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 66 national centers supported by the U.S. Department of Transportation through the University Transportation Centers Program.

An Executive Director manages the overall operations of the Center, an Outreach Director directs all technology transfer activities and the assistant director oversees the research process. The Center has an Executive Board, chaired by the URI Vice President for Administration, whose members represent all of the Center’s stakeholder groups.

**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 2011 all of our research projects, educational programming and outreach efforts were crowned with success. The URITC continued to build strong partnerships and engage more people in the discussion of transportation issues.

Several URITC researchers received awards for their research. Dr. Vinka Craver received the Rudolph Hering Medal from the Environmental and Water Resources Institute of the American Society of Civil Engineers for her paper “Ceramic Filters Impregnated with Silver Nanoparticles for Point-of-Use Water Treatment in Rural Guatemala.” Dr. Michael Greenfield received the International Road Federation’s Global Road Achievement Award in Research. Greenfield, the 2009 URITC Researcher of the Year, was honored for his project “Simulating Asphalts on the Molecular Level.” Professor Richard Sheridan was presented with the RI Chapter of the American Society of Landscape Architects’ Merit Award for his publication “Rhode Island Department of Transportation Salt Tolerant Tree and Shrub Guide.” He was assisted on this publication by Professor Brian Maynard (Plant Science) and Chris Manteuffel (URI Landscape Architecture Class of 2010).

In April, the URITC co-sponsored “A Call to Action,” a program designed to educate the public and state legislators on the issues facing transportation in Rhode Island. The panelists included Michael Lewis, Director of Rhode Island Department of Transportation and RIPTA Board Member; Jack Basso, Chief Operating Officer, American Association of State Highway and Transportation Officials (AASHTO); Allen Biehler, Former Secretary of the Pennsylvania Department of Transportation, President of Smart Growth America’s Leadership Institute and former President of AASHTO; Governor Parris Glendening, former Governor of Maryland and President of Smart Growth America Leadership Institute; and John Simmons, Executive Director, Rhode Island Public Expenditure Council (RIPEC). Governor Chafee, Senate President Teresa Pavia Weed and Speaker of the House Gordon Fox also addressed the attendees.

In June, the URITC co-hosted the research peer exchange for the joint University of Rhode Island Transportation Center/Rhode Island Department of Transportation Research Program. With the help of Cathy McGhee, Virginia Center for Transportation Innovation and Research; Bill Ahearn, Vermont Agency of Transportation; Skip Paul, Louisiana Department of Transportation; James Sime, Connecticut Department of Transportation; and Rudolph Cholova from the Czech Republic Transportation Research Center, the joint program’s processes and context were reviewed and suggestions were made as to how we could improve the program. One of the suggestions was to develop an Academy of Science for Rhode Island which would develop a pool of local expertise which could be tapped when investigating transportation issues. This would formalize a process that is presently more ad hoc.

Our educational and outreach programs again attracted a large audience in 2011. The newest summer academy, Green Design, introduced high school students to the role of transportation in the design of built landscapes. Led by Professor Will Green of URI’s Landscape Architecture Department, students were introduced to all modes of transportation and the “green” choices which can be made in design that will lead to a reduced environmental impact.

We also successfully entered the social media age with the introduction of Facebook pages for our summer workforce development programs. It is gratifying to see how many of our alumni attribute their selection of career direction to the programs that we offer.

On the Federal front, the URITC was not among the University Transportation Centers awarded funding under the final year of SAFETEA-LU. The URITC collaborated on two proposals with the University of Vermont Transportation Center and though we made the initial cut, we were not among the centers selected for funding. MAP-21 is now on the books and it is too early to tell what opportunities there will be for university transportation centers but we continue to discuss partnerships and directions with our colleagues in the hopes of regaining a federal source of research funds.

I would like to thank our partners at Rhode Island Department of Transportation, Federal Highway Administration, Rhode Island Consulting Engineers and the URITC staff. With their help we will continue to strive for new avenues to impact the transportation sector.
EXECUTIVE BOARD

The URITC Executive Board is composed of the principal University and public sector stakeholders. 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.

Robert Weygand, Chair
URI Vice President, Administration

Michael Lewis
Director, RIDOT

Peter Osborn
Division Administrator, R.I. Division, Federal Highway Admin. (FHWA)

Mark M. Higgins
Associate Dean, URI College of Business Admin.

Phillip Kydd
Assistant Director, RIDOT

Raymond Wright
Dean, URI College of Engineering

Jared Rhodes
Chief, RI Statewide Planning Program

Peter Alfonso
URI Vice President, Research and Economic Development

Kevin Smith
President & CEO, Sustainable Supply Chain Consulting

STAFF

Deborah Rosen
Executive Director

Ronald Giles
Senior Information Technologist

Nancy Murphy
Fiscal Management Officer

Neil Nachbar
Writer

Tory Perrotta
Senior Wordprocessing Typist

Gema Vinuales
Research Manager

CONSULTANTS

Jeff Cathcart
Humberto Martinez

Bridge Photos

Front Cover
Photos courtesy of RIDOT.

Inside Cover
Photos of the I-Way bridge and I-195 traffic courtesy of N.A.M. Photography.

Back Cover
Photos by Eric Full, Rhode Island-based photographer who focuses on seascapes, nature and outdoor portraits. His website is www.fullimages.com

Exchange Street Bridge photo courtesy of Flickr user the_bill.
Distinguished Professor Arijit Bose, of the URI Department of Chemical Engineering, was selected as the 2011 URITC Researcher of the Year.

“The Researcher of the Year is determined not only by how productive they are (number of presentations, number of articles, etc.), but also how well they mentor students and connect with industry,” said URITC Executive Director Deborah Rosen. “Professor Bose excels on all these dimensions. Additionally, his successful grant history demonstrates how to leverage funding sources to take a research idea from basic science to application.”

When informed of the honor, Bose was appreciative of the students who have worked closely with him.

