

October 10-12, 2023



ALCF Hands-on HPC Workshop

Allocation Programs at the ALCF

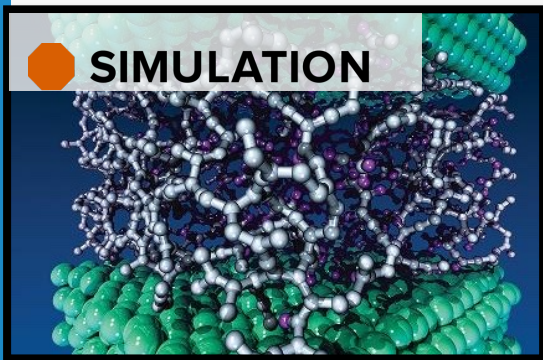
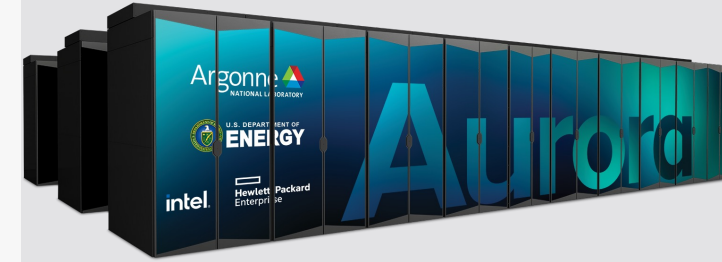
Katherine Riley
Director of Science, ALCF
October 10, 2023

Argonne Leadership Computing Facility

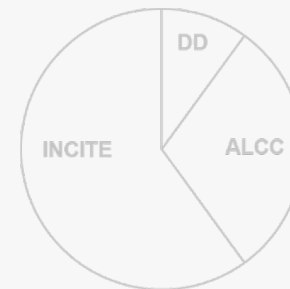


The Argonne Leadership Computing Facility provides world-class computing resources to the scientific community.

- Users pursue scientific challenges
- In-house experts to help maximize results
- Resources fully dedicated to open science



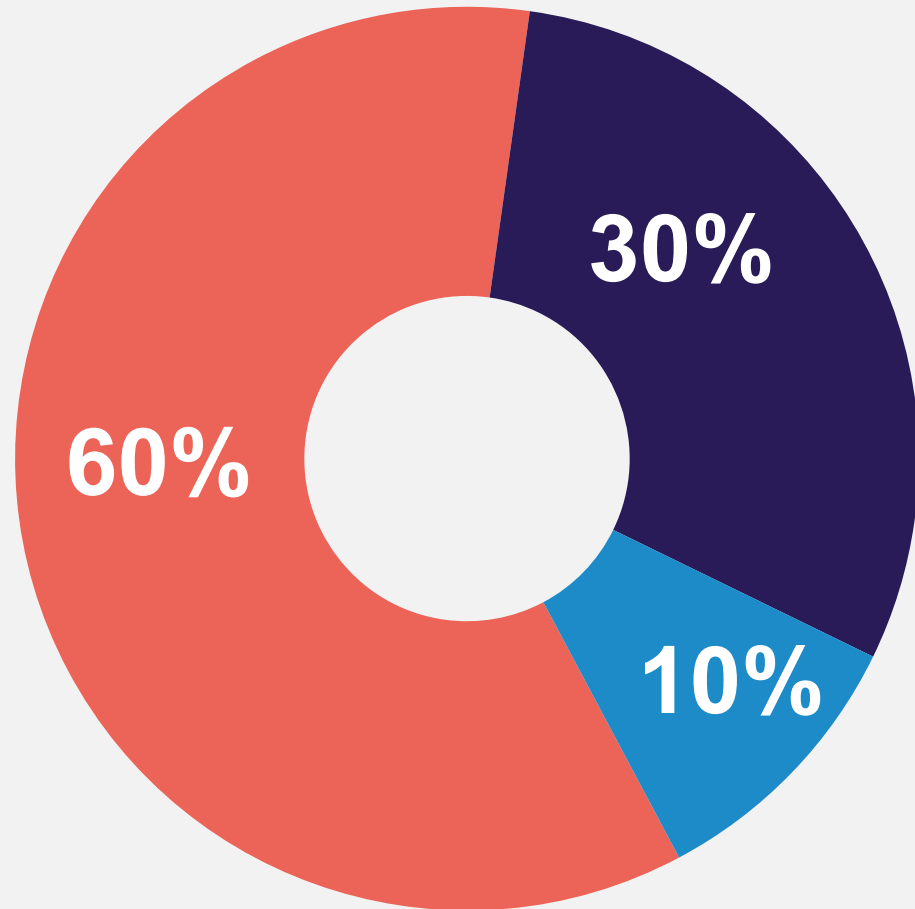
ALCF offers different pipelines based on your computational readiness. Apply to the allocation program that fits your needs.



