



**UNIVERSITY OF MASSACHUSETTS**  
Amherst

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TECHNICAL MEMORANDUM

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**TO:** ASEE Northeast Section Conference

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**SUBJECT:** Student Poster Abstract

**DATE:** 3/22/2015

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Establishing a learning environment that stimulates self-motivation in an undergraduate engineering curriculum.

Recent changes to a large (170-195 student) upper-division (junior-level) Fundamentals of Electrical Engineering course at UMass Amherst have had the effect of stimulating interest amongst mechanical engineering students in becoming “hackers”, participating in an emerging makerspace culture, and proposing electromechanical (versus strictly mechanical) topics for senior design and other projects. These are hallmarks of students being self-motivated to learn. The revised Fundamentals of EE course that is required of all mechanical and industrial undergrads at UMass now incorporates a substantive group-based hands-on project in which student teams design, build, and test a collision-avoiding robotic car (Annan et al.) The course is thus very hands-on and open-ended, in the sense that students have wide latitude in their approach to building the car. It is also highly motivating, since the students get to see the results of their efforts demonstrated in an autonomous vehicle. At the same time that the course was revised, the Mechanical and Industrial Engineering department opened up part of its laboratory space to student control. We have observed dozens of students participating in hacker experiments and occupying a new makerspace since these changes took place. We hypothesize that the hands-on, open-endedness, inter-disciplinarity, and motivating elements of the Fundamentals of EE course, combined with departmental willingness to allocate space for student control and management, are key ingredients in stimulating students to be self-motivated and innovative partners in their learning.