

SAFE WORK ZONES SAVE LIVES

Annual Report 2008



DIRECTOR'S MESSAGE



Stephen F. Duffy Ph.D, PE, F.ASCE
Center Director

In our second full year of operation, the University Transportation Center is fulfilling its primary mission of increasing safety in highway construction work zones.

The UTC's research efforts are in capable hands with the addition this past year of new Associate Director, Dr. Nigamanth Sridhar. Dr. Sridhar, Assistant Professor of Electrical and Computer Engineering at Cleveland State University, is young and enthusiastic and the recent recipient of a prestigious \$450,000 National Science Foundation Career grant. Dr. Sridhar's primary areas of research are in the integration of software engineering and distributed systems, with an emphasis on wireless sensor networks to help evaluate conditions in road construction work zones to increase safety for workers and drivers.



Nigamanth Sridhar Ph.D
Associate Director

The UTC increased its collaboration with government and industry partners through a number of visits to onstruction sites by students, and through the addition of several new advisory board members this year. Contributions by the UTC's governmental and industry partners are invaluable resources that will continue to shape the center for years to come. We're grateful for their advice and insights.

Finally, our efforts to prepare K-12 students, particularly women and minorities, for careers in science, technology, engineering and mathematics (STEM) received a significant boost with the award of a \$100,000 grant to Shaker Heights City School District by the US Department of Transportation. With assistance from the UTC, the grant will be used to develop a pre-engineering program for students in grades 3-12 to build a pipeline of future engineering and science students. Additionally, the UTC was proud to sponsor attendance at Southern Methodist University's "Infinity Project" for Tony Barbuto, Physics teacher at Theodore Roosevelt High School in Kent, Ohio. The "Infinity Project" focuses on high school engineering curriculum designed to foster student interest in the many applications of engineering in a digital world. As a result of Tony's trip to SMU, the "Infinity Project" will be presented as a one-semester supplement to physics courses at Theodore Roosevelt High School.

Read on to learn more about the many exciting programs the University Transportation Center hosted and participated in during 2008. We look forward to another great year improving the safety of highway construction work zones today, and building the engineers of tomorrow.



Making WORK ZONES SAFER for workers and drivers

Highway and road construction work zones are dangerous places for workers and drivers alike. Cleveland State University Transportation Center is dedicated to reducing deaths and injuries in highway construction work zones through research to identify factors that contribute to work zone hazards leading to the development of technological and practical solutions to increase safety.

Short-term utility and road work zones present unique challenges with respect to monitoring traffic. These temporary work zones are

especially hazardous as they appear in all types of locations and their brief durations make it difficult for drivers to adjust.

Professor Nigamanth Sridhar and a team of students from the Software Engineering and Civil Engineering programs are collaborating on the design and deployment of a sensor array that transmits real-time vehicle data from short-term work zones. Thanks to Area Wide Protective CEO Bill Fink, who serves on the Center's Advisory Board, Dr. Sridhar and his team will collect and analyze data from the

company's short-term utility and road work zones. The information they gather from these temporary work zones will be used to guide development of products and processes that will increase safety for construction zone workers and drivers at lower costs than current technology.

Additionally, Dr. Sridhar may collaborate with a science teacher at the Cleveland STEM High School to adapt solar battery chargers to power the sensor units used in the short-term work zone data gathering operation.



The Future of Engineering is

Engineering more effective STEM teachers

Bringing engineering concepts into K-12 classrooms was the purpose of the first Engineering Education Summer Conference (EESC) June 17 – 19. A joint venture of the Shaker Heights City School District and the University Transportation Center, the conference sought to improve the engineering knowledge of primary and secondary teachers, and provide them with resources to incorporate engineering into their curricula.

Education coordinator Diane Burrowbridge orchestrated the effort on behalf of the UTC, while science teacher Joe Marencik and Curriculum Director Dr. Jim Paces coordinated components for the Shaker Heights City School District. Faculty and staff members from CSU's Fenn College of Engineering provided expertise, which was enriched by field trips to the Cleveland Clinic and Great Lakes Science Center.

Funded with a \$100,000 Garrett A. Morgan Technology and Transportation Education Program (GAMTTEP) grant, Mr. Marencik was able to share the successes of Shaker Heights City Schools' pre-engineering program with fellow educators. Educators attending were able to establish partnerships with institutions like the UTC and the Fenn College of Engineering.

Twenty-three teachers of students in grades 2 – 12 participated in the three-day conference. Participating school districts included: Shaker Heights City Schools, Stow-Monroe Falls City Schools, Parma City Schools, Manchester Local, Westlake, and Owosso Public Schools from Owosso, Michigan.

The value of the conference to teacher attendees was summed up perfectly by one participant, who said, "I will be introducing engineering on day one of the new school year."