“It was a very pleasant surprise for me to be notified that I had been given this award,” said Bose. “This type of recognition provides great encouragement, not only to me, but to all the hard working students and collaborators, without whose dedication, none of this work would be possible.”

Bose has worked on many transportation-related research projects over the years, including developing a method to quantify asphalt-rock adhesion, working on inorganic composite nano materials for solar cell applications, and more recently, on self-healing concrete.

The professor has found the self-healing concrete project particularly rewarding.

“We can see the potential benefits if we are successful,” stated Bose. “The project has led to some commercial interest, and it is very satisfying to know that the results of our work may some day be used in the real world to improve the durability of concrete structures while simultaneously reducing energy consumption and mitigating carbon dioxide release.”

On three occasions, Bose was presented with the URI College of Engineering’s Vincent and Estelle Murphy Award for outstanding research. He received URIs Outstanding Intellectual Property Award in 2008 and URI Outstanding Research Award in 2011.

Bose has over 85 journal publications and holds eight U.S. patents. He is the co-director of the Rhode Island Consortium for Nanoscience and Nanotechnology and an associate editor of the IEEE Transactions in Nanotechnology.

Bose joined URI in 1982, after two years at Dupont, where he worked in their textile fibers department.
For FY2011 (and those not previously reported)

**Tom Boving**

*Installation of Stormwater Management and Treatment Demonstration Facility (2011)*


**Vinka Craver**

*Phase I- Pervious Pavement Research Facility (2010)*


**Douglas Hales**

*Strategic Management System with Performance Measures for Rhode Island Department of Transportation (2011)*


**Norbert Mundorf**

*Developing Tailored Intervention Technology for Alternative Transportation (2011)*


**Jyh-Hone Wang**


Research Projects

New Projects in 2011

Strategic Management System with Performance Measures for Rhode Island Department of Transportation
Dr. Douglas Hales
URI Department of Marketing & Supply Chain Management
Year Initiated: 2011 – 000128

Studying the Bottleneck Issue at Work Zones and Assessing the Effectiveness of a Portable Dynamic Lane Merging System in Promoting Zip Merging Behavior
Dr. Jyh-Hone Wang
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2011 – 000127

Strategic Analysis of Snow Routes
Dr. Manbir Sodhi
URI Department of Industrial and Systems Engineering
Year Initiated: 2011 – 000131

The Impact of Short Sea Shipping on Logistics in Rhode Island
Dr. Yuwen Chen
URI Department of Marketing & Supply Chain Management
Year Initiated: 2011 – 0003025

Developing Tailored Intervention Technology for Alternative Transportation
Dr. Norbert Mundorf
URI Department of Communication Studies
Year Initiated: 2011 – 0003027

Installation of Stormwater Management and Treatment Demonstration Facility
Dr. Thomas Boving
URI Department of Geosciences
Year Initiated: 2011 – 000141

Assessment of Current LRFD Methods for Pile Capacity Analysis in Rhode Island
Dr. Aaron Bradshaw
URI Department of Civil and Environmental Engineering
Year Initiated: 2011 – 000149

Characterization of Subbase Resilient Modulus at the Route 165 Study Site
Dr. Aaron Bradshaw
URI Department of Civil and Environmental Engineering
Year Initiated: 2011 – 000154

Succession Planning in State Departments of Transportation
Dr. Anthony Wheeler
URI Department of Human Resources Management
Year Initiated: 2011 – 0003082

Ongoing Projects in 2011

Development and Validation of a Predictive Settlement Model for Pile Driving in Silts
Dr. Christopher D.P. Baxter
URI Department of Civil and Env. Engineering and Department of Ocean Engineering
Year Initiated: 2010 – 002812

Self-Healing Concrete
Dr. Arijit Bose
URI Department of Chemical Engineering
Year Initiated: 2010 – 002813

A new self-healing concrete developed and tested by URI graduate student Michelle Pelletier, under the direction of Dr. Arijit Bose, garnered national attention. The research effort was featured in more than two dozen trade publications and websites in the transportation, construction, engineering, and chemical industries. Pelletier was named a 2010 Public Works Trendsetter by Public Works magazine.

Photo courtesy of URI Dept. of Communications & Marketing
Creating a Road Map for Diesel Emissions Reduction in R.I.: A Pilot Program to Reduce Pollution from Heavy Duty Vehicles Used to Perform State Work
Dr. Marion Gold
URI CELS Outreach Center Director
Year Initiated: 2010 – 000118

Phase I: Pervious Pavement Research Facility
Dr. Vinka Craver
URI Department of Civil and Environmental Engineering
Year Initiated: 2010 – 002595

Transportation for Sustainability: Phase II
Dr. Manbir Sodhi
URI Department of Industrial and Systems Engineering
Year Initiated: 2009 – 002021

Simulation, Modeling and Interpretation of Asphalt Rheology
Dr. Michael L. Greenfield
URI Department of Chemical Engineering
Year Initiated: 2008 – 001850

Modeling Molecular Level Actions of Asphalt Modifiers
Dr. Michael L. Greenfield
URI Department of Chemical Engineering
Year Initiated: 2005 – 001025

Settlement of Adjacent Ground from Pile Driving in Silts
Dr. Christopher D.P. Baxter
URI Department of Civil and Env. Engineering and Department of Ocean Engineering
Year Initiated: 2008 – 001851

Transportation for Sustainability: Phase I
Dr. Manbir Sodhi
URI Department of Industrial and Systems Engineering
Year Initiated: 2008 – 001869

Directional Synthesis of Lead Selenide-Titania Core-Shell Nanowire Heterostructures for High-Efficiency Low-Cost Solar Cells
Dr. Arijit Bose
URI Department of Chemical Engineering
Year Initiated: 2008 – 001891

Global Transportation Network and Supply Chain Management: An Integrative Approach
Dr. Mary Krome Hamilton
URI College of Business Administration
Year Initiated: 2005 – 001030

Multi-Modal Hurricane Evacuation Plan
Dr. Natacha Thomas
URI Department of Civil and Environmental Engineering
Year Initiated: 2005 – 001051

