

1999-2000 Senior Design Competition



The presentations for the 1999-2000 senior design competition were held on Friday April 16, 1999. In this year's event, all four departments in CECS were represented. The projects included the development of a new software for off-campus learning, a virtual glove to mimic human fingers, solar heating systems using rainwater, and the design of recyclable windshield wipers. The Office of the Dean in the CECS sponsors this annual event. Faculty advisors in each department advise participating students, providing the necessary, knowledge, methodology, and technology to support the formulation, analysis, and implementation of projects. Undergraduate students compete as teams. This year Professor N. Narasimhamurthi from ECE, J. Cherng and T. Shamim from ME, B. Maxim from CIS, and M Kachhal, E. Orady and A. Kamrani from IMSE advised and coordinated the projects. Four external reviewers evaluated these projects. Each departmental coordinator selected one reviewer. This year Dr. D. Kleinke, Supervisor of Direct Engineering, and Mr. G. Burek Manager of DE in AMTD, both from Ford Motor Company reviewed the projects along with Mr. Davis Morin, Vice President of Systems and Technology from HomeTown Communications and Mr. Mark French from Bosch Breaking Systems Division.



Dean Sengupta gave the opening remarks. "This is an event for students that is judged by [external reviewers](#) . This event allows our student to compete and participate in developing projects as teams."



The CIS department was represented with three projects. C. Chevela, N. Davanzo, and M. Hart developed the *Eclipse Software: foreshadowing the Technology of Tomorrow*^{1,2}. The objective of this software is to allow users to take classes without having to come to the campus. The most efficient way of achieving this task is the use of the Internet. This could be considered almost a "cost-free" method of communication, due to the popularity of the Internet. The [In-](#)

[Sight Solutions](#) project was developed by J. Branham, A. Schulde, and C. Azoke. A C++ software was implemented to provide a visual analysis of a binary tree search. The objective of the [Digital Image Library](#), the third CIS project, is to perform what is called as Multi-Scale Analysis. This was an extension to an existing system. An interface was developed, which allows the user to select the desired database, and selects the type of a search (e.g. texture, etc.). The result of the search is a score for similarity and the component's filename. The team members were T. Bauer, D. Hinkle, and B. Jager.

The ECE department was represented by two projects. V. Shridhar and E. Wicke developed the *Virtual Reality(VR) Glove*^{1,2} project. The group designed a VR glove that is linked to a computer. The computer then renders a detailed image of a hand that mimics the movements of the glove. A near real-time operation was achieved for the movements.



M. Hider, Sennan Alkarawi and J. Schmidt developed [the Interactive Home Control \(IHC\) System](#). IHC provides interaction among the home PC, the telephone, the Internet, common household appliances. The homeowner can call by phone or via Internet to turn home appliances on or off.

The IMSE Department was represented with three projects. The *Rapid Tooling Using Rapid Prototyping Technology* project was implemented by C. Rice and L.M. Noonchester. This project dealt with the concept of concurrent engineering. The objective was to integrate the design stage with the manufacturing stage through the use of rapid prototyping and tooling techniques. These technologies allow engineers to address all aspects of design including functionality, manufacturability assembly and handling early in the development life cycle. The *Design and Manufacture of the G&L Archery Rest* was the second project. J. Learmonth developed this project. The product was modeled using Cadkey software, and Teksoft CAD/CAM software was used to assist the designer in developing the Numerical Control (NC) code. The CNC machine for the fabrication of this part was an EMCO CNC milling machine located in MSEL laboratory.





The DFMA Analysis of Windshield Wiper Arm and Blade System¹ was the third project. The design and the analysis of the new design were done by S. Suchytas and J. Pongracz. An existing design of the wiper system was evaluated based on concurrent engineering and Design for Assembly and Manufacture (DFMA) philosophies. An improved design was proposed. The specifications were established to consider the part's functionality, manufacturability, assembly and recycleability.

An Alternative Solar Lighting System¹ developed by L. Rose, A. Polishak, J. Schaaf was the first ME project. In this project a new methodology including optimization analysis was developed for solar lighting. A detailed mechanical design and a working prototype were built. [Solar Outdoor Bathhouse](#) was the second project. In this project an environmentally friendly and inexpensive lightweight outdoor bathhouse was designed. This bathhouse relied on solar heat and collected rainwater for its operation. This project was developed by A. Vortriede, J. Eddy, and L. Holden. ME's final project was [An Automobile Paint Curing Oven Design](#) developed by C. Amodeo, P. Kurtz, J. Noel, and R. Sapain. The objective was to design the three main components contained in an automotive paint-curing oven, namely the agitation ducts, radiant heat panels, and fresh air heater.

These projects qualify to participate in Technology Day, which is sponsored by the Center for Engineering Education and Practice. Poster presentations will be made to external visitors. Faculty interested in this event should contact the CEEP office at 33403.

We would like to extend our sincere thanks to our reviewers for providing us with their valuable time and assistance for this year's event. Congratulation to the CECS students participating in this year event for their excellent work. They have proved themselves by participating as teams and practicing to become successful engineers of tomorrow. We, the faculty also take pride in guiding them toward their academic goals.

Congratulation to the Winners

