Semi-Annual Progress Report No. 3 – Center for Equitable Transit Oriented Communities

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1. ACCOMPLISHMENTS

1.1 What are the major goals of the program?

CETOC's Mission is to cultivate transit-centered, equitable, and resilient communities that support residents' multimodal travel needs and preserve the environment.

Goals:

Research: Advance scientific knowledge and identify innovations that can inform the planning and development of equitable transit-oriented communities.

Leadership: Cultivate a diverse group of visionary transportation leaders who will dedicate their careers and inspire others to advance public transportation and build equitable and resilient communities.

Education and Workforce Development: Train a new generation of transportation professionals with the knowledge and techniques needed to meet the challenges of the present and be prepared for the future.

Tech Transfer: Develop transformative products (e.g., tools, databases, methods, and strategies) to be widely adopted and implemented by the transportation profession for building equitable transit-oriented communities.

1.2 What was accomplished under these goals?

In this reporting period, substantial progress has been made on our first-year research projects (see below), with many now nearing completion. Year two projects have been selected through peer-review and initial work has begun on several. Year one projects continue to produce outputs such as journal and other publications, public presentations, and other forms of technology transfer. Numerous events have been held both in person and virtually by various consortium members which directly or indirectly served to disseminate relevant research or engage communities in discussion about equitable transit, transit-oriented communities, and other CETOC-related topics. Students at various academic levels are funded by CETOC at every consortium member university, contributing to research, education, and workforce development. Several CETOC-funded graduate students have obtained their degrees and entered the workforce. Collaborative partnerships within the consortium and with external partners continue to strengthen and multiply, with most of our second-year projects involving collaborative efforts and direct tech transfer with non-academic partners. The Center continues to grow, with increases in both PIs and students involved in and funded by the Center. A significant proportion of CETOC PIs are young and early career faculty, and most of our funded students come from minority or underrepresented groups. Events disseminating research and bringing researchers and practitioners together continue to grow, with larger funded events and symposia being held and planned.

1.2.1 Research

Research Effectiveness Metrics	Progress
# of peer-reviewed journal articles	11
# of conference presentations & talks given	17
# of Graduate students involved in research projects funded by CETOC	28
# of students of minority and underrepresented groups funded by CETOC	24

All metrics above refer only to activities during the semi-annual reporting period.

Full project descriptions for all projects listed below can be found at https://www.uno.edu/cetoc/research

1.2.1.1 Year One Funded Research Projects in Progress with Status Updates:

Lead University (Partners)	Project Code & Name	PI (Co-PIs)
UNO	**CETOC-23-R-01: Longitudinal Analysis of Transit's Land Use Multiplier in Three Regions**	Guang Tian
	Status Update: After some delays due to data issues, data processing is nearing completion. Due to numerous issues with the Austin dataset, we are replacing Austin with Salt Lake City, UT as the third study area. A new research assistant has been hired to assist with statistical analysis on this project, and final analysis of completed data is underway. A literature review and some sections of a research paper have been completed and initial results were presented at the inaugural USDOT Future of Transportation Summit in Washington, D.C. in August 2024.	
UNO	**CETOC-23-R-02: Quantifying the Influences of Telecommuting on VMT and Transit Usage**	Guang Tian
	Status Update: Data processing, analysis and a draft research paper are complete. The paper has been submitted to the Journal of Transport Geography and is under review after an initial Major Revisions decision. Study findings were discussed at the CETOC x APA Webinar/Lunch & Learn April 19th, which provided CM credits for attendees and was attended both in person and virtually. A recording of the session is available on the CETOC YouTube channel.	
UC-D	**CETOC-23-R-03: Examining the Role of Transit Investments on Opportunity Outcomes**	Aditi Misra (Manish Shirgaokar, Wesley Marshall)
	Status Update: A literature review has been completed. The project team has collected and aggregated data, including property transactions for Denver (1990–2021), bus stop amenities from RTD, and infrastructure data like sidewalk availability, ADA	

