Center for Advanced Multimodal Mobility Solutions and Education



Annual Performance Indicators Report for University Transportation Centers

October 1, 2017 to September 30, 2018

Submitted by

Center for Advanced Multimodal Mobility Solutions and Education

Prepared for

Office of the Assistant Secretary for Research and Technology (OST-R)
U.S. DEPARTMENT OF TRANSPORTATION

University of North Carolina at Charlotte (Lead)	Charlotte, NC 28223
University of Texas at Austin	Austin, TX 78712
University of Connecticut	Storrs, CT 06269
Washington State University – Pullman	Pullman, WA 99164
Texas Southern University	Houston, TX 77004



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1. PROGRAM INFORMATION

USDOT Tier 1 University Transportation Center

Annual Performance Indicators Report

Submitted to:	U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology (OST-R)
Grant Number:	69A3551747133
Project Title:	Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)
Center Director:	Wei (David) Fan, Ph.D., P.E. Professor Department of Civil and Environmental Engineering University of North Carolina at Charlotte 9201 University City Blvd., Charlotte, NC 28223 wfan7@uncc.edu | 704-687-1222
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Recipient Organization:	University of North Carolina at Charlotte
Project/Grant Period:	November 30, 2016 - September 30, 2022
Reporting Period Start Date:	October 1, 2017
Reporting Period End Date:	September 30, 2018
Report Term or Frequency:	Annual Performance Indicators
Signature of Submitting Official:	



2. PROGRAM-WIDE INDICATORS

University Transportation Centers Program Performance Indicators

UTC Name:	Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)
University:	Lead University: • University of North Carolina at Charlotte (UNCC) Consortium Member Universities: • University of Texas at Austin (UT Austin) • University of Connecticut (UConn) • Washington State University – Pullman (WSU) • Texas Southern University (TSU)
Grant #:	69A3551747133
Reporting Period:	October 1, 2017 to September 30, 2018

Performance Indicators	Total	UNCC	UT Austin	UConn	WSU	TSU
1. Number of transportation-related courses offered during the reporting period that were taught by faculty and/or teaching assistants who are associated with the UTC						
Undergraduate courses	20	2	5	10	1	2
Graduate courses	30	5	5	7	3	10
2. Number of students participating in transportation research projects during the reporting period funded by this grant						
Undergraduate students in research	5	0	3	1	1	0
Graduate students in research	34	7	7	6	4	10
3. Number of transportation-related advanced degree programs that utilize grant funds during the reporting period to support graduate students						
Masters level programs	3	0	1	0	1	1
Doctoral level programs	7	1	1	3	2	0
4. Number of students supported by this grant during the reporting period						

Undergraduate students	4	0	3	1	0	0
Masters students	16	0	2	3	1	10
Doctoral students	17	6	5	3	3	0
5. Number of degrees awarded during the reporting period to students supported by this grant						
Undergraduate degrees	0	0	0	0	0	0
Masters degrees	2	0	2	0	0	0
Doctoral degrees	1	1	0	0	0	0
6. Number and total dollar value of research projects selected for funding during the reporting period using UTC grant funds (Federal and/or Recipient Share) that you consider to be applied research and advanced research						
Number of applied research projects	11	2	3	2	2	2
Dollar value of applied research projects	$936,563.32	$180,012.00	$205,000.00	$120,000.00	$263,564.00	$167,987.32
Number of advanced research projects	5	3	1	1	0	0
Dollar value of advanced research projects	$405,021.00	$270,021.00	$75,000.00	$60,000.00	-	-



