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About the URI Transportation Center

The URI Transportation Center was established in 1999 to conduct multidisciplinary education, research, technology transfer, and outreach for surface transportation systems and advanced transportation infrastructure.

The Center is one of 27 national centers supported by the U.S. Department of Transportation through the University Transportation Centers Program.

The Center has a full-time staff of seven, headed by an Executive Director. URI faculty members head the education, research, and tech transfer / outreach efforts. The Center also has an Executive Board chaired by the URI President and composed of senior members of the Center’s stakeholder groups. An operating council provides additional leadership.

THEME
“Surface Intermodal Transportation Systems and Advanced Transportation Infrastructure with Special Reference to the Marine Environment.

MISSION
“To advance U.S. technology and expertise in the many disciplines composing transportation through the mechanisms of education, research, and technology transfer at a university-based center of excellence.”

National UTC Goals:

**Education:** a multidisciplinary program of course work and experiential learning that reinforces the transportation theme of the Center.

**Human Resources:** an increased number of students, faculty and staff who are attracted to and substantively involved in the undergraduate, graduate, and professional programs of the Center.

**Diversity:** students, faculty, and staff who reflect the growing diversity of the U.S. workforce and are substantively involved in the undergraduate, graduate, and professional programs of the Center.

**Research Selection:** an objective process for selecting and reviewing research that balances multiple objectives of the program.

**Research Performance:** an ongoing program of basic and applied research, the products of which are judged by peers or other experts in the field to advance the body of knowledge in transportation.

**Technology Transfer:** availability of research results to potential users in a form that can be directly implemented, utilized, or otherwise applied.
In 2004, the University of Rhode Island Transportation Center moved into new territory, both literally and figuratively. In mid-year, the URITC occupied newly renovated quarters, centrally located on the academic quad. This facility provides laboratory/classroom, library and administrative space to support the educational programs, research, and outreach activities of the Transportation Center.

During the year, we saw a significant increase in the number of students involved in transportation. In 2004, 225 students enrolled in transportation classes, and 108 students had their education supported at least partially by the URITC. These are six-year highs for transportation at URI.

The new transportation lab/classroom is one of the reasons for the increase in class enrollment. For example, a new course was developed in the College of Business Administration on transportation planning that also was cross listed with Community Planning and with Civil Engineering. The course relied heavily upon the lab facilities, including geographic information systems software that the URITC makes available to the campus. The lab facility is also used in other courses and for short-term assignments of transportation analyses.

In terms of research, the Transportation Center began twelve new research or education/demonstration projects during the year, and sixteen previously funded projects were completed. As a result, at the end of December, 2004, there were thirty-two ongoing projects and thirty-five completed projects, all of which can be found on www.uritc.org. Faculty, staff, and students were active in making the results of the research widely known. Researchers reported sixteen peer reviewed reports and thirty-one papers presented at conferences and other public forums.

During the year, we sponsored a varied outreach and technology transfer program for practitioners. The offerings ranged from small seminars to our National Transportation Week breakfast, which draws attendees from the public and private sectors. In conjunction with RIDOT and the FHWA, we also sponsored our first Market Ready Technology showcase, on Geofoam applications, to attendees from across the country. We also continued to provide short-term training courses, either through our LTAP center or through our partnership with the National Highway Institute, primarily to regional practitioners. Our technology transfer program acquired an international flavor based on our twinning relationship with the Slovak Road Administration, under which we
are supporting technical exchanges between technical experts and tech transfer professionals from
the Slovak Republic and Rhode Island.

The URITC also extended our outreach efforts to students. For pre-college aged students, we
sponsored Construction Career Days, during which more than 1000 high school students in Rhode
Island were given a chance to learn about career opportunities in construction. We also received
an award from the National Summer Transportation Institute program of USDOT that enabled
us to sponsor two summer institutes for middle school students. For university students, we
worked with the Dwight David Eisenhower Transportation Fellowship program of the USDOT
and the University of Puerto Rico-Mayagüez to establish a summer exchange program to give
undergraduate students a chance to work directly with researchers on transportation topics.
Based on the success of the pilot program in 2004, we will formalize the exchange program for
subsequent years.

The following report provides details of the URI Transportation Center’s work during 2004.
Center Staff

Richard J. Horn
Executive Director

Maria Amador
Assistant Director

Dan Berman
Executive in Residence

Ilene Payne
Executive in Residence

Jeff Cathcart
Director, Transportation Technical Assistance and Outreach

Catherine J. Manchester
Principal Clerk Stenographer

Tory Perrotta
Senior Word Processing Typist

John S. Peterson
Senior Information Technologist

Ying Qin
Research Associate

Judith Watson
Fiscal Management Officer
The URITC Executive Board is composed of the principal University and public sector stakeholders. The members of the Executive Board were instrumental in the development of the Transportation Center and remain actively engaged in supporting it.

The group provides advice to the President of the University of Rhode Island and to the URITC Executive Director in terms of the goals and overall objectives of the Center’s programs.

Executive Board

Robert L. Carothers, Chair
President, URI

James Capaldi
Director, RI Department of Transportation

Christopher L. Bergstrom
Executive Director, RI Economic Policy Council

Michael G. Cheston
Executive Director, RI Airport Corp.

David Farmer
Dean, URI Graduate School of Oceanography

Lucy Garliauskas
RI Division Administrator, FHWA
Executive Board Advisor

Richard J. Horn
Executive Director, URI Transportation Center

Edward M. Mazze
Dean, URI College of Business Administration

Stephen P. McAllister
Associate Commissioner for Finance, Office of Higher Education

Michael McMahon
Executive Director, RI Economic Development Corporation

Al Moscola
General Manager, RI Public Transit Authority

Bahram Nassersharif
Dean, URI College of Engineering

J. Vernon Wyman
Assistant Vice President, Business & Finance, URI

Jeffrey Seemann
Dean, URI College of the Environment & Life Sciences

M. Beverly Swan
Provost, Vice President Academic Affairs, URI

Janett Trubatch
Vice Provost, Research, Graduate Studies & Outreach, URI

Operating Council

Phil Kydd, Chair
Assistant Director, RI Department of Transportation

Richard Horn
Executive Director, URI Transportation Center

Edward M. Mazze
Dean, URI College of Business Administration

Bahram Nassersharif
Dean, URI College of Engineering

Janett Trubatch
Vice Provost, Research, Graduate Studies & Outreach, URI
In September, the URI Transportation Center left their space at 85 Briar Lane for a new home in the Carlotti Administration Building, centrally located on the URI campus in quarters previously occupied by the offices of the URI president and provost.

Aside from being in a more central and visible location on campus, the newly-remodeled space allowed for a 30 seat classroom and lab, something the old space couldn’t offer. The multipurpose lab boasts 30 wireless laptops complete with specialized transportation software such as TransCad, along with several other productivity and statistical applications. There are also three 5x8 foot combination projection screens/whiteboards, three LCD projectors, and a wireless audio/visual system.

One of the most interesting features of the lab, however, is not its technology but its furniture! The highly mobile lab seating and work surfaces can be reconfigured into a variety of work “pods,” or be quickly configured into a traditional classroom. This unique ability allows the Center to use the room for anything from meetings, to working groups, to formal classes.

Use of the lab began in October. It was the first fully-wireless laptop lab on campus, and was also the first lab with TransCAD software. Classes for TransCad were first held in the lab in October, as Assistant Professor Dr. Talia Mc Cray taught the use of the software to students from URI’s College of Business.

The wireless laptop lab seats 30, and can be configured as classroom, lab, or conference room.

The TSAL Laboratory opened doors in 2004.

The new URITC TSAL lab and administrative offices occupy the former offices of the URI President and Provost.

Transportation Systems Analysis Laboratory (TSAL)
Fourth Annual National Transportation Week Breakfast

Transportation Topics for the 21st Century

More than 150 members of the Rhode Island transportation community joined the URI Transportation Center for the Fourth Annual National Transportation Week Breakfast on Wednesday, May 19, 2004 at the Radisson Airport Hotel in Warwick, RI.

The topic of the breakfast was “Transportation Topics for the 21st Century,” with Frederick Salvucci of the Massachusetts Institute of Technology as the keynote speaker.

Along with the keynote address, awards were also presented for a children’s transportation poster contest, and URITC honored the 2003 URITC Student of the Year, Samuel Eisenbeiser.

National Transportation Week provides an opportunity for the transportation community to join together for greater awareness about the importance of transportation. National Transportation Week also focuses on acquainting youth with transportation-related careers.

“National Transportation Week is an opportunity to celebrate our achievements in transportation and face up to the challenges ahead. It also is an excellent time to convey to the American people how proud we are to be transportation workers. All of us, military and civilian, are proud to serve as members of America’s team. We will continue to foster the strong relationship between industry and government, working as partners to spur economic growth. Working together we will make transportation safer. We also will make it simpler for users to benefit from transportation resources, and we will ensure that investments and systems work smarter.”

