S-STEM Resource & Evaluation Center (REC)

The AI-Powered Scholar: Enhancing Workflows and Ethical AI Application in STEM

November 4, 2026
3:00-4:00 p.m. EST

NSF AWARD #2224093: AAAS-NSF S-STEM
Resource & Evaluation Center

Welcome!

In the chat…

please introduce yourself!

- Provide your name, institution & S-STEM award track (if applicable)



Housekeeping

Please keep you microphone on mute when not speaking. You are welcome to use the "raise your hand" button or type into the chat if you have a comment.

A great deal of how we communicate involves body language and nonverbal cues are helpful to let us know how you are responding to the discussion. If possible, please turn on your camera**.**

You are welcome to introduce yourself in the chat and ask questions anytime throughout the webinar.

Closed Captioning is accessible - click on the CC icon in the meeting control bar at the bottom of your screen.

Today's slides and recording will be posted on the event page of the S-STEM REC website.

Contact Jamila Black **in the chat or at jblake@aaas.org for technology questions or issues.**

Please take our short live survey to provide feedback on this virtual event!

Disclaimer

This material is based upon work supported by the National Science Foundation under Grant No. DUE-2224093.

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NSF AWARD #2224093

AAAS S-STEM Resources & Evaluation Center (REC)

The S-STEM REC seeks to cultivate a network of S-STEM stakeholders and promote the exchange of ideas, resources, opportunities, and knowledge related to the effective strategies and practices to increase the number of talented low-income students obtaining degrees in STEM and entering the STEM workforce.

AAAS S-STEM REC works to:



Increase the effectiveness of the S-STEM Portfolio



Build the capacity of S-STEM Network Programs



Build the capacity of S-STEM Scholars

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S-STEM REC Team

NSF SCHOLARSHIPS IN STEM NETWORK SOLICITATION

NSF AWARD #2224093: AAAS-NSF S-STEM Resource & Evaluation Center

AAAS | S-STEM REC

MNA

AIR®

QEM Network

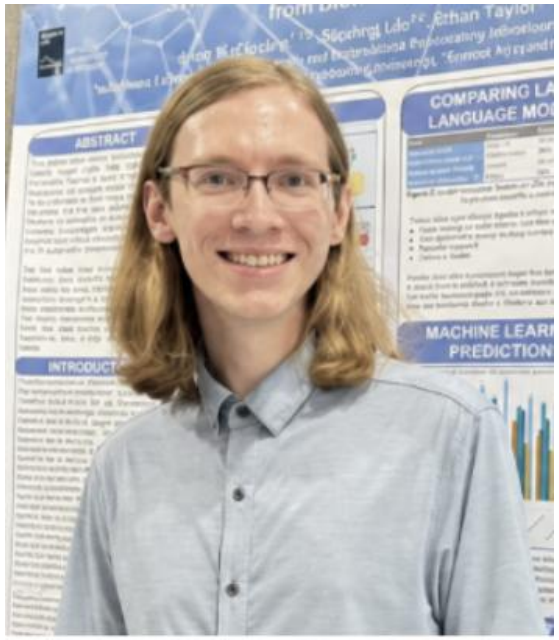
CERSE

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Webinar Objectives

- Today we will…
  - Discover strategies for using AI as a learning aid informed by S-STEM community agents
  - Identify essential ethical concerns around AI and understand factors around responsible AI use
  - Analyze how generative AI and large language models are shaping future STEM careers, industry innovation, and immediate societal needs
  - Test your knowledge through fast-paced Kahoot challenge rounds and exchange real-world insights with peer scholars and AI researchers across the S-STEM network

Meet Our Panelists



Scott McCloskey

Former Intern at NASA, Lawrence Berkeley National Laboratory

Recent Software Engineering graduate from UC Irvine and Saddleback



Dr. Crystal Brown

Associate Department Head, Program Director, Technology Policy and Sustainability Program, and Assistant Professor, Department of Social Science and Policy Studies

