The National Center for Transportation and Industrial Productivity

Semi Annual Report

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New Jersey universities' broad-based role as conduits through which computing technologies flow into the state was reaffirmed in the December 2000 dedication of the VALE-Elsevier science direct library program at the William Van Houten Library on campus by New Jersey Governor Christine Todd Whitman:

"........... success is the result of visionary leadership and a bold plan that tied the development of information resources to the university's strategic directions. I challenge (NJIT) to continue providing leadership as we work to harness information technologies to make New Jersey a better place in which to live, work and raise a family."
Section I

SUCCESS STORIES
NCTIP’s commitment to attract women to the transportation field (See Strategic Plan, Section 3.B, page 21, Conduct Outreach Programs for Women) may be seen in the number and caliber of women who are currently pursuing Ph.D.s in transportation. Two of the women have been granted NJIT Presidential Fellowships*.

Cheryl Allen-Munley, P.E., P.P. - NJIT Presidential Fellow with over 20 years of experience in transportation planning, traffic engineering, construction management and structural design, is working under the direction of Dr. Janice Daniel on the NCTIP research project, Shoulder Rumble Strips for Bicyclists. Ms. Allen-Munley, who began her studies while serving Jersey City as Director of Transportation (1989-1999) and voting subregional representative on the North Jersey Transportation Planning Authority (NJTPA), a local metropolitan planning organization encompassing 13 counties, chose NJIT to pursue her doctorate in transportation engineering because of its cooperative relationship with NJTPA. She felt that the interaction between academics and elected officials would serve to focus research on the current needs of transportation policy implementers. Allen-Munley became a full-time Ph.D. candidate in September 2000, having completed most of her course work and passed her qualifying exams while maintaining a 4.0 average. The goal of her dissertation is to develop a model to predict the safety of a bicycle route as a function of its physical characteristics, to enable policy to establish bicycle routes and criteria for the design of such routes. She received an M.B.A. from Columbia School of Business in 1983 and a B.S.C.E. from Massachusetts Institute of Technology in 1978.

Cecilia Kelnhofer-Feeley - 1997 NCTIP Outstanding Student of the Year, NJIT Presidential Scholar, winner of a $1,000 scholarship award from the Women’s Transportation Seminar-Greater New York Chapter and president of the NJIT Graduate Students Association 1997-98, Ms. Kelnhofer-Feeley received an M.S. in Transportation in 1998. She was an M.S. student in Humanities and Social Science at NJIT, completing her thesis on environmental policy studies, when she was hired by NCTIP to help prepare the multiple-volume commodity flow reports. Through that study, and discussions with professors and other students, her interest in transportation studies was piqued. Receiving stipend and tuition under NCTIP's ISTEA grant, she completed her masters in one year, and was employed for two years by the North Jersey Transportation Planning Authority (NJTPA) as a senior transportation planner. After a brief hiatus to become a mother, she returned to NJIT last fall to complete doctoral studies in transportation. Kelnhofer-Feeley was featured in the Winter 2000 NJTPA/NCTIP publication InTransition in an article on Women in Transportation. At the request of the university, she also serves on the Task Force on Graduate Studies and Research for NJIT's next Middle States accreditation process. She earned a B.S. in Science, Technology and Society in 1995.

Lida Mazaheri - 1999 NCTIP Outstanding Student of the Year, Ms. Mazaheri received an M.S. degree in Transportation Engineering from the New Jersey Institute of Technology in 1998, participating in the NCTIP research project, Integrated Signals - A Cost Benefits Analysis for the New Jersey Department of Transportation. After two years as a traffic engineer with the Port Authority of New York and New Jersey (PANYNJ), she returned in September 2000 to complete her Ph.D. While at PANYNJ, she was appointed traffic engineer in charge of New York's LaGuardia Airport. There her responsibility was to ensure the safe and orderly flow of the vehicular and non-vehicular traffic throughout the airport on a daily basis by implementing the latest traffic engineering techniques. Active in professional organizations, Ms. Mazaheri served as newsletter editor for the Institute for Transportation Engineers (ITE) Metropolitan Section of New York and New Jersey, where she organized and assisted with the ITE Met Section's monthly meetings and represented ITE at National Engineers week. During her graduate studies she was an active member of the Intelligent Transportation Society of America; Institute of Transportation Engineers and the Women's Transportation Seminar. A member of Alpha Epsilon Lambda, NJIT’s Graduate Honor Society, she has also served on its Executive Board. Ms. Mazaheri received her bachelor's degree in electrical Engineering from the University of Texas at Austin.

* A limited number of fellowships, with average stipends of $14,400, are offered to outstanding doctoral students. The stipend can be supplemented by residence, research, and summer support. Full tuition support is provided.
Kenrick C. Layne has been chosen 2000 Outstanding Student of the Year by NCTIP faculty. Mr. Layne, who arrived at NJIT after a ten-year career in the construction industry, completed his M.S. studies in Transportation Engineering in December 2000, and will begin Ph.D. studies in the fall of 2001, with a specific interest in transportation management.

Interspersing higher education with work experience is a common cultural path in Guyana, from where Kenrick Layne emigrated to the United States in 1993. While in Guyana, using the local terminology, Mr. Layne "wrote the City and Guilds of London Exam" in Building and Civil Engineering while working as a draftsman. After graduation as an engineering technician he became a site inspector, progressing to site supervisor and remaining in the construction industry through his return to college in 1984. After first obtaining a Diploma in Civil Engineering, he received his bachelor's degree in Civil Engineering from the University of Guyana in 1994. At that time he was involved in research on atmospheric pollution.

Since his arrival in the United States, Mr. Layne has pursued studies in environmental engineering towards a career in transportation. His master's research involved the application of automatic control theory to freight transportation, especially in New Jersey. Layne spent a semester working on an NSF-sponsored project to develop a control strategy for freight movement and used the simulation model CORSIM to simulate the roadways at Port Newark and Elizabeth. Prior research included collection of vehicle count data for use in traffic management.

Kenrick Layne was chosen to represent NCTIP as Outstanding Student of the Year because of his industriousness and seriousness of purpose as a transportation student, and because faculty believe he will be part of the transportation leadership in the 21st Century. He will receive his award at the 80th Annual Transportation Research Board meeting in Washington, D.C. in January 2001.

Having worked in almost every capacity of the construction industry, Layne looks forward to being able to apply that experience to the field of transportation.
At the end of each spring semester, NCTIP sponsors a nation-wide student paper competition that is open to students enrolled in a transportation-related academic program, or those conducting research associated with efficiencies in passenger or freight movement, or facility, institutional and regulatory efficiency. A faculty committee meets over the summer, choosing the winner in a refereed process, and a cash award of $1,000 is given.

Elisabeth Hahn, a graduate student at the University of Tennessee (UT) in Knoxville was chosen winner of the 2000 Student Paper Competition for her entry, *Evaluation of Roadway Construction Impacts on Local Business Along Middle-brook Pike in Knoxville, Tennessee*. Ms. Hahn is enrolled in the Civil and Environmental Engineering program at UT, pursuing a Masters degree in Transportation Engineering with an emphasis on Planning. Her thesis research involves a statistical analysis to investigate the relationship between urban area congestion and freeway and arterial supply.

Ms. Hahn has six years of experience working as a civil engineer in the private sector, and currently receives support for her assistantship from UT professors Drs. Frederick J. Wegmann and Arun Chatterjee, and from the Southeastern Transportation Center.

Some of the projects with which she has been involved during her studies at UT are travel demand forecasting for proposed bypasses in Cookeville and Lawrenceburg, TN; a transit benefits study; and an FHWA freight planning website renovation. President of UT’s Institute of Transportation Engineer's student chapter, Ms. Hahn enjoys travel in other countries, surfing, and backpacking.
Innovations in Education:
Development of Curriculum for Transportation Technology Modules for Paterson High School
Contact: Dr. Harold D. Deutschman, 973-596-2467, deutschm@njit.edu

On page 20 of the Strategic Plan (Section 3.A), NCTIP commits to expanding minority high school students’ awareness and interest in transportation careers. With this commitment in mind, NCTIP became involved with the Paterson School District in April 2000, after an initial contact made at the April 2000 TransAction conference, the premier conference in New Jersey for transportation professionals. Paterson was showcasing its plans for the Garrett Morgan Transportation and Technology Academy, and Professor Harold Deutschman, who has directed NJIT's Summer Transportation Institute for many years, responded.

Paterson had developed a concept for an alternative academy for 100 high school students that would provide a unique curriculum that would relate math, science and technology instruction to transportation, and to the lives of the students. The academy's mission would be to provide secondary school students with a program of academic study integrated with career exploration in the transportation related fields. The course had to be designed so that the students would be motivated for future careers in the transportation industry after college.

**Dr. Harold D. Deutschman**, Professor of Civil and Environmental Engineering at NJIT, was selected to design the curriculum and train the teachers for this unique program (the only one of its kind in the country) because of his background in initiating and operating pre-college programs at NJIT, and the recognition he has received from NJIT, the New Jersey Education Association, the National Science Foundation, the White House, and the American Society for Engineering Education.

Dr. Deutschman’s curriculum design for the freshman year was approved by the New Jersey Community Development Corporation and the Paterson School District. NCTIP is funding Dr. Deutschman's efforts.

The curriculum is an important link in the overall plan for a Transportation Opportunity Center in Paterson, which would also be a prototype program to demonstrate new and innovative ways to help low income residents achieve economic independence through the transportation field. Beginning September 2001 the educational programs of the Garrett Morgan Academy will be housed in this new center.

The program is actively working to design its web page.
E-Stations for Newark - Infrastructure Planning and the Urban Lab
Contact: Darius Sollohub, Associate Director, Master in Infrastructure Planning Program, New Jersey School of Architecture, NJIT, 973-596-5575, Solluhob@njit.edu, (NCTIP #995938) http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=13&grantNumber=992500

E-Stations for Newark is an exciting new project that has involved the New Jersey School of Architecture in NCTIP-funded research for the first time. The project also includes a cash match by NJDOT. It has high visibility and has brought interested stakeholders from metropolitan Newark to NJIT for discussions.

The prototype is being developed for application in Newark’s disadvantaged communities. It will be user-based and oriented to those with limited English proficiency - available in multiple languages.

An e-station is one of a series of enclosed bus stations, each of which has six key components:
- An intelligent transportation system
- E-commerce services
- A portal to the internet
- A telecommunications center
- A full-time concierge or facilitator, and
- Opportunity to provide supplemental social services and stimulate mixed use development.

As envisioned the e-station would be approximately 2,000 square feet in size, each station having a storefront facade, adequate seating, storage areas, banks of computers, a concierge desk and an ATM machine. The e-stations would be sponsored and maintained by local community organizations.

The e-station logic addresses residential neighborhoods lacking in accessibility to goods and services, with reliance on public transportation to meet needs. Where today a tremendous amount of information, wide range of services, and opportunities to purchase goods are offered on the Internet, without knowledge, financial resources or access to computers many residents cannot make use of any of these electronic opportunities. This robs them of the chance to take advantage of all kinds of resources, from e-mail to job information to purchasing goods through e-commerce. The absence of easy and comfortable physical access by public transportation to amenities and services, and the lack of electronic access to information and services, can be addressed simultaneously with a new building type, i.e., building and maintaining a series of e-stations complete with a connection to the electronic world that would link them.

Research, analysis and synthesis are needed to study optimal methods and infrastructure. The project aims to research, design and ultimately build a prototype of an e-station in Newark, working closely with a host community organization and following a two-step process. In Step One, a graduate design studio in the Master of Infrastructure Program will develop a detailed proposal for the Intelligent Transportation System and the e-commerce components. Concurrently, a design studio in the graduate architecture program will develop architectural design proposals for e-stations, working in concert under the guidance of faculty and planners at NJ Transit. Step two will focus on financing, constructing and operating the first e-station.

E-Stations for Newark has prepared its own web site, which is expected to be uploaded in mid-March.
In a project undertaken in conjunction with and funded by NJDOT, the rapid development and deployment of new sensor and processing technologies for increased accuracy, timeliness and functionality, including vehicle incident detection for the surveillance of highways, is being studied. This timely research will develop a prototype system to enable NJDOT to provide a real-time traffic alert service to the motorists in the South Jersey commuter corridor using the Ben Franklin and Walt Whitman Bridges, as well as Delaware River crossings north and south of these two bridges. South Jersey motorists will have more reliable and dynamic travel time information from the system being developed in this project.

To address the fundamental need for increased and higher quality surveillance sensing of highway conditions in order to meet NJDOT's ITS safety and efficiency objectives, NCTIP plans to develop and implement a test plan to merge competing, proprietary detection technologies into a synergistic system. It will demonstrate and evaluate the strengths of alternative technologies, how they may be optimally combined, and provide insight into an optimum mix of sensor technology. As the desirability of having as complete a picture, in real time, of highway conditions at all points on the highway must be balanced against the number and cost of sensors which can be affordably be installed, this research will provide quantitative measures of the number and mix of sensors needed to achieve maximum performance at minimum cost. A test site will be implemented in the time frame of the proposed operational test, instrumented with zero loop detectors, a fiber optic backbone and an operations/communications center.

NCTIP will utilize two additional distinct technologies, namely Video Image Processing and Microwave Radar Sensors, and evaluate their capabilities both individually and in combination, compared with the capabilities of loops. Both technologies have the distinct advantages of being non-intrusive (mounted off road). Both provide unique approaches to providing increased functionality, including incident detection and increased accuracy in measuring vehicle speed, spacing, and headway. It is expected that the operational test will ultimately evolve into a functional system that will incorporate additional highway facilities. Traffic detectors will be installed and used to monitor traffic along the corridor and the bridges connecting Camden and Philadelphia. The test bed will be instrumented with at least two video image processing sensors, ten microwave sensors, approximately six Variable Message Signs (VMS) sites at specified points in the system, radio/telephone-based communication links, a connection to the sensors and to the NJDOT Traffic Operation Center (NJTOC). NJTOC will be equipped with appropriate software and hardware and will be capable of receiving and analyzing input traffic data from the sensors. Using software developed for this study, traffic flow conditions on the two Delaware River bridges will be anticipated, and within seconds after slow or stopped traffic is detected, an appropriate message will be disseminated to highway users through VMS and/or highway advisory radio (HAR) (see NCTIP # 992511, http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=243&grantNumber=992500 for a related research project on the HAR).

This test bed will be a true showcase for ITS technologies in the Northeast United States.
ProMPTS, initially funded under ISTEA, and continued under TEA-21, continues to be a very successful project. Originally designed to help the NJDOT Division of Research and Technology staff manage and track research projects from problem statement through final products and closeout, ProMPTS was developed by NCTIP both at NJIT and at NJDOT’s Bureau of Research. With graphical interfaces and a database developed in Microsoft Access97, the program facilitates monitoring, and permits more optimal use of organizational resources.