	compliance, and bike facilities, all joined to census data. The team reviewed the EPA Smart Location Database to develop neighborhood quality metrics, expanding the dataset to include nearly 1000 variables on 4 million observations, resolving data wrangling and methodology challenges. Peer-reviewed abstracts were accepted for TRB's Conference on Advancing Transportation Equity and ACSP's Annual Conference, with journal submissions planned by 11/24.	
UC-D	**CETOC-23-R-04: Understanding Transit User Experience and Expectations in Under-served Communities**	Manish Shirgaokar (Aditi Misra, Wesley Marshall)
	Status Update: Completed a TRB paper to document results from expert interviews with stakeholders and transit agency experts. Gauged quality of bus stop inventory data from Denver Metro Area's transit agency, the Regional Transportation District (RTD). Inventory data are incomplete and may create issues with using passive ridership data to see correlations with the quality of bus stops. The team is considering going back to the choice experiment survey. Started work on stated preference survey which relies on the insights gained from expert interviews. Research methodology established with control-treatment geographies in the Denver Metro Region (based on zip codes where there are different levels of bus transit supply). Choice experiment leverages both visual tools (i.e., Photoshop images of bus stops with set of amenities) and other attributes such as frequency, span, wait time, and weather. Survey instrument to be fully developed and pilot tested before rolling out to commuters in the Denver Metro Area, for both automobile and transit users (we will quota sampling by geography but maintain population representativeness by commute mode ~ 85% auto versus 15% transit in the overall sample).	
FAU	**CETOC-23-R-05: Using Machine Learning to Understand the Built Environment's Influence on 15-Minute Transit-Oriented Communities**	Louis Merlin
	Status Update: The literature review on Internal Trip Capture is fully drafted. The literature review on 15-minute cities is in process. StreetLight data purchase is now fully transacted as of October 2024. The PI has yet to examine or interact with this data source. We are currently gathering data in GIS for the analysis of transit station areas in Washington DC and Portland metros. We have developed a checklist of data needs, and are about halfway through this checklist for Washington DC. Note: We had to restart data gathering because of some missing metro stations and because our university switched from ArcMap to ArcGIS Pro. Data analysis has not yet started.	

FAU	**CETOC-23-R-06: 50 Years of Trends in Station Areas across the United States**	John L. Renne
	Status Update: Literature review on data collection to measure TODs and TOCs: We have identified over two dozen papers and processed them to identify all the relevant indicators into a table. We have identified a total of 71 indicators, which include 21 Built Environment indicators, 17 Transportation indicators, 13 Economic indicators, and 22 Demographic indicators. Final literature review writing is still underway and now expected to be completed in Fall 2024. Creation of a database: We have made excellent progress in creating the database. We hired a post-doc, and the database is now about 90% completed.	
UF	**CETOC-23-R-07: Shared Micromobility as a Last-Mile Complement to Public Transit**	Xiang Yan
	Status Update: Established a new data pipeline for integrating public transit and micromobility data across Washington DC and Los Angeles. Conducted research using web and post-usage surveys, revealing shared e-scooters' barriers as a last-mile solution, with demographic insights on adoption rates. Developed and implemented a novel post-ride survey method for evaluating transit-micromobility multimodal trips. Identified discrepancies in the accuracy of buffer-zone methods for inferring first-mile/last-mile trips, suggesting alternatives for more accurate assessments. Published two manuscripts in the Journal of Transport Geography and Travel Behavior and Society, sharing findings from the project's research. Submitted two TRB papers: one is on how attitudinal and demographic factors influence the use of transit-connecting micromobility trips, the other is on data bias regarding the use of big data to analyze factors influencing public transit and shared micromobility integration. (Chae, K.S., Kim, S.H., Yan, X. *Exploring Attitudinal Group Differences in Preferences for Shared E-scooter Use and Its Integration with Public Transit*; Qian, Y., Liu, L., Yan, X. Big data, big bias? *On Factors Influencing Public Transit and Shared Micromobility Integration*.)	
UF	**CETOC-23-R-08: Analyzing Transit-Based Evacuation Demand in Hurricanes**	Xilei Zhang
	Status Update: Developed and implemented algorithms to infer individual transit-based trips in pre, during, and after Hurricane Ian based on mobile phone GPS data, General Transit Feed Specification (GTFS) data and Google routes API. Extracted the transit-based trips and activities to identify the difference in the patterns of transit-based activities. GPS dataset comes from Gravy Analytics, covering 150 million mobile devices with 13 billion records from September 1 to October 15, 2022, in Florida. Utilized the buffers of bus routes in GTFS datasets to identify the similarity of bus routes and GPS trips. Utilized the Google routes API to	

	compare Google transit routes to the GPS trip datasets. Filtered the GPS trips if the GPS trip speed is higher than the travel speed coming from Google routes API. Applied the different conditions from Google API and dataset, to find the best algorithm to infer the transit-based trips.	
UU	**CETOC-23-R-09: Gentrification, Displacement, and GHG Emissions at Transit-Oriented Communities**	Andy Hong
	Status Update: Utah Household Travel Survey data acquisition from WFRC is complete. VMT modeling is complete. GHG emission calculations are almost complete. Displacement analysis underway, some delays from incorporating more complex analyses.	
UU	**CETOC-23-R-10: Is Transit-Oriented Development Affordable for Low- and Moderate-Income Households (in Terms of H+T)?**	Reid Ewing
	Status Update: Published the article written based on the initial study (Kaniewska, J., Ewing, R., Sabouri, S., & Ameli, H. *Is transit-oriented development affordable for low-and moderate-income households?*) Presented the results of the initial study at the Utah Transportation Conference in October 2023, TRBAM 2024, FoTS 2024, in a graduate level course Land Use and Transportation planning at the University of Utah, and to Utah Transit Authority planners. Examined various VMT data options and settled on two: (1) travel data (including VMT) collected by StreetLight and (2) mode share and vehicle ownership data collected for seven TODs by Reid Ewing in his previous studies – Redmond TOD (Seattle, WA), Rhode Island Row (Washington, D.C.), Fruitvale Village (San Francisco, CA), Englewood (Denver, CO), Wilshire/Vermont (Los Angeles, CA), Orenco Station (Portland, OR), and Mockingbird TOD (Dallas, TX). Determined that StreetLight Data can provide VMT data for all 107 TODs which can be used to calculate transportation costs for each TOD. Currently in the process of acquiring the data.	

