

Ohio Supercomputer Center

An **OH·TECH** Consortium Member

osc.edu

1,000+
teraflops
peak computing
performance

4+
million
computer runs

161+
million
computing hours

459
projects
launched

1,267
active
clients

Propeling innovation, discovery and economic competitiveness

The Ohio Supercomputer Center (OSC) is a service organization that provides Ohio's university faculty, students, scientists and engineers with a wide range of services designed to deepen the impact of supercomputing on education and research across the state. OSC is a member of the Ohio Department of Higher Education's Ohio Technology Consortium.

- **We build Ohio's future.**

The center strives to be a strategic force in propelling Ohio's economy and positioning the state as a competitive national forerunner in science and technology.

- **We empower researchers.**

OSC empowers academic and industry researchers to achieve pioneering scientific discoveries in biosciences, advanced materials, energy and a host of emerging disciplines.

- **We partner with industry.**

OSC facilitates industrial processes with modeling and simulation tools for virtual product development, bringing leading-edge resources and advanced expertise to large and small enterprises.

- **We lead Ohio's knowledge economy.**

OSC directs strategic research activities of vital interest to the state of Ohio, the nation and the world. Our in-house research staff specializes in supercomputing, computational science, data management, biomedical applications and a range of other domains.

Providing tools for innovation

At the heart of the Ohio Supercomputer Center are our supercomputers, mass storage systems and software applications. *(See back page for system specs).*

- Dell Intel Xeon 'Owens' Cluster supercomputer, with a total peak performance of 750 teraflops of computing power.
- HP Intel Xeon 'Ruby' Cluster supercomputer, with a total peak performance of 144 teraflops of computing power.
- HP Intel Xeon 'Oakley' Cluster supercomputer, with a total peak performance of 154 teraflops of computing power.
- IBM Mass Storage System, containing more than 5 petabytes of backup tape storage capacity.
- DataDirect Storage System, containing 3.4 petabytes of high-performance spinning disks with 40–50 Gbps bandwidth distributed over several file systems for a single, centralized point of control.
- More than 20 licensed software applications maintained by OSC and access to more than 140 different software packages. These include the leading software packages for computational fluid dynamics, structural mechanics, numeric computation and visualization. OSC also develops advanced software codes and novel computational methods with its research partners.

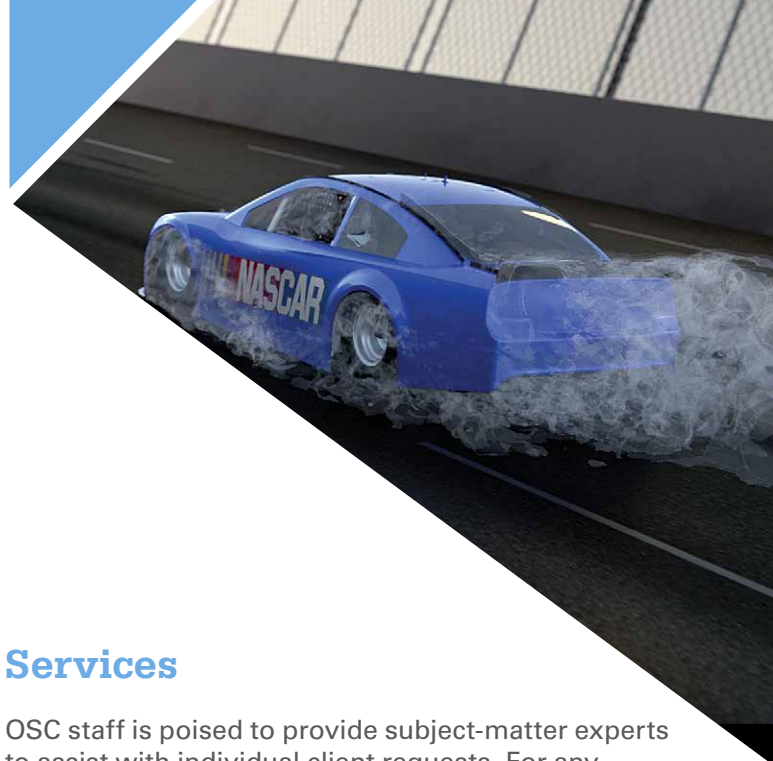


"(OSC) is a great resource for the state of Ohio. It allows people who might normally not be able to have access to this kind of resource access to a modern computational facility where we can do cutting-edge work."

