



# INCITE Overview

April 18, 2012



Julia C. White, INCITE Manager  
Presentation to HPC User Forum

# DOE-SC operates leadership computing facilities (LCFs)

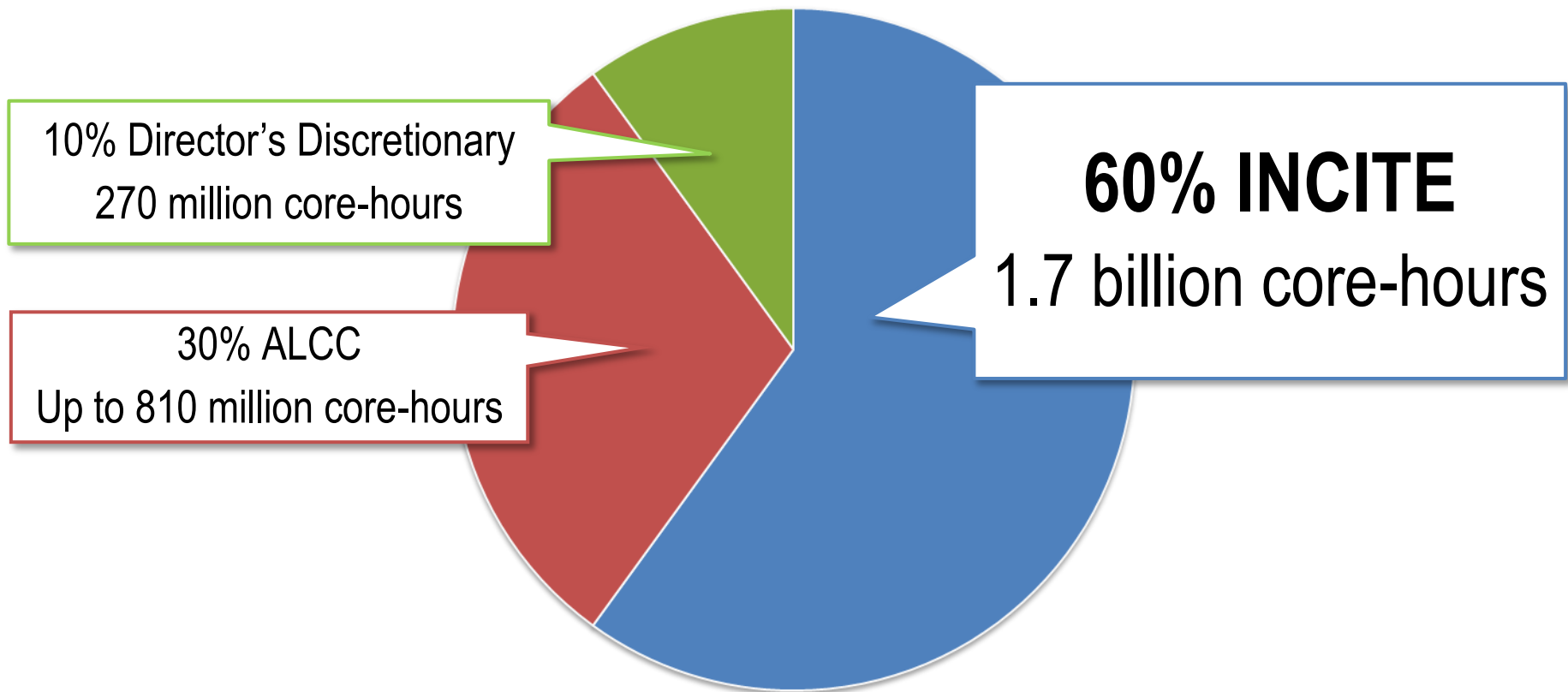
## Top500 List (Nov 2011)

- #3 Cray XT “Jaguar” at the Oak Ridge Leadership Computing Facility (OLCF)
- #23 IBM BG/P “Intrepid” at the Argonne Leadership Computing Facility (ALCF)

*Both LCFs are carrying out system upgrades, to be completed in 2013:  
10-petaflop IBM BG/Q “Mira and 20-petaflop Cray XK6 “Titan”*



# Access to LCFs: More than 2.7 billion core hours awarded in 2012



# What INCITE is for

INCITE seeks computationally intensive, large-scale research projects with the potential to significantly advance key areas in science and engineering.