1.2.1.2 Year Two Funded Research Projects Selected or in Progress with Status Updates:

Lead University (Partners)	**Project Code & Name**	**PI (Co-PIs)**
FAU (UF)	**CETOC-24-R-01: Mobility Hub Usage in West Palm Beach**	Serena Hoermann (Xiang Jacob Yan, Louis Merlin, John Renne)
	Status Update: Initial literature review in progress. Initial meeting with graduate researchers reviewed the project and planned for a field trip documenting mobility hubs in the study area.	

UC-D	**CETOC-24-R-02: Re-Examining TODs Through the Lens of Disability and Care Responsibilities: How Street and Network Structure Perpetuate Inequity of Access and Opportunity**	Aditi Misra (Wesley Marshall, Manish Shirgaokar)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UC-D	**CETOC-24-R-03: Identifying TOD-Capable Locations using D Variables: Flipping the Recipe on making the TOD Cake**	Manish Shirgaokar (Aditi Misra, Wesley Marshall)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UC-D	**CETOC-24-R-04: Useful Transit: Bridging the Gap Between the Vision and Reality of Transit-Oriented Communities**	Wesley Marshall (Aditi Misra, Manish Shirgaokar)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UF (UC-D)	**CETOC-24-R-05: High-resolution Measurement of Transit Riders' Extreme Heat Exposure Across U.S. Cities**	Xiang Yan (Wes Marshall, Aditi Misra, Manish Shirgaokar)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UF (UNO, UU)	**CETOC-24-R-06: Inventorying Bus Stop Amenities across the United States Using Google Street View Images and Computer Vision**	Xiang Yan (Guang Tian, Reid Ewing)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UF (FAU)	**CETOC-24-R-07: A Deep Learning Approach for Detecting Built Environment in Transit-Oriented Developments**	Xilei Zhao (John Renne, Xiang Yan)
	Status Update: Kickoff meeting held. Initial data collection has begun.	
UNO (UF)	**CETOC-24-R-08: Mobility and Accessibility of Transit-Dependent and Transportation-Disadvantaged (TD2) Population During Hurricanes**	Guang Tian (Xiang Yan)
	Status Update: Initial kickoff meeting held with PIs Jacob Yan and Guang Tian, Project Manager Bob Danton, and UNO-based Research Assistant Andrew Tritch. Regular meetings are set for monthly. Work has begun on Literature Review at UNO. UF-based work to begin after UF receipt of Year 2 Subaward.	
UNO (UU)	**CETOC-24-R-09: Updating and Expanding the Nation's Most Comprehensive Database of Household Travel Survey Data and Related Built Environmental Data**	Guang Tian (Reid Ewing)
	Status Update: MPOs with travel surveys administered since the last update to the dataset have been identified, along with information such as the years of the survey's administration and contact personnel at MPOs. Some MPO outreach has begun.	

UNO	**CETOC-24-R-10: Developing a Scalable Evaluation Framework and Dashboard for Implementing and Monitoring Equitable Transit-Oriented Communities**	Tara Tolford
	Status Update: A Research Assistant, Alexis Sager, has been hired at UNO to work with PI Tara Tolford and local partners on this project (in addition to other tasks). Several meetings have been held with PI Tara Tolford, Project Manager Bob Danton, Research Assistant Alexis Sager, and local partners including representatives of the City of New Orleans (City Planning Commission, Mayor's Office of Development, & Office of Sustainability & Resiliency) and NORTA. Scope, short and long-term goals and priorities have been identified by partners. Work has begun on literature review and background research. Work has begun on identification of relevant datasets for the dashboard, data collection, data cleaning, and data processing. Main point contacts at both NORTA and the CPC have moved on or will soon be moving on from their positions, meetings have been set with their successors to ensure a smooth transition and continued progress.	
UU (FAU)	**CETOC-24-R-11: New Transit, Bike Infrastructure, and Green Space: Do They Have a Multiplying Effect on Gentrification and Displacement?**	Alessandro Rigolon (John Renne, Andy Hong)
	Status Update: The project just started. We had two meetings to refine the methods and get the research assistant at the University of Utah up to speed.	
UU (UNO)	**CETOC-24-R-12: Transit-Oriented Development (TOD) Formation along Bus Rapid Transit (BRT) Lines: Database Development, Analysis, and Identification of High-Impact Policy, Design, and Service Characteristics**	Reid Ewing (Guang Tian, Tara Tolford)
	Status Update: At UNO, Research Assistant Alexis Sager has been hired to work on this project (in addition to other tasks). Work has begun on a literature review. Work has begun on database development with identification of US regions with BRT lines including various elements of their design and identification of lines/regions whose BRT has associated TOD. Identified all regions with at least one BRT line (32). Currently, we are building a database of MPOs, transit operators, and major cities in each region (including contact persons and their emails). Next, we will contact each person and ask for the list of BRT TODs in their region.	
UU (UNO)	**CETOC-24-R-13: What Makes Affordable Housing Affordable: Mechanisms Used to Produce Affordable Housing Near Transit in the US**	Reid Ewing (Justyna Kaniewska, Guang Tian)
	Status Update: Some work underway at UU in terms of extending the associated Year One project into the next phase of research, kickoff meeting forthcoming pending completion of UU's year two funding subaward.	

