Your Aurora ESP Proposal Title

### Section 1: PI and co-PI Information

#### 1a. Principal Investigator (PI) Information

* Last Name, First Name, Title (Dr., Mr., Ms., *etc.*)
* Institution
* Street address
* Email address

#### 1b. Co-Principal Investigator (co-PI) Information

For each co-investigator:

* Last name, first name, title (Dr., Mr., Ms., *etc.*)
* Institution
* Street address
* Email address

### Section 2: Project Summary

#### 2a. Executive Summary

Write an executive summary that accurately describes your proposed research and the high-impact scientific advances you will achieve with access to early resources at the ALCF. ***(1/2 page)***

#### 2b. Benefit to Community

Write a description of the benefit your project will provide to the science and HPC community. ***(1/2 page)***

#### 2c. Impact Statement

Provide a two-sentence project summary that can be used to describe the impact of your project to the public ***(50 words maximum)***.

#### 2d. Science Summary

Write a description of the science problem you would like to address in the late 2021 time frame. This problem should be appropriate for an exascale system, with characteristics as described in Section 3 below. Include research that will need to be completed in the next two years to lead up to this work. ***(1 page)***

#### 2e. Application Summary

##### 2e.i. Application Requirements

Write a list of your application requirements, including languages, libraries, , I/O middleware, databases, machine learning/deep learning frameworks, workflow software, containers, etc. Indicate your current approaches to parallelism (Spark, Swift, MPI, OpenMP, etc*.*). Please include “productivity” languages such as Python, R, Julia, *etc.* ***(1 page)***.

##### 2e.ii. Application Data Requirements

Write a description of your data management requirements. Example topics to include

* Streaming/realtime data feeds
* Access to remote databases
* Setup/access of local databases
* Data formats (HDF5, etc.)
* Data sizes/scales (ingested/output data for each stage in end-to-end workflow)
* ALCF persistant storage requirements (number of bytes, maximum number of files, other measurements that pertain to non-file-based storage)

##### 2e.iii. Application Description

Write a description of the current application, including methods, parallelization, I/O, *etc*. ***(1 page)***.

##### 2e.iv. Application Development Needed

Write a description of the code and/or algorithmic development you believe will be necessary to exploit an increase in parallelism per-node and an increase in overall levels of parallelism. Include work that will be needed in MPI parallelism. Show measurements of current application performance and scaling, indicating where development/optimization is needed to achieve performance goals for Aurora. ***(1 page)***.

### Section 3: Estimate of Resources Requested

(Refer to the detailed [Proposal Author Instructions](http://www.alcf.anl.gov/alcf-aurora-2021-early-science-program-datalearning-proposal-instructions) for guidance on making estimates.)

#### 3a. Current-Generation System (Theta) Resources:

* *Theta* time in *Theta* core-hours. *This time is primarily for development, not for science runs. The ballpark of your request should be a few to 10 million core-hours per year—sort of like a Director’s Discretionary allocation.*
  + Please specify the amount of time you need per calendar year (2018, 2019, 2020, and 2021)
* Disk space in TB
* Tape archive space in TB
* Brief schedule for how you would use that time on *Theta* to prepare for early access to next-generation hardware and the final next-generation system: scaling tests, development (e.g*.* algorithms, physics modules), verification, parameter sweeps, porting to Xeon Phi architecture, etc. Assume that your *Mira* and/or *Theta* access begins on 1 October 2018 and continues until the start of the Early Science period on *Aurora* (second half of 2021; exact date subject to change). Break this down into milestones as appropriate for your project. ***(1/2 page)***.

#### 3b. Next-Generation System (Aurora) Resources:

* *Aurora* time in exaFLOPS-hours
* Persistent storage space in TB (disk files/local databases/local object store/etc.)
* Tape archive space in TB
* Breakdown for how you would use time on *Aurora* to make final preparations for science runs, and for the science runs themselves. Preparations might include final scaling tests, science problem spin-up runs, *etc*. For the science runs themselves, estimate the total exaFLOPS-hours and breakdown into separate components/milestones as appropriate. You should plan for completing all of this during the (approximately) three-month Early Science period, when you and the other Aurora ESP projects will have dedicated pre-production access. Early Science starts in the 2nd half of 2021 (exact date subject to change). You will have continued access after that three months, but you will be sharing it with all our production users then, and may run at lower priority. ***(1/2 page)***.

### Section 4: Participation in Other Applications-Readiness Programs

Indicate whether your team, or others you are aware of using the same code base, have projects under the [OLCF CAAR program](https://www.olcf.ornl.gov/caar/). Also indicate if you have an active project in the [Exascale Computing Project](https://www.exascaleproject.org/).

### Section 5: Project Team Members, Research Funding

#### 5a. ALCF Funded Postdoc

Assuming 100% effort by an ALCF postdoc on your project for 2 years, identify the roles and responsibilities you expect for the postdoc. What activities do you expect him/her to focus on?

#### 5b. Names and Levels of Effort

List the names and levels of effort (as a percentage of full-time) for all team members you expect to do work on the ESP project. Indicate which aspects/areas of of the project each person world work on.

For each person, include a CV. If you have trouble getting all of the CVs into the PDF proposal document you are submitting, email [earlyscience@alcf.anl.gov](mailto:earlyscience@alcf.anl.gov) for assistance.

### Section 6: Commitments/Expectations

1. Having your institution(s) sign a multiparty RSNDA (restricted-secret nondisclosure agreement) with system vendor(s), so that you may speak with ALCF and other ESP participants about RSNDA information  
   Indicate “Confirmed” (meaning you confirm your project will do this)
2. Helping recruit an ALCF postdoc to work on your project team in a timely manner. The goal is to hire within the first year of the project  
   Indicate “Confirmed” (meaning you confirm your project will do this)
3. During the first two months of your project (after selection), prepare a detailed project plan with tasks/milestones we can use to document and report progress throughout the time until Aurora is accepted and the Early Science dedicated access period begins; ALCF will help with guidance on this  
   Indicate “Confirmed” (meaning you confirm your project will do this)
4. Provide simple planning documentation in the form of short-term activities/milestones, and report monthly on estimated percentage completion of milestones, as a means to track progress of your project.  
   Indicate “Confirmed” (meaning you confirm your project will do this)