



INTELLIGENT  
TRANSPORTATION  
SYSTEMS

[www.ieee.org/itss](http://www.ieee.org/itss)



IEEE ITS SOCIETY NEWSLETTER

Vol. 12, No. 1, January 2010

Editor: Dr. Charles J. Herget, [c.herget@ieee.org](mailto:c.herget@ieee.org)

In This Issue

Society News

Message from the Editor .....	2
An Interview with Society President, Alberto Broggi .....	3
Ümit Özgüner Elevated to Grade of Fellow of the IEEE .....	5
Board of Governors Election Results .....	6

Conferences

ITS Sponsored Conferences .....	7
Intelligent Vehicles Symposium (IV 2010) .....	8
Call for Papers, MESA' 10, SOLI' 10, VES' 10 .....	9
Mechatronic and Embedded Systems and Applications (MESA 2010) .....	10
Intelligent Transportation Systems Conference (ITSC 2010) .....	11
IEEE Forum on Integrated and Sustainable Transportation Systems .....	12
Conference Calendar .....	14

Announcements

Call for Papers: ITS Magazine: Special Issue on Microscopic and Macroscopic ITS Traffic Simulators .....	16
Call for Proposals: IEEE ITSS Best Ph.D. Dissertation Award .....	17

Research Programs

VisLab's Footprint in Intelligent Vehicles Technology .....	18
---	----

Transactions on ITS Abstracts .....	22
-------------------------------------	----

IEEE ITS Magazine Abstracts .....	26
-----------------------------------	----

Officers and Committee Chairs .....	27
-------------------------------------	----

©2010 by The Institute of Electrical and Electronics Engineers, Inc. Personal use of this material is permitted. Permission from IEEE must be obtained for all other uses, including reprinting/republishing this material for advertising or promotional purposes, creating new collective works for resale or redistribution to servers or lists, or reuse of any copyrighted component of this work in other works.

## Web Archive and Electronic Newsletter Subscription

The IEEE ITS Society Newsletter is published quarterly in January, April, July, and October. The current and all past issues of the Newsletter may be downloaded at no charge from the Society's web site:

[www.ieee.org/itss](http://www.ieee.org/itss)

You may subscribe to or unsubscribe from announcements at the same web site. Announcements are sent to approximately 10,000 ITS professionals from industry, academia, and government.

## Editorial Board

### Editor-in-Chief

Charles J. Herget . . . . . [c.herget@ieee.org](mailto:c.herget@ieee.org)

---

### Associate Editors

#### IEEE Transactions on ITS Report and Abstracts

Simona Berté .....[TransITS@ce.unipr.it](mailto:TransITS@ce.unipr.it)

#### Conferences, Workshops, and Journals

Massimo Bertozzi and Paolo Grisleri  
.....[itsconfs@ce.unipr.it](mailto:itsconfs@ce.unipr.it)

### Information for Contributors

Announcements, feature articles, book and meetings reviews, opinions, letters to the editor, professional activities, abstracts of reports, and other material of interest to the ITS community are solicited. Please submit electronic material for consideration in any of the following formats: Microsoft Word, OpenOffice, plain ASCII, rich text format (rtf), or portable document format (pdf) to the Editor-in-Chief at [c.herget@ieee.org](mailto:c.herget@ieee.org).

---

## SOCIETY NEWS

---



### From the Editor

---

*by Charles Herget*

We start the new year with a new president of the Society, Alberto Broggi, who will serve a two year term. We have included an interview with Alberto and an article on his research program, VisLab, at the University of Parma.

Ümit Özgüner a member of our Society, was elevated to the grade of Fellow of the IEEE, the highest position in the IEEE. Ümit has been very active in the management of the Society and its predecessor organizations. He served as the first Chair of the Council that preceded the Society, and he was the Vice President for Conference Activities for four years ending on Decem-

ber 31, 2009. A full chronology of the positions he has held in included the announcement.

IEEE has announced the winners of the election to the Board of Governors for three year terms starting the first of this year. We include the results of that election.

You will also find conference announcements, calls for papers and awards, and abstracts of papers in the recent issues of the Society's Transactions and Magazine.



---

## **An Interview with Society President, Alberto Broggi**

*Alberto Broggi*

The President of the Society for 2010-2011 is Alberto Broggi. The Newsletter interviewed President Broggi at the end of his term as President-Elect in 2009. That interview follows.

*Newsletter:* Prof. Broggi, thank you for giving us this interview.

*Broggi:* You're most welcome, and thank you for giving me this opportunity to tell our readers about myself and my plans for the society for the next two years.

*Newsletter:* Tell us a little about how you view the management of the Intelligent Transportation Systems Society and what are your duties as president?

*Broggi:* Well, indeed the President's duties are mainly aimed at keeping the Society healthy and well recognized in the ITS arena. In other words, we'll need to keep working on both the financial and scientific side.

Although ITSS is a fairly small and young society, we have one of the best transportation journals in the world -our IEEE Trans on ITS- and a great magazine -the ITSS Magazine; - our conferences are getting larger, although we have been hit by the crisis as well. So, this is a definitely good start, and we must continue on.

*Newsletter:* Please tell us what you see as the strong points and the weak points in the society and what you would like to accomplish during your term as president.

*Broggi:* I have no doubt: the strong points are our members! The members of the Society constitute the real substance of our value: it's because of our members and supporters that we reached our great professional level in our journals and conferences. It's their (our!) volunteer work that provided the necessary help to run our conferences, attract other people, generate interest in our scientific world.

And it's thanks to our members and supporters that our journal is now one of the preferred outlets for publications.

Regarding the weak points, well, I think they are mainly due to the youth of our Society. We still have to grow and work on consolidating our efforts, define guidelines, shape up our activities; in other words, we need to work on efficiency. When I will conclude my term in 2011, I'd like to leave to my successor a stronger Society, not only from the point of view of number of members, attendance to conferences, and impact factor of our Journals, but also regarding the robustness of procedures managing the whole Society.

*Newsletter:* Tell us about your background and how you became interested in ITS.

*Broggi:* It's a very straightforward story. When I prepared my Master's Thesis, my Department was engaged in a project related to designing hardware for real-time image processing (yes, having been working on ICT for many years I tend to forget I'm an electronic engineer). Anyway, the involvement in this project and some other parallel projects on vehicles triggered the idea to integrate this special purpose real-time image processing engine onboard a vehicle to perceive the surrounding environment.

And this is what I worked on during my PhD. As a matter of fact, I'm still working on this research stream, with different goals and on a different perspective. Nowadays although custom hardware is not mandatory to support our research (as it was back in the early 90's), my research group is still working on both software and hardware since we started a spinoff company named VisLab and would like to commercialize all the ideas and technologies that we developed in the last few years.

*Newsletter:* Please tell us more about your role in VisLab.

*Broggi:* I'm very proud of VisLab, which actually is a single name hiding different efforts. When with my group at the University of Parma prepared our first big challenge (a vehicle that drove 2000+ km in autonomous mode on Italian highways back in 1998), we felt the need for a name of the group: we selected VisLab, a short for Vision Laboratory, since that car was driven by an artificial vision system.

Then our interests broadened and we started working with different technologies and a number of projects involving intelligent systems. We decided not to change the name since VisLab was a very good acronym for Vision and Intelligent Systems Lab. Finally when we started our spinoff company, the name remained unchanged again, but we added a small ".IT" at the end with two meanings: first, that we are based in Italy, but more importantly it is an IT company.

Currently we are about 20 people at VisLab, and growing. Our budget comes almost exclusively from abroad since Italy is a wonderful place for vacationing, but when it comes to research money,... well, it's very difficult.

