MASSACHUSETTS INSTITUTE OF TECHNOLOGY
ARTIFICIAL INTELLIGENCE LABORATORY

AI Memo 1252 **August, 1990**

The 1990 AI FAIR

Anita M. Flynn

Abstract

This year, as the finale to the Artificial Intelligence Laboratory's annual Winter Olympics, the Lab staged an AI Fair – a night devoted to displaying the wide variety of talents and interests within the laboratory. The Fair provided an outlet for creativity and fun in a carnival-like atmosphere. Students organized events from robot boat races to face-recognition vision contests. Research groups came together to make posters and booths explaining their work. The robots rolled down out of the labs, networks were turned over to aerial combat computer games and walls were decorated with posters of zany ideas for the future. Everyone pitched in, and this photograph album is a pictorial account of the fun that night at the AI Fair.

1 First, There Was Olympics

For the past six years, during the last two weeks of MIT's January Independent Activities Period, the AI Lab has held its own Winter Olympics with a dozen or so athletic tournaments designed to give Lab members a chance to play, relax and intermix (and get in shape). The Lab is split up each year into four teams with various mappings such as by last name, place of birth, location of residence, mother's maiden name, etc. Each team has a captain and each sport a commissioner. This year the repertoire of sports included Trivial Pursuit, Aerobics, Ice Hockey, Ultimate Frisbee, Soccer, Volleyball, Bad Writing, Roller Blading, Table Tennis, a Dance Marathon, Basketball, Skiing and Running. A running tally is updated after each event and an Olympic trophy is awarded to the winning team on the last night. Usually, there has been a big party that night and a talent show. Last year however, the humans were upstaged by robots. We had given out kits of parts a month earlier and all involved built robots throughout January and then demonstrated their creatures at the Robot Talent Show on the final night of the Olympics[1]

This year however, we changed things up a bit by staging an AI Fair. The intent was to broaden the base and create a forum that would appeal to a wider range of participants among the Lab than those inclined towards robot building. The end result included exhibitions of natural language interfaces, voice-activated data retrieval systems, displays of research on parallel computers, squirt gun deciding vision contests and of course hallways full of mobots and this year's version of robot hacking – wet robot races.

But as creativity most often springs from playfulness, let's start with the games.

[1]See *"The Olympic Robot Building Manual"* AI Memo 1230, December, 1988 and *"The Official Photograph Album of the 1989 Robot Olympics"* MIT AI Lab Manual, April, 1989.

Figure 1: Basketball has been a long-time favorite in the Olympics. Peter Graham looks for the best pass.

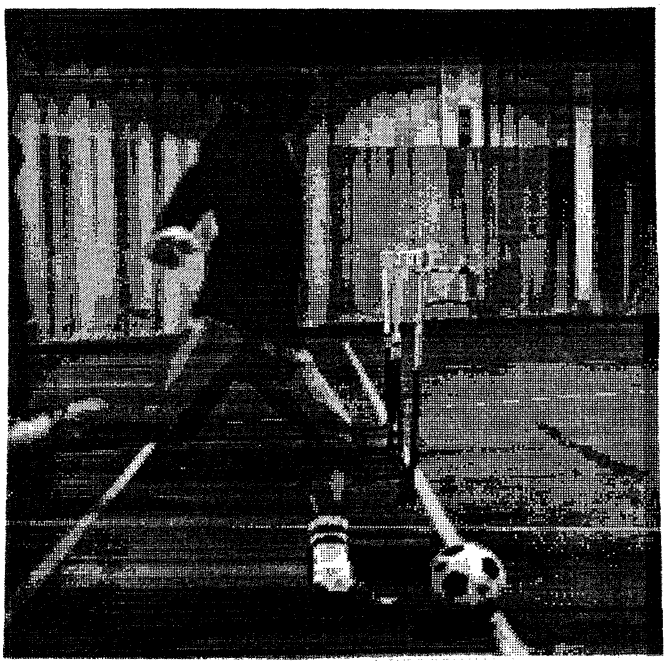


Figure 2: With snow on the ground outside, soccer goes indoors to the infield of the indoor track. Michael Noakes takes a goal kick.

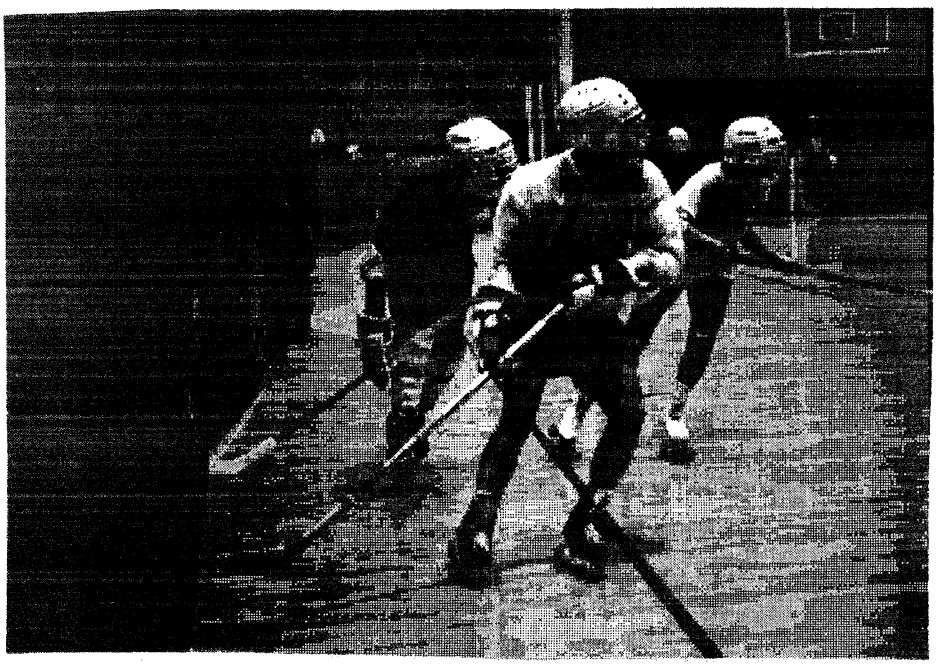


Figure 3: Roller blade hockey was the new bruising event this year and MVP Sports' timely sale of $ 20 roller blades enabled even poor grad students to pick up a pair for this event.

Figure 4: Aerobics had a new twist: "Tacky Aerobics". Wearing ten colors earned an extra point. It was quite a sight.

Figure 5: The Road Race coincided with perfect weather and an all-time high 66 runners.

Figure 6: But the real surprise was the Dance Marathon. Who would have thought 83 competitors would show up for all-night bopping in the 8th floor playroom? My how the Lab has changed!

2 AI Fair Parties

While Olympic events were taking place each day, background energy was focusing towards the Fair. A series of Tuesday afternoon parties brought people together to brainstorm and plan events for the big finale.

The idea of the Fair was to provide a completely nebulous and open-ended forum (all the better for being creative) for students to invent, display and share their enthusiasm. Thus you could display progress on a thesis project, get involved in setting up a special contest just for the Fair, get around to the project you've had in the back of your head for years, or dream up the way the world really should be and make a poster communicating your ideas appropriately. The Past, Present and Future of AI was all game.

Consequently, the outline for the Fair was very unstructured and it was never clear what was actually going to come of it all. But then, the fun in organizing is always the surprise.

The AI Fair parties each week were established to get things rolling and to brainstorm about what the Fair could be. Lab members got together and began to dream up new projects. Spearheaded by a few extra-energetic souls, the 7th floor playroom became the center of action.

Figure 7: Dave Barrett decided autonomous water-borne craft were the next challenge for robotics. He initiated "America's Cup in a Bathtub", a robot boat building contest in which the goal was to design a craft which could circumnavigate a figure eight around two infrared-emitting lighthouses.

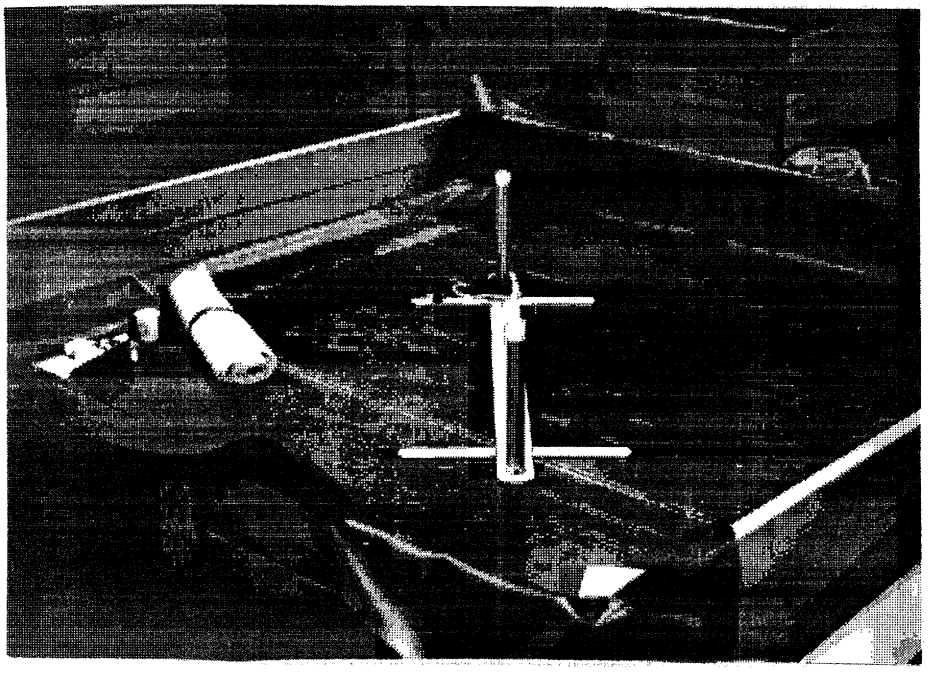


Figure 8: He built this rubber-tarpulin lined pool in the 7th floor playroom, which when filled was 8 inches deep. The structure in the center is the stand for two lighthouses which each held infared emitters broadcasting at different frequencies. Dave put together kits of parts, organized seminars on hull design and built a styrofoam cutting machine to help robot builders design their hulls.

Figure 9: The vision hackers got together and decided a fun problem for computer vision was face recognition. Led by Dave Michael (front), Dave Clemens and Paul Viola (not shown), they put up a challenge: stand behind your algorithm or get wet!

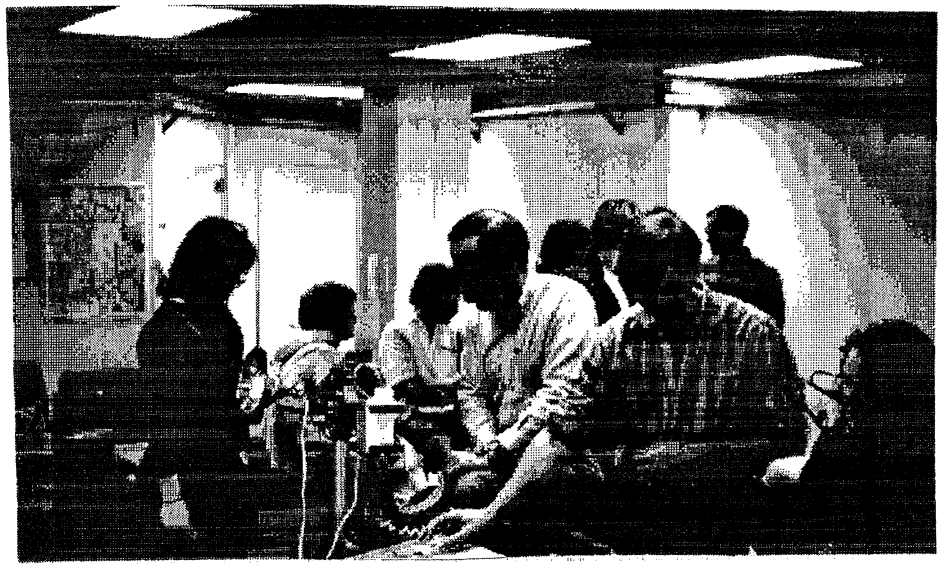


Figure 10: The See-n-Squirt contest was to write a face recognition algorithm that could discriminate between the programmer's face and Rod Brooks' face. Rod and programmer would stand in front of a camera while a Lisp Machine grabbed their image and began processing. The algorithm would hand off coordinates of Rod's face to a computer controlled squirt gun, which would fire off a stream of water. Rod was unfazed – he knows how hard vision is. If the algorithm wasn't up to snuff the programmer would likely get drenched instead. Here, Dave Clemens checks the Lisp Machine while Sara Billey and Randy Davis inspect the camera and servoed squirt gun.

