Ethics ENDSEM

MODULE 1 - SLIDE 1 QUESTIONS:

Brief Summary of Case Study: Using AI to Analyze Data

Dr. Falcon, a postdoc in Dr. Hawk's lab, is trying to analyze NIH health/genomic survey data but struggles with it. He decides to use an external AI platform, HotBot1, to help with analysis. Initially, he uses only public data, but later uploads de-identified NIH internal data (with no names or personal identifiers) to HotBot1 to improve the results. He discovers a promising genetic association but notes a potential issue — the finding may misrepresent an underrepresented minority group. Dr. Falcon shares this with Dr. Hawk, and they move quickly to write and submit a paper without Dr. Hawk deeply verifying the analyses.

Answers to the Questions

1. Has Dr. Falcon done anything wrong? If so, what actions should be taken?

Yes, potentially. Even though the data was de-identified, uploading it to an external AI platform could **violate data use agreements or NIH policies**. According to **IRB guidelines**, using external platforms must be approved, especially for human subjects data.

✅ **Mitigation Actions:**

- Review whether NIH policies allow uploading de-identified data to outside platforms.

- Report the use of HotBot1 to the IRB or institutional review board.

- Delay publication until a full ethical review is done.

- Train researchers on data sharing rules and ethical AI use.

2. Were Dr. Falcon's steps to protect the data sufficient? Was this a data breach?

Dr. Falcon did de-identify the data, which is good, but **it still might not be enough**. According to **Belmont Principle of Respect for Persons**, even de-identified data

must be used with care and only in approved ways.

➡️ Was it a data breach?

Maybe — if the platform (HotBot1) isn't approved under NIH data-use policies, uploading even de-identified data might count as unauthorized sharing.

---

3. How can scientists balance quick innovation with their lack of training in new tech like AI?

- Get **institutional training or mentorship** before using new technologies.

- Use **pilot studies** on public data first.

- Follow **ethics and compliance training** tied to human subject data.

- Collaborate with **experts in AI/data privacy**.

This respects the **Belmont Principle of Beneficence** — do no harm — while still promoting scientific progress.

---

4. How could HotBot1 misrepresent minority cohorts? How to prevent it?

AI tools often **reflect bias in training data**. If HotBot1 doesn't handle small subgroups well, the results could be misleading — especially for underrepresented groups.

➡️ Implications: Public health conclusions could be **harmful** or **unfair**.

✅ Prevention:

- Check for **fairness and bias** tools in AI models.

- Do subgroup validation.

- Don't overgeneralize findings from biased outputs.

- Always interpret AI results with **domain expertise**.

This links to **Justice** in Belmont — ensuring fair treatment of all population groups.

---

5. Is Dr. Hawk overseeing Dr. Falcon properly?

Not entirely. Dr. Hawk trusted Dr. Falcon but did **not verify the AI tools or the analysis**. While trust is important, **supervision is key**, especially when dealing with human data and novel tools.

➡️ **Belmont Principle – Respect for Persons & Beneficence** apply here. Supervision protects participants from harm or misuse.

✅ Dr. Hawk should:

- Ask for regular updates and explanations of methods.
- Understand enough to judge whether data handling is ethical.
- Possibly seek expert help in AI if unfamiliar.

MODULE 1- SLIDE 2

Brief Summary: Deciding What Study Results to Publish

Dr. Wyck is leading a Parkinson's disease study and finds expected risk factors (head trauma, high blood pressure, pesticides). Unexpectedly, smoking appears to *lower* the risk of PD, and so does second-hand smoke, although the latter isn't statistically significant. She worries that including the smoking result may harm public health messaging. She's unsure whether to report it and how to handle it in the paper.

Answers to the Questions

1. Should Dr. Wyck report all her findings, including smoking? What if it showed smoking increased risk instead?

✅ **Yes**, she **must report all valid results**, including the smoking association.

Ethically, **selective reporting** (cherry-picking results) is **misleading** and goes against the **Belmont Principle of Respect for Persons** (truthful communication) and **scientific integrity**.

If the smoking result showed increased risk, she'd likely report it — so **reporting should not depend on perceived public health impact**.

---

2. Should she only report findings with p-values < 0.05?

❌ **No.** Focusing only on $p < 0.05$ encourages **publication bias**.

It's more ethical to report **all findings**, while clearly explaining their **statistical significance**, limitations, and context.

This aligns with **transparency in research** and **respect for the scientific process**.