We are covering projects on the vehicular aspect of ITS, and mainly on intelligent vehicles. We have equipped several prototypes in our history and helped in setting some of the most impor-

tant milestones in the vehicular robotics arena. We were present at the first DARPA Challenge, reach the end of the second one, and successfully qualified for the DARPA Urban Challenge. And we are now preparing a new one, but I will disclose this new effort later on, when the vehicles will be ready.

*Newsletter:* Please tell us about interests outside of ITS and your family. Thank you for giving us some candid photos.

*Broggi:* I'm married to Simona, and have two daughters, Ilaria and Flavia, and although their names differ only for two letters, they're quite dissimilar and keep us busy for most of our free time.

I studied piano for many years, but unfortunately now time is always tight and it's been a long time since I really put some effort in playing some good piano sheets (I barely remember the easiest songs!). But luckily Ilaria, who will be turning eight in a couple of months, is now eager to learn how to move her little hands over the keyboard and I'm now teaching her something.



In the last few years I've been travelling a lot for business and this makes me love staying at home during my free time, relaxing and enjoying the kids. But when the snow calls, we learned to answer! And this is why I gave you our family picture on the snow.

*Newsletter:* Thank you for the interview. I am sure our readers will find it very informative.

---

## Ümit Özgüner Elevated to Grade of Fellow of the IEEE



Ümit Özgüner

IEEE has announced the names of members who have been elevated to the grade of Fellow effective January 1, 2010.

Ümit Özgüner, a member of our Society, was promoted to the grade of Fellow for contributions to the development of intelligent autonomous vehicles. Özgüner is the TRC Inc Chair on ITS in the Department of Electrical and Computer Engineering at The Ohio State University, Columbus, Ohio, USA.

Özgüner completed a long term of service to the Society and its predecessor organizations at the end of 2009.

His contributions are listed below.

**Administrative positions:**

- IEEE Control Society, Rep. on IEEE TAB, ITS Committee, 1995-1997.
- IEEE TAB, ITS Committee Chair, 1998
- IEEE ITS Council, President 1999, 2000 (elected)
- IEEE ITS Society, Member, Board of Governors, 2005-2007 (elected).
- IEEE ITS Society, VP Conferences, 2006-2007 (elected), 2008-2009 (re-elected).

**Conference Organization**

- Program Chair, 1997 IEEE ITS Conference, Boston.
- General Chair, 2002 Conf. On Decision and Control, Las Vegas.
- General Chair, IEEE Intelligent Vehicles Conference, June 2003, Columbus.
- General Chair, IEEE International Conference on Vehicle Electronics and Safety, September 2008, Columbus.

**Plenary Presentations**

- IEEE Intelligent Vehicles Conference, Parma, 2004;
  - IEEE Intelligent Vehicles Conference, Tokyo, 2006
- 

**Board of Governors Election Results**

IEEE has announced the results of the election for the Board of Governors. Those elected to a three year term beginning January 1, 2010, are

Arnaud de La Fortelle, Mines ParisTech Robotics Lab, France  
Katsushi Ikeuchi, Tokyo University, Japan  
Bart van Arem, Delft University of Technology, The Netherlands  
Sergio Velastin, Kingston University, United Kingdom  
Wei-Bin Zhang, California PATH Program, University of California, Berkeley, USA

Their biographical sketches can be found in the October 2009 issue of the Newsletter.

---

## Conferences

---

### ITS Society Sponsored Conferences

Following are the ITS Society sponsored conferences.

#### 2010

June 21-24

Intelligent Vehicles Symposium

La Jolla, California, USA

<http://cvrr.ucsd.edu/iv2010/>

July 15-17

The 6th IEEE/ASME International Conference on

Mechatronic and Embedded Systems and Applications (MESA'10)

<http://www.asmemesa.org>

2010 IEEE International Conference on Vehicular Electronics and Safety (VES'10)

<http://www.ieeeves.org>

2010 IEEE/INFORMS International Conference on Service Operations, Logistics, and Informatics (SOLI'10)

<http://www.ieeesoli.org>

MESA'10, VES'10, and SOLI'10 will be held concurrently in Qingdao, China

September 19-22

The 13th International IEEE Conference on Intelligent Transportation Systems

Madeira Island, Portugal

<http://itsc2010.isr.uc.pt>

#### 2011

June 29 to July 1

IEEE Forum on Integrated and Sustainable Transportation Systems

Vienna, Austria

<http://ieee-fists.org>

Announcements for these conferences appear on the following pages.



# Call for Papers

## 2010 IEEE Intelligent Vehicles Symposium

Sponsored by the IEEE Intelligent Transportation Systems Society

Hosted by the University of California, San Diego

### June 21-24, 2010, La Jolla, CA



**THE INTELLIGENT VEHICLES SYMPOSIUM (IV'10)** is the premier annual forum sponsored by the **IEEE INTELLIGENT TRANSPORTATION SYSTEMS SOCIETY (ITSS)**. Researchers, academicians, practitioners and students from universities, industry, and government agencies are invited to discuss research and applications for Intelligent Vehicles and Intelligent Infrastructures. The technical presentations are characterized by a single session format so that all attendees remain in a single room for multilateral communications in an informal atmosphere, most of the papers will be poster presentations. Papers dealing with all aspects of vehicle-related intelligent systems and cooperation between vehicles and infrastructures are solicited for **IV'10**. This year the symposium will directly follow the IEEE CVPR 2010 conference, held the previous week in San Francisco, CA. A Ph.D. Dissertation Forum will offer advanced Ph.D. students the opportunity to present their research to a panel of distinguished faculty and industry luminaries.

### Program Topics

- Driver Assistance Systems
- Automated Vehicles
- Active and Passive Safety
- Vehicle Environment Perception
- Driver State and Intent Recognition
- Looking-In, Looking-Out Perception
- System Architecture
- Smart Infrastructure
- Impact on Traffic Flows
- Cooperative Vehicle-Highway Systems
- Collision Avoidance
- Pedestrian Protection
- Inter-Vehicle Communications
- Dedicated Short Range Communications
- Assistive Mobility Systems for Disabled
- Intelligent Air and Space Vehicles
- Intelligent Robotic Vehicles
- Image, Radar, Lidar Signal Processing
- Information Fusion
- Vehicle Control
- Telematics
- Communications and Networks
- Human Factors
- Human Machine Interaction
- Novel Interfaces and Displays
- Others

### Important Dates

Paper submission deadline	<b>Jan. 15, 2010</b>
Notification of acceptance	<b>Mar. 30, 2010</b>
Workshop proposal deadline	<b>Feb. 1, 2010</b>
Demo/Exhibit proposal deadline	<b>Mar. 15, 2010</b>
Ph.D. Dissertation Forum submissions	<b>Apr. 15, 2010</b>

### Further Information

Further information can be found on our website, [cvrr.ucsd.edu/iv2010](http://cvrr.ucsd.edu/iv2010). If you want to organize a special session, workshop or demonstration you can contact the organization committee at [ieeiv2010@gmail.com](mailto:ieeiv2010@gmail.com).