Figure 11: The setup was left in the 7th floor playroom for weeks leading up to the Fair so that hackers could periodically try out their latest algorithms. Pattie Maes, Ron Chaney, Maja Mataric and Ian Horswill line up here for a Who Looks Most Like Ron? contest. Ian won!

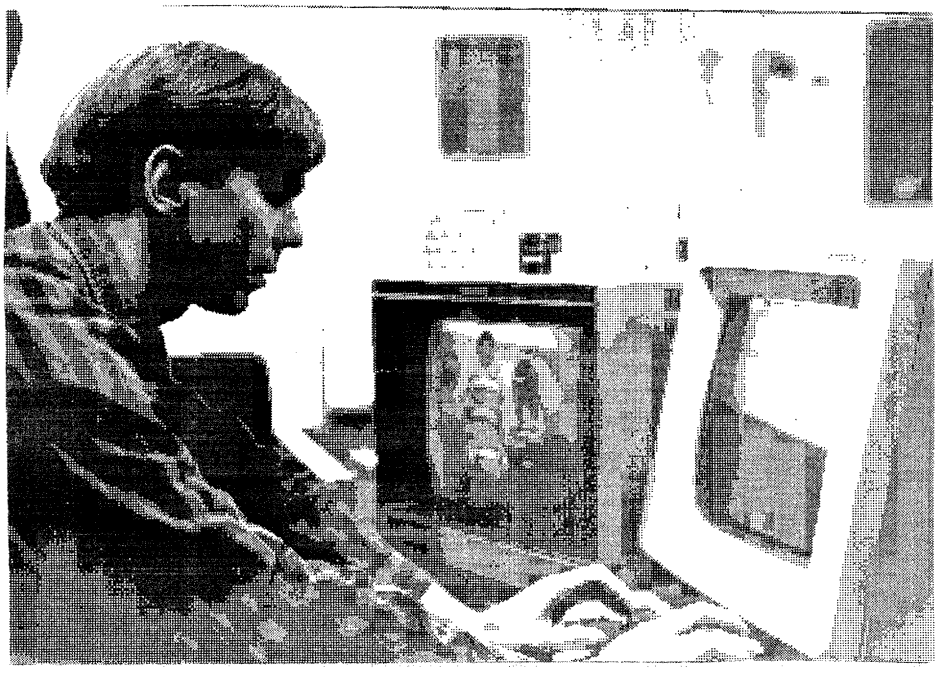


Figure 12: Dave Clemens grabs their image and starts a test on a new face recognition program. When not testing new code, a motion detector was left running all month and anyone happening to wander by unaware always caught a stream of water. As an added bonus, pictures of the targets getting hit were saved away for later display.

Figure 13: Rod's not sure he likes this whole idea.

3 The Fair

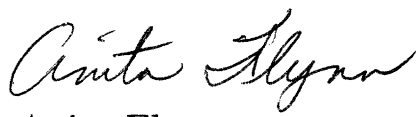
Showcase night finally arrived. It was a grand success with over 400 hundred visitors from who knows where.

Programs were printed up to guide visitors to exhibits throughout the Lab and a copy of the Fair program is included here to help guide you through the photographs.

AI Fair 1990

PROGRAM

Welcome to the 1990 AI Fair. We have almost everything legal for your entertainment and edification (with an emphasis on the former). Included are foods (cotton candy, popcorn, foreign and North American goodies), jugglers, games, robot demos, videos, fantastic computer simulations (games), serious programs, posters and a lot of people who would love to tell you about their work.

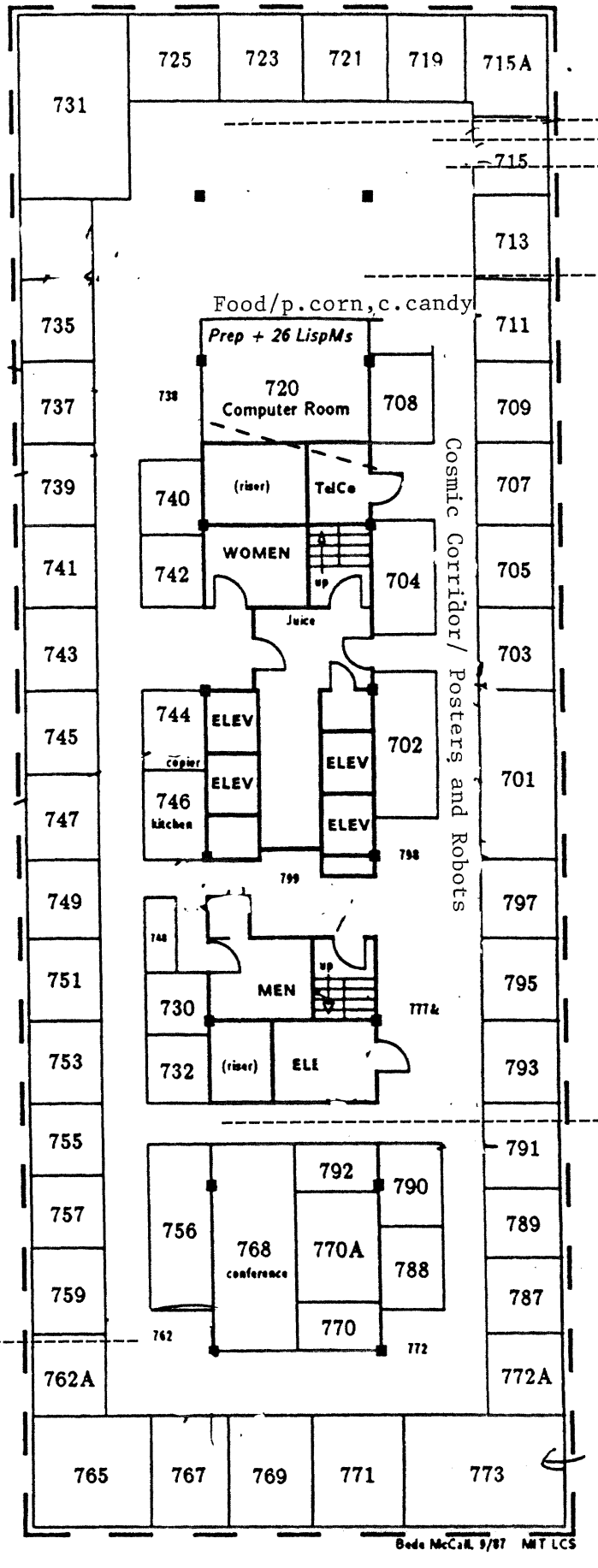


Anita Flynn
AI Olympics Chairperson

This program is designed to help you navigate through the three floors of the fair, 7, 8 and 9. The next three pages are maps of the three floors with brief codings to help you spot items of interest, like food. Codes, like 7B, are used to identify the location of specific activities on the map. More information on these activities is available in the ABSTRACTS section after the maps. The number on the code usually refers to the floor on which the display is located.

If you are a stranger to the Lab and are having trouble, ask anyone. We're happy to help. Have fun and watch us build the future.

7th Floor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Cosmic Corridor/ Posters and Robots
Food/p.corn,c.candy
7E Robot Contest
7B Sea Squirt Robot
7F HyperVoice Demo
7A Portraits Made by Computer
7G See-N-Squirt Contest
7J Dogfight, Simulation, Game
7C Juggling
Bede McCall 9/87 MIT LCS

7TH FLOOR

In the 7th floor playroom we now have a swimming pool. It's home to the America's Cup in a Bathtub, the wet robot races. Off by the whiteboard, is Squirt the Advisor, where vision hackers take a crack at face recognition. Rod Brooks and the programmer stand in front of a camera attached to a computer-controlled squirt gun. If the program recognizes Rod, he gets wet! The playroom will also have booths and exhibits of a phone-in voice-mail data base system plus some underwater submarine robots.

Down the 7th floor hallway past Le-Monde, you venture into a vision of the future in the "Third Millennium", put together by the Mobot Lab. All the mobots will be hanging out doing their thing, plus posters,videos and microscope views of micromotors. The theme of the hall way is how technology being developed now will change the way we approach space exploration in the year 2000 and beyond.

Food on 7: Popcorn and cotton candy are on the 7th floor. They're in the cross hallway that goes past the men's room.

7B <-- MAP REFERENCE FOR FLOOR 7

Sea Squirt Autonomous Underwater Vehicle

Tom Consi and Jim Bellingham, MIT Sea Grant

Location: 7th floor next to the pool.

Type of Display: Robot exhibit and video.

Abstract: The Sea Squirt is an autonomous underwater vehicle. It serves as a test-bed vehicle to study new ideas in A.I. and sensors. The Sea Squirt was built in winter-spring '89 and was operated fully autonomously for the first time in the summer of '89.

7C

How do we learn to juggle?

Chris Atkeson

Location of Display: 7th floor hallway outside 762-771

Type of Display: Human demo

Abstract: How can we improve machine learning algorithms based on observing human learning? Participants will attempt to reverse engineer their own motor learning abilities, by learning to juggle, or learning to juggle something new if they can already juggle.

7A

Computer Portraits by the Robo Squirt

Henry Minsky

Location: 7th Floor Playroom

Abstract: "Have Your Portrait Drawn by Computer". People will get a frame grabbed from the Squirt-Rod camera setup when it is not in use, and then will get a printout from the HP plotter in the 7th floor playroom.

7E

America's Cup in a Tub Boat Race

Dave Barrett

Location: 7ai Playroom: can't miss it- only big wet space in room

Type: Robot boat race

Abstract: This contest is basically a boat race around two navigation beacons (lighthouses) situated in an enclosed basin of water (the tub). All entries must meet 3 simple requirements, they must touch the water in some fashion, they must be fully autonomous, and they must not cause leaks in the basin. Points will be awarded for size, speed, intelligence and design.

note room change and different abstract.

7F

HyperVoice

Paul Resnick

Location of Display: 715 next to: playroom

Type of Display: Demo and poster

Abstract: Listen to and record jokes on my experimental HyperVoice system. Read about plans to use the technology for a free, publicly accessible (from any touch-tone phone) voice bulletin board in Boston's South end. The bulletin board will have three components, a Rainbow Pages, a Community Scoreboard, and a Community Calendar.

7G

See-N-Squirt or Robo Squirt

David Michael, David Clemens and Paul Viola

Location of Display: 7AI Playroom

Type of Display: Contest

Abstract: This is a contest (like at any other fair) where the object is to squirt water at Rod Brooks. You enter the contest by submitting a computer program that picks out Rod from an image of Rod and YOU. Both of you stand in front of the camera/squirt device (Robo Squirt) while we take the picture and let your program think... Robo Squirt will squirt once wherever your program thinks Rod's face is.

Motivation: FUN and the fact that face recognition is an open problem in AI and it has recently been conjectured that we don't spend enough time (here at MIT) thinking about it.

Time: We will probably start running the entries through at 8PM.

7J

Dogfight

Chris Foley, Olaf Bleck and Paul Viola

Location: on the cross hallway.

Abstract: Dogfight is an interactive flight simulator game which can be played amongst a number of people situated on various workstations. Four Sparc stations are set up for this.

7H

The Third Millennium

Rod Brooks' Mobot Lab

Lynne Parker, Pattie Maes, Paul Viola, Anita Flynn, Olaf Bleck, Colin Angle, Chris Foley, Maja Mataric, Mike Binnard, Ian Horswill, Roger Chen, Tom Merrill, Karen Sarchik, Lee Tavrow, Steve Bart, Marty Hiller, Dave Chapman, Sara Billey, Masahide Konishi, Scott Firestone, Hai Duong Vo, Paris Ballesteros, Jill Wilkens, Chuck Rosenberg, Cynthia Ferrell

The 7th floor Cosmic Corridor houses the Third Millennium exhibit hosted by the Mobot Lab. This hallway displays the Mobot Lab's vision of the future in the year 2000 and beyond. Working robots, videotapes and posters of past, present and future projects can be found sprinkled throughout the hallway:

The Current State of A-Eye - a mobile robot vision system inspired by they human eye.

