

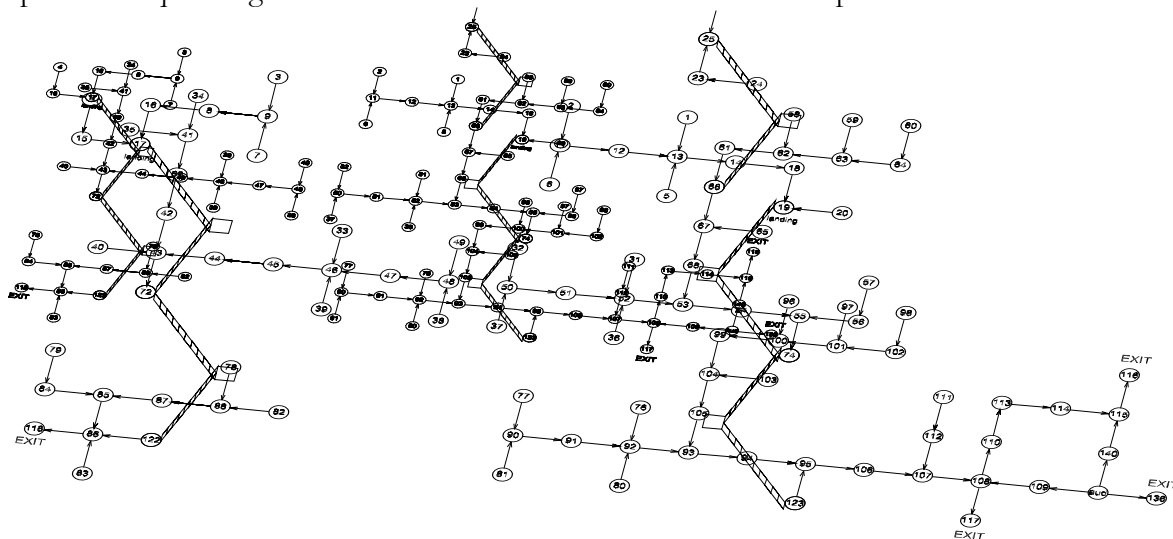
College of Engineering  
Summer Research Experience for Undergraduates Program

Request for an Engineering Student for Summer 2011 Research

Faculty Name James MacGregor Smith Phone 545-4542  
Department MIE Email: jmsmith@ecs.umass.edu

**Brief description of Summer Research Project (please explain the interdisciplinary nature of this project).**

This project is concerned with modeling the evacuation process from buildings on the Umass campus. Evacuation is a critical problem in our society since to estimate the clearance time and congestion in buildings is critically important for the overall design of the building and the safety of the occupants. Corridors, stairwells, # of exit doors, and overall design of the egress systems infrastructure are very important. This project is concerned with architecture, engineering, the behavior of people, and safety engineering. The drawing below represents an evacuation network of a campus building where the occupants of the building navigate the hallways, stairwells and corridors leading from their laboratories and rooms to safety outside the building. This isometric represents a queueing network that we use to model the evacuation problem.



**Brief description of what the student will be doing:** Students will gather data on the physical infrastructure of selected buildings on the Umass campus where there is a significant potential evacuation problem. The data will be transferred to programs developed by my students and myself to calculate the egress time, congestion, queues and bottlenecks of these buildings during an evacuation. Different scenario experiments involving varying the distribution and number of persons on each floor of the building, their location, potential blocked stairwells due to fire and smoke and the exits will be used to stress the buildings infrastructure. Empirical egress times available from the office of health and safety will be used to compare the computer based estimates. In addition, the research work will be transferred to a web site displaying the finished work and our evacuation research activities.

Is this a CASA-related project? Yes \_\_\_ No ☒

**Preferred background of student (major(s), class, GPA, pre-requisites, etc.):**

Industrial Engineering or Civil Engineering or other engineering degrees with exposure to probability and statistics and/or operations research and simulation modeling.

**Did you mentor a student last summer in the College REU Program?**

Yes ☒ No \_\_\_

**If yes, please describe the outcomes for that student (i.e. Honor's thesis, conference presentations, manuscripts, papers, etc. Describe accomplishments to date as well as plans for the spring semester if the work has continued):**

The student developed a research report of the activities over the summer that was to be presented at a conference. The presentation has not occurred at the present time.

**Please return this form to:**

**Lorraine Robidoux,  
REU Program Coordinator  
129 Marston Hall**

**By Friday, February 5, 2011**