

Robotic arm of the future at UNLV

by Jack Poleski
Reporter

The College of Engineering at the University of Nevada Las Vegas, is getting closer to completing one of its most important engineering projects.

The "Flexible Robot Arm Project," as it is called, began in 1987 and is headed by five UNLV professors, Dr. Samaan G. Ladkany; Civil and Mechanical Engineering, Dr. Mohamed Trabia; Civil and Environmental Engineering, Dr. William Culbreth; Mechanical Engineering, Dr. Sahjendra Singh; Computer Science and Electrical Engineering, and Dr. Woosoon Yim; Civil and Environmental Engineering.

The project was funded for \$1.5 million, by the Army Research Office (ARO), which is responsible for coordinating and supporting research in the physical and engineering sciences, for the U.S. Army Laboratory Command (LABCOM).

The project's objective was to build a robot that was much more energy efficient than existing robots, but with the same functional capabilities.

Trabia said that the way to achieve this goal was to decrease the weight and create necessary design alternatives.

"The flexible robot is much lighter than conventional robots and incorporates a new design that allows it to lift a big load like that being lifted by the much heavier, industrial robots," Trabia said.

He said that the Army would like to use robots for eliminating human involvement in such areas as, disarming minefields, moving and loading artillery, and removing dangerous toxic waste.

"But in the battlefield there is a scarce amount of power available, which has reduced the possibility of using robots in the past," Trabia said.

He said that the flexible robot would solve the Army's problem when finally completed,

but at the moment the reduced weight of the robot has created an undesirable amount of vibration when the robot is performing its movements.

Dr. Woosoon Yim, knew this would be a problem when the robot was being built.

"The vibrations created by this lighter weight, hinder the accuracy of the movements which is a problem, but one that could not have been solved without first building this robot," said Yim.

Yim is using lasers, linked with a computer program to record these vibrations.

"By analyzing and recording these vibrations we can determine the exact areas that are causing this vibration, then work on redesigning these areas and inevitably, solve our problem," Yim said.

Dr. Samaan Ladkany said that this project has made a positive impact on the engineering program at UNLV.

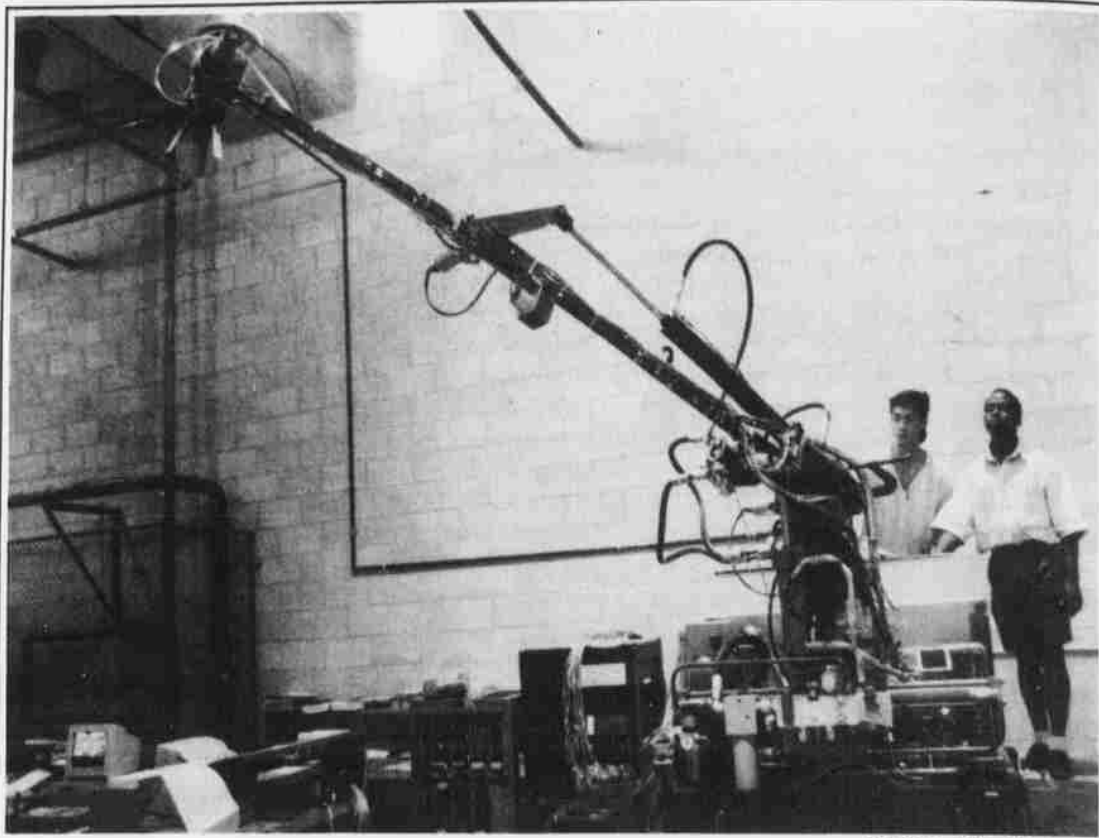
"The project's importance has attracted some of the best graduate students, approximately 12, who are paid for this work, which helps to fund their education, and offers them tremendous hands-on-experience for their future," Ladkany said.

