

ITS-Davis



*ITS-Davis e-news* is the electronic newsletter of the UC Davis Institute of Transportation Studies. Written for alumni and friends, *ITS-Davis e-news* reports information from ITS-Davis and affiliated campus departments that host transportation-related programs. For previous issues, see the [e-news archives](#).

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**Research Results****RESPONDING TO REGULATIONS: UC Davis Research Supports State Rulemaking on Global Warming**

ARB Research Group (left to right): Ethan Abeles, David Bunch, Belinda Chen, Andy Burke, Nic Lutsey

The California Air Resources Board (ARB) earlier this month issued its draft staff proposal for a new vehicle global warming pollution regulation in a comprehensive report. ITS-Davis researchers provided background reports on consumer choice behavior and regulatory costs. The regulation requires automakers to achieve the maximum feasible and cost-effective reductions in greenhouse gases from passenger vehicles beginning in 2009.

Challenged to anticipate the impact of the regulation, ARB contracted with ITS-Davis for two tasks. The first task was to provide insight into previous industry and consumer response to government regulations in order to assess how they might relate to future regulations. The second was to provide a modeling tool for ARB to investigate consumer response to greenhouse gas vehicle rules in a systematic and rigorous fashion.

Led by ITS-Davis Director Dan Sperling, with co-principal investigators David Bunch from UC Davis's Graduate School of Management, and ITS-Davis's Andrew Burke, Ken Kurani and Tom Turrentine, the research team included graduate students Ethan Abeles and Belinda Chen.

For task one, researchers created and analyzed a large data set of vehicle characteristics, sales, and prices, vehicle financing practices, and

external factors such as income, for the period 1975-2003. They supplemented the data analysis with case studies of the introduction of oxidation and three-way catalysts, air bags, and hybrid electric vehicles in the U.S., and diesel cars in Europe.

Costs imposed on vehicles due to U.S. emissions and safety regulations have been significant – somewhere between \$2,500 and \$4,000 per vehicle – representing up to one-third of vehicle price increases since the 1970s, the study finds.

“Whether you consider these costs to be large or small, they had little discernible effect on industry performance and activities,” says Sperling. The cost increases have been largely accommodated within normal business and market planning processes of companies, the study shows.

For the contract’s second task, Prof. Bunch extended his and others’ previous UC research to develop a new model, called CARBITS, to assist ARB staff’s analysis. CARBITS quantifies consumer response to changes in vehicle attributes, performance or price that may result from different regulatory scenarios. It simulates current and future vehicle purchase decisions of California households.

More robust than other models, CARBITS takes a microsimulation approach to modeling the light-duty vehicle market in California by identifying a range of possible inputs that closely mirror real life. It integrates market response and numerous sub-models to produce dynamic, multi-year forecasts for the periods 2000 to 2020.

“It’s important to note that we’re not trying to forecast the future with CARBITS,” says Bunch. “Rather the model is designed to help ARB evaluate alternative regulation scenarios against a base case or status quo scenario.”

The ARB will take comments on its draft staff proposal during public workshops in July, and will issue a final recommendation to the board in early August. The Board votes on the proposed regulation in September. As set forth in the original legislation, the regulation must be in place next year. It takes effect in 2009.

See the [Publications list](#) for all the related UC Davis publications on this topic.



David Bunch answers questions at ARB workshop last year

## REAL-WORLD WORK WITH REAL-WORLD IMPACT: Student Internship Benefits Student and Employer, Alike

Ph.D. student Nic Lutsey has been interning with the California Air Resources Board's Mobile Source Division helping staff develop the draft California vehicle global warming regulation that was released this month.

Lutsey, who last year completed his Master's thesis working with Dan Sperling, Harry Dwyer, and C.J. Brodrick on the Institute's Fuel Cell APU project, has used the vehicle simulation modeling and economic analysis skills he developed at school to help ARB staff analyze a range of potential impacts of the regulation.

Lutsey played a key role synthesizing mountains of data from two technology analyses conducted by outside consultants. (The technology analyses were different from the UC Davis consumer response research described above). Lutsey helped ARB staff model the economic and consumer impacts that would result from the use of those technologies in varying combinations across different regulatory structures.

“It was different subject matter than my previous work, but I used a lot of the same tools,” Lutsey said. His analysis helped ARB arrive at the form of the standard, or regulatory approach that staff would ultimately propose.

Lutsey also drafted significant portions of an early staff report on technology options for reducing greenhouse gas emissions, and presented his economic analysis at a regulatory workshop in Sacramento.