Completed Projects

Feasibility Study to Increase Utilization at the Port of Davisville (Quonset, RI)
Dr. James Kroes
URI College of Business Administration
Year Initiated: 2009 – 002035

Feasibility Study to Utilize the Port of Davisville (Quonset, RI) as a Port of Entry
Dr. James Kroes
URI College of Business Administration
Year Initiated: 2009 – 002315

Consumer Behavior, Transportation, Energy Use and Greenhouse Gas Emissions at URI
Dr. Frederick Meyerson
URI Dept. of Environmental Science & Management
Year Initiated: 2008 – 001943

Researching Sustainable Communities: Design, Layout and Transportation Systems
Dr. William A. Green
URI Dept. of Community Planning & Landscape Architecture
Year Initiated: 2008 – 001845

Studying the Vehicle Headway Issue and Its Impact on the Slow-Down Effect
Dr. Jyh-Hone Wang
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2008 – 001852

Increasing Seatbelt Usage Rate Among High School Students
Dr. Norbert Mundorf
URI Department of Communication Studies
Year Initiated: 2008 – 001897

Creating Sustainable Transportation Awareness in Communication Courses
Dr. Norbert Mundorf
URI Department of Communication Studies
Year Initiated: 2008 – 001857
Research Projects

Study of an Overload Truck Screening System for a Sustainable Highway Bridge Network
Dr. Mayrai Gindy
URI Department of Civil and Environmental Engineering
Year Initiated: 2008 – 001900

Enhancing the Preparedness and Response of the Transportation System in Case of Natural or Human-Caused Disasters
Dr. Jyh-Hone Wang
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2006 – 001031

Synthesis of Nanocatalyst-Support Composites for Transportation Applications
Dr. Arijit Bose
URI Department of Chemical Engineering
Year Initiated: 2005 – 001024

Assisting Elder Driver’s Comprehension of Dynamic Message Sign Messages
Dr. Jyh-Hone Wang
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2005 – 001026

New Anti-Fouling Coatings Based on Conductive Polymers
Dr. Richard Brown
URI Department of Chemical Engineering
Year Initiated: 2006 – 001032

Understanding the Activity and Travel Patterns of Teenagers Living in Providence, R.I.
Dr. Talia McCray
URI College of Business Administration
Year Initiated: 2006 – 001033

Improving Safe Transportation and Alcohol Awareness Messages
Dr. Norbert Mundorf
URI Department of Communication Studies
Year Initiated: 2006 – 001034

Transportation System Research Program Development
Dr. Christopher Hunter
URI Department of Civil and Environmental Engineering
Year Initiated: 2006 – 001385

A Strategic Model for Optimal Scaling of International Container Ports
Dr. Christopher Anderson
URI Graduate School of Oceanography
Year Initiated: 2005 – 001028

Integrity Assessment of Composite and Timber Piles in the Marine Environment Using Nondestructive Testing
Dr. Mayrai Gindy
URI Department of Civil and Environmental Engineering
Year Initiated: 2005 – 001027

Co-Utilization of Narragansett Bay by Maritime Commerce, Tourism, Recreational and Commercial Industries
Dr. Candace Oviatt
URI Graduate School of Oceanography
Year Initiated: 2005 – 001029

Commuter Behavior, Transportation, Energy Use and Greenhouse Gas Emissions at the University of Rhode Island (Summer 2006)
Dr. Frederick Meyerson
URI Department of Natural Resources Science
Year Initiated: 2005 – 001162

Nanostructured Materials for Advanced Transportation Applications
Dr. Arijit Bose
URI 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
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2004 – 000466

Acoustic Detection and Monitoring for Transportation Infrastructure Security
Dr. James Miller
URI Department of Ocean Engineering
Year Initiated: 2004 – 000471

Employing Graphics to aid Message Display on Dynamic Message Signs
Dr. Jyh-Hone Wang
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2004 – 000472
<table>
<thead>
<tr>
<th>Research Projects</th>
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| Testing Models of Asphalt System Modification Using Molecular Simulation  
Dr. Michael Greenfield  
URI Department of Chemical Engineering  
Year Initiated: 2004 – 000506 |
| Harnessing the Power of Relational Databases for Management of Geotechnical and Geologic Data  
Dr. Daniel Murray  
URI Department of Geosciences  
Year Initiated: 2002 – 536176 |
| Comparative Performance of Explosion Shielding Materials Used in Transportation  
Dr. Carl-Ernst Rousseau  
URI Department of Mechanical Engineering  
Year Initiated: 2004 – 000507 |
| Determining the Effectiveness of New Technology Data Collection Devices for Real-Time Transportation System Management  
Dr. Chris Hunter  
URI Department of Civil and Environmental Engineering  
Year Initiated: 2002 – 536177 |
| Developing Intermodal Transportation Station Projects: A Public-Private Partnership Approach  
Dr. Farhad Atash  
URI Dept. of Community Planning & Landscape Architecture  
Year Initiated: 2004 – 000557 |
| Development of Thermochromic Paints, Plastics and Rubbers for Rapid Visual Assessment of Temperature  
Dr. Brett Lucht  
URI Department of Chemistry  
Year Initiated: 2002 – 536183 |
| Evaluation of Nonviolence Training for Offenders  
Dr. Charles Collyer  
URI Department of Psychology  
Year Initiated: 2004 – 000562 |
| Replacement of Chromate in Paints and Corrosion Protection Systems  
Dr. Mercedes Rivero-Hudec  
URI Department of Chemical Engineering  
Year Initiated: 2002 – 000514 |
| Highway Flares and Runoff: a Potential Source of Perchlorate to Surface Water in Rhode Island  
Dr. Anne Veeger  
URI Department of Geosciences  
Year Initiated: 2004 – 000563 |
| Development of Thermochromic Paints, Plastics, and Rubbers for Rapid Visual Assessment of Temperature  
Dr. Brett Lucht  
URI Department of Chemistry  
Year Initiated: 2001 – 536152 |
| Liquefaction Potential of Inorganic and Organic Silts  
Dr. Christopher Baxterr  
URI Departments of Ocean Engineering & Civil and Environmental Engineering  
Year Initiated: 2003 – 000060 |
| Contamination of Urban Lakes by Storm Runoff from Highway and Railway Drainage Systems  
Dr. John King  
URI School of Oceanography  
Year Initiated: 2001 – 536155 |
| Web Based Relational Database Portal for Subsurface Geotechnical Data  
Dr. Daniel Murray  
URI Department of Geosciences  
Year Initiated: 2003 – 000158 |
| Development of an Advanced Pavement Deicing System  
Dr. David Taggart  
URI Department of Mechanical Engineering  
Year Initiated: 2001 – 536156 |
| Designing Model Asphalt Systems Using Molecular Simulation  
Dr. Michael Greenfield  
URI Department of Chemical Engineering  
Year Initiated: 2003 – 000216 |
| Investigation of Potential for Intermodalizing Paratransit in Rhode Island  
Dr. Christopher Hunter  
URI Department of Civil and Environmental Engineering  
Year Initiated: 2001 – 536157 |
| Promoting Bike-Riding on the Kingston Campus of URI: Overcoming Barriers to Change  
Dr. Lorraine Keeney  
URI Department of Nutrition and Food Sciences  
Year Initiated: 2003 – 536170 |