3. UTC-SPECIFIC INDICATORS

3.1. University of North Carolina at Charlotte

Part II – UTC-Specific Performance Indicators		
UTC Name	**Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**	
University	**University of North Carolina at Charlotte**	
Grant #	**69A3551747133**	
Reporting Period	**October 1, 2017 - September 30, 2018**	
Category	**Description of indicator**	**Metric**
1. Research Capability	• Research results published in: *Journal of Advanced Transportation*, *ASCE Journal of Transportation Engineering, Part A: Systems*, *International Journal of Transportation Science and Technology*, *Journal of Transportation Systems Engineering and Information Technology*, *Accident Analysis and Prevention*, *Transportation Letters: the International Journal of Transportation Research, World Wide Web, IEEE Transactions on Vehicular Technology, IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Internet of Things Journal, Personal and Ubiquitous Computing* • Research results presented at: the Transportation Research Board 97th Annual Meeting, the ASCE International Conference	• Number of refereed journal publications (18) 1. Chen, Z. and Fan, W., A Multinomial Logit Model of Pedestrian-Vehicle Crash Severity in North Carolina, Accepted for publication in *International Journal of Transportation Science and Technology*, October 2018. 2. Yu, M. and Fan, W., Optimal Variable Speed Limit Control in a Connected Autonomous Vehicle Environment for Relieving Freeway Congestion, Accepted for publication in *ASCE Journal of Transportation Engineering, Part A: Systems*, September 2018. 3. Li, Y. and Fan, W., Modelling the Severity of Pedestrian-Injury in Pedestrian-Vehicle Crashes in North Carolina: A Partial Proportional Odds Logit Model Approach, Accepted for Publication in *Journal of Transportation Safety & Security*, https://doi.org/10.1080/19439962.2018.1483989, In Press, October 2018.

	on Transportation & Development (ICTD 2018), the 2018 Autonomous Vehicles Symposium (AVS), 2018 Southern District ITE (SDITE) Annual Meeting, the 2018 World Transport Convention (WTC) and 37th IEEE International Performance Computing, Communications Conference (IPCCC 2018), the 2018 ITS Carolinas Annual Meeting, 18th COTA International Conference of Transportation Professionals (CICTP 2018), the Chinese Overseas Transportation Association (COTA) 21st Annual Winter Symposium, the NCSITE 2017 Annual Meeting • Working papers for the 2019 World Transport Convention (WTC), June 13-16, 2019	4. Jiang, Z.B., Gu, J.J., Fan, W., Liu, W. and Zhu, B.Q. Q-Learning Approach to Coordinated Optimization of Passenger Inflow Control with Train Skip-stopping on a Urban Rail Transit Line, Accepted for Publication in *Computers & Industrial Engineering*, https://www.sciencedirect.com/science/article/pii/S0360835218302596, In Press, June, 2018. 5. Yu, M. and Fan, W., Accessibility Impact of Future High Speed Rail Corridor on the Piedmont Atlantic Megaregion, *Journal of Transport Geography*, Volume 73, pp. 1-12, 2018. 6. Jiang, Z., Gu, J.J., Han, Y.Z., Fan, W. and Chen, J.J., Modeling Actual Dwell Time for Rail Transit Using Data Analytics and Support Vector Regression, *ASCE Journal of Transportation Engineering, Part A: Systems*, Volume 144 Issue 11, 04018071, 2018. 7. Yu, M. and Fan, W., Optimal Variable Speed Limit Control at a Lane Drop Bottleneck: Genetic Algorithm Approach, *ASCE Journal of Computing in Civil Engineering*, Volume 32 Issue 6, 04018049, pp. 1-17, 2018. 8. Liu, F., Xu, R., Fan, W. and Jiang, Z., Data Analytics Approach for Train Timetable Performance Measures Using Automatic Train Supervision Data, *IET Intelligent Transport Systems*, Volume 12, Issue 7, pp. 568-577, 2018. 9. Yu, M. and Fan, W., Tabu Search Strategies for Variable Speed Limit Control at a Lane Drop Bottleneck, *ASCE Journal of Transportation Engineering, Part A: Systems*, Volume 144, Issue 7, 04018033, pp. 1-12, 2018. 10. Chen, Z. and Fan, W., Extracting Bus Transit Boarding Stop Information Using Smart Card Transaction Data, *Journal of Modern Transportation*, 26(3), pp. 209-219, 2018. 11. Jiang, Z., Fan, W., Liu, W., Zhu, B., Gu, J., Reinforcement