-- Norman Y. Mineta, Secretary of Transportation
Women’s Transportation Seminar (WTS) Career Seminar

The University of Rhode Island Transportation Center and the Rhode Island Affiliate of Women’s Transportation Seminar (WTS)-Boston hosted their first joint student event, “Women in Transportation: Career Paths and Scholarship Opportunities,” on March 30, 2004 at the University of Rhode Island in Kingston, Rhode Island.

While enjoying pizza and soft drinks, area college and university students had an opportunity to hear Rhode Island women transportation professionals briefly and informally describe their career paths, areas of expertise, and current/past projects. Pam Sherrill, co-chair of the Rhode Island Affiliate of WTS-Boston, introduced speakers from the Rhode Island Department of Transportation, Rhode Island Statewide Planning, Rhode Island Airport Corporation, University of Rhode Island, and private consulting firms including Pare Engineering Corporation, Maguire Group Inc., and Edwards and Kelcey. The speakers shared their experiences and spoke of the opportunities and challenges they have faced.

Mona Manachi, Assistant Chief of RIDOT Highway Bridge Construction, shared humorous anecdotes from her early days at RIDOT. Katherine Trapani, Supervising Planner at Statewide Planning, highlighted the various jobs she’s held along the path from college student to transportation planning professional. Natacha Thomas and Talia McCray, both Assistant Professors at URI, told the students about their educational background and areas of research.

WTS Scholarship application information was also provided to the students by Susan Lynch of DMJM+Harris, who is herself a past scholarship recipient. Lucy Garliauskas, FHWA Rhode Island Division Administrator and former National WTS President, encouraged the students to pursue the scholarships and careers in transportation. The WTS scholarships recognize the accomplishments, contributions, and goals of female students pursuing careers in a transportation-related field.

After the presentations, each attendee introduced herself. Many speakers used the opportunity to provide advice to the students on summer internships, courses, and optimal EIT exam dates. Students asked questions of the group and also spoke one-on-one with the many transportation professionals in attendance.
2003 Outstanding Student of the Year, Sam Eisenbeiser

The University of Rhode Island Transportation Center selected Mr. Samuel K. Eisenbeiser as its 2003 Outstanding Student of the Year.

Mr. Eisenbeiser earned his Masters in Community Planning degree from the University of Rhode Island in May of 2003, achieving a GPA of about 3.9. As a graduate assistant, he played a key role in the University of Rhode Island Transportation Center (URITC)-funded project “Developing and Applying a Transportation Model for Aquidneck Island.” As part of this effort, he researched transportation models and demonstrated the use of GIS models in case studies related to planning efforts in three towns on Aquidneck Island, RI.

After graduation, Mr. Eisenbeiser accepted a position at Fitzgerald and Halliday, Inc., a full-service planning consulting firm involved in many transportation studies. At Fitzgerald and Halliday, he has worked on a corridor study and performed traffic analyses to optimize roadway lane configurations and signal timing. Prior to his graduate studies at URI, Mr. Eisenbeiser worked as a transportation planner in Connecticut. He also served in the US Coast Guard and was awarded the Guard’s Commendation Medal for outstanding achievement following an active duty tour.

Mr. Eisenbeiser was selected for the 2003 URITC Outstanding Student of the Year award because of his excellent academic achievement and professional background. As an outstanding graduate of the URI Community Planning program, Mr. Eisenbeiser is a promising young transportation planner.
Education, Outreach, Technology Transfer

Highlights

Summer Transportation Institute (STI)

The 2004 University of Rhode Island Transportation Center Summer Transportation Institute (URITC STI) focused on spurring interest in the transportation field among middle school students and fostering awareness and knowledge of transportation careers and education/training requirements. Through two two-week, nonresidential sessions held on the URI campus, a diverse student population was introduced to numerous careers in the field of transportation and to the various modes of transportation available in Rhode Island.

The URITC STI provided students with many educational activities and gave students the opportunity to interact with transportation professionals. Key components of the academic program included classroom instruction, guest speakers, field trips, and hands-on projects. Activities included:

- Overview of careers at the RI Department of Transportation (RIDOT), including engineering, transportation management, maintenance, materials, and administration
- Introduction to bridges by RIDOT Bridge Engineer Mike Savella
- Computer simulated and hands-on bridge building
- Safety session at the Historic Kingston Railway Station
- Tour of T.F. Green Airport
- Visit to the Martha’s Vineyard High-speed Ferry
- Tour of the RI Computer Museum
- Operation of heavy machinery, such as backhoes and jackhammers
- Scavenger hunts at each field trip location

The students were also responsible for planning, scheduling, and budgeting their multi-modal trip to the Boston Museum of Science, requiring the use of commuter rail, subway, bus, and other ground transportation.

The busy schedule also included recreational time for students to build friendships and have fun!
Construction Career Day

On April 20 & 21, 2004 the RI T2 Center hosted the 4th Rhode Island Construction Career Day at the RIDOT Midstate Facility. Over 1,000 high school juniors and seniors attended the event, which was coordinated by over 200 volunteers representing local public works departments, RIDOT, FHWA, the construction industry, various union apprenticeship programs, equipment dealers, School to Career and many other organizations.

The participants took part in many exciting activities, including operating backhoes, mowers, rollers, pavers, and sweepers, cutting steel plates, building toolboxes and birdhouses, riding in a bucket truck, and visiting displays from URI, CCRI, and New England Tech.

Construction Career Day started in Texas in 1999 when TexDOT, FHWA and the construction industry realized that not many young people are entering the field. With over 60% of the workforce eligible to retire in the next seven years, a workforce crisis is on the horizon.

“We didn’t want to see Rhode Island end up like Texas,” said Jeff Cathcart, director of the RI T2 Center. “We want our next generation to see how rewarding a career in construction can be. There is always going to be the need for good craftsmen, engineers and managers in the construction industry.”
Slovak Twinning Relationship

From May 7-15 2004, representatives from the URI Transportation Center, the RI Division office of the Federal Highway Administration, RI Department of Transportation, and the RI Local Technical Assistance Program traveled to the Slovak Republic as part of their twinning relationship with the European country.

Between the numerous meetings on highway grooving technologies, safety gear, economic development, and collaborative research, however, there was opportunity to explore a truly beautiful country.

The trip and twinning relationship afford both countries a continued opportunity to learn from each other, and emphasizes the similarity of the challenges experienced by transportation practitioners around the world.

The Slovak Republic was established after the division of former Czechoslovakia into two independent states on January 1, 1993. The Slovak Republic is a parliamentary democracy with a one-house, 150 member Parliament. The head of the state, the President, is elected for a five-year term.

Slovakia is bordered by the Czech Republic to the west, by Poland to the north, by Ukraine to the east and by Hungary and Austria to the south. The borders are mostly natural, made by rivers (the Moravia, the Danube) and mountains (the Carpathians, the High Tatra). Slovakia shares no borders with the sea, but is connected to the Black Sea by the Danube River and to the Northern Sea by the Rhine-Man canal.

Welcome to Slovakia!

Slovakia is a beautiful country and shares many of the transportation-related challenges that the US faces.
Education, Outreach, Technology Transfer

Highlights

Assessment of Rhode Island Transportation Education and Training Needs

The demands of the transportation workplace are both varied and changing. In order to develop a better understanding of the role of the University in meeting these demands, the URITC undertook an education and training needs assessment of local employers. The results are presented in the report “Assessment of Education and Training Needs in Rhode Island To Establish the Basis for Developing New University Programs in Transportation and Logistics,” prepared by Thomas F. Humphrey.

The report contains the results of surveys of local private sector firms and public sector firms agencies. Some notable findings are:

• There is a distinct difference that must be recognized between “Education Needs,” “Training Needs,” and “Outreach Needs.”

• “Skills” required by the private sectors are clearly focused on “Logistics” and “Supply Chain Management.”

• “Skills” required by the public sector are those that expand the breadth and vision of technically trained professional individuals in the area of Transportation Policy and Management.

• The “Training Needs” desired by both the private sector and by the public sector are typically administered effectively by in-house activities.

• There is general interest among the interviewees in both the public and private sectors for having more University “Outreach” programs to include peer-to-peer opportunities, seminars, and short courses on contemporary topics of mutual concern and interest.

The results of this study are being used by the URITC in directing support to new or revised programs.
Puerto Rican Student Exchange

As part of a collaborative effort between the Dwight David Eisenhower Transportation Fellowship Program, the University of Puerto Rico-Mayagüez (UPR-M), the Rhode Island Department of Transportation (RIDOT), the University of Rhode Island (URI) and the URITC, four students from UPR-M participated in summer internships in Rhode Island. The four students were selected through a competitive process conducted by the URITC and received Dwight David Eisenhower Transportation Fellowships, based on nominations by the UPR-M.

