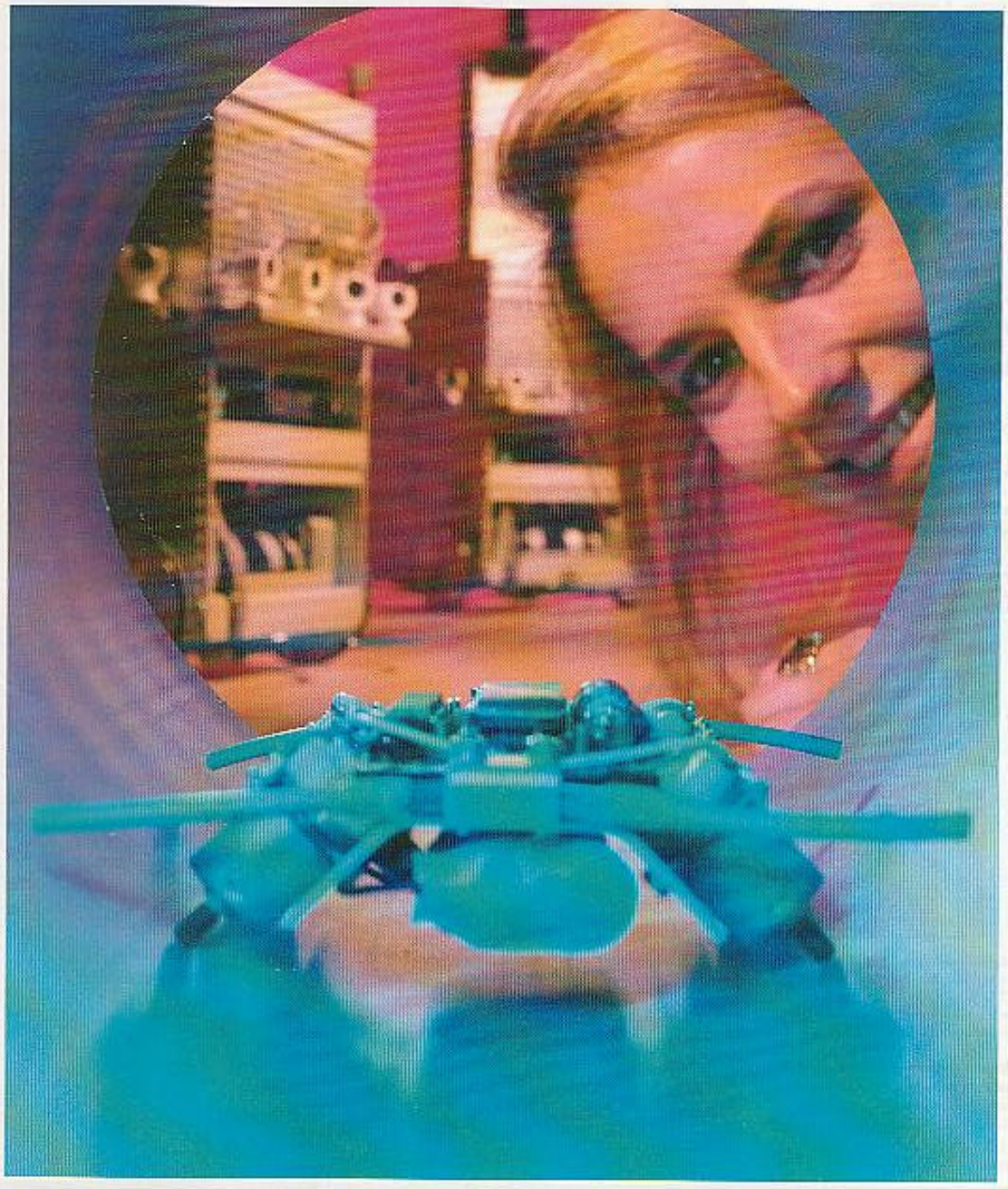
UNIVERSITY OF
essex

SQUARE 1

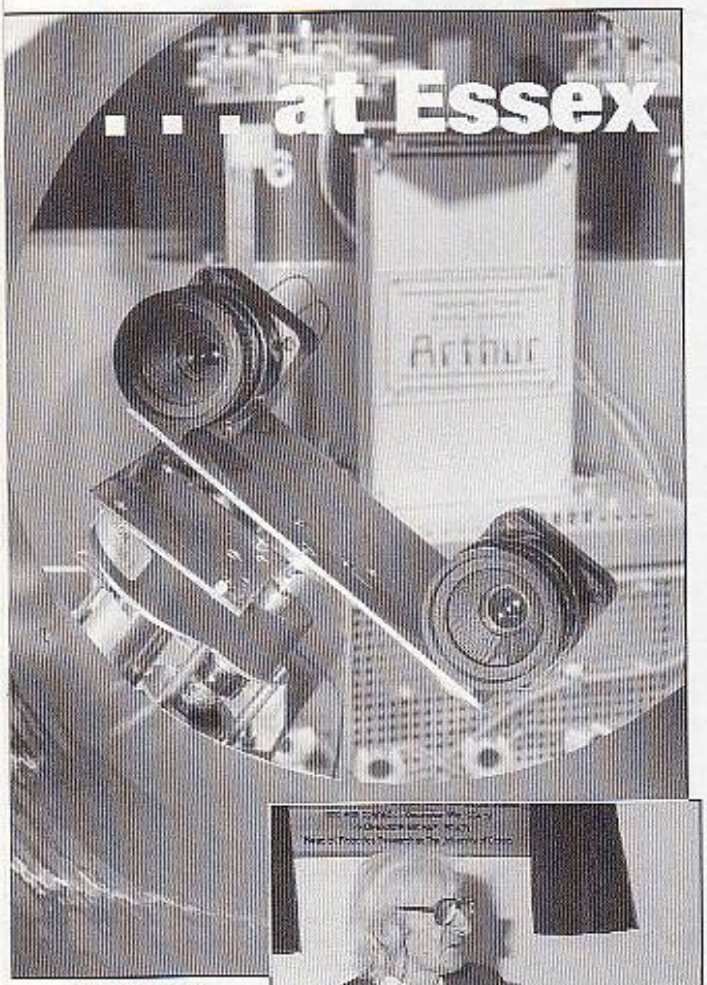
THE MAGAZINE OF ESSEX CONVOCATION

No. 5 1995



A pioneering new laboratory, which came into use in October 1993, has been proving extremely popular with students. Essex is believed to be unique in using the design and construction of intelligent robotic computers as a unifying theme to integrate teaching across the entire Computer Science curriculum, including five undergraduate courses, some final-year projects and MPhil and PhD research projects.

Pioneering role for robots



One of the large robots

Professor Tony Brooker at the opening of the Brooker Laboratory

The design of mobile robotic vehicles is found to increase student motivation enormously, and the fact that the same laboratory is also being used for research increases its attractiveness to undergraduates by giving added relevance to their work.

The laboratory comprises twelve hardware and software development stations, together with four large and several small robots. The large robots can communicate with each other, and with other computers, via Ethernet or a wireless radio link. Students have access to the same state-of-the-art hardware and software as is used, for example, by NASA and British Aerospace.

Most of the robot-related hardware was designed and built at the University at about one-tenth of the cost of the commercially available equivalent. In addition, five companies from the UK and USA have donated hardware and software worth about £400,000.

"We believe that this laboratory is world-beating in allowing subjects as diverse as hardware design, operating systems, communications, distributed processing, software engineering, image interpretation and artificial intelligence to be supported within a unified experimental environment."

Dr Vic Callaghan of the Department of Computer Science, who led the team which developed the laboratory.

In addition to its role in undergraduate teaching, the laboratory is also providing a focus for collaborative research: with BT, on semi-autonomous surveillance and on collaborative virtual reality; and with Slingsby Engineering on remotely operated submersible vehicles.