**Features:** ProMPTS significantly reduces the search time for extracting relevant research project data from existing NJDOT databases and significantly lowers paperwork costs. It is very user friendly. The operation of the system is simple and self-explanatory, and many data manipulation tasks have been streamlined. ProMPTS is not only a data management system, but also an operational process monitoring system. It provides both detailed and summarized up-to-date reports on project status, finance, and business situations (e.g., person’s working hours, assignment and salary costs; total budget for funding source in a program year; and research project budget/cost comparison charts). These reports can be quickly generated daily, weekly, monthly, and/or annually, giving management oversight of the entire project that is undergoing and allowing immediate responsive actions. ProMPTS provides a well-organized relational database that includes processed research project information. This information can be incorporated into the NJDOT internet information system to be viewed by the public. Thus, ProMPTS has the potential for helping NJDOT research projects appear on-line in the near future. It is envisioned that the system will be transferred to other state DOTs.

**Current Objective:** The current objective of ProMPTS is to provide software and operational support through September 30, 2001, successfully installing ProMPTS on the NJDOT Network and correcting operational problems that arise. It is also to check data integrity, data validation and security; complete required reports; and provide an easy way to update ProMPTS’ design.

**ProMPTS Demonstration CD:** Once ProMPTS is successfully running at NJDOT, ‘dummy data’ will be installed in a separate version of the program and a demo CD will be prepared as a tool for NJDOT to introduce ProMPTS to other DOTs and university centers. Pennsylvania and Kentucky DOTs have specifically expressed interest.

**AASHTO Presentations:** Presentations are being prepared by William Hoffman, Director of the NJDOT Division of Research and Technology, to demonstrate ProMPTS to the Regional American Association of State Highway Officials (AASHTO) Regional Advisory Committee (RAC) meeting to be held in June 2001 in Providence, RI; and to the National AASHTO RAC meeting to be held in July of 2001 in Montana. As the latter is a prominent national conference, it will afford NCTIP/NJIT valued recognition for this project.

**NJIT ProMPTS:** NJIT is funding an adaptation of ProMPTS which will feature an Award Notification and Budget/Expense Alert System to automatically e-mail PIs when projects have been granted, alert them to the status of their project budgets and expenses, and give appropriate warnings as projects reach completion dates, run into deficits, or show lack of progress, as required. Dr. Tang, who developed ProMPTS, is also PI for this adaptation.
Research Report Center Website

Dr. Tang, Senior Project Manager at NCTIP, has developed an NCTIP Data Entry Center Website to enable faculty principal investigators for NCTIP projects to submit research project information and quarterly reports through the Internet. Currently, this is a test version with all the basic features and functionality. More functions and forms will be added as required by NCTIP for USDOT and NJDOT reporting requirements.

The website may be logged into through MS Internet Explorer, by typing http://transportation.njit.edu/nctip_reports/default.htm in the address field, and pressing the 'Return' key. The NCTIP Data Entry Center login page should open. If you are entering this application for the first time, click 'Sign Up' to register. Otherwise, click 'Login'.

For public viewers, use 'NCTIPAdmin' as both UserID and Password to login. Registered users type their own UserID and Password, respectively. Then, clicking the 'Login' button on the login form will open the Data Entry Form Selection Board. From this main switchboard, select corresponding links to open Research Activity or Quarterly Report Data Entry forms.

There are two major working modes for the report forms: 'Edit' mode and 'Browse' mode. The default mode is 'Browse'. In 'Browse' mode, all data fields on the forms are read-only. Users can review, print hard copies, and e-mail project reports through the Internet. In 'Edit' mode, user can add new reports, edit or delete existing reports. At any time during editing the report, clicking 'Update' button will save results. Also, user can change their UserID and Password after registration for security consideration.

In addition to its uses within NCTIP, this system has been demonstrated to NJIT for use by other university entities, and to NJDOT. The report website has been designed as user-friendly as possible. It is still under improvement for better services for its users.

NCTIP MIS system

Dr. Tang has also developed an NCTIP Information Management System (NCTIP MIS). This Access 97 application centralizes the management of key administrative tasks of NCTIP such as research and quarterly reports data, faculty/staff and student support information, internal and external contact lists, and seminar and meeting registration records. With this MIS, the NCTIP administrator, research staff, and database manager can conveniently update relevant data and quickly generate corresponding reports to monitor center activities.

NCTIP has demonstrated the MIS to NJDOT with the purpose of equalizing reporting requirements of NJDOT with those of USDOT.
On November 8, 2000, NCTIP hosted NJDOT’s 2nd Annual Research Showcase at the New Jersey Center for the Performing Arts in Newark. The purpose of the Showcase was to present the results of NJDOT-funded university-based research to NJDOT’s internal and external clients.

About 250 transportation professionals from the New Jersey, New York, Delaware, and Connecticut DOTs, the New Jersey DMV, the New Jersey Division of Traffic Safety, FHWA, the Port Authority of New York and New Jersey, the Public Works Association of New Jersey, NJ Transit, the Committee for a Smart New Jersey, county engineers, private industry and the press attended the day-long seminar which was held in the Victoria Theater.

In addition to keynote speaker Robert Skinner, Executive Director of the Transportation Research Board, remarks were given by Dr. Saul K. Fenster, president of NJIT; Hon. James Weinstein, Commissioner, NJDOT; Denis Merida, District Administrator, FHWA; Hon. Diane Allen, Vice Chair of the New Jersey Senate Transportation Committee; and Hon. Alex De Croce, Chair of the Assembly Transportation Committee. Introductions were given by William Hoffman, NJDOT Director of Research and Technology, and Nick Vitillo, Manager of NJDOT’s Bureau of Research.

In addition to NCTIP, participants included NJDOT's Research Users Committee, City University of New York's University Transportation Center (UTRC); Rutgers University's Center for Advanced Infrastructure and Transportation (CAIT); NJIT's Department of Civil and Environmental Engineering and New Jersey School of Architecture.

For NJIT, NCTIP director Lazar N. Spasovic, John Schuring, chair of the Department of Civil and Environmental Engineering gave research profiles. Darius Sollohub, Special Lecturer and Associate Director of the M.I.P. Program at the New Jersey School of Architecture described the Riverside Transit Village Project (also funded by NJDOT - see Success Stories). Throughout the seven-hour day participants were encouraged to visit the research displays that encircled the walls of the NJPAC lobby.

Following the Showcase, buses were provided for convenient travel to the NJIT campus for a tour of the CEE research laboratory facilities (see following Success Story).

Photos from this event can be viewed on the NCTIP web site: http://transportation.njit.edu/nctip/researchshowcase/index.htm.
NCTIP lobbied early on to host the 2nd Research Showcase. It was agreed between NCTIP and NJDOT that the successful format of the original Showcase would be followed. NCTIP and the Department of Civil and Environmental Engineering (CEE) at NJIT share a long history of NJDOT-funded research projects. It was agreed with NJDOT that CEE, which partnered with NCTIP for the 1st Showcase, would again be fully involved. As CEE’s laboratories were part of NJIT’s recent multi-million dollar renovation of Colton Hall, with all of the laboratories receiving updated equipment, it was decided that a tour of the CEE facilities would be appropriately comparable to the Rutgers lab tour from the 1st Annual Showcase. In short, NCTIP took advantage of CEE’s new facilities and upgraded labs to bring transportation professionals to the NJIT campus. Many participants would likely be particularly interested in these labs. Approximately 35 participants were bussed from NJPAC to Colton Hall where they received a guided tour of the department, including:

- **The High Performance Concrete Laboratory** - one of the few academic facilities capable of testing very high strength concrete under uniaxial and triaxial states of stress. This lab contains a servo-hydraulic testing system with a "very stiff" frame that can apply up to 1000 kips to specimens under a computer-controlled closed-loop environment. Specimens can be tested at confining pressures ranging up to 12 ksi and at temperatures ranging from -200 to 400 deg C. Two fully controllable curing rooms and a variety of equipment for durability testing and aggregate characterization are also available.

- **The Structural Testing Laboratory** - which features a 1000 kip adjustable load frame and a 20-foot ceiling to allow testing of large-scale structural systems. The lab also features a combination strong floor/strong wall that is used with a 100-kip servo-hydraulic structural actuator, which provides great versatility in the application of lateral and dynamic loadings. All testing is PC-controlled with automated data acquisition, and the equipment can be configured to operate in strain-, stress- or piston-control modes.

- **CEE Hydraulics Laboratory**. Developed as part of NJIT’s $5.6 million renovation of Colton Hall, the recently completed hydraulics laboratory is used for both undergraduate and graduate student research. Seeing creative and well-equipped teaching laboratories as essential parts of a quality engineering education, CEE foresees experiments in this laboratory as providing excellent opportunities for undergraduate and graduate students to visualize and analyze the hydraulic phenomena they are studying in the classroom and will later apply as practicing engineers. The laboratory features a C4 5-meter Tilting Flume that allows students to explore more complex phenomena, such as hydraulic jump backwater effects, culvert tailwaters and sediment transport. Other apparatus are used to investigate the basic properties of fluids, including viscosity, capillarity and specific gravity. In addition, six new Pentium III PCs are used for data acquisition and reduction, and computer modeling.

- **The state-of-the-art Geoenvironmental Engineering Laboratory** was established with a $1 million equipment grant from the National Science Foundation (NSF) plus a $1.4 million institutional match by NJIT. The facility contains state-of-the-art instrumentation for investigating soil contaminant interactions, speciation of inorganic and organic contaminants, transport and transformation phenomena, and environmental behavior of geosynthetics and waste residues on macroscopic and microscopic levels. Available equipment includes an environmental scanning electron microscope (ESEM), x-ray fluorescence (XRF), calorimeter, FT-IR spectroscopy, organic carbon analysis, capillary electrophoresis, gas chromatography/mass spectrometry, controlled environment chambers, reactors, respirometry, and toxicity testing.

- **Computer Laboratory** - CEE’s own computing facility that directly supports the civil engineering and surveying programs. This lab is located in Colton Hall and is a 945 square foot, 24-seat facility. The lab PC’s are part of a local area network, and they also have a high speed connection to the internet. The CEE Computer Laboratory currently supports more than 30 software packages specific to civil and environmental engineering in addition to other more general software packages are available on the university network.

CEE’s offices and laboratories are principally located in Colton Hall, which was built in 1911, and is one of the
original laboratory buildings of the Newark Technical School, forerunner of the Newark College of Engineering. Colton Hall's recent renovation included complete gutting and reconstruction of the building interior, while still maintaining the classic red brick and granite façade on the exterior. CEE now has the newest and most functional facility of all NCE departments.
After the very successful 1st Annual Research Showcase day in November 1999, NJDOT decided to precede the 2000 event with an entire month dedicated to research and technology. October 2000 was designated as Research and Technology month.

Throughout the month of October, poster displays of research projects were set up in several lobbies around NJDOT headquarters in Trenton. Principle Investigators for the projects were available to NJDOT employees during designated time periods. Each Friday, speakers were provided from 12:00 noon to 2:30 p.m.

In addition to NJIT/NCTIP, participants included Rutgers University's Center for Advanced Infrastructure and Transportation (CAIT), City University of New York's University Transportation Center (UTRC), and Rowan University. Each research unit was assigned a week during the month, and provided the poster displays, principal investigators and speakers.

NCTIP was represented by a spectrum of research projects that included:

- Causes and Control of Transverse Cracking in Concrete Bridges - Year I
- Data Research - Materials Laboratory Information System (LIMS) - Year I
- E-stations for Newark -- Phase 1
- Evaluation of Design Ideas for Prevention of Vehicles Entrapment on Railroad Tracks
- Evaluation of the Potential for Using Ramp Metering in the ATMS of the I-80 Showcase Corridor
- ProMPTS - Project Research Project Maintenance & Monitoring System
- The Mature Driver: Safety and Mobility Issues
- The Uses of State DOT Research: Customer Use of Completed Projects from NJDOT Bureau of Research
- Mobility and the Costs of Congestion in New Jersey

Leading NJIT/NCTIP participation for the event were Drs. Lazar N. Spasovic and John Schuring, CEE Chair. Participating faculty/principal investigators included Drs. Chien, Meegoda, Jeng, Rotter, Saadeghvaziri, Schachter, Sollohub and Tang.
A significant amount of research projects come directly from NJDOT. Whereas in the past NCTIP has received approximately $250,000 each year, the university has been the recipient of a record amount of research dollars from NJDOT this past year. This past year, NJDOT opened the matching monies that were earmarked for NJIT, Rutgers and Region II to competition among the Centers. NJIT won the lion’s share of the projects. According to Lazar Spasovic, NCTIP director, these awards recognize NJIT and the investigating faculty as leaders in the requested fields of research inquiry, and indicate the high regard in which they are held by NJDOT’s Research Division. It also recognizes NJIT’s long-standing commitment to serving the state by providing the high-quality, leading-edge research.

NCTIP received $565,616 in new projects within this reporting period:

992509 / 995931 Development of a Simulation/Assignment Model for an ITS Priority Corridor $191,064
995938 / 992517 E-stations for Newark -- Phase 1 $120,175
992511 / 995933 Highway Advisory Radio (HAR) Systems $157,749
995936 / 992514 ProMPTS (Project Management & Progress Tracking System) - Maintenance and Improvement Contract $63,988
992930 / 995931 South Jersey Real Time Information System $32,640

... is carrying over $528,494 in ongoing projects from the last reporting period.

992503 / 995923 Causes and Control of Transverse Cracking in Concrete Bridges - Year I $120,031
992501 / 921030 Congestion Strategies for Adaptive Traffic Signal Systems $65,714
992505 / 995925 Data Research - Materials Laboratory Information System (LIMS) - Year I $83,713
992504 / 995924 Evaluation of Design Ideas for Prevention of Vehicle Entrapment on Railroad Tracks I $69,918
992502 / 995922 The Mature Driver: Safety and Mobility Issues $189,118

... and has been notified as of this writing of $299,694 in new grants to begin after January 2001:

992504 / 995924 Evaluation of Design Ideas for Prevention of Vehicle Entrapment on Railroad Tracks II $64,449
992519 / 995945 Identifying Factors and Mitigation Technologies in Truck Accidents in New Jersey $128,865
992520 / 995949 Shoulder Rumble Strips for Bicyclists $45,037
999515 / 995914 Water Level Prediction for Transportation Projects - Year II $61,343

$26,120 was received by NCTIP to implement the 2nd Annual NJDOT Research Showcase, and an additional $44,000 was granted for technology transfer projects.

Coming on the heels of the very successful Showcase, NJIT’s Department of Civil and Environmental Engineering received a record $554,292 from the New Jersey Department of Transportation (NJDOT) for sponsored research projects in infrastructure, materials and environment. The combined budget -- NJDOT funds and NJIT university cost share is $870,144. According to Dr. John Schuring, CEE chair, these projects are a direct correlation to NCTIP’s existence. They are:

NJDOT 995939 Concrete Maturity Implementation $103,400
NJDOT 995941 Contamination Arresting System $46,724
NJDOT 995942 Correlation Study: Surface Texture Versus Air Voids $80,130
NJDOT 995940 Improvement of Continuity Connection Over Fixed Piers $226,319
* Optimization of Very Early Strength Concrete $97,719

The New Jersey School of Architecture at NJIT received $50,000 for the Riverside Transit Village project (see Success Stories) which was completed in July 2000.

