

2019-2021 Biennium Internal Budget Proposal Narrative

Division: College of Science and Engineering

Evaluation Criteria: Proposals will be evaluated on every aspect of this template. It is highly recommended that the narrative portion touch on each area. Proposals forwarded to UPRC by unit leaders will be discussed at UPRC and authors are encouraged to attend so that they may answer questions and provide clarification.

CSAW – Computational Science at Western

- This is a revised version of a previously submitted budget proposal.
If box is checked please briefly outline any significant changes and/or indicate why it is being resubmitted.

[Click here to enter text](#)

Statement of Purpose: *(What is the challenge or opportunity being addressed? How does the proposal address this challenge or opportunity? Limit response to 1 page – please link to any existing reports, data, supplemental materials, etc.)*

Over the last six years, the Computer Science Department has made CSCI Department compute resources available to select faculty in other CSE departments to do large scale computational work on the CSCI department compute cluster. The CSCI Department cannot keep up with the demand for this computing resource and it's time to take the momentum that is currently built up and focus it on a new compute cluster with a new system administrator outside of the CSCI Department. Increasing enrollments in CSCI, and the hiring of more than ten new faculty over the last five years, with potentially five new faculty starting in Fall 2019 is taking its toll on the department in an administrative sense. We need to act now or we will end up negatively impacting many faculty who rely on this compute resource for their research.

To put the demand in perspective, Computational Science is becoming a focus area of many new faculty hires in CSE departments outside of CSCI. CSCI extended an offer to many new CSE faculty starting with the hire of Dr. Robin Kodner in Biology as a demonstration of our interest in interdisciplinary collaboration with new “computationally-focused” faculty. Since then we've supported almost a dozen other faculty in BIOL, CHEM, AMSEC, MATH, GEOL, PHYS, and BNS to varying degrees. This new compute cluster and a new staff person will give the non-CSCI CSE faculty a central contact person and a dedicated compute resource for their needs.

Anticipated Outcome(s):

All faculty in CSE who want/need access to a compute cluster will have the hardware, software and technical support that they need to accomplish their work. This applies to research work but also to teaching as many departments are developing courses with computational components that could be addressed by this proposal. We want to emphasize “All” in the previous sentence

because the current situation is not meeting the current demand college-wide and the demand is only increasing.

Metrics: *(How will outcomes be measured? Please include current data points and goals. If this proposal will have any impact on the [Overall Metrics](#) included in the university's strategic plan, please indicate which specific ones here.)*

Honestly, the current situation is sort of working now if viewed from the outside. Faculty in CSE have used the CSCI compute cluster, published papers, got students involved in computational science research, and wrote grants related to computational science.

However, the lack of support has been quite limiting for some faculty. In at least one instance we have lost a MS student who left due to frustrations in getting access and permissions to the cluster he needed for his research. Robin Kodner has also had to shift her research away from computational work because the support staff's continued adjustments to the cluster has rendered her pipeline unusable by her. This type of outcome is not acceptable in the long term to support new faculty.

Further, what an outsider would not see is that the CSCI Department support staff is taxed with their normal duties supporting CS faculty, especially new hires because they need more help getting labs set up and so on. Removing the responsibility of supporting the cluster equipment, but more importantly the applications support for the non-CSCI CSE faculty, will be important to the long term health of the CSCI tech support team.

Thus, one measure of success will be if the current non-CSCI CSE faculty who use the cluster have an equal or better experience going forward. This can be measured qualitatively in terms of the faculty's perceptions (i.e., an informal poll of CSAW faculty to self-report their satisfaction with the cluster), as well as objectively, by tracking the number of publications produced per year using cluster resources.

Another measure of success will be if more current non-CSCI CSE faculty who want to use the cluster are able to do so.

Similarly, another measure of success will be if new faculty come to WWU because of the availability of this resource. It's worked so far to recruit people, they could save their start-up funds for other endeavors which means faculty can tackle the computational aspects of their research immediately. Specifically Math, Physics, Biology, Chemistry and Geology believe that the availability of such a resource will aid in their recruitment of computationally-focused faculty.

How does this proposal align with your departmental/divisional strategic priorities? *(Please reference specific items from the recently completed departmental/divisional strategic plan and attach a copy.)*

The proposal impacts several departments in CSE. It helps achieve CSE priority #3 related to meeting state needs as computational science is a field in great demand in Washington. It helps

achieve priorities #4, #5 related to teaching and research. A handful of non-CSCI courses in CSE make use of the cluster but again others would like to use it in this capacity but CSCI cannot fully support this interest. Further, demand will only increase as new people are hired and the resource is tailored to meet faculty needs better for course work.