Two additional projects selected for Year Two were classified as Education projects; these are listed under *1.2.3 Education and Workforce Development*.

1.2.2 Leadership

Leadership Effectiveness Metrics	**Progress**
# of national and regional leadership positions held by CETOC PIs	21 (up from 12)*
# of leadership positions held by CETOC young faculty and students	12
# of leadership positions held by Minority Institution or underrepresented groups	17
# of conference planning positions held by CETOC PIs	10
# of leadership and research awards received by CETOC PIs during reporting period	6

All metrics above refer only to activities during the semi-annual reporting period.
**This increase is largely attributable to the increase in the number of PIs involved in CETOC.*

Notable awards received by CETOC PIs during the period include 3 NSF Awards (including one NSF CAREER Award), one NIST Award, and one PHEER Award.

1.2.3 Education and Workforce Development

Education and Workforce Development Effectiveness Metrics	**Progress**
# of transportation-related master's degree programs offered*	25 (up from 14)***
# of transportation-related PhD degree programs offered*	16 (up from 8)***
# of transportation-related graduates**	1,136
# of transportation-related certificate programs offered*	13 (up from 8)***
# outreach programs offered (total)**	6
# outreach programs offered targeting K-12 and underrepresented groups**	3

** During the semi-annual period*
*** Since the beginning of the CETOC grant (these metrics are new to this report)*
**** These increases are largely attributable to an expansion of degrees counted due to increased awareness and collaboration within our member universities with other departments- only a few of these represent new degree offerings.*

Full project descriptions for all projects listed below can be found at https://www.uno.edu/cetoc/outreach

1.2.3.1 Year Two Funded Education Projects Selected or in Progress with Status Updates:

Lead University	Project Code & Name	PI (Co-PIs)
UC-D	**CETOC-24-E-01: Developing Curriculum and Guidelines for a Capstone-Style Transit System Planning & Design Course**	Aditi Misra (Wesley Marshall, Manish Shirgaokar)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	
UF	**CETOC-24-E-02: Sustainable Transportation and Transit Workforce Development Strategies: Education and Technology Transfer (Prototyping and Testing Phase)**	Xilei Zhao (Xiang Yan)
	Status Update: Work has not started pending receipt of year 2 subcontract from UNO.	

1.2.3.2 Other Educational Modules and Case Studies Developed

Tian, G. May 2024. “GEOG 4832/5832 Capstone Case Study: Hoffman Triangle Neighborhood Condition Analysis”

Tolford, T. July 2024. "URBN 4800/5800 Final Projects: Exploring and Piloting Themes and Analytic Methods for Evaluating Transit-Oriented Communities Implementation "

1.2.3.3 Other Education and Workforce Development Activities

Across the five consortium member universities, CETOC research supported 5 undergraduate students, 14 master’s students, and 11 doctoral students during the reporting period. Two CETOC-funded master’s students and one CETOC-funded doctoral student received their degrees during the reporting period. The majority of CETOC-funded students are minorities or members of other underrepresented groups (including women and those identifying as LGBTQ).

Several other education and workforce development activities were carried out through CETOC during the period outside of official funded Education projects and degree-based work at our universities. Among these were the involvement of non-funded students in research opportunities, including undergraduate and graduate students from consortium member universities, a high school student engaged in research at University of Utah, and a student from Dillard University, an HBCU in New Orleans, who worked with the University of New Orleans-based team on research through external funding. At Florida Atlantic, a Post-Doctoral Fellow has been hired who will support CETOC research.

For two weeks in June & July 2024, members of the CETOC team and the Department of Planning and Urban Studies at the University of New Orleans collaborated with the UNO chapter of Upward Bound to present a curriculum focusing on transportation and urban planning. With an emphasis on equity, sustainability and climate resilience to students from local high schools. Upward Bound, part of the Federal TRIO Programs, provides precollege education, training, and guidance to high school students who come from low-income families as well as from families in

which neither parent holds a bachelor's degree. The 2024 Summer collaboration represented the first collaboration between CETOC and Upward Bound at UNO. We hope the success of the collaboration can serve as a model to expand collaboration to other CETOC consortium campuses with Upward Bound or similar programs as well as a broader example of potential educational and outreach programs across the Federal University Transportation Center (UTC) program.