## 1 Impact criterion

High-impact science and engineering

## 2 Computational leadership criterion

Computationally intensive runs that cannot be done anywhere else

## 3 Eligibility criterion

- INCITE grants allocations **regardless of funding source** (ex. DOE, NSF, private, etc)
- **Non-US-based researchers** are welcome to apply

**Call for 2013 proposals  
opens in Spring 2012**

The INCITE program seeks proposals for high-impact science and technology research challenges that require the power of the leadership-class systems

# INCITE awards history

*20X growth in number of projects*

**... but 1000X growth in core-hours**

Projects	3	3	15	45	55	66	69	57	60	<i>TBD</i>
Hours allocated	4.9M	6.5M	18.2M	95M	268M	889M	1.6B	1.7B	1.7B	<b>5B</b>

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

NERSC:  
3 projects and  
4.9M hours  
awarded

ALCF, OLCF,  
PNNL join  
INCITE

INCITE management  
by ALCF and OLCF;  
PNNL and NERSC  
transition out at  
end of 2009\*

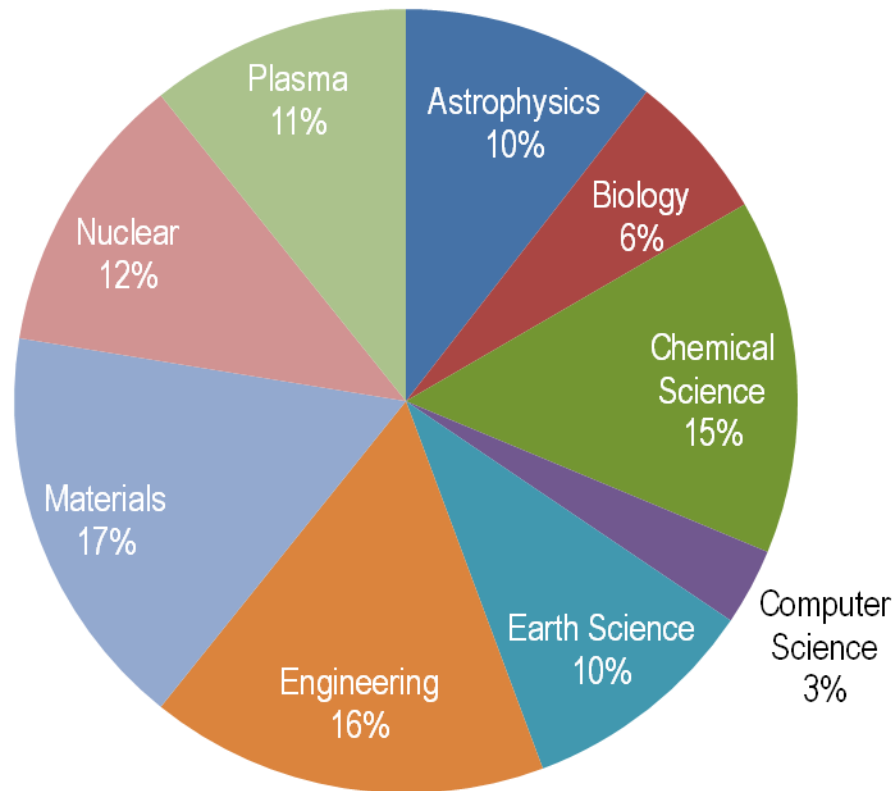
*ALCF and OLCF:  
Mira and Titan*

# 2012 INCITE allocations

28 new projects, 32 renewals

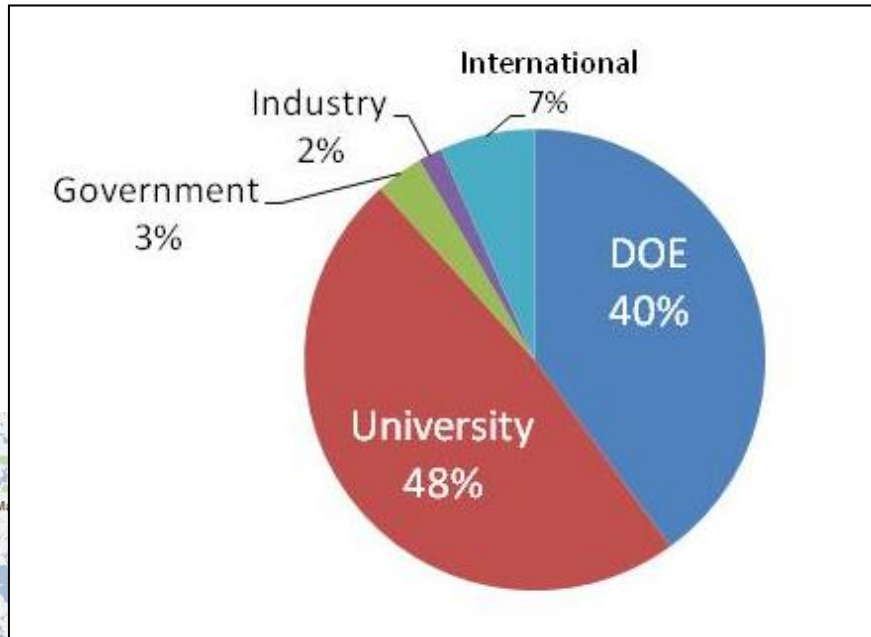
Acceptance rate: 33% for new proposals, 91% for renewals