Gnat Robots - robots on a chip. Print robots like we print integrated circuits for mass-producibility and low cost.

Electrostatic Micro Motors - silicon motors on a chip, the size of a human hair.

Piezoelectric Micro Motors - ultrasonic traveling wave motors based on piezoelectric materials.

Attila - a six-legged walking autonomous robot with 24 degrees of freedom and 80 sensors. Able to climb over rugged terrain and explore. Because it can.

Clint - one of last year's Laser Tag robots. Clint says "Make my day",when he scopes another robot in his sights.

Seymour - the traveling salesman robot who peddles candy for fun and profit. Multiple cameras and pyroelectric sensors provide perception passively.

Allen - the first mobot. Ran three levels of subsumption architecture control performing obstacle avoidance using sonars.

Herbert - the Collection Machine, finds and retrieves soda cans. Independent agents compete for resources of the body, in a colony architecture style brain.

Tom and Jerry - two toy cars with single chip brains. They implement a three layer subsumption control system utilizing infrared sensors.

Photovore - the light eater. Appeared in an Omni article on how to build a robot. Uses light sensors and a discrete logic brain to create a light hungry, shadow fearing robot.

Toto - the robot that's going places. Uses a totally distributed network to find his way home (there's no place like it).

Cooperating Robots - Many potential applications of mobile robots cannot be solved with only one robot, due to the limited range of capabilities of a single robot. An interesting solution to this problem is to develop cooperating robots that work together to accomplish a common mission. A poster describing the motivation of this work, potential applications, and required research for this project is shown.

Genghis - Come and see our 6-legged robot "Genghis" learn to walk using positive and negative feedback. Find out how we plan to make our mobile robots smarter and more robust by making them learn from experience. Higher performance scrambling emerges as additional layers of software and sensors are switched in.

Robotic Bulldozer Society Conquers the Moon - Imagine hundreds of little autonomous bulldozers reshaping the surface of the moon for the manned lunar base! Without explicit communication they cooperate to dig out trenches, deliver rocks, and cover lunar
bases. Come see the first {\it moon unit} practice on Earth terrain.

Backscratcher - a perfect backscratch anytime. Your stress will be relieved without having to persuade or reciprocate.

The Suitcase That Follows You - no more lugging and tugging. This spin-off from robotic technology will leave you gliding through airports in style.

Sandy the Cross Country Skier - you gotta see 'er! She shuffles, she tucks and her heart beats "AI".

Squirt - a one-cubic inch robot (well, almost). Contains onboard computer, sensors, motor and power supplies. Hides in the dark and moves towards noises.

Minder - it minds your business. You mutter to it all day long as it keeps track of your life.

Tito - a robot which builds maps and figures out what room it's in. Possible applications: mail delivery.

Rodney the Robot - an interactive, motorized version of the posters you see all around you.

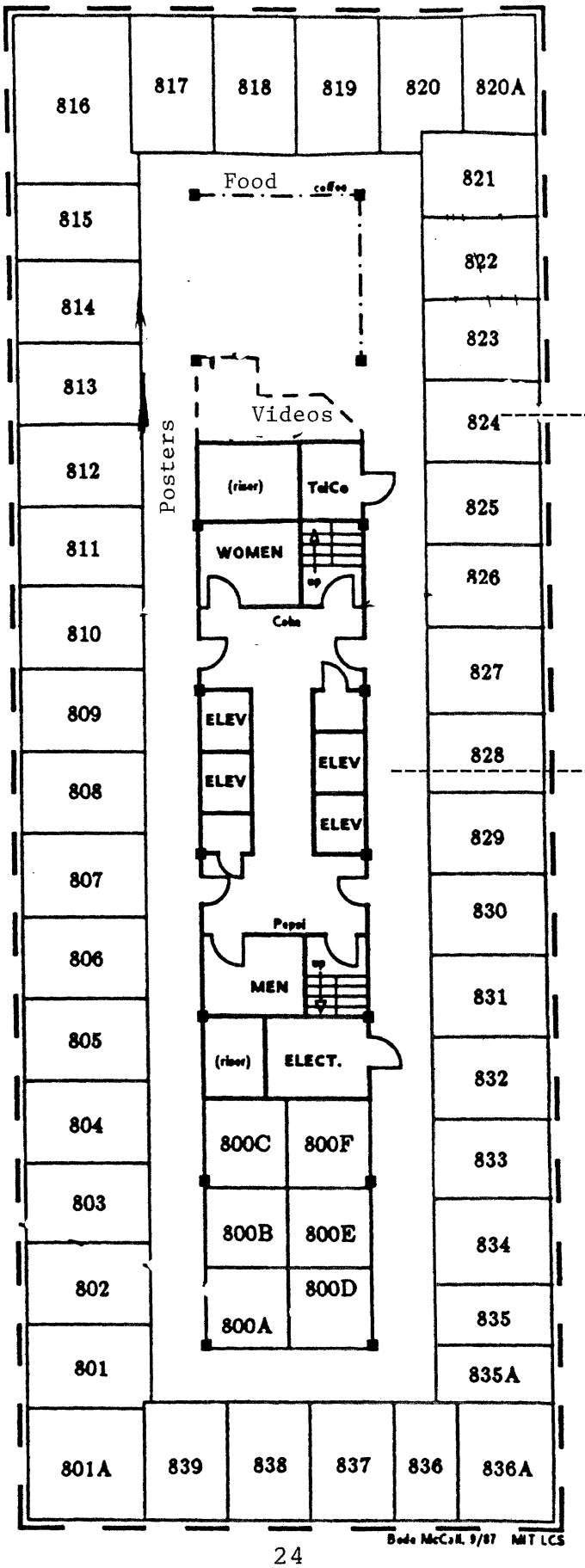
Video Theater - come view the archive of mobot videotapes. Spinning micromotors too.

Eddie - an autonomous wall and ceiling climbing robot, complete with its own suction pumps.

Hoser - an autonomous squirting robot. It uses pyroelectric sensors to find people and drenches them.

Mazda - Autonomous Cars of the Future - in the Knight Rider vein. Will use computer vision to recognize dangerous situations in the driving environment. Mazda researchers are working with the Mobot Lab to develop such vision technology.

8th Floor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800F
800B
800E
800A
800D
8A Voyager
Computer Demo
8G Blimp Robot Demo
Bede McCall 9/87 MIT LCS

8TH FLOOR

Check out the yummies in the 8th floor playroom. mmmm! Posters may be subject to tunneling phenomena. Beware!

MARVEL: A System for Recognizing World Locations with Stereo Vision

David J. Braunegg

Location of Display:

Playrooom Stage Type of Display: Videotaped Demo

Abstract: A mobile robot must be able to determine its own position in the world. To support truly autonomous navigation, I present MARVEL (Model building And Recognition using Vision to Explore Locations), a system that builds and maintains its own models of world locations and uses these models to recognize its world position from stereo vision input. MARVEL is robust with respect to input errors and responds to a gradually changing world by updating its world location models.

8A

Voyager: Start

Boris Katz

Location of Display: room 824 Type of Display: Computer Demo

Abstract: In August 1989 the Voyager 2 spacecraft concluded its twelve-year Grand Tour of the outer planets: from Earth, past Jupiter, Saturn, and Uranus, to Neptune. During this encounter, we conducted our own experiment in order to assess the robustness of our natural language system START in an open setting. Members of the press in the Jet Propulsion Laboratory's press room were invited to use START to ask questions about the encounter, the Voyager spacecraft, and the Solar system. Tonight, at the AI Fair, we will try to recreate the atmosphere at JPL on August 24, 1989 --- a few hours before Voyager's closest approach to Neptune.

The Kenneth W. Haase Library: A Legacy"

Deb Sterling

Type of Display: Video

Abstract: Typical visit to The Kenneth W. Haase Science Fiction Library.

Concurrent VLSI Architecture Group

Michael Noakes

Type of Display: Poster

Abstract: The CVA team of the Computer Architecture Group is developing techniques for applying VLSI technology to solve information processing problems. Individual projects concentrate on the design of multicomputer hardware and software, interconnection networks, VLSI arithmetic elements, and special purpose processors. This poster display captures the excitement of this effort and presents a research summary of the J-Machine fine-grained parallel processor, the performance and implementation of multicomputer networks, and thesis projects. This is your chance to find out what "those die-hards on the 6th floor" are up to.

Book: Array Grammars

P. Wang

Type of Display: Poster

Abstract: Recently, the study of multi-dimensional scene analysis has attracted more and more attention because it has significant applications in image processing, pattern recognition, robotic vision and object recognition. Among various models employed for such research and development, "Array Grammars" plays an important role in that it has several advantages over others in terms of accuracy, flexibility, parallelism and computation power.

What I am going to demonstrate is my most recent edited book entitled "Array Grammars, Patterns and Recognizers", (WSP, 1989) which is a collection of 14 technical papers on array grammars by world wide prominent professionals mainly from France, India, Japan and USA. I'll give examples, applications and answer questions.

The WAM Robot

Barb Hove

Type of Display: Poster

Abstract: I'm working on making the WAM robot arm great at baseball.It uses two cameras to locate a ball, then plans the most appropriate catching motion for the ball's trajectory.

8G

The Blimp

Michael Caine and Andy Christian

Location of Display: in the hallway near room 828

Type of Display: Robot

Abstract: What would the superbowl have been without the Goodyear blimp? Or was it the MetLife blimp? Anyway, what would the A.I. Olympics be without the MIT Robot Blimp? Well, not to fear! This year we are proud to announce the triumphant return of the world's heaviest weightless robot! Marvel as s/he ZOOMS down the 8th floor hallway at breathtaking speeds and dazzling heights performing feats of unheard of skill and daring! Well, it's kind of neat, anyway. Besides, the batteries still work.

Polarimetric SAR Image Understanding

Ron Chaney

Type of Display: Poster

Abstract: High resolution polarimetric SAR imaging radar systems have applications ranging from arms control treaty verification to intelligence gathering for the drug war. To exploit the full potential of such systems it is necessary to approach the problem as one of image understanding rather than the classical Bayesian detection / classification paradigm. This poster represents some early results from a SAR image understanding system.

Artificial Intelligence at MIT: Expanding Frontiers"

