



Master technology, create technology

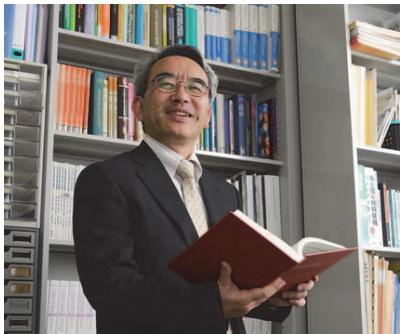
TOYOHASHI
UNIVERSITY OF TECHNOLOGY

Research Center for Future Vehicle City



**Toyohashi University of
Technology**

Message from the Director



**Director
Noriyoshi Kakuta**

The Research Center for Future Vehicle City was renewed on April 2011. The project of 2nd phase of the renewed research center is financially supported by Ministry of Education, Culture, Sports, Science and Technology(MEXT), too. The former successful research results established by the Research Center for Future Vehicle in 1st phase, which was closed on March 2011, is transferred into the new research center as resources.

Critical issues for future society are building up of a Sustainable Society with low carbon emissions and a safe and secure society through the partnership for a new generation vehicles (PNGV). The strong partnership between Toyohashi University of Technology(TUT) and neighboring municipalities is essential to achieve the new vehicle city . The Research Center for Future Vehicle City will continuously transmit research results on PNGV for the sustainable development of society to automobile industries in two points: 1) Low - carbon society by CO₂ reduction and advancement of industry, 2) safe and secure society in aging society with a falling birthrate.

Mission

Objectives of the Research Center for Future Vehicle City

1. Electric Vehicle

Seeking a new traffic system for electric vehicles by the modal shift from expressway to car ferry at Mikawa bay which is located in the almost central part of Japan and whole concept of EV in provincial cities.

2. Safe and secure society

Seeking a new transportation system toward the aging society with a falling birthrate: change from driver's standpoint to pedestrian's standpoint to create a comfortable vehicle city for vulnerable road users.

Research Projects

Advancement of Industry

Hirofumi Takikawa, Professor

Hideto Tanoue, Assistant Professor

Department of Electrical and Electronic Information Engineering

Electric and Renewable Energies for the Future - Vehicle - Life

- (1)Introduction of electric vehicles to industrial and service fields.
- (2)Control technology of battery - capacitor hybrid power system for energy - saving electric vehicle.
- (3)Development of solar cell, fuel cell, and capacitor using nano - carbon materials.
- (4)Utilization of solar - and wind - power generation to electric vehicles.
- (5)Demonstration of related technology of electric vehicle to the citizen of Toyohashi city.



Takanobu Inoue, Professor

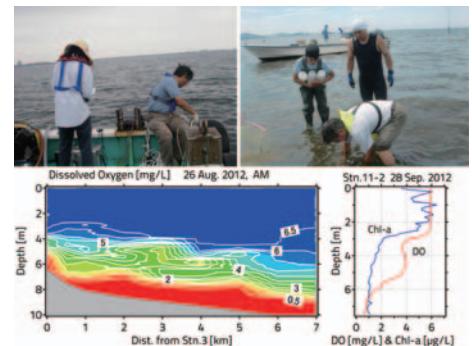
Shigeru Kato, Associate Professor

Takumi Okabe , Assistant Professor

Department of Architecture and Civil Engineering

Study on Water Quality Deterioration in Summer around Mikawa Port

Actual condition and primary mechanism of formation of hypoxia in Mikawa Port and its influence on neighboring waters are studied. Field measurement of water quality and nutrient load from rivers are carried out.