Several other education and workforce development activities and programs are in planning and development stages. At Florida Atlantic CETOC PIs are working with the Transportation Choices for Sustainable Development nonprofit to develop a Youth Professionals tech transfer and workforce development program which seeks to leverage additional partnerships within APA and other non-profit organizations. FAU in early discussions with the NSF Engineering Research Center for Smart Streetscapes to develop a joint program to offer an undergraduate certificate and/or a K-12 summer youth program.

Several CETOC-funded events held during the reporting period including the inaugural CETOC Webinar and the Resilient and Sustainable Infrastructure: Lessons from Global Cities Symposium held at FAU have offered AICP CM continuing education credits to attendees.

1.2.4 Technology Transfer

Technology Transfer Effectiveness Metrics	**Progress**
# of related editorial Journal positions held by CETOC PIs*	16 (up from 13)
# of downloads and transfers of CETOC research products (tech reports, policy briefs, databases, etc.)**	5
# of adoptions of tools/technologies by stakeholders**	2
# of success stories and newspaper coverage**	8

** During the semi-annual period*
*** Since the beginning of the CETOC grant (these metrics are new to this report)*

1.3 How have the results been disseminated?

Numerous events have been held both in person and virtually by various consortium members which directly or indirectly served to disseminate relevant research or engage communities in discussion about equitable transit, transit-oriented communities, and other CETOC-related topics. Of particular note among these during this period was the Resilient and Sustainable Infrastructure: Lessons from Global Cities Symposium held at FAU. CETOC researchers have also presented research nationally and internationally. CETOC PIs and CETOC-funded students attended the inaugural Future of Transportation Summit in Washington D.C. to present and discuss research, network with fellow transportation professionals, industry leaders, and government representatives and spread awareness of the Center and its research. Center Project Manager Bob Danton also attended the CUTC Summer Meeting in South Padre Island, TX to network with other UTCs and discuss research, tech transfer, and education. See also (3.1) Publications.

1.4 Plans for next reporting period

In the next reporting period, most year one projects should be complete or very close to nearing completion, and all year two projects should be well underway. We anticipate numerous publications resulting from year one research as well as publication of final reports for those projects. At the University of Florida, the three-day Research to Practice Transit Symposium has already occurred in October 2024, falling into the next reporting period. This CETOC-funded (in part) symposium brought together a wide range of researchers and practitioners and was a huge success in working towards pathways for technology transfer and engaged research in addition to dissemination of CETOC research. Numerous year-one CETOC projects will be presented at TRBAM 2025, where we will once again have the opportunity to disseminate our work among other researchers and practitioners and expose graduate students to future career opportunities. Work is underway to develop a CETOC Symposium to be held at UNO in the spring in collaboration with UNO's Center Austria which will bring together both researchers and practitioners from the US and Europe to discuss how we can best learn from colleagues across the Atlantic and continue to produce research which is useful to transit operators. This event will also coincide with the first in-person meeting of the CETOC Advisory Board. Events will continue to be hosted at our universities and elsewhere to disseminate research, and a second episode of our Webinar will be hosted this November with more to come. Our year two projects involve a significant increase in intra-consortium collaboration as well as collaboration with external partners in transit operation, local government, and other sectors and we look forward to the myriad opportunities these new partnerships have in store.

2. PARTICIPANTS & COLLABORATING ORGANIZATIONS

2.1 What organizations have been involved as partners?

- Abacoa Partnership for Community, collaboration with Serena Hoermann, FAU
- APA FL Broward & Treasure Coast Sections, collaboration with FAU (EP, TT, WD)
- APA Metro New Orleans, collaboration with UNO (EP, TT, WD)
- American Public Transit Association, collaboration with UF (E, EP, TT, WD)
- The Beach UNO, collaboration with UNO (E)
- Bike Easy, collaboration with UNO (E)
- Caltrans, collaboration with UF (E, EP, TT, WD)
- Capital Area Transit Systems (Baton Rouge), collaboration with UNO (R, TT)
- Center for Smart Streetscapes, collaboration with FAU (E, TT, WD)
- City of Gainesville: Dan Zhu, collaboration with Xilei Zhao, UF
- City of New Orleans Transit-Oriented Communities Interim Working Group (consisting of representatives from: New Orleans City Planning Commission; New Orleans Regional Transit Authority; CNO Mayor's Office of Resilience & Sustainability; CNO Mayor's Office of Community Assets & Investments; CNO Mayor's Office of Economic Development; CNO Mayor's Office of Community Development; CNO Mayor's Office of Nighttime Economy, Housing Authority of New Orleans; New Orleans Redevelopment Authority), collaboration with UNO (R, TT)
- Friends of the Lafitte Greenway, collaboration with UNO, (E)