Additionally, NCTIP research projects Data Research - Materials Laboratory Information System (LIMS) - Year II and Integrated Signals, A Cost Benefit Analysis for NJDOT, will be continued. Information is yet unavailable.

* Not yet assigned
** NJDOT Governor’s Challenge Grant
"Yielding, or promising to yield significant or beneficial results" - this is the definition of a Success Story. In this light, NCTIP's heightened visibility on the local and national scenes has been in large part due to an extraordinary output of research and education-related materials.

Research at NCTIP, for the second year in a row, was issued to coincide with NJDOT's Annual Research Showcase:

- In November 2000, NCTIP issued Research at NCTIP: New Jersey Department of Transportation Sponsored Research Projects. Released in time for the 2nd Annual NJDOT Research Showcase, of which NCTIP was the host, the 2000 publication contains 120 pages, detailing eleven of the many NCTIP/NJDOT research projects, giving abstracts of 15 current NCTIP/NJDOT research projects, and limiting publication and presentation information to years 1999 and 2000. Eight spectacular black and white photos of transportation infrastructure highlight the virtual laboratory of NJIT's surrounding area. While the interior remains a two-color process as in 1999, this time the cover is an eye-catching full color aerial overview of the Newark/Elizabeth Seaport, Newark Airport, the New Jersey Turnpike, and other road and rail networks - set against downtown Newark. At the Showcase, Research at NCTIP: New Jersey Department of Transportation Sponsored Research Projects was given to each Research Showcase attendee on entering. It has also been distributed to political leaders, transportation professionals and the press at the International Intermodal Transportation Center Symposium on December 5, 2000, along with Research at NCTIP: Toward the New Millenium and the Mobility and the Costs of Congestion in New Jersey study.

- The above publication followed the highly visible 40 page Research at NCTIP: Toward the New Millenium, which contained abstracts of all NCTIP research projects since its inception, a representative list of publications and presentations resulting from such research, and faculty information. A two-color printing process, the cover is a ghosted satellite shot of the Newark Area highlighting transportation infrastructure. This publication, timed for introduction at the first annual NJDOT Research Showcase, has been nationally circulated and used to promote the Center in numerous settings. It is still widely used.

InTransition has become an excellent forum for disseminating NJIT transportation research. Jointly published by NCTIP and the North Jersey Transportation Planning Authority, with a circulation of 7,000, InTransition reaches transportation professionals nationwide. The upcoming issue includes Darius Sollohub's Riverside Transit Village project, and an article based on Naomi Rotter's Moving Telecommuting Forward: An Examination of Organizational Variables, an NCTIP-funded project under the ISTEA grant. (The final report for which can be found at http://transportation.njit.edu/nctip/publications/Research%20Reports/NR%20Telecommunications/Moving%20Telecommunications%20Forward.html.

OnRoute becomes more and more well received, both according to feedback and the fact that address changes are requested by letter and e-mail (instead of 'return to sender'). The winter 2000 issue of the NCTIP newsletter features Joshua Greenfeld's Digital Map Requirements for Automatic Vehicle Location (NCTIP# 990972) research project, NCTIP Research Explores AVL Technology and highlights NJDOT's research showcase. OnRoute's national circulation is approximately 5,000. Back issues may be found at http://transportation.njit.edu/nctip/publications/OnRoute.htm.

A new brochure has been published describing the Interdisciplinary Program in Transportation. Used at all conferences/seminars, this brochure is available on the web at: http://transportation.njit.edu/nctip/academic/Transportation_Brochure.pdf.

In addition, Mobility and the Costs of Congestion in New Jersey continues to be widely used.
"....... example of this is NJIT's Congestion Management Study which quantifies the cost of congestion per county. As a legislator, this is valuable information, so much so, that I recommended that a Congestion Buster Task Force be included as part of the 2001 Transportation Trust Fund Renewal. I am happy to say that the trust fund was signed into law in July." New Jersey Assemblyman Alex De Croce, Chairman of the Assembly Transportation Committee.

Roads are broke; fix them first
My Two Cents by Mark Hrywna- Linden Spectator and Roselle Leader

State Senate President Donald DiFrancesco is a busy man these days. When you're planning a run for governor next year, you have to have an answer to the voters' question of "What have you done for me lately."

Gun safety, transportation funding and open space preservation are among the major items the Senate president introduced and is trying to gain approval (for) before the Legislature goes on hiatus for the summer.

Last week, the Senate failed to pass a component of DiFrancesco's "21st Century Congestion Relief and Transportation Trust Fund." The plan to establish the fund was approved, but Senate Democrats did not vote on dedicating the funds via a constitutional amendment that would appear on November's ballot.

The bill would authorize the state fund and provide $1 billion to the Department of Transportation.

State Sen. Bernard Kenny of Hoboken, D-33, introduced important amendments to DiFrancesco's plan with more specific goals for the Department of Transportation as well as prioritizing bridge repair. Even more importantly, an amendment would limit new highway construction, prohibiting them in rural areas or those protected by Green Acres and be "consistent with the State Plan."

A similar bill, with similar amendments, presented by Democrats, was introduced in the Assembly last week. DiFrancesco's plan, while identifying a stable source of funding for the Transportation Trust Fund, does not seem consistent with his hopes to preserve open space through different legislation he introduced last month. His "Conservation Action Fund" would create a $5 million pool that could purchase land in danger of development faster than the Legislature could.

Without Kenny's amendments, the Transportation Trust Fund concerns groups such as the New Jersey Conservation Foundation and the Tri-State Transportation Campaign.

According to the Tri-State Transportation Campaign, a nonprofit anti-sprawl group, state highway spending per capita from 1998-2000 was highest in Atlantic, Somerset, Mercer and Hunterdon counties, all far ahead of the pack. The figures may be deceiving because Atlantic County has the casino tunnel, but still, the next closest counties - Passaic and Hudson - were less than half in per-capita spending. Per-capita spending in other urban counties such as Union and Essex was a fraction of what it was in more rural areas.

Although the per-capita spending may be skewed by densely populated urban counties versus the sparsely populated, rural counties, it still raises a valid point. Suburban and rural areas of the state should not be leading the way in terms of highway spending. Once highways are built, new development soon follows, gobbling open, green spaces; there's no debating it.

The congestion study was also featured in the Fall 2000 NJIT Alumni magazine, circulation 35,000, including all transportation and CEE graduates.
“The Transit Village concept, places housing, shopping and transportation all in one place. ...it is a real congestion buster.” New Jersey Assemblyman Alex De Croce, Chairman of the Assembly Transportation Committee.

The Riverside Transit Village Project is included in this report because of its significance in weaving together several threads for NCTIP, and for the reflective visibility the uniqueness and promise of the project give the Center. This project was funded by NJDOT in conjunction with the New Jersey School of Architecture at NJIT. Being transportation based, the project was instrumental in encouraging Professor Sollohub in his E-Stations in Newark (NCTIP # 995938) http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=13&grantNumber=992500 research.

Professor Darius Sollohub, associate director of the Master in Infrastructure Planning (MIP) Program at NJIT's New Jersey School of Architecture, joined the transportation faculty recently with his NCTIP/NJDOT-sponsored E-Stations in Newark project. A second Sollohub research project, the NJDOT-funded Riverside Transit Village Project, encompasses several areas of synergy with NCTIP.

With a $47,000 grant from NJDOT, MIP faculty and students completed a study modeling possible development scenarios for the area surrounding a planned station site along the Southern New Jersey Light Rail System. The $450 million light rail system will serve a corridor that includes 17 towns and over 400,000 residents along the existing right-of-way of the former Camden and Amboy line. Riverside, a town of 9,000 is located at a midway point between the light rail's terminus cities, Trenton and Camden. The study's findings will be used to develop some general rules of thumb about the use of light rail in providing transportation support to communities.

The State of New Jersey advocates the concept, and launched a "Transit Village Program" in 1999 to restore stations to their historical role, enhance investment in urban areas and promote community leadership. Communities that create Transit Villages are given priority consideration for funding from NJDOT's Local Aid for Centers program, the Transportation Enhancements program, and the Bicycle and Pedestrian Projects program.

The initial segment of the project involved two phases. In Phase I, local conditions were inventoried and the area around the rail line was modeled to demonstrate three different transit village scenarios. One scenario has a waterfront residential area, another builds around a craft industry with a fishing pier for recreation and essential services like a supermarket and day care center, and a third focuses on commercial development along the rail line. In Phase II, models were presented to representatives from the town at a meeting hosted by Burlington County, and reviewed by local government agencies. Taking their responses into account, concepts and features from each model were used to develop a comprehensive urban design proposal.

Key recommendations from the study will be incorporated into Riverside's redevelopment plan. It is also planned to leverage NJIT's work in conducting further development studies, applying for funding and attracting private sector investment.
Of significant benefit to NCTIP has been the establishment of the International Intermodal Transportation (IITC) Center at NJIT. On page 34 of NCTIP's Strategic Plan, it is envisioned that the Center will "be involved in a major symposium on timely issues involving productivity of transportation systems and facility." IITC is a high tech resource center that will work closely with public and private sector stakeholders to facilitate transportation, economic development and quality of life improvement efforts within the international corridor that extends from the George Washington Bridge to the Princeton area in New Jersey. The complementary agendas of NCTIP and IITC are expected to enhance both Centers. One example of this is a conference on ports as economic engines in the 21st Century.

NCTIP was involved in the planning of a major symposium on campus in December 2000 to formally introduce IITC. NJIT president Saul K. Fenster moderated the symposium and following round-table discussions. Speakers included New Jersey Assembly Majority Leader Paul DiGaetano (D-36), Assembly Deputy Speaker and Chair of the Transportation Committee Alex DeCroce (R-26), Elizabeth Mayor J. Christian Bollwage, Bayonne Mayor and Assembly Minority Leader, Joseph V. Doria, Jr., and New Jersey Department of Transportation (NJ DOT) Commissioner James Weinstein. In addition, former Congressman and Chair of the House Transportation Committee Robert A. Roe, Deputy Director of the North Jersey Transportation Planning Authority Cliff Sobel, Chief of Planning and External Affairs for the Port Authority of New York and New Jersey Christopher O. Ward; joined the speakers for roundtable/panel discussions.

Lazar N. Spasovic, Director of NCTIP/IITC, and Assistant NJDOT Commissioner Pippa Woods presented an overview of IITC. Leaders from public, private and non-profit sectors who will serve on the IITC Advisory Board also attended.

"The corridor will be a comprehensive approach that will help us meet New Jersey's needs," said Congressman and vice chair of the Democratic Caucus Robert Menendez (D-NJ), who sponsored the federal legislation that provided IITC funding. "Our vision for the corridor is bold. New Jersey already has world-class port, airport, highway and rail facilities to move our innovative products. The international corridor will be a place like no other in the United States - a place where someone can take an idea for a product, research and develop it, finance it, manufacture it and export it anywhere in the world."

Commissioner Weinstein believes IITC will be a critical resource for NJDOT. The Center also will provide important support for the North Jersey Transportation Planning Authority, will act as an independent facilitator in a forum for stakeholders to develop a cooperative agenda for a dynamic, regional plan, and will utilize advanced modeling tools and provide a communication channel for the public.

IITC is funded by a $2 million grant from the United States Department of Transportation Federal Highway Administration (FHWA) under the High Priority Projects Program of the Transportation Equity Act for the 21st Century (TEA-21).

NCTIP, of course, loses no opportunity to spread the good word about itself. In the packages of information distributed to all participants and attendees, the new Research at NCTIP: New Jersey Department of Transportation Funded Research Projects, and Mobility and the Costs of Congestion in New Jersey, as well as a fact sheet on NCTIP were included.

A video of this event is available on request.
Another significant project external to NCTIP has brought together elements that pointedly reflect NCTIP's theme of transportation and industrial productivity, and brings with it a heightened visibility in significant areas. Once again, NCTIP is in the right place at the right time. On page 34 of the Strategic Plan, it is envisioned that "…………….potential research areas (will) include ………….economic revitalization of brownfields." The purpose of the last effort would be to create better jobs, increase the local tax base, improve neighborhood environments, and enhance the overall quality of life. While at the time NCTIP was envisioning partnering with NJIT's Center for Environmental Research and Science, a closer fit has been a joint project with the North Jersey Transportation Planning Authority.

The numerous freight and valued-adding service and manufacturing activities are a potentially 'good fit' for the region's brownfields. By nature, freight businesses require good transportation access. A large number of brownfields lie in proximity to the Newark/Elizabeth transportation hub that includes the marine port, airport, and major rail terminals. Attracting freight businesses to brownfields sites would reduce the need for long distance trucking of goods - thus reducing air pollution, increasing rail usage and creating new jobs nearby urban populations with significant unemployment.

Against this background, Dr. Lazar N. Spasovic has been named by NJIT to co-direct the Brownfields Planning project, (formally known as Preparing Modern Intermodal Freight Infrastructure to Support Brownfields Economic Development). The North Jersey Transportation Planning Organization (NJTPA), in partnership with NJIT, its host agency, was awarded a total of $1,500,000 to explore ways to channel new or expanded freight related businesses into the region's numerous abandoned or idled industrial properties, known as brownfield sites. Dr. Spasovic, director of both NCTIP and IITC, will share responsibility for this project with John Hummer, manager of trade services and new initiatives at NJTPA.

An October 2000 workshop focused on the results of an in-depth market analysis on the projected growth of trade northern New Jersey's ports will experience in the near future - and the opportunities this growth presents for brownfield redevelopment; warehouse facilities in the region; suitability for freight-related redevelopment; and how both IITC and NJDOT's Portway project can contribute to economic redevelopment of brownfields. Featured speakers were U.S. Senator Frank Lautenberg, Congressman Robert Menendez, NJIT President Saul K. Fenster, and Hudson County Executive Robert C. Janiszewski, the Chairman of the NJTPA Board of Trustees.

Phase I of an innovative and far reaching study of the brownfields sites concluded that a coming surge in international trade through the Port of New York and New Jersey presents a golden opportunity for the redevelopment of abandoned industrial sites in the region. The research effort seeks to determine which of the region's brownfields are best suited for redevelopment into operations that can profit from the growing freight industry and burgeoning port activities. A coming surge in international trade, especially from Asia, will create a market for value-added warehousing activities such as e-commerce, distribution and light manufacturing. A final report with recommendations is expected midyear 2001.
Section II

Summary
II.A Education

3.a Revise the existing graduate program curriculum of the Interdisciplinary Program in Transportation to better reflect the Center's theme.

CE 495 - Civil Engineering Design II (Transportation-Session)
First offered in the fall of 2000, this course introduces transportation design problems in public transit systems and highway traffic management systems. Both analytical and simulation approaches are introduced and applied in two case studies incorporated into this course. The Newark City Subway and the interstate highway I-80 are used for case studies. Below is the course outline developed for this course.