SMU Infinity Project helps teachers link students to engineering concepts

The Infinity Project was developed in 1999 by Southern Methodist University's Institute for Engineering Education to provide middle and high school science teachers with a math and science based curriculum that encourages students to pursue careers in engineering. The curriculum introduces students to the "engineering method" of solving problems, the science that makes modern digital devices possible, and human-kind's major engineering accomplishments. It provides teachers with a proven engineering based curriculum, tools to administer the program, and web-based support.

Admission to The Infinity Project is competitive, with a limited number of slots available for schools and teachers to receive training in the curriculum each year. Teachers or schools that apply must meet four

requirements: committed school administrators, motivated and qualified math, science, or technology instructors who are comfortable using computer programs, energetic students with the appropriate prerequisites, and sufficient lab equipment and space.

The UTC was delighted to sponsor attendance at The Infinity Project workshop for Theodore Roosevelt High School Physics teacher, Tony Barbuto last year. Tony has taught physics in the Kent school system for many years, and his participation in The Infinity Project training enriches the course offering for his students. The Infinity Project curriculum will now be available as a one-semester supplement to the physics offerings at Theodore Roosevelt High School as a result of Tony's training.



“Constructor for a Day” pairs industry and students

The Ohio Contractors Association’s “Constructor for a Day” program gives engineering students and K-12 educators an up-close view of engineering-in-action with trips to area construction sites and networking opportunities with industry professionals. The 23rd annual “Constructor for a Day” event on October 23, 2008 was one of the largest ever.

The day-long event began with breakfast and remarks from University Transportation Center supporter U.S. Congressman Steven C. LaTourette (OH-14), who welcomed 77 students and three K-12 educators at the Embassy Suites Hotel in Independence before they departed for site visits. The Great Lakes Construction Co., Cook Paving and Construction, Donley’s Inc.,



Independence Excavating, ODOT District 12, The Ruhlin Company, Kokosing Construction Co., The Shelley Company, VIP Restoration, Inc., Turner Construction and Panzica Construction, hosted CSU students and Center sponsored K-12 teachers at various construction sites around the region.

Students and K-12 teachers spent the day learning about engineering and construction methods at the various job sites. After the on-site visits, everyone returned to the Embassy Suites to view contractor displays, meet individually with representatives of host companies, and to share dinner. Cheryl Kosek, a behavior management consultant who specializes in professional development spoke on the topic, “Attitude: It makes a difference.”

Encounters with engineering in the real world

Getting students out of the classroom and into the field is crucial to increase their understanding of how engineering concepts translate into the real world. Fifth and sixth grade student members of the Science Olympiad team from Shaker Heights’ Woodbury Elementary School were treated to a field trip to a construction site in Painesville, Ohio on May 13, 2008 thanks to the UTC and advisory board member, George Palko, president and CEO of Great Lakes Construction Company.

Wearing hard hats donated by Great Lakes Construction Company and yellow safety vests donated by 3M, the students got a chance to escape the classroom and explore a construction site. With the help of a white board and surveying equipment, Mr. Palko discussed science and math and their applications to heavy

construction, including installation of underground utilities, excavation and traffic control. His description of the similarities between concrete and bread helped the students understand how math and science principles translate to the widening of a local highway.

Preceding their field trip, the Woodbury students welcomed Mr. Palko, Ann Nerone, president and CEO of Ballast Fence Company, graduate student Christine Fleming of Case Western Reserve University’s biomedical program, and Ryan Jones of the Engineering Equity Group to their school on April 22nd for a presentation on how engineering concepts lead to the development of everyday products, modern transportation systems and health care products and processes.

Financial Report

The Transportation Center has sponsored and/or received outside funding for the following projects:

1. Acquiring Driving Simulator

PI: Nancy Grugle, CSU
 Agency Award: \$107,051 (National Science Foundation)
 University Award Amount: \$40,000
 Center Award Amount: \$11,000
 Subaccount: GRUGL01

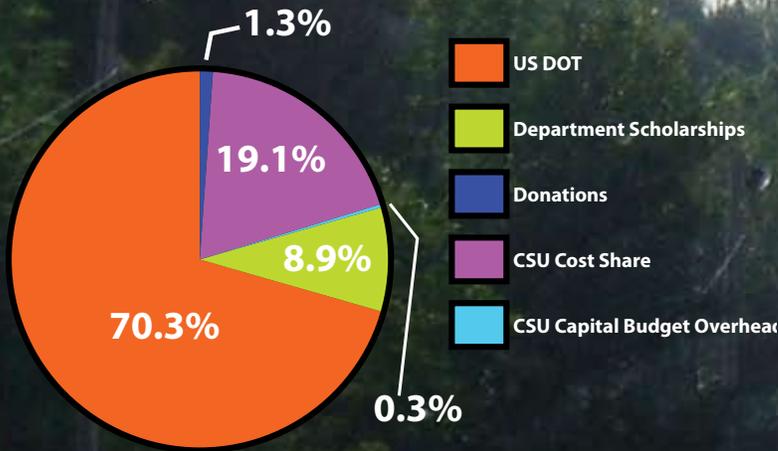
2. Demonstration of Innovative Techniques for Highway Safety Data Analysis

