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Chung Liu, Electrical and Computer Engineering Professor

Here's a look at another group of CSUF students. They have a good time, too. In fact, they claim to have an *"a-mazing"* time. These engineering students, a.k.a. the Micromouse Design Team, work long hours in the design lab in pursuit of the perfect robot rodent. Combining artificial intelligence with robotics research, these students and their adviser, electrical and computer engineering professor Chung Liu, have created *"Micromouse."*

Liu explains that their mission is to program Micromouse to solve a 10-by-10-foot maze in the least amount of time. The self-contained, intelligent rodent *"feels"* its way through a maze and memorizes the correct path after two passes. On the third run through the maze, it can *"crawl"* from start to finish without bumping into a wall or making a wrong turn.

"This is a very complicated process — an integration of a number of courses," Liu says. *"The students must have a background in electronics, programming, mechanics, some math and a lot of strategical knowledge. They spend many hours on this project and must sacrifice some of their other activities."*

Team members Wane Wier, Reginald Smith and Dennis Zweigle are quick to agree with Liu about the number of hours they must dedicate to this project. After all, designing Micromouse is not just fun and games.

The memory system that guides Micromouse consists of *"brains,"* a microprocessor that takes in data as it moves through the maze on the first and second runs and uses that data to determine the shortest route when it makes the third run. Micromouse needs *"eyes,"* sensors to detect walls. Moving through the maze, it projects beams of infrared light from its base. When a wall interrupts any of the beams, Micromouse stops, memorizes the obstacle's location, turns and moves on. Its *"legs"* must have a motor drive circuitry that can be precisely controlled by the microprocessor.

Discussing robotics research in anticipation of the intercollegiate Micromouse competitions are electrical and computer engineering professor Chung Liu and Micromouse Design Team member Wane Wier.

As expected, Micromouse needs *"cheese,"* its own internal power supply — batteries — to provide energy for the electronic circuits. And finally, the mechanized mouse must be in a weight-control program since a lighter robot can solve a maze more efficiently.

The Amazing Micromouse Maze Contest, sponsored by the Institute of Electrical and Electronics Engineers (IEEE), is held concurrently with the annual regional IEEE student paper and device contest. International and intercollegiate Micromouse competitions are held as well.

Chung Liu says that even without the competitions, Micromouse provides students the opportunity to apply classroom blackboard theories to actual devices. The knowledge and practical experience gained are valuable supplements to engineering students, who may later want to transfer this knowledge to dozens of industrial and domestic applications. Chips of artificial intelligence could be used in the future to guide vacuum cleaners and, possibly, even farm machinery.