#### General Chair

Professor Mohan M. Trivedi  
University of California, San Diego  
[mtrivedi@ucsd.edu](mailto:mtrivedi@ucsd.edu)

#### Program Chair

Professor Daniel J. Dailey  
University of Washington  
[dan@its.washington.edu](mailto:dan@its.washington.edu)



# Call For Papers



IEEE Intelligent Transportation Systems Society Sponsored Conferences  
Qingdao Shangri-La Hotel, China, July 15-17 2010  
Please visit conference website for details and potential changes

**2010 IEEE/ASME International Conference on  
Mechatronic and Embedded Systems and Applications (MESA'10)**  
<http://www.asmemesa.org>

**2010 IEEE/INFORMS International Conference on  
Service Operations, Logistics, and Informatics (SOLI'10)**  
<http://www.ieeesoli.org>

**2010 IEEE International Conference on  
Vehicular Electronics and Safety (VES'10)**  
<http://www.ieeeves.org>

Paper submission deadline: February 12, 2010  
Notification of acceptance: April 18, 2010  
Camera-ready copy Due: May 16, 2010

## Welcome to Qingdao!

The One of the Most Beautiful Coast Tourist Attractions of China  
The Home of the Famous Tsingdao Beer and Chinese International Beer Festival



Qingdao Websites: <http://english.qingdao.gov.cn/n2043295/index.html>, <http://www.qdta.cn/>, <http://www.qd.sd.cn/>



# Call for Papers



## The 6<sup>th</sup> IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications (MESA10) Qingdao, China, July 15-17, 2010 <http://www.asmemesa.org>

### Advisory Committee

Jorge Angeles, McGill University, Canada  
 David M. Auslander, Univ. of California, Berkeley, USA  
 Tianyou Chai, Northeast University, China  
 Ru-Wei Dai, Chinese Academy of Sciences, China  
 Krishna C. Gupta, Univ. of Illinois at Chicago, USA  
 C.S. George Lee, National Science Foundation, USA  
 Ren C. Luo, National Chung Cheng University, Taiwan  
 Bahram Ravani, Univ. of California, Davis, USA  
 Bruno Siciliano, Università di Napoli Federico II, Italy  
 Jianrong Tan, Zhejiang University, China  
 T. J. Tarn, Washington University, USA  
 Masayoshi Tomizuka, U. of California, Berkeley, USA  
 Feiyue Wang, U.Arizona & Chinese Academy of Sciences, USA  
 Youlun Xiong, Huazhong U. of Sci and Tech, China

### Steering Committee Chair

Harry H. Cheng, Univ. of California, Davis, USA

### General Chair

YangQuan Chen, Utah State University, USA

### General Co-Chairs

Dongming Guo, Dalian U. of Technology, China  
 Tianmiao Wang, Beihang University, China

### Program Chair

Primo Zingaretti, Polytechnic Univ. of Marche, Italy

### Chair of the Honors and Awards Committee

Zuomin Dong, University of Victoria, Canada

### Finance Chair

Yanqing Gao, University of Arizona, USA

### Publicity Chairs

Huayong Yang, Zhejiang University, China  
 Li Zheng, Tsinghua University, China

### Publication Chair

Guanpi Lai, University of Arizona, USA

### Local Organizing Chair

Nan Zhang, Chinese Academy of Sciences, China

### Executive Secretariat Contact E-Mail

leeemesa2010@gmail.com

### International Program Committee

<http://www.asmemesa.org>

### Objectives

Mechanical and electrical systems show an increasing integration of mechanics with electronics and information processing. This integration is between the components (hardware) and the information-driven functions (software), resulting in integrated systems called mechatronic systems. The development of mechatronic systems involves finding an optimal balance between the basic mechanical structure, sensor and actuators, automatic digital information processing and control in which embedded systems play a key role. The field of embedded system and mechatronics is becoming evermore challenging; issues in embedded software lie at the focus of researchers both in industry and academia. The goal of this 6<sup>th</sup> IEEE/ASME MESA, MESA10, is to bring together experts from the fields of mechatronic and embedded systems, disseminate the recent advances made in the area, discuss future research directions, and exchange application experience. The conference program is organized in a number of symposia.

### Symposia and Symposium Chairs

#### Autonomous Systems and Ambient Intelligence

Hyo-Sung Ahn, Gwangju Institute of Science and Technology, Korea

#### Autonomic and Distributed Mechatronic and Embedded Systems

Yu-Cheng Chou, University of California at Davis, USA

#### Bio-Mechatronics and Bio-sensors

Shane Xie, University of Auckland, New Zealand

#### Cyber-Physical Systems and Cooperative Systems

Stephen Nestinger, Worcester Polytechnic Institute, USA

#### Development, Verification, Debug Tools for Mechatronic and Embedded Systems

Jia Xu, York University, Canada

#### Embedded Computer Vision

Peter Rössler, UAS Technikum Wien, Austria

#### Embedded System Infrastructure and Theory

Martin Horauer, UAS Technikum Wien, Austria

#### Diagnosis and Monitoring in Mechatronic Systems

Wen Chen, Wayne State University, USA

#### Mechatronic and Embedded System Applications

Emanuele Frontoni, Polytechnic Univ. of Marche, Italy

#### Mechatronic and Embedded Systems in Education

Zhaoqing Wang, Zhejiang Sci-Tech University, China

#### Mechatronic and Embedded Systems for Renewable Energy Systems

Uriel A. Rosa, University of California, Davis

#### Mechatronic Control and Electrical Vehicular Systems

Chengbin Ma, UM-SJTU J.Inst., Shanghai Jiaotong U.

#### Robotics and Mobile Machines

Xianwen Kong, Heriot-Watt University, UK

#### Sensors and MEMS

Ja Choon Koo, Sungkyunkwan University, Korea

#### Sensor Networks and Networked Embedded Systems

Bo Chen, Michigan Technological University, USA

#### Small Unmanned Aerial Vehicle Technologies and Applications

YangQuan Chen, Utah State University, USA

### Sponsor

IEEE Intelligent Transportation Systems Society

### Technical Co-sponsors

ASME Division of Design Engineering

IEEE Control System Society

Chinese Academy of Sciences

Chinese Association for Automation

Chinese Mechanical Engineering Society

National Natural Science Foundation of China

### Paper Submission

Complete manuscripts in PDF format must be electronically submitted to the conference website <http://www.asmemesa.org>. Submitted manuscripts should be six (6) pages or less in IEEE two-column format, including figures, tables, and references. Please use the [LaTeX style file](#) or [Microsoft Word template](#) available from the conference website to prepare your manuscript.

### Important Dates

**February 12, 2010** Full paper, proposal for special session, workshop and tutorial

**April 18, 2010** Notification of acceptance

**May 16, 2010** Camera ready paper submission

# IEEE ITSC 2010



## 13<sup>th</sup> International IEEE Conference on Intelligent Transportation Systems Madeira Island, Portugal, 19 – 22 September 2010 On the Way to Intelligent Sustainable Mobility

### Conference committee

#### General Chair:

Urbano Nunes  
University of Coimbra, Portugal

#### Conference Vice-Chair:

A. T. de Almeida  
University of Coimbra, Portugal

#### Conference Vice-Chair:

Paulo Peixoto  
University of Coimbra, Portugal

#### Program Chair:

Yibing Wang  
Monash University, Australia

#### Publications Chair:

Steve Watkins  
Missouri University of Science and  
Technology, U.S.A.

#### Tutorial/Workshops Chair:

Jorge Lobo  
University of Coimbra, Portugal



UNIVERSIDADE DE COIMBRA



The IEEE Intelligent Transportation Systems Society (ITSS) is sponsoring its 13<sup>th</sup> international conference on basic research and applications of leading advances in communications, computer, control, and electronics technologies related to Intelligent Transportation Systems (ITS).