He said that besides this, the engineering program received some invaluable equipment, (graphic sensors, computers, and the robot itself) that will be of great help in future projects.

He added that the efforts of Nevada Senator Harry M. Reid, were one of the reasons UNLV received this project.

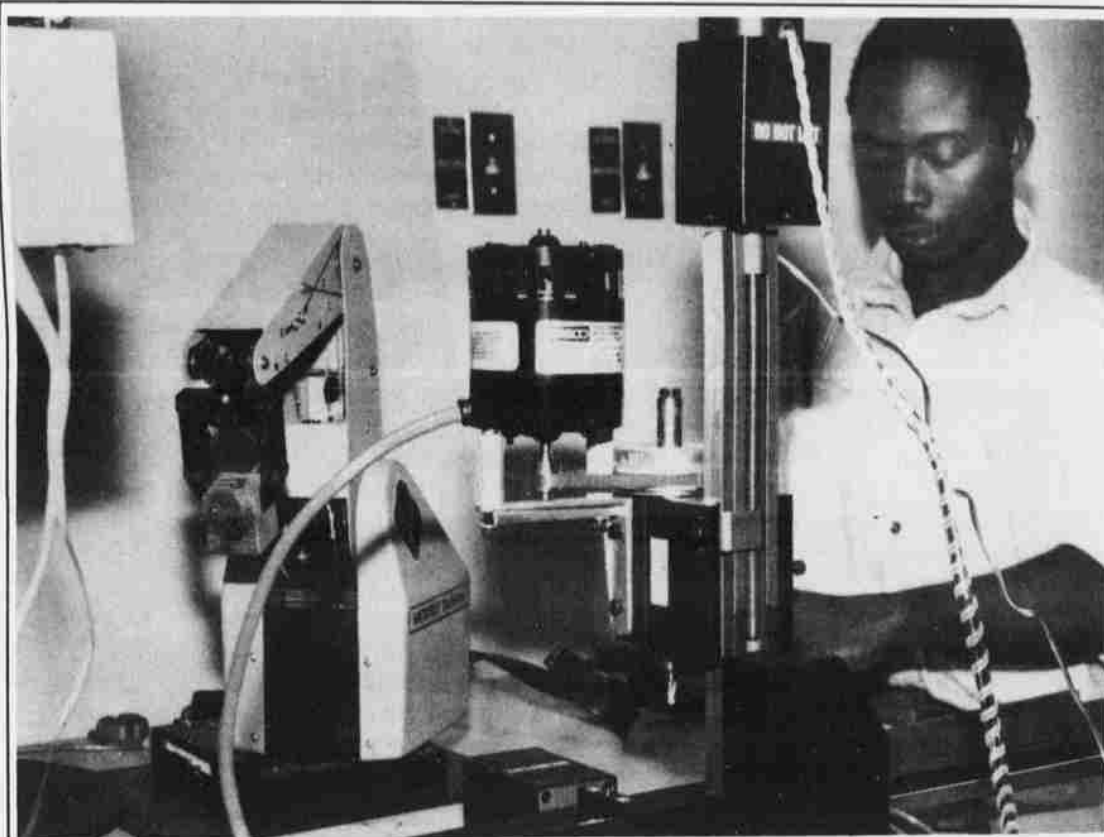
Ladkany finished by saying, "It is the interdisciplinary teamwork that has made this project the success that it is."

The project is scheduled for completion in Spring of 1991. The team in charge of the project welcomes any students interested in this project, and would be glad to arrange demonstrations.



