## CAII 2024 Ashby Hackathon Information

This competition is co-organized by the [**Center for Artificial Intelligence Innovation**](https://ai.ncsa.illinois.edu/) at the [**National Center for Supercomputing Applications**](https://www.ncsa.illinois.edu/). The main goal of the hackathon is to let talented UIUC students showcase their skills in a friendly competition while working on challenging problems involving computational science and machine learning using state-of-the-art computational systems at NCSA.

The competition will take place on **April 20-21** at the National Center for Supercomputing Applications with the final presentation of the competition results on **April 23** during the [NCSA Student Research Conference](https://calendars.illinois.edu/detail/7?eventId=33480519)**.** We encourage you to sign up soon using this [Registration Link](https://forms.gle/TgZWVP186JZou9ui7). Deadline for registration is April 12, 2024.

**Eligibility**: Teams must have two or more students (undergraduate and/or graduate) with at least one currently enrolled in the Computer Science Department. Students are encouraged to form teams of up to five students.

**Criteria**: Teams will be evaluated on the following:

1. Innovative approach with respect to utilizing LLMs to generate and execute a workflow, as well as the use of machine learning, information visualization, and other computational techniques.
2. Effective use of NCSA computing resources, including performance on its flagship AI platform.
3. Quality of a written project summary and oral presentation.
4. Relevance of the developed solution.

**Prize**: 1st place $3000, 2nd place $1500, 3rd place $750

**HACKATHON PROJECT**

**Using LLMs as a front-end to computational workflows**

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*Technical team contact:* Kastan Day (kvday2@illinois.edu), Minu Mathew (minum@illinois.edu), Rohan Marwaha (rohan13@illinois.edu), Asmita Dabholkar (avd6@illinois.edu)

*Problem:* The main problem to be addressed in this hackathon is how to use LLMs and AI techniques as a front for workflow management systems to execute computational workflows. An initial attempt at solving this problem is described in [arXiv:2312.07711](https://arxiv.org/abs/2312.07711). Relevant code and data are available on [GitHub](https://github.com/grimloc-aduque/Phyloflow-Parsl-Implementation). Students will be provided with access to Delta supercomputer and OpenAI API credits.

**General info docs** : [GDrive link](https://drive.google.com/drive/folders/1FM3Guy5vJsHvDZtAARozCzmPhPxyQHRn)

**Workflow starter kit** :

[Example Workflows](https://github.com/rohan-uiuc/ncsa-hackathon-workflows)

[Example Agent](https://github.com/UIUC-Chatbot/workflow-agent)

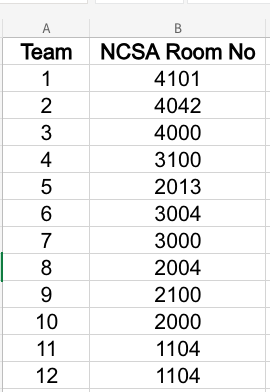
**Expected Deliverable**: The goal of the hackathon is to develop a workflow agent/agents that can autonomously execute a computational workflow, potentially leveraging large language models (LLMs) or other AI techniques to automate certain tasks. Participants are free to choose any workflow of choice as long as it involves a combination of data processing, analysis, and decision-making steps (essentially involving computations). The deliverable (workflow agent) should demonstrate/execute the entire workflow, including the code implementation and the final results/visualizations, rather than just the code or the results in isolation.

**Scope of the Project**: The focus should be on developing a robust, replicable computational process that can tackle complex, real-world problems. While the [examples provided](https://github.com/rohan-uiuc/ncsa-hackathon-workflows/tree/main?tab=readme-ov-file#example-hackathon-starter-workflows) serve as a starting point, the teams are encouraged to explore their own ideas that align with the broader theme of the hackathon, which is to showcase how AI-powered workflows can be used to solve complex computational challenges. The key is to demonstrate that the agent can develop and execute the workflow for the user.

**Using Delta HPC**: Participants are given access to NCSA’s Delta HPC cluster. Checkout the [presentation](https://docs.google.com/presentation/d/1mHNwGp0Q5nmYJDCRyYZPT7_THEG9VanX/edit#slide=id.p1) on how to use Delta and use [example scripts](https://github.com/rohan-uiuc/ncsa-hackathon-workflows/tree/main/example_slurm_scripts) to run jobs.

While participants have been granted access to Delta, it's important to note that its utilization is optional. Teams are encouraged to leverage their preferred environments, whether it's their local machines, Google Colab, or other platforms, to develop their projects.

**Logistics**:

* Hackathon duration : Apr 20, 2024 8:00 AM to Apr 21, 2024 EOD
* Participants will have access to NCSA building on Sat and Sun (Apr 20-21)
* Use Slack for all communication. [caii-hackathon-sp24.slack.com](http://caii-hackathon-sp24.slack.com)
* Feel free to contact any of the admins for help - be it debugging, accessing Delta, flushing out your ideas, etc.
  + Rohan
  + Kastan
  + Asmita
  + Minu
  + Volodymyr Kindratenko
* Teams are assigned rooms within the building for ease of collaboration. Given below are the list of rooms assigned for each team. Participants are welcome to be wherever their creative ideas keep flowing - be it in NCSA or outside.
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* Light breakfast and lunch will be provided outside of Room 1104.
* Teams will give a presentation of their work on Tuesday, April 23rd, 4-6pm. The admins will reach out to each team to find out what time works best for them on Tuesday and prepare a schedule accordingly. We will also provide a PowerPoint template to prepare the presentations.