Truth in Science and Integrity in Research

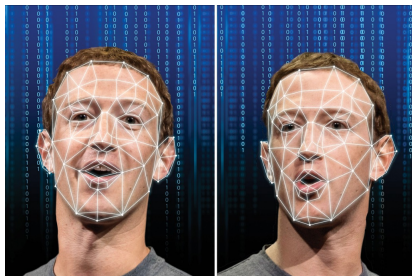S. Koby Taswell, Adam Craig, Anousha Athreya, Carl Taswell

Brain Health Alliance Virtual Institute, Ladera Ranch, CA, USA

2022 ASIS&T Workshop: October 9 @ 13:00 EDT
Who Are the Guardians of Truth and Integrity?

Deep Fake: True or False?

- Over the past decade it is increasingly challenging to determine what is true or false
- Words can be used and abused to mean the opposite of their original meaning
- Images, videos, and audio can be doctored to falsify records

Deep Fake Illustration by Stephen Blue for Time

Motivating Questions

- How does false or harmful information manifest in published literature?
- What can be done to identify risks and harm?
- How to ensure science and research is not fake?
- More positively phrased: *How do we guard truth in science?*

What is Truth

- Truth is understood differently in different contexts
- Religion, Philosophy, History, Science etc. all provide an explanation to some portion of the world we live in
- Different perspectives on truth may agree or disagree on a certain topic
- Science differs by being based on:
    - Experimentation
    - Measurable phenomena
    - Reproducibility
- Science results in
    - A changing and growing understanding of the world
    - Real world impact

Threats to Truth

- Scientific truth is only as accurate as the reported information
- Information, whether true or false, can be used to distort the understanding of the world via:
  1. Falsification of results
  2. Abuse of true information
  3. Omission or cover-up of information
  4. Misattributed or plagiarized concepts

Analyzing Information and Claims

- Questions to ask about a piece of information
    1. Is this information true or false?
    2. If false, were the authors aware of falsehood prior to publication?
    3. If false, did the authors agree to correct the published literature after the falsehood was brought to their attention?
    4. If true, is this information somehow harmful to a specific person, population, or group?

- To answer these questions, we defined 5 terms which can be used to identify and categorize different claims

False Information - Benign

- If authors agree to correct published literature, the impact and outcome is often less damaging, but there is some nuance

- Mis-information occurs when: "The authors were **not aware of the falsehood** prior to publication, and **agree to correct** the published literature after the mistakes are brought to their attention."

- Dis-information occurs when: "The authors were **aware of the falsehood** before publication, but due to possible extenuating circumstances were unable to make corrections prior to publication, and then later **agree to correct** the published literature when given the opportunity to do so."

False Information - Not Benign

- If the authors refuse to correct published literature, the impact and outcome is often more damaging, however, knowledge of falsehood prior to publication plays a role in determining intent

- Anti-information occurs when: "The authors were **not aware of the falsehood** before publication, and the authors **refuse to correct** the literature after the mistakes are brought to their attention."

- Caco-information occurs when: "The authors were **aware of the falsehood** before publication, submitted the false information with purposeful intent to spread it, and the authors **refuse to correct** the published literature when given repeated opportunities to do so."

Categorizing False Information - Summary and Examples

- The four types of information can be categorized by:

	Benign	Not benign
Aware	Dis-information	Caco-information
Not aware	Mis-information	Anti-information

- Examples:
  - Mis-information: An academic publishes research that contained errors, but corrects their own mistakes after it is pointed out to them.
  - Caco-information: An academic publishes falsified and/or plagiarized work with intent to profit off of the concepts. When confronted, they downplay any wrongdoing and point blame at others rather than correct their own mistakes.

Categorizing True Information - Mal-information

- Mal-information is defined as: "the use with malicious intent of true or partially true information that may be based in reality but abused in violation of laws, regulations, or codes of conduct, then published with the purpose of harming other persons, groups of individuals, or the common good of society and public benefit." [1]
- Examples:
  - Abuse of private information collected from social media
  - Sharing of private or confidential information
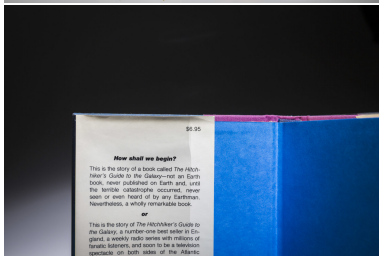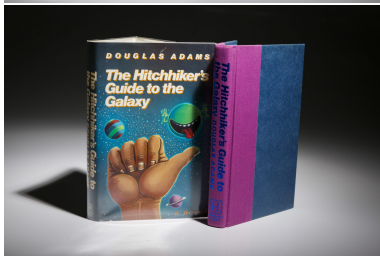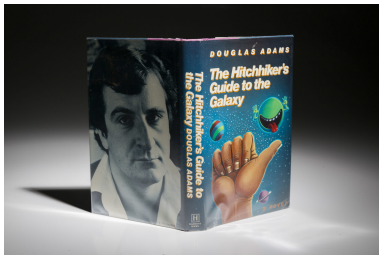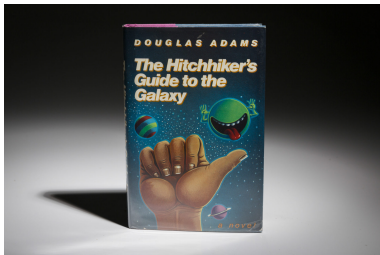 - Intentional exclusion of relevant information