		Learning Approach for Coordinated Passenger Inflow Control of Urban Rail Transit in Peak Hours, *Transportation Research Part C: Emerging Technologies*, Volume 88, pp. 1-16, 2018. 12. Gong, L. and Fan, W., Developing A Systematic Method for Identifying and Ranking Freeway Bottlenecks Using Vehicle Probe Data, *ASCE Journal of Transportation Engineering, Part A: Systems,* Volume 144, Issue 3, 04017083, pp. 1-14, 2018. 13. Xu, R.H., Liu, F.B. and Fan, W., Train Operation Adjustment Strategies in Metro Based on Transfer Capacity Coordination, *Journal of Transportation Systems Engineering and Information Technology*, Vol. 17, No. 6, pp. 164-170, 2017. 14. Xu, Y.L., Xia, Y.Y. and Fan, W., Thermal Stability Analysis of High Modulus Asphalt Admixture with DSC Test, *Journal of Building Materials*, Volume 6, 2017. 15. Sujit Biswas, Kashif Shaif, Fan Li, Boubakr Nour, Yu Wang, "A Scaling Blockchain Framework for Secure Transactions in IoT", *IEEE Internet of Things Journal*, to appear. 16. Yang Liu, Wei Quan, Tian Wang, Yu Wang, "Delay-Constrained Utility Maximization for Video Ads Push in Mobile Opportunistic D2D Networks", *IEEE Internet of Things Journal*, to appear. 17.Huijie Chen, Fan Li, Yu Wang, "SoundMark: Accurate Indoor Localization via Peer-Assisted Dead Reckoning", *IEEE Internet of Things Journal*, to appear. 18. Yufeng Zhan, Yuanqing Xia, Jinhui Zhang, Yu Wang, "Incentive Mechanism Design in Mobile Opportunistic Data Collection with Time Sensitivity", *IEEE Internet of Things Journal*, Volume: 5, Issue: 1, Pages: 246-256, February 2018.

		• Number of conference papers presented, and other presentations made (18) • Number of technical research reports published (3)
2. Leadership	• Associate Editor, *IEEE Transactions on Intelligent Transportation Systems*, and *ASCE Journal of Transportation Engineering, Part A: Systems,* and *International Journal of Transportation Science and Technology* • Editorial Board, *Journal of World Review of Intermodal Transportation Research*, and *International Journal of Transportation* • Area Editor, "Smart Mobility and Shared Economy", "Public Transit", and "Transportation Policy, Planning and Modeling", 18th COTA conference International Conference of Transportation Professionals (CICTP2018), and "Connected and Autonomous Vehicle," 19th COTA conference International Conference of Transportation Professionals (CICTP2019) • Organizer/Coordinator for 2018 CAMMSE Transportation Summer Camp, UNCC STEM Blasters, and 2018 CAMMSE Research Symposium • Session Chair and Co-Chair of Subcommittee, Co-General Chair of the 5th International Workshop on Crowd Assisted Sensing, Pervasive Systems and Communications (CASPer 2018), Track Co-Chair of Social Networks and Computing (SNC) Track of the 26th International	• Editorship (5) • Organizing committee member, session chair or area editor of conference (6) • Number of professional committees or board member (8) • Number of review panels (5)