Architecture supports three types of computing

- Large-scale Simulation (PDEs, traditional HPC)
- Data Intensive Applications (scalable science pipelines)
- Deep Learning and Emerging Science AI (training and inferencing)

ALCF Allocation Programs



INCITE: Innovative and Novel Computational Impact on Theory and Experiment

- Yearly call with computational readiness and peer reviews
- Open to all domains and user communities

ALCC: ASCR Leadership Computing Challenge

- Yearly call with peer reviews
- Focused on DOE priority
- Exascale Computing Project (ECP)

DD: Director's Discretionary Program

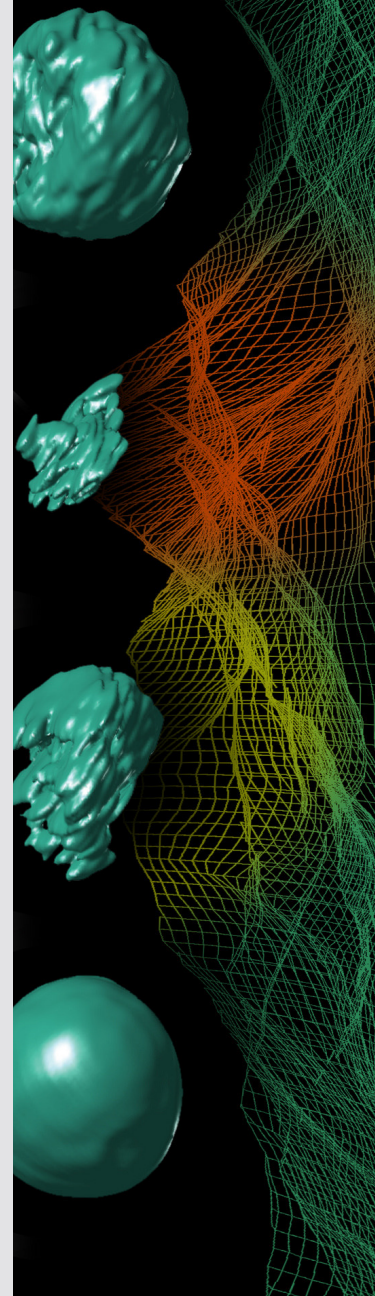
- Rapid, small allocations for project prep and immediate needs
- Early Science Program (ESP)
- Strategic Program
- Proprietary Projects