The students lived on the URI campus and worked directly for RIDOT senior staff or URI faculty members conducting URITC sponsored research. The summer internships allowed the students to gain meaningful experience in ongoing transportation research programs and in RIDOT projects. The students also had the opportunity to meet federal and state transportation professionals.

In addition to the educational and professional rewards, the summer internships also provided many opportunities for students from UPR-M and URI to work together and to get to know each other. Inputs from faculty and project advisors and from students, both URI and UPR-M, indicate that this was a productive and enriching experience for all involved.
Aimed at Rhode Island public works employees and other transportation practitioners, LTAP training provides useful assistance in workforce development, best practices, and safety.

## LTAP / T2 Workshops

The RI Technology Transfer Center provided a series of training courses during the first six months of 2004. The dates, topics, and attendance are listed below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Course Description</th>
<th>Attendees</th>
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<tr>
<td>8-Jan</td>
<td>Advisory Board Meeting</td>
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<td>13-Jan</td>
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<td>League of Cities &amp; Towns</td>
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<td>Chain Saw Skills &amp; Safety</td>
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<td>Chain Saw Operating Techniques</td>
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<td>27-Apr</td>
<td>Small Engine Repair &amp; Maintenance</td>
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<td>Chain Saw Refresher</td>
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**LTAP / T2 Workshops Continued**

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<td>Snow &amp; Ice Workshop</td>
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<td>16-Nov</td>
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<td>Preparing for Winter - Pawtucket</td>
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</table>
The mission of the National Highway Institute (NHI) is to provide proactive leadership, expertise, resources, and information to improve the quality of the U.S. highway system in order to enhance economic growth, quality of life, and the environment. The NHI develops and delivers training and education in cooperation with its partners to sustain and expand the transportation community's professional capacity in technologies and strategies, thereby accelerating the implementation of the state-of-the-art and continuing to advance the state-of-the-practice.

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Through its unique partnering agreement with NHI, the URI Transportation Center offered seven professional development training sessions with more than 170 total attendees. The URITC/NHI partnership is an important regional asset, affording quality continuing education to public and private transportation practitioners.

**NHI Course Offerings**

- **Driven Piles Foundation Inspection**
  January 27, 2004
  28 Attendees

- **Contract Administration**
  January 27-28, 2004
  19 Attendees

- **Highway Utility Issues**
  February 17, 2004
  31 Attendees

- **Drilled Shafts Foundation Inspection**
  February 24, 2004
  27 Attendees

- **Highway Utility Issues**
  April 5, 2004
  23 Attendees

- **Bicycle Facility Design**
  April 7, 2004
  20 Attendees

- **Context Sensitive Solutions**
  March 30-31, 2004
  31 Attendees
On Tuesday, June 22, 2004, at Quonset Point, R.I., the Rhode Island Department of Transportation (RIDOT), the Federal Highway Administration (FHWA) Resource Center and the University of Rhode Island Transportation and LTAP Centers co-hosted a Showcase on Geofoam to demonstrate one of FHWA’s “Market Ready Technologies.”

Geofoam is commonly used for light-weight fill applications, landslide stabilization, and settlement mitigation in areas in need of support (earth around roads, bridges). It can also be installed in less than ideal weather conditions, lessening construction delays due to weather. To assure that this Showcase would effectively demonstrate this property, the Showcase Development Committee deliberately chose June 22, historically a rainy day in Rhode Island.

During the morning session, engineers from the FHWA Resource Center and Parsons Brinkerhoff Quade & Douglas, Inc covered the history and provided a technical overview of EPS Geofoam technology. RIDOT representatives provided background on the Showcase’s Davisville Railroad Bridge Project No. 369, and representatives from the contractor and manufacturer also shared real-life Geofoam experiences.

Participants from seven states, including local agencies, braved the weather for the visit to the actual working site. This site was selected because it illustrated how the use of Geofoam allowed for reuse of an existing bridge abutment and back wall, thus saving money and time.
ITS Technology: Academia and Industry Lunch and Learn

An ITS Lunch and Learn Seminar with the theme “ITS Technology: Academia and Industry” was hosted by the University of Rhode Island Transportation Center on May 5, 2004 at the University of Rhode Island. With the objective of bringing together faculty, researchers, and industry representatives for an exchange of ideas on ITS issues of common interest, speakers addressed the following four topics:

- **Educational Directions**: Chris Hunter, University of Rhode Island
- **Human Factors**: Cynthia Levesque, RI Department of Transportation
  Transportation Management Center
- **Safety and Security Applications**: Vincent Reina, RI Public Transportation Authority
- **Communications Technologies**: Paul Bell, VHB, Inc.

After introductions to the topics by the four speakers, each speaker facilitated small group discussions over lunch. The seminar concluded with brief presentations summarizing the discussions of each group.


Project Issue(s)

• The US Environmental Protection Agency is considering adoption of a safe drinking water maximum contaminant level for perchlorate due to the adverse health effects linked to prolonged exposure to the chemical.

• Perchlorate is found in common highway safety flares; if flares containing the chemical are being used near bodies of surface-water or ground water recharge areas (areas where precipitation seeps into the earth,) there is a risk of pollution.

• The Rhode Island Department of Health, after conducting a study of nine public wells, has not found evidence of perchlorate contamination in the water supply. However, the study did not investigate potential sources and pathways of perchlorate from nearby roadways, so the risk of contamination cannot be assessed.

For More Information:
Dr. Anne Veeger
University of Rhode Island
Woodward Hall
Kingston, RI 02881
401-874-2187
veeger@uri.edu

New Research Projects

Highway Flares and Runoff: a Potential Source of Perchlorate to Surface Water in Rhode Island

Abstract
Most people share a concern about the quality of their drinking water. Most often, the water we receive in our households is safe, but contamination is always a potential threat. Low levels of perchlorate are being reported in various water samples around the country. While these low levels have no measurable effect on health, constant exposure to high levels of the chemical may adversely affect the functions of the thyroid gland. The research performed in this study will work towards determining if there is a risk of a high level perchlorate contamination to the water supplies in certain Rhode Island locations.

This project team will begin by determining the ten most likely sites for highway safety flare use according to recorded numbers and locations of nighttime motor vehicle accidents; these locations will have the highest potential for perchlorate contamination. Information about each site’s drainage system will be collected, including locations of nearby wells and runoff pathways to nearby bodies of surface-water. The team will then collect runoff samples over a nine month period.

Water samples from the ten sites will be tested for perchlorate levels and the results will be analyzed for spatial and temporal distributions of the chemical. If significant concentrations are detected, a mass flux model will be developed to track how much perchlorate is moving through the water system. This information will be used to evaluate perchlorate contamination risk at each site.

The results of this study will be published, and collected data will be incorporated into the relational database GeoInfoDB, which includes subsurface well and water quality data.

Potential Benefits
• This study may result in steps taken towards the prevention of perchlorate contamination of the public water supply, including the development of proper road flare handling procedures.
• Apparently the first study of its kind performed in Rhode Island, this study may serve as a model for similar future research.
• RIDOT practitioners, town engineers, water-quality experts, and URI researchers will gain an increased understanding of transportation and water-quality problems, resulting in intelligent decision making when issues in both areas intersect.
Nanostructured Materials for Advanced Transportation Applications

Abstract
Imagine a windshield that is not only hard enough to block the wind and flying debris, but would also resist cracking when hit with a small stone. Or, imagine a fender that is lightweight to increase fuel efficiency, yet is still strong enough to help protect the vehicle's occupants.

Vehicle manufacturers are constantly striving for lighter and stronger materials with which to build. To be sure, the weight of a four door sedan has steadily decreased since the gas-guzzling six-thousand pound beasts of the 1970’s. Vehicle engineers have relied mostly on the use of metal alloys (which are not as strong as the pure metals previously used) in vehicle parts to lighten vehicles. Likewise, engineers have yet to find a way to make windshield/window glass not only strong enough to block wind and structured to shatter on impact, but that will also be able to resist cracking when hit by pebbles. Now, materials scientists are harnessing the new science of nanotechnology to produce greatly improved and innovative materials that just might make broken windshields and flimsy lightweight fenders a thing of the past.

Nanotechnology is a manufacturing process by which products may be built atom by atom. Though this process has not yet been perfected, headway is being made in this area of nanoscience. This project focuses on the integration of nanoparticles into currently used materials such as the metal and glass used in the production of vehicles.

Because of their small size, nanoparticles have unique properties. They tend to be harder, lighter, and more transparent than larger particles, which is desirable in the manufacturing of vehicle parts such as windshields and fenders. When interspersed in glass currently used for windshields, nanoparticles will create a much tougher, more crack-resistant product. Similarly, when a composite of nanoparticles and metal alloy is created, the material will remain lightweight, retain its important metallic properties (it can be heated and bent to a desired shape without cracking), yet will be tougher against impacts.

