PATH Bids Farewell to Director Orne

This issue of Intellimotion is the first to lack a "Director's Corner" article, since it is the first to appear since Don Orne left PATH in November 1993 to pursue a new opportunity as Director of Transportation Systems at TRW's ESL Division in Sunnyvale, California. After Don assumed the position of PATH Director in September 1991, one of his first innovations was the creation of this quarterly newsletter, Intellimotion, to help spread the word to the world at large about the progress that we were making at PATH.

Don arrived at PATH at a difficult time, after a year and a half of a "caretaker government" (I can say that since I was the "caretaker"), and managed to get us moving forward smartly. When Don became the PATH Director, the program incorporated 50 research projects on four campuses (University of California at Berkeley, Davis and Irvine and University of Southern California), plus a full-time staff of 15 people. Today, PATH is conducting more than 80 research projects on ten campuses (the four listed above plus UCLA, U.C. Riverside, San Diego State University, The Claremont Graduate School, George Mason University, University of Washington), and has a full-time staff of 35. During that time, the annual budget has grown from $7 million to about $10 million, additional industrial sponsors have joined the program, and PATH has become significantly more active in the national IVHS program, including participation on winning teams in several major federal procurements.

It is clear to me that Don was the right person at the right time to lead PATH into a period of substantial growth in scale and stature amidst much turmoil from without. He provided PATH with an exceptional combination of leadership ability, coolness under fire, understanding of the national IVHS scene, breadth of vision and program management experience. This will make his a tough act to follow.

It has been a privilege working closely with Don over the last two years. All of us at PATH wish him well in his new endeavors.

Steve Sladover
Acting Director
As part of their meeting in San Francisco, members of the IVHS America Coordinating Council took a tour of the San Francisco Bay Area, culminating in a visit to PATH headquarters in Richmond. While on the bus members were not only shown some scenic highlights but were also shown some transportation features of the Bay Area including San Francisco's Cable Cars, the Golden Gate Bridge and its reversible lanes, the Larkspur Ferries, 1-80 widening project, the Bay Bridge Toll Plaza and Metering Lights, and some traffic congestion (of course). At PATH Headquarters Council members attended presentations and demonstrations by PATH researchers, Caltrans, MTC (Metropolitan Transportation Commission), and private contractors. Demonstrations and presentations by PATH researchers included:

- **IVHS Architecture, SmartPath Simulation**
  - U.C. Berkeley researchers provided a demonstration of the SmartPath simulation model. This computer modeling environment provides a way to simulate interactions among automated vehicles under varying conditions. (See Intellimation 2(3) pg 9).

- **Traffic Surveillance Using Machine Vision**
  - Presented was a video showing a PATH developed way of tracking individual cars using a machine vision based traffic surveillance system in which a computer analyzes video images. This could be used to obtain traffic information such as traffic flow, congestion, accidents, aberrant driver behavior, etc.

- **USC Dynamic Visualization**
  - USC researchers provided a video tape demonstrating Dynavis, an interactive computer engineering environment that allows a researcher to compare different vehicle control models in lateral and longitudinal control studies (see Intellimation 2(3) pg 4).

- **On-chip Micro Acoustic Transducers, Micro Accelerometers and Rate Sensors**
  - Representatives of U.C. Berkeley's Sensors and Actuators Center provided information on the various on-chip sensors and actuators they are developing under PATH sponsorship. Some of the potential applications are integrated vehicle dynamics, autonomous vehicle guidance, yaw and pitch information and vehicle communications.

- **Qualimatrix Optical Ranging Sensor**
  - Qualimatrix showed a prototype of their Optical Ranging Sensor. This sensor uses a pair of forward looking cameras viewing a low-power infrared light source on the car ahead to measure the distance using triangulation. This provides an accurate measurement of vehicle separation which is critical to the successful operation of an automated highway. (See Intellimation 2(1) pg 4).

- **Lateral Control Demo Test Ride**
  - Visitors were given a chance to experience a ride in the automatically steered lateral control test vehicle on the field station's test track. (See Intellimation 1(3pg 2, 222) pg 3).