— David Ball, Ph.D., Chemistry Department
Chair, Cleveland State University

"Without access to (OSC), what we do would be impossible. The money spent for us on CFD saves us money in the long run because when we go to the track and we go to the wind tunnel, we're already 90 percent sure that we're going down the right path."

— Eric Jacuzzi, Senior Aerodynamics/Vehicle Performance Engineer, NASCAR



Clients

While today's researchers have many options for accessing HPC resources, each year more users turn to OSC as their partner in scientific discovery. With highly reliable educational computing services achieving 99.7 percent uptime, OSC continues to empower its clients as they break ground in a multitude of emerging disciplines.

Academic

In 2015, OSC served 1,267 clients, including students, faculty and staff members across 25 universities. For 11 of these universities, 114 doctoral and 121 master's-level graduates used OSC in receiving their degrees. As a whole, OSC clients accomplished:

- 4+ million computational jobs
- 161+ million computing hours
- 459 projects launched by Ohio faculty
- 19 classroom projects

Industry

The AweSim program unites OSC experts, engineering specialists and industry to provide small- to mid-sized manufacturers with simulation-driven design that enhances innovation and strengthens economic competitiveness. AweSim provides affordable, accessible and scalable modeling and simulation on high performance computers via:

- online modeling and simulation apps
- educational resources
- industry-specific expertise and consultants

From research involving Formula-style racing to food processing, AweSim has continued to grow since its inception, with 150 AweSim developers/clients on over 30 projects helping to reduce prototyping time and costs. On average, for every \$1 invested in modeling and simulation, companies receive at least \$7 in return on investment.

Services

OSC staff is poised to provide subject-matter experts to assist with individual client requests. For any issues that arise, OSC's 24/7 support desk provides clients with technical expertise and services.

Client facilitation

Through the integration of increased training and education leadership, OSC is working toward deeper client engagement. OSC staff visit campuses to facilitate classroom projects, train students on the basics of supercomputing and demonstrate the broad service offerings OSC can provide. This takes an instructional load off faculty members so their time is maximized to focus on content and solving problems. OSC also offers training and consultation for individual users to build core competencies for effective HPC use.

Software development

OSC provides ample access to software packages as well as the option for researchers to run software for which they provide the license, open source packages or in-house developed applications.

Visualization and virtual environments

OSC's award-winning Interface Lab translates technology into effective training and assessment tools for use by various sectors, such as the health care, automotive and manufacturing industries. With recent upgrades, the lab is working to develop shared virtual environments where individuals can move around freely without tethered devices.

"Having the OSC is an incredible resource. It enables us to get things done more quickly and efficiently. Things run so much faster, it gives you a lot more flexibility to experiment with the analytical approach than if you were just trying to do this on a personal computer."

— Rodney Richardson, bioinformatics studies graduate student, The Ohio State University

High performance computing systems



	Oakley Cluster (2012)	Ruby Cluster (2014)	Owens Cluster (2016)
# Nodes / Cores	692 / 8,304	240 / 4,800	824 / 23,392
Cores per Node	12 cores / node	20 cores / node	28 cores / node
Compute CPU Specs	Intel Xeon x5650	Intel Xeon E5-2670 v2	Intel Xeon E5-2680 v4
# of GPU / Accelerators	128 NVIDIA M2070	20 NVIDIA Tesla K40 20 Xeon Phi 5110p	NVIDIA GPUs (2017Q1)
Memory per Node / per Core	48 GB / 4 GB	64 GB / 3.2 GB	128 GB / 4.5 GB
IB Interconnect (speed)	QDR (40 Gbps)	FDR / EN (56 Gbps)	EDR (100 Gbps)

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A Division of the Ohio Department of Higher Education