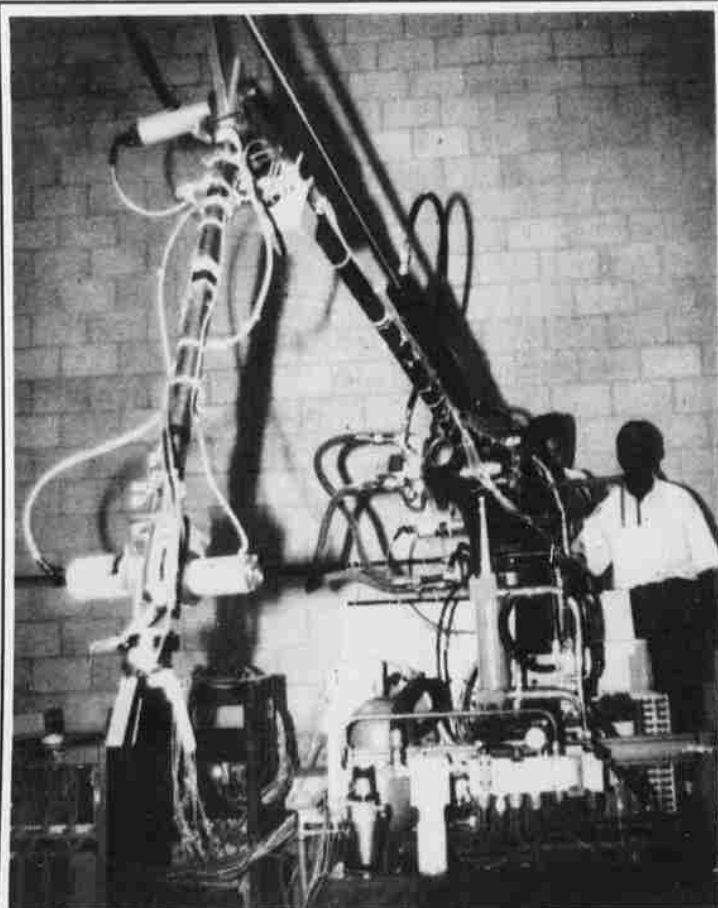
Yell Photo / Robert Anderson

Giant arm - UNLV's School of Mechanical Engineering works on the flexible robotic arm research project. Pictured operating the arm are Ronald G. Mariano (senior) and Anietie Ukpong (graduate student).



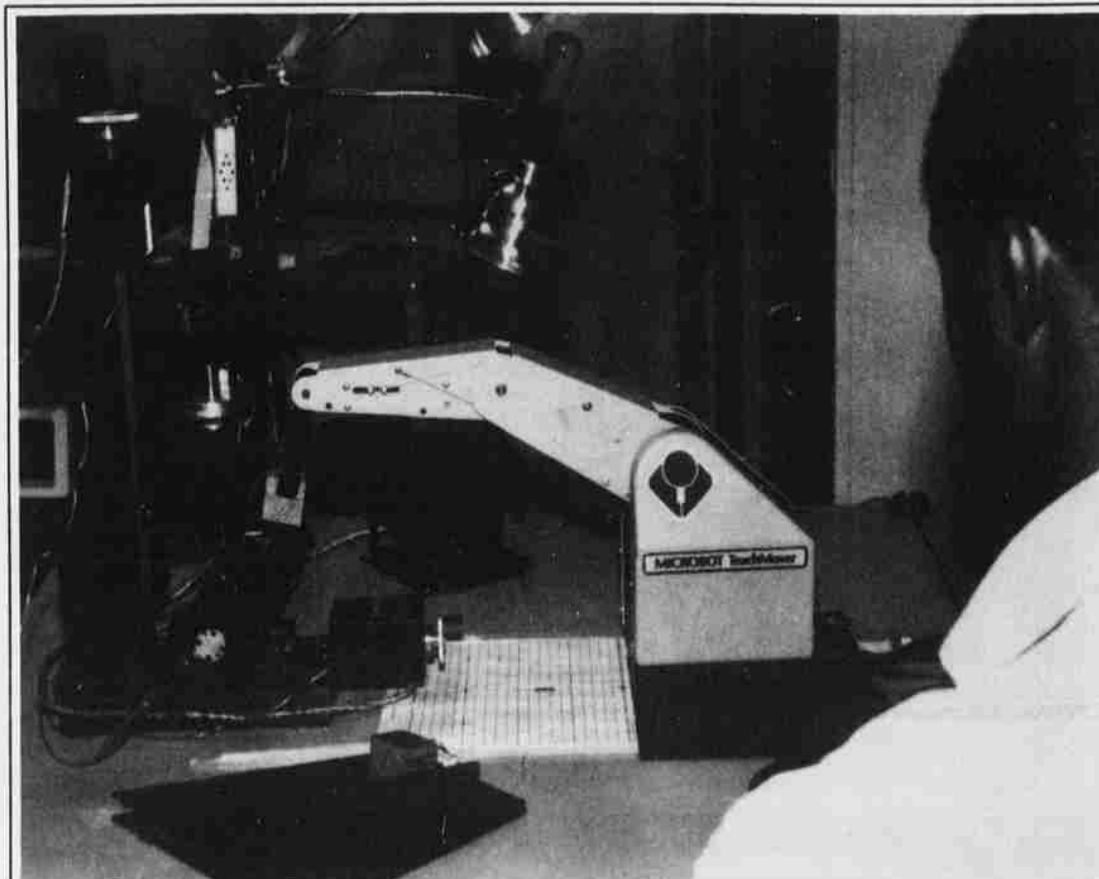
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On a smaller scale - But not to be out done, is the Microbot Teachmaster used to simulate industrial robotic situations. Here, graduate student Anietie Ukpong, programs the arm to place the product on a drill press after picking it up from the stock pile.



Yell Photo / Robert Anderson

Many uses - This large arm can do a variety of tasks including: painting, machining and lifting heavy loads around the workstation. Currently the team is working on making the arm more flexible in order to load and shoot a rifle for the army.



Yell Photo / Robert Anderson

Moving right along - Ukpong programs the Teachmaster to deliver the product from the drill station to the stamping station and eventually onto the conveyer belt.