Distribution of INCITE time by science domain

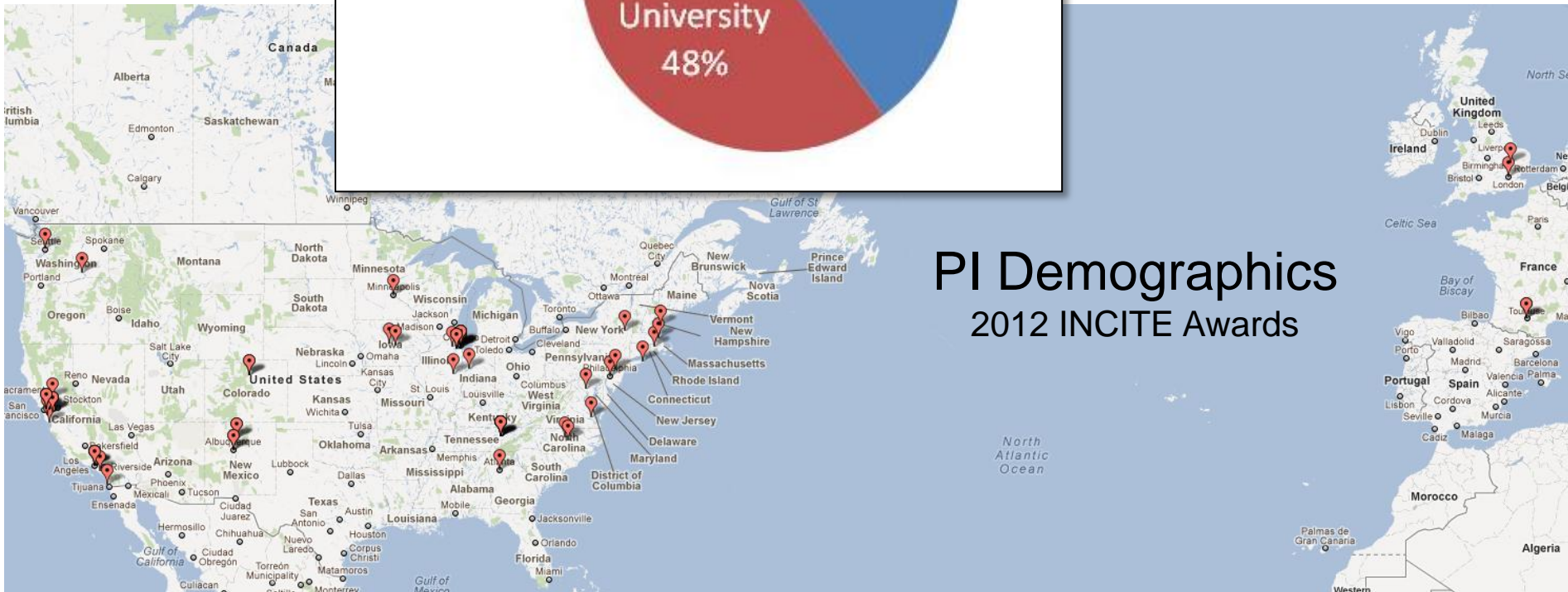


**Awarded 1.67 billion hours  
for CY 2012**

# 2012 INCITE award demographics



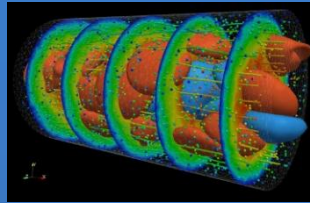
PI Affiliations  
2012 INCITE Awards



# Diversity of INCITE science

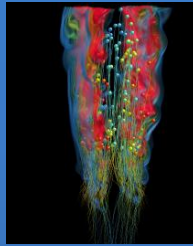
Simulating a flow of healthy (red) and diseased (blue) blood cells with a Dissipative Particle Dynamics method.

- George Karniadakis, Brown University



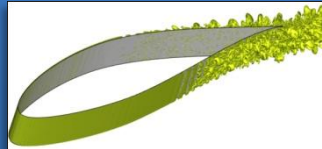
Provide new insights into the dynamics of turbulent combustion processes in internal-combustion engines.

- Jacqueline Chen and Joseph Oefelein, Sandia National Laboratories



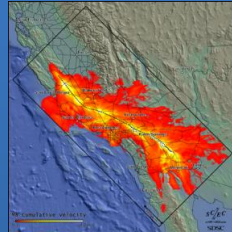
Demonstration of high-fidelity capture of airfoil boundary layer, an example of how this modeling capability can transform product development.

- Umesh Paliath, GE Global Research



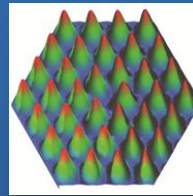
Calculating an improved probabilistic seismic hazard forecast for California.

- Thomas Jordan, University of Southern California



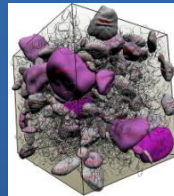
Modeling charge carriers in metals and semiconductors to understand the nature of these ubiquitous electronic devices.

- Richard Needs, University of Cambridge, UK



High-fidelity simulation of complex suspension flow for practical rheometry.

- William George, National Institute of Standards and Technology



## Other INCITE research topics

- Glimpse into dark matter
- Supernovae ignition
- Protein structure
- Creation of biofuels
- Replicating enzyme functions
- Global climate
- Regional earthquakes
- Carbon sequestration
- Turbulent flow
- Propulsor systems
- Membrane channels
- Protein folding