DD

Director's Discretionary

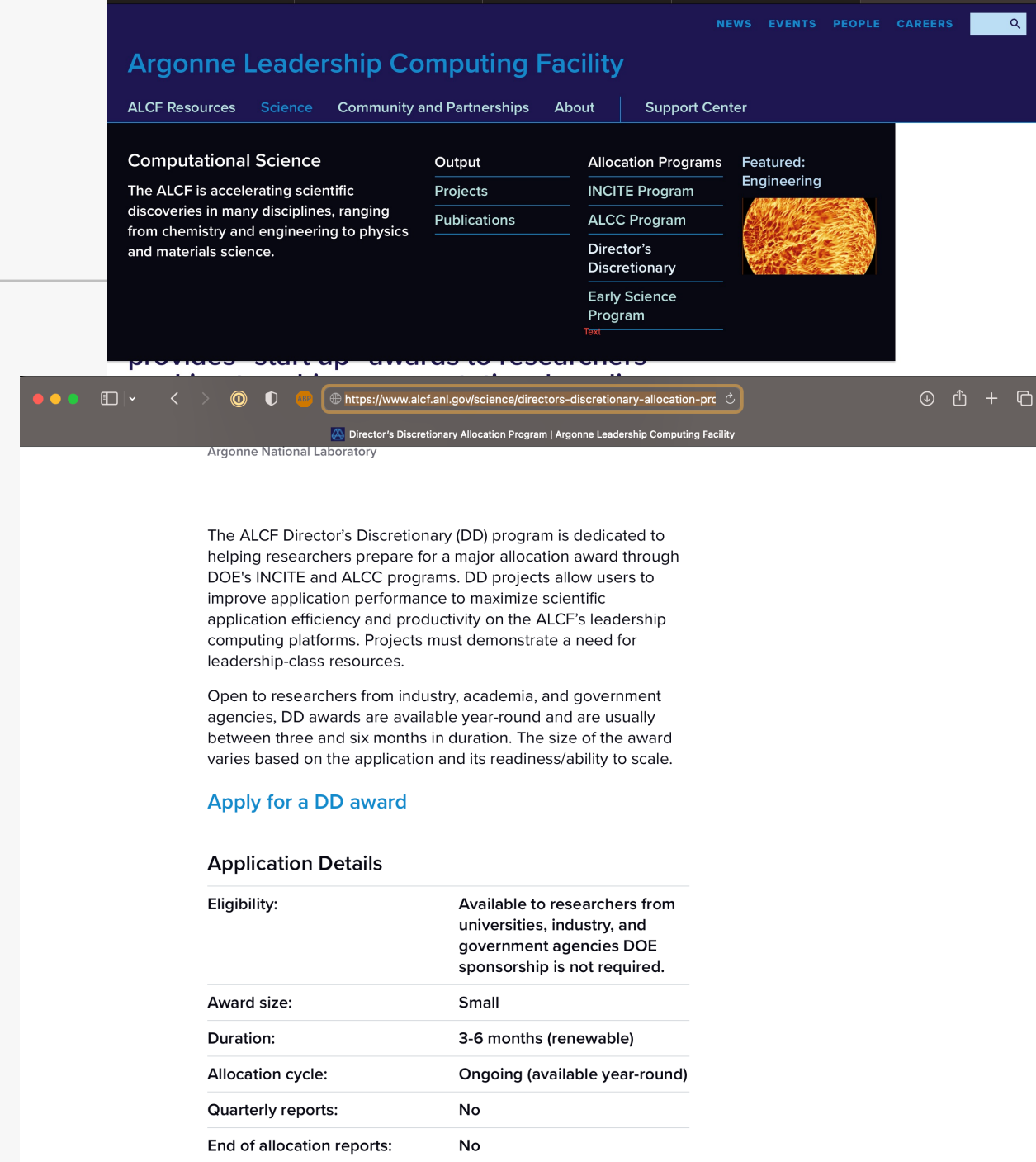
- **Purpose:** A “first step” for projects working toward a major allocation
- **Eligibility:** Available to all researchers in academia, industry, and other research institutions
- **Review Process:** Projects must demonstrate a need for high-performance computing resources; reviewed by ALCF
- **Award Size:** Low 10 thousand of node-hours
- **Award Duration:** 3-6 months, renewable
- **Total percent of ALCF resources allocated: 10%**

- **Award Cycle**
Ongoing (available year-round)



Applying to DD

- Process is designed to be quick
 - Short application, ~2 week turn around
- Demonstrate a need for LCF resource
- Evaluate viability and porting to LCF resources
- Work toward an INCITE or ALCC



The screenshot shows the Argonne Leadership Computing Facility website. The main navigation bar includes "ALCF Resources", "Science", "Community and Partnerships", "About", and "Support Center". The "Science" section is highlighted, with sub-links for "Output", "Projects", and "Publications". The "Allocation Programs" section lists "INCITE Program", "ALCC Program", "Director's Discretionary", and "Early Science Program". A featured image of a glowing orange and yellow structure is labeled "Featured: Engineering". Below the navigation, the page title is "Director's Discretionary Allocation Program | Argonne Leadership Computing Facility". The main content area describes the DD program, its purpose, and eligibility criteria. A table titled "Application Details" provides specific information about the program.

Argonne National Laboratory

The ALCF Director's Discretionary (DD) program is dedicated to helping researchers prepare for a major allocation award through DOE's INCITE and ALCC programs. DD projects allow users to improve application performance to maximize scientific application efficiency and productivity on the ALCF's leadership computing platforms. Projects must demonstrate a need for leadership-class resources.

Open to researchers from industry, academia, and government agencies, DD awards are available year-round and are usually between three and six months in duration. The size of the award varies based on the application and its readiness/ability to scale.

