ARGONNE NATIONAL LABORATORY LEADERSHIP COMPUTING FACILITY


# ALCF Allocation Programs

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# Argonne's path to Exascale is critical to our nation's scientific leadership




ALCF4

2007 — 557 TeraFLOPS — 2013 — 10 PetaFLOPS — 2017 — 11 PetaFLOPS — Exascale — 2021

# Argonne leads in extreme scale computing and computational Science

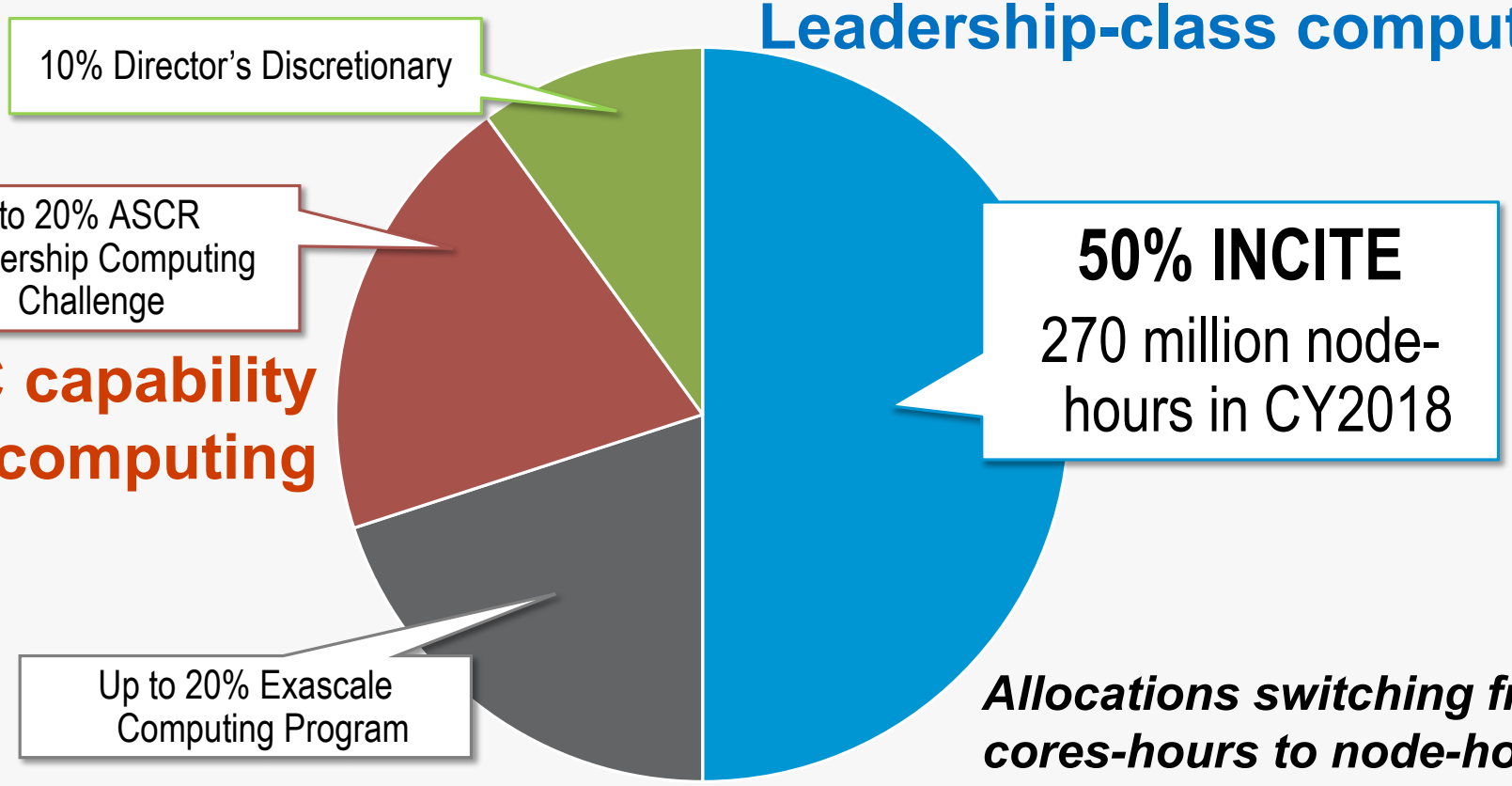

Theta – **11 petaFLOPS Cray XC40:** Intel processors and interconnect technology, a new memory architecture, and a Lustre-based parallel filesystem, all integrated by Cray's HPC software stack.


