For the past five summers, Professor Hespanha's lab has mentored students from Dos Pueblos High School in Goleta, California. The original graduate student mentors (Daniel Klein and Jason Isaacs) presently work as a research scientist at Intellectual Ventures and as an Assistant Professor in Computer Science at the California State University at Channel Islands, respectively. The current mentors are Graduate Student Researchers in Professor Hespanha's lab: David Copp, Justin Pearson, Hari Sivakumar, and Henrique Ferraz.

STUDENT SPOTLIGHT

Justin Pearson, ECE Graduate Student Researcher

A circular white robot the size of a large banana cream pie trundles across the floor toward an ordinary empty metal coffee can. It swoops in a wide arc around the can like a predator circling prey, then drives directly into it, nudging the coffee can across the floor. Like a child balancing a broomstick, the robot constantly adjusts its position behind the coffee can to keep it from rolling off the side. The robot pushes the coffee can past a small crowd of high school students, and as it enters a circular target of black electrical tape on the dusty floor, the robot stops.

"Time," announces a graduate student. A team of two Dos Pueblos High School students eagerly write their score on the whiteboard. Another two students reset the field and prepare their own robot. The fifth and sixth students turn back to their laptops, squashing the (hopefully) last bug before it's their turn to showcase their robot-driving program.

The robots in this can-pushing race perform autonomously – not under remote-control. Once the students start their program, they can only watch as their robot faithfully executes their pre-loaded program. This week's goal is to push the coffee can to a target on the floor as fast as possible. Next week the students will write programs to drive the robots like a flock of birds – moving together while staying a safe distance apart.

This is a glimpse into a robotics internship hosted by Professor Joao Hespanha and his lab in the UCSB Department of Electrical and Computer Engineering in collaboration with the Institute for Collaborative Biotechnology. Over the course of six weeks, Dos Pueblos High School students learn programming, control theory, and robot kinematics – everything required for a variety of robot challenges like can-pushing, flocking, and waypoint-following.

Students enrolled in the Dos Pueblos Engineering Academy will employ these skills while competing in the annual FIRST Robotics competition.