[Apply for a DD award](#)

Application Details	
Eligibility:	Available to researchers from universities, industry, and government agencies DOE sponsorship is not required.
Award size:	Small
Duration:	3-6 months (renewable)
Allocation cycle:	Ongoing (available year-round)
Quarterly reports:	No
End of allocation reports:	No

ALCC

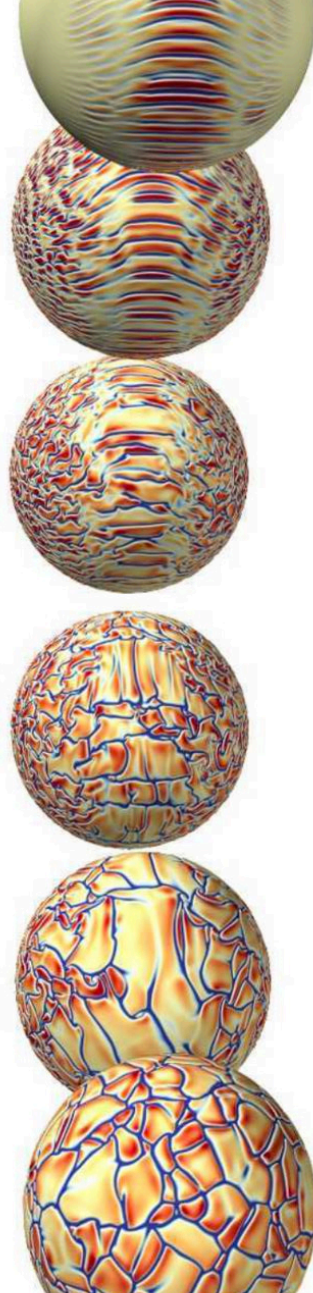
ASCR Leadership Computing Challenge

- The DOE's ALCC program allocates resources to projects directly related to the DOE's energy mission, as well as national emergencies, and for broadening the community of researchers capable of using leadership computing resources.
- **Eligibility:** Available to researchers in academia, industry, and other research institutions
- **Review process:** DOE peer reviews all proposals for scientific/technical merit; appropriateness of approach; and adequacy of personnel and proposed resources
- **Award size:**
 - 10,000-200,000 Polaris node-hours
 - ~ 250K – 1M Aurora node-hours
- **Award duration:** 1 year
- **Total percent of ALCF resources allocated:** 20-30%

- **Award Cycle**

July 1 to June 30

Nov Call
Plan for
LOI



What is INCITE?

Innovative and Novel Computational Impact on Theory and Experiment

INCITE promotes transformational advances in science and technology through large allocations of computer time, supporting resources, and data storage at the Argonne and Oak Ridge Leadership Computing Facilities (LCFs) for **compute intensive and/or data intensive** large-scale research projects.



The LCFs have a mission to provide support for high-impact **open science** research that cannot be accomplished elsewhere. No requirements exist for funding source or research topic.

INCITE

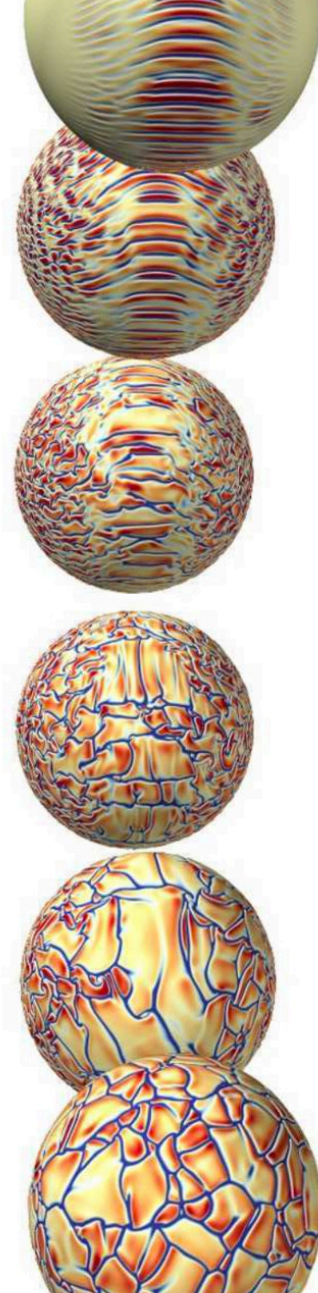
Innovative & Novel Computational Impact on Theory and Experiment