This project has multiple phases, which will focus on the development and characterization of new techniques and composite materials. New processing techniques have been designed and will be used to create new composites. The composites produced will then be characterized based on their properties and potential usefulness. The results of this project will be new, effective materials with unique properties for use in vehicles and buildings.

Potential Benefit(s)
• Tougher windshields and metallic parts will contribute to the production of safer, more cost-effective vehicles.
• The research may result in patentable commercial property, such as new processing techniques and materials.
• The information gained from this research will be used to inform Nanoscience and Nanotechnology, a new course to be offered by the PI.

For More Information:
Prof. Arijit Bose
University of Rhode Island
Chemical Engineering
Crawford Hall
Kingston, RI 02881
401-874-2804
bosea@egr.uri.edu
New Research Projects

Quonset Point (QP) Multi-Modal, Mixed-Use Ferry Terminal Study

Abstract
During the past fifteen years, many communities and developers have begun to consider ways in which the interrelationship between transportation and the built environment can be more interesting and profitable. Recently, many developments have integrated ferry terminals as a key component of the mixed land use and multi-modal transportation approach.

The project team will explore the feasibility of a multi-modal, mixed-use ferry terminal at Quonset Point. The team will study selected similar ferry terminals to identify factors pertinent to the planning of scenarios for Quonset Point and to evaluate each scenario’s possible success. The team will also analyze current water transportation passenger patterns in the Southern New England area to establish potential routes and uses for the proposed terminal. The research team will work closely with the Quonset Development Corporation (QDC) throughout the project to obtain information regarding issues such as potential ferry traffic, tenants, and land uses for Quonset Point.

This study will result in multiple scenarios for the redevelopment of Quonset Point. A final report with concept maps and plans (which will illustrate potential terminal sizes, configurations, and locations) will be considered by QDC when planning for the future of the Quonset Point waterfront.

Potential Benefit(s)
• The results of the project will be considered by QDC as part of the planning and redevelopment of the Quonset Point waterfront.
• Other Rhode Island communities and coastal communities of the United States may use the results of the project while researching their own (re)development and considering mixed-use, multi-modal ferry terminals.
• A more attractive, better-designed ferry terminal may attract more passengers, tourists, and local visitors. “Increasing economic development may lead to job growth in the area as well.

For More Information:
Prof. Richard Burroughs
University of Rhode Island - Marine Affairs
Washburn Hall
Kingston, RI 02881
401-874-4045
rburroughs@uri.edu
Narragansett Bay High Speed Ferry Network
Phase 2: Engineering, Marketing, Economic Development

Abstract
The year is 2015, gas costs four dollars per gallon, and you have been stuck in a traffic jam for an hour due to the increasing number of vehicles on Rhode Island’s roadways. You find yourself wishing that there were an alternative, affordable way to get from your home in Kingston to your office in Providence. Through this project, Brian Hanley, executive director of Rhode Island Design Studio, Professor Angelo Simeoni of the University of Rhode Island’s Community Planning and Landscape Architecture Department, and Dr. Stephan Grilli of the University of Rhode Island’s Department of Ocean Engineering intend to study such an alternative. The project team will direct students to develop plans for the multiple aspects involved in a high speed ferry network.

Hanley manages the involvement of the multiple schools working on the project, which range from Rhode Island high schools to colleges and universities. Simeoni’s landscape architecture students will develop vision plans and preliminary designs for ferry terminals at Bold Point Park, East Providence, and Prudence Island. The Bold Point Park site promises to be an important area of development, as there is the possibility of connecting the East Bay bike path, the public transportation system, a ferry system, a community park, and parking, enabling commuters, tourists, and beachgoers to travel without their cars. The Prudence Island site enables students to determine what locations are best suited for the development of a terminal, and what type of terminal (permanent or seasonal shelter) is most appropriate for the area. Grilli’s ocean engineering students will study the Scarborough Beach Landing design (developed during Phase 1 of the project) in order to design possible structures for the docking of a ferry in the open water.

This project’s resulting vision plans for the implementation of a high speed ferry network, which may be referred to during the discussions and development of transportation alternatives in the state of Rhode Island.

Potential Benefits
• Students involved in the project will gain valuable real-world experience in planning, development, marketing, and various other areas.
• The resulting plans and research information may prove useful to the state in future decisions regarding the implementation of a ferry network.

For More Information:
Brian Hanley
Executive Director, RI Design Studio
106 Massasoit Ave.
Cranston, RI 02920
401-261-4701
brian.hanley@cox.net

Dr. Stephen Grilli
University of Rhode Island
Ocean Engineering
217 Sheets Building
Narragansett, RI 02882
401-874-6139
grilli@oce.uri.edu

Prof. Angelo Simeoni
University of Rhode Island
Community Planning and Landscape Architecture
6 Greenhouse Rd.
Kingston, RI 02881
401-874-4549
aes@uri.edu
Evaluation of Nonviolence Training for Offenders

Abstract
Most of us have been guilty of some traffic offense at one time or another, whether or not we actually got caught in the act. Though we do not usually intend to drive recklessly, often times overwhelming circumstances influence us, resulting in speeding or other dangerous driving practices. For those convicted of such offenses, learning to handle thoughts and emotions would be more likely to improve future driving practices than typical community service requirements. The University of Rhode Island offers just that to some convicted traffic offenders in its nonviolence training program. However, some form of evaluation of the program is needed to ensure that the program is applied as effectively as possible.

Professor Charles Collyer, of the URI Psychology Department, will develop such an evaluation procedure, which will focus on the attitudes, intended behavior, and actual behavior of the convicted offenders. A four-part questionnaire will be developed to address these issues before nonviolence training, immediately following training, and at appropriate follow-up intervals. The questionnaire developed in this study will be answered by those in the nonviolence training program and by a comparison group. The resulting data will be analyzed in an effort to discover what changes are attributable to the training.

This study will be a useful part of an ongoing program aimed at improving nonviolence training. The results will increase understanding of which methods work and how they are effective.

Potential Benefit(s)
• More effective delivery of nonviolence training will result in putting safer drivers back on the road.
New Research Projects

Acoustic Detection and Monitoring for Transportation Infrastructure Security

Abstract
With heightened concern regarding possible terrorist activities, much attention is being paid to the safety and security of coastal areas and ports in the United States. Two of the top issues are the security of U.S. bridges and the expansion of LNG import facilities. The destruction of bridges could result in the loss of many lives and would cause severe damage to an integral part of our transportation system. Expansion of LNG facilities would increase the number of incoming shiploads of the flammable gas. Everett, Massachusetts currently imports LNG, with the ship’s path crossing close to downtown Boston, and expansion of the current LNG terminal in Providence has been proposed in order to allow for importing as well. Were one of these ships attacked, the effects would be catastrophic. Despite these growing concerns, there is currently no effective system to monitor the underwater security of U.S. harbors.

This project team will work towards the development of such a monitoring system by researching an already widely used technology - sonar. Sonar is an excellent underwater detection device because of sound’s superior capability to travel through water. Unlike light, sound can travel long distances through water with little distortion, making it possible to transmit sound waves that bounce off of objects and to record the returning waves. People have been using sonar technology to locate icebergs, rocks, submarines, and marine life for quite some time, but little attempt has been made to research sonar’s ability to detect human divers. This project will attempt to do just that.

Because a human is mostly water, the acoustic target strength (or the acoustic size of the target, which determines how much sound will be reflected) is rather small - the person is not much different than the water that the sound is traveling through. However, a diver carries a scuba tank. This air-filled tank has much different qualities than water, making its target strength, and the amount of sound returned, much larger. Considering these differences, the project team will determine the related equations and guidelines necessary for generating an acoustic system capable of detecting and recognizing divers.

Potential Benefit(s)
• This research will increase and enhance current knowledge about the uses and capabilities of sonar technology.
• The results of this project may lead to an effective detection and monitoring system for greater protection of U.S. ports and harbors.

For More Information
Dr. James Miller
University of Rhode Island
Ocean Engineering
Narragansett, RI 02882
401-874-8540
miller@egr.uri.edu

The facilities used for testing the sonar technology, located at the URI Bay Campus.
Project Issue(s)
• A dynamic message sign (DMS) system, a direct link between the highway management system and drivers, is being used in Rhode Island and surrounding states in an effort to provide drivers with real-time information regarding highway driving conditions.
• Currently, the system displays only descriptive textual information. It is likely that incorporating graphic messages with the text may be more effective, particularly for the elderly and those whose first language is not English.

For More Information:
Dr. Jyh-Hone Wang
University of Rhode Island
Industrial and Manufacturing Engineering
103 Gilbreth Hall
Kingston, RI 02881
401-874-5195
jhwang@egr.uri.edu

Employing Graphics to aid Message Display on Dynamic Message Signs

Abstract
Being stuck in bumper to bumper traffic is no fun for anyone, especially when there is no way of finding out how far ahead the cause of the traffic jam is. Luckily, Rhode Island has recently adopted the use of a DMS system to inform drivers of expected traffic delays due to weather conditions, accidents, and construction. However, the text-based format of these displays may not be as effective as other possible methods.