---

3. Which findings should be emphasized in the title, abstract, and discussion?

She should highlight:

- The main **statistically significant findings** with **biological plausibility** (head trauma, blood pressure, pesticides).
- Briefly **mention** the unexpected smoking result, but **frame it responsibly** in the discussion.

🔑 **Ethical balance**: Don't hide surprising results, but don't overemphasize them either.

---

4. How should she discuss the protective effect of smoking? Should she speculate on mechanisms like dopamine?

She can **briefly mention hypotheses** (e.g., nicotine's role in dopamine), but must:

- Clearly label it as **speculation**.
- Include **contrasting evidence** from public health literature.
- Emphasize the **overall health risks** of smoking.

➡️ This respects the **Belmont Principle of Beneficence**: minimize harm and maximize benefit.

---

5. What should the authors say about second-hand smoke finding?

- Report it transparently, but **note it's not statistically significant (p = 0.07)**.
- **Caution readers** about interpreting borderline findings.
- Recommend further research, rather than drawing firm conclusions.

This is **ethically honest** and promotes **scientific integrity**.

---

6. What about smoking's known health risks — are they relevant here?

✅ **Absolutely.** Even if smoking seems protective for PD, it:

- **Increases risks** for cancer, heart disease, and early death.

- Should be mentioned to **contextualize** the findings.

- Reminds readers that **net public health advice** remains unchanged.

This aligns with the **Belmont principle of Justice** — ensuring public health messages are not skewed to benefit a few while harming others.

Brief Summary: Research Misconduct or Sloppy Science?

Rose Scarlett, an exchange student with prior ethics training, joins Professor Plum's lab and works on a collaborative project. She becomes secretive about her data and eventually can't produce original files when asked. When she finally shares data, it's poorly labeled, disorganized, and inconsistently documented. She offers inconsistent versions of the same figure and gives vague excuses. Dr. Peacock grows suspicious and insists on seeing the primary data, only to find serious issues with record-keeping and transparency. Rose blames time pressure for her disorganized records but claims the final figure is accurate.

Answers to the Questions (Framed Ethically)

1. Are there problems regarding data management?

✅ Yes — **major problems.**

- Missing or deleted original data.

- No labeling or dating.

- Multiple inconsistent figure versions.

- Poor or nonexistent organization.

This violates **best practices in research integrity** and **NIH data management standards**. Good record-keeping is essential for **transparency**, **reproducibility**, and **accountability**.

2. Who is at fault?

Multiple parties share responsibility:

- **Rose** is primarily responsible — she failed to maintain proper records and transparency.

- **Dr. Byrdie Peacock** acted appropriately by following up, but **could have intervened earlier**.

- **Professor Plum**, as PI, has the duty to ensure the lab follows proper protocols and that new students are **closely mentored** — so bears **some oversight responsibility**.

3. What do you think of Rose's explanation?

❌ Not convincing.

- Saying she was "rushed" is **not a valid excuse** for poor documentation or inconsistent data.

- Given her **prior ethics training**, she **knew better**.

Her actions raise concerns about **possible fabrication**, not just sloppiness.

4. Is pressure ever a legitimate excuse for being sloppy?

No — **never in research.**

Everyone faces pressure — job deadlines, publication, competition — but researchers have an ethical obligation to:

- Maintain accuracy

- Protect the public trust

- Be honest and transparent

Ethical research **requires discipline under pressure**, not shortcuts.

5. What's an appropriate response to pressure?

- Talk to mentors or advisors

- Ask for timeline extensions if needed

- Use proper planning and data management tools

- Maintain integrity even if results are delayed

This aligns with the **Belmont principle of Beneficence** — doing good and avoiding harm.

---

6. Would your opinion change if Rose had prior training in ethics and record keeping?

Yes — it actually **makes the situation worse**.

Prior training means she knew the standards and **chose not to follow them**, making it closer to **intentional misconduct**, not just a mistake.

---

7. How could this situation have been prevented?

- Regular data audits/check-ins by Dr. Peacock or Professor Plum
- Mandatory digital backup protocols
- Clear expectations about notebook organization and labeling
- Team collaboration culture (not secrecy)

Proactive mentorship and lab policies are key.

---

8. Can you show your primary data from a year ago? Can others reproduce your experiments from your notebook?

These are **ethical self-check questions** every researcher should ask regularly.

A responsible researcher should:

- Be able to trace back all data
- Have experiments reproducible from clear, detailed notebooks

If the answer is "no," **improvements are needed** to meet basic standards of research integrity.