URI Transportation Center  
2011 Annual Report
Rethinking the Region
Dr. Maureen Moakley
URI Department of Political Science
Year Initiated: 2001 – 536168

Intermodal Transport of Petroleum Products- Smart Terminals
Dr. Winston Knight
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 2000 – 536133

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

Quonset Point (QP) Multi-Modal, Mixed-Use Ferry Terminal Study
Dr. Richard Burroughs
URI Department of Marine Affairs
Year Initiated: 2004 – 000470

Challenges and Prospects of the Proposed Intermodal Transportation Hub at T.F. Green Airport
Dr. Farhad Atash
URI Dept. of Community Planning & Landscape Architecture
Year Initiated: 2004 – 000564

Narragansett Bay High Speed Ferry Network - Phase 2: Engineering, Marketing and Economic Development
Dr. Angelo Simeoni
URI Dept. of Community Planning & Landscape Architecture
Year Initiated: 2004 – 000592

Enhancing Driving Safety through Proper Message Design on Variable Message Signs
Dr. Jyh-Hone Wang
URI Dept. 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
URI Department of Mechanical Engineering
Year Initiated: 2003 – 000057

Calibration of Scour Models Using Advanced Sonar Technology for Bridge Safety
Dr. James Miller
URI Department of Ocean Engineering
Year Initiated: 2003 – 000059

Porous Pavement and Water Quality: Investigation of a Newly Constructed Parking Lot and Its Potential Impact on Subsurface Water
Dr. Thomas Boving
URI Department of Geosciences
Year Initiated: 2003 – 000163

Narragansett Bay High Speed Ferry Network Phase 1 - Site Selections and Site Designs
Dr. Angelo Simeoni
URI Dept. of Community Planning & Landscape Architecture
Year Initiated: 2003 – 000188

Stretching Ability of Chip Seal Membranes (Project Cancelled Due to the Death of PI)
Milton Huston
URI Department of Civil and Environmental Engineering
Year Initiated: 2002 – 536175

Developing and Applying a Transportation Model for Aquidneck Island
Dr. Farhad Atash
URI Dept. of Community Planning & Landscape Architecture
Year Initiated: 2002 – 536178

Integrated Transportation Pricing Strategy for Newport
Dr. Timothy Tyrrell
URI Dept. of Environmental & Natural Resource Economics
Year Initiated: 2002 – 536179

Development of a Course on Bridge Management
Dr. George Tsiatas
URI Department of Civil and Environmental Engineering
Year Initiated: 2002 – 536180

Wood Filters as an Innovative Treatment Method for Roadway Runoff Pollutants
Dr. Thomas Boving
URI Department of Geosciences
Year Initiated: 2002 – 536181

RIDOT 2002 Bicycle Transportation User Survey; Dev. Intermodal Connections for the 21st Century
Dr. R. Choudary Hanumara
URI Department of Computer Science and Statistics
Year Initiated: 2002 – 536182
Research Projects

Dredging in a Changing Scientific and Regulatory Environment - Year 2
Dr. Richard Burroughs
URI Department of Marine Affairs
Year Initiated: 2002 – 536184

Application of a Multimodal Demand Simulation Model to Assess Container Transportation Policy Issues in the Northeast
Dr. Thomas Grigalunas
URI Dept. of Environmental & Natural Resource Economics
Year Initiated: 2002 – 536185

Mechanical Behavior of Recycled Asphalt Material Under Dynamic Loading Conditions
Dr. Martin Sadd
URI Department of Mechanical Engineering
Year Initiated: 2002 – 536186

Dredging in a Changing Scientific and Regulatory Environment
Dr. Richard Burroughs
URI Department of Marine Affairs
Year Initiated: 2001 – 536151

Field Study of Composite Piles in the Marine Environment
Dr. Christopher Baxter
URI Dept. of Ocean & Civil and Environmental Engineering
Year Initiated: 2001 – 536153

Development of a Customer Satisfaction and Service Quality Measurement Method and Tool for the Rhode Island Public Transit Authority
Dr. Albert Della Bitta
URI College of Business Administration
Year Initiated: 2001 – 536154

Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec
URI Department of Chemical Engineering
Year Initiated: 2001 – 536158

Intelligent Traffic Anomaly Diagnosis Through the Integration of Diverse Information Sources
Dr. Joan Peckham
URI Department of Computer Science
Year Initiated: 2001 – 536159

Processing of Cenosphere-Cement/Asphalt Composite Materials and Evaluation of their Mechanical and Acoustic Properties
Dr. Arijit Bose
URI Department of Chemical Engineering
Year Initiated: 2001 – 536160

