Delta Illinois Proposal Guidelines and Recommendations

A project proposal should be 4-6 pages (excluding references), and contain the following:

1. Name(s) of Illinois PI and Co-PIs and if applicable, name(s) of collaborators and their institutions.
2. Project Abstract
3. Project Overview (General proposals only)
4. Target Problem
5. Description of Code(s)
6. Experience, Readiness, Usage Plans and Funding Source(s)
7. Resources Required
8. Requested Start Date and Duration
9. References

Explanations and guidelines are described in detail below.

PRINCIPAL INVESTIGATOR

The Principal Investigator must be a University of Illinois at Urbana-Champaign faculty or staff member. Multiple co-PIs may be listed and they may be students, postdocs, or faculty/staff members from Illinois or other institutions. Young investigators are encouraged to apply. Only one Principal Investigator should be listed for each proposal. The proposal should include the PI and co-PIs names, title, department, university, and contact information.

PROJECT ABSTRACT

A one-paragraph (about 150 words) project summary including why Delta is necessary for this activity. This summary may be shared with the community on the Delta website.

PROJECT OVERVIEW (FOR GENERAL PROPOSALS)

For general allocations, include a one-page overview of the project that describes the science/engineering problem to be solved and the computational approach, including challenges. Also describe the possible scientific impact to the specific field of science or to the greater scientific community. This overview may be shared with the community on the Delta website.

TARGET PROBLEM

A description of the specific research question(s) that the resources requested will be used to answer and the scientific and societal impact of the proposed work. Include an explanation of why a resource of the capability that Delta represents is necessary to address this research.

DESCRIPTION OF CODE(S)

Describe the structure of the application codes that you intend to use. These may either currently exist, might require enhancement, or they may be in development. Include descriptions of any novel computational or data driven approaches. Please include details about the algorithms involved and the approach that you intend to use to ensure that the code performs effectively on the Delta GPU-centric architecture. Describe how your code(s) will use each of the major system elements: the memory hierarchy, the communications network, the computational elements, GPU nodes, and the I/O subsystem. Identify which system element(s) is/are likely to be the main bottlenecks and how the design of your application minimizes the impact of these bottlenecks. Describe how you intend to analyze the output resulting from your use of Delta. **IMPORTANT**: Please describe any run-time libraries or special system software or program development environment features required.

EXPERIENCE, READINESS, USAGE PLANS AND FUNDING SOURCE(S)

Briefly describe your experience with using other HPC systems. Include the current state of readiness of the application codes that you intend to use and your plans for developing these to the point where they are ready to run in production mode on the Delta system. Evidence of suitability for running on Delta may include data on the efficiency of the application or evidence of running on other GPU resources.

Provide an estimated schedule. The estimate should be per quarter and may be represented as a percent of the requested allocation (e.g. Q1: 10%, Q2: 20%, Q3: 50%, Q4: 20%). It would be best to plan to use most of the time by the end of Q3 and not plan to use time in the final quarter, Q4 since many allocations will be trying to complete their usage.

The Delta project is tasked with efficient utilization of the Delta system and accordingly reserves the right to age out and scale back allocations if their utilization rate is very low. However, the project understands that research time availability varies across the academic calendar and will consult with the PI before taking such steps.

Please identify the source(s), amount(s) and duration of existing funding that is supporting the development of your application. If not currently funded, please describe how you intend to support any required development work.

RESOURCES REQUIRED

Describe the resources required to complete research on the Target Problem. This description should include the amount and type of each Delta allocatable resource needed for your runs (Delta CPU in core-hours, Delta GPU in A100 gpu-hours, and Delta Storage), the anticipated input and output requirements, the amount of data that you anticipate transferring to or from Delta, the amount and type of storage required and any other system resource needs that you anticipate. As Delta is a GPU-centric resource CPU-only requests are discouraged. For a description of the default storage quotas see:

REQUESTED START DATE AND DURATION

For general allocations, the default duration is 12 months. If you believe your project can be completed in less time, please indicate as such (e.g. 6 months). All projects should include the desired start date for the allocation.

REFERENCES

Include references related to the work at the end of the proposal as part of the main document.

Additional considerations for Delta Illinois allocations:

1. Faculty or staff for whom the University of Illinois at Urbana-Champaign is their home institution by primary appointment affiliation are eligible to submit an Illinois allocation proposal as Principal Investigator; this includes postdoctoral fellows or postdoctoral research associates. Registered graduate or undergraduate students are not eligible to apply as Principal Investigators due to administrative requirements regarding appointment status, but are encouraged to apply if their faculty or staff advisor will agree to be Principal Investigator on the proposal. Visiting faculty or external adjunct faculty for whom Illinois is not their primary home institution are eligible to apply as Principal Investigators if, for the period covered by the proposal request: i) Illinois will be their primary (majority) place of residence; and: ii) and they will hold appointments at Illinois during this period. All proposals can include co-PIs and collaborators from other institutions.
2. There are two Illinois allocation periods open per year, with year-long allocation awards. The open allocation periods normally occur in August /September (Fall) and January/February (Spring).
3. The maximum Illinois allocation will be about 1/10th of the total allocatable amount per period (~25k GPU hours and ~690k CPU core hours)
4. Illinois allocations should be for research only; If resources are needed for instruction, please submit your request through the ACCESS program.
5. Start-up allocations may be requested for test runs and to determine full allocation request needs; up to 1,000 GPU hours, 50,000 CPU core hours
6. Illinois allocation requests should be significantly different from requests by the same user for discretionary requests or have a strong reason (e. g., proposal opportunity, disaster response, etc.). Discretionary allocations should be utilized before an additional Illinois request is made.
7. Delta will allocate the CPU and GPU resources separately, with an emphasis on the GPU resources. The expectation is that most allocations will be primarily GPU allocations with smaller, supporting CPU allocations.
8. Research teams are responsible for managing their own export control needs
9. The Delta compute elements are more powerful than the Blue Waters compute units with the Delta CPU nodes offering ~6X faster performance and the A100 GPU offering 15X performance improvement. On a performance basis the Delta Illinois allocation offers the same or better performance than 10% of the Blue Waters GPU nodes, but less than 5% of the CPU capability. The smaller storage pool will also limit Delta's use for the extended storage of large data sets, though the performance of Delta's flash based storage will provide much faster throughput for some workloads.
10. Allocation Definitions:
    a. **Supplement** -- Supplement requests add additional resources to an existing project allocation. Supplement requests can be submitted up until 30 days remain on the current allocation. If a PI has less than 30 days remaining on their allocation but is in need of a supplement, they must typically first submit and be approved for a time extension.
    b. **Extension** -- Extension requests add additional time to an existing project allocation by extending the allocation end date. A time extension can be submitted when less than 90 days remain on the allocation and up to 90 days after the expiration of the allocation.