### CALL FOR PAPERS Program topics

#### Travel and traffic management

- Travel information and route guidance
- Ride matching and reservation
- Traveler services information
- Traffic control
- Incident management
- Travel demand management
- Emissions testing and mitigation
- Highway-rail intersection

#### Emergency management and transportation security

- Emergency notification and personal security
- Emergency vehicle management
- ITS and national security
- Parallel management
- Systems for transportation emergency

#### Commercial vehicle operations

- Commercial vehicle electronic clearance
- Automated roadside safety inspection
- On-board safety monitoring
- Commercial vehicle administrative processes
- Hazardous material incident response
- Commercial fleet management

#### ITS modeling and analysis

- Data mining and analysis
- Travel behavior under ITS
- Simulation and modeling
- Traffic theory for ITS
- Statistical modeling
- Optimization and control: theory and modeling
- Geographic information systems
- Hardware in the loop simulation
- Artificial transportation systems

#### Other topics

- Intelligent infrastructure
- Agent-based methods
- Electronic payment services

#### Paper submission

Complete manuscripts in PDF format must be electronically submitted for peer-review in IEEE standard-format. Detailed submission instructions can be found through conference website at <http://itsc2010.isr.uc.pt>.

**Manuscript submission deadline: 15 March 2010**

#### Public transportation management

- Public transportation management
- En-route transit information
- Personalized public transit
- Public travel security

#### Intelligent vehicles

- Aerial, marine and surface intelligent vehicles
- Environment perception
- Lane detection and lane keeping
- Pedestrian and vehicle detection
- Real-time perception and sensor fusion
- Multi-autonomous vehicle studies, models, techniques and simulations
- HMI and Human-machine interaction
- Cooperative techniques
- Collision prediction and avoidance
- Advanced vehicle safety systems
- Driver assistance systems
- Real-time motion planning in dynamic environments.
- Sensor fusion for accurate global positioning
- Lidar, vision and radar sensing
- Vehicle localization and autonomous navigation
- Automated vehicle operation

#### Electric vehicle technologies

- Electric motors drives and propulsion technologies
- Energy efficiency optimization
- Special purpose vehicles for aged and handicapped people
- Passenger cars and public transport
- Battery management systems
- Advanced energy storage and control systems
- Hybrid plug-in systems
- Infrastructure for charging, communication and controls
- Vehicle-to-grid (V2G) and smart grids



# FISTS 2011

Forum on Integrated and Sustainable Transportation Systems



## IEEE Forum on Integrated and Sustainable Transportation Systems (FISTS)

Vienna, 29 June to 1 July 2011

### OVERVIEW

Experience the first IEEE FISTS Forum - an international event addressing the latest development in traffic and transport

[www.ieee-fists.org](http://www.ieee-fists.org)

Organiser



Host



Supported by



Oceanic Engineering Society



## First Forum on Integrated and Sustainable Transportation Systems 2011 in Vienna

In the industrialised countries – even actually in a downturn – the vast majority of experts expect a growth in economy and mobility beyond the level of 2008 after recovery by 50% for passenger vehicles and 100% by cargo by 2020 (European White Book on Transport – mid term review 2006). With this prognosis we will experience lack on transport infrastructure capacity specifically within and around dens populated areas. (85% of the European population will live in cities by that time).

- Which measures can be taken to support the prosperous economic development of these countries ensuring the necessary growth of mobility?
- By which technologies can this demand be provided?
- How can technology respond to this demand?
- Will technology be available early enough?

The increasing demand for transportation will have a significant impact on the environment unless methods for keeping the impact within acceptable limits can be found. Which technologies, knowledge and expertise can support politicians and people to achieve the ambitious plans for sustainable mobility without negative impact to the prosperous development of their economies and the environment?

### Goals of the forum:

FISTS is aiming to address these issues primarily from the technological point of view keeping economic, environmental and human aspects into consideration. It will also encourage the discussion between politics, industry, academics with focus to technology.

### Focus of the forum:

- Stakeholders and key problems in the transportation systems
- Policy and user perspective
- Operation and technology
- Necessary framework to get most benefit of technology implementation for the society
- Outlook till 2050

### Committee Chairs:

General Chair: Charles Herget  
Co-chair, Europe: Reinhard Pfliegl  
Co-chair, North America: Wei-Bin Zhang

Program Chair: Matthew Barth  
Finance Chair: Daniel Dailey

### Time line:

Feb. 2010	Call for papers
Sept. 2010	Deadline for submission for papers
Dec. 2010	Final Program
June 2011	Conference

### Contact:

For further information, please visit our website

[www.ieee-fists.org](http://www.ieee-fists.org)



## Conference Calendar

---



*Massimo Bertozzi / Paolo Grisleri*

This section lists upcoming ITS-related conferences, workshops, or exhibits.  
Contributions are welcome; please send announcements to [itsconfs@ce.unipr.it](mailto:itsconfs@ce.unipr.it).

### 2010

March 23-24, 2010

WIT 2010: 7th International Workshop on Intelligent Transportation

Hamburg, Germany

Submission due by: November 16th, 2009

<http://wit.tu-harburg.de/>

April 4-7, 2010

3rd International Conference on Transport Science and Technology Conference

New Delhi, India

Submission due by: December 31, 2009

<http://www.ewebevolution.com/transtec/>

April 12-15, 2010

SAE 2010 World Congress

Detroit, Michigan, USA

<http://www.sae.org/congress>

May 3-8, 2010

IEEE International Conference on Robotics and Automation

Anchorage, Alaska, USA

<http://icra2010.grasp.upenn.edu>

May 16-19, 2010

IEEE 71st Vehicular Technology Conference: VTC2010-Spring

Taipei, Taiwan

<http://www.ieeevtc.org/vtc2010spring/>

Submission due by: 15 October 2009

May 17-21, 2010

VISAPP-2010 Conference

Angers, France

<http://visapp.visigrapp.org/>

Submission due by: November 22, 2009

June 13-18, 2010

Computer Vision and Pattern Recognition: CVPR 2010

Hyatt Regency, San Francisco, California

<http://cvl.umiacs.umd.edu/conferences/cvpr2010/>

Submission due by: November 19, 2009

July 4-7, 2010

ISIE 2010 - IEEE International Symposium on Industrial Electronics

Bari, Italy

<http://www.isie2010.it/>

Submission due by: October 16, 2009

August 1-4, 2010

National Rural ITS Conference

Seaside, OR, USA

<http://www.nritsconference.org>

Submission due by: February 1, 2010

September 6-8, 2010

7th Symposium on Intelligent Autonomous Vehicles

Lecce, Italy

<http://iav2010.unile.it/>

Submission due by: December 14, 2009

September 8-10, 2010

2010 IEEE Multi-Conference on Systems and Control

Yokohama, a port city on Tokyo Bay, Japan

<http://www.mei.titech.ac.jp/msc10/>

Submission due by: October 15, 2009

October 25-29, 2010

17th World Congress on ITS

Busan, South Korea

<http://www.itsworldcongress.kr>

Submission due by: January 2010

---

## Announcements

---



### Call for Papers



## IEEE Intelligent Transportation Systems Magazine

### Special Issue on Microscopic and Macroscopic ITS Traffic Simulators

**Guest Editor: Jeffrey Miller**

Transportation projects can be quite expensive to design and implement, and ITS projects are no different. Before an organization will spend potentially hundreds of thousands of dollars on a project, they want to know what the result will be. Simulators are used to verify or determine these results.

There are many simulators on the market with many differences, including macroscopic vs. microscopic, free vs. paid, real-time data vs. offline data, open-source vs. closed-source, simulator vs. emulator, different driver algorithms implemented, ITS architectures supported, verification algorithms used, additional functionality, etc. So when an organization wants to test their project and verify expected results before implementing it, which simulator should they use? This issue of the ITS Magazine will be focused on comparing different simulators and providing an overview of the features implemented in them.

