Research Computing Support for Berkeley Faculty

1. Berkeley faculty computing allowance – free!

What faculty get: Each Berkeley faculty member is eligible for an allowance of 300,000 Service Units (scalable core-hours) of computation per academic year on Savio, UC Berkeley's high performance computing cluster. Allowances can be shared with project partners.

What faculty pay: There are no costs to Berkeley faculty. Faculty members simply submit an application to participate. Berkeley Research Computing staff will then assist them with the steps needed to access Savio.

How this can help with recruitment, retention, and grant proposals: This annual faculty allowance can be written into start-up and retention letters and can be used as institutional cost-share on grant proposals.

2. Condo Cluster and Condo Storage services

What faculty get: For faculty who need computational resources beyond the free computing allowance, the campus offers what is often called a *condo* cluster service. In Berkeley's condo model, the only cost to faculty members is the price of the computing servers that they would like to add to the Savio cluster.
The Condo Storage service provides large-scale data storage with the same model – faculty just buy storage "shelves". The campus covers other one-time and recurring costs, including system administration staff, storage, network, and consulting.

What faculty pay: The one-time cost to buy into the condo cluster is approximately $21K for a standard model (96 compute core and 64GB RAM). Other models are available with more memory, GPUs, etc. Faculty agree to share unused computing capacity (when they are not using it) with other users.
The one-time cost to buy into condo storage is $7K per 25TB of usable storage.

How this can help with recruitment, retention and grant proposals: In recruitment and retention, deans or chairs can commit the funds needed for the faculty member to buy into the condo; start-up or retention letters may include commitments to cover the one-time cost of purchasing compute servers or storage. Letters may also note the campus coverage of recurring costs. The campus' support for the condo can also be used as institutional cost-share on grant proposals; federal funding agencies have told us this support is important. Research IT staff will help detail the costs and value of these services.

Berkeley Research Computing – A Partnership Program

These services are provided as part of the Berkeley Research Computing (BRC) program, funded by the Chancellor, the Vice Chancellor for Research, and the campus CIO. The services are managed by Research IT, a department in the Office of the CIO/IST, in partnership with the Lawrence Berkeley National Laboratory. *Please contact us for consultation*!
For more info, visit: **research-it.berkeley.edu/brc** or email **research-it@berkeley.edu**

Berkeley Research Computing (BRC) Services:
Sample language for start-up and retention letters, and for grant proposals

1. Start-up – Berkeley Faculty Computing Allowance

The Berkeley campus will provide you an allowance of up to 300,000 Service Units (scalable core-hours) of computation per academic year on UC Berkeley's high performance computing cluster, called "Savio." Berkeley Research Computing consulting staff will be available at no charge to help you learn about the Berkeley Research Computing facilities and optimize your research software for this environment.

2. Start-up / Retention – Condo Cluster and Storage Support

We [*referring to the Dean, Chair, or contributing party*] will provide you with a $70,000 [*or whatever figure is chosen*] allocation so that you can purchase up to 8 high performance computing nodes (each of which has 24 cores and 64GB RAM), as well as 100TB of storage, for your research. This provides approximately 1.6 million core-hours of computation per year to your research team (8 million core-hours over the 5 year life of the nodes). In addition, the campus will cover the one-time costs of associated InfiniBand cables, along with the yearly costs of system administration, high-speed network access (Science DMZ at 100gbs), parallel storage, and consulting. Berkeley Research Computing (BRC) consulting staff will be available at no charge to help you learn about the BRC facilities and optimize your research workflows for this environment. The approximate value of this institutional support is $4,000 ($20,000 over the 5 year life of the nodes).

3. Grant Proposal Condo: Example from a $2 million NSF grant proposal for Computational Research Center on campus

For faculty researchers and research groups the benefits of participating in this campus condo model are: the campus will cover the cost of on-going system administration; the cluster is housed in a state-of-art data center designed to provide the power and cooling needs of computationally intensive clusters; researchers will be provided compute resources based on their cluster contribution; researchers will also have access to burst capacity beyond their compute contribution; researchers do not have to hire and manage their own system administrators; and researchers will have access to consulting and design expertise related to issues of data security and privacy. We are also enthusiastic about the possibility of a partnership between the [*Department, or Center for XYZ*] and the office of the CIO in providing training for users of this cluster.