**“As a grad student, Nic did much more than crunch numbers. We would not have come this far without his work – he helped us get through this and figure out what it means.”**

**--Air Resources Board Chief Deputy Executive Officer Tom Cackette.**

Lutsey says it has been rewarding to be involved in a project with tangible results, and to see how a regulation comes together.

“It’s been an amazing experience for me to see the interplay between all the interest groups that are involved in crafting a regulation. You’d never be able to pick up that kind of thing working on research papers at a university.”

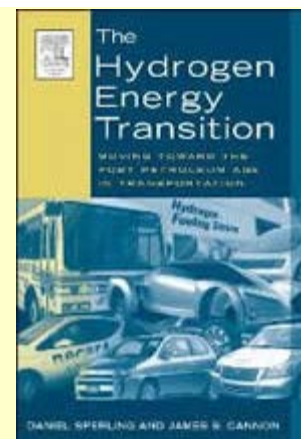
## TRANSPORTATION PUBLICATIONS FROM UC DAVIS: Hot off the Presses

### Featured Publication: The Hydrogen Energy Transition

Edited by ITS-Davis Director Dan Sperling, and James Cannon, president of Energy Futures, this book is a collection of papers presented by the leading experts in hydrogen research – from public, private and academic sectors – at last summer's Asilomar Conference, hosted by ITS-Davis.

The focus of *The Hydrogen Energy Transition* is to address key questions regarding a transition to hydrogen fuel. The initiatives set forth in this book will influence energy policy and research in the U.S. The book's 15 chapters examine the spectrum of issues facing a hydrogen transition, including consumer and market acceptance, vehicle technologies and cost, infrastructure development and fuel sources. It includes state, national and international perspectives, and thoughtful and honest discussion of previous experiences with alternative fuels and vehicles.

A limited number will be available through ITS-Davis. Order online directly from Elsevier Academic press at [www.elsevier.com/locate/specialsales](http://www.elsevier.com/locate/specialsales).



## RESEARCH REPORTS

**The Ability of Automakers to Introduce a Costly, Regulated New Technology: A Case Study of Automotive Airbags in the U.S. Light-Duty Vehicle Market with Implications for Future Automobile and Light Truck Regulation.** Abeles, Ethan C. *ITS-Davis*. June 2004. Publication No. UCD-ITS-RR-04-13.

**Hearing on the Use of Hydrogen Fuel Cell Technology in the National Park Service.** Eggert, Anthony. Testimony Before the Subcommittee on National Parks, Recreation and Public Lands, United States House of Representatives, May 15, 2004. *ITS-Davis*. May 2004. Publication No. UCD-ITS-RR-04-12.

**Improvement of Thermal Stability of Li-Ion Batteries by Polymer Coating of LiMn 2O 4.** Stroeve, Pieter and Ruxandra Vidu. *ITS-Davis*. May 2004. Publication No. UCD-ITS-RR-04-11.

**Feasible CAFE Standard Increases Using Emerging Diesel and Hybrid-Electric Technologies for Light-Duty Vehicles in the United States.** Burke, Andrew and Ethan Abeles. *Presented at the 15th Global Warming International Conference*. April 22, 2004. Publication No. UCD-ITS-RR-04-9.

**A Graduate Course Comparing the Major Types of Urban Models.** Johnston, Robert A.; Michael J. Clay. *ITS-Davis*. March 2004. UCD-ITS-RR-04-8.

**Modeling the Individual Consideration of Travel-Related Strategy Bundles.** Choo, Sangho and Patricia Mokhtarian. *ITS-Davis*. April 2004. UCD-ITS-RR-04-7.

**Performance of Drained and Undrained Flexible Pavement Structures Under Wet Conditions Test Data From Accelerated Pavement Test Section 543-Drained.** Harvey, John; Manuel O. Bejarano; Abdikarim Ali; Mark Russo; David Mahama; Dave Hung; Pitipat Preedonant. *ITS-Davis*. April 2004. UCD-ITS-RR-04-6.

**A Thermal Model to Evaluate Sub-Freezing Startup for a Direct Hydrogen Hybrid Fuel Cell Vehicle Polymer Electrolyte Fuel Cell Stack and System.** Sundaresan, Meena. *ITS-Davis*. March 2004. UCD-ITS-RR-04-5.