Worcester Polytechnic Institute



Dr. Roseline Telfort

Senior Research Scientist in Education and Child Development at NORC

University of Chicago

THE AI-POWERED SCHOLAR

Scott McCloskey

(Any Pronouns) - 24

Ethical AI tools & applications in
Academia & the Workforce

UC Irvine · B.S. Software Engineering (Saddleback College transfer)

Berkeley Lab · Summer 2024 intern · Supercomputer fine-tuning · AAAS

NASA Ames · Summer 2026 intern · Astrobiology web migration triage

Video Game Lead at UCI · Leading a team of 29 · Game on Steam



INDUSTRY REALITY

AI at work and school is already unavoidable





AI is already standard in Industry: modern engineering and technical research teams use it, and almost every professional engineering team expects AI-assisted development now

Used as a coding assistance tool, it helps: AI supports test cases, documentation, and refactoring, and can handle boilerplate and repetitive data work so people can focus on architecture

Increased productivity?: Can increase productivity but also lead to more problems if not used correctly

Use AI for your learning!

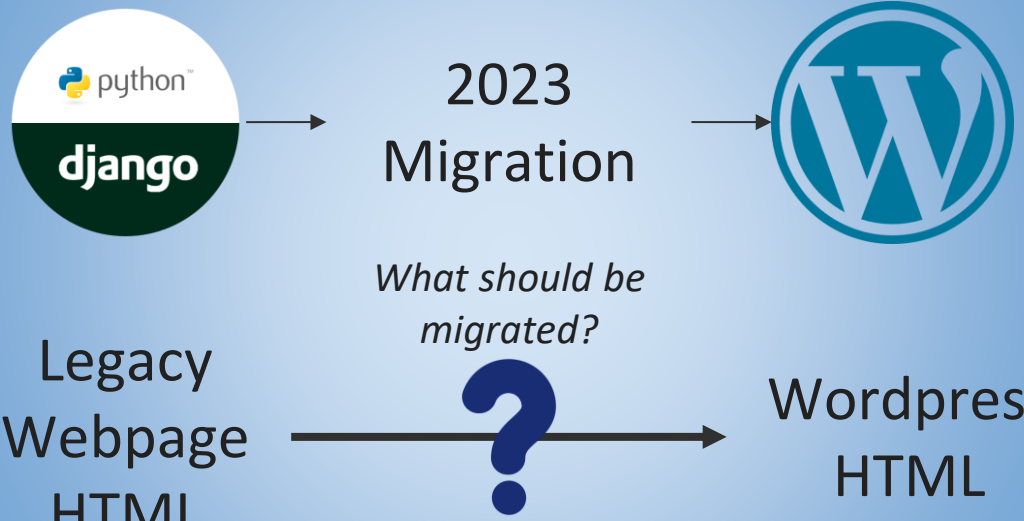
Let it amplify real mastery and keep your core understanding. Don’t let it consume your learning.

CASE STUDY · NASA Ames Research Center

NASA: How I used AI to help sort 3,500+ articles for migration

My task: to migrate NASA's legacy Astrobiology website into the new Wordpress website using if/else trees & migration criteria using a large language model (LLM).

The Problem



The Data

ID	Title	Source	Current Categories	Posted By	Overriding Author	Source URL	Direct Link	NAI Article	Body Text
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

3,563 News Articles Total!!!

Do Migrate

- Scientific Interviews
- Astrobiology Magazine
- NAI Articles
- Interesting scientific content!

Don't Migrate

- Content from other sources
- Articles mentioning something about to happen
- Requests to submit abstracts/papers

DATA GOVERNANCE & SECURITY

Privacy comes first with federal data

Working with government and proprietary data requires isolation of sensitive data. Free consumer chatbots expose user inputs to model training pipelines.

Zero Data Retention

ZDR contract agreements legally mandate that vendor APIs do not log prompts or use customer inputs for future public model weights.