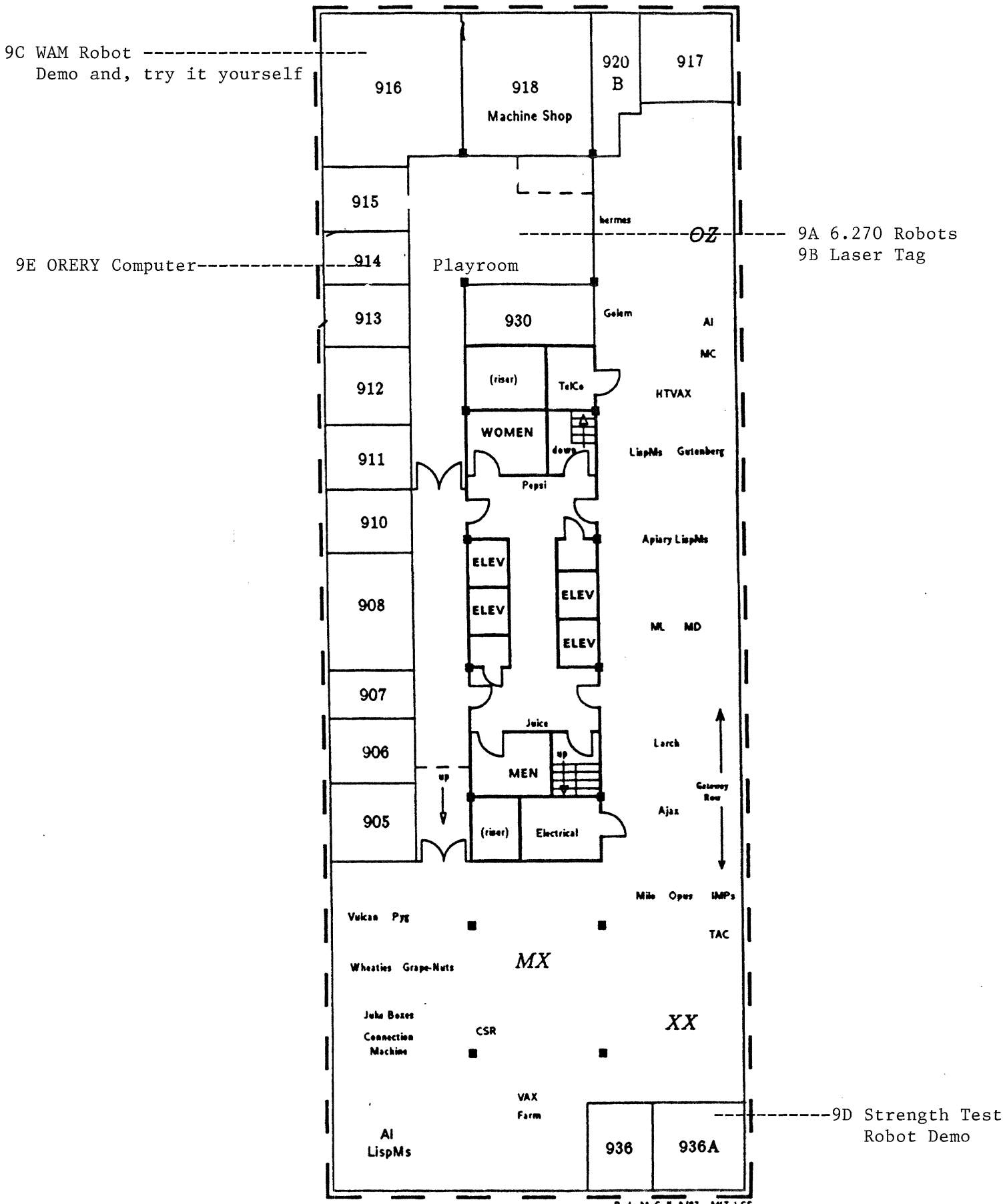
Patrick H.Winston with Sarah A.Shellard

Display type: Poster/Book

Place: 8AI (Just outside 817 if possible)

Abstract: This collection of over 40 milestone contributions is soon to be published by MIT Press. Pick up a copy of the overviews and summaries of each chapter for a peep preview!

9Th Floor


9C WAM Robot
Demo and, try it yourself
9E ORERY Computer
9A 6.270 Robots
9B Laser Tag
9D Strength Test
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9TH FLOOR

The 9th floor is a 3-ring circus too. The Laser Tag robots will be set up in the 9th floor playroom. Come watch the Battle of the Bots. Next to Laser Tag will be the 6.270 robots that play Hockey Puck Keep Away. The 9th floor will also be the site of a strength test booth and you can play basketball with the teleoperated Whole Arm Manipulator in 916.

9A

6.270 Robots

Fred Martin and Pankaj Oberoi

Location: Next to laser tag in the 9th floor playroom.

Abstract: The contest is for robots to find the infra red emitting puck and keep it from the others. Dribble?

9B

Laser Tag

Tom Moyer

Location: Playroom

Abstract: Combat of the future, using Radio Shack vehicles. Two teams compete with infra red laser mounted robotic vehicles. Each vehicle has a sensor to tell if it has been hit. Watch the competition.

9C

WAM Basketball

Tom Moyer

Location: 916

Abstract: Can the Whole Arm Manipulator (WAM) robot match Larry Bird at dunking baskets? Try it yourself using joy stick control.

9D

Motor Task with Animated Graphical Output

Mike Nitabach, Joe McIntyre, Jenny McFarland, Sherif Botros

Location: 936

Type of Display: Interactive Robot

Abstract: Test your speed and strength! Perform incredible feats of skill! We will be measuring single-joint arm movements of visitors to our display. How fast can you move your arm? How accurately can you move your arm? Find out the answers to these and other exciting questions. Great Prizes for Participants!

9E

The Orery

Prof. Gerald J. Sussman

Location of Display: 914 Next to: laser tag

Type of Display: Orery Computer

Abstract: The orery computer has computed the orbit of Pluto for the 100,000 years.

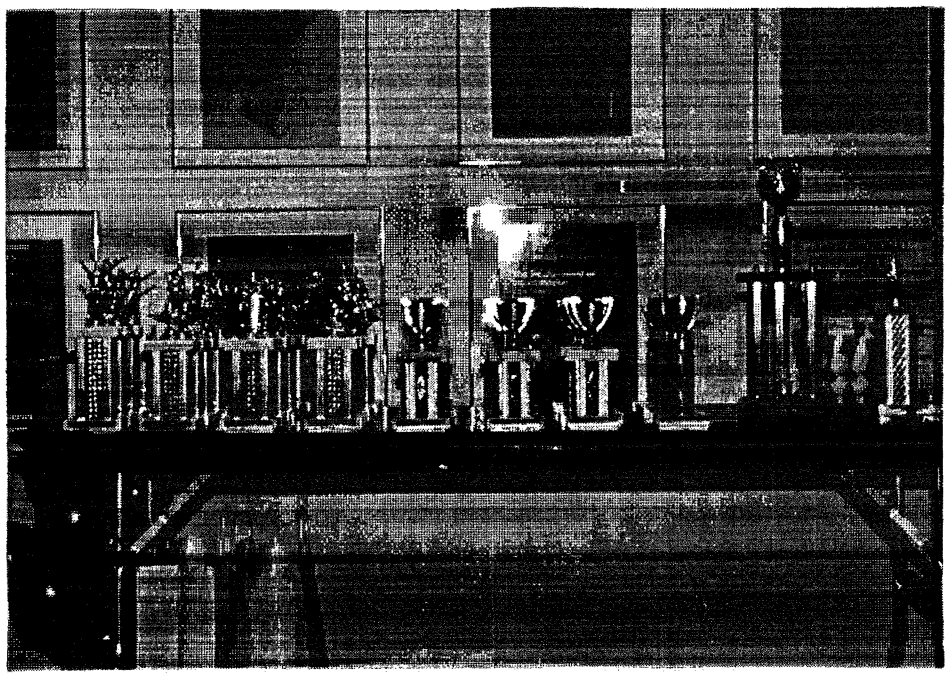

Figure 14: Trophy presentations came first, with trophies for all the helpers who ran the Olympics – captains, commissioners and AI Fair subcaptains.

Figure 15: But Anita handed out the biggest trophy of all to Diane Dustman, the winning captain.

Figure 16: People mingled throughout the hallways viewing posters...

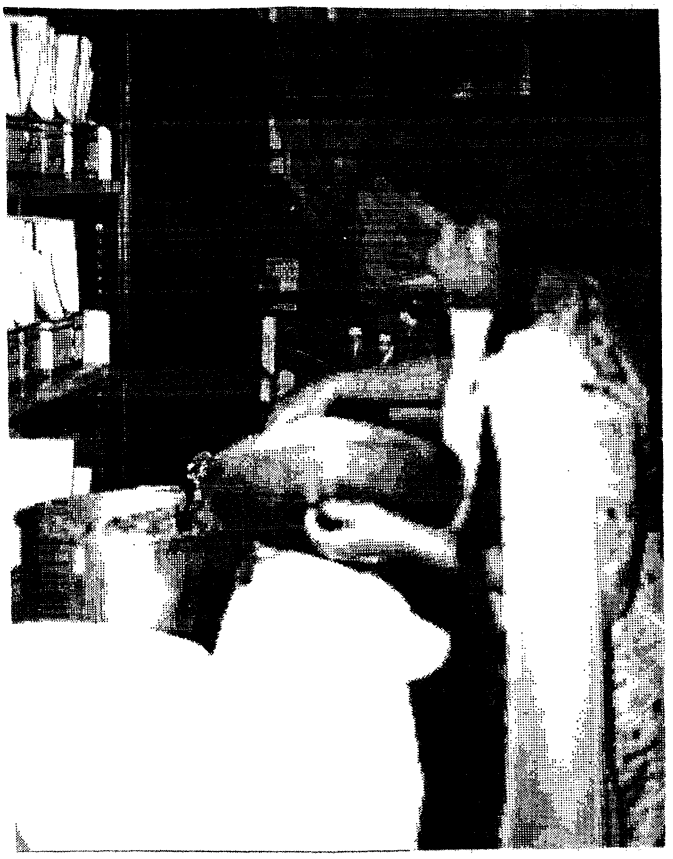

Figure 17: ...and indulging in pot luck international food until contests got underway.

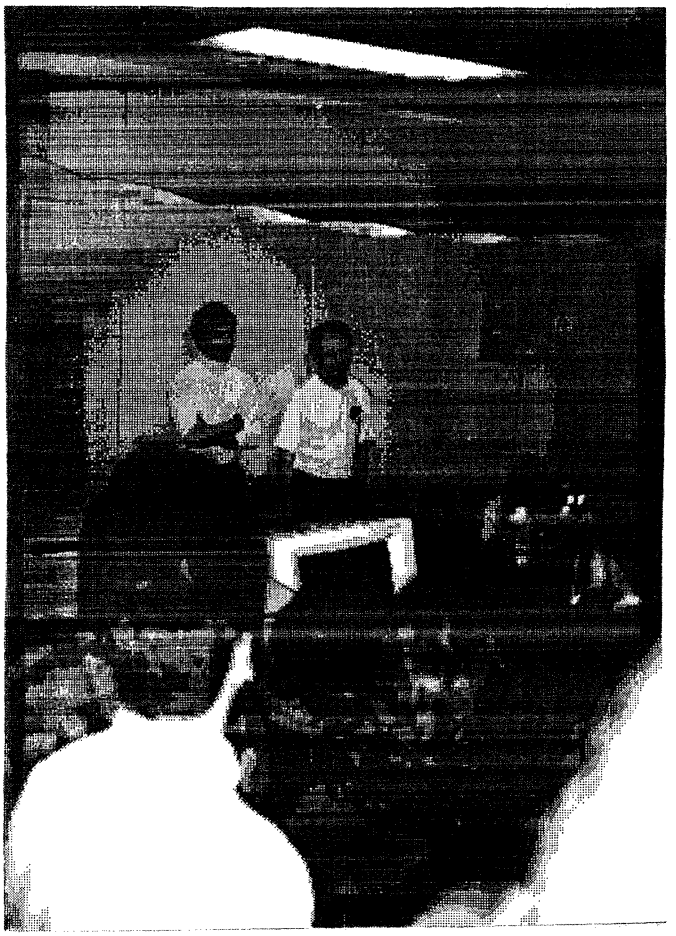

Figure 18: "Squirt Rod Brooks" came first. Here, Mattew Turk stands behind his program, an algorithm which used a region finding technique to locate their heads and then calculated "eigenface" descriptions of their faces. So much for linear algebra! To Mattew's embarassment, after waiting for five minutes for machines at the Media Lab and the AI Lab to talk to each other, it promptly squirted him right in the forehead. Later that night, after looking over the (hastily written) program, he realized a mistake on an offset – the program was actually looking at their left shoulders. It appears that Mattew's left shoulder looks more like Rod's face than Rod's left shoulder. Later testing with the correct offset and the same image taken at the contest (which had been saved) found Rod's face pronto.

Figure 19: The crowd loves it.

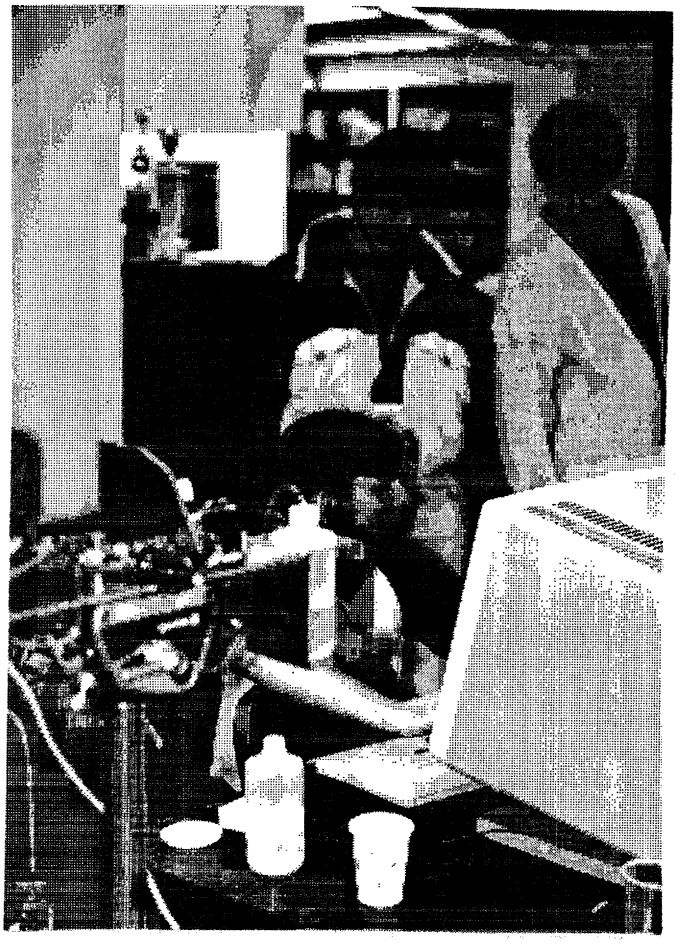

Figure 20: Dave Clemens mans the controls. His entry found heads and eyes, and then measured the space between the eyes and hair. It successfully aimed at the more receding hairline. But on the second try, Rod pushed his hair down and pulled David's back, serving him his just reward for vanity.