- The DOE's INCITE program provides allocations to computationally intensive, large-scale research projects that aim to address "grand challenges" in science and engineering.
- **Eligibility:** Available to researchers in academia, industry, and other research institutions
- **Review process:** INCITE program conducts a two-part review of all proposals including a peer review by an international panel of experts, and a computational-readiness review
- **Award size:**
 - 100,000-300,000 node-hours on Polaris
 - ~0.5M-3M node-hours on Aurora. Larger awards than projects could receive elsewhere.
- **Award duration:** 1-3 years, renewable
- **Total percent of ALCF resources allocated:** 60%

- **Award Cycle**

January 1 to
December 31

2025
Call Opens
April 2024



INCITE Eligibility Criteria

Access on a competitive, merit-reviewed basis*

1	Merit criterion
	Research campaign with the potential for significant domain and/or community impact
2	Computational leadership criterion
	Computationally demanding runs that cannot be done anywhere else: capability, architectural needs
3	Eligibility criterion
	<ul style="list-style-type: none">• Grant allocations regardless of funding source*• Non-US-based researchers are welcome to apply

*DOE High-End Computing Revitalization Act of 2004: Public Law 108-423

Twofold review process

		New proposal assessment	Renewal assessment
Most Crucial	Scientific Peer review INCITE panels	<ul style="list-style-type: none"> • Scientific and/or technical merit • Appropriateness of proposal method, milestones given • Team qualifications • Reasonableness of requested resources 	<ul style="list-style-type: none"> • Change in scope • Met milestones • On track to meet future milestones • Scientific and/or technical merit
	Technical Assessment LCF centers	<ul style="list-style-type: none"> • Technical readiness • Appropriateness for requested resources 	<ul style="list-style-type: none"> • Met technical/computational milestones • On track to meet future milestones
Risk Assessment	Award Decisions	INCITE Awards Committee comprised of LCF directors, INCITE program manager, LCF directors of science, sr. management	

Early Career Path

INCITE looks to support and encourage the next generation of researchers by committing 10% or allocatable hours

- Who can apply to the Early Career Path?
 - Researchers less than 10 years out from their PhD who need LCF-level capabilities to advance their overall research plan.
- How to apply to the Early Career Path?
 - The option to self-identify as early career will be available on the INCITE application.
- Will it increase my chances of an award?
 - If you qualify, it could. Overall, projects must still be meritorious in the peer review and computationally ready.

Early Career 2022	
Total proposals	28
Total Meritorious	23
Total High Merit	9
Total Awarded	10

Key Questions to Ask Yourself

- Is both the scale of the runs and the time demands of the problem of LCF scale?
 - Yes, I can't get the amount of time I need anywhere else.
 - Yes, my applications are too large to run on other systems.
- Do you need specific LCF hardware or systems?
 - Yes, the very large memory and I/O available here are necessary for my work.
 - Yes, my application requires mixed/reduced precision accelerator hardware.
- Do you have the people ready to do this work?
 - No, I'm waiting to hire a postdoc.
 - Yes, I have commitments from the major participants.

Note: Some of these characteristics are negotiable, so make sure to discuss atypical requirements with the ALCF

Key Questions to Ask Yourself (cont.)

- Do you have large data/AI needs?
 - Yes, my data-intensive needs require the LCF resources.
- Do you have a *tested* workflow solution?
- Do you have a post-processing strategy?
- Do you use ensemble runs and need LCF resources?
 - My ensembles can run under the direction of a large job or workflow manager, with I/O scaling on a parallel file system -> possibly yes
 - My ensemble expects to run millions of serial batch jobs on nodes with local disk available -> probably no
- Do you understand the life cycle of your data?