On-Premise Compute

NASA and the LBNL executes code on internal supercomputing clusters and isolated government cloud regions. This prevents code from being used for training or sensitive data being leaked.

At-Home Local LLMs

Tools like **Ollama** run open-source models completely offline on your laptop. Zero data leaves your device, guaranteeing total privacy.



Rule of thumb: Never paste unreleased research, student records, or proprietary code into unvetted consumer web portals.

RESEARCH AT SCALE

Berkeley Lab: fine-tuning on a supercomputer

During my Summer 2024 internship at Lawrence Berkeley National Laboratory, I worked on a solo project to fine-tune a model to predict sugar yields from plant biomass feedstocks.

What fine-tuning actually means

Re-training a model on new data by modifying the existing model's weights.

HPC Infrastructure

Ran on the Lawrencium and Perlmutter supercomputers.

AI as a literature copilot

At the time, I was my mentor's first computer science student. AI helped research the latest models in 2024 and fine-tuning steps to help guide me.



NASA Ames Research Center Supercomputer Facility - Summer 2026

STUDENT TOOLKIT

Tools for coding, free for students

Agentic editors read your whole workspace, analyze dependencies, and edit files in place.

CODING AGENT

OpenAI Codex

OpenAI’s coding agent for your terminal, your IDE and the cloud. It reads your whole repo, edits files across it, runs commands and tests, and can work through tasks in parallel.

https://developers.openai.com/community/students

Student benefit: $100 in Codex credits, valid for 12 months. Open to verified US and Canadian university students.

DEVELOPER ECOSYSTEM

GitHub Student Developer Pack

Access free GitHub Copilot for seamless in-line completions and pull request summaries, alongside dozens of cloud credits and developer utilities.

https://education.github.com/pack

Student benefit: Copilot Student plan with unlimited completions and monthly AI credits, as long as you stay a verified student.

ETHICAL & COGNITIVE FRAMEWORK

Use AI to learn, not to replace learning

If an AI writes your code or drafts your essay, the model got smarter while you stayed the same. Treat the model as an interactive coach.

A Good Tutor Prompt:
“Act as my tutor. Do not give me the answer directly. Ask me guiding questions and wait for my response.”

Critique, don't generate

Write your draft first. Ask the model to find logical fallacies, edge cases, and runtime pitfalls

Deconstruct complex topics

Ask it to explain intricate concepts using concrete real-world metaphors or step-by-step analogies.



Berkeley Lab - Summer 2024

ACTIVE RECALL WORKFLOW

Study tools: lectures to flashcards

Transform passive lectures and disorganized PDFs into high-retention practice loops.

01

Whisper-v3-large

Transcribe audio recordings into searchable, timestamped text files. *Always verify professor permission before recording.*

02

NotebookLM

Feed class slides, YouTube links, and docs. Automatically generate interactive study guides and multi-tiered difficulty flashcards.