This study will assess the effectiveness of graphic displays on the DMS system in aiding the current text-only message format.

The research team will begin with a survey designed to reflect drivers’ opinions and preferences regarding textual and graphic displays. Collected information will illustrate the drivers’ understanding and interpretation of various graphic displays, the influence of such messages on drivers’ route choices, and will identify potential problems with the use of graphics in the DMS system. The team will also conduct both driving simulation experiments and field studies on a test route to gauge driver response to and comprehension of various graphic and textual messages. Participants in these experiments will be demographically diverse in order to more accurately represent the effects of the DMS system on the population as a whole.

The results of this study will identify potential difficulties with graphic messaging and inform recommendations regarding the design and implementation of graphic messaging on Rhode Island’s dynamic message signs.

Potential Benefit(s)
• Increasing driver comprehension and understanding of DMS messages, thus increasing driver awareness of traffic and road conditions, will increase highway safety in general.
• Because the use of graphic messages is new to the United States, this research may be helpful to other states considering the implementation of a graphic DMS system.
**New Research Projects**

**Challenges and Prospects of the Proposed Intermodal Transportation Hub at T.F. Green Airport in Warwick, Rhode Island**

**Abstract**
In 1998, former Rhode Island Governor Lincoln Almond proposed an intermodal transportation project that would involve the development of a train station near T.F. Green in Warwick, a rental car garage, and a “people mover” system for transport between the station and the airport. Such a development has the potential to be a major benefit to Rhode Island, improving traffic conditions and making T.F. Green a more attractive option to travelers. However, the project is highly controversial due to the large number of unknowns involved. How will the project be financed? Will people use the expanded services? Does the success of the train station depend on the future expansion of the airport and an increased volume of consumers?

Graduate students enrolled in the University of Rhode Island’s Community Planning Studio Course, under the direction of Professor Farhad Atash, have performed a comprehensive study of the proposed intermodal transportation project. Their main objectives were to identify the potential benefits as well as the challenges facing the acceptance and development of such facilities. The students were also to suggest policy recommendations for dealing with the potential challenges.

The students involved in this research judged that the proposed project should be carried out as a complete package. There is a current need for the development of a train station in closer proximity to the airport, but the station will be less effective if there is not an easy connection between the station and the airport, and if there is not a convenient car rental location. Thus, the “people-mover” system and the rental car garage are necessary for the optimal functioning of the intermodal transportation hub. Understanding that large projects are sometimes not completed as a whole, the students also concluded that if it is feasible to build only the train station (due to cost or other circumstances), then the other elements should not be forgotten, but pursued when possible.

The results of this research and the policy recommendations were presented to a group of stakeholders involved in the proposed intermodal transportation hub at T.F. Green, stimulating discussion and debate among those in attendance.

**Project Benefit(s)**
- Graduate students in the Community Planning Program have gained first-hand experience in the area of intermodal transportation planning, a field that is growing as alternatives to highway driving become necessary.
- The results of this research may help bring the project stakeholders together to discuss possible solutions to many of the challenges they face, possibly spurring development into action.
- The University of Rhode Island, the Community Planning Department, and the students involved will be recognized as having contributed to the debate on this major transportation project.
New Research Projects

Safety Belt Usage Rates at High Schools and Colleges in Rhode Island

Abstract
Though teens have the highest motor vehicle accident fatality rate of any age group, there is too little information to adequately assess the effects of efforts to raise safety belt usage rates. This study will gather and analyze the needed information and determine strategies for potential specific interventions.

The project team will conduct a paper survey at high schools across the state, and a web-based survey will be administered at various colleges. These surveys will collect data on teenage students that reflect safety belt usage rates, patterns, and behavioral characteristics of both the teenagers surveyed and of their safety belt use. The resulting data will be organized into categories illustrating specific patterns and characteristics such as peer pressure influences, differences between grade levels, and personal reasons for non-use. The data and categories will also be used to produce “Model Tables” for national use.

The resulting information will be used to custom-tailor possible intervention campaigns specifically targeted towards groups with low rates of safety belt usage.

Potential Benefit(s)
• The collected information may help build targeted intervention campaigns as a complement to the “Buckle-Up America” effort to raise the safety belt usage rates among teens.
• The Rhode Island intervention programs will be able to specifically target low-performing groups and raise awareness of the statewide usage rates. They could also serve as a national model for school intervention programs.
• Overall, a lower fatality rate among teens in motor vehicle crashes may result from the specific intervention programs built from the study’s findings.

For More Information:
Dr. Jerome Schaffran
University of Rhode Island
Lower College Road
Kingston, RI 02881
401-874-2270
schaf@uri.edu

Danial Berman
Federal Highway Administration
380 Westminster St.
Providence, RI 02903
401-528-4560
daniel.berman@fhwa.dot.gov
Project Issue(s)
• Driver fatigue is responsible for a large percentage of fatal truck crashes.

• In an effort to reduce driver fatigue, the Federal Motor Carrier Safety Administration (FMCSA) has implemented new hours-of-service regulations which require drivers to include time spent waiting at loading and unloading docks as part of their on-duty hours.

• These new regulations have had a negative impact on the transportation costs of retail distribution centers, but neither the trucking industry nor retail distributors understand how to reduce such effects.

For More Information:
Dr. Valerie Maier-Speredelozzi
University of Rhode Island
Industrial & Manufacturing Engineering
103 Gilbreth Hall
Kingston, RI 02881
401-874-5187
vms@egr.uri.edu

New Research Projects

The Impact of Truck Driver Hours-of-Service Regulations on Retail Warehouse Operations

Abstract
Driver fatigue is a very dangerous circumstance for both truck drivers and others on the road. Previous FMSCA regulations, though intended to lessen the incidence of driver fatigue, have actually caused drivers to falsify their driving logs in an effort to save time and money. Now, because the drivers must account for time spent loading, unloading, and waiting, and are unable to spend as much time on the road, retail distributors have faced an increase in their shipping costs.

Collaborating with the CVS Logistics Division and a distribution center in Woonsocket, Rhode Island, this project team will research the effects of the new hours-of-service regulations on the warehouse operations of retail distributors. Data will be collected regarding current load, unload, and wait times. This information will be used to create computer simulation models of warehouse procedures, which will be used to identify areas in need of improvement. Using this information, alternate designs and procedures will be analyzed.

The final results of this study will be used to formulate recommendations to improve the efficiency of current operating procedures. The results will also be published and a presentation will be prepared for the Transportation Research Board conference.

Potential Benefit(s)
• This study will contribute to research in transportation related logistics and modeling strategies for retail supply chains, which may help in reducing the higher costs resulting from the new hours-of-service regulations.
• The results of this study may also prove useful to other industries affected by government regulations, such as airline crew scheduling and product distribution for items with limited shelf life.
• The improvement of driver schedules and loading/unloading dock procedures will allow drivers to avoid unexpected delays, meet schedule demands, and maintain compliance with hours-of-service regulations, leading to safer driving conditions for truck drivers and others on the road.
New Research Projects

Developing Intermodal Transportation Station Projects: A Public-Private Partnership Approach

Abstract
More and more Rhode Islanders are commuting to Boston and Providence for work everyday. The traffic conditions during rush hour are already sub-par, intensifying the effects of normal wear and tear on Rhode Island highways and creating many angry drivers. With the increasing amount of commuters, these conditions will only get worse. But, imagine an alternative to traffic jams and beat-up roads. Imagine a commuter rail whose services were extended past Providence, with stops at T.F. Green in Warwick and Wickford Junction, among others. Rhode Island is currently considering this expansion, which is a much needed alternative for commuters. However, the potential addition of multiple train stations is costly, and the financing options of such a project are unclear.

This research project will study the challenges of developing these stations in Rhode Island while focusing on the development of creative financial tools, specifically potential public-private partnerships. The project team will attempt to discover new ways of financing the station infrastructures and the development of the surrounding areas by researching methods used by other cities and states. The team will investigate whether or not these methods would work in Rhode Island by identifying potential legal and institutional barriers (e.g. different taxing systems, different operations of state and local government). Once these barriers have been identified, the team will create possible strategies for overcoming such obstacles.

The final result of this study will be the development of a “creative finance toolbox,” which will contain information on “best practices,” the pros and cons of public-private partnerships, and the suitability of several financial tools for the development of the train stations and surrounding areas in Rhode Island.

Potential Benefit(s)
• The results of this study will be shared with many agencies, including Rhode Island Department of Transportation, Rhode Island Statewide Planning Office, Rhode Island Public Transit Authority, and Rhode Island Economic Development Corporation. These and other state and local agencies will be able to use the information in an effort to overcome financing difficulties in the future development of train stations in Rhode Island.
• By expanding the commuter rail, Rhode Island commuters will have a practical and affordable alternative to driving, thus relieving the amount of traffic and wear and tear on Rhode Island highways.