Mira – **10 petaFLOPS IBM Blue Gene/Q:** equipped with 786,432 processors, 768 TB of memory, and IBM's 5D torus interconnect.

**Argonne's leadership computers continuously place high in the Top500 annual ranking**

# Three primary ways for access to LCF

## Distribution of allocable hours




***Allocations switching from cores-hours to node-hours***

# Map To Allocation Programs

| Program | | |
|---|---|---|
| **INCITE** | **Production** | **Capability Computing** |
| **ALCC** | **Production** | **SC Capability Computing missions driven** |
| **Discretionary** | **Production** | **Development, testing, proposal preparation** |
| Data Science Program | Production | Developing technical and science capability for data and learning based workflows |
| Early Science Program | Next Generation | Developing technical and science capability for next generation systems |
| Exascale Computing Projects | Next Generation | The ECP mission-driven |

| LCF Allocation Programs | INCITE 50% | | ALCC 20% | | Director's Discretionary 10% |
|---|---|---|---|---|---|
| **Mission** | High-risk, high-payoff science that requires LCF-scale resources* | | High-risk, high-payoff science aligned with DOE mission | | Strategic LCF goals |
| **Call** | Yearly - Closes June<br>*2018 Call Open* | | Yearly– Closes February | | Rolling |
| **Duration** | 1-3 years, yearly renewal | | 1 year | | 3m,6m,1 year |
| **Typical Size** | **20-30 projects** | | **10-30 projects** | | **~100 of projects** |
| **Total Hours** | **270M node-hours**<br>**ALCF: 184M Mira, 13.5M Theta** | | **108M node-hours**<br>**ALCF: 73M Mira, 5.4M Theta** | | **ALCF: 37M Mira, 2.7M Theta** |
| **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<br>***Capability > 8,192 nodes (16.7% of Mira)***<br>***Capability > 878 nodes (20% of Theta)*** | | | | |

# ALCF Data Science Program (ADSP) Overview

- *Big Data* science problems that require the leadership scale and performance
- Span computational, experimental and observational sciences
- Focus on data science techniques including but not limited to statistics, machine learning, deep learning, UQ, image processing, graph analytics, complex and interactive workflows
- Two-year proposal period and will be renewed annually. Proposals will target science and software technology scaling for data science
- Yearly call for proposal.
  Next deadline – June 20, 2018
- https://www.alcf.anl.gov/alcf-data-science-program

# 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 computationally intensive, large-scale research projects.

# INCITE 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** |
| | • 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 |
|---|---|---|
| 1 **Peer review: INCITE panels** | • Scientific and/or technical merit<br>• Appropriateness of proposal method, milestones given<br>• Team qualifications<br>• Reasonableness of requested resources | • Change in scope<br>• Met milestones<br>• On track to meet future milestones<br>• Scientific and/or technical merit |
| 2 **Computational readiness review: LCF centers** | • Technical readiness<br>• Appropriateness for requested resources | • Met technical/ computational milestones<br>• On track to meet future milestones |
| **Award Decisions** | • INCITE Awards Committee comprised of LCF directors, INCITE program manager, LCF directors of science, sr. management | |

# 2018 award statistics, by system

| | Titan | Mira | Theta |
|---|---|---|---|
| Number of projects* | 31 | 27 | 14 |
| Average Project | 70.1M | 125.2M | 90.7M |
| Median Project | 80M | 100M | 40M |
| Total Awards (core-hrs in CY2018) | 2.18B | 3.38B | 1.27B |

* Total of 55 INCITE projects (many of the projects received time on a combination of Mira, Theta and Titan)
* Theta core-hours reported are in “Mira-equivalent core-hours”

# Questions