03

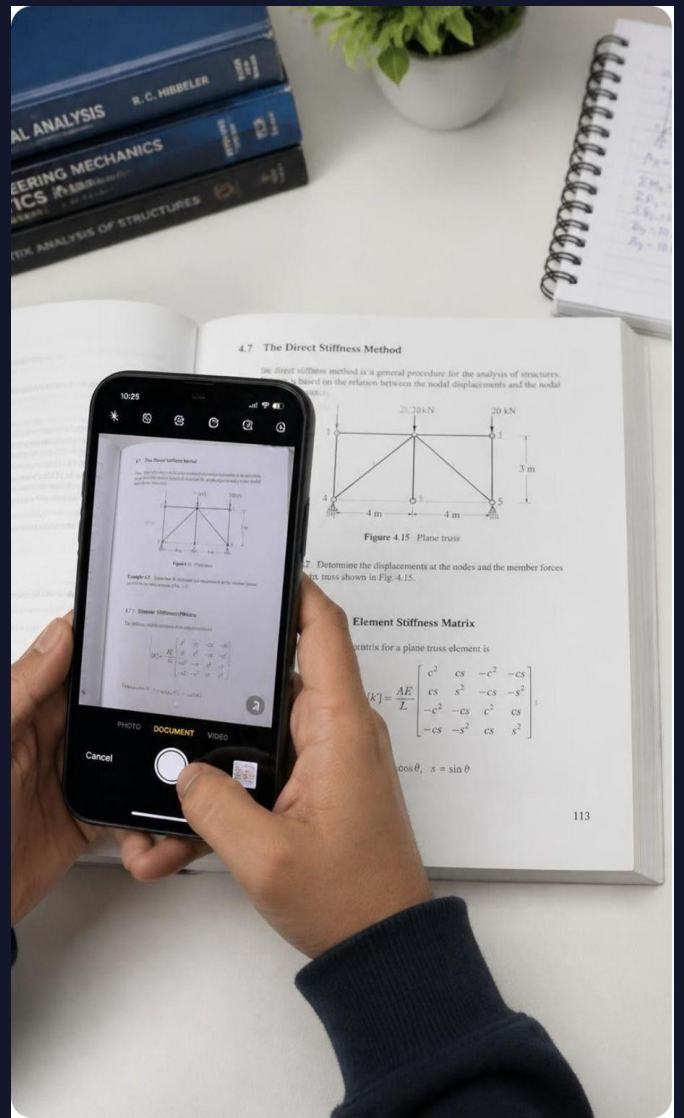
Timed Friction Loop

Set a 15-minute timer to struggle with a bug or proof on your own first. Only prompt AI for a hint after time expires.

Deliberate struggle creates permanent synaptic pathways; instant answers bypass retention entirely.

STEP-BY-STEP WORKFLOW

Study strategy: Scan your textbook into a study tool



Scan to PDF

Scan a portion of a book or document to PDF with Adobe Scan (free, iOS and Android)

OCRmyPDF - https://github.com/ocrmypdf/ocrmypdf

Run OCRmyPDF (a Python repo) to make the text searchable.

NotebookLM - https://notebook.google.com/

Drop it into NotebookLM for a searchable, hallucination resistant study guide. And you can make flash cards!

CLOSING THOUGHTS

Keep your own brain in the loop

Artificial intelligence is a powerful accelerator, but critical thinking and verification remain entirely yours.

Automate the tedious, keep the thinking

Delegate repetitive syntax, boilerplates, and reformatting. Protect your core conceptual design and problem solving focus.

Validate every claim & line of code

Treat every model output as a proposal from a smart junior intern: test against unit tests, inspect dependencies, and verify primary sources.





Berkeley Lab - Summer 2024

Who’s Doing the Thinking?

AI in College



CRYSTAL BROWN,
Worcester Polytechnic Institute

Ownership of the Process

Use AI to brainstorm topics, clarify complex concepts, or organize your research notes.

Your final work must reflect your own judgment, evidence, and original conclusions.



YOUR VOICE

Same Tool. Different Choices.

Supports Learning

Use AI to clarify complex concepts, summarize dense readings, or structure your study schedule effectively.