	Conference on Computer Communications and Networks (ICCCN 2018) • Member, TRB Standing Committees (AHB60, AHD60), ASCE Connected & Autonomous Vehicles Impacts Committee, Advanced Technologies Committee, Public Transport Committee, Rail Transportation Committees, NCDOT Fully Autonomous Vehicle (FAV) Research Working Group Committee, and Professional Engineers of North Carolina (PENC) State Board • Panel Member, NCHRP Synthesis 20-05/Topic 50-10, NCHRP 08-116, NCHRP 03-131, National Science Foundation (NSF) Proposal Review, National Defense Science and Engineering Graduate (NDSEG) Scholarship Evaluation	
3. Education and Workforce Development	• Two existing undergrad courses and five existing graduate courses • Seven graduate students in CAMMSE projects • One degree program in the College of Engineering in the Department of Civil and Environmental Engineering at UNC Charlotte • UNC Charlotte Transportation Summer Camp in 2018, STEM Blasters Educational activity for High School students in 2018 • Reached out to several Middle and High schools in the Charlotte-Mecklenburg Schools (CMS) and Cabarrus school system • 1st CAMMSE Research Symposium in 2018	• Transportation related courses offered by faculty (7) • Number of students participating in CAMMSE funded projects (7) • Number of transportation related degree programs with students funded by CAMMSE (1) • Number of transportation summer institute/camp (2) • Number of Research Symposium (1) • Number of transportation summer campers (15) • Number of transportation seminars (41)



	• Eleven UNC Charlotte ITE student chapter bi-weekly seminars and thirty UNC Charlotte transportation graduate students weekly seminars	
4. Technology Transfer	• Six invited presentations at five different universities in China (Shijiazhuang Tiedao University, Tongji University, Shanghai Maritime University, Wuhan University of Science and Technology, and Dalian University of Technology) • Two other invited presentations (at the First Annual National Mobility Summit of US DOT University Transportation Centers and the North Carolina Turnpike Authority (NCTA) Automated Vehicle Proving Ground (AVPG) partnership meeting) and one presentation at the 1st Annual CAMMSE Research Symposium • Eighteen presentations at various conferences (e.g., ICTD 2018, 2018 AVS, 2018 SDITE, the 2018 WTC, 37th IEEE IPCCC 2018, 2018 ITS Carolinas Annual Meeting, CICTP 2018, 2017 NCSITE 2017 as mentioned in the “Research Capability” section	• Presentations given at professional and academic meeting (27) • Number of professionals in the audience (est. 1000)
5. Collaboration	• North Carolina DOT, Charlotte Area Transit System, Centralina Council of Governments in collaborative research and UNC Charlotte in providing cash, in-kind support, facilities, etc. • Research Collaboration with Shijiazhuang Tiedao University, Tongji University, Shanghai Maritime University, Wuhan University of Science and Technology, and Dalian University of Technology in 2018 • Center personnel: Dr. Wei Fan, Dr. Miguel Pando, Dr. David	• Number of collaborative partners (4) • Number of international collaboration (5) • Number of Center personnel involved (5)

	Weggel, Dr. Martin Kane, and Dr. Yu Wang	



3.2. University of Texas at Austin

Part II – UTC-Specific Performance Indicators		
UTC Name	**Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**	
University	**University of Texas at Austin**	
Grant #	**69A3551747133**	
Reporting Period	**October 1, 2017 - September 30, 2018**	
Category	**Description of indicator**	**Metric**
1. Research Capability	• Liu, Hao & Claudel, Christian & B. Machemehl, Randy. (2018). A Stochastic Formulation of the Optimal Boundary Control Problem Involving the Lighthill Whitham Richards Model. IFAC-PapersOnLine. 51. 337-342. 10.1016/j.ifacol.2018.07.055. • Baumanis, Carolina, Jennifer Hall, and Randy Machemehl (2018). Comparing Cyclist Behavior among Three Urban Test Beds in Austin, TX, Proceedings of the CSCE Annual Meeting, June 2018. • Fu, Mengyu, Characterization of cyclist behavior across built environments. M.S. Thesis. The University Texas at Austin, UT Electronic Theses and Dissertations, 2018. (http://hdl.handle.net/2152/68176) • Kilgore, Scott, Modeling commuter rail riders' access mode decision-making using revealed preference data from Austin, Texas. M.S. Thesis. The University Texas at Austin, UT Electronic Theses and Dissertations, 2017. (http://hdl.handle.net/2152/63559)	• Number of refereed publications (1) • Number of refereed conference proceedings (1) • Number of technical reports (2)