In December 1994 the laboratory was opened officially and named after the University's Founding Professor of Computer Science, Professor Tony Brooker, who retired in 1988. The opening was carried out by Professor Mike Brady. Currently Professor of Information Engineering at the University of Oxford, where he leads the robot research group, he was on the staff of the Essex Department of Computer Science from 1970 to 1980.

. . . and Oxford

Meanwhile Essex graduate **Paul Beardsley** *(MSc Intelligent Knowledge-Based Systems '89)* has written to us from Oxford, where he completed a DPhil in computer vision in 1992 and has since been working as a post-Doc. Computer vision, he explains, involves programming robots to see, providing them with the same abilities that vision gives to humans - to recognise objects and faces, to grasp and manipulate objects, and to move around an environment without colliding with obstacles. Work in all these areas has gone on in the Robotics Group at Oxford, plus other projects such as smart surveillance cameras which can automatically rotate to keep a moving target in view, and a lip-reading system which is used in conjunction with the analysis of sound to do speech recognition.

Paul is currently working on a robot called GTI, designed and built within the Oxford group, which views the world using a sophisticated 'head' carrying two cameras which act as its eyes. The head can rotate from side to side or up and down, and the two cameras can be moved independently. This makes it possible to emulate the type of exploratory motions a human would make when looking around - turning the head and fixing the gaze on different objects. His job is to develop new algorithms and write the computer programs which enable GTI to build up a picture of its surroundings and move around, avoiding obstacles in its path. Many people feel intuitively that a task like seeing an individual object must be easy, but this is a reflection of the phenomenal ability of the human visual system. In fact, the computer programs required are very complex and they need state-of the-art equipment to handle the number of calculations involved. GTI is one of the most sophisticated robots of its type in the world today, and the research work has recently been presented at an international conference in Stockholm, and British meetings in London and Edinburgh.

Paul Beardsley with GTI

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