Replaces Learning

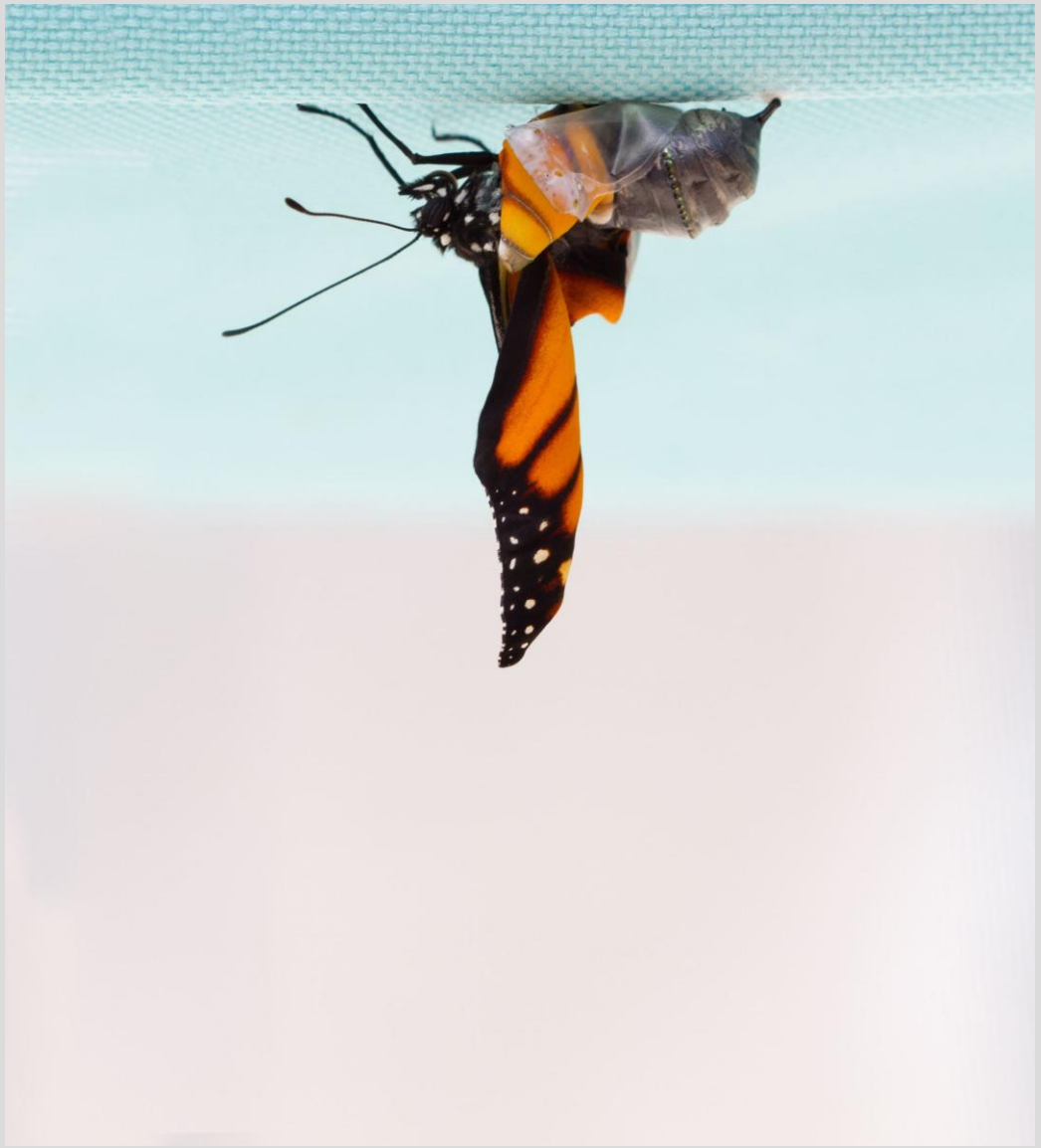
Avoid using AI to draft your essays, generate original arguments, or fabricate sources for your assignments.

"The assignment instructions and course policy still matter."

Confidence is Not the Same as Truth

AI models often sound authoritative while providing inaccurate information. Always treat AI output as a draft that requires your verification. Cross-reference claims with original sources and confirm that all citations exist before including them in your work.

AI tools are really a product that is being sold to us...



Where is the Line?

Consider a student who asks AI to draft an entire paper. They rewrite a few sentences to polish the prose, then submit the work without disclosing the AI's role. Does minor editing transform generated content into your own original academic contribution?

Is editing enough to make it your own?

Academic Integrity

Responsibility

Academic integrity requires you to own your work. Stay honest and transparent by clearly attributing AI assistance when it is used.

