'Round About the Institute

Pictured above: Professor Christopher Brennen floats off the floor of the KC-135 microgravity research plane. Below left to right: graduate student Steve Hostler and post-doc James Cory.

Suspended Students, Professor: Measurements Made in Zero Gravity

The Deformation of Granular Material, particularly the relationship between the stresses and the rates of deformation, has been the subject of some controversy and much discussion since R.A. Bagnold's observations 50 years ago. Earth-bound experimental measurements are fantastically difficult due to the action of gravity, which makes it almost impossible to sustain a homogeneous suspension of the grains.

For this reason, Professors Melany Hunt and Christopher Brennen devised a rheometer to fly in zero gravity in the NASA KC-135 airplane and to make measurements in that environment. The experiment was built by post-doctoral scholar Jim Cory (MS '98 APh, PhD '01 APh) with help from graduate student Steve Hostler. Cory, Hostler, and Brennen flew the experiment at NASA Glenn in June, doing three flights, each with 40 25-second intervals of zero gravity.

The photographs give a slightly different meaning to the phrase "you are now free to move about the cabin."

New York City's Gotham Hall ballroom.

Alumni celebrating at the NYC gala (left to right): Dr. Jan W. Dash (BS '63 Eng), Dr. Dhiraj Kumar Sharma (MS '72 EE, PhD '75 EE), and Dr. Mirmira R. Dwarakanath (PhD '69 Ph).

East Coast Campaign Kick-Off

The Institute's "There's only one. Caltech" fundraising campaign recently made its way to the Big Apple with a celebration dinner at Gotham Hall, a newly restored historical building in midtown Manhattan. Nearly 200 guests attended the gala event, which introduced alumni and friends on the eastern seaboard to the Institute's ambitious plans for the future.

The program included remarks from Ben Rosen (BS '54 EE), Chairman of the Board of Trustees, Wally Weisman, Vice Chairman of the Board of Trustees and Campaign Chairman, and President David Baltimore, as well as a screening of the campaign film, *Infinite Possibilities*. Adding greatly to the event was the presence of many Caltech faculty members and trustees who helped foster engaging conversations about the work of the campus community and beyond.

To find out more about the campaign, visit http://one.caltech.edu

Scott Fleming, team infrastructure lead, welding.

Computing team member Sue Ann Hong.

How Hard Can It Be? Team Caltech Races in the DARPA Grand Challenge

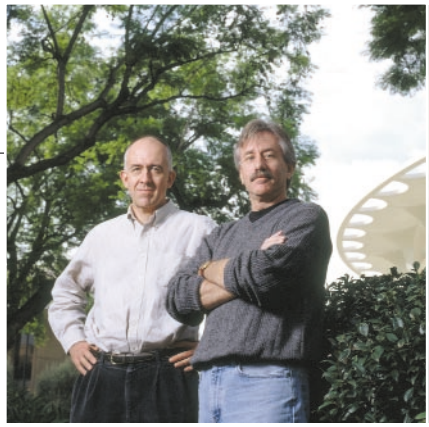
Where Are We Going? Las Vegas. How are we getting there? Driving. Who's going to drive? No one! Bob, a 1996 Chevrolet Tahoe 4x4, will drive himself, alone. How? Using GPS signals, several cameras, a laser measurement system, on-board software, and maybe just a little luck (we are going to Las Vegas, after all). What route will we take? We won't know until 2 hours before the race. One thing's for sure: we want to win.

Such are the knowns and unknowns surrounding the DARPA Grand Challenge race where $1,000,000 goes to the team whose fully autonomous ground vehicle completes a course between Los Angeles and Las Vegas (225 to 250 miles) in the fastest time and in less than 10 hours. The race will occur on March 13, 2004. Only publicly available signals (e.g., GPS) may be used for navigation. Otherwise, the vehicle must be fully autonomous, receiving no other signals for navigation, path planning, obstacle avoidance, and terrain differentiation. Such a feat has never been done and will be extremely difficult and maybe impossible. But then again, until now we've never unleashed a team of tenacious Caltech undergraduates on the problem.

Over the summer, 23 students, mostly sophomores, and a handful of advisors (engineers and scientists from Caltech, Northrop Grumman, and JPL; including Alex Fax [PhD '02 CDS]) worked together on re-engineering Bob. With fall classes starting, a few of the team members have left to focus on their studies, leaving only 16 to finish the job.

If they win the race, future Caltech undergraduates will benefit from their spoils: all prize money will go towards undergraduate needs, including scholarships.

See how Team Caltech plans to bring home the booty at
http://team.caltech.edu



Above (left to right): Professor Pietro Perona, Director, Center for Neuromorphic Systems Engineering and Stephen Nowlin, Director, Alyce de Roulet Williamson Gallery. Right: artist Martin Kersels and Professor Peter Schröder's project, "Sciance."

Neuro: Art and Science Meet Again

Once Upon a Time, artists and scientists were one and the same. Then, maybe a couple hundred years ago, artists became artists and scientists became scientists. Both groups involved themselves in wide-ranging creative problem solving, but lots of things happened that started to separate them. Each group began asking different questions and seeking answers in different places. Call it the age of specialization?

A joint project of Art Center College of Design and Caltech's NSF Center for Neuromorphic Systems Engineering (CNSE) brought the two groups a bit closer together through a year-long collaboration exploring the CNSE's core mission of endowing machines with senses and sensory-like behavior. The resulting exhibition, NEURO, at Art Center's Alyce de Roulet Williamson Gallery and, of all places, the lobby of the Athenaeum, was a thought-provoking intersection of art, science, and engineering.

Stephen Nowlin, Director of the Williamson Gallery, and Pietro Perona, Professor of Electrical Engineering and Director of the CNSE, led a group of six artists and many Caltech faculty and graduate-student collaborators. "In tandem, art and science force shifts of perception we might otherwise never imagine," writes Nowlin in his essay on the NEURO website. Perona adds, "We thought that art might be a good vehicle to make our [scientific] ideas more accessible, and to provide some of our fellow citizens with an entry point into our laboratories."

To find out who did what, go to http://www.artandscience.us