Introduction of Transportation System Design
Review of Public Transportation Problems
Review of Case Study I
Transit System Analysis
Discussion of Case Study I
Case Study I Presentation
Case Study I Report Due
Review of Highway Transportation Problems
Introduction of Simulation Model (CORSIM)
Construction of Computerized Freeway Networks
Example 1 (Simulation Analysis)
Example 2 (Ramp Metering Control)
Classes Follow a Thursday Scheduled
Review of Case Study II
Discussion of Case Study II
Case Study II Presentation
Case Study II Report Due

CE 351 - Introduction to Transportation Systems
Developed and approved by the Civil and Environmental Engineering Department at NJIT, this course will introduce problems in modern transportation systems, while transportation planning and traffic engineering issues on highways and urban streets will be covered and demonstrated by traffic simulation model CORSIM. The concepts of highway (e.g., freeways, arterials and urban streets) operations and capacity, traffic flow theory, speed/volume relationships, and weaving sections will be introduced prior to computer simulation analysis.

The tentative Course outline is listed below.
Introduction of Problems in Transportation Systems
Review of Highway Engineering Problems
Introduction to Capacity Analysis
Introduction of CORSIM - Freeway Section
Freeway Systems I - Basic Segment, Ramp Junctions
Freeway Systems II - Traffic Flows and Operations
TRAN/CE 625 - Public Transportation Operations and Technology
This course has been developed and will be offered in Spring 2001. Course material includes the introduction of traffic simulation model into this course, while a case study has been developed as shown the week of 3/9/2001. The course outline is listed below.

Introduction

Public Transportation System Overview
Classic Optimization Methods
Public Transportation Research Topics
Vehicle Characteristics and Motion
Station to Station Travel Analysis
Highway Transit Modes
Operations, Performance, and Costs
Project Discussion (Project Proposal Due)
Rail Transit Modes
Operations, Performance, and Costs
Transportation System Performance
Capacity, Productivity, Efficiency, and Utilization
Simulation of Bus Operations
Case Study: NT Transit Bus Route 39
Spring Recess (No Classes Scheduled)
Midterm Exam
Vehicle Stopping Regimes and Spacings
A Numerical Example
Time Dependent Shortest Path Topic:
Minimum Path in a Transit System with Fixed Schedule
Good Friday (No Class Scheduled)
Vehicle Scheduling
Vehicle Routing
New Concepts and Proposed Modes
Student Presentation
Final Exam (Term Project Due)

These courses are open to undergraduates as well as graduate students.

3.b Design, develop and implement a new Logistics Engineering Program within the Department of Industrial and Manufacturing Engineering.

Masters in Logistics Engineering - Update
In September 2000, NJIT initiated a Masters degree program in Logistics Engineering. Housed in the Department of Industrial and Manufacturing Engineering, the program is chaired by Dr. Athanassios K. Bladikas who is also director of the Interdisciplinary Program in Transportation. The program is designed to be complimentary to the Transportation curriculum, and aims to educate professionals to enter or advance in logistics positions in such industries as transportation carriers of all modes, manufacturers, distributors, and chain store retailers.

Individuals with undergraduate degrees in engineering, the sciences or business may apply. The busy water, air, rail, highway intermodal and distribution facilities in northern New Jersey provide an ideal laboratory for the program, which has an applied, quantitative and information technology-rich content and focuses not only on the technical aspects of operating the supply chain, but also on the managerial and coalition-building skills needed for partnerships, as well as the information systems that control the process. Qualified students may continue their studies for the Ph.D. in transportation or industrial development.

University resources are committed for the program. A faculty member has been hired to support it, the library has strengthened its collection in the area, and additional computing resources will soon be in place.

3.c Design, develop and implement a transportation/supply chain management focus within the new MBA program in Management of Technology.

MBA Management of Transportation - Update
The MBA program in Management of Technology is being reviewed by the School of Management curriculum committee for the purpose of providing knowledge of existing and future needs in technology management. Transportation and logistics specialization courses will not be affected, but core courses are likely to change. Students enrolled in the MBA program, in addition to the technology-based courses, will study basic management courses thus strengthening their educational development. Understanding of technology and its relationship to business will be further strengthened by coursework in three technical specialization areas namely transportation/logistics, manufacturing, and management information systems. The transportation focus will be directed toward management of large-scale public systems and private systems.

In a January 2001 article in the New York Times, the new program was referred to:

"As the so-called new economy continues to put a radically different face on the business world, higher education institutions in the area are racing to avoid being left at the starting gate. A course brochure for a new M.B.A. program designed by NJIT promises "to keep you ahead of the revolution in our tech-driven economy."

In September, NJIT started an upgraded technology training program for business professionals that the university touts as the first of its kind in the state. The program, a full 18-month M.B.A. course, has been
well subscribed to in its first run by mid-career managers and corporate draftees looking to gain vital high-tech skills.

"You've seen technology grow substantially in the last decade or so, and a lot of companies have realized in order to achieve competitive advantages, it is important to have managers today up to speed," said Pikay Richardson, an academic director and research professor in the New Jersey School of Management. "NJIT decided to achieve some unique selling point, a competitive advantage if we offer a technology oriented M.B.A. We've actually moved into that M.B.A. area. Our students have come back to tell us that although their master's of technology have given them some advantage, they would prefer an MBA in the management of technology."

Students attend Fridays and Saturdays regularly and have several full week sessions that include an overseas trip aimed at giving them a global perspective. That still leaves them time to work at their regular jobs. "The skills they bring back with them are up-to-date and immediately applicable," said Richardson. "Companies without doubt will regard (employees) as best of value for money," he said. "We expect them to be upgraded in terms of salary."

The M.B.A. program is 16 courses rolled into one, with four more courses than the university's Master of Science program. Those include Internet, information systems and two general management classes. "Basically, the difference is more courses and a few upgraded in terms of technology," said Richardson.

**MBA Offered at Mt. Laurel**
The New Jersey School of Management will offer its first technology intensive Executive Master of Business Administration program, in March, at the Technology and Engineering Center at the NJIT Mount Laurel campus.

The flexible 18-month degree program, the only one offered in New Jersey, includes two monthly classes, as well as two full one-week sessions -- one in New Jersey when the course begins and another abroad about 10 months later. The program prepares mid-career managers to face the challenges of today's technologically complex business environment.

**Collaborative Doctorate Program - Update**
NCTIP continues to advertise NJIT's unique Collaborative Doctorate, which is open to public and private sector employees. Designed for mid-career engineers, executives, scientists, military personnel and educators who want to pursue a Ph.D. while continuing full-time employment, the requirements are the same high quality as for other NJIT doctoral programs, but a greater flexibility allows participants to draw on the combined expertise and resources of both NJIT and their current employers. This program will be highlighted, along with Master's programs in transportation and civil and environmental engineering, at the April 2001 TransAction conference in Atlantic City.

**3.d Participate in the National UTC Student Award Program**
Transportation graduate student, Kenrick Lane, has been chosen NCTIP 2000 Student of the Year. Mr. Lane will be honored at the TRB conference in Washington, D.C. in January 2001, and awarded $1,000 (See Success Stories).
3.e **Carry out the vertical integration of transportation education at NJIT**

- NCTIP continuously strives to make undergraduates aware of transportation as a field of study and an area of professional growth. Transportation articles appear with frequency in university and student publications. Seminars are advertised to the student body. Transportation courses are offered as electives to undergraduates, including the three new offerings listed above (see 3.a)

- The logistics and management of technology emphases offer wider options to undergraduates.

- If they pursue the joint BS/MS program, undergraduate students in good standing can register and take two graduate courses in a chosen field of study in their senior year. These courses include transportation, and are counted toward both BS and MS degrees.

- A colloquium was held in January 2000 for the students of the Honors College. Entitled E-Station: Providing Internet Access to the Inner City, and based on Professor Sollohub's research project, E-Stations in Newark (NCTIP 995938) http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=13&grantNumber=992500; it was moderated by Honors Scholar Eric Miller. Bill Havlena, Assistant Professor, School of Management, was a panelist, as were Jerry Lutin, Senior Director of Planning Research and Development, NJ Transit, SanDonna L. Bryant, Coordinator, Newark Community Development Network.

3.f **Expand the undergraduate transportation offerings in the Civil and Environmental Engineering Department**

The following courses have been added to the CEE curriculum and are open to undergraduates:

- CE 495 - Civil Engineering Design II (Transportation-Session)
- CE 351 - Introduction to Transportation Systems
- TRAN/CE 625 - Public Transportation Operations and Technology

3.h **Establish the Center's advisory board and select an education and training committee**

The December 2000 Advisory Board meeting took the form of an in-depth planning session to discuss strategic direction for transportation at NJIT. Twelve people representing administration, faculty, staff and the NCTIP advisory board met for a team-building/working dinner at a restaurant in Newark on Sunday evening, December 18, led by Dr. Spasovic. The following morning, they were joined by the University Provost, chairs of the Department of Civil and Environmental Engineering, School of Management, and New Jersey School of Architecture, and representatives from IITC and the NJTPA/NJIT brownfields initiative. Dr. Athanassios K. Bldikas attended both meetings in his dual capacity as chair of the Department of Industrial and Manufacturing Engineering and Director of the Interdisciplinary Program in Transportation. John Betak, NCTIP Board Chair, led the team in an hours-long focusing on what NJIT as an institution needs to do to respond to the emerging needs of USDOT and NJDOT, and to further develop its educational and service activities. As the influence of NCTIP has been used to obtain substantial funding from NJDOT, not only for NCTIP but for NJIT as a whole, it is necessary that other visions for transportation around NJIT be understood and taken into account. In addition, the IITC and Brownfields initiatives require their own resources. To grow, a unified vision must be achieved. Further meetings will be held to continue this process.
II.B Human Resources

3.a Increase Student Participation

Transportation Classes at NJDOT Headquarters
Through a joint effort of the New Jersey Institute of Technology (NJIT) and NJDOT, employees can now earn a Master of Science in Transportation or a Doctor of Philosophy in Transportation without traveling to Newark for classes. NJIT will hold sufficient courses at NJDOT's main building to fulfill all degree requirements. All courses are taught by NJIT faculty and NJDOT employees are eligible for tuition reimbursement. The courses are also open to other potential students from the public and private sectors in the area of Central New Jersey.

NJIT faculty also visited NJDOT headquarters in December to inform employees of two graduate classes to be held. These are Introduction to Urban Systems Planning and Project Management.

Transportation Program Brochure
A brochure describing the Interdisciplinary Program in Transportation has been updated and is widely used to attract prospective students and entice employers to encourage their employees to pursue graduate degrees and participate in continuing education training. The brochure is available on NCTIP's home page: http://transportation.njit.edu/nctip/academic/Transportation_Brochure.pdf

Information on research activities and seminars that may support the outcome of increased student recruitment and participation is also available on the web: http://transportation.njit.edu/nctip/

Fellowships/Scholarships
Presidential Fellowships: Ph.D. students Cecilia Kelinhofer-Feeley and Cheryl Allen-Munley have been awarded NJIT Presidential Fellowships. A limited number of these fellowships, with average stipends in excess of $14,000, full tuition awards, fees coverage, travel, books and cost of living support, are offered to outstanding doctoral students each year, with emphasis on minorities and underrepresented groups. Students who are approved for these awards generally have the most outstanding records, often with perfect 4.0 GPAs, as is the case with Ms. Allen-Munley.

Research assistantships. Research assistantships are offered to students to conduct research under the supervision of NJIT faculty. Duties range from academic support to day-to-day operation of administrative offices. NCTIP has supported 23 students during this reporting period.

Undergraduate Scholars Program: The NCTIP Undergraduate Scholars Program has provided awards of $2,000 each to eight students who have successfully completed at least two transportation courses and either an independent study, mentored research/development transportation project or faculty supervised agency/industry internship of at least one semester's duration. Two students are from the Masters in Infrastructure Planning program, and six are from Civil and Environmental Engineering.

Advanced Institute for Transportation Education (AITE) Scholarship: With the concurrence of the New York State Department of Transportation, NJIT's Advanced Institute for Transportation (AITE) scholarship has been awarded to an NYSDOT employee to begin studies for a Master's degree in Transportation in the Spring 2001 semester.
Edwards and Kelcey, Inc., an international planning, consulting, engineering and construction services firm headquartered in Morristown, NJ, will offer a $25,000 scholarship to an engineering student who will consider coop employment or internship at E&K, preference to be given to a student from the Newark metropolitan region. The scholarship will be in the name of the late Ronald A. Wiss, former President and CEO.

Student Accomplishments

At the request of Dr. Ronald Kane, Dean of Graduate Studies, Cecilia Kelhofer-Feeley, a Ph.D. student in Transportation and an NJIT Presidential Fellow, is serving on the Task Force on Graduate Studies and Research for NJIT’s next Middle States accreditation process. During 2000-2001, various task forces at NJIT are doing self-studies in specific areas as part of larger report that will be given to the Middle States Association team.

Alex Sideris and Jakub Rowinski presented current research undertaken at NCTIP at the Transportation Research Forum 42nd Annual Conference. The meeting took place in Annapolis, Maryland, from November 29th to December 1st, 2000.

- Sideris presented a paper titled: Operational Planning of Intermodal Marine Terminals dealing with the allocation of resources at a container terminal. The presentation summarized the product development cycle of a new software tool. The project scope was to develop a real-time, information driven, berth planning system. A graphical user interface facilitates the on-site use by people with limited computer skills and an efficient database management component allows for performance analysis and evaluation of terminal operations at a managerial level. Currently the system is being considered for final implementation at Maher Terminals, the largest container terminal operator at Port Elizabeth in New Jersey. Port Elizabeth is “America’s Containership Capital.” Maher Terminals Inc. runs two terminals with a total of 7,350 feet of berthing space, approximately 450 acres of upland area and 16 container cranes. Managing a facility of this size is a challenging task. The NJIT research team conducted a series of interviews with the terminal management team to identify both the functional and technical design requirements of the software product. Initially the product will be used for extensive data collection, recording all the management team decisions. A set of expert modules is envisioned to enhance further the knowledge-based decision support component of the product.

- Rowinski presented the paper entitled A Multi-Commodity, Multi-Class Generalized Cost User Equilibrium Assignment Model. The paper presents work completed as part of an ongoing New Jersey Department of Transportation sponsored project. The developed model takes into account the impacts of congestion on truck route choice and is implemented as a Geographic Information System (GIS) within the TransCAD software package and Microsoft Access. The objective of the presented paper was to demonstrate how the model can provide the freight transportation planner with an initial assessment of the magnitude of changes in the traffic flow and the user costs that would result from the implementation of various new policies. Several possible improvements proposed by the state of New Jersey are analyzed using the model.

3.b Increase Faculty Participation

Current Affiliated Faculty/Principal Investigators
Athanassios K. Bladikas, Industrial and Manufacturing Engineering and Transportation
Mei Chen, Civil & Environmental Engineering and Transportation
Steven Chien, Civil & Environmental Engineering and Transportation
A search is currently underway for an additional faculty in Civil and Environmental Engineering who will be part of the core transportation faculty.