Serious Consequences

Violating academic standards is a serious matter. Students who fail to maintain integrity risk formal reports and potential removal.

REPORTS FILED



Important for All Majors

Integrity applies to all disciplines, including computer science, engineering, math, social science, and humanities courses.

Your 4-Question AI Check

01 Am I allowed to use it for this task?

02 Can I explain and defend the final work?

03 Did I verify facts, sources, and results?

04 Have I disclosed my use as required?

What is one skill you do not want to outsource to AI?



Keep your curiosity sharp and your critical thinking uniquely human.

Thank you.

Keep your curiosity sharp and your critical thinking uniquely human.

AI, STEM, AND SOCIETY:

Opportunities, responsibilities, and what comes next

Roseline Telfort, PhD
Senior Research Scientist

Technology → integrity → privacy → workforce → society



• STEP 1 OF 4: UNDERSTAND THE TECHNOLOGY

Large Language Models

What LLMs can do, what they cannot guarantee, and why scientific verification remains essential.

WHAT THEY CAN DO

Generate, summarize, translate, classify, draft code, and support idea development.

WHAT THEY CANNOT GUARANTEE

Accuracy, valid citations, unbiased results, sound methods, or correct reasoning.

THE SCIENTIFIC PRACTICE

Treat AI output as a draft, lead, or hypothesis to inspect. Verify claims, calculations, citations, assumptions, and methods.



• STEP 2 OF 4: PROTECT SCHOLARLY INTEGRITY

Plagiarism, Authorship, and Workplace Expectations

Three questions to answer before AI touches your manuscript, analysis, employer proprietary information, or funded work.

1 ASK FIRST

Is AI allowed for this lab task, manuscript, or funded product?

2 DISCLOSE

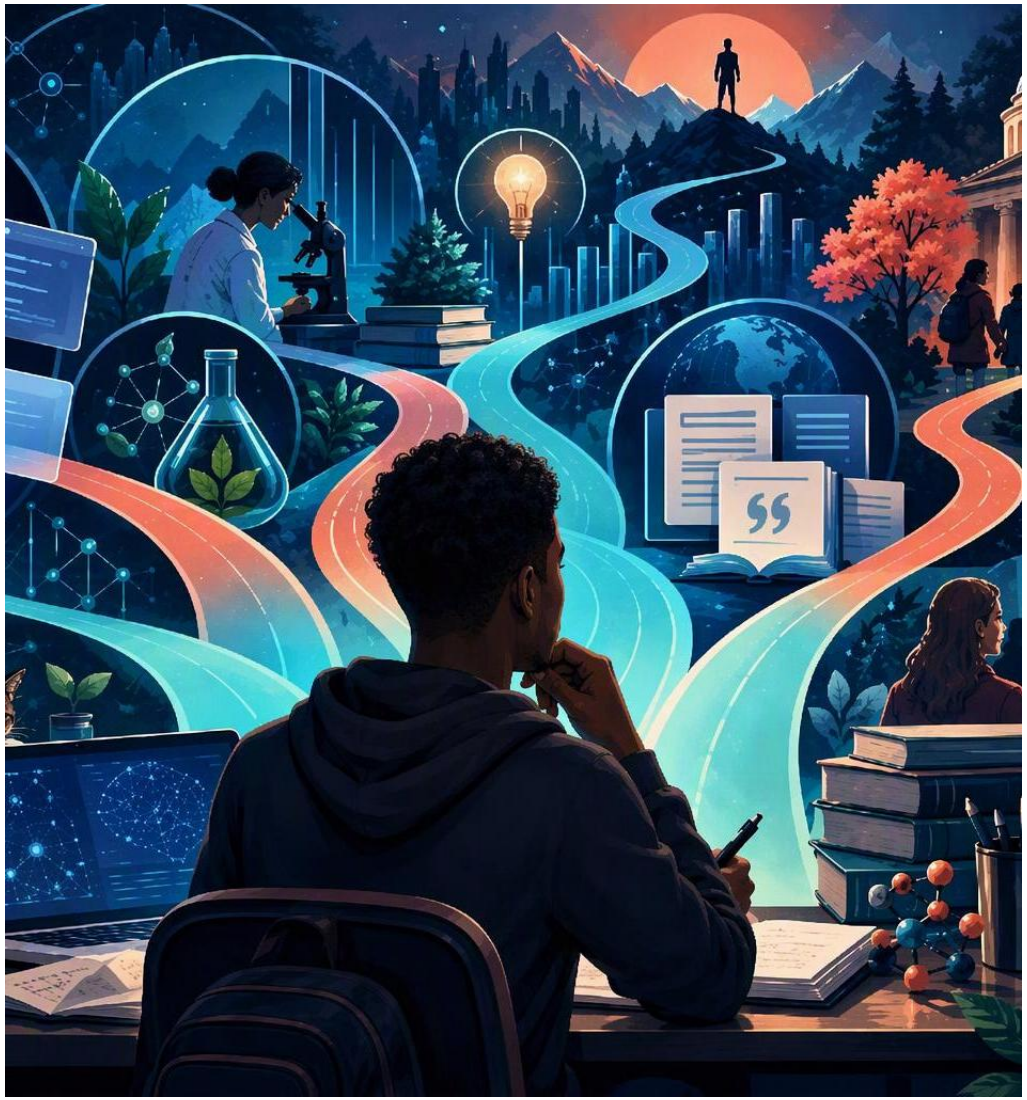
Must the tool, purpose, prompts, or level of assistance be documented?