2. Leadership	• Associate Editor, *Journal of Transportation of the Institute of Transportation Engineers, Institute of Transportation Engineers* • Editorial Board Member, *Transportation Research Part B Transportation Research Part C, Journal of Infrastructure Systems* • Member, Transportation Network Modeling Committee, Transportation Research Board • Chair, Transit, Freight, and Logistics Subcommittee, Transportation Research Board	• Editorship (4) • Committee membership (2)
3. Education and Workforce Development	• Two undergraduate courses and five graduate courses • Three undergraduate students and eight graduate students in CAMMSE projects • One degree program in the Cockrell School of Engineering in the Civil, Architectural and Environmental Engineering Department	• Transportation related course offered by faculty (7) • Number of students participating in CAMMSE funded projects (11) • Number of transportation related degree programs with students funded by CAMMSE (1)
4. Technology Transfer	• Three MS students have graduated this past year. The CAMMSE-supported students that have graduated during this reporting period will carry the new technology that they have developed with them for the rest of their careers • Baumanis, Carolina, Jennifer Hall, and Randy Machemehl (2018) “Comparing Cyclist Behavior among Three Urban Test Beds in Austin, TX”, Presentation given at the CSCE Annual Meeting, June 2018.	• Number of graduated students in the work force (3) • Number of presentations (1)
5. Collaboration	• City of Austin in collaborative research and UT’s Center for Transportation providing in-kind support, facilities, etc. • Capital Metropolitan Transportation Authority in	• Number of collaborative partners (2) • Number of Center personnel involved (4)

	collaborative research and UT's Center for Transportation providing in-kind support, facilities, etc. • Center personnel: Dr. Randy Machemehl, Dr. Stephen Boyles, Dr. Christian Claudel, Carolina Baumanis	



3.3. University of Connecticut

Part II – UTC-Specific Performance Indicators		
UTC Name	**Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**	
University	**University of Connecticut**	
Grant #	**69A3551747133**	
Reporting Period	**October 1, 2017 to September 30, 2018**	
Category	**Description of indicator**	**Metric**
1. Research Capability	• Research results presented at 2018 Transportation Research Board 97th Annual Meeting	• Number of refereed journal publications (0) • Number of conference papers presented (1) • Number of technical research reports published (2)
2. Leadership	• Associate Editor, *Transportation Letters* • Session Chair INFORMS; Paper Review Coordinator TRB Standing committees AP025, ADB10 • Member, TRB Standing Committees (AP025, ADB10), ASCE Public Transportation Committee, Connecticut Transportation Institute	• Editorship (1) • Organizing committee member or subcommittee chair of conference or workshop (3) • Number of professional committees or affiliated centers (4)
3. Education and Workforce Development	• Ten undergrad course offerings and seven graduate course offerings • Six graduate students in CAMMSE projects, one undergraduate student • Degree programs in civil engineering, geography and statistics	• Transportation related courses offered by faculty (17) • Number of students participating in CAMMSE funded projects (7) • Number of transportation related degree programs with students funded by CAMMSE (3)



4. Technology Transfer	• Two invited presentations (Northeast Regional Conference on Economic Development), and two other presentations (TRB 97th Annual Meeting)	• Presentations given at professional and academic meeting (4) • Number of professionals in the audience (est. 200)
5. Collaboration	• Connecticut DOT, partnership for Strong Communities, University of Queensland • Dissertation Reviewer, UNSW; Research Collaboration with University of Queensland • Center personnel: Dr. Nicholas Lownes and Dr. Karthik Konduri	• Number of collaborative partners (3) • Number of international collaboration (2) • Number of Center personnel involved (2)