- **Freeway Service Patrol and SAFE Call Boxes**
  - MTC reported on the network of solar-powered roadside call boxes and an update on the benefits of the Caltrans, CHP and MTC administered Freeway Service Patrol. (See Intellimation 3(1) pg 5).

- **TravInfo Operational Test**
  - Caltrans and MTC described TravInfo which is a Field Operational Test of a centralized database providing easy access to real-time travel information on all modes of transportation in the San Francisco Bay Area. TravInfo will test the thesis that comprehensive and timely information on the Bay Area's complex transportation system will result in reduced congestion and traffic delay. (See UCBITS-PWP-93-16).

- **PATH researchers Bobby S. Rau and Farhad Eskandari demonstrate the SmartPath Simulation Model**

Visitors experience a ride in the Lateral Control Test Vehicle after hearing a presentation by PATH researcher Wei-hsin Zhang
PATH Hosts Second Annual Program-wide Meeting at Berkeley Marina

Nearly 100 people attended this year's Annual PATH Program-wide meeting on IVHS research. The meeting covered PATH sponsored research in ATMS, ATIS and AVCS. Presentations were made by faculty and researchers from throughout the PATH partnership. In conjunction with the meeting, research focus groups met to provide input for the preparation of the 1994 RFP. This meeting provided numerous benefits to the PATH community, including a broad overview of the types of research being sponsored and conducted by PATH, a chance to exchange information with peers, and an opportunity to form or re-new friendships.

General Session Presentations

Communications Needs and Architecture for AVCS, Jean Walrand, U.C. Berkeley
Evaluation of Radio Communication Links and Networks, Jean-Paul Linhart, U.C. Berkeley

Fred Brossard of USC presents his research, Drag on a Platoon of Vehicles

An Integrated Physical/Link-Access Layer Model of Packet Radio Architectures, Andreas Polydoros, USC
Automated Vehicle Control, Petros Ioannou, USC
Traffic Modeling for the Environment, Matthew Barth, U.C. Riverside
Toward a Planning Methodology for Intelligent Urban Transportation Systems, Asad Khattak, U.C. Berkeley
Mobility, Simulation, and Performance of Fully Automated Highways, Pravin Varaiya, U.C. Berkeley
Vehicle Longitudinal Control, Karl Hedrick, U.C. Berkeley

ATMIS Presentations

California Advanced Driver Information System, Paul Jovanis, U.C. Davis
Freeway Service Patrol Evaluation, Alex Skabardonis, U.C. Berkeley
Evaluation of TransInfo Project, Stein Weissenger, PATH

AVCS Presentations

Vehicle Lateral Control, Masayoshi Tomizuka, U.C. Berkeley
Platoon Collision Dynamics and Emergency Maneuvering, Benson Tongue, U.C. Berkeley
Silicon Microsensors for Automobile Position Localization and Ultrasonic Communication, Albert Picano, Berkeley Sensors and Actuators Center
Drone on a Platoon of Vehicles, Fred Brossard, USC

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Name, title
Company, type of business
Address
Phone and FAX
Primary area of interest in IVHS
Mention Intellimation Mailing List