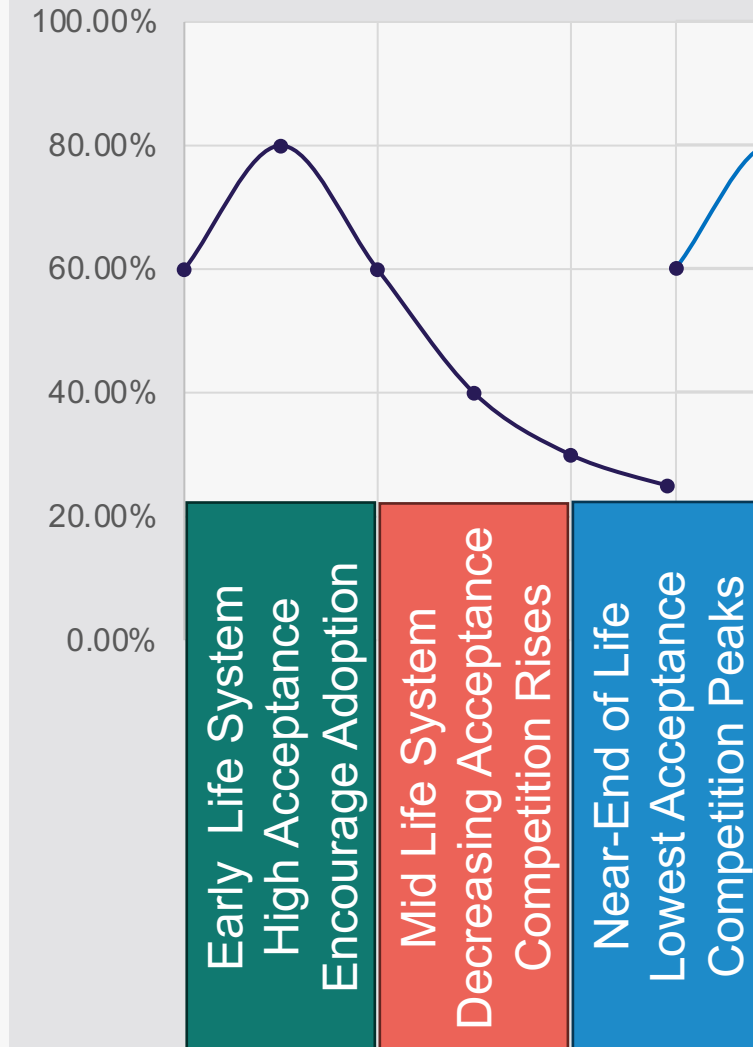
Note: Some of these characteristics are negotiable, so make sure to discuss atypical requirements with the ALCF

Guidance Applying for INCITE

- Scientific merit is the key aspect to success
- Reviewers are accomplished researchers in their fields
 - Write for reviewers who are experts, but perhaps not experts in your subspecialty
- Be clear about work or data that is needed to be able to start
- Follow the guidance for both the technical assessment and proposal template
 - Demonstrate your computational approach as much as possible
- INCITE hosted webinars when the call opens

Key take away: Proposal-craft is key, and reviewers are looking for a complete story.

Illustration of Acceptance Rates over System Life
Award Sizes are Inverse



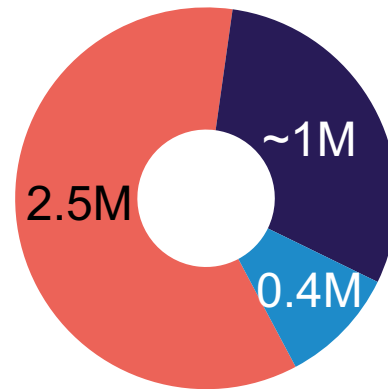
Estimations of Project Award Sizes and Node-hours



Polaris
44 PF HPE



Total Node-Hours for Allocation



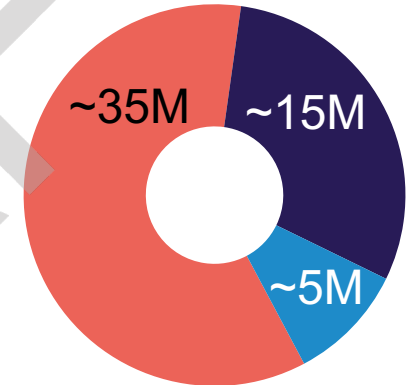
DD



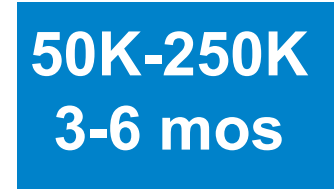
Aurora
≥2 EF Intel-HPE



Total Node-Hours for Allocation



DD



2023 and 2022 Award Statistics

2023 Award Statistics	Summit	Frontier	Theta	Polaris
Number of projects*	32	26	12	12
Average Project	535K	765K	1.58K	168K
Median Project	495K	850K	1.58K	163K
Total Awards (node-hrs in CY2023)	17.1M	19.9M	18.6K	2.01M