Topics addressed may include but are not limited to the following:

- Simulator overview
- Comparison of simulators
- Existing simulator success stories
- Emerging simulators with description of features
- ITS application support in simulators
- Other topics relevant to discussions of simulators

#### **Submission Procedure:**

Authors should prepare manuscripts according to the Information for authors available at <http://www.ewh.ieee.org/tc/its/trans.html> and email a PDF version of their papers to [jmiller@uaa.alaska.edu](mailto:jmiller@uaa.alaska.edu).

#### **Schedule**

<b>Paper submission</b>	<b>May 15, 2010</b>
<b>Review completed, Notification of acceptance</b>	<b>August 1, 2010</b>
<b>Final manuscript submission</b>	<b>September 1, 2010</b>

# Call for Proposals

## IEEE ITSS Best Ph.D. Dissertation Award

### **Purpose and Selection Criteria**

The prestigious IEEE ITSS Best Ph.D. Dissertation Award is given annually for the best dissertation in any ITS area that is innovative and relevant to practice. This award is established to encourage doctoral research that combines theory and practice, makes in-depth technical contributions, or is interdisciplinary in nature, having the potential to contribute to the ITSS and broaden the ITS topic areas from either the methodological or application perspectives.

### **Application material**

Each application must consist of the following material:

1. A doctoral dissertation written by the applicant in any language no more than 18 months prior to the submission deadline and not previously submitted.
2. A summary of the dissertation in English of up to 3 pages in length written by the Ph.D. candidate highlighting the significance of the problem, the technical approach taken, application context and potential, and the scope of the dissertation.
3. A self-contained paper in English based on the dissertation written primarily by the Ph.D. candidate following the regular requirements of scientific journals such as the Transactions on ITS or the ITS Magazine.
4. A letter of recommendation from the applicant's dissertation advisor that comments on the significance of the research, attests to the originality of the work, and comments on the engagement of the student in the field of ITS and the ITSS.

## IEEE ITSS Best Practice Award for Engineers

### **Purpose and Selection Criteria**

The IEEE ITSS Best Practice Award for ITS Engineers is given annually for ITS engineers and teams who have developed and deployed successful ITS systems or implementations. This award is established to recognize, promote, and publicize major application innovations with real-world impact.

### **Application material**

Each application must consist of the following material:

1. A 5-page summary of the ITS application providing sufficient detail for evaluation of the novelty and impact of the work
2. At most 3 letters of recommendation from the customers or users of the developed application attesting to its significance and practical impact

### **Application and Selection Process for either Award**

Please upload the application packet in pdf-format until **May 1, 2010** to the following internet address:

<http://www.mrt.uni-karlsruhe.de/itssAward>

Applications by email are not accepted.

Dedicated selection committees will evaluate the applications for the IEEE ITSS Awards and propose candidates for final approval by the ITSS Board of Governors. The first prize winners will receive awards of USD 1000 each. The second prize winner of the *Best Ph.D. Dissertation Award* will receive USD 500. Award certificates will be given out at the ITSC 2010 conference in Madeira, Portugal, where the recipients will be asked to give a brief presentation of their work.

---

## Research Programs

---

### VisLab's Footprint in Intelligent Vehicles Technology

The Artificial Vision and Intelligent Systems Laboratory (VisLab) of Parma University (Italy) is a research laboratory involved in basic and applied research developing machine vision algorithms and intelligent systems for the automotive field.



Figure 1. VisLab location.

It undertakes research in many disciplines like machine vision, pattern recognition, low-level image processing, machine learning, artificial intelligence, robotics, and real-time systems, but the main focus of the laboratory is to apply basic and advanced

research to intelligent transportation systems and intelligent vehicles.

The laboratory know-how is world renown and was mainly developed together with automotive companies for active/passive safety systems, Advanced Driver Assistance Systems, perception of the automotive environment, up to completely automatic vehicle driving. Some examples are: lane detection, vehicle detection, pedestrian detection, obstacle localization, sensor fusion with radar and laser scanner, night vision, start inhibit. The know-how includes: monocular, stereo, trinocular, up to tetra-vision systems, using daylight, Near Infrared, Far Infrared cameras; analog and digital cameras.

#### Group Profile

After being for many years one of the key laboratories worldwide providing top-notch theoretical and applied research on Intelligent Vehicles, in 2008 the University of Parma started a spin-off company named VisLab.

VisLab is specialized in vehicular applications involving both environmental perception and intelligent control, and offers its expertise in the field of perception for vehicular robotics. Thanks to its tight cooperation with top level companies in Europe, America, and Asia, VisLab has developed its own vision on products for the automotive market and offers a wide variety of perception and safety systems.



Figure 2. The VisLab staff.

Thanks to the presence of Faculty members and PhDs, VisLab researchers also provide training and education.

## **The Research Group**

The VisLab research team is composed by faculty members of the University of Parma, post docs and researchers, all deeply committed to bringing artificial vision technologies to the robotics world. More specifically, VisLab is not just involved in “image processing”, but in “image processing for vehicular applications”. Thanks to an excellent and highly motivated team work, VisLab is providing research to many projects involving partners from all over the world. Currently, VisLab is composed of 20 people, all with engineering background.

## **Expertise**

One of the most distinctive features that explains VisLab’s continuous and proactive presence in projects with car manufacturers, automotive suppliers, and vehicle-based companies is the very specific experience developed throughout the years.

The many projects brought VisLab’s researchers in close contact with applications for which innovative techniques had to be developed and different technologies had to be mastered. Monocular, stereoscopic, and even 4-camera systems were developed in Daylight, Near, and Far Infrared domains, while sensor fusion with laser-scanners, radars, and other vehicle data are now part of VisLab’s expertise.

The application of vision systems on board of vehicles not only requires to fully dominate the latest vision technologies, but also to have a deep knowledge of the key issues of this environment, such as calibration, illumination, noise, temperature, power consumption, low costs, low size, endurance specifications as well as style constraints. Besides its renowned expertise, the key to VisLab’s quick application prototyping is the proprietary software that has been developed in the last 10+ years and that constitutes the basis of each application developed by VisLab. VisLab was one of the first laboratories to invest on vision technologies on board of vehicles, and its efforts are still contributing to shape the history of vehicular robotics.

## **The Research**

VisLab’s mission is to provide supervisory and fully autonomous systems to help vehicles reach a higher degree of safety. VisLab’s interest started with road, off-road, and all-terrain vehicles, but has recently extended to cover maritime and aerial applications as well. VisLab’s ultimate goal is to provide vehicles with a sufficiently complete and sharp perception to allow them to move autonomously in any environment.

## **Main Research Streams**

The main research themes that VisLab has been working on in the last decade are connected to perception on board of vehicles. Both sensing technologies (using artificial vision and other complementary sensors) and processing techniques have been the focus of VisLab’s efforts

since its constitution. The most important achievements, some of which are regarded as world-wide milestones, cover the following applications:

**Advanced Driving Assistance Systems:** perception systems able to understand the surrounding environment and assess the danger level; in unsafe situations, such systems either warn the driver or take control of the vehicle bringing it back to safety conditions. **Automatic Driving Systems:** perception systems that, besides understanding the surrounding environment, are able to model the 3D world and provide enough information to a following processing module that can safely drive the vehicle with no human intervention.

### Other Applications

VisLab is also active in other fields where the application of visual perception plays a basic role, such as video surveillance and industrial inspection.

