# Deploying and Managing DSABR: A Distributed System for Automated Blender Rendering

Peter Bui, Grant Wuerker
Computer Science
{buipj,wuerkegr}@uwec.edu

## 1 Student Activities and Learning

As noted in the research narrative, the project will consist of the following components:

1. **Python-WorkQueue bindings**: We will have to update the Python-WorkQueue bindings and possibly the command-line implementation of DSABR.

2. **HTCondor Middle-Ware**: We will need to implement a software intermediary to translate between the web portal and HTCondor.

3. **Worker Management**: Once these components are in placed, we can then explore different algorithms and metrics for scaling the number of workers utilized on different rendering jobs.

Our goal is to have a functional system by Spring 2015 and to perform testing with Art faculty and students. If successful, we will try to publish at MICS (April 2015) and HTCondor Week (May 2015).

The student selected for this project is Grant Wuerker. Although he is only a sophomore, Grant has advanced knowledge of Python and web development, including cloud computing. He was chosen based on a recommendation from my colleague Dr. Chris Johnson, who said that Grant is a great student and quite motivated. In this project, Grant will learn more about distributed computing and scheduling algorithms. He will gain practical skills in Python programming, web development, and system administration.

## 2 Faculty Mentoring

A description of my mentoring principles can be found in: "Using Clusters in Undergraduate Research: Distributed Animation Rendering, Photo Processing, and Image Transcoding." The relevant principles are:

1. **Develop applications, not infrastructure**. Students are motivated by real-world applications that they can relate to and are interested in developing. Therefore, I work to ensure that the projects are realistic, but also interesting to the students.

2. **Utilize high-level frameworks**. Because software can become quite complex, I often encourage my students to use high-level frameworks that will allow them to become productive quickly so they can explore the problem domain. Sometimes this means using off-the-shelve software, while at other times this means providing the students with my own code or prototype.

3. **Recognize that nothing is straightforward**. All research projects encounter obstacles. As a mentor, I strive to be patient and recognize that while a problem may appear straightforward to me, it may be quite challenging to an undergraduate. My role is to provide the student with the appropriate background knowledge and guidance to not only find a solution, but learn how to find future solutions.

4. **Practice incremental development**. To support the process of research, I practice incremental development. This means I meet with students once a week to discuss their progress, any problems they are encountering, and how to develop solutions to these challenges. Additionally, my students record their research journey in a blog that I read before each meeting. Moreover, I have the students use a version control system, which allows me to track the progress of their code.

   When it comes time for a paper or presentation, the students do the bulk of the writing. Afterwards, I apply the same principles of iterative development by having the students edit the publication based on my feedback until it has reached a satisfactory form. For talks and posters, I also have the students perform a live test run before presenting in public to ensure they effectively communicate their work.

# 3 History of Prior Activities

A list of all the papers and presentations produced from my collaborative student-faculty research at UW-Eau Claire is provided in the attached Faculty Vita. Highlights include the following:

1. One best paper award in the education, outreach, and training track at CLUSTER, a national high performance computing conference.

2. Two third-place student-written papers at the Midwest Instruction and Computing Symposium, a regional Computer Science conference.

3. One invited presentation at HTCondor Week, an annual workshop at UW-Madison.

Also listed are all of the students I have worked with in both collaborative research and as an independent study advisor.