- Jacksonville Transportation Authority: Alexander Traversa, collaboration with Xiang Yan, UF
- Intelligent Transportation Systems Society, collaboration with UF (E, EP, TT)
- Institute of Transportation Engineers, collaboration with UF (E, EP, TT)
- Louisiana Transportation Research Center, collaboration with UNO (R)
- Miami-Dade Transit: Linda Morris, collaboration with Xiang Yan, UF
- Mineta Transportation Institute, collaboration with UF (E, EP, TT, WD)
- New Orleans City Planning Commission, collaboration with UNO (CS, R, TT)
- New Orleans Public Belt Railroad, collaboration with UNO (E)
- New Orleans Regional Planning Commission, collaboration with UNO (E)
- New Orleans Regional Transit Authority (CS, R, TT, WD)
- Palm Beach County Planning Congress, collaboration with FAU (EP, TT, WD)
- Port of New Orleans, collaboration with UNO (E)
- Port of St. Bernard, collaboration with UNO (E)
- Regional Transportation District, Denver, CO: Jonathan Wade, data expert and domain expert on transit, collaboration with Manish Shirgaokar, UCD
- Salt Lake City Transportation Division: Stephanie Sotkin, collaboration with Andy Hong, UU
- Transportation Choices for Sustainable Communities, collaboration with FAU (E, TT, WD)
- TRIO/Upward Bound, collaboration with UNO (E, WD)
- UC Davis Transit Research Center, collaboration with UF (E, EP, TT, WD)
- Utah Department of Transportation, collaboration with Andy Hong, UU
- Wasatch Front Regional Council: Bert Granberg, collaboration with Andy Hong, UU
- West Palm Beach Mobility Coalition, collaboration with Serena Hoermann, FAU
- WTS, collaboration with multiple consortium members (EP, TT, WD)
- WSP New Orleans, collaboration with UNO (E, EP)

Codes: CS: cost-share E: education & outreach EP: event production R: research TT: tech transfer WD: workforce development

2.2 Have other collaborators or contacts been involved?

Collaboration is ongoing between all consortium member PIs and other researchers within consortium universities on current projects, planned future projects, planned events and webinars, education projects, outreach projects, data sharing, and more. Non-organizational (academic) collaborators outside the consortium include:

- Nacima Baron, Gustave Eiffel University, collaboration with John Renne, FAU
- Billy Fields, Texas State University, collaboration with John Renne, FAU
- Shih-Kai Huang, Jacksonville State University, collaboration with Xilei Zhao, UF
- Sung Hoo Kim, Hanyang University, collaboration with Xiang Yan, UF
- Bin Li, Lousiana State University, collaboration with Guang Tian, UNO
- Meiqing Li, University of Central Florida, collaboration with Xiang Yan, UF
- Xiaojiang Li, University of Pennsylvania, collaboration with Xiang Yan, UF
- Michael Lindell, University of Washington, collaboration with Xilei Zhao, UF

- Rafael H.M. Pereira, Institute for Applied Economic Research, Brazil, collaboration with Xiang Yan, UF
- Thomas Sanchez, Texas A&M University, collaboration with Xiang Yan, UF
- Thomas Vanoutrive, University of Antwerp, collaboration with Louis Merlin, FAU
- Wenwen Zhang, Rutgers University, collaboration with Xiang Yan, UF

3. OUTPUTS

3.1 Publications

Publications and presentations marked with an asterisk acknowledge(d) federal CETOC funding. All others should be considered CETOC-related or CETOC-associated, but not CETOC-funded. CETOC-funded researchers and students are indicated in **bold**. Only items and activities published or occurring during the reporting period are listed.*

3.1.1 Journal Publications

Ammar, D., Wu, Y., Guo, H., **Misra, A.**, Jia, B., & Bao, S. (2024). Identifying User Needs and Current Challenges of External Interface Design for AV-VRU Communications: Insights from an Expert Survey Data Analysis. *Transportation Research Record, 2687*(4), 228-242.

Bian, R., **Tolford, T.**, & Bhat, M. R. (2024). Developing a statewide active transportation planning dashboard with mobility data. *Transportation Planning and Technology*, 1-23.

Ferenchak, N. N., & **Marshall, W.** (2024, December). Traffic safety for all road users: A paired comparison study of small & mid-sized U.S. cities with high/low bicycling rates. *Journal of Cycling and Micromobility Research, 2*, 100010.

Hoermann, S., **Renne, J. L.**, Freeman, K., **Merlin, L. A.**, Dzhurova, A., & Lopez, P. (2024). Peer Engagement: On Reflecting Student Diversity in a Research Trial. *International Journal of Qualitative Methods, 23*, 1-14.

Sanchez, T. W., **Qian, Y., & Yan, X.** (2024). AI Applications in Transportation and Equity: A Survey of U.S. Transportation Professionals. *Future Transportation, 4*(4), 1161-1176.

***Tian, G.**, & **Danton, B.** (2024). Studying Understudied Populations' Travel Behaviors with a Machine Learning Approach – A Focus on Hispanic and Latinx Households. *Journal of Planning Education and Research*.