PI: Nancy Grugle, CSU
 Agency Award: \$57,142 (ODOT)
 Center Award Amount: \$128,006
 Subaccounts: GRUGL02, DUFFY18B

3. Garret A Morgan Technology and Education Grant

PI: Joseph Marencik, Shaker Heights City School System
 Co-PI: Stephen Duffy, CSU
 Agency Award: \$100,000 (US DOT)
 Center Sub-Award from Shaker Schools: \$41,833
 Subaccount: DUFFY19

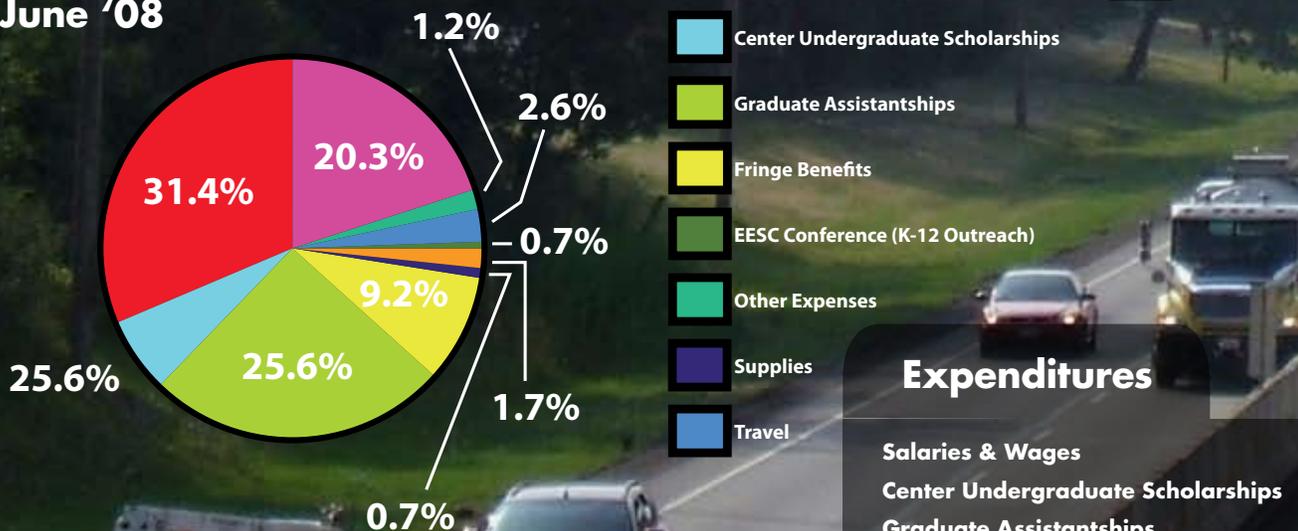
Funds as of June '08



Funds

US DOT	\$408,300.00
Department Scholarships	\$51,517.00
Donations	\$2,000.00
CSU Cost Share	\$111,129.02
CSU Capital Budget Overhead	\$7,838.00
Total	\$580,784.02

Expenditures as of June '08



Expenditures

Salaries & Wages	\$134,179.91
Center Undergraduate Scholarships	\$27,722.00
Graduate Assistantships	\$109,267.50
Fringe Benefits	\$39,468.13
EESC Conference (K-12 Outreach)	\$2,918.95
Other Expenses	\$5,054.82
Supplies	\$3,198.06
Travel	\$11,091.01
Maintenance	\$7,460.00
Indirect Costs	\$86,712.48
Total	\$427,072.86

2008 UTC Advisory Board

In 2008, the UTC Advisory Board grew with the addition of two outstanding industry professionals, Bonnie Teeuven, PE, Deputy District Director of Ohio Department of Transportation (ODOT), District 12,

and Tom McGlynn, Sr., Business Unit Director at 3M. We look forward to their contributions in guiding the UTC in the coming years.



William Fink
President/CEO,
Area Wide Protective



Tracy Scriba
Federal Highway
Administration



Tom McGlynn, Sr.
Director, Highway Safety
Business Unit, 3M



Bruce Owens
Vice President,
Plastic Safety Systems



George Palko PE
President/CEO:
The Great Lakes
Construction Company



Anthony Liberatore, Jr.,
Business Manager,
Laborers Local 860



Mark Potnick
Director, Labor Relations
& Safety, Ohio Contractors
Association



Bonnie Teeuwen PE
Deputy Director,
ODOT District 12

UTC Staff

There were several personnel changes at the UTC in 2008. We bid farewell to one of our most promising research faculty members, Professor Nancy Grugle, who accepted a position with Lockheed Martin when her husband was transferred to Denver, Colorado. We wish Nancy the best in her new endeavors.