**The Response of the Auto Industry and Consumers to Changes in the Exhaust Emission and Fuel Economy Standards (1975-2003): A Historical Review of Changes in Technology, Prices and Sales of Various Classes of Vehicles.** Burke, Andrew, Ethan Abeles and Belinda Chen. *ITS-Davis*. June 2004. Publication No. UCD-ITS-RR-04-4.

**Present Status and Marketing Prospects of the Emerging Hybrid-Electric and Diesel Technologies to Reduce CO2 Emissions of New Light-Duty Vehicles in California.** Burke, Andrew. *ITS-Davis*. June 2004. Publication No. UCD-ITS-RR-04-2.

## REPRINTS

**Intelligent Transportation Systems.** Shaheen, Susan and Rachel Finson. *Encyclopedia of Energy*, Volume 3. May 2004. Publication No. UCD-ITS-RP-04-24. Available at [www.elsevier.com](http://www.elsevier.com)

**Motor Vehicle Use, Social Costs of.** Delucchi, Mark. *Encyclopedia of Energy*, Volume 4. April 2004. Publication No. UCD-ITS-RP-04-23.

**Influence of Powder Precursors on Reaction Sintering of Al 2TiO 5.** Groza, Joanna R., Lia Stanciu; Ligia Stoica; Carmen Plapcianu. *Scripta Materialia*. April 2004. UCD-ITS-RP-04-22.

**Fuel Cell System Economics: Comparing the Costs of Generating Power with Stationary and Motor Vehicle PEM Fuel Cell Systems.**

Lipman, Timothy, Jennifer L. Edwards and Daniel Kammen. Energy Policy. April 2004. UCD-ITS-RP-04-21.

**UC Drive: A New Gridded Mobile Source Emission Inventory Model.** Niemeier, Debbie A.; Yi Zheng and Tom Kear. Journal of Atmospheric Environment. April 2004. UCD-ITS-RP-04-20.

**The Hope For Hydroge.** Sperling, Dan and Joan Ogden. Issues in Science and Technology. April 2004. UCD-ITS-RP-04-19.

**Short-Term Versus Long-Term Coalitions in the Policy Process: Automotive Pollution Control, 1963-1989.** Zafonte, Matthew; Paul Sabatier. The Policy Studies Journal. March 2004. UCD-ITS-RP-04-18.

**Carsharing and Partnership Management: An International Perspective.** Shaheen, Susan; Dan Sperling; Conrad Wagner. *Transportation Research Record 1666*. March 2004. UCD-ITS-RP-04-17.

**U.S. Shared-Use Vehicle Survey Findings on Carsharing and Station Car Growth: Obstacles and Opportunities.** Shaheen, Susan; Mollyanne Meyn; Kamill Wipyewski. *Transportation Research Record 1841*. April 2004. UCD-ITS-RP-04-16.

**Intelligent Transportation Technology Elements and Operational Methodologies for Shared-Use Vehicle Systems.** Barth, Matthew; Michael Todd; Susan Shaheen. *Transportation Research Record 1841*. March 2004. UCD-ITS-RP-04-15.

**California's Zero-Emission Vehicle Mandate: Linking Clean-Fuel Cars, Carsharing and Station Car Strategies.** Shaheen, Susan; John Wright; Dan Sperling. *Transportation Research Record 1791*. March 2004. UCD-ITS-RP-04-14.

**Shared-Use Vehicle Systems: Framework for Classifying Carsharing, Station Cars, and Combined Approaches.** Barth, Matthew and Susan Shaheen. *Transportation Research Record 1791*. March 2004. UCD-ITS-RP-04-13.

**Commuter-Based Carsharing: Market Niche Potentia I.** Shaheen, Susan. *Transportation Research Record 1760*. March 2004. UCD-ITS-RP-04-12.

*Publications can be ordered by fax, e-mail or mail. Some are now available online.*

ITS-Davis is in the process of getting all research reports in downloadable pdf format online.

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## Education Highlights

### ANOTHER ACADEMIC YEAR CLOSES

#### New Jobs for Recent Grads

**Meena Sundaesan, Ph.D., Transportation Technology and Policy**, completed her dissertation in March, and in May accepted a full-time position with DaimlerChrysler, where she had previously been interning. She is a senior research analyst at the company's California Fuel Cell Partnership office in West Sacramento. Sundaesan received a Master's Degree in Mechanical Engineering from UC Davis in 2002. Her advisor was Bob Moore. Members of her dissertation committee included Harry Dwyer and Myron Hoffman. Co-Chairs included professors Bob Moore and Dan Sperling. See the [Publications List](#) for a link to Sundaesan's dissertation.