Figure 21: Chalk another one up for Rod as Dave Michael's convolution/template-matching program thinks he looks more like Rod than Rod himself. Dave had the contest's SIMPLEST program (minimum number of right parentheses). His program used a previously stored subsampled image of Rod's face as a template and ran it over a subsampled contest image, finding the best match. It "would've" worked if only Rod's eyes hadn't been closed in the template image.

Figure 22: Barb Moore's program worked and got Rod every time. Barb used a "Barb-finding" algorithm – and then aimed at the other guy. She found head blobs, by checking every 10th horizontal line for "reliable" gradients in intensity (either side of the head) then strung those together vertically. Choosing appropriate head heights and widths, she could optimize for her head (the long hair helped). The second best head was assumed to be Rod and she aimed for right between the eyes.

Figure 23: Rod's final challenge came from Tao Alter's program. Unlike the simple, ten-minute hacks used by others, Tao claimed that his algorithm performed "recognition by alignment" using shape from shading and a 3-D wire-frame model of Rod's head. The program quickly found Rod's mark.

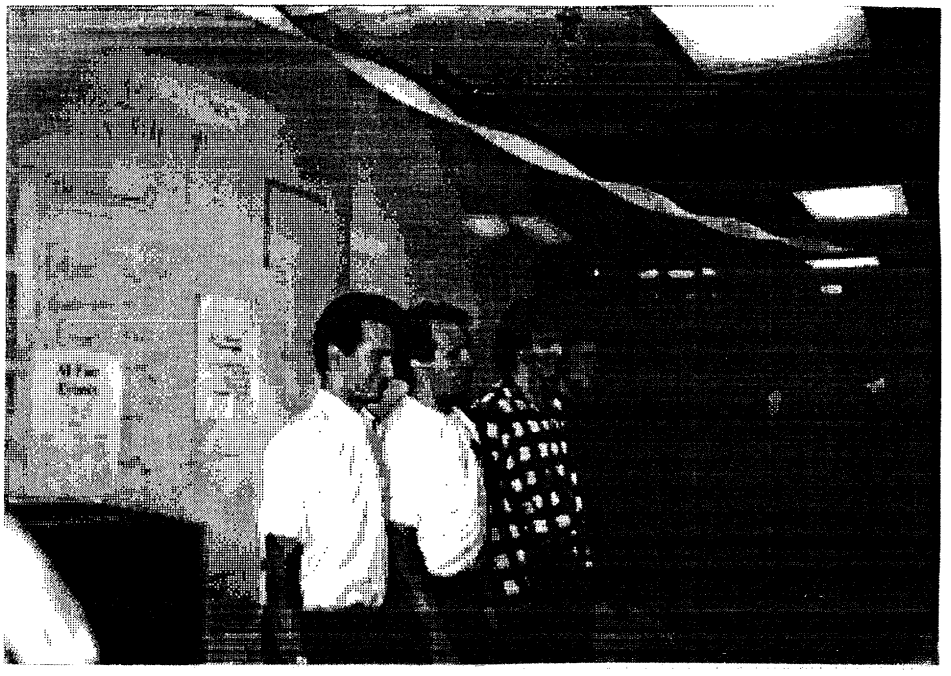

Figure 24: While testing the robustness of the program, Rod was picked out in a line-up of four look-alikes.

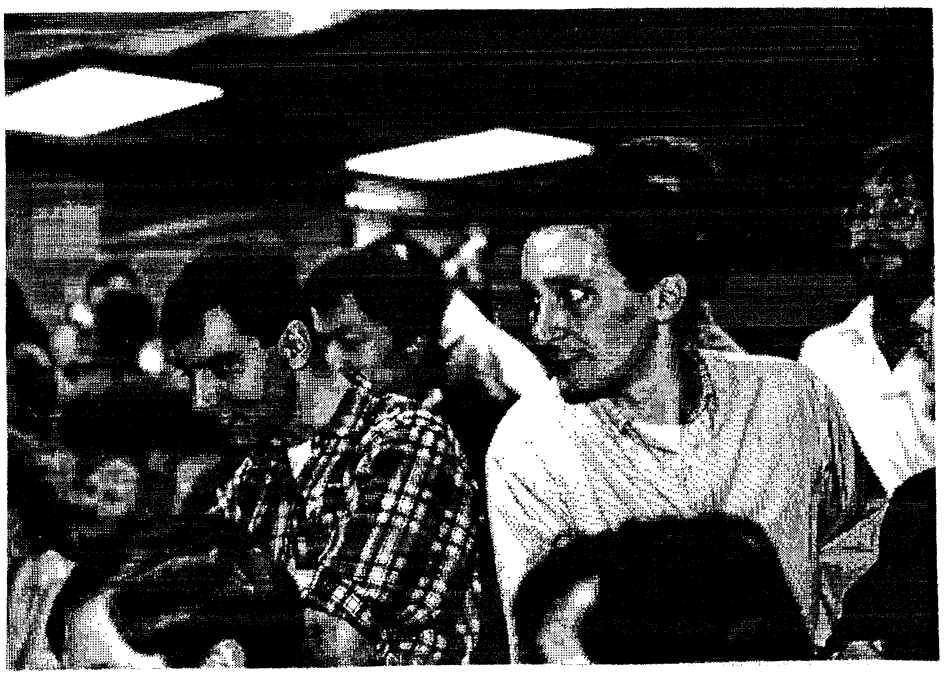

Figure 25: As a last test, Rod turned his back and the program fired at the point that looked most like Rod's head: his derriere.

Figure 26: But the judges uncovered the real truth – David Beymer in a back room controlling the gun remotely.

Figure 27: With lots of laughs, the crowd adjourned for popcorn (compliments of Laurel Simmons)...

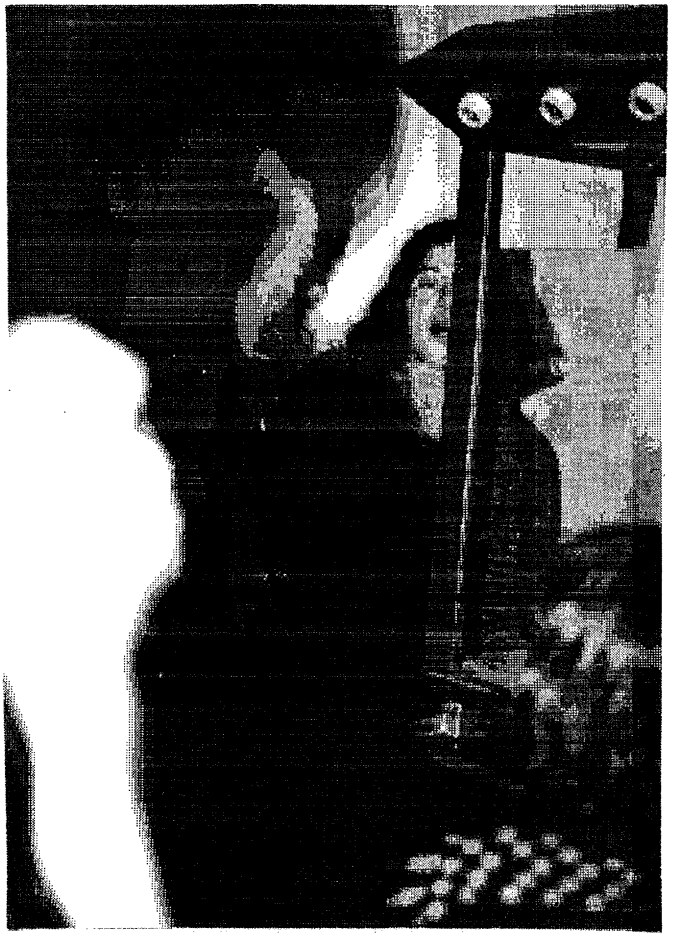

Figure 28: ...and cotton candy by Karen Sarachik.

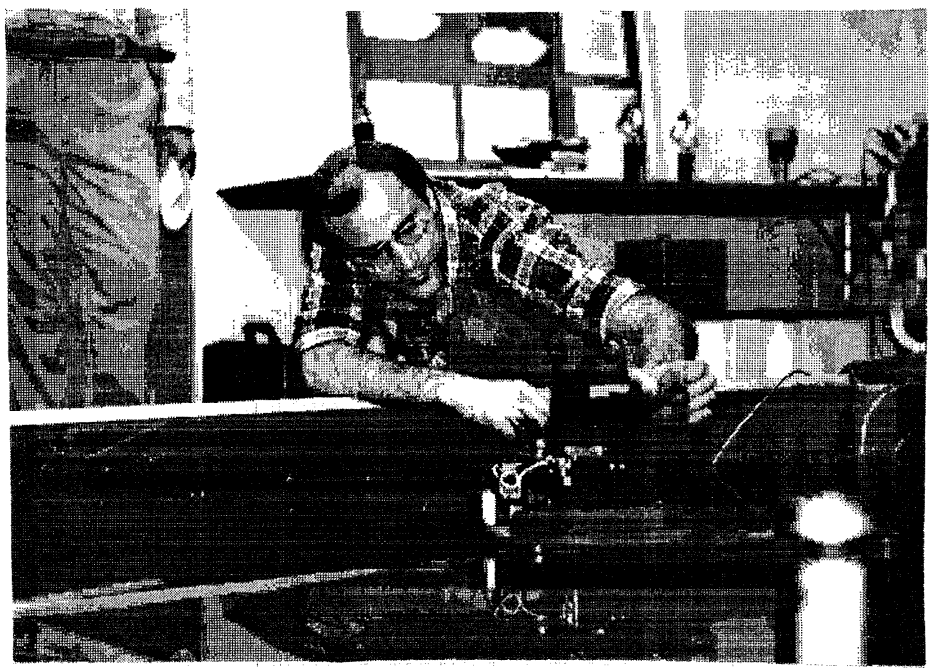

Figure 29: The other main attraction was Dave Barrett's America's Cup. Here Dave tweaks the Leg Lab's entry.

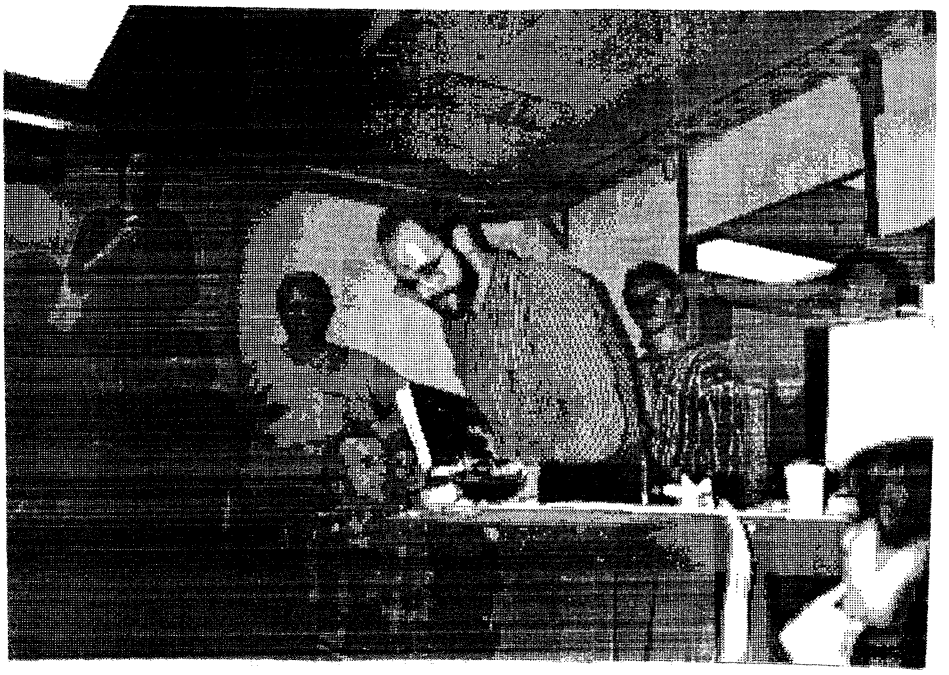

Figure 30: Tom Consi and his group from Sea Grant also built a boat. All participants put infrared detectors on their boats to sense the direction of the lighthouses. Onboard microprocessors directed motors to try to run figure eights.

