

DEPARTMENT OF ENGINEERING AND COMPUTING EDUCATION
COLLEGE OF ENGINEERING AND APPLIED SCIENCE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

FOR APPLICATION YEAR: 2024

PROJECT TITLE: Spatial Training in STEMM Education: Spatial Tasks, Apps, and Assessments (STAA)

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Project Description

Spatial ability is recognized as a pivotal dimension of multifaceted intelligence, crucial for one's successful performance in science, technology, engineering, mathematics, and Medicine (STEMM) education and professional domain. Therefore, numerous studies have used spatial training to improve students' spatial ability, which might improve their STEMM performance. Despite its significance, there has been a lack of effort to review and evaluate the training effects from the literature. Therefore, this project aims to (a) systematically review diverse spatial training methods in STEMM education, (b) assess the effects of the training on student performance, and (c) develop an efficient spatial task as a means to accurately evaluate students' spatial ability.

The undergraduate research assistant (URA) will start the project by conducting a thorough search for experimental research articles focusing on spatial training methods, with a specific emphasis on Virtual, Augmented, and Extended (VAE) reality technology. The tasks will involve the documentation of various aspects of spatial training methods in the identified research articles, such as (a) target population, (b) STEMM content areas, (c) types of spatial tasks (e.g., gaming, animation in surgical training, apps for engineering design graphics within the VAE reality technology), (d) spatial assessment tools, and (e) changes in student performance resulting from spatial training. By reviewing spatial training methods, the URA will be able to contribute to the development of a new spatial task or training tool for improving one's spatial ability. Additionally, there will be opportunities for collaboration in the preparation of a conference paper as a co-author. The position will offer valuable exposure to interdisciplinary research and collaboration with graduate students working on diverse projects within Dr. Yoon's research group.

Dr. Yoon is looking for an undergraduate research assistant (URA) who

- has an interest in spatial training and learning
- is curious, eager to learn, and detail-oriented
- is perseverant and think outside the box
- would like to develop an ability to work/collaborate with others and work independently
- has working experience in CAD modeling and/or 3D printing (not required but preferred)