***Tian, G.**, **Danton, B.**, **Ewing, R.**, & Li, B. (2024, December). Varying influences of the built environment on household travel in the United States – An update with 36 diverse regions and machine learning. *Cities, 155*, 105490.

Wagner, M., **Shirgaokar, M.**, **Misra, A.**, & **Marshall, W.** (2024, May 24). Navigating ADA Compliance: How Practitioners' Experiences Reveal Challenges and Opportunities for Improving Accessibility of Transportation Infrastructure. *Journal of the American Planning Association*, 1-18.

Washington, V., Guikema, S., Mondisa, J.-L., & **Misra, A.** (2024). A data-driven method for identifying the locations of hurricane evacuations from mobile phone location data. *Risk Analysis, 44*(2), 390-407.

***Xu, Y.**, Ke, Q., **Zhang, X.**, & **Zhao, X.** (2024). ICN: Interactive Convolutional Network for Forecasting Travel Demand of Shared Micromobility. *GeoInformatica*, 1-16.

***Zhang, X.**, Ke, Q., & **Zhao, X.** (2024). Travel Demand Forecasting: A Fair AI Approach. *IEEE Transactions on Intelligent Transportation Systems, 25*(10), 14611-14627.

3.1.2 Books and Other Non-Periodical, One-Time Publications

Marshall, W. (2024). *Killed By a Traffic Engineer: Shattering the Delusion that Science Underlies the Transportation System.* Washington, D.C.: Island Press.

3.1.3 Other Publications, Conference Papers, Presentations, Workshops and Webinars

Cissé, N.A., **Renne, J.**, l'Hostis, A. "Equitable Transit Oriented Development in Paris: The Case Study of the Rosa Parks Neighborhood." 35th International Geographical Congress, Dublin, Ireland, August 24-29, 2024.

*Fields, B., Baron, N. **Renne, J.** (Moderator). "Climate and Mobility Transitions in Urban Development." Resilient and Sustainable Infrastructure: Lessons from Global Cities Symposium, Florida Atlantic University, April 19, 2024.

Gangireddy, S., Bian, R., **Tolford, T.**, Hassan, H. "Project-Based Crash Analysis for Crash Risk Reduction during Pavement Preservation." International Conference on Transportation and Development, Atlanta, GA, June 2024 (Published Conference Proceedings).

***Hoermann, S.**, Bartle, M. "Equitable Resilience Planning" Resilient and Sustainable Infrastructure: Lessons from Global Cities Symposium, Florida Atlantic University, April 19, 2024

Hoermann, S. "Stories Communities Tell: How Discourse Matters in Resilience Policy and Planning Climate Gentrification." Conference on Policy Process Research, May 15, 2024.

Hoermann, S. "Climate Gentrification Pathways and Resilience: Policy and Planning Discourses in Miami." Livable Cities Conference, London, UK, June 28, 2024.

Jiang, S., **Zhao, X.**, & Riding, K. "AI Application in Pavement Management." 2024 Pavewise Concrete Conference, September 2024.

***Kaniewska, J.** "Is Transit-Oriented Development Affordable for Low- and Moderate-Income Households (In Terms of H+T)?" USDOT Future of Transportation Summit, Washington, DC, August 14, 2024.

Lovreglio, R., & **Zhao, X.** "Wildfire Evacuation Investigations from Questionnaire Data to GPS Data." Spring '24 Seminar Series, B. John Garrick Institute for the Risk Sciences, UCLA, June 6, 2024.

Marshall, W. "Empowering Livable Cities to Move Beyond Traffic Engineering Norms." International Making Cities Livable (IMCL) Conference, Newport, RI, April 2024.

Marshall, W. "How to Argue with a Transportation Engineer." Congress for the New Urbanism Annual Meeting; Cincinnati, OH, May 2024.

Marshall, W. "Book Talk: Killed by a Traffic Engineer." Active Towns Podcast, May 31, 2024.

Marshall, W. "Why Vision Zero is Failing Us: Reevaluating Crash Data & Our Human Error Problem." Institute of Transportation Engineers Mountain District Annual Meeting, Big Sky, MT, June 2024.

Marshall, W. "Author's Forum: Killed by a Traffic Engineer." Congress for the New Urbanism: On the Park Bench Webinar, June 25, 2024.

Marshall, W. "Book Talk: Killed by a Traffic Engineer." Old Firehouse Books, Fort Collins, CO, June 28, 2024.

Mashall, W. "Rethinking Vision Zero in U.S. Cities." Institute of Transportation Engineers Annual Meeting, Philadelphia, PA, July 2024.

Marshall, W. "Fireside Chat." National Youth Transportation Equity Convening (NYTEC), September 2024, Denver, CO.

Marshall, W. "Killed by a Traffic Engineer - What's parking got to do with it?" Parking Reform Network Webinar, September 12, 2024.

