused**?
    a. *If a person would like to say something is disinformation then pick out the pieces to support their argument, what is stopping them.*
    b. *What is the difference between academic disagreement/questioning and disinformation*
2. How can this steer policy recommendations?
3. Aggregating motivations Motive/Why

Discussion