1. Executive Summary

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2. Project Description

This proposal is for an upgrade to the computer equipment that supports courses in the departments of Computer Science, Mathematics and Statistics, Communications, and Art and Design. This equipment (described in section 4) will replace the current workstations in room 140 COE. The current machines (two year old Dell machines with a 266 Mhz PII and 128 Mbytes of RAM) will be moved up to room 757 to replace those older computers (200 Mhz PII with 64 Mbytes RAM). The Digital Projection Unit will be attached to one of the computers, allowing instructors to display course notes, software examples, etc. in the classroom.

Very high-end equipment is necessary to support the computer graphics and animation courses that are taught in this classroom. Two of these courses CSc 4840/6840 (Computer Modeling and Image Synthesis) and CSc 4841/6841 (Computer Animation) are cross-listed as Film (Film 4840 & 4841) and Graphics Design (GRD 4840 & 4841) and thus, have students from all three departments. These courses are taught in the COE 140 classroom using 3D Studio Max, a high end computer modeling and animation package. Creating images and animations using Max is very resource intensive. For example, computer animations require 30 frames per second so a two-minute animation requires 3600 frames. If each frame requires 10 - 30 seconds to render (not an unusually long time with the current 266 Mhz P II processor machines) then a single animation will require 10 - 30 hours to render! This makes it impossible for students to experiment and do re-rendering. Since Max is threaded, it takes advantage of dual processors so that the new machines should be about 6 times faster than the current machines, thus allowing students to create more images/animations in the same amount of time. As students create complex models these also require large amounts of memory and a very fast graphics card, otherwise the model and scene complexity is severely limited, as is currently the case.

In addition to the in-class time, the students will use these machines extensively outside of class. It is estimated that they spend approximately ten hours per week outside of class for these courses.
Other graphics courses are not held in COE 140 (they are more lecture oriented with only occasional classes in COE 140), but the students will use the requested equipment for their assignments. CSc 4820/6820 (Computer Graphics Algorithms) and CSc 8820 (Advanced Computer Graphics Algorithms) use technologies such as Renderman, VRML, Java 3D, OpenGL, and Renderman (actually the freeware BMRT package). These all require excellent graphics cards and a large amount of processing power. The Renderman/BMRT system (used to make movies such as Toy Story) can create very high quality single images using Ray Tracing or Radiosity. A single complex Radiosity image can require eight hours to render on a slow machine. The other systems are oriented towards fast real-time interactive graphics, e.g., as in games. These require the fast graphics cards and high-speed processors for good performance. Fortunately, all this software is free.

Another course whose students will use this equipment is CSc 4620/6620 (Digital Image Processing). This is a new course designed to support the Yamacraw track for computer science students. Students use a freeware version of Matlab to do their projects. These projects are very compute intensive and will benefit from the computational capability of the new machines.

The Department of Mathematics and Statistics uses COE 140 for special sections of several courses. These are scheduled based on the availability of the room and an instructor.

Math 1111 College Algebra. Special sections use files developed to work with a mathematical oriented software package called StudyWorks. COE 140 accommodates 30 to 35 students in one of these sections. These students self select from a pool of over 2500 students who take Math 1111 per year.

Math 1113 Precalculus. Special sections use files developed to work with WebCT. COE 140 accommodates 30 to 35 students in one of these sections. These students self select from a pool of over 1000 students who take Math 1113 per year.

Math 2050 Informal Geometry, Math 4301/6301 Transformational Geometry, and Math 4371/6371 Modern Geometry. Special sections work with a software package called Geometer's Sketchpad. COE 140 accommodates 20 to 40 students in sections of these courses that are heavily populated by education majors.

The Interior Design Department in the School of Art and Design has two courses (ID 4250/6250 and ID 4350/6350) which use AutoCAD – a high end computer aided design program, which would be much more useful with the new equipment. One section of these will be taught in this room each semester.

COE 140 is open Monday-Thursday 8:30 AM to 9:30 PM and Friday 8:30 AM to 5:00 PM. Any of these times when there is not a scheduled class the room is open to students in any of the above courses. The two System Administrators in the Departments of Computer Science and Mathematics and Statistics perform all software installation and system administration. Room 757 (where the current machines will be transferred) is used for occasional classes and otherwise is open access for students in the Departments of Computer Science and Mathematics and Statistics during normal office hours (8:30 am to 5:15 pm M-F).
3. Relevance to Regents Guidelines

This project directly supports Guidelines [1] (Technology fee revenues should be used primarily for the direct benefit of students to assist them in meeting the educational objectives of their academic programs.) and [3] (Technology fee revenues should be used for hardware and Network related expenditures that include support of general purpose or special purpose laboratories used by students for body productivity and more discipline related activities.) The requested equipment supports twelve academic courses from four Departments that enroll students from all of GSU.

4. Justification of One-time Funding Requirements

This request is for the following equipment:

25 Dell Precision 420 Workstations at $4,900 each:
Dual 800 MHz PIII processors; 256 Mbytes RAM, 18GB Ultra 160/M SCSI 10,000 RPM Hard Drive, Gloria II Pro, AGP Pro 4X 64MB Video Card, 8X/4X/32X IDE CD Read-Write, 3.5" 1.44MB Floppy Drive, 19" (17.96" viewable, .25dp) Ultrascan P991 Monitor, Microsoft® Windows® 2000 Professional.

1 X Sharp N4 Digital Projection Unit $5,000

Total Request: $127,500

In some of the supported courses, especially the Graphics and animation courses, the students generate very large files, e.g. an animation might be 50 mbytes. Thus, the machines are equipped with a CD Read-Write device so students can copy the files to CD-ROMs.

Continuing Funding Requirements

The expected lifetime of these machines is three years, so a similar request will be made every three years.

5. Accountability of Funds

Since all funds obtained in this proposal will be used to upgrade the equipment in COE 140 this will be documented.

6. Additional Funding Required, Non-Technology Fee

As stated in the Project Description the two System Administrators in the Departments of Computer Science and Mathematics and Statistics will perform all software installation and system administration.

7. Impact on Computing/Network Infrastructure
None, since this request replaces current machines that use the Network.