Our FAX is (510) 231-9565
# Schedule

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Location</th>
<th>Title</th>
<th>Authors/Presenters</th>
<th>TRB Paper #</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-10:15 a.m.</td>
<td>2A</td>
<td>Sheraton</td>
<td>Using the Integration Model to Study High-Occupancy-Vehicle Facilities</td>
<td>Vinton W. Becon, Jr., David T. Lovell, and Adolf D. May, University of California, Berkeley</td>
<td>940372</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>11</td>
<td>Sheraton</td>
<td>California Advanced Public Transportation System (APTS) Program</td>
<td>John West, California State Department of Transportation</td>
<td></td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>43</td>
<td>Sheraton</td>
<td>Traffic Pattern Estimation and Route Guidance</td>
<td>R. Jayakrishnan, University of California, Irvine, Irvine</td>
<td>PRESIDING</td>
</tr>
<tr>
<td>6:00-7:00 p.m.</td>
<td></td>
<td>Sheraton</td>
<td>Traffic Management from Theory to Practice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:30-10:15 a.m.</td>
<td>112A</td>
<td>Hilton</td>
<td>Development of User Needs and Functional Requirements for a Real-Time Ridesharing System</td>
<td>Adolf D. May, University of California, Berkeley</td>
<td>940922</td>
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<tr>
<td>3:00 p.m.</td>
<td>137B</td>
<td>Hilton</td>
<td>Models of Commuters' Information Use and Route Choices: Initial Results based on a Southern California Commuter Route Choice Survey</td>
<td>Raghu R. Kowsink, John Gard, Jason Luo, and Paul P. Jovanis, University of California, Davis;</td>
<td>940708</td>
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<tr>
<td>2:00 p.m.</td>
<td>142</td>
<td>Hilton</td>
<td>Evaluation of Transit 'Telephone Information at SCRTD</td>
<td>Mohamed A. Abdel-Aty, Kenneth M. Vaughan, and Paul P. Jovanis, University of California, Davis;</td>
<td>940374</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>187</td>
<td>Hilton</td>
<td>Progress in Automatic Highway Systems</td>
<td>Emmanuel Le Colletier, Youngbin Yim, University of California, Berkeley;</td>
<td>940290</td>
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<tr>
<td>8:30 a.m.</td>
<td>187</td>
<td>Hilton</td>
<td>Potential Benefits of Roadside Intelligence for Flow Control in an IVHS</td>
<td>Steven E. Siladover, University of California, Berkeley</td>
<td>PRESIDING</td>
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<tr>
<td>8:30 a.m.</td>
<td>187</td>
<td>Hilton</td>
<td>Functional Definition of Automated Highway Systems</td>
<td>Bobby S.Y. Rao and Pravin Varaiya, University of California, Berkeley</td>
<td>940085</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>187</td>
<td>Hilton</td>
<td>Intelligent Vehicle-Highway System Safety: Multiple Collisions in Automated Highway Systems</td>
<td>Wei-Bin Zhang, Steven E. Siladover, University of California, Berkeley; Randolph W. Hall, University of Southern California; Thomas Plocher, Honeywell Inc.</td>
<td>940988</td>
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<tr>
<td>2:30-4:15 p.m.</td>
<td>215A</td>
<td>Hilton</td>
<td>Travel Behavior for IVHS, TDM, and Land Use Planning, Part 1</td>
<td>Anthony Hitchcock, University of California, Berkeley</td>
<td>940201</td>
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<tr>
<td>4:30 p.m.</td>
<td>215B</td>
<td>Hilton</td>
<td>Travel Behavior for IVHS, TDM, and Land Use Planning, Part 2</td>
<td>Ryoichii Kitamura, Kyoto University, Japan, Japan</td>
<td></td>
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<tr>
<td>7:30 p.m.</td>
<td>223</td>
<td>Sheraton</td>
<td>Benefits of Commuters' Route Deviation from In-Vehicle ATIS: Stated and Reported Preferences</td>
<td>Asad Jan Khattak, Adib Kanafani, and E. Le Colletier, University of California, Berkeley</td>
<td>940394</td>
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<tr>
<td>7:30 p.m.</td>
<td>238</td>
<td>Hilton</td>
<td>Planning Methodology for Intelligent Urban Transportation Systems</td>
<td>Adib Kanafani and Asad Jan Khattak, University of California, Berkeley; Melanie Croty, Metropolitan Transportation Commission; Joy Dalgren, University of California, Berkeley</td>
<td>940418</td>
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<tr>
<td>7:30 p.m.</td>
<td>238</td>
<td>Hilton</td>
<td>Role of Teamwork in a Planning Methodology for Intelligent Transportation Systems</td>
<td>Adib Kanafani, University of California, Berkeley; Marvin L. Manheim, Northwestern University; Asad Jan Khattak, University of California, Berkeley; Nicholas J. Wlodos, Northwestern University</td>
<td>940401</td>
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<tr>
<td>8:30 a.m.</td>
<td>245</td>
<td>Sheraton</td>
<td>Procedure for Predicting Freeway Incident Duration</td>
<td>Asad Jan Khattak, University of California, Berkeley; Joseph L. Schuery, Northwestern University; Mu-Hai Wang, Purdue University</td>
<td>940379</td>
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<td>8:30 a.m.</td>
<td>258</td>
<td>Hilton</td>
<td>Spatial Evolution of Queues During the Morning Commute in a Single Corridor</td>
<td>Carlos F. Daganzo and Wei-Hua Lin, University of California, Berkeley</td>
<td>940115</td>
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<tr>
<td>8:30 a.m.</td>
<td>258</td>
<td>Hilton</td>
<td>Dynamic User-Optimal Departure Time/Route Choice: A Link-Based Variational Inequality Formulation</td>
<td>Bin Ran, University of California, Berkeley; Randolph W. Hall, University of Southern California; David E. Boyce, University of Illinois, Chicago</td>
<td>940325</td>
</tr>
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</table>