For More Information:
Prof. Farhad Atash
University of Rhode Island
Community Planning & Landscape Architecture
308 Lippitt Hall
Kingston, RI 02881
401-874-2982
atash@uri.edu
New Research Projects

Comparative Performance of Explosion Shielding Materials Used in Transportation

Abstract
Driving next to a tractor trailer is a frightening experience for many drivers. Wondering if the driver can see you, if he or she is fatigued, or if the truck will roll over seem to be enough worries for such a situation. However, there is now the added concern about the threat of an explosion due to a number of possible factors. The damaging results of this risk, however, may be decreased with research into more effective container shielding materials.

This study will test and compare the effectiveness of currently used materials and composites in shielding and mitigating explosion effects. A shock tube facility, which replicates the conditions of an explosion and can be accurately controlled, will be built and used to test the effectiveness of metals and plastics that are currently used in transportation containers. This study will also identify and test new composites and materials for possible use in the construction of transportation containers.

The result of this comparative study will be the enhancement of the reliability of transportation vehicles against the forces of explosion. Understanding of the effectiveness of different shielding materials will be gained and techniques of strengthening the vehicles where vulnerable will be developed.

Potential Benefit(s)
• The results of this research may lead to improvements in the safety of transportation vehicles, providing a partial remedy to the new safety hazards imposed by terrorist and criminal activities.
• New materials may be found to be more effective in shielding and mitigating the effects of explosive forces than those materials currently used.
• Extensive data regarding the properties of new and current materials pre- and post-explosion will be recorded. This data may prove useful in other areas of manufacturing not related to transportation vehicles.

For More Information:
Dr. Carl-Ernst Rousseau
University of Rhode Island
222-B Wales Hall
Kingston, RI 02881
401-874-2542
rousseau@egr.uri.edu
Publications, Presentations & Success Stories
**Reported Publications, Presentations & Success Stories**

**FY 2004 URITC 000318 Mr. Dan Berman**  
**Safety Belt Usage Rates at High Schools and Colleges in Rhode Island**

12/20/2004  Success Story: Several press releases were covered by local news sources. The researchers were interviewed by Channel 10 News, radio, and two newspapers.

**FY 2004 URITC 000466 Dr. Valerie Maier Speredelozzi**  
**The Impact of Truck Driver Hours-of-Service Regulations on Retail Warehouse Operations**

10/08/2004  Success Story: The Project Start Seminar was delivered with two representatives of the CVS Transportation & Logistics department in attendance. Recently, the PI was contacted by the media relations group at URI in an effort to further publicize the project.

**FY 2004 URITC 000471 Prof. James Miller**  
**Acoustic Detection and Monitoring for Transportation Infrastructure Security**

11/30/2004  Poster presentation entitled “Measurements and Modeling of the Target Strength of Divers” by James Miller and Gopu Potty accepted at the OCEANS-2005 conference to be held in Brest, France in June, 2005.

**FY 2004 URITC 000562 Prof. Charles Collyer**  
**Evaluation of Nonviolence Training for Offenders**

12/03/2004  Invited colloquium presentation entitled “Disagreement About What Is Violent” by Charles Collyer at the University of Massachusetts at Amherst.

**FY 2004 URITC 000564 Prof. Farhad Atash**  
**Challenges and Prospects of the Proposed Intermodal Transportation Hub at T.F. Green Airport in Warwick, Rhode Island**

12/09/2004  Success Story: Sam Snead, one of the graduate students participating in the study, was selected by URITC to attend the annual TRB Conference in Washington, DC in January 2005.

12/08/2004  Success Story: The graduate students presented the findings of their study to key stakeholders at the University of Rhode Island Transportation Center. The presentation was covered by the Warwick Beacon on December 9, 2004.
Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories

FY 2004 URITC 000592 Prof. Angelo Simeoni
Narragansett Bay High Speed Ferry Network: Phase 2 - Engineering, Marketing, and Economic Development

11/12/2004 Success Story: Barrington High School marketing students distributed the marketing survey developed by the Bryant University marketing students. The survey results were incorporated with results collected on the Bryant University campus. The Marketing Survey Report describes the Barrington High School data.

FY 2003 URITC 000188 Prof. Angelo Simeoni
Narragansett Bay High Speed Ferry Network: Phase 1 - Site Selections and Site Designs

Spring 2004 Success Story: LAR 344 Landscape Architecture Design Studio II is offered by Angelo Simeoni at URI during the Spring 2004 semester.

FY 2003 URITC 000163 Dr. Thomas Boving
Porous Pavement and Water Quality: Investigation of a Newly Constructed Parking Lot and its potential Impact on Subsurface Water


Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories

FY 2003 URITC 000216 Dr. Michael Greenfield
Designing Model Asphalt Systems Using Molecular Simulation

11/09/2004 Poster presentation entitled “Developing Model Asphalt Systems Using Molecular Simulation” by Liqun Zhang and Michael Greenfield at the American Institute of Chemical Engineers (AIChE) Annual Meeting in Austin, TX.


FY 2003 URITC 000057 Dr. Carl-Ernst Rousseau
Experimental Evaluation of Novel Composites for Use in Transport of Explosive Materials

12/31/2004 Success Story: One student has completed his Master’s degree in Mechanical Engineering through this project. Another student will follow in the spring term.

08/19/2004 Success Story: Research results from testing materials for homeland defense with a 23-foot “shock tube” were included in the URI News Bureau Press Release.

07/01/2004 Success Story: The project team built a new shock tube facility at URI. As a result, the PI has received a 3 year $150,000 grant from the US ARMY to evaluate the explosive capabilities of their tank panels. Thus, this project will benefit not only the transportation industry, but also our national security as a whole.

05/07/2004 Presentation entitled “Experimental Evaluation of Novel Composites for Use in Transport of Explosive Materials” by Jim Leblanc at the Graduate Student Symposium 2004 at Worcester Polytechnic Institute, MA.

FY 2003 URITC 000052 Dr. Jyh-Hone Wang
Enhancing Driving Safety through Proper Message Design on Variable Message Signs

11/05/2004 Presentation entitled “Enhancing Motorist Understanding of Variable Message Sign Messages” by Jyh-Hone Wang at the 17th Rhode Island Transportation Forum, Kingston, RI.
Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories

07/31/2004  Success Story: As a participant of the URITC/Dwight David Eisenhower Fellowship Program, Carmen Vilar, an exchange intern student from the University of Puerto Rico - Mayaguez, was able to join this project and made a great contribution to the research.

FY 2003 URITC 000059 Prof. James Miller
Calibration of Scour Models using Advanced Sonar Technology for Bridge Safety


12/31/2003  Success Story: RIDOT engineers showed interest in the acoustic survey method and suggested some bridges maintained by the Department for future field efforts.

FY 2003 URITC 000060 Dr. Chris Baxter
Liquefaction Potential of Inorganic and Organic Silts

11/05/2004  Presentation entitled “Liquefaction Potential of Inorganic and Organic Silts” by Chris Baxter and George Veyera at the 17th Rhode Island Transportation Forum, Kingston, RI.

FY 2002 URITC 536176 Prof. Daniel Murray
Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data

11/05/2004  Presentation entitled “Web-based Relational Databases Portal for Geotechnical Data” by Anne Veeger, Daniel Murray, Jon Boothroyd, and O. Don Hermes at the 17th Rhode Island Transportation Forum, Kingston, RI.

03/01/2004  Success Story: RIDOT will adopt the relational database developed by this project and require all contractors to file digital borehole data that will be incorporated into the database.