#### Internships and Awards for Current Students

**Ethan Abeles, Transportation Technology and Policy**, has been selected to participate in the National Park Foundation 2004 Transportation Scholar program. He begins a nine-month assignment at Fort Clatsop National Memorial outside of Astoria, Oregon, this month. The program is a partnership between the National Park Service, Eno Transportation Foundation and National Park Foundation, and is made possible by support from Ford Motor Company.

**Haining Du, Civil and Environmental Engineering**, was awarded the first CH2M HILL Transportation Technology Fellowship for the 2003-2004 academic year. Working with Prof. Michael Zhang, Du is





Tara Goddard meets the governor

researching the use of wireless communications for data collection in transportation.

**Oliver Gao, Civil and Environmental Engineering**, a Ph.D. candidate working with Prof. Debbie Niemeier, received the University of California Transportation Center (UCTC) Dissertation Award in April. Gao performs computer modeling research with the UC Davis-Caltrans Air Quality Program.

**Tara Goddard, Civil and Environmental Engineering**, is continuing her Executive Fellowship at the California Department of Housing and Community Development, where she is involved in several transportation and land use-related projects. She works with staff from Caltrans and the California Resources Agency, and recently had a chance to meet Governor Schwarzenegger. She returns to ITS-Davis this fall to finish her master's, under advisor Dan Sperling.

**Zhenhong Lin, Transportation Technology and Policy**, has received the 2003-2004 ChevronTexaco Fellowship. Lin, a Ph.D. candidate, is developing mathematical techniques to evaluate the cost and environmental attributes of various hydrogen distribution options, and applying the techniques to geographically specific case studies.

**Nic Lutsey, Transportation Technology and Policy**, a Ph.D. candidate working with Dan Sperling, has been [interning](#) at the California Air Resources Board.



UC Davis alum Hans Strandgaard, now with CH2M HILL, awards first scholarship to Haining Du

## ALUMNI PROFILE: Paravastu (Badri) Badrinarayanan, 2001



Paravastu (Badri) Badrinarayanan, TTP, 2001

After receiving his Master's Degree in Transportation Technology and Policy in 2001, Paravastu (Badri) Badrinarayanan continued his stay at UC Davis as a post-graduate researcher for a year. While at UC Davis he worked with Bob Moore on the Fuel Cell Vehicle Modeling Program (FCVMP). He joined United Technologies, UTC Fuel Cells, in South Windsor Ct. in July 2002.

Badri says his research with the FCVMP prepared him to work in the fuel cell industry. "The modeling work I did at UC Davis clearly compliments the experimental and analytical work I am currently involved in at UTC Fuel Cells."

Looking back, he says he especially appreciates the FCVMP's professional approach and its interaction with industry. "FCVMP had significant industry involvement. This gave us an excellent idea of how technologies are developed and of the various factors – technical, political and social – that play a critical decision-making role pertaining to technologies."

Badri also credits his FCVMP team work with Joshua Cunningham (TTP '01, and now at UTC Fuel Cells), Meena Sundaresan, Ph.D. (TTP '04, now at DaimlerChrysler), Anthony Eggert (TTP '01, now program manager of ITS-Davis's Hydrogen Pathways research program), and Ram Ramaswamy (FCVMP program manager and now at UTC Fuel Cells) and others, with preparing him for his applied science work at UTC.

Although his work and academic credentials are technical, Badri specifically chose the Institute's TTP program because it offers a broader perspective. "Although I was primarily attracted by its fuel cell program, the Institute helped me understand the important interaction between policy and technology, and the factors that play a role in developing environmentally friendly transportation systems.

"For any technological change to occur, someone needs to work on the details. For me, understanding the big picture as well as the impact of my individual contribution are great motivators to work on the details. Being at ITS-Davis helped me arrive at that understanding."

Badri, who was born and raised in India, says he also was attracted to UC Davis and the Institute because people here are working on issues

involving developing nations. “My long-term professional goal is to work on energy related projects in developing nations. Although I was fuel cell focused at ITS-Davis, it was invaluable to interact with people working on those other issues.”

### LEARNING EXPERIENCE ON THE ROAD: UC Davis Attends Final FutureTruck Competition

UC Davis Engineering Prof. Andy Frank’s team of enthusiastic and hard working students have just returned from their third FutureTruck Competition – this time at the Ford Proving Grounds in Michigan. The UC Davis team accepted first prize in the Delphi Advanced Powertrain Controls Award and earned the Best Technical Report award.

