Nov. 2024

Generative AI in graduate research practice in chemistry

PURPOSE OF GUIDELINES: To provide guidance and regulation for the use of generative AI for research components of the program and the degree-level competencies students must demonstrate to be awarded their degree using practices acceptable to the discipline and general principles of responsible conduct of research and academic integrity. The guidelines were developed based on the principles in the CGPS Generative AI framework¹ including academic integrity, transparency and disclosure, data privacy and confidentiality and developing literacy including awareness of bias in algorithms/training data.

GUIDELINES

- **1. Applications:** In the preparation of applications for internal or external scholarships, research funds, or ethics approval, students are responsible for ensuring they follow the rules of the agency or office with regard to generative AI use in preparing applications.
- **2. Coursework:** Permission to use generative AI in coursework is up to each instructor. Students must adhere to the instructions provided in each course syllabus.

3. Thesis/Dissertation Work:

Generative AI has much promise to accelerate research productivity. Regardless of how students gather, synthesize and report information and ideas, they are responsible for the accuracy of the information and that all sources are appropriately cited in their work. Currently, generative AI is fallible in several ways including perpetuation of biases from the data used to train AI algorithms, generation of sources that do not exist and failure to cite sources to the rigor required in graduate level scholarship.

At the end of their degree, students in chemistry must demonstrate the ability to be knowledgeable of background in their area of study, synthesize the relevant background literature, critically evaluate background literature, design and conduct original research that adds to the body of knowledge in chemistry, present research findings in the form of seminars and conference-style presentations, and create and orally defend written descriptions of their research in the form of a dissertation.

As a final assessment, students must be able to defend their thesis/dissertation in an oral examination. Students that rely too heavily on software to generate their written documents are at risk of not being able to defend the work in the same way a student who writes their document and is aware of the intended meanings. As a general rule, an author should not cite a source unless the author has read the source.

¹ - As of May 2024, there is a <u>university taskforce</u> in the process of establishing principles and guidelines for the use of AI and generative AI in teaching and learning, research and administration. When the university principles and guidelines have been adopted, these guidelines may be updated to align with the university guidelines For example, the taskforce is considering sustainability as part of this exercise; generative AI uses tremendous resources/has a large carbon footprint which may temper recommendations for use.

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With the above principles and required competencies in mind, we developed the following guidelines for use of generative AI in thesis/dissertation work and advise students to ensure they can defend all of the text in their written work.

1. Types of generative AI and uses:

- Select generative AI tools may be used for gathering information and writing text providing that they are disclosed through a transparency statement or listed as part of the methodology. The approved applications include: Research Rabbit, iAsk Academic, and ChatGPT for Research, Copilot and Jasper.
- Use of generative AI software for the production of illustrations, audio, video or other types of audio-visual material is currently not allowed due to the legal issues relating to AI-generated images and videos remaining broadly unresolved and the inability to clearly hold copyright of the work.
- Prior to using any generative AI applications not listed above in thesis work, the student should consult with their supervisor to ensure it will be acceptable for use and publication. Disputes on whether specific generative AI can be used should be referred to the Graduate Chair.
- Patents: Students and faculty who wish to apply for patents should be aware of the implications of generative AI use. The most recent guidance from the US Patent office includes the statement *"This guidance explains that while AI-assisted inventions are not categorically unpatentable, the inventorship analysis should focus on human contributions, as patents function to incentivize and reward human ingenuity. Patent protection may be sought for inventions for which a natural person provided a significant contribution to the invention, and the guidance provides procedures for determining the same."*

2. Academic Integrity and Bias:

- Students are responsible for their use of generative AI in researching background information including verifying all sources and any breaches in publication ethics that could arise.
- Students using generative AI (and AI in general) must be aware of the biased nature of training data and able to respond to questions regarding training data for generative AI applications used.

3. Transparency and Disclosure:

• Use of Large Language Model (LLM) generative AI software such as Chatgpt and Bing Copilot² in the writing of reports for advisory committee meetings, thesis/dissertation proposals, thesis/dissertation is permitted and must be disclosed using a transparency statement describing exactly how the generative AI software was used.

² As of July 1, all graduate students will have access to copilot through PAWS.

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- To retain copyright of the thesis/dissertation, the document cannot be entirely written by the applications. The degree of human input required to retain copyright remains unresolved.
- 4. Data Privacy and Confidentiality due to privacy and confidentiality concerns of information deposited into generative AI applications, students must ensure any data provided to generative AI will not breach privacy and confidentiality requirements and be aware of restrictions due to the development of new intellectual property or use of intellectual property from research partners as students frequently work on industry partnered projects.

Contravening these guidelines will constitute academic misconduct.

PUBLISHING

In our discipline students disseminate their scholarly work primarily through publication in peerreviewed journals, peer-reviewed conference presentations, and their dissertation.

Students and supervisors are responsible for keeping up to date with current editorial/publisher policies where they intend to publish research to ensure compliance with those policies.

Failing to follow editorial rules with regard to publishing or peer review will constitute a violation of the responsible conduct of research policy.

REVIEWING:

Students may be engaged in assisting faculty with reviewing for journals or directly approached by journals to perform reviews. Both faculty and students are responsible for adhering to the

regulations on whether or not generative AI tools can be used in reviewing work. Currently Springer Nature does not allow us of AI tools for reviewing papers and Tri-Agency does not allow reviewers to enter information from proposals into generative AI due to the need for confidentiality.

TRAINING:

Supervisors and students are encouraged to engage in workshops and training to develop AI literacy, focusing on ethical use, academic integrity, and critical evaluation of AI tools.

Library learning module (in GPS960) – Academic Integrity Module: Understanding Generative AI

TLE https://teaching.usask.ca/learning-technology/gen-ai/overview.php#top