### Project Achievements

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>FY 2002 URITC 536178 Prof. Farhad Atash</td>
<td><strong>Developing and Applying a Transportation Model for Aquidneck Island</strong> Paper entitled “Linking Land Use and Transportation Planning in Aquidneck Island, RI: A Regional Perspective” by Farhad Atash and Kelly Woodward was presented at the “Tools of the Trade” 9th National Conference on Transportation Planning for Small and Medium-Sized Communities in Colorado Springs, Colorado.</td>
</tr>
<tr>
<td>12/09/2003</td>
<td>Success Story: A reporter from Channel 10 TV in Rhode Island interviewed Farhad Atash to discuss the findings of the project.</td>
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<td>FY 2002 URITC 536179 Prof. Timothy Tyrrell</td>
<td><strong>Integrated Transportation Pricing Strategy for Newport</strong> Paper entitled “A Stated Preference Study of Parking Choices Among Tourists in Newport, Rhode Island” by Chris Anderson, Chandita Das, and Timothy Tyrrell submitted to <em>Transportation Research Record</em>, under review for publication.</td>
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<td>06/10/2004</td>
<td>Success Story: Vortechnichs Inc. has contacted Thomas Boving to work out possible product development based on wood filter technology in combination with Vortechs storm water treatment system.</td>
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**URITC Publications, Presentations & Success Stories**

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## Project Achievements

### Reported Publications, Presentations & Success Stories

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<tr>
<td>06/01/2004</td>
<td>Success Story: Completion of Master Thesis by Kevin Neary entitled “Removal of Polycyclic Aromatic Hydrocarbons from a Detention Pond by Sorption into a Wood Filter.”</td>
</tr>
<tr>
<td>03/05/2004</td>
<td>Presentation entitled “The Use of Aspen Wood Filter to Absorb Polycyclic Aromatic Hydrocarbons from a Providence Detention Pond” by Kevin Neary and Thomas Boving at Rhode Island Natural History Survey’s 9th Annual Conference: Ecological Research in Rhode Island, Cranston, RI.</td>
</tr>
</tbody>
</table>

**FY 2002 URITC 536182 Prof. R. Choudary Hanumara**

**RI DOT 2002 Bicycle Transportation User Survey; Developing Intermodal Connections for the 21st Century**

<table>
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<tr>
<td>01/30/2004</td>
<td>Success Story: Upon request, the research team provided data to the Federal Highway Administration (FHWA) and Pedestrian and Bicycle Information Center (PBIC) on pedestrian and bicycle use and the extent and/or quality of pedestrian and bicycle facilities.</td>
</tr>
</tbody>
</table>

**FY 2002 URITC 536183 Dr. Brett Lucht**

**Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature**

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Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories


09/16/2003  Presentation entitled “Synthetic Methods for the Modification of the Thermochromic Properties of Polythiophenes” by Yu Wang at National American Chemical Society Meeting, Golden Valley, MN.

FY 2002 URITC 536184 Prof. Richard Burroughs
Dredging in a changing scientific and regulatory environment - Year 2

11/16/2004  Presentation entitled “Navigational Dredging and Institutional Change” by Richard Burroughs at the 7th Marine Transportation System Research and Technology Coordination Conference, Washington, DC.


FY 2002 URITC 536186 Prof. Martin Sadd
Mechanical Behavior of Recycled Asphalt Material Under Dynamic Loading Conditions


Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories


06/15/2003  Presentation entitled “Microstructural Simulation of Asphalt Samples Using a Finite Element Network Model” by Qingli Dai and Martin Sadd at the 16th ASCE Engineering Mechanics Conf., University of Washington, Seattle, WA.

05/20/2003  Presentation entitled “Effect of Loading Rate on the Splitting Strength of Recycled Asphalt Concrete” by Arjun Tekalur at SEM Student Conference, Worcester Polytechnic Institute, Worcester, MA.

FY 2001 URITC 536151 Prof. Richard Burroughs
Dredging in a Changing Scientific and Regulatory Environment

Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories

FY 2001 URITC 536158 Dr. Mercedes Rivero-Hudec and Prof. Sze Yang
Replacement of Chromates in Paints and Corrosion Protection Systems

08/02/2004  Success Story: Research results on developing a new group of non-toxic, corrosion resistant polymers to replace chromates in paint and other coating systems were included in the URI News Bureau Press Release.

FY 2001 URITC 536159 Prof. Joan Peckham
Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources

08/08/2003  Success Story: Visited RIDOT (Steve Kutt’s office) to show our software with Ming-song Zheng. RIDOT will use the concept to develop their own system. They are also interested in evaluating the software developed by Da-hong (Jean) Wang for installation at RIDOT.

FY 2001 URITC 536160 Prof. Arijit Bose
Processing of Cenosphere-Cement/Asphalt Composite Materials and Evaluation of their Mechanical and Acoustic Properties


FY 2001 URITC 536162 Prof. Norbert Mundorf
Creating Safe Transportation Options for College Students


## Publications, Presentations & Success Stories

### Reported Publications, Presentations & Success Stories

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<td><strong>FY 2001 URITC 536163 Prof. Thomas Grigalunas</strong></td>
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<td></td>
<td><strong>Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21 Century (Year 3)</strong></td>
</tr>
<tr>
<td>11/16/2004</td>
<td>Presentation entitled “Integrating Financial, Economic, and Environmental Issues in Container Port and Related Intermodal Planning” by Tom Grigalunas, Simone Trandafir, Meifeng Luo, and James Opaluch, University of Rhode Island; and Suk-Jae Kwon, Korea Ocean Research and Development Institute at the 7th Marine Transportation System Research and Technology Coordination Conference, Washington, DC.</td>
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<td><strong>FY 2000 URITC 536131 Prof. Norbert Mundorf</strong></td>
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<td><strong>Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies</strong></td>
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<td><strong>FY 2000 URITC 536138 Prof. Martin Sadd</strong></td>
</tr>
<tr>
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<td><strong>Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials</strong></td>
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Publications, Presentations & Success Stories

Reported Publications, Presentations & Success Stories

FY 1999 URITC 536104 Prof. Armand Silva
Beneficial Uses of Dredge Material from the QPD Intermodal Port Terminal


FY 1999 URITC 536106 Prof. Thomas Grigalunas
Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century (Year 1)


Ongoing Projects

Safety Belt Usage Rates at High Schools and Colleges in Rhode Island
Daniel Berman
URITC Executive in Residence & FHWA RI Division Assistant Division Manager
Dr. Jerome Schaffran, Professor
University of Rhode Island Human Development and Family Studies
Year Initiated: 2004-000318

Nanostructured Materials for Advanced Transportation Applications
Prof. Arijit Bose, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2004-000464

The Impact of Truck Driver Hours-of-Service Regulations on Retail Warehouse Operations
Dr. Valerie Maier-Speredelozzi, Assistant Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2004-000466

Quonset Point (QP) Multi-Modal, Mixed-Use Ferry Terminal Study
Prof. Richard Burroughs, Professor
University of Rhode Island Department of Marine Affairs
Year Initiated: 2004-000470

Acoustic Detection and Monitoring for Transportation Infrastructure Security
Prof. James Miller, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 2004-000471

Employing Graphics to Aid Message Display on Dynamic Message Signs
Dr. Jyh-Hone Wang, Associate Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2004-000472

Testing Models of Asphalt System Modification Using Molecular Simulation
Dr. Michael Greenfield, Associate Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2004-000506
Ongoing Projects

Comparative Performance of Explosion Shielding Materials Used in Transportation
Dr. Carl-Ernst Rousseau, Assistant Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2004-000507

Developing Intermodal Transportation Station Projects: A Public-Private Partnership Approach
Prof. Farhad Atash, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2004-000557

Evaluation of Nonviolence Training for Offenders
Prof. Charles Collyer, Professor
University of Rhode Island Department of Psychology
Year Initiated: 2004-000562

Highway Flares and Runoff: a Potential Source of Perchlorate to Surface Water in Rhode Island
Dr. Anne Veeger, Associate Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2004-000563

Challenges and Prospects of the Proposed Intermodal Transportation Hub at T.F. Green Airport in Warwick, Rhode Island
Prof. Farhad Atash, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2004-000564

Narragansett Bay High Speed Ferry Network - Phase 2: Engineering, Marketing, and Economic Development
Prof. Angelo Simeoni, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2004-000592

Enhancing Driving Safety through Proper Message Design on Variable Message Signs
Dr. Jyh-Hone Wang, Associate Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2003-000052
Experimental Evaluation of Novel Composites for Use in Transport of Explosive Materials
Dr. Carl-Ernst Rousseau, Assistant Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2003 -000057

Calibration of Scour Models Using Advanced Sonar Technology for Bridge Safety
Prof. James Miller, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 2003 -000059

Liquefaction Potential of Inorganic and Organic Silts
Dr. Christopher Baxter, Assistant Professor
University of Rhode Island Departments of Ocean Engineering & Civil and Environmental Engineering
Year Initiated: 2003 -000060

Web Based Relational Database Portal for Subsurface Geotechnical Data
Prof. Daniel Murray, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2003 -000158

Porous Pavement and Water Quality: Investigation of a Newly Constructed Parking Lot and its Potential Impact on Subsurface Water
Dr. Thomas Boving, Assistant Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2003 -000163

Narragansett Bay High Speed Ferry Network Phase 1 - Site Selections and Site Designs
Dr. Angelo Simeoni, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2003 -000188

Designing Model Asphalt Systems Using Molecular Simulation
Dr. Michael Greenfield, Associate Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2003 -000216
Ongoing Projects

Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data
Prof. Daniel Murray, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2002 -536176

Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management
Dr. Chris Hunter, Assistant Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2002 -536177

Developing and Applying a Transportation Model for Aquidneck Island
Prof. Farhad Atash, Professor
University of Rhode Island Department of Community Planning & Landscape Architecture
Year Initiated: 2002 -536178

Integrated Transportation Pricing Strategy for Newport
Prof. Timothy Tyrrell, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 2002 -536179

Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
Dr. Thomas Boving, Assistant Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2002 -536181

Development of Thermochromic Paints, Plastics and Rubbers for Rapid Visual Assessment of Temperature
Dr. Brett Lucht, Associate Professor
University of Rhode Island Department of Chemistry
Year Initiated: 2002 -536183

Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast
Prof. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 2002 -536185
Ongoing Projects

**Mechanical Behavior of Recycled Asphalt Material under Dynamic Loading Conditions**
Prof. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2002 -536186

**Replacement of Chromate in Paints and Corrosion Protection Systems**
Dr. Mercedes Rivero-Hudec, Associate Dean
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2002 -000514

**Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature**
Dr. Brett Lucht, Associate Professor
University of Rhode Island Department of Chemistry
Year Initiated: 2001 -536152

**Field Study of Composite Piles in the Marine Environment**
Dr. Christopher Baxter, Assistant Professor
University of Rhode Island Departments of Ocean Engineering & Civil and Environmental Engineering
Year Initiated: 2001 -536153

**Contamination of Urban Lakes by Storm Runoff from Highway and Railway Drainage Systems**
Prof. John King, Professor
University of Rhode Island School of Oceanography
Year Initiated: 2001 -536155

**Development of an Advanced Pavement Deicing System**
Prof. David Taggart, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2001 -536156

**Investigation of Potential for Intermodalizing Paratransit in Rhode Island**
Dr. Christopher Hunter, Assistant Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2001 -536157
Ongoing Projects

**Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources**
Prof. Joan Peckham, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 2001 -536159

**Multimodal Vehicle Display Design and Analysis**
Prof. Manbir Sodhi, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2001 -536161

**Creating Safe Transportation Options for College Students**
Prof. Norbert Mundorf, Professor
University of Rhode Island Department of Communication Studies
Year Initiated: 2001 -536162

**Rethinking the Region**
Prof. Maureen Moakley, Professor
University of Rhode Island Department of Political Science
Year Initiated: 2001 -536168

**Intermodal Transport of Petroleum Products - Smart Terminals**
Prof. Winston Knight, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 2000 -536133

**Multi-Modal Vehicle Display Design and Analysis**
Prof. Manbir Sodhi, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 1999 -536103
Completed Projects

Stretching Ability of Chip Seal Membranes  (Project cancelled due to death of PI)
Dr. Milton Huston, Adjunct Associate Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2002 -536175

Development of a Course on Bridge Management
Prof. George Tsiatas, Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2002 -536180

RI DOT 2002 Bicycle Transportation User Survey; Developing Intermodal Connections for the 21st Century
Prof. R. Choudary Hanumara, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 2002 -536182

Dredging in a Changing Scientific and Regulatory Environment -Year 2
Prof. Richard Burroughs, Professor
University of Rhode Island Department of Marine Affairs
Year Initiated: 2002 -536184

Dredging in a Changing Scientific and Regulatory Environment
Prof. Richard Burroughs, Professor
University of Rhode Island Department of Marine Affairs
Year Initiated: 2001 -536151

Development of a Customer Satisfaction and Service Quality Measurement Method and Tool for the Rhode Island Public Transit Authority
Prof. Albert Della Bitta, Professor
University of Rhode Island College of Business Administration
Year Initiated: 2001 -536154

Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec, Associate Dean
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2001 -536158
Completed Projects

Processing of Cenosphere-Cement/Asphalt Composite Materials and Evaluation of their Mechanical and Acoustic Properties
Prof. Arijit Bose, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 2001 -536160

Comprehensive Framework for Sustainable Container Ports Development of U. S. East Coast in the 21st Century (Year 3)
Prof. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental & Natural Resource Economics
Year Initiated: 2001 -536163

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Prof. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2001 -536164

Implementation of a Highway Monitoring Program Utilizing Intelligent Transportation Systems (ITS) (Project cancelled due to death of PI)
Dr. Milton Huston, Adjunct Associate Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2000 -536141

Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies
Prof. Nikhilesh Dholakia, Professor
University of Rhode Island College of Business Administration
Year Initiated: 2000 -536131

Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond
Dr. Thomas Boving, Assistant Professor
University of Rhode Island Department of Geosciences
Year Initiated: 2000 -536132

High Accuracy GPS Base Station and Web Delivery System
Prof. Peter August, Professor
University of Rhode Island Department of Natural Resources Science
Year Initiated: 2000 -536134
Completed Projects

**Replacement of Chromates in Paints and Corrosion Protection Systems**  
Dr. Mercedes Rivero-Hudec, Associate Dean  
University of Rhode Island Department of Chemical Engineering  
Year Initiated: 2000 - 536135

**Fiber Reinforcement of Concrete**  
Prof. Richard Brown, Professor  
University of Rhode Island Department of Chemical Engineering  
Year Initiated: 2000 - 536136

**A Web-Based Core Library for Rhode Island**  
Prof. Daniel Murray, Professor  
University of Rhode Island Department of Geosciences  
Year Initiated: 2000 - 536137

**Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials**  
Prof. Martin Sadd, Professor  
University of Rhode Island Department of Mechanical Engineering  
Year Initiated: 2000 - 536138

**TRANSMAP: An Integrated, Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI**  
Prof. Malcolm Spaulding, Professor  
University of Rhode Island Department of Ocean Engineering  
Year Initiated: 2000 - 536139

**Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century**  
Prof. Thomas Grigalunas, Professor  
University of Rhode Island Department of Environmental and Natural Resource Economics  
Year Initiated: 2000 - 536140

**Moving Smart in Rhode Island**  
Prof. Joan Peckham, Professor  
University of Rhode Island Department of Computer Science and Statistics  
Year Initiated: 2000 - 536142
Inorganic and Organic Characterization of Dredged Sediments from the Proposed Quonset Point Channel in Narragansett Bay
Prof. Raymond Wright, Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2000 -536143

Performance Improvement & Measurement of Open-Graded Asphalt Mixes
Prof. Mohammad Faghri, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 2000 -536144

Magnet and Induced Impacts of Quonset Container Port
Dr. Edward Mazze, Dean
University of Rhode Island College of Business Administration
Year Initiated: 2000 -536145

Red Light Running in Rhode Island
Dr. Chris Hunter, Assistant Professor
University of Rhode Island Department of Civil and Environmental Engineering
Year Initiated: 2000 -536146

TRANSMAP: An Integrated, Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI
Prof. Malcolm Spaulding, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 1999 -536100

Fiber Reinforcement of Concrete
Prof. Richard Brown, Professor
University of Rhode Island Department of Chemical Engineering
Year Initiated: 1999 -536101

Geologic Transportation Maps for the 21st Century
Prof. O.Don Hermes, Professor
University of Rhode Island Department of Geosciences
Year Initiated: 1999 -536102
Completed Projects

Beneficial Uses of Dredge Material from the QPD Intermodal Port Terminal
Prof. Armand Silva, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 1999 -536104

The Design and Development of Information and Computer Systems for the URITC
Prof. Joan Peckham, Professor
University of Rhode Island Department of Computer Science and Statistics
Year Initiated: 1999 -536105

Comprehensive Framework for Sustainable Container Ports Development of US East Coast in the 21st Century
Prof. Thomas Grigalunas, Professor
University of Rhode Island Department of Environmental and Natural Resource Economics
Year Initiated: 1999 -536106

Development of an Advanced Bridge, Highway, and Runway Deicing System
Prof. David Taggart, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 -536107

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Prof. Martin Sadd, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 -536108

Modeling for Real-Time Traffic Control in the Rhode Island Intelligent Road
Prof. William Palm, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 -536109

Using Cenospheres to Develop New Asphalt and Cement-Based Concrete Materials
Prof. Arun Shukla, Professor
University of Rhode Island Department of Mechanical Engineering
Year Initiated: 1999 -536110
Completed Projects

**Interactions of Transportation and Telecommunications Behaviors in Relation to RIIR: Modeling the User Perspective**
Prof. Nikhilesh Dholakia, Professor
University of Rhode Island College of Business Administration
Year Initiated: 1999 -536111

**Data Analysis and Detection Methods for Online Health Monitoring of Bridge Structures**
Prof. Sau-Lon Hu, Professor
University of Rhode Island Department of Ocean Engineering
Year Initiated: 1999 -536112

Prof. David Shao, Professor
University of Rhode Island Department of Industrial and Manufacturing Engineering
Year Initiated: 1999 -536113

**Smart Speed Bumps**
Prof. William Ohley, Professor
University of Rhode Island Department of Electrical Engineering
Year Initiated: 1999 -536114
The 2004 budget was approved at a level of $3,624,000, with the Federal share at $1,812,000. Actual commitments and expenditures against this budget are $1,496,190. The distribution of sources of the Year 2004 funds committed are 53.7% from the Federal grant, 20.4% from the University of Rhode Island, and 25.9% from Industry and Public Sector Partners.

The allocations against the 2004 year grant were 67.9% to research and the administrative costs associated with the research. Education accounted for 3.1% of the funds, Technology Transfer and Outreach efforts accounted for 12.9%, and General Administration costs amounted to 16.4% of the funds.