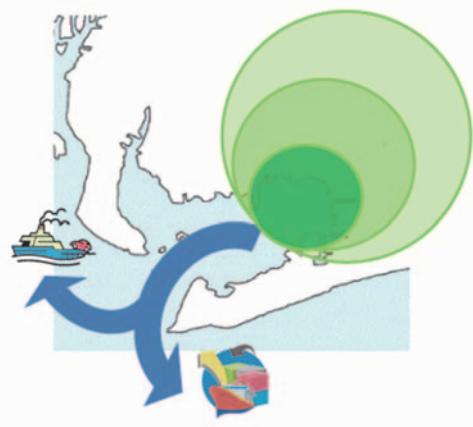
Hiroyuki Shibusawa, Associate Professor

Yuzuru Miyata, Professor

Department of Architecture and Civil Engineering

Evaluating the Economic Impacts of the Production of New General Automobiles with Technological Innovations and a Modal Shift to Marine Transport

The automobile industry has developed environmentally friendly vehicles in the face of global warming issues and exhaustion of petroleum. New generation automobiles will become popular in several decades, so the industrial structure will be affected by the appearance of these automobiles. In this study, we explore the economic impacts of shifting production systems in the automobile industry and a modal shift by using national and multiregional input output models.



Research Projects

Advancement of Industry

Yasuhiro Hirobata, Professor

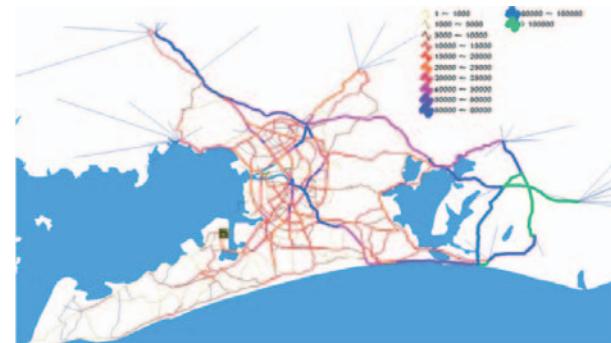
Kojiro Matsuo, Assistant Professor

Department of Architecture and Civil Engineering

Researches on Transportation Measures Looking Ahead to a Future Vehicle City Based on Travelers' Behavior Analyses

For the purpose of establishing a safe, convenience, comfortable, environmentally-friendly, and balanced transportation systems in regions, this project, through various travelers' behavior analyses, tackles following research themes:

- (1)Analyses of EV Bus Routes and Level of Services in Toyohashi Considering the Travel Demand
- (2)Evaluation of the Measures for Reducing the Effects of Traffic Congestio in Tahara District of Mikawa Bay Area
- (3)Researches on Introducing ITS for Creating the Appropriately Speed Controlled Urban Area



The result of a traffic demand simulation for a future road network in Toyohashi and Tahara districts

Yuzuru Miyata, Professor

Hiroyuki Shibusawa, Associate Professor

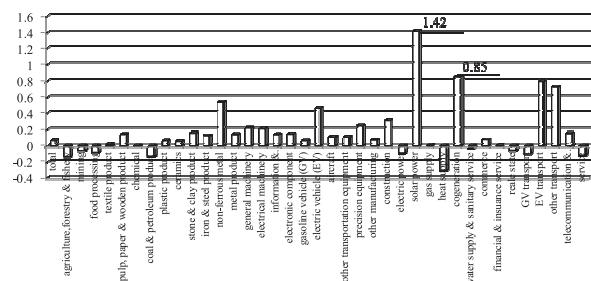
Department of Architecture and Civil Engineering

Creation of Future Vehicle Society

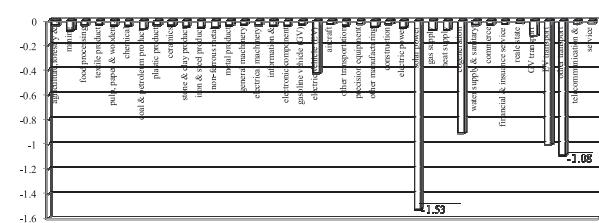
This study focuses on electric vehicles (EVs), and advocates a new city concept, Future Vehicle Society, assuming popularization of electric vehicles in a city. To overcome the disadvantage of short distance covered by EVs, ocean transportation of EVs is taken into account as well. We consider the self - power generation by firms and households centering the solar power. To cope with the shortcoming of small scale and unstable power supply, we assume the smart grid system. The current study region is Toyohashi city where our university is located.

