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 2019 time frame. 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, and current parallel method (MPI, OpenMP, etc*.*) ***(1 page)***.

##### 2e.ii. Application Description

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

##### 2e.iii. 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. Consider here how you might use the memory hierarchy on the KNH nodes—the at least 16 GB of high-bandwidth on-package memory (HBM) and some combination of off-package DRAM and NVM (nonvolatile memory). There's a [presentation from Intel](http://ihpcc2014.com/pdf/100_KNL_HPC_Developer_Forum_SC_14.pdf) that discusses the three modes of using the high-bandwidth memory on Knights Landing CPUs cache for DRAM, flat, or hybrid), which you can use as a guide for Knights Hill. Memory bandwidth bound applications with good strong scaling may consider running entirely from the HBM. The simplest and possibly best approach for some codes might be using the entire HBM automatically as a cache for off-package memory. ***(1 page)***.

### Section 3: Estimate of Resources Requested

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

* *Mira* time in core-hours
* Disk space in TB
* Tape archive space in TB
* Brief schedule for how you would use that time on *Mira* and/or *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 January 2017 and continues until the start of the Early Science period on *Aurora* (1 January 2019; 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 core-hours
* Disk space in TB
* 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 core-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 on 1 January 2019 (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: Portability

#### 4a. Portability Approach

Discuss briefly your plans, if any, to achieve portability of your projects application(s) across different supercomputer architectures, at least the two tracks described in the proposal author instructions: many-core CPU and CPU-GPU. ***(1/2 page)***.

#### 4b. 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 [NERSC NESAP program](https://www.nersc.gov/users/computational-systems/cori/nesap/) or the [OLCF CAAR program](https://www.olcf.ornl.gov/caar/). Also indicate if you have an active project in the [ALCF Theta Early Science Program](https://www.alcf.anl.gov/articles/alcf-selects-projects-theta-early-science-program).

### Section 5: Project Team Members

5a. 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.

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 NDA (nondisclosure agreement) with Intel and with Cray, so that you may speak with ALCF and other ESP participants about NDA 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 6 months 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)