3.4. Washington State University – Pullman

Part II – UTC-Specific Performance Indicators		
UTC Name	**Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**	
University	**Washington State University – Pullman**	
Grant #	**69A3551747133**	
Reporting Period	**October 1, 2017 to September 30, 2018**	
Category	**Description of indicator**	**Metric**
1. Research Capability	• Research results published in: *International Journal of Industrial Organization; Journal of Econometrics; Construction and Building Materials* • Research results presented at: 1st Annual CAMMSE Research Symposium; GeoShanghai 2018 Conference; etc.	• Number of refereed journal publications (3) 1. Yan, Jia, The effect of merger on airline efficiency: evidence from China, forthcoming in the International *Journal of Industrial Organization*, with Xiaowen Fu, Kun Wang and Tae Oum, 2018. 2. Yan, Jia, Vehicle Size Choice and Automobile Externalities: A Dynamic Analysis, forthcoming in the *Journal of Econometrics*, with Clifford Winston, 2018. 3. Liu, K., Zhang, K., Shi, X. Performance Evaluation and Modification Mechanism Analysis of Asphalt Binder Modified by Graphene Oxide. *Construction and Building Materials*, 2018, 163, 880-889. • Number of presentations (8) • Number of technical research reports published (3) 1. Akin, M., He, Y., Shi, X. The Use of Connected Vehicle Technology to Facilitate Multimodal Winter Travel (Phase I). Final report for the Center for Advanced Multimodal Mobility Solutions & Education. Charlotte, North Carolina. August 2018. 2. Yan, J. The Effect of Competition of Transport Modes on Mobility. Final report for the

		Center for Advanced Multimodal Mobility Solutions & Education. Charlotte, North Carolina. August 2018. 3. Fay, L., Akin, M., Muthumani, A., Shi, X. Quantifying Salt Concentration on Pavement – Phase II. Final report for the Aurora Pooled Fund and Iowa Department of Transportation, Jan 2018.
2. Leadership	• Editorial Board of *Transportmetrica*; Editorial Board of *International Journal of Transportation Science and Technology* • Chair for Session for Pavement Materials: Recent Advances, GeoShanghai 2018 Conference, May 30, 2018, Shanghai, China • Chair, Organizing Committee, TRB ADC 60 (Committee on Resource Conservation and Recovery) Summer 2018 Workshop, July 15-17, 2018, Spokane, WA • Dissertation award committee of the Hong Kong Society of Transportation Studies • Member of Dissertation Committee as the 1st Opponent for Norwegian University of Science and Technology • ASCE Construction Institute (CI) Bituminous Materials Committee, Control Member • Member of TRB Committees: Standing Committee on Durability of Concrete (AFN30); Standing Committee on Resource Conservation and Recovery (ADC60); Standing Committee on Geo-Environmental Processes in Soils (AFP40)	• Editorship (2) • Organizing committee member or subcommittee chair of conference or workshop (2) • Number of professional committees or affiliated centers (6)
3. Education and Workforce Development	• Teaching the following Ph.D level courses related to transportation: Econometrics II, Econometrics	• Transportation related courses offered by faculty (3)



	IV, Topics in Applied Microeconomics • Supporting 3 Ph.D students, 1 MS student and 1 undergraduate student in CAMMSE funded projects • One degree program in the College of Engineering and Architecture and another degree program in the College of Agricultural, Human and Natural Resource Sciences at WSU	• Number of students participating in CAMMSE funded projects (5) • Number of transportation related degree programs with students funded by CAMMSE (2)
4. Technology Transfer	• Invited presentations at: Hong Kong Polytechnic University, Fudan University, Brookings-Tsinghua Conference on Transportation and Environment; GeoShanghai 2018 Conference; Corrosion Protection Technology (CPT) for Winter Maintenance; TRB ADC60 Summer Workshop, etc. • Workshop presentation "Fantastic Elastic Wind-Up Cars" at Palouse STEAM Summit 8/21/2018 with 8 professionals in audience	• Presentations given at professional and academic meeting (11) • Number of professionals in the audience (158)
5. Collaboration	• The Washington State Department of Transportation (WSDOT): in-kind support for CAMMSE research; Montana State University: facility utilization • Visiting professor at Nankai University, Tianjin Chengjian University, Wuhan Polytechnic University, China • Hosted two visiting scholars from Wuhan University of Science & Technology, and Central South University of Forestry & Technology, China, respectively	• Number of collaborative partners (2) • Number of international collaboration (5) • Number of Center personnel involved (3): Dr. Jia Yan, Michelle Akin, Dr. Xianming Shi



