ANL-12/TRACC-USDOT-Y6Q4

Argonne NATIONAL LABORATORY

Energy Systems Division

Transportation Research and Analysis Computing Center (TRACC)

Year 6 Quarter 4 Progress Report (Final)

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Transportation Research and Analysis Computing Center (TRACC) Year 6 Quarter 4 Progress Report

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by
H. Ley
Energy Systems Division, Argonne National Laboratory

submitted to
D. Tucker-Thomas
Office of Research Development & Technology
Research and Innovative Technology Administration
U.S. Department of Transportation

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Introduction, Objectives, and Results

Argonne National Laboratory initiated a FY2006-FY2009 multi-year program with the US Department of Transportation (USDOT) on October 1, 2006, to establish the Transportation Research and Analysis Computing Center (TRACC). As part of the TRACC project, a national high performance computer user facility has been established, with full operations initiated in March 2008. The technical objectives of the TRACC project included the establishment of a high performance computing center for use by USDOT research teams, including those from Argonne and their university partners, and the use of advanced computing and visualization facilities for the performance of focused computer research and development programs in areas of interest for USDOT. The project was reauthorized for FY2010 and operated for 6 years.

The objectives have been met by establishing a high-performance computing facility, known as the Transportation Research and Analysis Computing Center (TRACC), and providing technical support for its use by USDOT staff and their university and industry contractors. In addition to facilities for advanced computing, visualization, and high-speed networking in the TRACC facility, advanced modeling and simulation applications research is being conducted by the TRACC facility scientific applications staff in coordination and collaboration with USDOT researchers.

This final project report for Year 6 of the project (Y6Q4) summarizes the principal activities associated with the operation of the computing center and in the performance of the computational research in the key application areas identified by USDOT as its highest priorities. As defined by the Year 6 Statement of Work (SOW) the activities and objectives for the sixth year of the project are: (1) traffic modeling and simulation and emergency transportation planning; (2) computational fluid dynamics for hydraulics and aerodynamics research; (3) multi-dimensional data visualization; and (4) computational structural mechanics applications.

The establishment of the high performance computing center based on a massively parallel computer system and the transportation research and demonstration projects associated with key focus areas

included the use of computing facilities as well as the exchange of research results with the private sector and collaboration with universities to foster and encourage technology transfer.

The final report consists of highlights of the many activities at TRACC over the six years of operation. TRACC was first established at the DuPage Airport Flight Center with the plan to move to the new DuPage National Technology Park shortly after. This location would have been a catalyst for close collaboration with universities and the industry, but due to the economic downturn in 2008, the DuPage National technology Park was never fully developed. TRACC stayed at the DuPage Airport Flight Center until December 2010, establishing a unique supercomputing center for USDOT researchers from universities, government agencies, planning organizations, and consulting firms. TRACC funded university projects at Northern Illinois University and the University of Illinois in Urbana/Champaign to develop new technologies and support other users on the shared high performance platform.

TRACC used a multi-pronged approach to build a strong user community, by not only providing raw computing power, but also providing commercial software licenses, technical assistance, extensive training, one on one help, and outreach activities to identify potential users of the facility. TRACC started developing complex visualization software for transportation simulation software, parallelized software packages to make use of the HPC architecture at TRACC, and developed software interfaces such as TRANSIMS Studio to make the software more accessible to users.

Over the years, about 70 projects have made use of the TRACC HPC clusters, and operation will continue based on alternative funding. The 120 current users will be supported from several projects with USDOT under Interagency Agreements, and TRACC's operation has transitioned into direct work for USDOT agencies, such as FHWA and NHTSA. All this work has been enabled by the original TRACC grant, and allows USDOT, state DOT, and transportation researchers and engineers to perform research and analysis more cost effectively than before. The Turner-Fairbank Highway Research Center, for example, is now relying on TRACC to evaluate complex hydraulic problems using commercial CFD software, being able to reduce the need for costly experiments to satisfy requests guidance on new highway infrastructure designs from state DOTs. NHTSA is using TRACC's high performance computers for house-internal occupant safety calculations, such as the simulation of roll-over crashes and similar analysis. Most TRANSIMS transportation models in the US are making use of TRACC's clusters to run trip dynamics analysis of region-size multi-modal simulations.