### Selected VisLab Prototypes

During its history, VisLab developed a number of prototypes of vehicles. The development ranged from active vehicles, namely vehicles able to warn the driver and take control of the vehicle for a limited time, to fully autonomous prototypes, namely vehicles able to drive without any human control or input. In addition, VisLab also equipped passive vehicles for data acquisition and/or driving monitoring without any output on driving or towards the driver. In the following, some selected prototypes that made VisLab history are described.



**MoBLab:** in 1994 VisLab participated in the final meeting of the PROMETHEUS Project (the first and largest European Project devoted to increasing road safety) with a vehicle (MobLab, Mobile Laboratory) jointly developed by many Italian research centers. Real-time lane detection with a special-purpose computer architecture (SIMD, with 256 single-bit processors) and monocular camera was demonstrated on the MobLab.

**ARGO:** in 1998 the VisLab research team demonstrated and tested their own automatic vehicle (the ARGO vehicle) through a 2000+ km trip on Italian highways. During that test, which lasted one week, ARGO drove itself for 94% of the whole route using two mini b/w cameras and a Pentium 200MHz (devoted to image acquisition, processing, trajectory planning, driving actuators, and data recording). Not bad for being 1998! Part of the code was written in Assembly language to boost performance. This was one of the first experiments worldwide, which launched VisLab Laboratory as one of the most advanced in the world in 2001.



**RAS:** in 2001, VisLab participated in the Italian Scientific missions to Antarctica (South Pole) and contributed with an automatic snowcat, able to perceive the environment thanks to a pair of stereo cameras. VisLab gave the snowcat the capability to locate the track left by previous vehicles on ice to implement a leader-follower functionality in icy Antarctica environments.





**VTruck:** this VOLVO truck has been equipped within the APALACI Project (a PREVENT Integrated Project funded by the EC) in 2005 and thoroughly tested throughout 2006. The stereo system developed by VisLab allows the vehicle to perceive the presence of obstacles (mainly pedestrians) in the close proximity of the vehicle and inhibits taking off when a pedestrian is walking in front of the vehicle (start inhibit).

**VWCars:** 2 different vehicles (a Touareg and a Passat) have been equipped by Volkswagen AG (Wolfsburg, Germany) and given to VisLab for developing pedestrian detection systems for VW (2001-2005). The Touareg used FIR and NIR cameras, together with radars, to perceive pedestrians in front of the vehicle.



**TerraMax:** this vehicle, equipped with a vision system developed by VisLab, represents a milestone in robotics and autonomous driving. It safely concluded the 2005 DARPA Grand Challenge: it left on October 8, 2005, at about 9.00 am and safely reached the finish line on October 9, 2005, at about noon, after more than 220 km driven in full autonomy and more than 32 hours of continuous operation. It spent the night out in the desert, alone, and with all its sensors and engine up and running.

**TerraMax T2:** A completely re-mastered version of TerraMax entered the DARPA Urban Challenge in 2007. TerraMax T2 was one of the 11 vehicles to pass the qualifications entering the final phase of the Urban Challenge. This vehicle perceives the 3D world thanks to 11 cameras that provide all-round vision for urban environment.



**Grandeur:** that vehicle is used to test innovative approaches to pedestrian detection in urban areas (2008). Pedestrians are detected by means of data fusion between a laser scanner and a stereo vision system; the result is used to automatically brake the vehicle for obstacle avoidance or collision mitigation. It is a joint development between VisLab and Mando (South Korea).

**BRAiVE:** it is the latest (2009) VisLab prototype and has been equipped with the summa of VisLab technologies to be a laboratory vehicle to test innovative concepts and design new ADAS systems and to serve, at the same time, as fully equipped demo vehicle. It features 10 cameras, 3 single plane laser-scanners, one 4-planes laser scanner, 16 laser beams, GPS and IMU; moreover, thanks to MANDO Corp. technicians, it has been equipped with an x-by-wire driving system. As demo vehicle and for HMI development, it has also been equipped with 4 different monitors, OLED buttons, touchpads, different plugs (USB, firewire, Ethernet, and power supply), and other input devices. BRAiVE development has been possible thanks to a European Research Council (ERC) advanced grant and the sponsorships of Cariparma Foundation and MANDO corps.



---

# IEEE Transactions on ITS Abstracts

---

## Abstracts of Papers

IEEE Transactions on Intelligent Transportation Systems  
Volume 10, No. 4, December 2009

Fei-Yue Wang; Broggi, A.; White, C.C., "Road to Transactions on Intelligent Transportation Systems: A Decade's Success," pp.553-556.

Abstract: The paper discusses the journal efforts on intelligent transport systems. 2009 marks the end of the first decade of our IEEE Transactions on Intelligent Transportation Systems (T-ITS). Over the past ten years, we have experienced various ups and downs, but we survived, and now, we thrive. In this last issue of the passing decade, the Founding, Past, and Current Editors in Chief would like to join everyone in celebrating the tenth anniversary of this great journal. We would like to take this opportunity to share some ideas and reflections on the past, present, and future of this publication.

\*\*\*

De Schutter, B.; Shladover, S. E., "Introduction to the Special Section on IV'08," pp.557-559.

Abstract: The 13 papers in this special section were originally presented at the 2008 IEEE Intelligent Vehicles Symposium (IV'08) held in Eindhoven, The Netherlands, on June 4-6, 2008.

\*\*\*

Barth, A.; Franke, U., "Estimating the Driving State of Oncoming Vehicles From a Moving Platform Using Stereo Vision," pp.560-571.

Abstract: A new image-based approach for fast and robust vehicle tracking from a moving platform is presented. Position, orientation, and full motion state, including velocity, acceleration, and yaw rate of a detected vehicle, are estimated from a tracked rigid 3-D point cloud. This point cloud represents a 3-D object model and is computed by analyzing image sequences in both space and time, i.e., by fusion of stereo vision and tracked image features. Starting from an automated initial vehicle hypothesis, tracking is performed by means of an extended Kalman filter. The filter combines the knowledge about the movement of the rigid point cloud's points in the world with the dynamic model of a vehicle. Radar information is used to improve the image-based object detection at far distances. The proposed system is applied to predict the driving path of other traffic participants and currently runs at 25 Hz (640 times 480 images) on our demonstrator vehicle.

\*\*\*

Wedel, A.; Badino, H.; Rabe, C.; Loose, H.; Franke, U.; Cremers, D., "B-Spline Modeling of Road Surfaces With an Application to Free-Space Estimation," pp.572-583.

Abstract: We propose a general technique for modeling the visible road surface in front of a vehicle. The common assumption of a planar road surface is often violated in reality. A workaround proposed in the literature is the use of a piecewise linear or quadratic function to approximate the road surface. Our approach is based on representing the road surface as a general parametric B-spline curve. The surface parameters are tracked over time using a Kalman filter. The surface parameters are estimated from stereo measurements in the free space. To this end, we adopt a recently proposed road-obstacle segmentation algorithm to include disparity measurements and the B-spline road-surface representation. Experimental results in planar and undulating terrain verify the increase in free-space availability and accuracy using a flexible B-spline for road-surface modeling.

\*\*\*

Pietzsch, S.; Trung Dung Vu; Bulet, J.; Aycard, O.; Hackbarth, T.; Appenrodt, N.; Dickmann, J.; Radig, B., "Results of a Precrash Application Based on Laser Scanner and Short-Range Radars," pp.584-593.