An NCTIP planning meeting was held on December 18, 2000, designed to organize NJIT resources before the competition of the 17 named centers scheduled for October 2001. The meeting involved department chairs and/or faculty from civil and environmental engineering, industrial and manufacturing engineering, architecture and management, as well as staff from NJIT, IITC and NJTPA.

Faculty Highlights

- *Dr. Maria Boile*, ‘95 (Ph.D. Tran.), currently an assistant professor of civil and environmental engineering at Rutgers University, received a $1,000 award winner of the Intermodal Passenger Transportation Paper Contest sponsored by Lewis D. and John J. Gilbert Foundation for her paper entitled: Evaluating the Efficiency of Transportation Services on Intermodal Commuter Networks. This paper was presented at the TRF meeting in Annapolis Maryland in November 2000, and is being submitted for review for publication in the Journal of the Transportation Research Forum. The research behind the paper was partially sponsored by NCTIP. Details of the project may be found at [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=completed&projectNo=58&grantNumber=991912](http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=completed&projectNo=58&grantNumber=991912).

- *Dr. Mei Chen*, ‘99 (Ph.D. Tran) has joined the NCTIP staff as Visiting Faculty, currently teaching Tran/CE 603 Introduction to Urban Transportation Planning. She will also teach Tran/CE 705 Mass Transportation Systems in the fall. Dr. Chen is currently working on IITC research, and will be preparing proposals for NJDOT. Previously, she had worked as a research associate for NJIT’s Transportation Information and Decision Engineering (TIDE) Center (*see NCTIP 2000 Annual Report, page 34*).

- *Dr. Janice Daniel* has received a $100,000 research award under the New Jersey Department of
Transportation Research Challenge Grant Program for *Identifying Factors and Mitigation Technologies in Truck Accidents in New Jersey*. The theme for this program is for the second year Governor Whitman's Transportation Vision for the 21st Century called "New Jersey FIRST (Future Investments and Reinvestment in State Transportation." Dr. Daniel's project, deemed the "best of the freight proposals, meets the Governor's call for an investment strategy which will "expand mobility options, strengthen the fabric of our community and make New Jersey an unsurpassed leader" in this new century. The project, which will be initiated after this reporting period, is partially supported by the USDOT funds through the NCTIP.

- **Dr. Joshua Greenfeld** was cited in the December 2000 issue of the U.S. Department of Transportation University Research and Education Plan, under "Samples of Academic Efforts in Support of Federal Enabling Research. Greenfeld's research project, *Digital Map Requirements for Automatic Vehicle Location* (NCTIP #990972), was recognized as an example of "research on the development and application of technologies to monitor, analyze, quantify and, thereby, improve safety and performance in transportation systems." The final report for this project may be found at [http://transportation.njit.edu/nctip/publications/Research%20Reports/Digital%20Map%20Requirements/Digital%20Map%20Requirements.htm](http://transportation.njit.edu/nctip/publications/Research%20Reports/Digital%20Map%20Requirements/Digital%20Map%20Requirements.htm).

- **Dr. Jay Meegoda**, PI for the *Data Research - Materials Laboratory Information System (LIMS)* project (NCTIP #992505), was promoted to full professor in the fall 2000.

- **Dr. Hindy Schachter** whose most recent research project for NCTIP was *The Uses of State DOT Research: Customer Use of Completed Projects from NJDOT Bureau of Research* (NCTIP #999511), has been granted an NCTIP initiation award to research an area of long-time interest to her - *Gender and Professional Worklife at State DOTs* (NCTIP # 992515). This research topic is timely and as the state DOTs across the nation’s grapple with the issue of retention and promotion of their staffs. (See final report: [http://transportation.njit.edu/nctip/publications/Research%20Reports/Uses%20of%20State%20DOT%20Research.html](http://transportation.njit.edu/nctip/publications/Research%20Reports/Uses%20of%20State%20DOT%20Research.html); and [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=20&grantNumber=992500](http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=20&grantNumber=992500).)

- **Dr. Arijit Sengupta**, associate professor of in the department of engineering technology, has joined the transportation faculty for the first time with his research on *Logistics Problems in Warehousing and Distribution of Perishable Goods at Tropicana's Northeast Distribution Center* (NCTIP # 992513). (See [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=11&grantNumber=992500](http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=11&grantNumber=992500).)

- **Professor Darius Sollohub**, Associate Director of the Master in Infrastructure Planning program in the New Jersey School of Architecture, brought his interest in transportation, as shown in the Riverside Transit Village Project (see Success Stories) to bear with *E-Stations in Newark* (NCTIP #995938). (see Success Stories; see [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=13&grantNumber=992500](http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=13&grantNumber=992500).)

- **Dr. Jian Yang** joined the faculty as an assistant professor of logistics in September 2000, and is currently working on a research project, *Policies for Real-Time Traffic Routing* (NCTIP#992518). His research is in supply chain management with emphasis on logistics and inventory control. (See [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=27&grantNumber=992500](http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=27&grantNumber=992500)).
Faculty are encouraged to carry out technology transfer activities - presenting results of their research in seminars, workshops, and guest lectures, as well as in presentations to professional clients and participation in professional conferences.

In addition to NJIT faculty, joint research was undertaken with Rutgers, City College of New York and Northwestern University.

3.c Hire Center Support Staff

A search is currently underway for a Business Manager.

3.d Increase Professional Community Awareness

"There's no reason why New Jersey's major corporations shouldn't be turning to institutions like Rutgers and NJIT just as they do business with the MITs and Stanfords of the world, we need to get the private sector more involved with our institutions." (New Jersey Governor Christie Whitman, Atlantic City Press, January 24, 2001.)

NCTIP's visibility and national reputation vis-à-vis the academic and professional communities have been enhanced by research publications and newsletters mailed nationwide,* conferences attended and papers and publications given; quality of faculty recruited to carry out the Center's activities; programs such as the National Student Paper contest,* and caliber of students graduated. Ties with New Jersey DOT have been strengthened, resulting in record funding for projects. New Jersey municipal and county engineers have responded to NCTIP seminars, and government leaders at local, county and state levels have become involved, particularly as the International Intermodal Transportation Center* and the Brownfields Project* have been leveraged (*See Success Stories).

A meeting of the Port Issues Sub-Committee of the Advisory Council on Port Competitiveness was held in August 2000, chaired by Lazar Spasovic, and attended by Assembly Majority Leader Paul DiGaetano. Dr. Spasovic described NCTIP in detail, and gave an overview of its research potential. He then introduced IITC. John Hummer of NJTPA, co-director with Dr. Spasovic for the NJTPA/NJIT brownfields study, envisioned the new economic corridor made possible by the wealth of brownfields sites in the region. He discussed movement of cargo by marine, air and rail, and how to make the port pay for itself. A discussion by the sub-committee membership listed the most critical port issues as dredging, landside access, rail/highway/pipeline capacity, global cargo flows, the green-port concept (environmental friendliness of terminals, rail and clean fuel strategies), land use in the port vicinity, economic revitalization of brownfields, cost of doing business and labor issues.

The August/September 2000 issue of NJDOT's in-house publication Transporter carried an article Earn a Degree at NJDOT,

Through a joint effort at the New Jersey Institute of Technology (NJIT) and NJDOT, employees can now earn a Master of Science in Transportation or a Doctor of Philosophy in Transportation without traveling to Newark for classes. The Institute will hold enough courses at NJDOT's main building to fulfill all degree requirements. All courses are taught by NJIT faculty and are eligible for tuition reimbursement.

In support of NJIT transportation courses that are held each semester at NJDOT headquarters in Trenton,
the following memo was sent to all NJDOT personnel:

"The New Jersey Institute of Technology will be here at DOT headquarters on December 11 from 1:00 p.m. until 3:00 p.m. in the MOB room 2700 regarding the two Graduate Engineering classes that will be held at the Department. They are: Introduction to Urban Systems Planning and Project Management. If you are interested in meeting with the NJIT staff please feel free visit. All staff who wish to enroll in these course must be enrolled in the Tuition Aid/Career Development program."

In his capacity as director of NCTIP and IITC, Dr. Spasovic attended the November 1, 2000 Annual Transportation Symposium, organized by the Regional Business Partnership’s (Newark area chamber of commerce) Transportation Subcommittee. The topic for the event was Deep Waters and Brownfields: Managing the Growth of Global Trade in the Newark Region. Its purpose was to enable the region to anticipate and prepare for the revolution in global trade, handle new methods of goods distribution and ensure that the port's growth enhances and complements the region's economic viability. Speakers addressed the increasing levels of trade and why distribution systems are changing. They presented projects underway to build new infrastructure and offered ways to reuse brownfields, all as means to manage growth and keep the region competitive.

Professor Darius Sollohub met with editors from Wired and Fast Company Magazines who will likely do an article on his E-Stations in Newark (see above) research. He is actively pursuing fundraising with PSEG, Fleet Bank, First Union Bank and IDT. In February 2001 Sollohub will convene the board of the Urban Lab that administers the CRDA funds to begin selecting a Community Development Corporation that will operate and maintain the facility using Newark One Stop funds. Dr. Bruce A. Kirchhoff, distinguished professor in the School of Management, is having his business management class develop the business plan. A community focus group was held on November 5, 2000, conducted by Professor Havlena of the School of Management. Lazar Spasovic and several transportation students, faculty and staff attended.

II.C Diversity

3.a Expand minority high school students' awareness and interest in transportation careers.

- Transportation Institute for High School Students - Summer 2000
  In the summer of 2000, high school students from the Newark metropolitan area who were rising 10th graders were introduced to the field of transportation through lectures, workshops, design sessions and guest lecturers (practicing engineers). Under the direction of Dr. Harold D. Deutschman, Professor of Civil and Environmental Engineering at NJIT, the students worked on such varied projects as ramp metering, transit scheduling, design of a residential subdivision, and design of traffic signals. The students also had classes in computers and communication. In June 2000 Dr. Deutschman received an award from the White House for his many years of mentoring activities.

- Garrett Morgan Academy for Transportation and Technology
  Because of his background in initiating and operating pre-college programs at NJIT, and the recognition he has received from NJIT, the New Jersey Education Association, the National Science Foundation, the White House, and the American Society for Engineering Education (see Success Stories), Dr. Deutschman was also sought to design the curriculum and train the teachers for the
Paterson, NJ school district's Garrett Morgan Academy for Transportation and Technology. This innovative program, (the only one of its kind in the nation), opened its doors to its inaugural class of thirty 9th graders in September 2000. Dr. Deutschman visits regularly to work with the students.

**Abington School Gifted and Talented Program**

Under the direction of Kip Rowan of NJIT's Instructional Technology and Media Services, six of the students from the Abington Avenue School Gifted and Talented program prepared an impressive video documenting a successful semester during which 52 students from grades four through eight and their teachers attended NJIT one day a week. The program was designed to promote literacy in math, science and technology. The video, which took the students from an initial project through model building, tours of the Port of Newark/Elizabeth and Newark International Airport, and a transportation T-shirt contest, was sent to U.S. Transportation Secretary Rodney Slater because of his stated interest in the Garrett A. Morgan Transportation Futures Program, as well as to all persons involved in making this past semester such a success.

### 3.b Conduct Outreach Programs for Women

Dr. Janice Daniel, one of four core transportation faculty, is an excellent role model for both female and minority transportation students. She has assisted Dr. Bladikas in his outreach to high school students, and participated in programs organized by the university women's center.

The NJIT Women's Transportation Seminar sponsored a talk in November 2000 by Lois Goldman, principal planner of the North Jersey Transportation Planning Authority. Ms. Goldman's topic was *A Seminar on Regional Travel: The Household Interview Survey*.

**University-wide**

The Constance A. Murray Women's Center at NJIT has been renamed the Murray Center for Women in Technology to emphasize the place of women in the sciences. A subcommittee of NJIT's Women's Issues Committee is currently preparing a report on the personal and collective accomplishments of women at NJIT. It will be presented to NJIT President Fenster at the end of the current academic year.

The Murray Center has successfully pushed for the production of a brochure aimed specifically at recruitment of women. This brochure has just been issued and will be displayed with transportation literature at the April 2001 TransAction seminar. Sally O'Malley has offered to work with the Women's Center on a companion brochure for women graduate students.

The first organizing meeting of the Society of Women Engineers chapter at the NJIT Mount Laurel campus was held in November 2000. The female population at the NJIT Mount Laurel campus has continued to grow. About 25 percent of the total NJIT undergraduate population consists of female students pursuing degrees in computer science, information systems and engineering.

### 3.c Conduct Outreach Programs for African-Americans and Hispanics

The June 22, 2000 issue of *Black Issues in Higher Education* included rankings of schools in the number of undergraduate degrees conferred to minorities. The rankings are based on quantity of graduates, making NJIT's figures in comparison with larger schools even more significant. According to data from the 1997/1998 academic Year, NJIT ranked:

- 16th in Engineering Baccalaureate degrees granted (77 graduates, 51 Hispanic, 26 African-American)
Lazar Spasovic has been exploring a potential joint cooperative agreement with Professors Ronald Bailey and Marihelen Glass of North Carolina A&T. Professor Bailey is the Acting Chair of the architectural engineering program. Dr. Glass, who is with the landscape architecture program, was contacted at the suggestion of Carol R. Johnson, a close associate of Professor Sandy Moore. Ms. Johnson presented a seminar in April 2000 on Landscape Value and Transportation.

II.D Research Selection

3.a Establish research topic selection procedures

A draft summary report detailing Dr. Naomi Rotter's study of existing criteria and processes for RFPs from several schools/centers was submitted outside the time frame of this report. The full report will appear in the June 2001 Annual Report. Dr. Rotter's recommended changes are organizational rather than substantive.

3.b Establish faculty outreach procedures

Faculty throughout the university are routinely apprised of the activities of the Center. OnRoute is routinely distributed to all faculty and senior administration.

With the addition of the two new entities, IITC and the Brownfields project, efforts have redoubled to educate NJIT faculty and staff re increased transportation activities.

Transportation information appears regularly in NJIT internal and external publications (most recently in The President's Report, The Alumni Newsletter, and News @ NJIT, the in-house publication.), and appears, as appropriate, on the university's web page. The Research and Technology Transfer Subcommittee of the Advisory Board is overseeing the establishment of formal procedures.

3.c Establish a Research and Technology Transfer Subcommittee of the Advisory Board

The Advisory Board re-designated this Subcommittee the Research Selection Sub Committee. It has been established and is functioning. See 3.a.

3.d Prepare plans for the formal association of the Center with private and public sectors entities

The new International Intermodal Transportation Center at NJIT has been since its recent initiation an ideal setting for student mentoring. Multiple committees and subcommittees are involved in policy making, and interested students are part of this process. They have opportunities to see and hear the greater picture involving the three area ports: air, sea and rail, and their interconnectedness. Subcommittees to date have discussed issues of dredging, landside access/use, rail and highway capacity, drayage, global cargo flows, 'green port' concepts, land use in the vicinity of the ports, costs of doing business in the port area, labor issues, and the economic revitalization of brownfields. Dr. Spasovic is also chair of the Port Issues
Subcommittee of the Advisory Council on Port Competitiveness.

