

## Process for Requesting Support for HPC in Startup Packages

The following process must be followed to request HPC or other advanced research computing equipment support as part of a startup request. HPC equipment may include, but not be limited to, computer servers with multi-core CPUs, servers/appliances with GPUs or other high-end workstations performing modeling/simulation, artificial intelligence/machine learning or big data analysis.

The Advanced Research Computing (ARC) team of professionals can help prospective researchers match their needs to existing resources or determine that an individual investment/purchase is best. Investing in the central resource maximizes the amount of compute resources a faculty can purchase because the HPC infrastructure (networking, racks, head/management nodes, support) are provided and ensures a secure environment to reduce overall risk to the university.

**College/Prospective Faculty Hire** should directly engage the ARC team:

1. Review Available HPC resource options for Faculty Startup Investments described below
2. Meet with ARC Team to discuss research computing requirements and requests and work together to identify appropriate solutions leveraging university and/or statewide resources.

**To schedule a discussion with the ARC Team, contact** Jane Combs, Assoc Director, ARC facility, by email at [combsje@uc.edu](mailto:combsje@uc.edu)

### Available HPC resource options for Faculty Startup investments

#### Option 1: UC's Advanced Research Computing Center: 'Condo' purchase - Priority Access

Faculty may purchase priority access to nodes in the centrally managed UC Community HPC Cluster (CPUs, GPUs) and assign access to their lab members, students and other collaborators. This is a good option for researchers who have time sensitive research requiring the powerful resources available in the UC ARC HPC Cluster. Current hardware configurations for purchase are listed on the <https://arc.uc.edu/hardware> and include CPU, GPU and CPU Large Memory nodes.

UC ARC HPC Cluster hardware options for purchase

- Regular Memory (RM) CPU nodes provide extremely powerful general-purpose computing, machine learning and data analytics, AI inferencing, and pre- and post-processing.
- Large Memory (LM) CPU nodes provide 2TB of shared memory for genome sequence assembly, graph analytics, statistics, and other applications requiring a large amount of memory for which distributed-memory implementations are not available
- GPU nodes provide exceptional performance and scalability for deep learning and accelerated computing.

#### Option 2: The Ohio Supercomputer Center 'Pay by the Hour': Fair Share access

The Ohio Supercomputer Center offers HPC resources which can be pre-purchased based on an hourly usage rate with the first \$1,000 subsidized by the state of Ohio. Charges are based on the type of resource and rates can be found on the OSC website (<https://osc.edu>). Faculty can assign access to their projects to lab members, students and other collaborators. This option is beneficial to researchers who need a significant amount of resources (more than can be provided by UC ARC) for large computational simulations and analysis and are willing to wait in the job queue.

### Option 3: National Resources provided by XSEDE

The Extreme Science and Engineering Discovery Environment (XSEDE) is a single virtual system that scientists can use to interactively share computing resources, data and expertise. People around the world use these resources and services — things like supercomputers, collections of data and new tools — to improve our planet. Various resources are available to researchers at no cost including Jetstream, NSF's Science and Engineering Cloud resource, Open Science Grid (high throughput computing services, Expanse GPU cluster and many others.

### **The ARC team will document the faculty requirements and propose appropriate next steps for finalizing the startup request**

1. Propose best solution for researcher.
2. If ARC related (see below), provide cost estimate and facilitate acquisition and onboarding.
3. If OSC or XSEDE resources offer the best solution, work with the researcher to identify cost estimate and facilitate access and payment once on board.
4. If direct equipment acquisition is required (e.g., Servers which are used by cyber-physical research requiring physical modification and/or root access; ITAR/Export Control or other classified research), the ARC team will document this requirement and provide recommendations to the college and VP for Research on the necessary equipment investments.

**Description:** Faculty researchers who require priority access to high performance computing and analytics resources can use startup, grant or other funding to contribute nodes to the UC central cluster in the UC Advanced Research Computing (ARC) core facility. The cluster is professionally managed and housed in UC's secure data center as part of the integrated UC research computing and data ecosystem which includes high speed data transfer, secure research storage and high-performance computing and big data analysis tools. Professional staff are available to support the on-boarding and use of the tools.

Priority access to the equivalent number of annual core hours per contributed node is given to the PI and anyone they assign (collaborators, students, lab members) for a time period not to exceed the estimated lifetime of the equipment, currently five years. Any unused cycles will be available for shared access. Policies affecting sharing are maintained by the ARC Core Facility Advisory Board.

**Benefits:** Using the central resource maximizes the amount of compute resources a faculty can purchase because the HPC infrastructure, including high speed networking, racks/pdus, head/management nodes, professional management and support, are provided at no additional cost. By participating in this way, the PI and any assignees will have access to all cluster resources in addition to their contributed nodes.

**Cost:** Nodes contributed to the cluster must be consistent with current cluster hardware configurations. Current hardware configurations can be found here: <https://arc.uc.edu/hardware>. The ARC team can work with you to review your needs and provide an estimate based on current configurations and costs for your purchase to be included in grant proposals or startup requests. Contact: [arc\\_info@uc.edu](mailto:arc_info@uc.edu)