

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
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STEM EDUCATION USING SPACE ROVER AND STUDENT ROVER CHALLENGE (SRC)

**Abstract**

Space engineering and science necessitate a rich foundation of knowledge, which can be enhanced by adopting an interdisciplinary strategy for mission success. STEM education bridges science, technology, engineering, and mathematics, teaching students to integrate these fields. A significant hurdle in STEM teaching is engaging students, often due to the inaccessibility of resources and uninspiring content. This paper outlines the methods and outcomes of employing Space Rovers in STEM education and discusses the forthcoming International Student Rover Challenge, set for late summer, built on this educational framework.

Since its inception in 2015, the Pumpkin Idea Factory makerspace in Busan, South Korea, has offered a creative space for children aged 6 to 16. Founded by Mr. Jang, a former mathematics teacher, the space initially aimed to spark interest in mathematics through hands-on model building, such as submarines, karts, and rovers. This innovative approach led students from disinterest in math to keen engagement in complex programming, mechanical engineering, and science for constructing space rovers and drones. The experience also kindled an interest in space engineering and exploration. The makerspace tackled the challenge of resource accessibility by utilizing recyclable materials like PVC pipes and affordable components, alongside Arduino for simplifying complex system assembly. Through this educational model, students developed problem-solving and teamwork skills. Leveraging this successful educational strategy, an international Student Rover Challenge is being organized to provide young learners with a competitive platform for testing rovers, aiming to introduce them to STEM and space exploration while fostering a network of educational and mentorship opportunities to nurture the next generation of space professionals.