This is the fifth and final year of the FutureTruck (formerly FutureCar) Competition. Building on its success, U.S. Department of Energy and General Motors, with other government and industry sponsors, have launched a new competition series, Challenge X: Crossover to Sustainable Mobility. UC Davis is one of 17 universities selected through a competitive process to participate in the hands-on research and development program. As the Challenge X program gets underway in the coming months, *ITS-Davis e-news* will track UC Davis’s team and activities.



UC Davis 2004 FutureTruck entry on the course in Michigan

### CONTINUING ED: UC Extension Offers Transportation Planning

Interested in keeping fresh on the latest in transportation, land use and development issues? Check out UC Davis Extension’s programs tailored for today’s busy professionals. UC Davis Extension offers several transportation and planning courses through its Land Use and Natural Resources program. Upcoming classes include Bicycle Planning and Design, and Road Ecology. Visit <http://extension.ucdavis.edu> for more information.

### MOK, YOU ROCK! Students Name Mokhtarian “Excellent Teacher”

Pat Mokhtarian walked out of her final class of the year and found herself surrounded by a group of adoring students waiting to present the first-ever Excellent Teacher Award. The card read, “Mok, You Rock!” The framed certificate, signed by several dozen ITS-Davis students, bore inscriptions such as these:

“She spends an incredible amount of time and effort grading homework and providing feedback.”

“Her lectures are always well-prepared and thoughtful.”

“She is a great person, teacher, and genuinely cares about making you a better person, student and professional. Prof. Mokhtarian is on my top-five all-time best teachers list.”

Mokhtarian acknowledges her style is direct and attentive; she focuses on providing specific input so that students can calibrate their standards. “If you don’t give them feedback, they have no way of knowing how to improve,” she says. “In my mind, I’m training them in logical thinking, and self criticism is a big part of what we’re trying to teach here.”

Spoken like an Excellent Teacher.



Taihyeong Lee presents the Excellent Teacher award to Pat Mokhtarian

## ITS-Davis and Campus Highlights

### BICYCLE SAFETY: Community Service and Learning in ITE-Sponsored Research Program

ITS-Davis students active in the campus's new student chapter of Institute of Transportation Engineers (ITE) are putting their data collection and analysis skills to work on a real-world bicycle safety project, thanks to a grant from District 6 of ITE.

The student chapter is collecting data on the time that it takes bicycles to get through City of Davis intersections with traffic signals. Many of the signals have not been programmed to take so-called "bicycle clearance" time into account. This project will provide information that enables transportation professionals to design signals to accommodate bicycle crossings.

Civil and Environmental Engineering student Daniel Rubins is coordinating the project under the direction of professors Susan Handy and Michael Zhang, with professional mentors from the campus and city's bicycle and pedestrian programs. Transportation Technology and Policy graduate students Sondra Rosenberg, Chris Congleton and Michael Nicholas are managing the data collection, transfer, and analysis, with data collection help from 17 undergrads.

<http://ite.engineering.ucdavis.edu/>



UC Davis ITE student chapter officers left to right: Prof. Susan Handy, Dan Rubins, Prof. Michael Zhang, Thomas Barron, Sondra Rosenberg, Katy Flynn and Michael Nicholas

### IN THE SPOTLIGHT: Institute Faculty and Affiliates Recognized

**Bruce Gates** has been awarded the American Chemical Society's 2004 Gabor A. Somorjai Award for Creative Research in Catalysis. The \$5,000 award recognizes outstanding research that advances the understanding or application of catalysis.

**Pat Mokhtarian** in March traveled to Oslo, Norway, where she was one of two international keynote speakers for the 40th anniversary of the Institute of Transport Economics. Her talk was on "Information/Communication Technologies and Travel: Trends into the Future."

**Alexandra Navrotsky**, director of the NEAT nanotechnology center, traveled to Norway in May to deliver the Hassel Lecture. The prestigious lecture commemorates Odd Hassel, who won the Nobel Prize for Chemistry in 1969. Prof. Navrotsky was invited by the Norwegian Chemical Society and the University of Oslo.

### FAREWELL TO FCVMP DIRECTOR BOB MOORE

The Institute bids a fond farewell to Bob Moore, who is leaving Davis after seven years as co-director of the GATE Fuel Cell Vehicle Center and director of the Fuel Cell Vehicle Modeling Program (FCVMP). Moore has accepted a faculty appointment at the University of Hawaii.