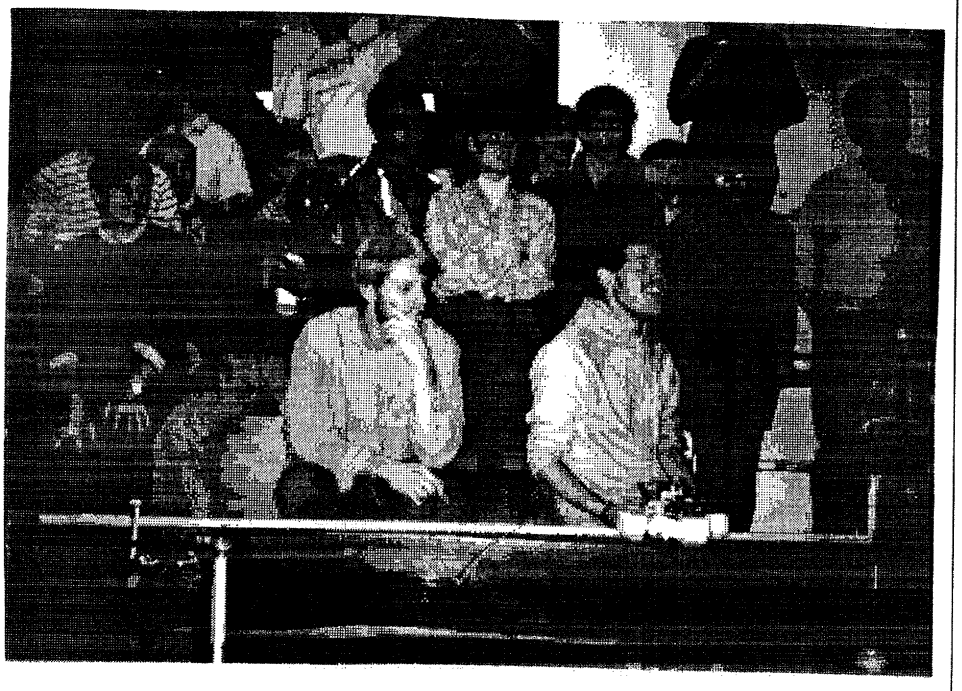

Figure 31: Olaf Bleck (left) and Lee Tavrow (right) also entered boats.

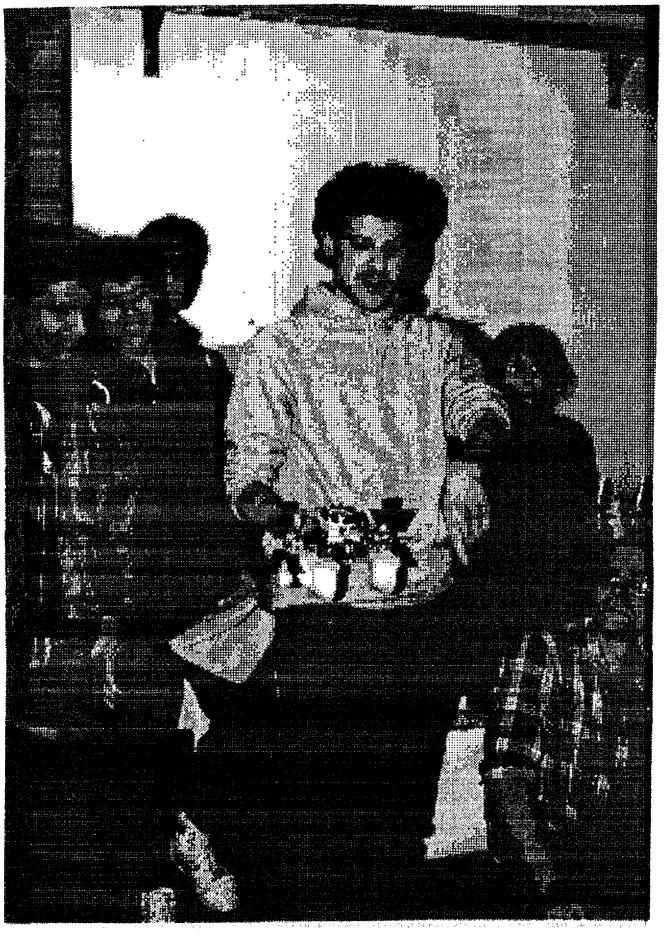

Figure 32: Lee Tavrow's entry looked like it belonged on the Mississippi with its double paddle wheel design. Its ring of near-infrared sensors were multiplexed to determine the directions to the two lighthouses. By keeping the appropriate lighthouse to the left of the forward direction of the boat, the paddleboat could successfully navigate the course (in theory).

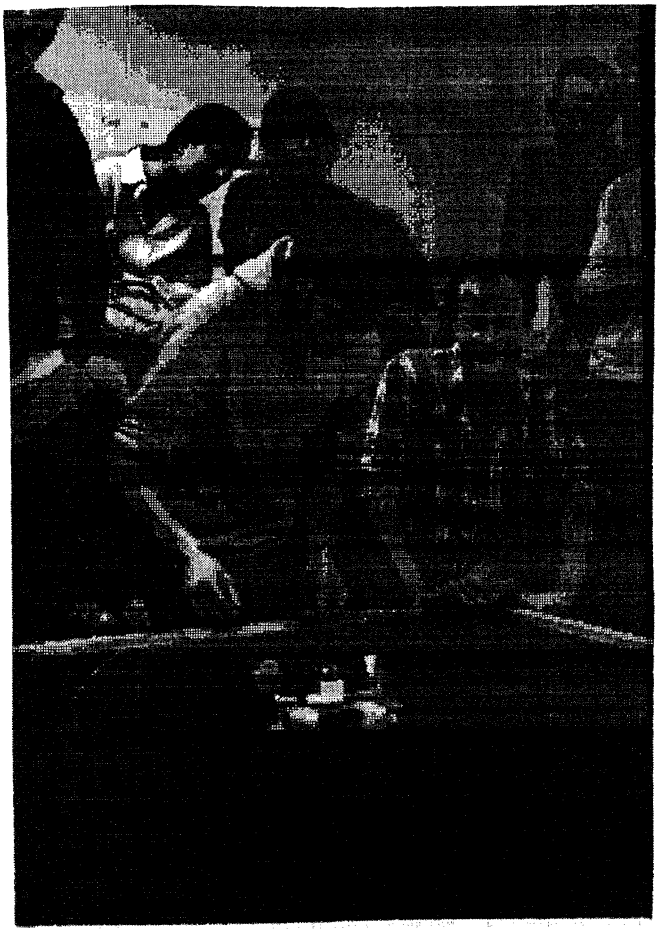

Figure 33: "If only I had more time" is the common theme in robot contests. Lee's boat was probably the most successful and he only needed a LITTLE more time. It worked within two hours of the end of the Fair.

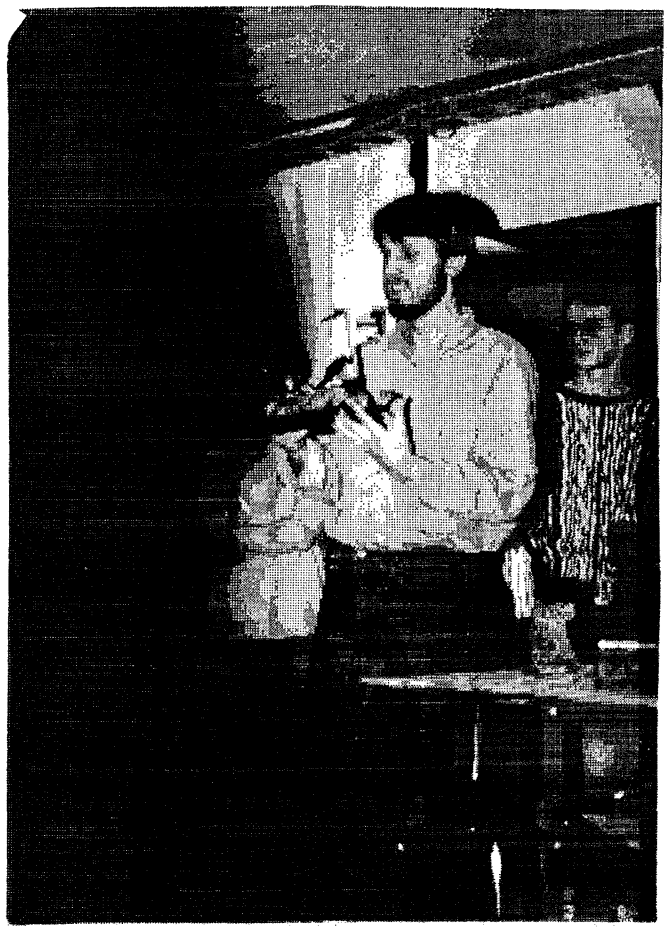

Figure 34: Olaf Bleck's boat was built on a double pontoon stryrafoamed hull.

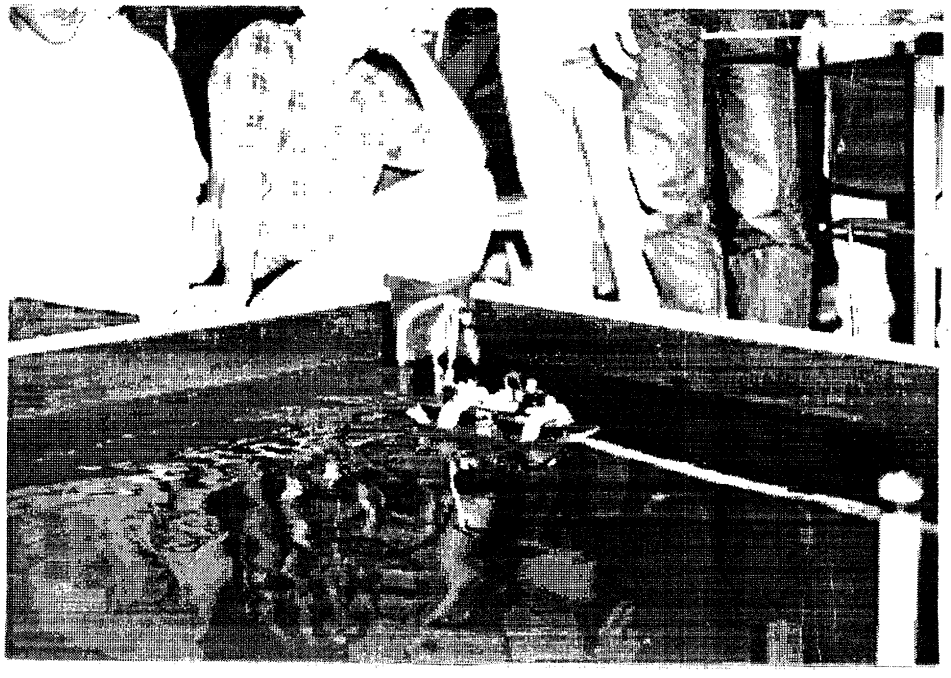

Figure 35: It cruised a bit too fast for its sensors and headed straight for the wall. Oh well, if it only had a little more time.