Total of 56 INCITE projects

- Summit, Frontier, Polaris : 2
- Summit, Frontier : 12
- Summit, Frontier, Theta: 1
- Frontier, Polaris : 3
- Theta, Polaris : 4

* All reported in node-hours native to each resource

2022 Award Statistics	Summit	Theta	Polaris
Number of projects*	37	17	11
Average Project	508 K	1.24 M	102 K
Median Project	540 K	1.00 M	100 K
Total Awards (node-hrs in CY2022)	18.8 M	21.1 M	1.22 M

Total of 53 INCITE projects

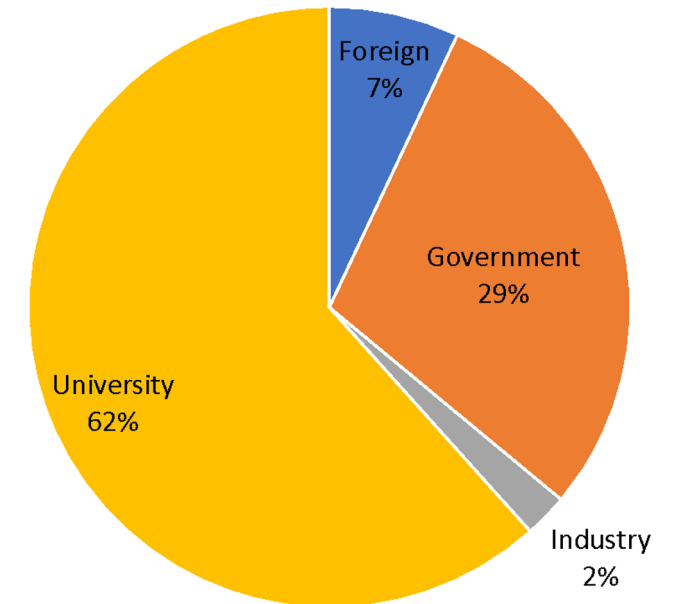
- Theta, Summit: 4
- Theta, Polaris: 11

* All reported in node-hours native to each resource

2023 INCITE Award Statistics

- Call for proposals closed June 17, 2022
- Each LCF resource was ~2X over-subscribed based on requests
- 60% of allocable time on the LCF production resources (Summit and Theta) were awarded for CY 2023, 50% of Polaris
- 56 projects awarded of which 9 are renewals

Lead PI Affiliations (Awards, by Project)



Acceptance rates

*50% of nonrenewal submittals were accepted
This is a much higher rate than historical rates*

Contact information

Katherine M. Riley, INCITE Manager
INCITE@DOEleadershipcomputing.org

INCITE Information

www.doeleadershipcomputing.org

- Kept up to date with most recent dates and information
- Webinar history and sign-up
- Templates and guidance on proposals



New for 2024: [Proposal Support for 2024 Proposals](#)

Important *Dates & Deadlines*

JUN 16

Call for Proposals closes at 8:00 pm EDT on June 16, 2023.

JUL 21

Renewal proposal submittal deadline is 5:00 pm EDT on July 21, 2023.

LCF Allocation Programs	INCITE 60%		ALCC 30%		Director's Discretionary 10%
Mission	High-risk, high-payoff science that requires LCF-scale resources*		High-risk, high-payoff science aligned with DOE mission		Proposal preparation Strategic LCF programs ECP
Call	1x/year – Opens in April, Closes June		1x/year – Opens in November, Closes February		Rolling
Duration	1-3 years, yearly renewal		1 year		3m,6m,1 year
Typical # Projects	10-30 projects (system dependent)		5-15 projects		~100 of projects
Total Hours	~2M Polaris node-hours		~900K Polaris node-hours		~290K Polaris node-hours
Review Process	Scientific Peer-Review	Computational Readiness	Scientific Peer-Review	Computational Readiness	Strategic impact and feasibility
Managed By	INCITE management committee (ALCF & OLCF)		DOE Office of Science		LCF management
Readiness	High		Medium to High		Low to High
Availability	Open to all scientific researchers and organizations Capability > 20% of resource				

Questions?

Thank you!