**Maher Terminals**, a long-time supporter of NCTIP, continues to mentor students, allowing access to its facilities and programs. Roger Nortillo, Executive Vice President of Maher Terminals, is a member of the Advisory Board. Brian Maher, President, is a member of NJIT's Board of Overseers, and has made significant donations to the university for use in inner city educational programs.

**Tropicana, Inc.** has been working with NCTIP on a $189,000 research project to develop heuristic methods for multi-echelon inventory problems. Where today’s emphasis on meeting customer requirements and improving service, getting the right product to the right customer at the right time has become a standard, and speed and accuracy of transactions, information flow, and distribution processes are essential for industries that deal with short shelf-life and product life cycles and high-tech markets, access to Tropicana’s facility affords students an excellent basis for logistics training.

**Lucent Technologies** has awarded NJIT a $125,000 grant to establish a computing and composition program to develop technology skills designed to better prepare children from grades K-12 to meet the challenges of a global society. The grant is part of more than $1.6 million that will be awarded to 18 Newark-based agencies, including NJIT, to support two programs: (1) Academics Plus - an initiative that supports school- and community-based partnerships that encourage high academic achievement in the areas of science and math studies, as well as college preparedness; and (2) Preparing Newark's Youth for Global Skills - an initiative that supports development of work-based learning programs aimed at building job skills for the 21st century workplace. This program primarily supports programs that provide internships, computer-based training and leadership development. The grants are part of the Lucent Foundation's overall efforts to improve academic performance and provide employment and career opportunities for Newark's young people. For example, Lucent has invested more than $1 million to provide employment opportunities for high school and college students during the summer months and after school in collaboration with six community service organizations. David Ford, president of the Lucent Technologies Foundation, sees Newark as demonstrating that it is ripe for change. Dr. Sandy Moore, director of the Abington Avenue School Gifted and Talented Program, is studying ways to leverage this grant as part of NCTIP's commitment to Newark area youth (see II.C., 3.a.).

**II.E Research Performance**

**3.a Conduct research in the freight movement efficiency area**

NCTIP will conduct freight movement efficiency research to find the best solutions for vehicle routing and scheduling, inventory management, supply chain issues, and information technology problems with particular emphasis on studying ways of improving the seamless intermodal interface.

**Logistics Problems in Warehousing and Distribution of Perishable Goods at Tropicana's Northeast Distribution Center** (NCTIP #992513) [http://transportation.njit.edu/nctip/research/ResearchReport.asp?status=New&projectNo=11&grantNumber=992500].

In addition, because of the Center's existence research is being conducted for the National Science Foundation:

**Dynamic Flow Control for Urban Freight Movement**

**Optimization and Control of Freight Movement and Roadway Transport Systems.**

3.b. **Conduct research in the passenger movement efficiency area.**

Improvements in personal productivity by ensuring timely arrival at destinations through the implementation and evaluation of traveler information systems and the development of more accurate methods of collecting and delivering real-time information are being addressed by


3.c **Conduct research in the facility, institutional and regulatory efficiency area.**

Improvements to institutional productivity by providing state DOTs and MPOs with the necessary tools to support quantitative decision making and more efficient execution of mandated functions are addressed by


This category also includes \textit{The Allied Signal 2020 Infrastructure Study}, on board because of NCTIP's existence.

\textbf{3.d Develop Research Laboratory}

In order to quickly and most efficiently deal with transportation research and education, NCTIP has combined with IITC to furnish an advanced computer laboratory. The laboratory is equipped with over 20 computers and contains the latest and most sophisticated transportation planning, traffic analysis, computer programming and GIS database management software. To accommodate large scale transportation networks and detail analysis, the computers are constantly updated. The state-of-the-art computation laboratory includes powerful Sun Sparc workstations, Intel Pentium Windows 2000 (NT) and Pentium 586 servers, Pentium Pro and Pentium Windows 3 NT workstation 4.0 computers, and an 11x17 color printer.

Well equipped to perform the most complex research in transportation and logistics, workstations are networked to facilitate supervision and sharing of documents to foster teamwork on research projects.

Grouped by category, the following expanded battery of software packages is available:

\textbf{Traffic Analysis}
- CORSIM - simulation
- Transit 7F - corridor analysis
- PASSER - corridor analysis and simulation
- Highway Capacity Software 3.0 - ITE capacity analysis
- Paramics - 3D simulation

\textbf{Transportation Planning}
- GAMS - mathematical programming
- TRANSCAD - GIS-based transportation network modeling
- MINUTP - transportation network modeling and traffic assignment
- Tranplan - transportation network modeling and traffic assignment
- QRS2 - transportation network modeling and traffic assignment

\textbf{GIS}
- MapInfo
- ARC Info
- ARC View
- Map Objects
- GeoMedia

\textbf{Databases and Information}
- TIGER files
- Census Transportation Planning Package (CTPP)
- National Transportation Atlas Database
- NJDEP Color Infrared Digital Imagery
NJ Brownfields Database
NJDOT Statewide Truck Model
NJTPA North Jersey Regional Transportation Model
NJDOT GIS Base Mapping

Student/Faculty-Developed Transportation Applications
TELUS - transportation economic land use software

General Applications
Oracle
Visual Studio
Microsoft Office
Adobe Acrobat and Photoshop
SQL server

3.e **Implement a research program monitoring system (see also Success Stories)**

**NCTIP Research Program Monitoring System**
To automate NCTIP submission of information to USDOT/NJDOT, a web-based information system has been designed (http://transportation.njit.edu/NCTIP_reports/default.htm). One segment of the MIS feeds project information directly to the NCTIP Research Projects web section, moving projects between new, ongoing, and completed categories as appropriate. A second segment allows input to the NCTIP directory by multiple people and automatically updates the Directory web page. A third segment, which will enable faculty to input and send Quarterly Reports directly to NJDOT on line, is in its trial stage. Project managers will input first quarter 2001 project information through the web, and reports will be supplied to NJDOT.

3.f **Implement a research program impact evaluation system**

The North Jersey Transportation Planning Authority (NJTPA) and the New Jersey Department of Transportation (NJDOT) have used the NCTIP-developed county-based commodity flow database for studying the impact of the Conrail merger on the New York/New Jersey metropolitan region. Research continues on this database.

**II.F Technology Transfer**

NCTIP has significantly increased its visibility and name recognition over the past six months by means of its national publications, local seminar series, magazine, newspaper, TV and radio coverage, hosting the NJDOT Research Day, participating in the NJDOT Research Month, use of its web site, attendance at conferences and presenting PowerPoint presentations to select audiences.

Leveraging its connection to IITC and the NJTPA/NJIT brownfields stakeholders, NCTIP has made its presence known through meetings with local political leaders and distribution of its publications at IITC and brownfields gatherings.
3.a. **Establish the framework and supporting procedures needed to carry out the Center's technology transfer activities**

NCTIP has state-of-the-art technology transfer computing capabilities, including a Micron Millennia computer with a Pentium III processor, 128 MB 133 MHZ SDRAM, 40x speed RW CD-ROM, a 19" monitor, and a Microtek Scanmaker III scanner. The system is equipped with Microsoft Office 2000 PRO, and updated desktop publishing softwares Adobe Illustrator, Photoshop, and Acrobat; Visual Studio Pro; QuarkXPress; Macromedia Dreamweaver UltraDev; MGI Photo Studio 8.6.

In this reporting period NCTIP has added significantly to its photographic capabilities - as seen in the November 2000 Research at NCTIP publication - with a Sony Cyber-shot digital camera.

NCTIP mailing lists are continuously updated.

3.b **Initiate a series of seminars**

The NCTIP Seminar Series has been unbroken since 1996. In advance of each seminar, a brochure is designed, produced and about 500 copies are mailed. In addition to faculty, students, alumni, NJDOT and FHWA personnel, municipal engineers, public and private sector consultants, each mailing is addressed to specific audiences as befits the topic of the seminar. The seminars are published by flyer throughout the university, in NJIT in-house newsletters, and on the NCTIP web site.

**The Seven Most Hazardous Road Defects - Peter S. Parsonson, Professor Emeritus, School of Civil and Environmental Engineering, Georgia Tech University.**

This presentation discussed the seven kinds of road defects most likely to cause crashes resulting in injury or death. Using examples from his consulting practice, Dr. Parsonson illuminated Roadside hazards - typically trees, utility poles, obsolete guardrails, steep backslopes, etc., and described efforts to provide a forgiving roadside for errant vehicles; Sight-distance obstructions - including vegetation, slopes, signs, buildings, guardrails, vehicles parked near intersections, curves and hilltops; Edge drop-offs - which may cause vehicles that leave the road and come back on to swerve out of control and quickly cross the centerline due to a dangerous "scrubbing reentry;" Highway/railroad grade crossings - a problem where an unsignalized crossing has restricted sight distance; Work zones - which may have dangerous edge drop-offs, transition zones, lane closures and slow-moving construction vehicles; Curves - e.g., where the radius is too small or the superelevation and/or advance warning is inadequate, with sight distance obstructed; and Hydroplaning - which may occur where an asphalt pavement is rutted; near the bottom of a sag vertical curve with inadequate cross-slope; where a bad combination of alignment and cross section causes sheet-flow of water across the pavement; or where the ditches or culverts are clogged with sediment or debris and cause water to overflow across the road. Dr. Parsonson posited that to satisfactorily deal with road defects, an agency should follow widely accepted standards, especially its own; avoid new and unproven designs; project what might go wrong, taking into account all the possibilities; and have a rational method of project selection so that scarce funds for operation and maintenance will be used most effectively.

**Geo-Synthetic Reinforced Segmental Retaining Walls -Dr. Robert M. Koerner, H.L. Bowman Professor of Civil Engineering, Drexel University**

Segmental retaining walls (primarily those with pre-cast concrete block facing) reinforced by geo-grids or geo-textiles are in a period of enormous growth. Estimates are that 35,000 of those walls exist and that they cover the entire range of heights. This presentation gives a perspective of the evolution of retaining walls, and follows with results of a recent cost survey. It is seen that geo-synthetic reinforced walls are the least
expensive of all wall categories and at all wall heights. Dr. Koerner presented three design methods and compared them to one another with respect to their details and idiosyncrasies. He gave numerical examples showing the modified Rankine method to be the most conservative, the Federal Highway Administration (FHWA) method as intermediate, and the National Concrete and Masonry Association (NCMA) method as the least conservative. A survey of the literature was discussed, showing an approximate 23 walls that suffered either excessive deformation or actual collapse - the overwhelming cause being (1) back-filling with improperly drained fine grained soils and (2) contractor deficiencies which could have been avoided with proper construction quality assurance (CQA) and construction quality control (CQC). Dr. Koerner closed his presentation with a discussion of possible concerns, most of which are under active investigation. Clearly, continued strong growth for geo-synthetic reinforced segmental remaining walls is justified.

**Other seminars are sponsored by student groups, including:**

Intelligent Transportation Society: Transportation doctoral student Alexios Sideris was the speaker for the Alpha Students' Chapter of the Intelligent Transportation Society of America meeting in December 2000. He presented a project he has been working on for Maher Terminals titled *Operational Planning of Intermodal Marine Terminals*.

The NJIT Women's Transportation Seminar sponsored a talk in November 2000 by Lois Goldman, principal planner of the North Jersey Transportation Planning Authority. Ms. Goldman's topic was *A Seminar on Regional Travel: The Household Interview Survey*.

3.c  **Prepare and distribute newsletters**

*OnRoute* has been published and distributed nationally since 1996. Its circulation is just under 5,000. The current issue includes a lead feature on Dr. Greenfeld's automatic vehicle locator research, NCTIP Research Explores AVL Technology; Director's column; highlight on NIDOT 2nd Annual Research Showcase; new Masters Degree in Logistics Engineering; an update on the Brownfields project; awarded grants; and the national student paper contest winner.

As there is so much about NCTIP to publicize, the next issue of the newsletter is already in progress.

3.e  **Publish "In Transition" Magazine**

The autumn 2000 issue of InTransition included articles on
- Sprawl, the Equal Opportunity Menace
- Smart Growth and Environmental Justice
- The Best Homegrown Transportation Confab in the USA
- How a Garden Club Saved San Francisco's Cable Cars, and
- The Seventh Wonder of the Traction World.

Jointly published by NCTIP and the North Jersey Transportation Planning Authority, *InTransition* is an excellent forum for disseminating NJIT transportation research. The winter 2000 issue featured TELUS (see 2000 Annual Report), and the upcoming issue will feature two NCTIP-supported areas of research: Darius Sollohub's Transit Village, and Naomi Rotter's Telecommunications. *InTransition* has a circulation of 7,000.
3.f **Maintain the Center's Home Page on WWW**

The Center's web page has been redesigned to more clearly accommodate the growing amount of materials on it. Databases now feed into the web page (See Success Stories) so that research project information is constantly updated. The Directory also has a one-source feed to keep the information current. PowerPoint presentations, photos of events, etc., are now accessible.

Under "Research" information is categorized by TEA-21, ISTEA, and Other Funded Projects. Within these categories, divisions New, Ongoing, and Completed exist, as appropriate. As the status of a project changes, the web designation is automatically updated as data is inserted into the database.

3.g **Electronic user group on modeling issues**

**ITC Tie-In**

NCTIP is benefitting immensely from the presence on campus of the International Intermodal Transportation Center and the Brownfields Planning Project (see Success Stories). The major symposium held on December 5, 2000 to introduce IITC was also the kickoff event for organizing stakeholders meetings. Drawing on elements of NCTIP, IITC, the Brownfields initiative and NJDOT’s Portway project, the university has become the primary facilitator to enable stakeholders to develop cooperative agendas for a
dynamic, regional plan.

The stakeholder workgroups are composed of both public and private sector individuals: local government officials, community leaders, and private transportation providers and users. Their purpose is to raise the questions and focus the IITC staff on the questions to be answered and the specific issues to be addressed.

The operational workgroups are led by the IITC staff, which is composed of NJIT transportation faculty and practitioners under the direction of Dr. Spasovic. The staff is a mix of backgrounds: academic, government and private sector - to help provide a range of perspectives on any issue. Other members of the operational workgroups are professionals from the different affected transportation or other agencies. The operational workgroups work with the IITC staff by providing technical support and a depth of knowledge on a given subject which would otherwise not be available.

A Stakeholders meeting scheduled for March 13 will focus on Brownfields/Economic Development and Portway/Intermodal Facilities.

**Brownfields Planning Project Tie-In**

An October 2000 Brownfields Workshop featured discussions of the dramatic growth of trade expected at northern New Jersey's ports, the state of warehousing in the region and other related topics. Held at the Newark Club, One Newark Center, in downtown Newark, the assembly was addressed by U.S. Sen. Frank Lautenberg and U.S. Rep. Robert Menendez, who joined Hudson County Executive Robert C. Janiszewski, Chairman of the NJTPA Board of Trustees, and NJIT President Saul K. Fenster and approximately 150 representatives of business, government, academia and other fields who attended. The NJTPA and NJIT are in the midst of an innovative study of northern New Jersey's abandoned and under-utilized industrial sites, known as brownfields. This ongoing research effort is determining which of the region's brownfields are best suited for redevelopment into operations that can profit from the region's burgeoning port activities.