Multimodal Vehicle Display Design and Analysis
Dr. Manbir Sodhi
URI Department of Industrial Engineering
Year Initiated: 2001 – 536161

Creating Safe Transportation Options for College Students
Dr. Norbert Mundorf
URI Department of Communication Studies
Year Initiated: 2001 – 536162

Comprehensive Framework for Sustainable Container Ports Dev. of U.S. East Coast in the 21st Century (Year 3)
Dr. Thomas Grigalunas
URI Dept. of Environmental & Natural Resource Economics
Year Initiated: 2001 – 536163

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Dr. Martin Sadd
URI Department of Mechanical Engineering
Year Initiated: 2001 – 536164

Exploring Ways of Influencing Transport Behaviors by Using Telecommunications Technologies
Dr. Nikhilesh Dholakia
URI College of Business Administration
Year Initiated: 2000 – 536131

Chemical Retention Capacity of a Newly Constructed Roadway Runoff Detention Pond
Dr. Thomas Boving
URI Department of Geosciences
Year Initiated: 2000 – 536132

High Accuracy GPS Base Station and Web Delivery System
Dr. Peter August
URI Department of Natural Resources Science
Year Initiated: 2000 – 536134
Research Projects

Replacement of Chromates in Paints and Corrosion Protection Systems
Dr. Mercedes Rivero-Hudec
URI Department of Chemical Engineering
Year Initiated: 2000 – 536135

Fiber Reinforcement of Concrete
Dr. Richard Brown
URI Department of Chemical Engineering
Year Initiated: 2000 – 536136

A Web-Based Core Library for Rhode Island
Dr. Daniel Murray
URI Department of Geosciences
Year Initiated: 2000 – 536137

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Materials
Dr. Martin Sadd
URI Department of Mechanical Engineering
Year Initiated: 2000 – 536138

TRANSMAP: An Integrated, Real-Time Environmental Monitoring and Forecasting System for Highways and Waterways in RI
Dr. Malcolm Spaulding
URI Department of Ocean Engineering
Year Initiated: 2000 – 536139

Comprehensive Framework for Sustainable Container Ports
Development of US East Coast in the 21st Century
Dr. Thomas Grigalunas
URI Dept. of Environmental & Natural Resource Economics
Year Initiated: 2000 – 536140

Implementation of a Highway Monitoring Program Utilizing Intelligent Transportation Systems (ITS)
Milton Huston
URI Department of Civil and Environmental Engineering
Year Initiated: 2000 – 536141

Moving Smart in Rhode Island
Dr. Joan Peckham
URI 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
Dr. Raymond Wright
URI Department of Civil and Environmental Engineering
Year Initiated: 2000 – 536143

Performance Improvement & Measurement of Open-Graded Asphalt Mixes
Dr. Mohammad Faghri
URI Department of Mechanical Engineering
Year Initiated: 2000 – 536144

Magnet and Induced Impacts of Quonset Container Port
Dr. Edward Mazze
URI College of Business Administration
Year Initiated: 2000 – 536145

Red Light Running in Rhode Island
Dr. Chris Hunter
URI 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
Dr. Malcolm Spaulding
URI Department of Ocean Engineering
Year Initiated: 1999 – 536100

Fiber Reinforcement of Concrete
Dr. Richard Brown
URI Department of Chemical Engineering
Year Initiated: 1999 – 536101

Geologic Transportation Maps for the 21st Century
Dr. O. Don Hermes
URI Department of Geosciences
Year Initiated: 1999 – 536102

Multi Modal Vehicle Display Design and Analysis
Dr. Manbir Sodh
URI Dept. of Industrial & Manufacturing Engineering
Year Initiated: 1999 – 536103

Beneficial Uses of Dredge Material from the QPD Intermodal Port Terminal
Dr. Armand Silva
URI Department of Ocean Engineering
Year Initiated: 1999 – 536104
Research Projects

The Design and Development of Information and Computer Systems for the URITC
Dr. Joan Peckham
URI 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
Dr. Thomas Grigalunas
URI Dept. of Environmental & Natural Resource Economics
Year Initiated: 1999 – 536106

Development of an Advanced Bridge, Highway, and Runway Deicing System
Dr. David Taggart
URI Department of Mechanical Engineering
Year Initiated: 1999 – 536107

Effect of Microstructure on the Static and Dynamic Behavior of Recycled Asphalt Material
Dr. Martin Sadd
URI Department of Mechanical Engineering
Year Initiated: 1999 – 536108

Modeling for Real-Time Traffic Control in the Rhode Island Intelligent Road
Dr. William Palm
URI Department of Mechanical Engineering
Year Initiated: 1999 – 536109

Using Cenospheres to Develop New Asphalt and Cement-Based Concrete Materials
Dr. Arun Shukla
URI Department of Mechanical Engineering
Year Initiated: 1999 – 536110

Interactions of Transportation and Telecommunications Behaviors in Relation to RIIR: Modeling the User Perspective
Dr. Nikhil Dholakia
URI College of Business Administration
Year Initiated: 1999 – 536111

Data Analysis and Detection Methods for Online Health Monitoring of Bridge Structures
Dr. Sau-Lon Hu
URI Department of Ocean Engineering
Year Initiated: 1999 – 536112

Dr. David Shao
URI Dept. of Industrial and Manufacturing Engineering
Year Initiated: 1999 – 536113

Smart Speed Bumps
Dr. William Ohley
URI Department of Electrical Engineering
Year Initiated: 1999 – 536114
On May 19, the URITC hosted its 11th Annual Transportation Week Breakfast at the Airport Radisson in Warwick.

The keynote speaker was the Administrator of the Federal Highway Administration (FHWA), Victor Mendez. The subject of his speech was the future of transportation and how to build and maintain a first-class transportation system during challenging economic times.