Abstract: In this paper, we present a vehicle safety application based on data gathered by a laser scanner and two short-range radars that recognize unavoidable collisions with stationary objects before they take place to trigger restraint systems. Two different software modules that perform the processing of raw data and deliver a description of the vehicle's environment are compared. A comprehensive experimental evaluation based on relevant crash and noncrash scenarios is presented.

\*\*\*

Broggi, A.; Cerri, P.; Ghidoni, S.; Grisleri, P.; Ho Gi Jung, "A New Approach to Urban Pedestrian Detection for Automatic Braking," pp.594-605.

Abstract: This paper presents an application of a pedestrian-detection system aimed at localizing potentially dangerous situations under specific urban scenarios. The approach used in this paper differs from those implemented in traditional pedestrian-detection systems, which are designed to localize all pedestrians in the area in front of the vehicle. Conversely, this approach searches for pedestrians in critical areas only. The environment is reconstructed with a standard laser scanner, whereas the following check for the presence of pedestrians is performed due to the fusion with a vision system. The great advantages of such an approach are that pedestrian recognition is performed on limited image areas, therefore boosting its timewise performance, and no assessment on the danger level is finally required before providing the result to either the driver or an onboard computer for automatic maneuvers. A further advantage is the drastic reduction of false alarms, making this system robust enough to control nonreversible safety systems.

\*\*\*

Shunguang Wu; Decker, S.; Peng Chang; Camus, T.; Eledath, J., "Collision Sensing by Stereo Vision and Radar Sensor Fusion," pp.606-614.

Abstract: To take advantage of both stereo cameras and radar, this paper proposes a fusion approach to accurately estimate the location, size, pose, and motion information of a threat vehicle with respect to a host one from observations that are obtained by both sensors. To do that, we first fit the contour of a threat vehicle from stereo depth information and find the closest point on the contour from the vision sensor. Then, the fused closest point is obtained by fusing radar observations and the vision closest point. Next, by translating the fitted contour to the fused closest point, the fused contour is obtained. Finally, the fused contour is tracked by using rigid body constraints to estimate the location, size, pose, and motion of the threat vehicle. Experimental results from both synthetic data and real-world road test data demonstrate the success of the proposed algorithm.

\*\*\*

Yongchang Ma; Chowdhury, M.; Sadek, A.; Jaihani, M., "Real-Time Highway Traffic Condition Assessment Framework Using Vehicle-Infrastructure Integration (VII) With Artificial Intelligence (AI)," pp.615-627.

Abstract: This paper presents a framework for real-time highway traffic condition assessment using vehicle kinetic information, which is likely to be made available from vehicle-infrastructure integration (VII) systems, in which vehicle and infrastructure agents communicate to improve mobility and safety. In the proposed VII framework, the vehicle onboard equipment and roadside units (RSUs) collaboratively work, supported by an artificial intelligence (AI) paradigm, to determine the occurrence and characteristics of an incident. Two AI paradigms are examined: 1) support vector machines (SVMs) and 2) artificial neural networks (ANNs). Each RSU then assesses the traffic condition based on the information from multiple vehicles traveling on its supervised highway segment. As a case study, this paper developed a model of the VII-SVM framework and evaluated its performance in a microscopic traffic simulation environment for a highway network in Spartanburg, SC. The performance of the VII-SVM was

compared with the performance of the corresponding VII-ANN framework, and both frameworks were found to be capable of classifying the travel experience using the kinetic data generated by each vehicle. The performance of the VII-SVM framework, in terms of its detection rate, false-alarm rate, and detection times, was also found to be superior to a baseline California-type incident-detection algorithm. Moreover, the framework provided additional information, including an estimate of the incident location and the likely number of lanes blocked, which will be helpful for implementing an appropriate response strategy. The proposed VII-AI framework thus provides a reliable alternative to traditional traffic sensors in assessing traffic conditions.

\*\*\*

Veeraraghavan, H.; Papanikolopoulos, N.P., "Learning to Recognize Video-Based Spatiotemporal Events," pp.628-638.

Abstract: A key research issue in activity recognition in real-world applications, such as in intelligent transportation systems (ITS), is to automatically learn robust models of activities that require minimal human training. In this paper, we contribute a novel approach for learning sequenced spatiotemporal activities in outdoor traffic intersections. Concretely, by representing the activities as sequences of actions, we contribute a semisupervised learning algorithm that learns activities as complete stochastic context-free grammars (SCFGs), namely, the grammar structure and the parameters. Our approach has been implemented and tested on real-world scenes, and we present experimental results of the grammar learning and activity recognition applied to data collection and traffic monitoring applications using video data.

\*\*\*

Viikari, V.V.; Varpula, T.; Kantanen, M., "Road-Condition Recognition Using 24-GHz Automotive Radar," pp.639-648.

Abstract: This paper studies 24-GHz automotive radar technology for detecting low-friction spots caused by water, ice, or snow on asphalt. The backscattering properties of asphalt in different conditions are studied in both laboratory and field experiments. In addition, the effect of water on the backscattering properties of asphalt is studied with a surface scattering model. The results suggest that low-friction spots could be detected with a radar by comparing backscattered signals at different polarizations. The requirements for the radar are considered, and a 24-GHz radar for road-condition recognition is found to be feasible.

\*\*\*

Tampere, C.M.J.; Hoogendoorn, S.P.; van Arem, B., "Continuous Traffic Flow Modeling of Driver Support Systems in Multiclass Traffic With Intervehicle Communication and Drivers in the Loop," pp.649-657.

Abstract: This paper presents a continuous traffic-flow model for the explorative analysis of advanced driver-assistance systems (ADASs). Such systems use technology (sensors and intervehicle communication) to support the task of the driver, who retains full control over the vehicle. Based on a review of different traffic-flow modeling approaches and their suitability for exploring traffic-flow patterns in the presence of ADASs, kinetic traffic-flow models are selected because of their good representation on both the aggregate level (congestion dynamics) and the level of the individual vehicle (vehicular interactions either directly or through intervehicle communication). The human-kinetic modeling approach is presented. It is a multiclass variant of kinetic traffic-flow models that is strongly based on individual driver behavior, i.e., on fully continuous acceleration/deceleration behavior and explicit modeling of the activation level of the driver. The strength of this modeling approach is illustrated by application to a driver-assistance system that uses intervehicle communication. It warns drivers when approaching sharp decelerations in a queue tail. The explorative analysis shows that the system results in safer and smoother transition from free-flowing to congested traffic. It also avoids compression of the queue tail, thus preventing the emergence of stop-and-go congestion patterns.

\*\*\*

Braun, M.; Winter, S., "Ad Hoc Solution of the Multicommodity-Flow-Over-Time Problem," pp.658-667.

Abstract: Ad hoc shared-ride systems built upon intelligent-transportation-system (ITS) technology represent a promising scenario for investigating the multicommodity-flow-over-time problem. This type of problem is known to be strongly NP-hard. Furthermore, capacity assignment in this shared-ride system is a problem to be solved in highly dynamic transportation and communication networks. So far, the known heuristics to this problem are centralized and require global knowledge about the environment. This paper develops a decentralized ad hoc capacity-assignment approach. Based on a spatial decomposition of the global optimization problem, the solution provides effective agent decisions using only local knowledge. The effectiveness is assessed by the trip quality for ride clients and by the required communication effort.

\*\*\*

Ghazel, M., "Using Stochastic Petri Nets for Level-Crossing Collision Risk Assessment," pp.668-677.

