

Chenming Hu Trivia

- **First technical publication:** "A resistive-gated IGFET tetrode" with Richard Muller, EDL, 1971
- **Ph.D. Thesis:** "Integrated Optics for Optical Communication," Adviser: John Whinnery, 1973
- **First media exposure:** "Car That Runs on Gas or Juice," San Francisco Chronicle, A2, 1979

Car That Runs on Gas or Juice

By H. G. Reza

What is made from molded fiberglass and flattened aluminum cans, powered by a gasoline engine or by an electric motor that formerly turned a tank turret, can be plugged into a wall socket and can be driven in the city or on the freeway?

The answer — a hybrid car. Students at the University of California at Berkeley have developed a car that can be powered by a gasoline engine for freeway driving or by an independent electric motor for city driving.

The UC students took \$10,000, some of it from their own pockets, and built what Chenming Hu believes is a revolutionary vehicle.

"The novel thing about this car," Hu said, "is that either motor can power it. Electric cars have limited range, and if their batteries fail the cars usually wind up stuck in the middle of the street.

"With our car the worst thing that can happen when the batteries fail is that we have to turn on the gasoline engine."

Hu, who is an assistant professor in the Engineering and Computer Science Department, was adviser to the 12 students who built the car.

He says the car can literally be plugged into an ordinary wall socket to charge the batteries overnight, but concedes that its range of 20 miles per charge is "one of its limitations."

But he quickly adds, "That in itself isn't so bad. Several studies have shown that 70 percent of all automobile trips are 15 miles or less per round trip. So the car could take you on one shopping trip per day."

The car was built over a



performance and engineering excellence.

The University of Minnesota's entry placed first in the hybrid category, but UC student Ajit Shah charged that the Minnesotans had an abundance of technical assistance from various corporations.

Hu said the UC car was literally finished on the day of the competition. "The students were putting the car together from parts scattered on the ground. I guess that's characteristic of the way students handle all projects," he said, laughing. "It's like cramming the night before an exam."

The car's body was constructed from a kit consisting of five pieces of fiberglass bought from a San Jose dealer for \$3500. The gasoline engine is a four-cylinder, four-stroke motorcycle engine donated by Honda.



CHENMING HU
He called it revolutionary.

case.

"Time and money were equal. And we didn't have either," said student Steve Greenberg.

Hu said the students were expecting to finance the project with corporate contributions, but were able to raise less than \$6000. They still owe more than \$3000.

"We actually need an additional \$5000 to consider the car completed," said Shah. "For example, we'd like to install a dashboard."

Hu said the university will keep the car as a continuing project and he hopes that future students will be able to improve as new technologies develop.

The car narrowly missed being destroyed in early September while being returned to Berkeley from Detroit.

Chenming Hu Trivia (cont'd)

- **First Patent:** US Pat. 4366555 -"Electrically erasable programmable read only memory" 1980
- **First Book:** *Solar Cells -- from Basics to Advanced Systems* with Richard White, 1983
- **First publication cited over 50 times:** "Lucky-electron model of hot electron emission," IEDM 1979
- **First cited >100x:** "Alpha-particle-induced field and enhanced collection of carriers," EDL 1982
- **First cited >200x:** "Nonvolatile memory device employing source side injection," US Patent, 1988

Chenming Hu Trivia (cont'd)

- **First cited >300x:** "Sub-50 nm P-channel FinFET," X. Huang et al., TED, 2001
- **First >400x:** "Hole injection SiO₂ breakdown model for low voltage lifetime," Schuegraf, Hu, TED, 1994
- **First >500x:** "New paradigm of predictive MOSFET and interconnect modeling for early circuit simulation," Y Cao, T Sato, M Orshansky, D Sylvester, C Hu, Custom IC Conf., 2000
- **First >750x:** "FinFET-a self-aligned double-gate MOSFET scalable to 20 nm," D. Hisamoto et al., TED, 2000
- **Highest (977x):** "Hot-electron-induced MOSFET degradation-model, monitor, and improvement," Hu et al., Journal Solid State Circuits, 1985

Chenming Hu Trivia (cont'd)

- **h-index:** 109 (from Google Scholar)
- **>90%:** Semiconductor companies that used BSIM model in IC design
- **78700:** Results of Google search for "BSIM Model"
- **590,000:** Results of Google search for "FinFET"
- **0:** Companies that have announced sub-20 nm IC technology that is not based on FinFET or UTB