URITC Executive Director Deborah Rosen recognized the Center’s 2010 Co-Researcher of the Year Award winners, Yuwen Chen and James Kroes. The URI professors’ feasibility study on increasing utilization at the Port of Davisville resulted in Rhode Island receiving a $22.3 million Federal Transportation Investment Generating Economic Recovery (TIGER) grant.

Phil Kydd, deputy director of the Rhode Island Department of Transportation and URITC board member, presented RIDOT’s 7th Annual Quality Award. The recipients were:

**Excellence Award**
- David Capalbo, RIDOT
- Lisa Hill, RIDOT
- R.I. Division of Purchases
- The Employees of RIDOT
- Maintenance Division

**Quality Award**
- Russell Holt, P.E., RIDOT

**Pioneering Award**
- Steven Drager, RIDOT
- R.I. Airport Corp.
- Gilbane Building Co.

**Transportation Safety Award**
- Luanne Nevitt, P.E., RIDOT
- Maguire Group Inc.

**Innovation Award**
- The Town of Burrillville

**Highway Safety Award**
- Janis Loiselle, RIDOT
Close to 130 high school students from 14 schools participated in the URITC’s 5th Annual Engineering Career Day on May 20 at URI’s Kingston campus.

Divided into groups, the participants rotated through four learning labs: bridge and geotechnical engineering; traffic engineering and highway design; field survey, GIS and asset management; and water resources, environmental planning, hazardous materials and drainage.

“For five years, we have given students the opportunity to learn more about civil engineering, with workshops specifically designed to provide insight into the many diverse areas of study and design,” said Rhode Island Department of Transportation (RIDOT) Director Michael P. Lewis.

A new feature in 2011 was the bridge building contest. Students were asked to design and construct a model bridge out of balsa wood and glue according to the specification provided. The bridges were completed ahead of time and tested for strength at the event.

Besides URITC and RIDOT, Engineering Career Day was sponsored by the Federal Highway Administration (FHWA), RI Consulting Engineers (RICE), and the University of Rhode Island College of Engineering.
The 11th annual Rhode Island Construction Career Days (RICCD) was held April 27-28 at the Rhode Island Department of Transportation’s (RIDOT) facility in East Greenwich.

Despite a rainy second day, the event was an overwhelming success. Close to 800 students, accompanied by 138 chaperones, learned about many career opportunities in construction from the exhibitors and by operating tools and heavy equipment.

Exhibitors represented state agencies, public works departments, private industry, police and fire departments, colleges and universities.

The 34 pieces of heavy equipment included excavators, mini excavators, backhoes, man lifts, a paver, a roller, a snow plow truck, bucket trucks, a street sweeper, a line stripner, and the jaws of life.

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A student is taught how to operate a backhoe.

The students also received a hands-on introduction to welding, plumbing, electrical work, carpentry and sheet metal work. The URITC’s driving simulator tested their skills behind the wheel.

The most anticipated part of RICCD was the bridge building competition. The contest had 14 entries on the first day and 13 on day two.

Using balsa wood and glue, and specifications provided by the URITC, teams designed and constructed their bridges during or after school. As the bridges were weighed in at the competition, the creativity of the students was on full display.

For some schools, the bridge contest was the main reason for attending the event. In fact, some advanced physics and mathematics classes incorporated the competition into their curriculum. For the first time, a private school attended RICCD – a decision that was largely based on entering the bridge contest.

Another highlight during the two days was the URITC’s computer station, where 10 laptops featured the West Point Bridge Builder and Gridlock Buster programs. The Rhode Island Consulting Engineers (RICE) showed the students how to use the software.

RICCD is managed by the URITC and sponsored by RIDOT and the Federal Highway Administration.
Hosting a Construction Career Day event for the first time in 2011 was the state of Kansas. Held in Topeka, more than 1,200 students attended, making it the 15th largest event in the country. The bulk of the expenses were covered by funds provided by FHWA and the Kansas Department of Transportation. But exhibitor fees and donations from contractors paid for T-shirts and other items.

Three states, Arizona, Ohio and Oklahoma, reached milestones in 2011 by hosting their 10th event. Washington held its 20th CCD event in the state’s history. With five events in 2011, New York increased its record number of events to 44.

However, after six consecutive years of growth, the number of CCD events decreased in 2011 from the previous year, from 60 to 46. The number of states that hosted events also slipped a bit, from 28 in 2010 to 25 in 2011.

The events that were held, were well attended, as the figures below indicate.

- Total Students .................................................. 63,512
- Students per Event ............................................. 1,381
- Schools per Event ................................................ 36
- Equipment per Event ........................................... 20
- Exhibitors per Event ............................................ 54
- Cost per Event ................................................. $36,316

The 2011 figures brought the number of students who have attended a Construction Career Days event since the program began in 1999 to 467,849, making a half a million an attainable goal for 2012.

Each CCD event is unique in the population they serve, in the activities offered and in the source of funding. However, they share the common goal of introducing careers in construction to America’s youth.

“We want them to understand the opportunities for advancement and the salaries that can be earned. There are also many students who are not aware that there are college majors related to the construction industry, which opens up even more options,” said Ohio event coordinator Tonya Beesely.
On March 11, 80 students from six middle schools gathered at URI for the SMILE Transportation Engineering Challenge. SMILE is an acronym for Science and Math Investigative Learning Experiences.

The future engineers were asked to design and build a model truss bridge using chopsticks and glue. Each team was given specifications and a budget for supplies. Once completed, the bridges were weighed, specifications were checked and the structures were put to the strength test.

Rather than working with classmates, the students are placed into groups with those from other schools. “We try and mix up the genders, grades and schools as much as possible,” said SMILE Program Coordinator Lacey Feeley. “We do this so that the students can meet new people who have similar interests. It is another way for students to build confidence and realize that there are many people who value learning.”

Having students from different schools work closely together also fosters teamwork and creativity. “My students participated in meaningful discussions, used problem-solving strategies that they practiced throughout the year, and worked collaboratively with other students to produce a product that they would be proud of,” said Karen Fiore of Calcutt Middle School in Central Falls.