This study is conducted by applying a computable general equilibrium model of Toyohashi city, GIS approach and a spatial computable general equilibrium model of 47 prefectures in Japan.

The goals of this study include policies to realize Future Vehicle Society in Toyohashi city and establishment of the methodology for a comprehensive evaluation of Future Vehicle Society from environmental, social and economic point of view.



Change Rate in Industrial Output by Subsidies



Change Rate in Commodity Prices by Subsidies

Research Projects

Safety and Security

Zhong Zhang, Professor

Takashi Imamura, Visiting Associate Professor

Department of Mechanical Engineering

Study on Social Symbiotic System for Safe Driving Support from the Viewpoint of Individuality

Vehicles and Automobiles are still important transportation system, because local cities do not have enough public transportation compare with big city. Moreover, necessity of driving support system has been increased according to the multifaceted requirements such as adapt for the diversification of driver's characteristics, compatibility of safety, economy and ecology.

This research aims to develop novel driver support system and its fundamental technology in order to realize the normalization of driving ability. Therefore, modeling of driver's individuality using information technology, non-contact human evaluation system using image processing, and application of driving simulator to the measurement of driving behavior and to the traffic safety education have been studied.



Yasushi Kanazawa, Associate Professor

Department of Computer Science and Engineering

Study on Safety and Secure System for Vulnerable Road Users

To investigate a safety traffic system for vulnerable road users is required to create a comfortable vehicle city. Since the visual information of an environment is very useful and important for such purpose, we apply the techniques of image processing and computer vision to our researches. Our main researches are

- (1) visual presentation of traffic signs for vulnerable road users, and
- (2) development of traffic warning system for vulnerable road users using an omnidirectional camera.



Yoji Sakurai, Professor

Department of Electrical and Electronic Information Engineering

Research and Development of Next-Generation

Secondary Batteries

We are actively involved in research and development of very safe, low-cost, high-performance, highly reliable electrochemical energy conversion devices with potential use in clean vehicles such as electric cars and fuel-cell-powered vehicles and in green energy (natural energy) power generation.



Research Projects

Safety and Security

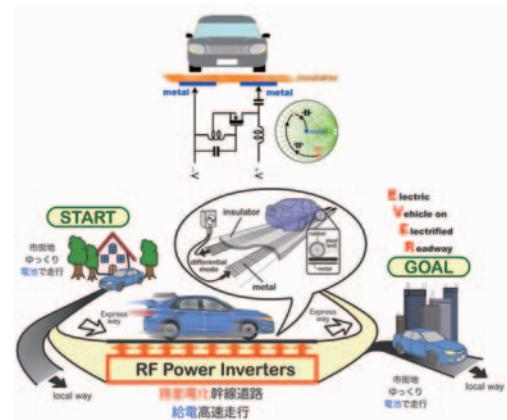
Takashi Ohira, Professor

Department of Electrical and Electronic Information Engineering

Innovative Technologies for Electric Vehicle on Electrified Roadway: EVER

Electric vehicles are expected to be ultimate green mobility. This project intends to overcome their crucial technical barriers: short cruising range, long charging time, and need of bulky batteries. We develop

- (1) Electrification of roadways with RF mesh electrodes beneath the road surface,
- (2) Via-wheel power transfer "V-WPT" from road to vehicle during in motion, and
- (3) Power electronics to convert the collected RF energy into driving mechanics.



Naohiro Goto, Associate Professor

Department of Environmental and Life Sciences

Environmental Impact Analysis of Vehicle System

- (1) Transition of resource consumption of transportation system
- (2) Environmental impact of electrical bicycle