During the workshop, John Ricklefs of Moffact & Nichol, consultants on the project, presented a market analysis of the freight industry trends that could fuel these redevelopment opportunities. As channels to the area's ports are deepened in the next several years, larger containerships will arrive. These vessels will bring goods directly from Asia - goods that now enter the country on the West Coast and are shipped east by rail.

**E-Stations in Newark**

A community focus group to discuss Professor Darius Sollohub’s *E-Stations in Newark* project was held in November 2000. Conducted by Professor William J. Havlena of NJIT’s School of Management, the presentation vividly described the concept of an E-Station and elicited creative and focused feedback from attendees.
NJIT Honors College Colloquium

A colloquium titled *E-Station: Providing Internet Access to the Inner City*, will be held on campus in January 2001. Moderator for the event will be Eric Miller, Honors Scholar; panelist: Bill Havlena, Assistant Professor, School of Management, Jerry Lutin, Senior Director of Planning Research and Development, New Jersey Transit, SanDonna L. Bryant, Coordinator, Newark Community Development Network

3.h **Annual Report**

NCTIP has designed its 2000 annual report in two ways for different purposes. The first conforms to USDOT requirements and contains all required information. Material from this report has been excerpted and is currently in design/print process for national distribution as well as for feature material at upcoming events and conferences.

3.i **Symposium on Productivity and Transportation Systems**

NCTIP joined forces with IITC in the planning of a major symposium on campus in December 2000 to formally introduce IITC. NJIT president Saul K. Fenster moderated the symposium and following round-table discussions. Speakers included New Jersey Assembly Majority Leader Paul DiGaetano (D-36), Assembly Deputy Speaker and Chair of the Transportation Committee Alex DeCroce (R-26), Elizabeth Mayor J. Christian Bollwage, Bayonne Mayor and Assembly Minority Leader, Joseph V. Doria, Jr., and New Jersey Department of Transportation (NJ DOT) Commissioner James Weinstein. In addition, former Congressman and Chair of the House Transportation Committee Robert A. Roe, Deputy Director of the North Jersey Transportation Planning Authority Cliff Sobel, Chief of Planning and External Affairs for the Port Authority of New York and New Jersey Christopher O. Ward; joined the speakers for roundtable/panel discussions (see *Success Stories*).

3.j **Increased visibility**

The main thrust of NCTIP's efforts over this reporting period has been increased visibility. NCTIP understands this to be key to all other efforts. Numerous publications were issued, the website was updated, seminars were held, conferences attended. (see *Success Stories*). See also II.b. 3.b.

NCTIP will be well represented at the January 2001 80th Annual Transportation Research Board meeting in Washington, D.C. by the following presentations:

Boilé, Maria, Rutgers University, Lazar N. Spasovic, Jakub Rowinski and Ya Wang, NJIT, *Multicommodity Multiclass Generalized Cost User Equilibrium Assignment*.

Chen, Mei and Steven Chien, *Dynamic Freeway Travel Time Prediction Using Probe Vehicle Data: Link-based vs. Path-based*.

Chien, Steven, Branislav Dimitrijevic and Lazar N. Spasovic, *Bus Route Planning in Urban Grid Commuter Networks*.

Chowdhury, Md. S., Parsons, Brinckerhoff, Quade and Douglas, Inc., and Steven Chien, NJIT, *Optimization of Transfer Coordination for Intermodal Transit*.

Chowdhury, Md. S., Parsons, Brinckerhoff, Quade and Douglas, Inc., and Steven Chien, NJIT, *Dynamic Vehicle Dispatching at Intermodal Transfer Stations*.

Chien, Steven and Yuqing Ding, NJIT, *Improving Transit Service Quality and Headway Regularity with Real-Time Control*. 


An *E-Stations in Newark* web site will be uploaded in mid-March, and will be linked to the NCTIP web site. Several multi-media presentations have been held for this project, and a project review took place in December. Fundraising brochures will be prepared.

NJIT has specifically requested that *Mobility and the Costs of Congestion in New Jersey* remain featured on the NCTIP site. The university, which featured the study for several months after its publication, will again highlight it on the main web page because of current interest.

For the first time, an NCTIP holiday card was designed, printed and mailed to about 2,000 people nationwide.

### III.A Institutional Resources

**Library**

In December 2000, NJIT President Saul K. Fenster and Gov. Christine Todd Whitman heralded the opening of the program, VALE-Elsevier, at the William Van Houten Library on campus. NJIT is part of a consortium of 15 college and university libraries in New Jersey involved in the purchase of a very expensive, sophisticated electronic database that will be available to all students and faculty in these institutions.

The Virtual Academic Library Environment (VALE) program is made available through an agreement with ScienceDirect®, the world's largest database of scientific, medical and technical information. VALE offers users access to more than 1,200 full text journals from leading scientific, medical and technical publishers. NJIT has been a leader in establishing the consortia of libraries. Richard Sweeney, NJIT librarian and a member of the VALE Executive Board, was a prime mover in negotiating the Elsevier agreement. Last year, NJIT was the only New Jersey institution of higher learning to contract with Elsevier for access to Science Direct.

**Communications, Media Services and Computer Services**

*Communications* expedites NCTIP's many publications, providing editorial, pre-press production and printing services as needed. Communications also inputs NCTIP-provided transportation material into the several department and university newsletters and reports it publishes, and provides photos where needed. NCTIP, in turn, has provided Communications with transportation-related photos, several of which will be used in the upcoming NJIT annual report. Special Events are also handled through this department.

*Media Services* has really extended itself particularly this year to Dr. Moore to facilitate the video the children from the Abington Avenue School G&T program designed and produced. The Department is also helping the Abington students design and set up a web site. Media Services also tapes the seminar series, and provides technical support and equipment for special events.
Computer Services provides web and computer technology backup as needed.

Administration
NJIT Administrative support for research activities at NJIT is provided through the Office of Sponsored Programs under the Associate Vice Provost for Research and Development, and the Office of Grants and Contracts Services in the Finance and Budget office under the Vice President for Administration and Treasurer. Initial awards, extensions, and the technical progress of grants are under the jurisdiction of Sponsored Programs, while Grants and Contracts perform fiscal management, record keeping, and billing. The services of both offices are used extensively by the NCTIP's director and principal investigators. NJIT manages approximately $35 million of funded activities annually.

Other Research Efforts
NJIT In addition to the NCTIP, IITC and the Brownfields project, there are two other major research efforts in transportation at NJIT. The New Jersey Transportation Information and Decision Engineering (TIDE) Center, a $700,000 per year grant from the New Jersey Commission on Science and Technology (NJCST) to NJIT, Princeton and Rutgers University, and the Transportation Economic and Land Use System (TELUS), a six-year, $1,000,000 per year FHWA project mandated under TEA-21.

Computer Technology
Intent on maintaining its strong position in information technologies, NJIT has launched a $50 million spending plan that reflects a progression of investment in cutting edge technology. Phase one will include developing a virtual private network giving faculty, staff and students access to campus-based proprietary information resources, such as course registration, course notes, grade book, library holdings and purchasing from anywhere via the Internet; augmenting high-performance computing services for long running, computing intensive projects generated by faculty and students; expanding research facilities for doctoral students and researchers who need access to real-time interactive visual graphics and information processing; providing technology-enabled "smart" classrooms, fully equipped with network connectivity; and providing web enabling access to the university's student information systems for faculty, staff and students.

For the past three years New Jersey Institute of Technology has been ranked as America's most wired public university by Yahoo! Internet Life. This ranking is an important accomplishment not because NJIT has miles of fiber optic cable, nor because the university educates one of the largest groups of computing majors in the nation. "Most wired" is an attitude at NJIT, one that pre-dates any ranking surveys, and one that is critical to NJIT's mission as a public research university. The "most wired" ranking recognizes NJIT's effective harnessing of the power and potential of information technology and its determination to stay ahead of the curve of emerging technology issues. NJIT recognized the potential impact of computing on commerce and learning more than two decades ago, and became one of the first public universities to provide PCs to all incoming freshmen. The university was also a pioneer in requiring computer science courses for students in all majors. NJIT is committed to maintaining a superior information technology infrastructure that facilitates and enhances teaching, learning and research as well as administrative systems. We are accomplishing this through a permanent campus-wide planning committee and an annual resource allocation appropriate to maintain leadership in information technology.

University Updates
- Total student enrollment at NJIT this semester is 8,829, which includes 5,645 undergraduates and 3,184 graduates. This represents an increase of nearly 7 percent compared to the fall semester of 1999.
NJIT’s endowment has grown to $42 million in 2000 from $2.9 million in 1990.

NJIT’s rate of growth for research is among the top 10 technological universities in the nation, with expenditures nearly tripling in the past decade, from $15.2 million to $43 million.

NJIT has created a position, Vice President for Technology Development, which will be responsible for the solicitation, development and implementation of large-scale technology research and development projects of an institutional character. The focus of this position is on developing partnerships with industry as well as managing governmental affairs, intellectual property and contract projects in information technology. Donald Sebastian, who joined NJIT in 1995 as a professor in the Department of Industrial and Manufacturing Engineering and was later appointed executive director of the Center for Manufacturing Systems, was appointed to fill the new position.

Saul K. Fenster, President, has been named vice president of the Society of Manufacturing Engineers, Dearborn, Mich., Board of Education Foundation for this year.

**Admissions Marketing Report Award**
The Admissions Marketing Report (AMR), a monthly magazine covering the rapidly changing and competitive admissions marketing field, has honored NJIT with a Bronze Award for the Online Viewbook. Acknowledging the reality that more and more high school students are using the Web to learn about colleges and apply for admission, and NJIT works to provide a strong electronic connection with prospective students, supplying an 'online guide' rather than a traditional 'viewbook.' The award recognizes the imagination and timeliness of the `online guide' concept. With broad-based editorial policy, AMR is able to tap into the marketing strategies and admissions procedures of colleges, universities and vocational and proprietary schools.

**Garden State New Millennium Scholarship Program**
In an attempt to keep the ‘best and the brightest' available to New Jersey companies clamoring for workers trained in science and technology, a bipartisan bill, proposed in November by the state assembly leaders, would establish the Garden State New Millennium Scholarship Program, offering up to $10,000 a year to residents majoring in science and technology. Students would have to complete at least one study-related internship and commit, upon graduation, to one year of work in New Jersey for each year they received the aid. According to NJIT President Saul K. Fenster, New Jersey is competing head-on with the best universities in the country, and "we have to make our universities very attractive to students that otherwise would go to MIT, Carnegie Mellon, Cal-Tech and Georgia Tech." The proposed scholarship "is one part of a larger effort," he said. At NJIT, university officials are on a construction schedule of one building a year, and enrollment is up by 7 percent. But making gains has not been easy, said Fenster, who added that he is working to raise private dollars to make the school a desirable destination for prospective students. According to the National Center for Education Statistics, almost 25,000 New Jersey freshmen - 37 percent - left the state to study elsewhere in 1996, the last year for which statistics are available. Those figures put New Jersey second only to New York as the state most hard-hit by brain drain. A 1998 study by the American Electronics Association ranked New Jersey the seventh-largest high-tech state. The state added 30,000 jobs between 1993 and 1998 in what is among the fastest growing fields nationwide.
Section III

Research Project Status
A number of projects funded under the ISTEA grant erroneously appeared in NCTIP’s 2000 Semi Annual Report. Those projects listed below are all funded under TEA-21.

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Title</th>
<th>Principal Investigator(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New - Initiated</td>
<td></td>
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</tr>
<tr>
<td>992509</td>
<td>Development of a Simulation/Assignment Model for an ITS Priority Corridor</td>
<td>Chien, Mouskos Ziliaskopoulos</td>
</tr>
<tr>
<td>992517</td>
<td>E-Stations for Newark – Phase I</td>
<td>Sollohub</td>
</tr>
<tr>
<td>992515</td>
<td>Gender and Professional Worklife at State DOTs: A Pilot Study</td>
<td>Schachter</td>
</tr>
<tr>
<td>992511</td>
<td>Highway Advisory Radio (HAR) Systems</td>
<td>Niver</td>
</tr>
<tr>
<td>992513</td>
<td>Logistics Problems in Warehousing and Distribution of Perishable Goods at Tropicana’s Northeast Distribution Center</td>
<td>Bladikas Sengupta</td>
</tr>
<tr>
<td>992518</td>
<td>Policies for Real Time Traffic Routing</td>
<td>Yang</td>
</tr>
<tr>
<td>992514</td>
<td>ProMPTS (Project Management and Progress Tracking System) – Maintenance and Improvement Contract</td>
<td>Tang</td>
</tr>
<tr>
<td>992509</td>
<td>South Jersey Real Time Motorist Information System</td>
<td>Chien</td>
</tr>
<tr>
<td>Ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>992503</td>
<td>Causes and Control of Transverse Cracking in Concrete Bridge Decks – Year I</td>
<td>Saadeghvaziri</td>
</tr>
<tr>
<td>992501</td>
<td>Congestion Strategies for Adaptive Traffic Signal Systems</td>
<td>Daniel</td>
</tr>
<tr>
<td>992505</td>
<td>Data Research – Materials Laboratory Information Systems (LIMS) – Year I</td>
<td>Meegoda Tang</td>
</tr>
<tr>
<td>992504</td>
<td>Evaluation of Design Ideas for Prevention of Vehicles Entrapment on Railroad Tracks – Year I</td>
<td>Jeng</td>
</tr>
<tr>
<td>992502</td>
<td>The Mature Driver – Safety and Mobility Issues</td>
<td>Rotter</td>
</tr>
<tr>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSF</td>
<td>Dynamic Flow Control for Urban Freight Movement</td>
<td>Daniel</td>
</tr>
<tr>
<td>AFA</td>
<td>New Jersey Alliance for Action 2020 Infrastructure Study</td>
<td>Spasovic</td>
</tr>
<tr>
<td>NSF</td>
<td>Optimization and Control of Freight Movement and Roadway Transportation Systems</td>
<td>Daniel</td>
</tr>
</tbody>
</table>

NJDOT will fund the following projects after 1/1/01.
1. Data Research - Materials Laboratory Information Systems (LIMS) - Year II
2. Evaluation of Design Ideas for Vehicle Entrapment on Railroad Tracks - Year II
3. Identifying Factors and Mitigation Technologies in Truck Accidents in New Jersey.
4. Integrated Signals, A Cost Benefit Analysis for NJDOT
4. Shoulder Rumble Strips for Bicyclists
5. Water Level Prediction for Transportation Projects - Year II*

*Phase I of this project was funded under the ISTEA grant.
This past year NJDOT opened the matching monies that were earmarked for NJIT, Rutgers and Region II to competition among the Centers. NCTIP won the lion's share of the projects, and has matched almost all NCTIP federal funds with NJDOT dollars. The following research projects have starting dates after 12/31/00.

