

AIMS2 Summer research for Mechanical Engineering

Research Project 1

Faculty: Dr. Vidya Nandikolla

Student:

Title: Stem Integrated Robotics: Drone

Description:

The overall focus of this proposal is to seamlessly integrate the interdependent disciplines of Science, Technology, Engineering and Math (STEM) into a focused and real-world robotics project. The goal is to emphasis on engineering (mechanical, electrical, & software), design, innovation, communication, small group collaboration, and critical thinking skills for student to be successful in college, career and community.

A robot can be a mechanical agent using an electronically operated mechanical machine guided by computer program or electronic circuitry. They can be autonomous, semi-autonomous or remotely controlled. The proposed drone project will introduce the concepts and navigation control. The drone will be programmed to navigate to a particular location and send the specific data to the user.

Research Project 2

Faculty: Dr. Vidya Nandikolla

Student:

Title: Biomedical Modeling

Description: 3D finite element modeling will be used to model human foot to investigate the biomechanical stress distribution. The developed foot model will be validated for both static and dynamics conditions to study the pressure distribution. Foot is the lowest part of the body and it's contact surface area to the ground holds and balances the weight of the complete body during activities such as walking, running, climbing etc. The study of the forces acting on the foot is important, as it will help us understand the different types of injuries.

Research Project 3

Faculty: Dr. Vidya Nandikolla

Student:

Title: Robotics for Elementary

Description: STEM focus in elementary school is critical. This project will develop elementary level STEM concepts and hands-on activity to demonstrate the fundamentals to elementary school students. We will demonstrate our activities in elementary school and train the teachers for their summer camp.

Research Project 4

Faculty: Dr. Vibhav Durgesh

Student:

Title: Flow visualization experiments on NACA0021 airfoil at low Re numbers

Description: This study focused on designing and developing a Hydrogen bubble setup and performing flow visualization experiments on a NACA0021 airfoil for a Reynolds number of 19,000 at varying degrees of angle of attack (i.e., 0, 6, 8, and 12 degree). All the measurements for this study were performed in the Water tunnel facility in the Mechanical Engineering Department at California State University, Northridge. For this purpose, an in house Hydrogen bubble facility was developed using high power DC voltage supply and pulse generator controlled using LabView program. The flow visualization measurements performed in this study were able to accurately identify separation and re-attachment locations on the airfoil at different angles of attack. The results from this study showed that the separation location was closer to trailing edge of the airfoil at zero degree angle of attack, and moved closer to the leading edge with increase in angle of attack.