3 OWN IT

Can you defend every idea, citation, and claim, and explain how it was produced?

THEN CHECK YOUR POLICY

Read your institution's AI and integrity policies. Detection scores do not replace policy, evidence, or human review. An AI-invented citation is still your error.



• STEP 3 OF 4: PROTECT DATA AND PEOPLE

Data Privacy Begins Before the Prompt

Integrity covers what you claim; privacy covers what you share. Classify the data before it goes into any AI tool.

GREEN: PUBLIC OR APPROVED DATA

Published papers, open datasets, and your own non-sensitive work. Still follow your lab's AI rules.

YELLOW: CHECK FIRST

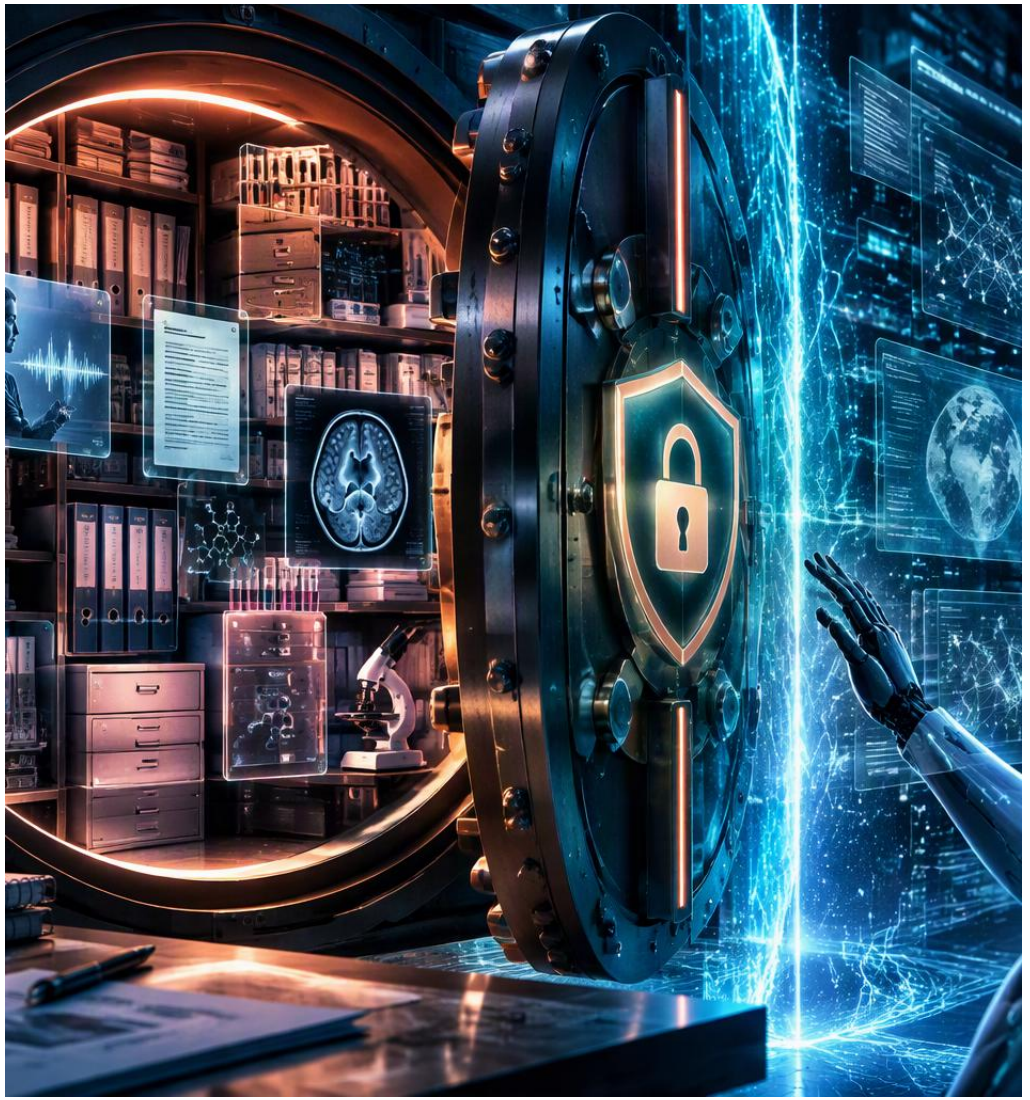
De-identified or internal data. Confirm consent language, IRB scope, and data-use agreements before sharing.

RED: STOP AND GET AUTHORIZATION

Participant, student, or health records; proprietary code; unpublished findings. Approved enterprise tools only.

WHAT COUNTS AS SENSITIVE DATA

Names, IDs, health and education records, interview or survey responses, credentials, and unpublished work.



• STEP 4 OF 4: BUILD SKILLS THAT LAST

Your Career in an AI-Enabled STEM Workforce

You can verify, disclose, and protect. Now build skills that last as routine tasks shift to AI.

AI CAN HELP WITH

Literature searches, first drafts, boilerplate code, data cleaning, and routine analysis.

YOU STILL OWN

Framing questions, choosing methods, interpreting results, spotting wrong output, and communicating findings.

SKILL TO PRACTICE THIS YEAR

Verify AI output against your own data and methods, and ask your PI or employer what the rules are for AI use.



Using AI Responsibly in Your Lab and Career

Recap: understand the tool, protect integrity, protect data, build skills. Then ask four questions about every AI use.

WHO BENEFITS?	Faster analysis, writing, and coding
WHO MAY BE EXCLUDED?	Unequal tool access; biased data
WHAT COULD FAIL?	Fake citations, data leaks, errors
WHO REMAINS ACCOUNTABLE?	You, your PI/colleagues, your organization

Verify • disclose • protect • credit • ask



Questions & Answers



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Post-event Survey

Link:
https://airtable.com/appV3WgwaOshneEiM/pag3ljJ8klFdXgnww/form



Stay Connected With Us!

Explore: https://sstemrec.aaas.org/
Get on our Mailing List: http://eepurl.com/grH5C9
Connect on LinkedIn: https://www.linkedin.com/company/csew
Follow on Bluesky: https://bsky.app/profile/aaascsew.bsky.social