How does this proposal support the University Mission and Strategic Objectives? *(Please refer to the [2018-2025 Strategic Plan](#) and indicate which core theme(s) this proposal will help achieve.)*

The proposal contributes to all three core themes:

- (1) **Advancing Inclusive Success:** Faculty-mentored research in computational sciences is one of the most scalable of the high-impact opportunities CSE faculty can provide for students. The shared cluster directly enables such experiences for a broader range of students.
- (2) **Increasing Washington Impact:** Employers in the state's science, engineering, and technology sectors are seeking computational literacy in their new hires. They often find employees with this skill set from outside of the state. This proposal will enable us to sustainably train the state's future STEM workforce in this essential skill area.
- (3) **Enhancing Academic Excellence:** Computational sciences research enriches collaborative scholarship in CSE by integrating theoretical and experimental approaches to critical problems in health sciences, energy, and climate change. It also enables the kinds of student research experiences in fundamental physical and life sciences that help increase Washington students' competitiveness for top-flight graduate programs in the sciences.

What are the consequences of not funding this proposal?

Without the requested support for a CSE cluster, the research programs of some recently tenured faculty and several junior faculty who rely on the CS cluster will be interrupted. Access to this resource is essential to several current and pending external grants across the College, and these projects would be negatively impacted without cluster access.

An informal survey of cluster users currently show that almost 20 papers have been published using results generated by the cluster.

In short, the CSCI department cannot sustain support the way it's been working for the last few years.

What alternatives were explored?

This eventual shift of the cluster to a CSE resource and the creation of a CSE staff position was our plan from the outset. We asked for a support staff to assist in this effort from Day 1 when Jeff Wright was Dean and again when Catherine Clark took over as Dean but there was no traction given to the idea. In CSCI we took the initiative to try to get this running "out of our own hide" which we have done until now but this can no longer be done.

Additionally, a team of three faculty (Filip Jagodzinski, Tim Kowalczyk, and Brian Hutchinson) wrote a proposal to the 2017 Silicon Mechanics Research Cluster Grant program and a pre-proposal to the NSF CRI program. Feedback from the CRI indicated that NSF expects institutions to support this kind of resource directly rather than through external funding. Unfortunately, the Silicon Mechanics program did not run in 2018, so there was no opportunity to revise and resubmit the declined proposal (there is only one recipient, and no feedback is provided on declined proposals).

Which units (departments, colleges, etc.) will be involved?

Chemistry: Three faculty research programs in chemistry are principally computational in nature: Robert Berger, Tim Kowalczyk, New hire in computational biochemistry (Fall 2019). Several other faculty have computational elements to their research that benefit from cluster access: Jeanine Amacher, David Patrick, Sergey Smirnov.

Math: Kimihiro Noguchi uses the cluster for his statistics research

Biology: Robin Kodner has her pplacer pipeline running on the cluster and has tried to incorporate classroom activities on the cluster to some success. Dan Pollard and Matt Zingraf have needs for computational resources for both classroom and research applications. Several other faculty have computational and bioinformatics elements to their research that benefit from cluster access: Marion Broadhagen, Eric DeChaine, Craig Moyer and Dietmar Schwarz.

Geology: Bob Mitchell uses the cluster for his research.

Physics: Kevin Covey and Armin Rahmani use the cluster for their research

Equipment needed:

- 1) Initial Hardware. \$0
To start this process the CSCI department will “donate” a chunk of their current cluster being used by faculty outside of CSCI to this venture as we have another cluster purchase on the horizon that we have fully funded from internal funds. This chunk that we donate will be in excess of what the current non-CSCI faculty have access to today.
- 2) Hosting. \$10K one-time cost
To get the current hardware up and running at 32nd street would require about \$10K for various components, like a network switch, universal power supply, etc.
- 3) Additional Hardware. See below.

For major (>\$25k) purchases, please provide the following information.

Item:

If desired, more money could be directed towards new hardware once a staff person is hired and surveys the needs of CSE faculty.

Purpose:

An upgrade that would double the current configuration could be purchased

Cost:

\$100,000

Anticipated Useful Life:

5-8 years

Replacement Cost if any:

Would need to budget circa \$20,000/year for replacement.

Human Resources *(Complete the table below adding additional rows if necessary):*

<i>Position Title</i>	<i>Total Headcount</i>	<i>Total FTE</i>	<i>Salary and Benefits per FTE</i>	<i>Total Cost</i>
<i>Cluster System Administrator & Applications Support Specialist</i>	<i>1</i>	<i>1.0</i>	<i>\$111,430</i>	<i>\$111,430</i>

Table above should match data on budget spreadsheets submitted with this proposal. Complete the spreadsheet to get salary, benefit, and total cost amounts. Contact your division budget officer with questions.

Operating & Maintenance Costs (include service contracts, installation costs, etc.):

Click here to enter text

Space Requirements:

What type of space is needed for this proposal? (e.g., private office, lab space, group work/study space, etc.)

One compute rack at 32nd Street. Office for the new support staff.

What features must this space have? (e.g., fume hoods, plumbing, 3-phase power, etc.)

Power, cooling, internet connection to campus.

What needs can be accommodated within your existing space?

None

How much new space will be required?

None