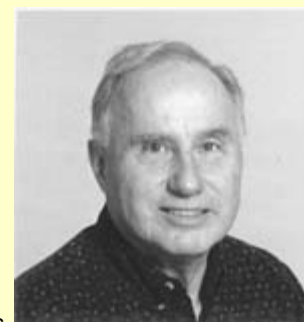
"With Bob's leadership, we raised the bar on fuel cell research here at Davis, and across the country," said ITS-Davis Director Dan Sperling.

Sperling points to the FCVMP's work product as evidence of his success:

- The program produced nearly 60 technical publications
- Nine students earned their master's or Ph.D. while working on the program
- A consortium of 20 companies, including most of the major international automotive and oil companies, plus several government agencies, including the U.S. Department of Energy and the California Air Resources Board, participated in and funded the program

Under Moore's direction, students and researchers created detailed computer models of FCV systems to analyze performance, efficiency, and emissions with the goal of developing a realistic view of the long-term potential of FCV technologies. The FCVMP organized consensus on key technical issues and played an important role in fuel selection planning.

"We are indebted to Bob for organizing and managing such an outstanding program," said Sperling.



Bob Moore



## ON THE PATH TO HYDROGEN: ITS-Davis H2 Pathways Update

### Newest H2 Pathways Members

ITS-Davis is pleased to announce the addition of Petrobras, Caltrans, U.S. EPA and Pacific Gas & Electric to the Hydrogen Pathways research program. With their addition, the contributing industry partners totals 20 and includes: Air Products, BP, ChevronTexaco, ConocoPhillips, ExxonMobil, GM, Honda, Hyundai, NRCan, Nissan, Shell, Subaru, TOTAL, Toyota, U.S. DOE, and U.S. DOT. For more information on the program, see <http://www.its.ucdavis.edu/Hydrogen/>

### Implementing Hydrogen Highways

California Gov. Arnold Schwarzenegger has asked ITS-Davis to help implement his Hydrogen Highways Initiative, announced here on the UC Davis campus in April. Prof. Joan Ogden has been named as the academic representative to the Hydrogen Highways Implementation Advisory Panel, which held its first meeting in Sacramento earlier this month.

The panel is charged with developing a blueprint to implement the California Hydrogen Highways Network by the end of the decade. In addition, five Topic Teams have been established to focus on key issues such as roll-out strategy; environment and health; business and investment; insurance, liability, and codes and standards; and marketing, communication and education. ITS-Davis's Anthony Eggert organized Institute researchers and graduate students to participate on these teams at the first meeting. Ten ITS-Davis faculty, researchers and students will participate in the topic teams.



Joan Ogden

### Informing Congress

Anthony Eggert traveled to the Grand Canyon National Park in May to testify before the House Subcommittee on National Parks, Recreation and Public Lands on the use of hydrogen fuel cell technology in the National Park Service.

Eggert said that national parks represent an excellent opportunity to demonstrate a strong public commitment to new types of clean and efficient energy technologies such as renewable power, hydrogen and fuel cells. At the same time, he warned, we must ensure that hydrogen and fuel cell deployment projects in our national parks add value with respect to key environmental, technology development and educational goals. He identified considerations and potential applications for successful deployment of hydrogen and fuel cell vehicles in national parks. And he noted that education and continued research in conjunction with universities and the private sector are necessary to continue development of the technology.



Anthony Eggert

## INFORMING THE THRONGS: ITS-Davis at Picnic Day

Every year, during the campus open house known as Picnic Day, thousands flock to Davis to see the latest and greatest in research, academic and just plain fun activities going on here. ITS-Davis wowed the crowds again with its Toyota Fuel Cell Hybrid Vehicle in the Picnic Day Parade. Later, on the grassy knoll outside Bainer Hall, ITS-Davis arranged a showcase of community electric and alternative fueled vehicles. Several alumni stopped by the display and attended the *Friends of ITS-Davis* reception. ITS-Davis thanks the California Fuel Cell Partnership, especially DaimlerChrysler, Ford, Hyundai, Nissan and Toyota, and the California Air Resources Board staff who helped coordinate vehicle participation.



Dan with J.T. Guerin (CEE '96) at Picnic Day 2004

## SCHOOL'S OUT!





ITS-Davis friends and families gather to celebrate summer's arrival at the annual end-of-the-year picnic.

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