*This is Professor Adolf D. May's lecture as the recipient of the 1994 TRB Distinguished Lectureship Award.*
Automated Highway Systems

In Cooperation with the California PATH Program

February 1-2, 1994 Berkeley, California

The Program

In light of the imminent start of a major federal initiative to develop an Automated Highway System (AHS) prototype, the world-renowned research team at the University of California’s Partners for Advanced Transit and Highways (PATH) Program will present their first short course on the results of their research conducted over the past five years on AHS. The course will cover AHS issues ranging from system-level design concepts and safety analyses to specifics of vehicle lateral and longitudinal control and evaluations of the mobility and air quality impacts of AHS.

Schedule, Cost and Location

When: February 1-2, 1994
Tuesday and Wednesday
8:30 a.m. - 5:00 p.m. (each session)
Check-in: 7:30-8:00 a.m.

Cost: $450, includes course notes
Caltrans and USDOT registrants are entitled to a fee reduction; fax requests to ITS Extension 510/548-9591

Where: Berkeley Marina Marriott, 200 Marina Blvd.
510/548-9762

$83 single/double per night
Make reservations by January 10, 1994

How to Enroll

By Phone: You can call by phone if you are interested in the call toll at 510/642-8011.
By Mail: Please complete and return the form printed. Enrollment must be accompanied by the full fee. You may pay by check on a check card or Visa. Make checks payable to the UC Regents. To enroll by mail, return this form to: University Extension, Department 8, 2220 Fulton Street, Berkeley, CA 94720.

By Purchase Order: Purchase orders from companies may be sent to one employee through the use of a Federal purchase order or letter of authorization in lieu of enrollment payment. The purchase order letter of authorization may be submitted - with or without extra forms - to fax students to be enrolled through the mail, for immediate enrollment, or to UC Berkeley Extension at 510/548-5070 for a noncredit tax payment made over the phone.

Please Note: When using a purchase order in lieu of enrolled payment, the following procedures should be followed:

- Only endorsed purchase orders or signed letters of authorization addressed to University Extension or ITS can be honored for enrollment payments. An internet Direct Payment Voucher does not authorize us to enroll your employees.
- When enrollment has been requested through this method, please do not send a check in payment until you have received an invoice from University Extension. This will help avoid misinterpretation of your fee and/or duplication of your enrollment request and thus ensure that the requested class is reached if course cancellation does not occur.
- Refunds can only be to the party of the invoice (i.e. if the company is registered) and such University Extension refund policies apply.

Conference Update

UPDATE on Conferences

IVHS America

PATH will once again be represented at the IVHS America Fourth Annual Meeting being held in Atlanta, GA, April 17-20, 1994. We will not only have researchers presenting papers but will also have a booth in the exhibit area.

Industrial Liaison Program

March 9-10, 1994 will see several PATH researchers presenting papers at the annual U.C. Berkeley College of Engineering Industrial Liaison Program. Representatives of many companies around the world will come to see and hear presentations on the many research programs being conducted at the University.

ITS Extension Short Course

U.C. Berkeley Institute of Transportation Studies Extension Programs is presenting a short course on Automated Highway Systems in cooperation with PATH. It will be held February 1-2, 1994 at the Berkeley Marina Marriott. Topics will cover AHS architecture, AHS simulation, AHS safety prediction, AHS safety issues, vehicle lateral and longitudinal control, sensors, communications, environmental impacts and more. For further information see the article on the previous page or call 510/548-9590.