3.5. Texas Southern University

Part II – UTC-Specific Performance Indicators	
UTC Name	**Center for Advanced Multimodal Mobility Solutions and Education (CAMMSE)**
University	**Texas Southern University**
Grant #	**69A3551747133**
Reporting Period	**October 1, 2017 to September 30, 2018**

Category	Description of indicator	Metric
1. Research Capability	• Research results published in: *Transportation Research Record: Journal of Transportation Research Board* • Research results presented at the Transportation Research Board 97th Annual Meeting • Technical reports for CAMMSE: "*Use of Innovative Intersection Designs for Roadway Traffic Congestion Mitigation*" and "*Predicting The Vessel Arrival Times to The Port of Houston Container Terminals: A Machine Learning Approach in Lieu of The Vessels' Operator Input Estimated Time of Arrival"*	• Number of refereed journal publications (1) 1. Zhao, Q., T. Goodman, M. Azimi, Y. Qi, "Roadway Related Truck Crash Risk Analysis: Case Studies in Texas", *Transportation Research Record*, August 29, 2018. https://doi.org/10.1177/0361198118794055 • Number of conference papers presented (1) • Number of technical research reports published (2)
2. Leadership	• Editorial Board, *International Journal of Transportation Science and Technology* • Editorial Advisory Board: *Asian Transport Studies* • Paper reviewers for ASCE Journal of Transportation Engineering, Part A: Systems, Journal of Transportation Safety & Security and Canadian Journal of Civil Engineering • Member, TRB Standing Committees (AW020, AW030, AT050, AW010)	• Editorship (2) • Number of professional committees or affiliated centers (5) • Number and type of notable national and regional awards (9)

	• Member, Maritime Education, Training, and Outreach subcommittee of the Lone Star Harbor Safety Committee (LSHSC) • CAMMSE funded students received notable national and regional awards including: *Texas ITE Houston Section Scholarship (3), The International Transportation Management Association Scholarship (2), The Transportation Club of Houston Scholarship (1), The International Transportation Management Association (2) and TSU university scholarship (1)*	
3. Education and Workforce Development	• Two existing undergrad courses and nine existing graduate courses • Two undergraduate and nine graduate students in CAMMSE projects • One undergraduate degree program and one graduate degree program in the College of Science, Technology and Engineering at TSU • One master thesis directly supported by CAMMSE "*Evaluation of Drivers' Compliance to Temporary Speed Limits While Approaching Work Zones on Two-lane Highways*" • Organized "*Summer Maritime Academy"* and "*Summer Internship Program with Elkin High School Engineering Academy"* in summer 2018 • Organized "Fast Forward Leadership and Skills Development Workshop" in April 25th,2018	• Transportation related courses offered by faculty (11) • Number of faculty in transportation areas (3) • Number of students participating in CAMMSE funded projects (10) • Number of transportation related degree programs with students funded by CAMMSE (2) • Number of master thesis (1) • Number of outreach activities (2) • Number of professional development events (seminars, symposia, short courses, workshops, etc.) conducted for practicing professionals (1) and total participants (35)
4. Technology Transfer	• Four invited presentations (Zhejiang Normal University, Qilu University of Technology, 2018	• Presentations given at professional and academic meeting (5)

	CAMMSE Research Symposium), and one other presentation (the TRB 97th Annual Meeting)	• Number of technical research reports published by the consortium (2)
5. Collaboration	• Collaborate with Beijing Jiaotong University • Collaborate with Qilu University of Technology • Collaborate with Houston-Galveston Area Council (HGAC) to provide internship positions to graduate students • Collaborate with Propeller Club Port of Houston to establish a student auxiliary chapter in TSU • Center personnel: Dr. Yi Qi, Dr. Lei Yu and Dr. Mehdi Azimi	• Number of collaborative partners (4) • Number of international collaboration (2) • Number of Center personnel involved (2)

Center for Advanced Multimodal Mobility Solutions and Education