Renne, J. "Mobility-as-a-Service." Invited Lecture, Global Challenges in Transport Course, Transport Studies Unit, University of Oxford, April 4, 2024.

Renne, J., Baron, N., Fields, B. "Toward Climate Resilient Urban Mobility Infrastructures: Exploring Opportunities to Bounce Forward." 35th International Geographical Congress, Dublin, Ireland, August 24-29, 2024.

***Tian, G.**, **Danton, B.**, Lipson, N. "The Impact of Work from Home on Planning." CETOC Webinar Series x New Orleans Metro APA Lunch & Learn, New Orleans, LA & Online, April 18, 2024.

Tian, G. (Panelist). "Leveraging Digitalization, Artificial Intelligence, and Other Integrated System-of-Systems Technologies to Decarbonize Transport." Seventh EU-U.S. Transportation Research Symposium, Washington, DC, June 11, 2024.

***Tian, G.** "How Can Transit-Oriented Communities Be Affordable and Sustainable?" USDOT Future of Transportation Summit, Washington, DC, August 13, 2024.

Tian, G. (Moderator). "The Future of Highways." TRB Committee AMS50 Webinar Series, September 25, 2024.

***Tritch, A.** "A Longitudinal Analysis of Light Rail Transit's Land-Use Multiplier Effect in Three Regions." USDOT Future of Transportation Summit, Washington, DC, August 15, 2024.

Tolford, T. "Louisiana Trails and Recreation Asset Inventory: Mapping Louisiana's Trails and Recreation Assets for Planning and Outreach." Webinar, May 23, 2024.

***Yan, X.** "Shared Micromobility as a Last-Mile Transit Solution? Spatiotemporal Insights from a Novel Dataset." USDOT Future of Transportation Summit, Washington DC, August 13, 2024.

***Zhao, X**. "Using AI to Optimize Emergency Evacuations." FDOT Transportation Technology Research Symposium, May 2024.

*Only publications, conference papers, presentations, workshops and webinars featuring CETOC-funded researchers and/or CETOC-funded graduate students (in **bold**) are listed. For other CETOC-funded and CETOC-related events, please see https://www.uno.edu/cetoc/events.*

3.2 Websites and Other Internet Sites

3.2.1 CETOC Home Page

https://www.uno.edu/cetoc

3.2.2 CETOC Social Media:

Instagram: https://www.instagram.com/cetocofficial/
LinkedIn: https://www.linkedin.com/company/cetoc/
X/Twitter: https://twitter.com/CETOCOfficial
YouTube: https://www.youtube.com/@CETOCOfficial

3.3 Technologies & Techniques

Nothing to report.

3.4 Inventions, Patents, & Licenses

Nothing to report.

3.5 Other Products

Nothing to report.

4. OUTCOMES

4.1 Increased Understanding and Awareness of Transportation Issues

See 3.1.1-3.1.3.

4.2 Passage of new policies, regulation, rulemaking, or legislation

Nothing to report.

4.3 Increases in body of knowledge

See 3.1.1-3.1.3.

4.4 Improved processes, technologies, techniques, and skills

Nothing to report.

4.5 Enlargement of the pool of trained transportation professionals

See 1.2.3.1-1.2.3.3.

4.6 Adoption of new technologies, techniques, or practices

Nothing to report.

5. IMPACTS

5.1 Effectiveness of the Transportation System

Nothing to report.

5.2 Technology Transfer

Nothing to report.

5.3 Increase in the Body of Scientific Knowledge

See 1.2.4; 3.1.1-3.1.3.

5.4 Transportation Workforce Development

See 1.2.3; 4.1; 4.5.

5.5 Transfer of Results

See 1.2.4; 1.3; 3.1.1-3.1.3.

5.6 Commercialization of Technology

Nothing to report.

5.7 Adoption of new practices

Nothing to report.

5.8 Opportunities in research and training

See 1.2.3; 4.1.

5.9 Underrepresented Groups

The majority of currently funded CETOC students and over half of currently funded CETOC PIs represent underrepresented groups, including minorities, people of color, women, and those identifying as LGBTQ.

5.10 Development and Dissemination of New Educational Materials

See 1.2.3.

6. CHANGES/PROBLEMS

While some minor changes to some year one research projects have occurred due to various issues, primarily surrounding data quality and availability, none of these have significantly altered the scope of the research underway (See 1.2.1.1 for project-level details). As mentioned in prior reports, year one projects were delayed initially by issues of subcontract finalization which have since been resolved, and while some projects are still somewhat behind their initial planned schedules, they are all well underway and anticipated for completion within the no-cost extension period granted to subgrantees by the University of New Orleans, which ends on May 31, 2025. Work is underway with subgrantees to address issues with some consortium members in terms of aligning tech transfer and cost share spending with overall expenditures, and subgrantees whose spending in these categories is out of alignment with overall expenditures have been asked to provide written plans for addressing and correcting these budgetary misalignments within the next quarter.

7. SPECIAL REPORTING REQUIREMENTS

Nothing to report.