TRB

PATH will be well represented at the upcoming 73rd TRB Annual Meeting scheduled for January 9-13, 1994 in Washington D.C. For a list of PATH and PATH sponsored papers see pages 6-7 of this newsletter.
Here is an update on some recent PATH publications.

A complete list, including past research and working papers and technical memoranda, can be obtained from the Institute of Transportation Studies, University of California, 109 McLaughlin Hall, Berkeley, CA 94720; FAX: 510-642-1266.

PATH Research Reports
UCB-ITS-PRR-93-14 Parking Methodology for Intelligent Urban Transportation Systems Add Randal, Anoel Khalek, Mahine Hattay, Joe Dahlgren, June 1993
UCB-ITS-PRR-93-16 Studies of Rural Infrastructure Requirements for Small Innovative Vehicles, William Gunston, November 1993
UCB-ITS-PRR-93-17 Consumer Demand for Automated Private Transit: Extrapolations from Vangua User Experience, Movio Breuna, Daniel Spellings, Kenneth Parson, November 1993
UCB-ITS-PRR-93-18 Highway Automation and Intelligent Transportation - Regional Impacts Analysis Project: Executive Summary, Southern California Association of Governments (SCAG) & California PATH, November 1993
UCB-ITS-PRR-93-19 Highway Automation and Intelligent Transportation - Regional Impacts Analysis Project: Phase I: Baseline / Sensitivity Data Analysis, Southern California Association of Governments (SCAG) & California PATH, November 1993
UCB-ITS-PRR-93-20 Highway Automation and Intelligent Transportation - Regional Impacts Analysis Project: Phase II: Impacts/Analysis Results, Southern California Association of Governments (SCAG) & California PATH, November 1993
UCB-ITS-PRR-93-21 Highway Automation and Intelligent Transportation - Regional Impacts Analysis Project: Phase III: Impacts/Analysis Results, Southern California Association of Governments (SCAG) & California PATH, November 1993

PATH Working Papers
UCB-ITS-PWP-93-16 Traveler Evaluation Plan, Yeonghee Yoon, Anoel Khalek, Mark Miller, Randolph Hall, November 1993
UCB-ITS-PWP-93-18 Communication Requirements and Network Design for ITS, Pay Shiou Hsu, Joan Wardlow, November 1993
UCB-ITS-PWP-93-19 Custom Interface Builder Prototypes for Advanced Driver Interface Rapid Prototyping, David Moore, November 1993
UCB-ITS-PWP-93-20 Decision Support and Converse Building for PLAIDS, Add Randal, Mahine Hattay, October 1993
UCB-ITS-PWP-93-21 Models of Coherence Information Use and Route Choices: Initial Results Based on a Southern California Commute Route Choice Survey, Mohamed A. Abdel-Aty, Kenneth M. Yeung, Ryoichi Kikumori, Paul P. Jarvis, Fred L. Mannering, November 1993

PATH Technical Memoranda
TECH MEMO-93-09 A Communication System for the Control of Automated Vehicles, Sonia E. Secker, Patricia Young, September 1993
TECH MEMO-93-10 Longitudinal Control of the Lead Car of a Platoon, David Gallue, John Lyman, November 1993
TECH MEMO-93-07 Casualties in Accidents Occurring During Split and Merge Manoeuvres, Anthony Mikhail, November 1993

local motion

The last few months have been busy at PATH Headquarters with numerous new staff joining us.

Stein Weissenberger has taken over the ATUMS Program Director position from Randolph Hall, on a temporary basis. Stein received his B.S. and M.S. degrees in mechanical engineering from Massachusetts Institute of Technology and his Ph.D. in aeronautical and astronautical sciences from Stanford University. Since 1976, he has been associated with the electronics engineering department at Lawrence Livermore National Laboratory. He managed the Transportation Research Program and was responsible for the development of transportation R&D projects and for the transfer of technology to the public and private transportation sectors. Previously, he was Division Leader of the Engineering Research Division, involving the management of a group of over 100 professionals across a broad spectrum of engineering disciplines. He has published numerous papers in control theory, large-scale systems, stability theory and systems and decision analysis, with applications to such fields as arms-control treaty verification, nuclear safeguards systems, wildlife management and aircraft guidance. He formerly was an Associate Professor at the University of Santa Clara, Santa Clara, CA.