Abstract: Level crossings (LCs) are identified as critical security points in both road and rail infrastructures. Statistics show that more than 300 people are killed every year in Europe in more than 1200 accidents occurring at LCs. In this paper, we first propose a global model involving both rail and road traffic in the LC area. This model is obtained by a progressive integration of elementary models that we developed, each of which describes the behavior of a part in the whole LC environment. We are more precisely interested in a particular phenomenon that may cause collisions at LCs and corresponds to the accumulation of vehicles' waiting queues at the LC exit zone. As a notation, we use stochastic Petri nets (SPNs) in such a way as to precisely reflect the system's dynamics. Second, the simulation of the global system behavior is performed in light of the behavioral model while adopting the Monte Carlo principle. The TimeNet tool is used as a simulator that allows the monitoring of risky situations. To qualitatively and quantitatively assess the effect of various factors on the risk level, setup tasks are undertaken. Finally, the simulation results are analyzed and interpreted. This analysis makes it possible to consider some solutions to reduce the incurred risk.

\*\*\*

Kaempchen, N.; Schiele, B.; Dietmayer, K., "Situation Assessment of an Autonomous Emergency Brake for Arbitrary Vehicle-to-Vehicle Collision Scenarios," pp.678-687.

Abstract: The autonomous emergency brake (AEB) is an active safety function for vehicles which aims to reduce the severity of a collision. An AEB performs a full brake when an accident becomes unavoidable. Even if this system cannot, in general, avoid the accident, it reduces the energy of the crash impact and is therefore referred to as a collision mitigation system. A new approach for the calculation of the trigger time of an emergency brake will be presented. The algorithm simultaneously considers all physically possible trajectories of the object and host vehicle. It can be applied to all different scenarios including rear-end collisions, collisions at intersections, and collisions with oncoming vehicles. Thus, 63% of possible accidents are addressed. The approach accounts for the object and host vehicles' dimensions. Unlike previous work, the orientation of the vehicles is incorporated into the collision estimation.

\*\*\*

Masini, A.; Corsini, G.; Diani, M.; Cavallini, M., "Analysis of Multiresolution-Based Fusion Strategies for a Dual Infrared System," pp.688-694.

Abstract: A dual infrared system to assist a driver in bad visibility conditions is studied. The problem of selecting the best multiresolution-based image fusion technique is addressed with reference to automotive scenarios. A new method for objective evaluation of multisensor image fusion strategies is presented for the optimal design of the fusion process. Multiresolution-based fusion methodologies are compared, and experimental results obtained from a prototype dual infrared camera system are shown and analyzed. Numerical results, in terms of the quality of the fused images and of the computational load, are presented and discussed. The effectiveness of the dual infrared system in urban and extraurban automotive scenarios is illustrated with a number of examples.

---

# IEEE Intelligent Transportation Systems Magazine

## Abstracts

---

### Abstracts of Papers

IEEE Intelligent Transportation Systems Magazine  
Volume 1, No. 3, Fall 2009

Mauri, G.; Antonio, L.; Lorena, N., "Customers' satisfaction in a dial-a-ride problem," pp.6-14.

Abstract: This paper presents a general model for a dial-a-ride problem and a Simulated Annealing approach to solve it focusing on the quality of service. The model includes several distinct cases of the real problems and an objective function that treats transportation costs and customer's inconveniences. The routes are clustered and scheduled in a separate way using specific heuristic methods. The solution method is implemented in C++ and performed over a data set based on real problems. Computational results present new best known solutions with a higher level of quality of service than a recent method found in the literature.

\*\*\*

Wei Shi; Jian Wu; Shaolin Zhou; Ling Zhang; Zhi Tang; Yuyu Yin; Li Kuang; Zhaohui Wu, "Variable message sign and dynamic regional traffic guidance," pp.15-21.

Abstract: Traffic has always been the infrastructure of national economic and social development. With the pace of urbanization unprecedented speedup and the increase of vehicle possessions, traffic congestion has become a big problem in modern cities. Regional traffic guidance system provides traffic information for road travelers in pre-trip and in on-trip, and guides travelers to change travel modes, choose travel routes, and save travel time to take full advantage of road network resources. Variable message sign (VMS) is one of the main ways to provide traffic information in metropolitan road network, but traditional VMS guidance regions are designated manually by traffic administrators to cause very bad effectiveness and efficiency, and there are even some VMS used only for advertising that have nothing to do with the traffic guidance management. We analyze the traffic guidance model based on VMS, and study the dynamic regional partition problem and the dynamic traffic guidance problem under real-time traffic conditions, and put forward the architecture and two algorithms. The architecture serves mainly for the whole cycle of developing VMS based guidance from raw data collection to traffic information publish. The algorithms dynamically partition traffic guidance regions and dynamically change the vehicle turning ratio at intersections to balance traffic flow and save travel time in guidance regions. The cellular automaton method based on SWARM platform is employed to simulate traffic environment, and verify the effectiveness and efficiency of the model and the algorithms by compare with the other traditional regional guidance algorithm.

\*\*\*

Hongxia Zhao; Shuming Tang; Yisheng Lv, "Generating artificial populations for traffic microsimulation," pp.22-28.

Abstract: Travel demand is derived from people's participation in daily activities scattered in time and space. Traffic microsimulation starts by generating individuals to participate in activities. In this paper, we propose a framework called Artificial Population Systems (APS) in order to automatically generate artificial populations for traffic microsimulation. Different from the conventional approach using empirical data to generate synthetic populations for the base year, our APS framework can generate artificial populations which evolve with time and space. So, with artificial populations, we will get more reasonable traffic demand forecast and analytical results in long term traffic microsimulation.

---

## Officers and Committee Chairs

---

<p style="text-align: center;"><b>Officers</b></p> <p>President:</p> <p>Past-President:</p> <p>VP Admin Activities:</p> <p>VP Conference Activities:</p> <p>VP Financial Activities:</p> <p>VP Member Activities:</p> <p>VP Publication Activities:</p> <p>VP Technical Activities:</p> <p>Transactions Editor:</p> <p style="text-align: center;"><b>Committee Chairs</b></p> <p>Awards:</p> <p>Conferences and Meetings:</p> <p>Constitution and Bylaws:</p> <p>Fellow Evaluation:</p> <p>Finance:</p> <p>History:</p> <p>Long-Range Planning:</p> <p>Member Activities:</p> <p>Nominations and Appoint- ments:</p> <p>Publications:</p> <p>Standards:</p> <p>Student Activities:</p> <p>Technical Activities:</p>	<p>Alberto Broggi, Università di Parma, Parma, Italy</p> <p>William T. Scherer, U. of Virginia, Charlottesville, VA, USA</p> <p>Sudarshan Chawathe, U. of Maine, Orono, ME, USA</p> <p>Reinhard Pfliegl, AustriaTech, Vienna, Austria</p> <p>Daniel J. Dailey, U. of Washington, Seattle, WA, USA</p> <p>Jason Geng, Galax LLC, Rockville, MD, USA</p> <p>Christoph Stiller, Universität Karlsruhe, Karlsruhe, Germany</p> <p>Daniel Zeng, U. of Arizona, Tucson, AZ, USA</p> <p>Fei-Yue Wang, CAS, China, and U. of Arizona, Tucson, AZ, USA</p> <p>Chelsea C. White III</p> <p>Reinhard Pfliegl</p> <p>Sudarshan Chawathe</p> <p>Petros Ioannou</p> <p>Daniel J. Dailey</p> <p>Rye Case</p> <p>Fei-Yue Wang</p> <p>Jason Geng</p> <p>William T. Scherer</p> <p>Christoph Stiller</p> <p>Jason Geng</p> <p>Shuming Tang</p> <p>Daniel Zeng</p>
---	---