We expect that the compute cluster in this proposal will become part of the campus' institutional condo cluster. As such we will be able to provide the following campus support yearly for this grant totaling approximately $169,647:

- System administration costs will be funded by the campus (15% FTE, $27K/year)
- Professional HPC-IT staff will provide consulting and management services (15% FTE, $21K/year, plus 5% FTE $10.5K/year)
- The cluster will be housed in the campus data center (collocation $36.5K/year, power and cooling $74K/year, network connections $400/year)

Berkeley Research Computing

A Research IT program, sponsored by the CIO, the Vice Chancellor for Research, and the Chancellor

Consulting and Community

- First point of contact for researchers, to ensure match to appropriate resources
- Specialist consulting in each service area, plus Domain Consultants and partners with specific skills
- Support migration between computational models for efficient scaling and reproducible research
- Foster cross-domain community and knowledge-sharing
- Collaborate with network of partners (D-Lab, SCF, etc.) to coordinate consulting services across campus

Condo/Institutional Cluster ("Savio")

- High performance computing with high-speed, low-latency interconnect and high-speed parallel filesystem
- Faculty Computing Allowance provides free access
- Infrastructure and admin costs subsidized for Condo contributions, unused capacity available to campus
- Condo users can "burst" beyond their hardware
- Condo Storage service provides low-cost big data storage
- Supports students learning computational methods
- Managed in partnership with LBNL HPC Services group

Cloud Computing support

- Consulting services and documentation to solve common problems of access and administration of public cloud resources (Amazon, XSEDE, etc.), and integration with teaching
- Integration with data and network infrastructure
- Experimenting with flexible compute models to run cloud-like applications in BRC infrastructure
- Working with EECS, AMPLab, D-Lab, BIDS to develop materials and services

Analytics Environments on Demand

- Web-accessible environments to run analytics software packages (Stata, R Studio, ArcGIS, etc.) on a scalable platform
- Domain-specific VM images can be prepared and managed
- Provides anywhere, anytime access
- Working with IST to provide service infrastructure and consulting; partnering with domains for support

Research IT
Advancing Research@Berkeley

UC Berkeley Office of the CIO
http://research-it.berkeley.edu
research-it@berkeley.edu

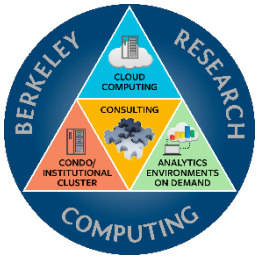
Partner network: Lawrence Berkeley National Laboratory, D-Lab, BIDS, Library, ETS Educational Technology Services Berkeley, Digital Humanities at Berkeley, IST UC Berkeley, amplab UC Berkeley

Research IT
Advancing Research@Berkeley

Research IT provides research computing technologies, consulting, and community for the Berkeley campus. Our goal is to advance research through IT Innovation.

Consulting and Faculty Partnerships

In all aspects of Research IT services we work directly with faculty across the sciences, social sciences, and humanities to identify and address technical needs at all phases of the research process, from planning and grant funding through dissemination.



Berkeley Research Computing

BRC supports research with a coordinated set of services and consulting across a range of computation and data analysis needs. BRC includes the Savio high-performance computing cluster, cloud computing support, and analytics environments on demand. The Faculty Computing Allowance program provides free baseline access to all campus PI's.

Research Data Management

The RDM Program is a multi-year effort to provide Berkeley researchers with access to a rich toolset supporting data management through its full lifecycle, from planning through archiving and data sharing. A cross-campus community of consultants and service providers catalog and coordinate support and documentation for current and emerging data management challenges; compliance with policy requirements; and better stewardship of research data.

Digital Humanities

Research IT provides technical and project management consultation for faculty and graduate students who are interested in using digital tools and methodologies as part of their research. Research IT staff collaborate with the Dean of Arts and Humanities and the Digital Humanities Working Group to coordinate events and activities that engage faculty and students with digital humanities work at Berkeley.

Museum Informatics

Research IT works with campus museums to develop and operate collection management systems using CollectionSpace, and builds public and special-purpose applications that build on CollectionSpace data and functionality.

Research IT Futures

Research IT works with campus partners and faculty to identify and prioritize emerging needs. We engage with peer institutions to develop best practice models.

Research IT
Advancing Research@Berkeley

UC Berkeley Office of the CIO
http://research-it.berkeley.edu
research-it@berkeley.edu

Partner network:

Lawrence Berkeley National Laboratory
Lab
BIDS
Library
ETS Educational Technology Services Berkeley
DIGITAL HUMANITIES AT BERKELEY
IST
amplab