- Chemical catalyst design
- Combustion
- Algorithm development
- Nano-devices
- Batteries
- Solar cells
- Reactor design
- Nuclear structure

# 2013 INCITE Call for Proposals

More than 5 billion core-hours will be allocated for Calendar Year 2013

## What's new

- Management plan required
- Development plan for next-gen system
- Guidelines about ensemble simulations and the capability metric
- Request for Information

## Call for Proposals

[www.doeleadershipcomputing.org](http://www.doeleadershipcomputing.org)

The INCITE program seeks proposals for high-impact science and technology research challenges that require the power of the leadership-class systems. Allocations will be for calendar year 2013.

**April 11 – June 27, 2012**

### Contact information

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# Request for Information

We invite prospective INCITE-proposal PIs to respond to a Request for Information to inform the INCITE management of the proposal topics anticipated. The information requested here is **not** a prerequisite for proposal submittal, nor will it limit any requests you may decide to make in your INCITE proposal.

<http://hpc.science.doe.gov/allocations/incite/>

*The response to date includes expressions of interest from across the US, Europe, and Asia.*

# Contacts

For details about the INCITE program:

[www.doeleadershipcomputing.org](http://www.doeleadershipcomputing.org)

[INCITE@DOEleadershipcomputing.org](mailto:INCITE@DOEleadershipcomputing.org)



For details about the centers:

[www.olcf.ornl.gov](http://www.olcf.ornl.gov)

[help@nccs.gov](mailto:help@nccs.gov), 865-241-6536



[www.alcf.anl.gov](http://www.alcf.anl.gov)

[support@alcf.anl.gov](mailto:support@alcf.anl.gov), 866-508-9181