Volunteers and mentors included URI students from the National Society of Black Engineers (NSBE), the Society of Hispanic Professional Engineers (SHPE), students from the Center for Student Leadership, SMILE alumni now studying at URI, RIDOT employees, and employees of Steere Engineering, Schneider Electric and Toray Plastics.

### Participating Schools

<table>
<thead>
<tr>
<th>School</th>
<th>City/Town</th>
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<tbody>
<tr>
<td>Broad Rock Middle School</td>
<td>South Kingstown</td>
</tr>
<tr>
<td>Calcutt Middle School</td>
<td>Central Falls</td>
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<tr>
<td>Curtis Corner Middle School</td>
<td>South Kingstown</td>
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<tr>
<td>Davisville Middle School</td>
<td>North Kingstown</td>
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<tr>
<td>Deering Middle School</td>
<td>West Warwick</td>
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<tr>
<td>Woonsocket Middle School</td>
<td>Woonsocket</td>
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A URI student mentor (left) helps a team with their bridge.

A student uses a hot glue gun to hold pieces together.

Two students secure the pieces of their bridge.
For the seventh consecutive summer, the Federal Highway Administration’s Eisenhower Fellowship Program allowed students from University of Rhode Island and the University of Puerto Rico at Mayagüez (UPRM) to research transportation-related subjects at the other’s campus.

The eight-week program also included students from Purdue University and Howard University. The students shared the results of their research on July 29 at the URI library. For the first time, everyone at URI and UPRM, along with guests in Washington, D.C., were able to view the presentations via video conferencing.

Student  
Davis Chacón Hurtado  
UPR Mayagüez  
Josué Ortiz-Varela  
UPR Mayagüez  
Stuart Crooks  
Howard University  
Laura Schifman  
URI  
Leilany Benejam  
Purdue University  
Matthew Perkins  
URI  
Susan Refai  
Purdue University

Research Topic  
Establishing a Method for Extraction of Polycyclic Aromatic Hydrocarbons from Contaminated BMP Soils  
Message Signs Study to Improve Work Zones Bottleneck Issue  
Geotechnical Research On Underground Pipelines and Wind Turbine Foundations  
Possible Impacts On High Preterm Birth Rates In Puerto Rico  
Implementation of Safety Edge in Puerto Rico  
Design Wave Conditions for Puerto Rico and the U.S. Virgin Islands  
Geosynthetic Reinforced Soil Integrated Bridge Systems in Puerto Rico

Faculty Advisor  
Dr. Vinka Oyanedel-Craver  
URI  
Dr. Jyh-Hone Wang  
URI  
Dr. Aaron Bradshaw  
URI  
Dr. Ingrid Y. Padilla  
UPR Mayagüez  
Dr. Benjamin Colucci  
UPR Mayagüez  
Dr. Miguel Canals  
UPR Mayagüez  
Dr. Benjamin Colucci  
UPR Mayagüez

Above: From left, Josef Mikulik of the Czech Republic, URITC Executive Director Deborah Rosen, URITC Research Manager Gema Vinuales, Stuart Crooks, URITC Researcher Valerie Maier-Speredelozzi, Silvia Sanchez, Davis Chacón Hurtado, Hongyin Zhang, Josué D. Ortiz-Varela, FHWA-RI Assistant Administrator Dan Berman.

Left: Stuart Crooks giving his presentation. Davis Chacón Hurtado stands next to his professor from the University of Puerto Rico - Mayagüez, Alberto Figueroa.
The University of Rhode Island Transportation Center (URITC) named Justin Messina as its 2011 Student of the Year. Messina will receive his award at the Transportation Research Board’s Annual Meeting in January 2012 in Washington, D.C.

“Receiving the Student of the Year award is a great honor,” said Messina. “Being invited to TRB’s annual meeting is a great opportunity for anyone interested in the transportation field.”

Since September 2010, Messina worked on the project, “Studying the Bottleneck Issue at Work Zones and Assessing the Effectiveness of a Portable Dynamic Lane Merging System in Promoting Zip Merging Behavior.” The project is co-sponsored by the URITC and the Rhode Island Department of Transportation (RIDOT). Justin conducted his research under the supervision of Dr. Jyh-Hone Wang, professor of Mechanical, Industrial and Systems Engineering at URI.

“I learned a lot about how the DOT operates in the area of advisory message and work zone merge configurations and setup,” said Messina. “Though the unit ultimately was not employed in the field, my time in the RIDOT facility working with the Congman Dynamic Lane Merge System unit provided great insight into new developments being proposed for advisory messages.”

Messina has also assisted Dr. Wang and Dr. Valerie Maier-Speredelozzi in the URITC-sponsored project, “Developing Training and Educational Materials for the TranSim IV Driving Simulator.”

“Conducting tests using the driving simulator was rewarding for a couple of reasons,” recalled Messina. “It allowed me to interact with teenagers in a pilot study for the Rhode Island drivers’ educational classes and it fulfilled my interest in statistical methods and the design of experiments.”

Due to his research accomplishments, Justin was awarded a Transportation Fellowship by the New England University/Transportation Center in spring 2011 and a research assistantship by URITC in the above projects for summer and fall 2011.

Based on the research results, Messina presented a poster at the UTC Spotlight Conference in Washington, D.C. in September 2011. He also wrote a paper titled, “Assessing the Message Design on Variable Message Signs in Mitigating the Bottleneck Issues at Work Zones,” which was submitted to TRB.

As an M.S. degree candidate in systems engineering, Messina has a 3.65 GPA.

“The systems engineering program has gone a long way in preparing me for challenges in a variety of fields,” stated Messina. “Using the tools taught in the program, I’ve been able to take a systems approach to challenges in life, which has been very valuable.”
The seventh annual URITC Summer Transportation Institute (STI) was held for two 2-week sessions starting July 5 and August 1 at the URI Kingston campus.

Representing diverse backgrounds, 38 middle school students learned about transportation careers and the respective education and training requirements.

