

Advanced Computing Research Lab

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The purpose of the Advanced Computing Research Lab (ACRL) is to provide a venue for ongoing applied research in computer science at Evergreen. This includes applied research in Computer Science pedagogy, support for collaborative faculty and student research projects that span multiple academic years, and a base for providing support to disciplines at Evergreen that might benefit from targeted computational techniques, solutions and systems.

Background

In the past, computer science research at TESC has been constrained by limited faculty resources, demanding faculty schedules, and a lack of a consistent pool of students capable of and willing to work on advanced topics. Coincidentally, this year, during the program Student Originated Software, a number of advanced students have formed a nucleus of student researchers that have the following attributes:

- they are advanced students and so are capable of working independently on advanced topics
- collectively, they will be at TESC for another year beyond this year (giving us a two year window in which to establish a stable base of software, hardware, and expertise)
- their interests are in deploying practical systems based on the theoretical and academic work they have been involved in during Computability and Student Originated Software: they are interested in finding *clients* at Evergreen with whom they can work to create computational solutions to domain dependent problems.

We have also been the recipient of a number of computers donated through St Peter's hospital: one of our students works at St. Peter's and he arranged for the donation of a number of computers that were being retired. Academic Computing has made a small lab available for our dedicated use near the existing general purpose labs (the ACC and the GCC).

This represents a unique opportunity for us. With a stable group of students over 2 years, we have the possibility of growing a significant expertise that can be passed on to less experienced students as they enter the advanced programs and prepare to do student research themselves. With such a group we will not experience the loss of knowledge and capability typically found when we get the next generation of advanced students and the previous generation graduates. They are committed to taking the theoretical topics we've been studying and applying them to new domains, providing a basis for interdisciplinary work at Evergreen that includes Computer Science in a fundamental way, rather than merely as a tool or an application.

Faculty Interests

I have a strong interest in setting up a research lab that can be used collaboratively among Computer Science students and faculty. Without that kind of collaboration and the ability to connect student work with faculty interests, we (the Computer Science faculty) do not have the time to do any significant research. This Advanced Computing Research Lab gives us the opportunity to significantly expand our reach, in terms of what we attempt technically, who we are able to collaborate with, and the interdisciplinary work we can consider. I have a particular interest in using the lab as a basis for three software labs that I have partially completed: a language lab for teaching language design principles; an os lab supporting

student modifications to operating systems; and a concurrency lab, exploring practical applications for parallelism. These software labs themselves are projects that may involve student researchers, increasing our effectiveness as educators and our ability to provide informed consultation to other disciplines.

Goals

The current goals of the ACRL include:

- build an extensible lab that can be folded into the curriculum of the advanced computer science department.
- give other disciplines access to state of the art super computation so they might further the scope of their research.
- position the computer science department at TESC as an integral resource to the advanced sciences at Evergreen.
- give CS students hands-on experience working in large software development systems, language theory, and concurrency.

Plan

We are already engaged in building a distributed computing lab, using the resources made available by academic computing and St. Peter's hospital. Specifically we are working on generating a library of distributed machine learning algorithms that interface well with an end-user who has little to no programming experience.

Our motivation for focusing on this library at the outset comes from informal conversations and collaborations with some of the other Sciences students and faculty; we believe that this library would be very helpful and useful for some of the work going on at Evergreen.

By maintaining a strong working relationship among advanced CS students, CS faculty and Academic Computing, we plan on being able to consistently keep the lab up to date and populated with students. Academic Computing has already applied for an internship system administration position for the lab. And we're trying to organize a large (8-10 students) project team to build software/infrastructure over the summer. The ACRL will be an ongoing presence at Evergreen. We hope to use these funds to complete the initial configuration of the lab (by the end of the summer 2010) so that it will support our currently defined projects (the library of machine learning algorithms, and the three software labs). Our projected timeline is:

2009/2010 academic year	Initial creation of cluster computing lab and prototyping software for Machine Learning
7/2010 - 8/2011	Building infrastructure to incorporate resources with CS curriculum
Fall 2010	Opening the lab to Evergreen campus
2009 - 2013	Creating resources for research in the sciences at Evergreen / integrating the ACRL with ongoing projects like Dark Heart
2009 - Onward	Building a collaborative and interactive learning experience for the advanced science students at Evergreen through outreach and shared research goals

Needs for Completing this Project

Currently we have a number of machines donated by St. Peter's. In order to create a working cluster and provide the software required to be effective, we need:

Item	Justification	Cost
1 1GB base tx 48 port switch	Necessary to efficiently network all the machines together locally; without the proper hardware this will become the bottleneck for the cluster. This is a significant investment that will define what can be done with the lab.	\$800
20 40GB hard drives	Due to patient security issues, the computers donated by St. Peters will not have any hard drives; without them, our cluster will be functionally useless.	\$400
8 port KVM	A KVM will allow us to centralize control and monitoring of all workstations as well as allow us to open the lab to more students and troubleshoot problems on a given machine much more effectively.	\$400
48 CAT 6 cables at 6'	Networks the HardDrives to the Computers	\$120
Office misc	Building this lab into a classroom environment will require teaching supplies (whiteboard markers, presentation related items) and incidentals (surge protectors, keyboards).	\$280
Books/software	It is important that we provide supplemental books and texts for administrators, researchers, and other interested parties. Ideally, we would love to be able to provide a small library of computer science related texts that will be useful to advanced students and faculty. Faculty in areas with whom we hope to collaborate may need certain kinds of specialized software in order to integrate the lab with their curriculum. These may include operating systems and languages built for academics.	\$460
Total:		\$2460