Citing the need to pursue other research interests, Professor Norb Delatte Ph.D., PE stepped down as Associate Director of the University Transportation

Center. Professor Delatte will continue to work with graduate students associated with the CSU UTC as he pursues his interest in pavement design, with emphasis on pervious pavements. We wish him continued success.

The Center was pleased to welcome Associate Director, Dr. Nigamanth Sridhar, and Diane Burrowbridge, the UTC's new Education Coordinator. The Center is fortunate to have the energy and expertise of these outstanding professionals.



Stephen F. Duffy
Ph.D, PE, FASCE
Center Director



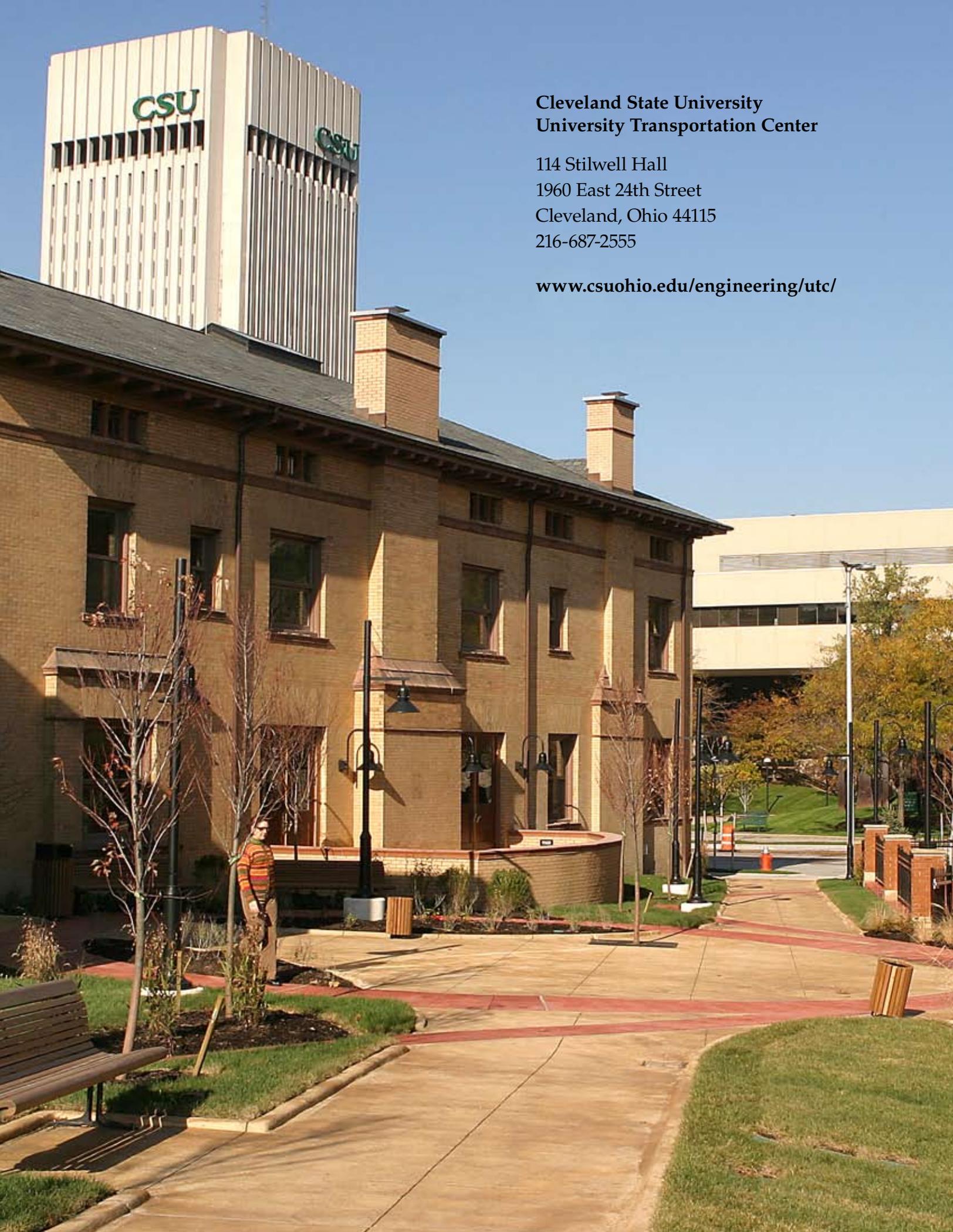
Nigamanth Sridhar
Ph.D
Associate Director



Saini Yang
Ph.D
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Diane Burrowbridge
PE
Education Coordinator



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