Mark Hickman joined PATH in October as a Visiting Postdoctoral Researcher. He will be working on research in planning public transit and multi-modal applications of advanced information technologies.

Mark will also contribute to ongoing PATH research in policy and institutional issues. He recently completed his Ph.D. in Transportation Systems at the Massachusetts Institute of Technology. His research there involved assessing the value of real-time information systems for passenger information and vehicle control in public transit. Before returning to graduate school, he worked for two years with Charles River Associates, a transportation consulting firm in Boston.

The PATH Publications Office has been expanded with 3 new staff members:

Bill Stone joined PATH in September as PATH Editor. Bill was formerly one of the Editors working on The American Manual: Higher Plants of California, worked as a Curator at a Junior Museum, was a Forest Service Naturalist, and a California State Park Ranger.

Gerald Stone joined PATH in December as Assistant Editor. Gerald has his own freelance editorial business and has produced numerous reports, newsletters, brochures and the like.

Sara Martinez de Osaba joins PATH as our Editorial Assistant in an official capacity after having filled the position on a temporary basis for some time. She double majored in Political Economy and Spanish Literature at U.C. Berkeley and currently also volunteers at the Pesticide Education Center in San Francisco, the Spanish-Speaking Citizen's Foundation in Oakland, and Allanazas in San Rafael.

James Brett Michael joins PATH as an Assistant Research Engineer, in January. He will be working on AVCS safety issues. He received a Ph.D. in Information Technology, his M.S. in Information Systems and M.B.A., all from George Mason University, and has a B.S. in Finance from West Virginia University. He brings 7 years of basic and applied research on the sociotechnological issues of applying information technology with particular emphasis on formal methods, database security and system safety.

William David joins PATH in January as a Senior Development Engineer concentrating on sensor systems. He has a M.S. in Engineering Optics and a B.S. in Electro-Physics from the University of Rochester and has completed his course work for a Ph.D. in Electrical Engineering at UCLA. He brings experience as an Electro-Optical Development Engineer working with conceptualization, design, development and fabrication and evaluation of infrared, laser ranging and millimeter wave radar technologies.

Han-Shue Tan joins PATH as an Assistant Research Engineer, in February. He will be working on AVCS vehicle dynamics and control issues. He has Ph.D. and M.S. in Mechanical Engineering from U.C. Berkeley and a B.S. in Mechanical Engineering from National Taiwan Hu University of Taiwan. He was formerly with Hughes Missile Systems working on automotive control applications.

Seibum Choi joined PATH as an Assistant Research Engineer in September, working on vehicle longitudinal control experiments. He has a Ph.D. in Mechanical Engineering...
from U.C. Berkeley, a M.S. in Mechanical Engineering from Korea Advanced Institute of Science and Technology and a B.S. in Mechanical Engineering from Seoul National University. He has worked on control algorithms to reduce pollution and improve automotive engine response.

Nobuaki Takubo is a visiting scholar from the National Research Institute of Police Science in Tokyo, Japan where he has been researching driver behavior. He has a Bachelor of Technology and a Master of Technology from Chiba University. He has experience in accident analysis, vehicle behavior under various conditions and using a neural network system for modeling driver behavior.

Ahmad Bahai joins PATH as a Visiting Postdoctoral Researcher in January working on vehicle to vehicle communication for AVCS. He has been involved with PATH as a graduate student working with Professor Varaiya. His Ph.D. is from U.C. Berkeley in Electrical Engineering. He has an M.S. degree in Electrical Engineering from University of London, Imperial College, and a B.S. in Electrical Engineering from Tehran University.

Intellimotion is a quarterly newsletter edited and designed by the publication staff (Bill Stone, Andrew Watanabe, Sara Martínez de Osaba) of California PATH.

PATH Publications
1301 South 46th Street, Bldg. 452
Richmond, CA 94804
Tel: 510/231-9495
FAX: 510/231-9565

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