Classroom instruction, guest speakers, field trips and hands-on projects were key components of the academic program.

Activities included:
• Introduction to bridges
• Computer bridge building contest
• Balsa wood bridge building contest
• Safety sessions at the Kingston Railway Station
• Writing in daily journals
• Transportation math
• Tour of T.F. Green Airfield
• Hands-on activity at RIDOT maintenance facility and sign shop
• Boat tour of Narragansett Bay
• Tour of Boston

As part of the enhancement program, the participants experienced a multi-modal trip on which they rode a commuter rail, a subway, a bus, a ferry and walked.

At URI, the students visited dorms, classrooms and sports facilities, met staff and ate in a dining hall.

Using balsa wood and glue, the students divide into teams and try to construct the strongest and most efficient bridge.

The students rode an MBTA train to Boston.

The students visited RIDOT's Transportation Management Center, which monitors traffic and alerts motorists of delays.
In 2011, the URITC hosted four summer academies for high school students: the Business Academy, the Construction Academy, the Engineering Academy and the Green Design Academy.

A total of 62 students from diverse backgrounds participated. Funding for the academies was provided by RIDOT through a FHWA grant.

**Goals of the Summer Academies**

These initiatives were designed to:
- give first-hand knowledge of transportation work
- provide many opportunities for mentoring by industry role models
- spread the message that the transportation sector offers many rewarding career options
- make students aware of necessary courses early enough in their education to be prepared to move on to a career or college with the right tool kit
- increase diversity in the transportation workforce

**Construction Academy**

A one-week Construction Academy for 16 high school sophomores, juniors, seniors and recent graduates took place July 18 – 22.

The curriculum included:
- OSHA 10-hour certification
- flag person certification
- work zone safety
- hands-on heavy equipment operations
- tour of RIDOT construction project
- blueprint reading
- estimating
- construction math
- preparing for a job interview

The Construction Academy gave the students a much better understanding of the careers available in the construction industry, the benefits these careers offer, the steps required to pursue these careers, and an expanded circle of friends.

Pictured to the right, Construction Academy students learned about fire safety on the work site.

**Engineering Academy**

Twenty high school freshmen, sophomores, juniors and seniors attended this academy from July 25 – 29.

The curriculum included:
- Tour of College of Engineering
- “How Do I Become an Engineer,” led by Ray Wright, Dean of URI's College of Engineering
- “Speed Dating” with practicing engineers from the Rhode Island Consulting Engineers (RICE)
- Structural Engineering Lab
- Transportation Engineering Lab
- Environmental Engineering Lab
- Geotechnical Engineering Lab
- Tour of Transportation Management Center
- Tour of bridge construction in North Kingstown
- Tour of South Kingstown Wastewater Treatment Plant

**Students in the Engineering Academy visited the construction site of a bridge.**
**Business Academy**

The Business Academy was attended by 13 high school freshmen, sophomores, juniors and seniors from July 25 – 29. The participants learned about all aspects of a company's supply chain. Classroom instruction, guest speakers, field trips and hands-on training were key components of the program.

Activities included:
- Ropes Confidence Course Team Building Exercise
- Interactive Supply Chain Management Group Exercise
- Tour of an Ocean State Job Lot Distribution Center
- Tour of businesses along Narragansett Bay
- Tour of the Quonset Point Business Park and Port, including the Port of Davisville
- Transportation Team “Quiz” Competition

**Green Design Academy**

In 2011, the Green Design Academy became the newest summer academy offered by the URITC. The academy enabled students to learn what sustainability means and how it influences the design of communities and landscapes.

Each day, students used different modes of transportation, such as walking, cycling, taking subways and trains, and riding in vans to access and experience the built and natural landscapes.

“By experiencing different modes of transportation and landscapes exhibiting ‘green’ improvements and choices that can be made to reduce our impacts, students were shown that they can choose how to live and that their choices do have an impact on the places they live and on the systems on which they rely for sustenance,” said Professor Will Green, who led the group and is the chairman of URI’s Department of Landscape Architecture.

Thirteen students, comprised of freshmen, sophomores, juniors and seniors attended the Green Design Academy from July 11 – 15.
Aimed at Rhode Island Department of Public Works employees and other transportation practitioners, RI T2 Center workshops provide useful assistance and training in workforce development, best practices, and safety. Between 20-40 public works employees and transportation practitioners attend each class.

In 2011, the Center offered 73 T2 workshops and seven NHI (National Highway Institute) classes.

Here is just a sample of some of the workshops that were held:

**Safety-Related**
- Highway Work Zone Safety
- Chain Saw Skills and Safety
- Bucket Truck Safety
- Safe Driver Training
- Flagger Certification
- OSHA 10-Hour Construction

**Job Performance-Related**
- Managing Stormwater in Tough Budget Times
- Pavement Preservation
- Introduction to Welding
- Introduction to Snow Fighting
- Time Management
- Dealing with Setbacks
- Computer Training: Word, Excel, Access

The Chainsaw Skills and Safety workshop is one of several safety-related classes offered each year.

In addition to the classes, the T2 Center also ran a few roundtable discussions, for state and municipal employees to share ideas and best practices. What resulted from the discussions was greater collaboration between departments, leading to financial savings and more efficient practices.

Roundtable discussion topics included:
- Hurricane Irene
- Winter Operations
- Street Light Usage

The Pavement Preservation workshop held on Oct. 26 was well-attended by local and state employees.

The Indoor Expo was once again the largest event of the year. It was held on Feb. 9 at Wright’s Farm Restaurant.
Source of Funds as of 12/31/11

This chart represents the composition of funds committed for Grant Year 2010.

- State Grant: 57%
- Federal Grant: 29%
- University Match: 12%
- Third Party Match (industry and public sector partners): 2%

Use of Funds as of 12/31/11

This chart illustrates the composition of allocations against the total source of funds for Grant Year 2010.

- Technical Transfer/Outreach: 35%
- Education: 23%
- Administration: 22%
- Research: 20%