

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
ON TRACK - UNDERGRADUATE AND POSTGRADUATE SPACE EDUCATION (2)

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PROMOTING STEM EDUCATION VIA THE DESIGN, ANALYSIS, FABRICATION AND TESTING  
OF A SIMULATED LUNAR ROVING VEHICLE**Abstract**

A ground based lunar rover has been developed in order to meet the design requirements and constraints stipulated by the United States of America (USA) National Aeronautics and Space Administration (NASA) in association with the annual Great Moonbuggy Race held in Huntsville, Alabama, USA. Mechanical and Aerospace Engineering (MAE) and Civil and Environmental Engineering (CEE) undergraduate students from the University of Alabama in Huntsville (UAH) have designed, modeled, analyzed, fabricated and tested a lunar rover, or moonbuggy. The design challenge aims to inspire students to seek Science, Technology, Engineering and Math (STEM) careers and challenge the design teams with real engineering problems similar to those encountered by NASA's original Apollo lunar rover engineers – such as confinement of the unassembled vehicle to a limited volume and the ability of the vehicle to traverse harsh terrain. The UAH design team has participated in the NASA race for three consecutive years. The team members have gained critical design experience with respect to modeling, simulation, analyses, parts procurement, material analyses, safety, durability, maintainability and reliability. Students that have participated in the moonbuggy challenge gained vital experience that accelerated their practical experience beyond that of their peers. The challenge provided the students with invaluable experience in the design of a complex vehicle utilizing an integrated design team approach. The UAH design team also maintains extensive outreach efforts in order to inspire future generations of students to pursue STEM careers. This paper describes the learning outcome as a result of involvement in the engineering design process required to design and fabricate the moonbuggy and the outreach efforts associated with primary and secondary education students.