Brief Summary: Authorship and Misconduct in Collaborative Research

Dr. Johansson, a Special Volunteer at NIH, published a paper involving AI/ML research developed using NIH resources — but without informing NIH supervisors, following NIH's manuscript clearance process, or submitting the necessary invention disclosure. The paper lists NIH as an affiliation and

acknowledges its contributions, but the work described wasn't part of the official collaborative agreement (CRADA). Dr. Fathi, Johansson's NIH supervisor, had no knowledge of the work or the paper.

Answers to the Questions (with Ethics Focus)

1. What are some of the ethical/legal/policy concerns created by this situation?

✅ **Major concerns:**

- **Violation of NIH publication policy:** Manuscripts involving NIH research must go through NIH's manuscript clearance.

- **Failure to disclose inventions:** NIH requires an **Employee Invention Report (EIR)** for intellectual property developed with NIH resources.

- **Breach of CRADA terms:** The project was **outside the scope** of the official agreement.

- **Improper attribution of affiliation:** Dr. Johansson listed NIH affiliation despite the NIH not being properly informed or involved.

- **Potential conflict of interest** and **undisclosed dual activities**.

These issues could amount to **research misconduct** and have legal, professional, and reputational consequences.

2. What should the NIH/Dr. Fathi do?

✅ Ethical and procedural steps:

- **Immediately report the incident** to the NIH ethics and technology transfer offices.

- **Request a correction or retraction** from the journal, especially if the software was used without authorization.

- **Request removal of their name** from the publication if they did not contribute or approve the work — authorship without consent is unethical.

- **Initiate an internal review** of the matter and consider disciplinary action if misconduct is found.

Transparency and documentation are essential to restore trust and uphold NIH standards.

---

3. Can Dr. Johansson remain first author but not list NIH affiliation?

🚫 **No — not ethically appropriate.**

- Dr. Johansson used NIH resources: facilities, data, and possibly mentorship.

- Omitting the NIH affiliation would be **dishonest and misleading** and would violate NIH's terms of appointment and use of resources.

Even if the research was not officially approved, **NIH support must be acknowledged truthfully**.

---

4. Should the NIH contest the patents that are being applied for?

✅ Likely yes.

- If the AI software or ideas were **developed with NIH resources**, NIH may have **ownership rights** or **co-inventorship**.

- NIH should review whether the intellectual property involved falls under **federal ownership rules** and whether the patents were filed **without proper disclosure**.

Failure to report inventions or include NIH as a co-developer can be a **serious legal issue** and must be addressed to protect public interest.

Key Ethical Principles Involved:

- **Respect for persons and institutions** (authorship transparency, accurate affiliations)

- **Accountability and integrity** (clearance process, invention reporting)

- **Justice** (ensuring fair recognition of institutional contributions)

- **Transparency in collaboration** (respecting formal agreements like CRADAs)

Summary: Use of AI in Scientific Writing and Citation Integrity

Dr. Blue asked Dr. Green to draft a review article. Dr. Green used an AI tool (without informing Dr. Blue) to generate content and references. The article was

submitted and published with both as co-authors. Later, a post-publication blog revealed fake citations. Upon review, additional issues were found: more inaccurate references and plagiarized text. These issues raise concerns about transparency, accuracy, and ethical writing practices.

Answers to Questions (Ethics in Research Focus)

1. When Dr. Blue and Dr. Green submit their correction to the journal, should they also address the inaccurate and irrelevant references and the copied sentences and acknowledge the use of the AI tool?

✅ **Yes — absolutely.**

- Ethically, **all known issues** must be transparently disclosed, not just the ones raised by the public.

- This includes:

    - Acknowledging **use of the AI tool**.

    - Correcting or removing **fake, irrelevant, and inaccurate references**.

    - Addressing the **plagiarized sentences** (and correcting them).

> Research integrity demands full disclosure and correction—not partial, selective admission.

---

2. Should they retract the article?

✅ **Probably yes.**

- The article contains **multiple serious flaws**: fake references, plagiarism, and lack of transparency about AI use.

- A simple correction may not suffice to uphold **scientific trust and rigor**.

- **Retraction** is an appropriate response when the article's **foundation is flawed** and cannot be fully salvaged.

> Retraction shows accountability and protects the scientific record.

3. Did they commit research misconduct, i.e., plagiarism?

✅ **Yes.**

- Copying text **word-for-word without quotation or attribution** is **plagiarism**, even if done unintentionally or by AI.

- **Intent** is not always required for it to be misconduct — especially when **negligence** is involved.

- Both authors share responsibility, though **Dr. Green** holds primary responsibility for using AI improperly, and **Dr. Blue** for not thoroughly reviewing the submission.

