College of Engineering  
Summer Research Experience for Undergraduates Program  

Request for an Engineering Student for Summer 2012 Research  

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Brief description of Summer Research Project (please explain the interdisciplinary nature of this project).  
The extent of damage observed in highway bridges after recent extreme events (e.g., earthquake in Tohoku, Japan (2011) and flooding in the New England area, United States (2011)) indicates an urgent need to calibrate the bridge design limit states following a multi-hazard reliability-based approach. Among different natural hazards, scour is one of the most common causes of bridge failure (more than 53%) in the United States. To prevent failure of bridges spanning waterways, it is essential to design them so that they can satisfy all performance requirements after any structural degradation due to scour.  
This project will investigate the reliability of the existing bridges designed following the current specifications for scour events. Towards this goal, a general review of the scouring phenomenon and its different types will be necessary. Furthermore, numerical and laboratory models need to be established to capture the potential effects of scouring on existing bridges. This project includes different aspects of structural engineering, hydraulic design, and mechanical engineering (specifically fluid-structure interaction).  

Brief description of what the student will be doing:  
The student will be expected to complete the following tasks:  
1. Review the design specifications for highway bridges crossing waterways  
2. Participate in field trips to the actual scoured bridges  
3. Conduct numerical analysis on the representative bridge models  
4. Investigation of appropriate health-monitoring techniques  
5. Write a final report on the completed activities, prepare a poster, and present the results in a seminar  

Is this a CASA-related project? Yes ___ No x  

Preferred background of student (major(s), class, GPA, pre-requisites, etc.):  
Must be CEE major, in junior or senior level  
Student must have completed the “Structural Analysis” and/or “Dynamics of Structures”  
Must have a GPA of 3.5 or higher  

Did you mentor a student last summer in the College REU Program?  
Yes____ No x  

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):  
N/A  

Please return this form to: lrobidou@ecs.umass.edu by February 3, 2012