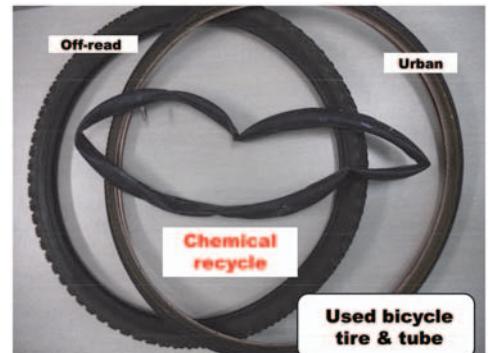


Noriyoshi Kakuta, Professor

Department of Environmental and Life Sciences

Development of Chemical Recycling Technology for Bicycle Tire and Inner Tube

Increase in the number of parked bicycles has become an important issue in order to achieve sustainable city. Development of new techniques for reuse and resource recovery is necessary to reduce the number of bicycle abandoned landfills. We will focus on to investigate the recycling of environmentally friendly technologies for the chemical recycling of the inner tube and bicycle tires that were discarded.



Support for Student Formula Japan



Exhibition at Toyohashi City Hall



Organization

The Research Center for Future Vehicle City has established two research divisions: “low - carbon society and advancement of Industry” and “low - carbon society, safety and security ”. The former is composed of fields of natural energy , logistics, environment, urban system. The latter is composed of fields of safe and secure, natural energy, and environment. We promote research projects related with these fields.

Advancement of Industry

- Natural Energy
- Logistics
- Environment
- Urban System

Safety and Security

- Safe and Secure
- Natural Energy
- Environment

Low
Carbon
Society

Low - carbon Society and Advancement of Industry
- Low - carbon oriented Vehicle City by Utilized Port Functions -

Solar Clean Energy
Electric Energy Storage, Energy - Supply Station
Port Logistics, Modal Shift to Marin Transport
Improvement of Water Quality
Balanced Ecosystem
Intensive Use of Harbor Area Effective Utilization of Port Energy

Members

Hirofumi Takikawa
Yasuhiro Hirobata
Takanobu Inoue
Yuzuru Miyata: Deputy director
Hiroyuki Shibusawa
Hideto Tanoue
Shigeru Kato
Takumi Okabe
Kojiro Matsuo

Low - carbon Society , Safety and Security

- Safety and Security Vehicle City for Aged people and Children -

Safety Traffic System and Traffic Sing for Aged people and Children
Renewable Energy for Supporting Future Vehicle Port City
Recycle Technology and System for Modal Shift

Members

Zhong Zhang
Yasushi Kanazawa
Yoji Sakurai
Noriyoshi Kakuta: Director
Takashi Ohira
Naohiro Goto
Takashi Imamura

ACCESS



●From Chubu International Airport to Toyohashi

Take any Meitetsu trains from the airport, and change trains at "Jingu-mae" to Toyohashi. About 20-30 minutes from Airport to Jingu-mae, and 50 minutes from Jingu-mae to Toyohashi.

●By train to Toyohashi station

From Nagoya: Meitetsu train, JR train or Shinkansen are available.

It takes about 50 minutes from Nagoya to Toyohashi by Meitetsu or JR train, and 25 minutes by Shinkansen.

From Tokyo: Shinkansen Hikari super express runs every two hours, takes 1h30 to Toyohashi station. Shinkansen Kodama runs every 30 minutes, and it takes about 2h15.

Coaches are also available from Tokyo (Shinjuku) to Toyohashi.

From Osaka: Take Nozomi super express to Nagoya, then change to Kodama or Hikari, or local trains. It takes about 80-120 minutes total.

●From Toyohashi station to the campus

Toyotetsu bus runs from Toyohashi station to the campus every 10-15 minutes from 7am to 8pm.

Take the bus destination "Gikadai-mae," "Rispa Toyohashi," or "Fukushi-mura" from the bus stop No. 2 at Toyohashi station, east exit.

●By road to the campus

Tomei Express Way: Exit at Toyokawa IC toward Toyohashi city center (Route 151 and Route 1). From Toyohashi city center, take the route 259 and 405. It takes approximately 20 minutes.

Route 23 (Toyohashi Bypass) from Nagoya: Exit where the route 23 Nanane IC, and turn left (take the route 405). Toyohashi Tech campus is just by the route.

Toyohashi University of Technology

Research Center for Future Vehicle City

Research Cooperation Division

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