LONG PAPERS

WILEY

The hitchhiker's guide to scholarly research integrity

S. Koby Taswell[1] | Christopher Triggle[2] | June Vayo[3] | Shiladitya Dutta[1] | Carl Taswell[1]

Douglas Adams' The Hitchhikers Guide to the Galaxy

thefirstedition.com/product/the-hitchhikers-guide-to-the-galaxy

Don't Panic banners on Towel Day in Innsbruck Austria

Celebrated every year on May 25 in tribute to Douglas Adams

en.wikipedia.org/wiki/Towel_Day

Creative Authenticity and Fair Citation

'Dwarves standing on the shoulders of giants,' attributed to 12th century Bernard of Chartres, popularized 1675 by Isaac Netwon.

Figure: Cedalion standing on the shoulders of Orion, by Nicolas Poussin 1658

Scholarly Research Integrity

- As defined by Merriam-Webster, Integrity:
  1. firm adherence to a code of especially moral or artistic values, incorruptibility
  2. an unimpaired condition, soundness
  3. the quality or state of being complete or undivided, completeness
- To ensure integrity in truth we must maintain integrity in action.
- Fraud, plagiarism, and misconduct represent a lack of moral integrity and result in damage to the wholeness of academic literature
- Certain groups attempt to track and monitor the issue within publishing and promote ethical research
  - RetractionWatch.com
  - PubPeer.com
  - Committee on Publishing Ethics (COPE)
- Yet, the danger still looms

Plagiarism: A continuing problem

- Plagiarism has now become the most common cause of retractions; see study by [2], discussed by [3]

  Recommended presentation by Rosiana Azman and Stephen Fox:

  AzmanFox-Understanding-Plagiarism-9-2014

Idea-Laundering Plagiarism by Authors

- Idea-laundering plagiarism by authors is "the act of passing ideas that were illegitimately obtained through another illegitimate process with the intent of making it appear legitimate, that is, making dirty ideas look clean." [4]
- Analogous to money laundering perpetrated by organized crime
- Because authors are aware of information they have obtained by any means, then by definition idea-laundering plagiarism must be either dis-information or caco-information depending on the author's response when asked to correct the 'omission of citation' of the reference they plagiarized

Idea-Bleaching Censorship by Editors

- Authors engaging in idea-laundering plagiarism may also be aided by editors who are active within their research or social group

- Idea-bleaching censorship by editors is "any act that aids and abets the plagiarists by ignoring and silencing inquiries or requests from readers who report the plagiarism." [5]

Taking Action

- Within the US, federal law defines certain illegal behaviors:
  - Intellectual property theft (US Patent and Trademark law)
  - Creation or spread of false information (18 U.S. Code § 35)
  - Censorship by law (Bill of Rights, 1st amendment)
- Violations of these laws have various punishments, but these laws are not always applicable and incidents must first be identified then pursued in court
- Outside of legal action, different companies or organizations may have certain policies to protect against the spread of wrongful information
  - Reporting content in social media
  - Correcting the wrongful information via publication
  - Punitive action against wrongdoers, incentives for appropriate use of information

Conclusion

- Do not assume information is true and benign. Use the right tools to identify and combat improper use of information, regardless of veracity.
- Academic literature is not above use of wrongful information
  - Idea-laundering plagiarism by authors both omits the truth and creates false information
  - Idea-bleaching censorship by editors silences the truth and allows the spread of false information
- When possible verify, identify, then act
  1. Verify if the information is wrongful
  2. Identify the type of wrongful information
  3. Act upon the discovery, do not be silent

Contact Info

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References

[1] S. K. Taswell, A. Athreya, M. Akella, *et al.*, "Truth in science," *Brainiacs Journal of Brain Imaging and Computing Sciences*, vol. 2, no. 1, pp. 1–9, 1 Dec. 31, 2021. DOI: 10.48085/M85EC99EE. [Online]. Available: www.BrainiacsJournal.org/arc/pub/Taswell2021Truth.

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[3] G. Conroy, *The biggest reason for biomedical research retractions, Detection software is not enough*, Oct. 18, 2019. [Online]. Available: https://www.natureindex.com/news-blog/the-biggest-reason-for-biomedical-research-retractions.

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