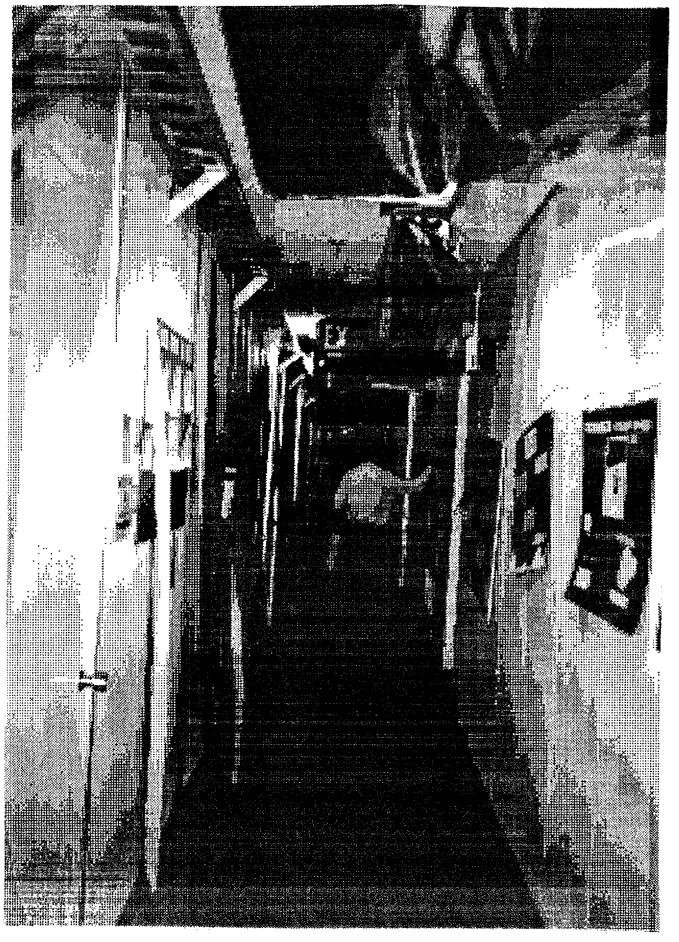

Figure 36: Another big attraction was the Cosmic Corridor – which the Mobot Lab decorated with posters, mylar and steaming dry ice to present its vision of the Third Millenium, the years 2000 and beyond. From suitcases that follow you to sleep capacitors and micro bulldozers for lunar base excavation, they had it all figured out.

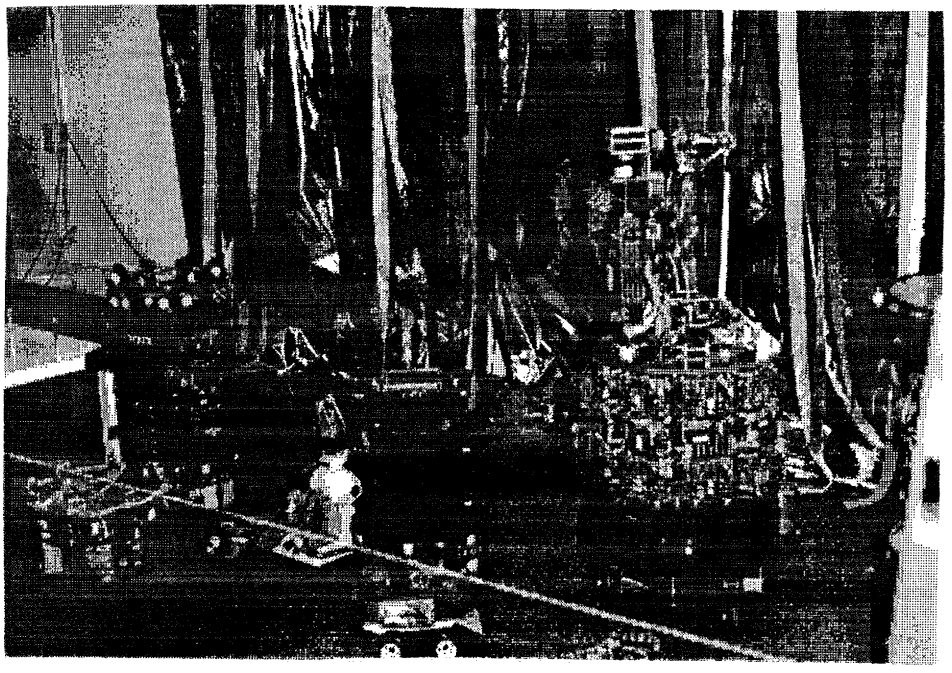

Figure 37: All the mobots trooped down for the big show: Seymour on the left, Tito in front of Seymour, Hoser next to the right, Toto the black robot in the middle, Horton and Photovore down in front, Herbert with his arm and Allen cut off on the right.

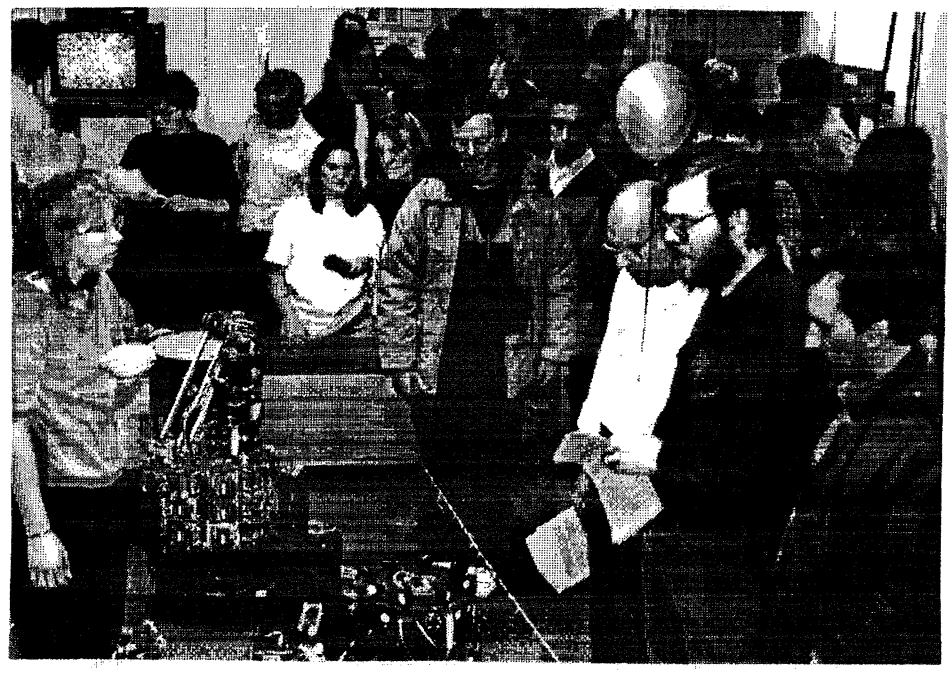

Figure 38: The crowd enjoyed the robots.

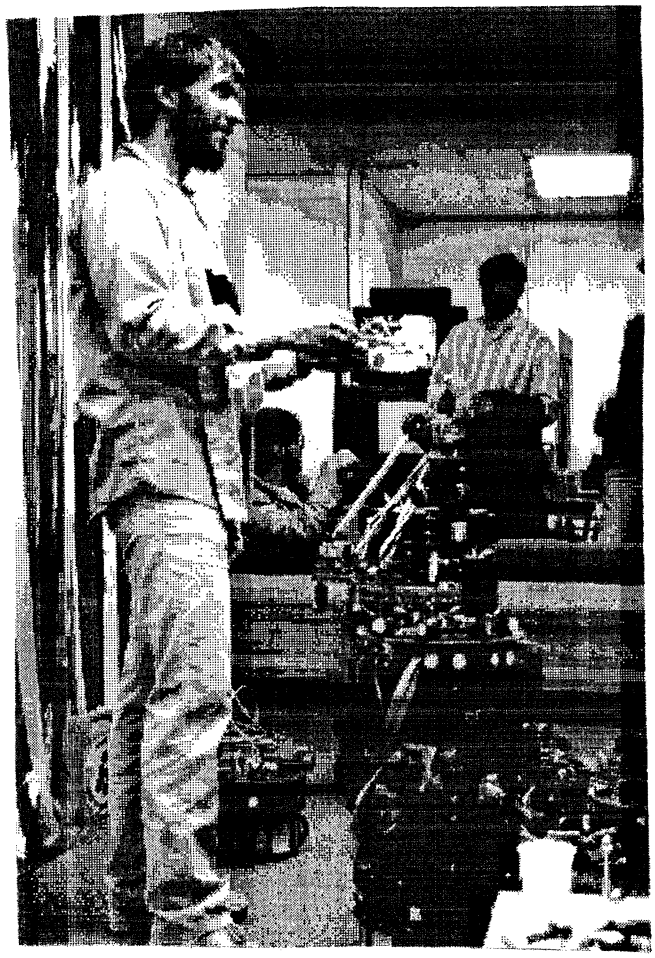

Figure 39: Colin Angle answers questions about all the robots.

Figure 40: Pattie Maes displays Genghis and explains her algorithm which now makes Genghis learn to walk.

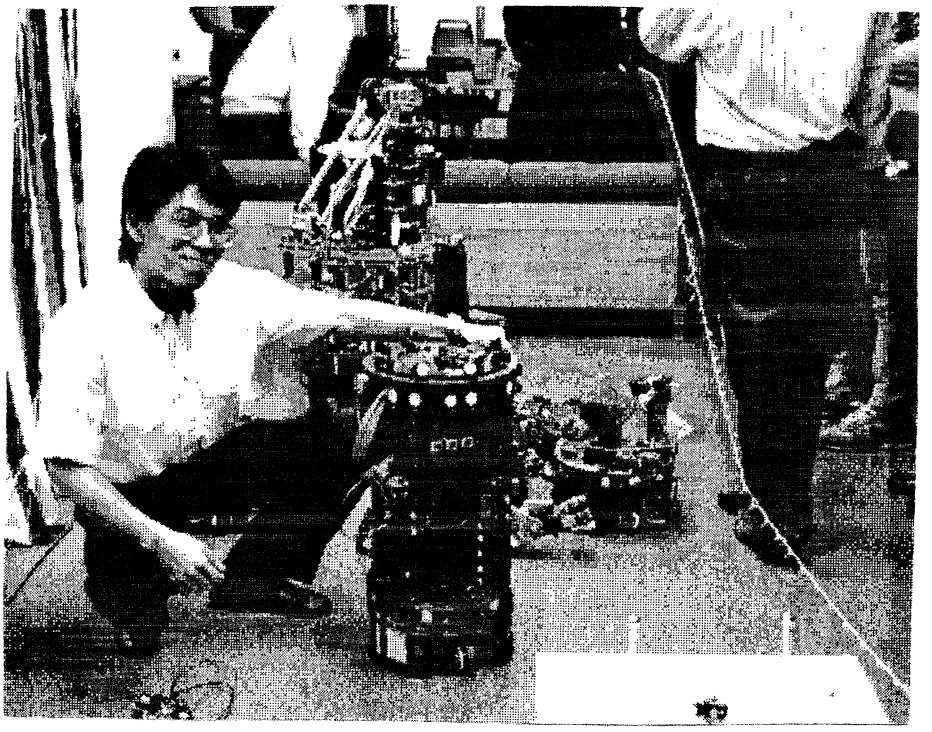

Figure 41: Masahide Konishi stands with the robot he's been working on, Seymour.

Figure 42: Lynne Parker takes a turn manning the booth.

