

# Beyond ChatGPT: Using AI Across the Academic Research Lifecycle

Undergraduate  
Research  
Professional  
Development  
Program

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# Learning Objectives

- Identify AI tools used at different stages of the research process.
- Understand strengths and limitations of AI applications in research.
- Experiment with AI tools for ideation, literature review, data analysis, and writing.
- Recognize ethical concerns and best practices for responsible AI use.





# AI in Research: Overview



AI enhances every stage of academic research:



Ideation, Literature Review,  
Methodology Design,



Data Collection, Data Analysis,  
Writing and Dissemination.



AI supports tasks traditionally  
performed manually,



enabling researchers to analyze  
richer data and scale research  
impact.

# Brainstorming Research Questions

- Generates novel ideas, identifies research gaps.
- Interactive brainstorming tools (ChatGPT, HyperWrite).



# Literature Review

- Summarizes and synthesizes literature using NLP.
- Tools: Semantic Scholar, Elicit, Litmaps.





# Designing Methodology



Suggests appropriate methods, experimental designs.



Tools for method selection, bias detection.

# Data Collection



AUTOMATES SURVEY CREATION, DATA  
GATHERING (TEXT, VISUAL, AUDIO).



IMPROVES DATA QUALITY AND  
SAMPLING STRATEGIES.

# Data Analysis



IDENTIFIES PATTERNS, AUTOMATES  
CODING AND THEMATIC ANALYSIS.



TOOLS: JULIUS AI, NVIVO,  
RAPIDMINER.

## Writing and Argumentation

Aids drafting,  
improves structure  
and clarity.



Supports evidence-  
based argumentation.

# Ethical and Responsible Use

01

Maintain academic integrity and transparency.

02

Verify and critically evaluate AI outputs.

03

Properly attribute AI contributions.

04

Actively mitigate bias and check for plagiarism.

05

Use AI to enhance efficiency, not as a shortcut.



## Wrap-Up and Key Considerations



AI reshapes research workflows across disciplines.



Enhances efficiency, insights, and collaboration.



Considerations:



Ethics and privacy, interdisciplinary communication,



limitations of AI automation, democratization of tools.