Ethical Themes

- **Accountability in authorship:** All co-authors are responsible for the content of a published paper.

- **Transparency in tools used:** Use of AI must be disclosed if it substantially contributes to writing or idea generation.

- **Plagiarism and integrity:** Copying without attribution is unethical, even if from AI-generated content.

- **Scientific record integrity:** Fake or inaccurate citations damage the credibility of scholarship and must be fully corrected.

IBM's "Diversity in Faces" Dataset Controversy

Summary: IBM's "Diversity in Faces" Dataset Controversy

In January 2019, **IBM released a dataset** called *Diversity in Faces (DiF)* to improve fairness in facial recognition technology. The dataset included annotations on **1 million facial images** drawn from **Flickr's YFCC-100M Creative Commons** photo set. IBM stated the goal was to help reduce **biases** in AI facial recognition

systems, which had shown higher error rates for **darker-skinned individuals and women**.

While initially praised as a step toward more equitable AI, **criticism emerged** after an NBC News report revealed that **individuals in the photos were unaware** their images had been used for this purpose. Many were **disturbed** to learn their facial data had been analyzed and distributed to hundreds of research organizations, without meaningful **consent or notification**.

Users also found it **nearly impossible to remove their photos** from the dataset, and even if removed from the central IBM repository, their data had already been shared widely. This sparked renewed public scrutiny and criticism of how facial datasets—often collected by **scraping public images online**—are compiled and used.

In response to mounting ethical concerns, other institutions like **Microsoft, Stanford, and Duke** also took down their own facial recognition datasets.

Ethical Takeaways

1. **Informed Consent is Essential**

   - Public availability of images (e.g., on Flickr) does **not imply consent** for use in AI training or biometric research.

   - Data subjects must be informed, especially when **sensitive features** like facial geometry and skin tone are involved.

2. **Privacy vs. Public Data**

   - Just because data is publicly accessible does **not mean it's ethical** to use it in any context.

   - The line between public and private data use in AI must be carefully navigated.

3. **Data Governance & Transparency**

   - There was a lack of **transparency** around how the dataset was built and used.

   - The **difficulty in opting out** raises concerns about user agency and control over personal data.

4. **Distribution Control Fails**

   - Even when removal is requested, **widespread sharing** of data makes full retraction impossible, leading to **irreversible exposure**.

5. **Corporate Responsibility**

   - While the goal of improving fairness in AI is laudable, it must be pursued with **ethical data collection**methods.

   - Tech companies must balance innovation with **accountability and respect for individuals' rights**.

6. **Ethics in AI Research**

   - Promoting fairness in AI should not come at the cost of **violating personal autonomy or privacy**.

   - Ethical practices must be **built into every stage** of data handling—from collection to sharing and usage.

Ethics of Student Data Tracking at Universities

Summary: Ethics of Student Data Tracking at Universities

At the **University of Arizona**, researchers analyzed **student ID card swipes** to map students' routines and social interactions, aiming to **predict student retention**. This data, gathered over three years, was anonymized for the initial study. However, the researcher mentioned that, in the future, **student identities could be shared with academic advisers**to inform support efforts, and **Wi-Fi tracking** might be added for even greater behavioral insight.

While the university highlighted the model's predictive power in a press release, the initiative sparked **public backlash**and **media criticism**, particularly regarding **student privacy and consent**. Many students were unaware that their CatCard data was being used this way. Although an assistant provost stated that predictive analytics already use ~800 data points, they emphasized any expansion

(e.g., tracking ID swipes) would be preceded by a **campus conversation** and an **opt-out option**.

A related article from **EDUCAUSE Review** emphasized **ethical use of student data**, focusing on **transparency** and **clear communication**, though it did **not endorse opt-out mechanisms**. Instead, it justified data use as necessary to improve learning environments and contribute to general knowledge.

Utilitarianism (Greatest Good)

- **Pros**: If the data helps improve retention and academic support for large numbers of students, the overall benefit may justify the practice.

- **Cons**: Significant harms to **privacy**, **student trust**, and potential misuse could outweigh benefits if not managed properly.

Rights-Based Ethics

- Students have a **right to control their personal data** and to be informed about how it is used.

- Collecting behavioral data without **explicit consent** or transparent processes may violate these rights.

Justice (Fairness)

- Data collection should not **disproportionately impact** or disadvantage certain student groups.

- Institutions must ensure **equal treatment** and avoid profiling or unfair interventions.

Common Good

- Data could be used to **improve the overall learning environment** and educational outcomes.

- However, this goal must be balanced with **community trust and individual dignity**.