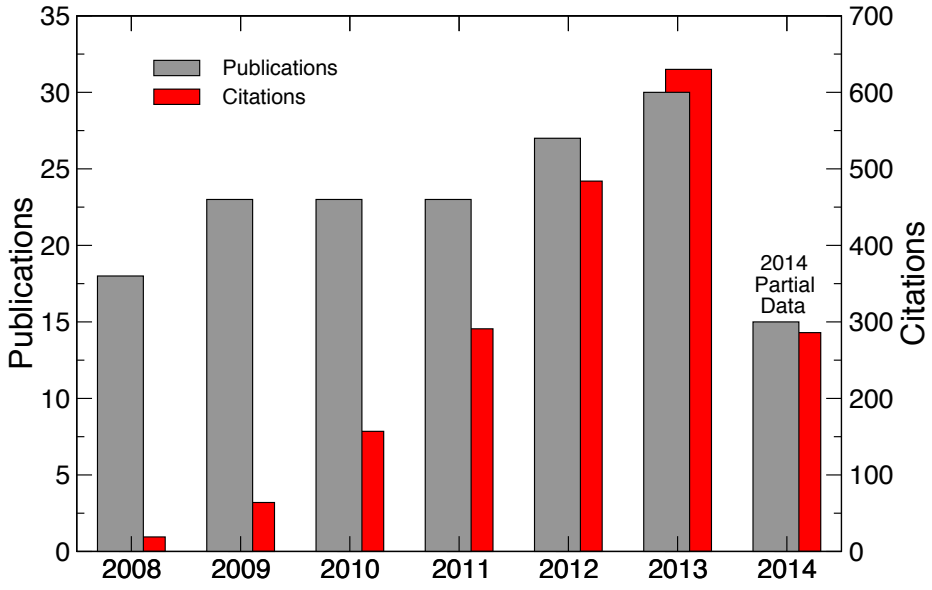
Wesleyan's High-Performance Computing Cluster

Over the past 7 years, we have transitioned from a model where high-performance computing (HPC) needs were distributed among research groups, to a central resource that is shared among faculty and widely utilized for classroom exercises. This central facility was established and expanded by two NSF awards totaling roughly $500,000. The facility is housed and maintained by ITS.

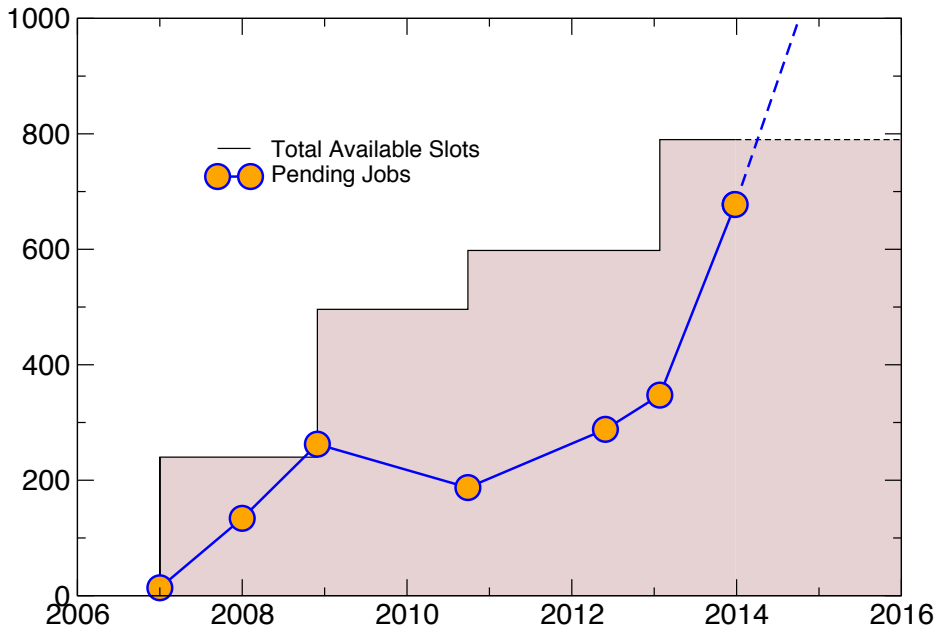
These central HPC facilities have resulted in range of benefits, including:

1. Availability of cutting-edge resources to students (both for teaching and research)
2. Computing skills work-force development
3. Improved efficiency (fewer computing cycles wasted, less energy used)
4. Reduction of administrative burden on faculty
5. Savings on individual faculty startup and space renovation
6. Faculty recruitment and retention
7. Research productivity
8. Support for new initiatives (GPU computing, modeling in social sciences, "big data", etc…)

We offer a few quantitative facts to support these statements. Each year, the cluster has up to 100 classroom student users. Additionally, there are presently 177 research student users of the cluster, who represent 27 different faculty research groups. Research utilizing the cluster has resulting in more than 150 publications over 7 years, which have been heavily cited, as detailed in the figure below.



We have also been a “victim of success”: at the same time that easy availability has led to flourishing activity, that activity is overburdening our available resources. While our facilities have nearly tripled in size since being founded in 2007, the number of tasks “pending” for computation is rapidly outstripping our capacity, as the figure below illustrates. The pending tasks are those that already exceed current capacity.



We therefore believe that it is in the university's interests to develop a sustainable maintenance and upgrade plan to ensure the long-term stability of these valued resources. This is also in-line with the agreement laid out in the first external grant that established the HPC facilities.

Accordingly, we propose to establish a more formal mechanism to support these facilities. We are eager to discuss the form of support, and we have thought of several vehicles to consider. Naturally, we intend to continue to pursue external funds. But we also propose to develop internal funding, through a combination of research overhead, academic affairs contributions, and donor fund raising.