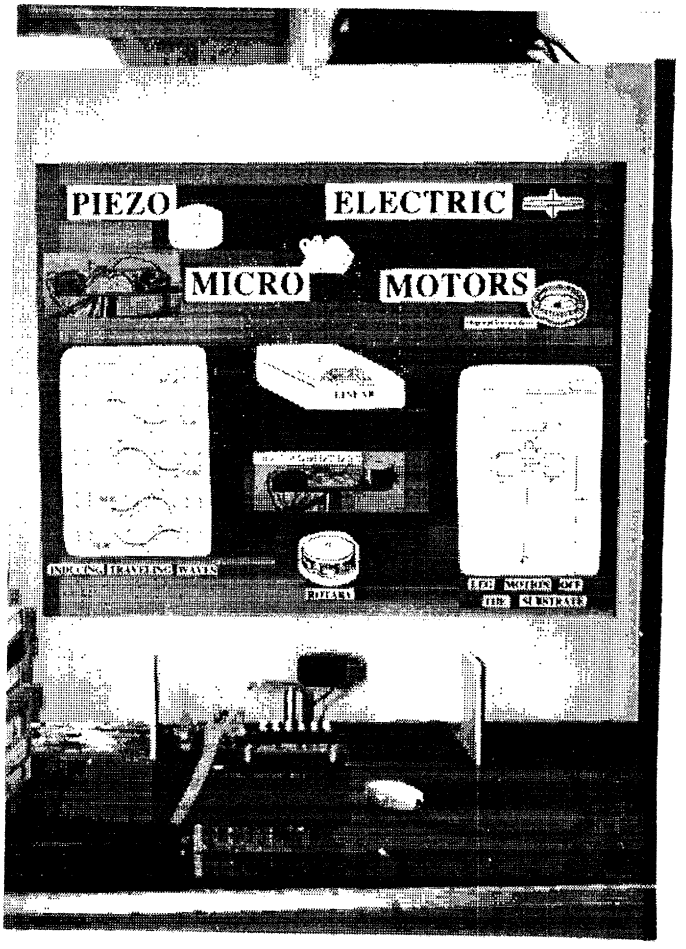

Figure 43: Other Mobot Lab displays included this one on piezoelectric ultrasonic motors, which work without gears, magnets or coils and can be scaled down to the size of a human hair.

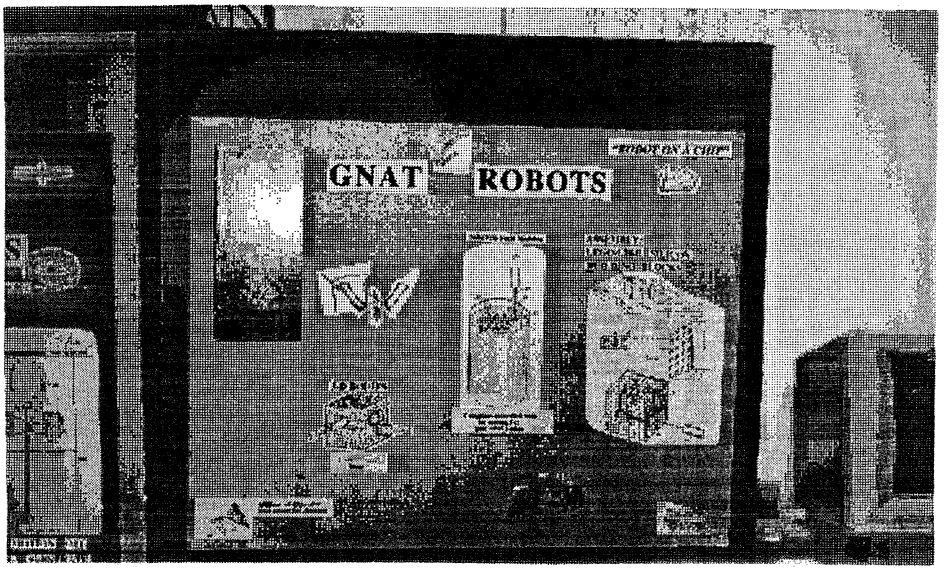

Figure 44: Micro motors are being developed to one day be incorporated into gnat robots – small machines designed to get around the problems of large, cumbersome, expensive robots.

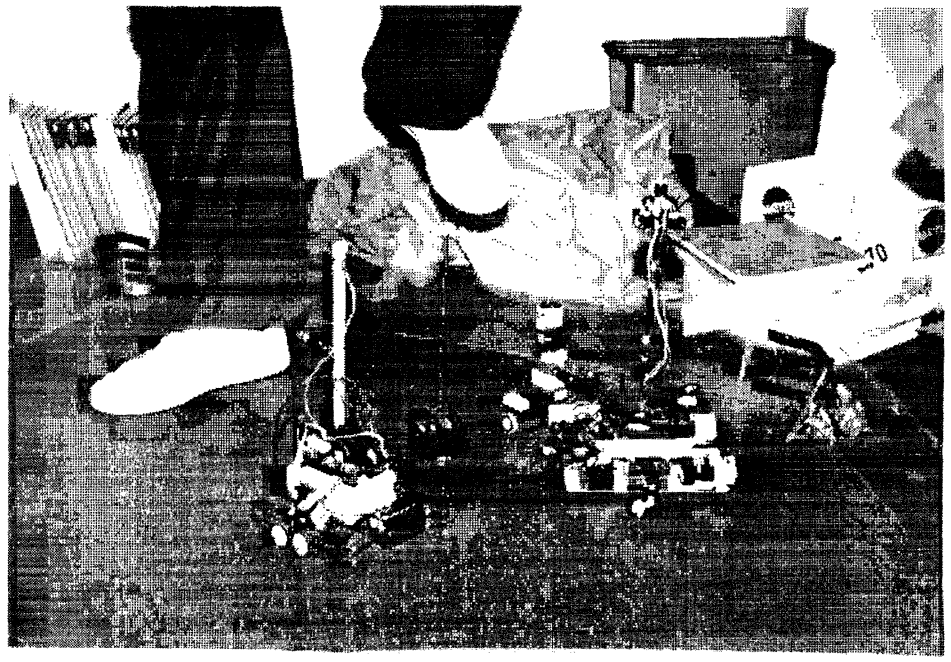

Figure 45: Other events included this sneak preview to the 6.270 "Robo Puck" contest, which was organized by Course 6 undergraduates for another contest later in IAP. From kits of parts that included Legos, motors, 6811 microprocessors and infrared sensors, the goal was to build a robot that would play keep away with an infrared-emitting puck. The last robot to touch the puck at the end of thirty seconds was the winner.

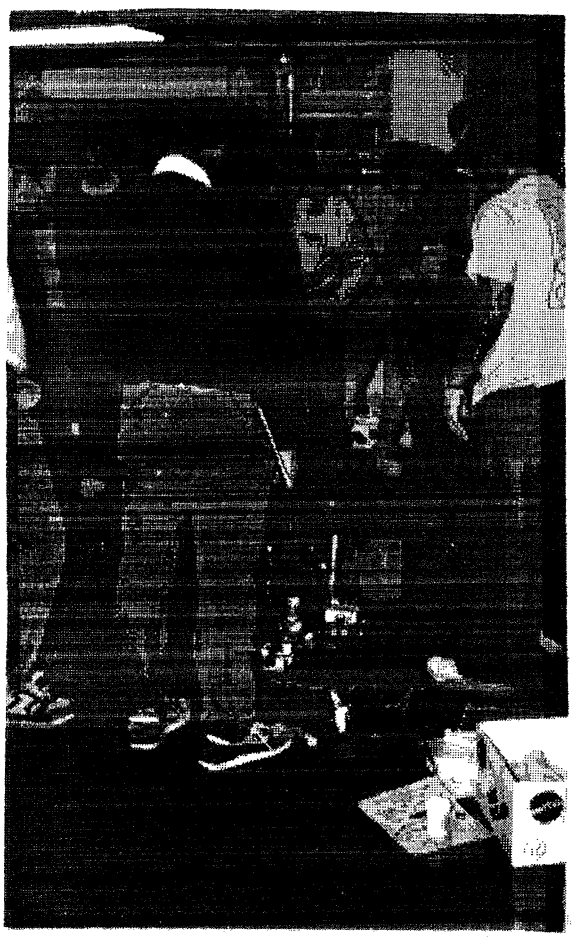

Figure 46: One of the challenge matches gets underway.

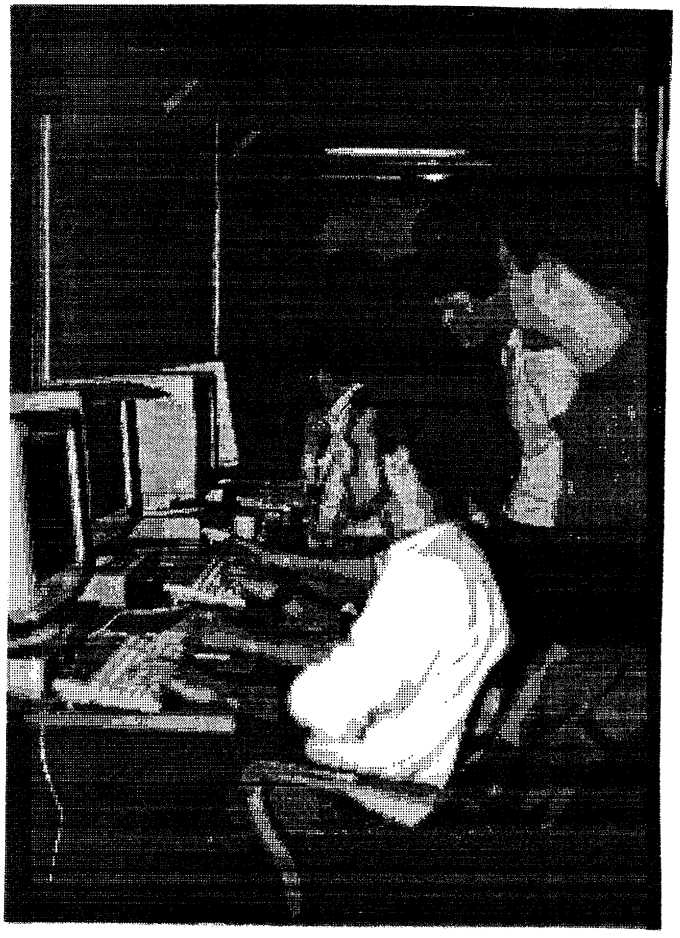

Figure 47: "Dogfight" was another big hit. Four Sparcstations were setup in a darkened back hallway for games of aerial combat across the network.

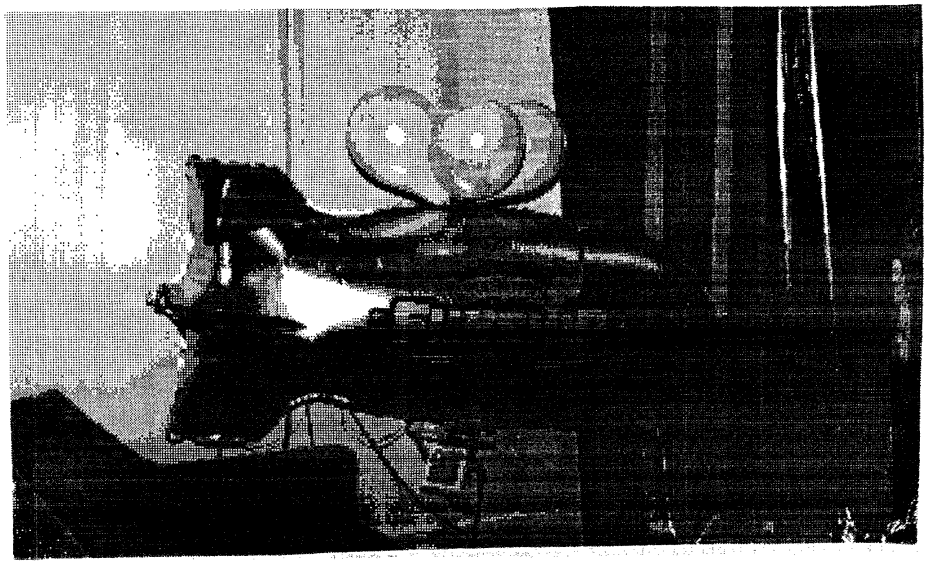

Figure 48: The AI Lab Blimp from last year's Robot Talent Show made its appearance too. Complete with sonar, computer, batteries and two propellers, it patrolled the halls, avoiding running into walls.

Figure 49: Sea Grant joined the Fair and brought over their two foot long autonomous submarine.

Figure 50: Amateur movie producing was another event for the Fair. Eric Ristaad laughs as he watches "The Alien Who Visited the AI Lab" (starring himself).

Figure 51: Computer portraits were another feature attraction. Sundar holds up his portrait which was generated by hacking together frame grabbing from the Lisp Machine, an edge finder and a schematic drawing program.

4 The End

The Fair was a snapshot of life at the AI Lab, 1990. It provided something for everyone and an opportunity for students to try something new. Thanks to all who helped pull it off and to Dave Clemens, Tao Alter, Mattew Turk, Barbara Moore, David Michael and Lee Tavrow who helped with the captions in this Photograph Album.

May there be many more years of the Spirit of Olympics!