1. Concrete Maturity Meter Implementation
2. Contamination Arresting Systems
3. Correlation study - Surface Texture versus Air Voids
4. Improvement of Continuity Connection over Fixed Piers
5. Optimization of Very Early Strength Concrete
Section IV

Financial Report
## FINANCIAL REPORT
**Period: July 1, 2000 - December 31, 2000**

<table>
<thead>
<tr>
<th>BUDGET CATEGORIES</th>
<th>Budgeted ($)</th>
<th>Programmed ($)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Director Salary</td>
<td>52,250</td>
<td>29,081</td>
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</tr>
<tr>
<td>Faculty Salaries</td>
<td>221,667</td>
<td>244,665</td>
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<tr>
<td>Administrative Staff Salaries</td>
<td>50,000</td>
<td>22,214</td>
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<tr>
<td>Other Staff Salaries</td>
<td>100,000</td>
<td>52,516</td>
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<tr>
<td>Student Salaries</td>
<td>174,000</td>
<td>244,809</td>
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<tr>
<td>Staff Benefits</td>
<td>88,583</td>
<td>85,453</td>
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</tr>
<tr>
<td><strong>Total Salary and Benefits</strong></td>
<td><strong>686,500</strong></td>
<td><strong>678,738</strong></td>
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</tr>
<tr>
<td>Undergraduate Student Fellowships</td>
<td>10,000</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>28,000</td>
<td>23,000</td>
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<tr>
<td>Expendable Equipment and Supplies</td>
<td>72,995</td>
<td>85,262</td>
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<tr>
<td>Domestic Travel</td>
<td>25,000</td>
<td>32,538</td>
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<tr>
<td>Other Direct Cost: Education</td>
<td>120,000</td>
<td>147,538</td>
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<tr>
<td><strong>Total Direct Costs</strong></td>
<td><strong>942,495</strong></td>
<td><strong>977,076</strong></td>
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<tr>
<td>Indirect Costs</td>
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<td>271,716</td>
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<tr>
<td><strong>Total Costs</strong></td>
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<td><strong>1,248,792</strong></td>
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</tr>
<tr>
<td>Federal Share</td>
<td>646,800</td>
<td>627,494</td>
<td></td>
</tr>
<tr>
<td>Matching Share</td>
<td>652,639</td>
<td>621,298</td>
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</tr>
</tbody>
</table>
**FINANCIAL STATEMENT**

**Period: September 9, 1999 - June 30, 2000**

(Revised to reflect the fully expended Year 1 budget)

<table>
<thead>
<tr>
<th>BUDGET CATEGORIES</th>
<th>Budgeted ($)</th>
<th>Programmed ($)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Director Salaries</td>
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<td>47,500</td>
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</tr>
<tr>
<td>Faculty Salaries</td>
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<td>373,333</td>
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<tr>
<td>Administrative Staff Salaries</td>
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<tr>
<td>Other Staff Salaries</td>
<td>50,000</td>
<td>55,333</td>
<td>Overmatch</td>
</tr>
<tr>
<td>Student Salaries</td>
<td>101,500</td>
<td>113,000</td>
<td>Overmatch</td>
</tr>
<tr>
<td>Staff Benefits</td>
<td>116,402</td>
<td>116,402</td>
<td></td>
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<tr>
<td><strong>Total Salary and Benefits</strong></td>
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<td>755,568</td>
<td></td>
</tr>
<tr>
<td>Undergraduate Student Fellowships</td>
<td>16,000</td>
<td>16,000</td>
<td></td>
</tr>
<tr>
<td>Permanent Equipment</td>
<td>28,000</td>
<td>44,780</td>
<td>NJIT Overmatch</td>
</tr>
<tr>
<td>Expendable Equipment and Supplies</td>
<td>72,995</td>
<td>72,995</td>
<td></td>
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<tr>
<td>Domestic Travel</td>
<td>25,000</td>
<td>25,000</td>
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<tr>
<td>Other Direct Costs</td>
<td>70,000</td>
<td>71,232</td>
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<tr>
<td><strong>Total Direct Costs</strong></td>
<td>950,730</td>
<td>985,575</td>
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<tr>
<td>Indirect Costs</td>
<td>380,709</td>
<td>380,709</td>
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<tr>
<td><strong>Total Costs</strong></td>
<td>1,331,439</td>
<td>1,366,284</td>
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<tr>
<td>Federal Share</td>
<td>655,500</td>
<td>655,500</td>
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<tr>
<td>Matching Share</td>
<td>675,939</td>
<td>710,784</td>
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</tr>
</tbody>
</table>

The main source of matching funds for the Center was the New Jersey Department of Transportation through its Annual Basic Agreement administered by the Division of Research and Technology. As indicated, the Center receives $250,000 annually from NJDOT.

Additional funding was provided by the Foundation of the New Jersey Alliance for Action, Maher Terminals Inc., and the New Jersey Transportation Planning Authority (NJTPA).
APPENDIX
NEW JERSEY BUSINESS MAGAZINE FEATURES NJDOT RESEARCH DAY
Contact: Sally O'Malley, Technology Transfer Specialist, NCTIP, 973-596-6463, omalley@njit.edu

TRANSPORTATION
By James T. Prior, Editor-in-Chief

NJDOT-NJIT TRANSPORTATION RESEARCH SHOW IS A HIT

Most motorists don’t think about the concrete barriers on many of New Jersey’s state highways. They know the barriers separate opposing lanes of traffic and keep it flowing safely. Not much attention is paid to the foundations that support our highway signs either. The public may not be aware that if these signs are hit, they break away from the anchors to mitigate damage from the impact. Both these safety innovations—the concrete “Jersey” barriers now used throughout the world and breakaway sign supports—were researched and developed by employees of the New Jersey Department of Transportation.

That was one of the informative presentations at the recent NJDOT 2nd Annual Research Showcase, which drew 150 engineers and government officials to the New Jersey Performing Arts Center, Newark. NJDOT was joined as host by the New Jersey Institute of Technology’s (NJIT) National Center for Transportation and Industrial Productivity (NCTIP).

NJ Commissioner of Transportation James Weinstein, who mentioned the Jersey barriers and breakaway poles, said the NJDOT’s Division of Research and Technology, headed by William Hoffman, is turning transportation problems into solutions. He said that NJDOT is joined in some 100 active research studies of transportation in the state by NJIT, Rutgers University, University Transportation Research Center and the Federal Highway Administration in these studies.

Weinstein said that on a typical day in the state, motorists make 28 million vehicle trips on roads and bridges which support the greatest volume of traffic in the nation. More than 255,000 people ride buses to work, 100,000 commute by rail and 23,000 commute via ferry and county buses. Daily, some 20 cargo ships arrive from all over the world, with 218,400 tons of freight. Daily, there are 324,000 tons of goods manufactured in the state, transported on 136,000 trucks.

He said the State of New Jersey has achieved a national niche for its efforts in fuel cells. It is promoting the use of electric-powered vehicles, alternate source power for transportation and light rail systems.

Dr. Raul Fersner, president of NJIT, said the school and NCTIP are important research sources for the NJDOT and that the government-academic teamwork is leading to a safer and more efficient transportation infrastructure. The meeting took place the day after Election Day, at which New Jerseyans overwhelmingly approved dedication of gasoline taxes for transportation efforts. Fersner called it “an important step forward.”

Two legislators also addressed the audience—Senator Diane Allen, vice chair of the Senate Transportation Committee, and Assemblyman Alex De Croce, chair of the Assembly Transportation Committee. Allen said light rail systems, which have been around since New Jersey put one in place between Camden and the Amboys in the 19th century are having a rebirth.

“We’re moving down the right track,” she said. De Croce hailed academia as the incubator of tomorrow’s transportation solutions.

The keynote speaker, Robert E. Skinner, Jr., executive director of the Transportation Research Board (TRB), a unit of the non-profit National Academies of Sciences and Engineering, Washington, addressed the issue of transportation in the 21st century. He said there are three propositions that will drive the change in transportation: the 20th century transportation advances in autos and planes altered the way we live, work and recreate; there will be no quantum leaps in this century in transportation, rather preserving the mobility we have; and information technology (IT) may be a substitute for transportation (video conferencing, work-at-home, etc.).

(continued on page 56)
Skinner said there are four areas which will have an impact on transportation: demographics; institutions; capacity and congestion; and the human dimension.

On demographics, he said that by 2020, there would be 20 percent more of us and by 2050, some 43 percent more. "We're becoming a nation of immigrants again," he said at the rate of 820,000 a year through 2035. We're getting older. Now, 13 percent of the population is over 65; by 2025, it will be 19 percent. Traffic patterns will change. Work trips have become suburbanized and it is difficult to service that with conventional transit.

On institutions, Skinner said there are 39,000 governmental units which own highways in the U.S. and some 6,000 agencies operate transit services. So transportation institutions are fragmented.

On capacity and congestion, he said capacity has not kept pace – leading to congestion. Between 1980 and 1997, highway lane miles increased by 4 percent, while registered motor vehicles increased by 31 percent and vehicle-miles traveled advanced by 67 percent.

On the human dimension, which he called "The Wild Card," Skinner said "Americans want it all, and, in the future, there will be more of us." He said that without a major crisis that galvanizes public opinion and forces a major policy change, we could expect a continuation of the current trend.

Dr. Lazar N. Spasovic, director of the NCTIP and also of the International Intermodal Transportation Center (IITC) at NJIT, said studies have shown that New Jersey traffic congestion has cost our economy $5 billion, or an average $880 per driver, sitting in traffic.

Spasovic outlined two research projects: the subway and light-rail system in Newark; and the master plan for Riverside in Burlington County which would create a new town center to take advantage of the coming Trenton-to-Camden light-rail line. The vacant area, called "The Golden Triangle" would create a new neighborhood of businesses, apartment, a town square and a park.
NJIT Launches New International Intermodal Transportation Center

By James T. Prior, Editor-in-Chief

New Jersey, the linchpin of international trade and transportation traffic along the Eastern Seaboard, now has a new International Intermodal Transportation Center (IITC), a support resource for the North Jersey Transportation Planning Authority and the New Jersey Department of Transportation, which will work with the public and private sectors to integrate the various transportation, economic development and quality of life improvement efforts in the International Corridor which stretches from Princeton to the George Washington Bridge.

The Center, funded by a $2-million federal grant from the U.S. Department of Transportation Federal Highway Administration under TEA-2 (the Transportation Equity Act), is operating at New Jersey Institute of Technology (NJIT), Newark, under the direction of Dr. Lazar N. Spasovc, director. He has a core staff of a half dozen experts and faculty members and will rely on work by students and graduate students and tap into the public-private resources.

NJIT President Dr. Saul K. Fenster, speaking at a December symposium on the International Corridor, unveiled plans for the Center, which will be a multi-year effort in three phases: data collection and synthesis; data analysis and evaluation; and plan development and optimization.

He said the IITC would operate as an independent facilitator in a forum to develop a cooperative agenda for a dynamic regional plan. He called it "a one-stop center" which will facilitate the movement of produces and people.

"The Center's mission is to view the regional transportation assets as critical elements of an overall economic engine," Fenster told the almost 200 leaders of government, academia and the business community at the symposium. "What is needed is a smart, coherent plan that efficiently ties together transportation, economic development, land use and quality of life perspectives. NJIT will provide the forum and know-how to realize this plan."

The IITC will be involved in such projects as Portway, which is designed to facilitate traffic between dockside and nearby rail and trucking warehousing terminals and the interstate and international surface distribution network. IITC will look at such issues as freight/passenger transportation and brownfields. It will also identify public and private sector investments made in the corridor communities to support mobility and advance intermodal-related economic development. In short, it will look at all aspects as part of an integrated, efficient whole.

The IITC has an advisory board of over 30 government officials, academicians and business leaders, including Joe Gonzalez, president of the New Jersey Business & Industry Association.

New Jersey Assembly Majority Leader Paul DiGaetano (D-36), one of the symposium panelists, correlated the state's transportation network to a cardiovascular system - both of which can be easily clogged. He said a movement in the state to channel development back into the cities would lead to a contest for space. He said the IITC "will validate the needs of the port."

"The International Corridor will be a comprehensive approach that will help us meet New Jersey's needs," said Congressman and Vice Chair of the Democratic Caucus Robert Menendez (D-NJ), who sponsored the legislation. Speaking from Washington via videotape, Menendez said, "Your vision for the Corridor is bold. New Jersey already has world class port, airport, highway and rail facilities to move our innovative products. The International Corridor will be a place like no other in the United States - a place where someone can take an idea for a product, research and develop it, finance it, manufacture it and export it - anywhere in the world."

Commissioner James Weinstein of the New Jersey Department of Transportation (whose department chose NJIT as the Center) said he "looked forward to working in partnership with NJIT to achieve the vision for the Corridor." He stressed the importance of the Portway, the landside access to Port Newark/Elizabeth, which he said was "the cornerstone of economic expansion." He said New Jerseyans bear almost $5 billion annually in costs for traffic congestion - for lost time, operating costs and fuel consumption.

Weinstein said the Portway would be a 10-year effort involving $750 million and 11 projects. The first phase is in progress.

Elizabeth Mayor Chris Bellwage said the
IITC would be able to help his city with its efforts to move people and goods. He said the new Newark-Elizabeth light-rail system, a new flyover from the Turnpike and the Portway are integral parts of his transportation network. He said the new Jersey Gardens Mall, a $350-million venture, is visited by 3,000 per day and means $2 million in revenue to the city.

Fenster, Menendez and others saluted former Congressman Bob Roe, who had been chairman of the House Transportation Committee, as “the Father” of federal legislation for intermodal transportation efforts. “When we started, I had to explain what ‘intermodality’ was all about,” Roe recalled. “New Jersey is a microcosm of intermodality with seaports, rail lines, airports, highways and rapid transit, all together. There’s no place like this in the U.S.”

He warned that the initial federal transportation plan (called ICE-TEA) and the second phase, TEA-2, will be followed by TEA-3 in 2003. He said debates and hearings will begin this year and New Jersey’s delegation has to ensure the funding continues for our state. Transportation is the only area in which New Jersey gets back more money than it sends to Washington. New Jersey has the highest concentration of cars, railroad trackage and highways per square mile than any state in the nation.

Alex DeCroce, Assembly Deputy Speaker and chairman of the Assembly Transportation Committee, echoed those sentiments, saying the third phase “won’t be easy.” Passage of TEA-2 took the greatest cooperation, in a bipartisan way, to get it done. He said New Jersey has a $150-billion investment in its infrastructure and spends about $11 billion annually in repairing it.

Christopher O. Ward, chief of planning and external efforts, Port Authority of New York & New Jersey, encouraged New Jerseyans to join in “the next great battle in Congress for our fair share of the transportation bill.” He said that this coalition should build a model of transportation and then fund it with federal dollars. “We’ve got to put our building blocks together,” he advised.

Cliff Sobel, deputy executive director, North Jersey Transportation Planning Authority, described how brownfield sites near the port are being developed to reduce the time and traffic elements of cargo movement. He said a $1.4-million U.S. Department of Transportation grant is being used to study the economic potential of brownfields. He said freight traffic is predicted to increase two or three times in the next 20-30 years.