Towards the end of the SAFETEA-LU grant period, TRACC acquired a new high performance cluster computer to support the future needs of all these USDOT projects. The operation of the machine for the coming years is funded by various sponsors from FHWA and NHTSA, and the TRACC facility has become an essential part of the USDOT research infrastructure, leveraging existing research projects with modern computational approaches that are cost-efficient and scale up to address real world challenges in maintaining and renewing the U.S. transportation infrastructure.

Organizations and Users with Access to the TRACC HPC Clusters

3-D Numerical Simulation of Direct-Injection, Mixture Formation and Combustion in a Hydrogen Engine			
	ES Division, Argonne		
		Scarcelli, Riccardo	***User***
	US DOE Engines and Emissions Control Technologies		
		Singh, Gurpreet	***Cognizant Engineer***
A Microstructure-Based Modeling Approach to Characterize Asphalt Materials			
	Michigan Department of Transportation		
		Staton, John	***Cognizant Engineer***
	Michigan Technological University		
		Barak, John	***Cognizant Engineer***
		Colbert, Baron	***User***
		Dai, Qingli	***User***
		Lu, Haizhu	***User***
		Ng, Kenny	***User***
		You, Zhanping	***Cognizant Engineer***
Analysis and Design of Roadside Safety Features for Safety Performance			
	Texas Transportation Institute		
		Abu-Odeh, Akram Y.	***User***
		Bligh, Roger P.	***Cognizant Engineer***
		Sheikh, N.M.	***User***
Analysis of THOR-NT Dummy for Vertical Impact Environments			
	NASA Langley		
		Annett, Martin S.	***Cognizant Engineer***
	Virginia Tech		
		Putnam, Jacob	***User***
		Untaroi, Costin	***User***
Application of Chaos Theory Analysis to Structural Health Monitoring of Cable-Stayed Bridges			
	FHWA NDE		
		Jalinoos, Frank	***Cognizant Engineer***
		Jin, Shuang	***User***

Application of TRANSIMS for Highway Work Zones			
	FHWA OoP		
		Yang, David	***Cognizant Engineer***
	Western Michigan University		
		Oh, Jun-Seok	***User***
Assessment Of Occupant Kinematics in Rollovers; Rollover Crash Analysis			
	NHTSA HID		
		Barsan-Anelli, Aida Cristina	***User***
		Ridella, Stephen	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***User***
Bridge Hydraulics - Analysis Support for Hydraulics Research in Transportation Applications			
	TFHRC		
		Kerenyi, Kornel	***Cognizant Engineer***
		Xie, Zhaoding	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
		Sofu, Tanju	***Cognizant Engineer***
	University of Nebraska-Lincoln		
		Bushra, Afzal	***User***
		Guo, Junke	***Cognizant Engineer***
		Shan, Haoyin	***User***
		Zhai, Yuan	***User***
Bridge Scour Modeling Using CFD			
	California Department of Transportation		
		Flora, Kevin Scott	***Cognizant Engineer***
CFD Analysis of Outlet Modifications to Improve Highway Pipe Efficiency at Peak Flows			
	Maine Department of Transportation		
		Hebson, Charles	***Cognizant Engineer***
		Mann, Alexander	***User***
		Pearce, Bryan	***User***
	TFHRC		
		Kerenyi, Kornel	***User***
CFD Modeling of FDOT's Sediment Erosion Rate Flume (SERF)			
	Florida Department of Transportation		
		Renna, Rick	***Cognizant Engineer***
	University of Florida		
		Crowley, Raphael	***User***
		Robeck, Corbin	***User***
	University of Nebraska-Omaha		
		Li, Chen	***User***
		Woldeyesus, Kokob Zeremariam	***User***

Chicago Business District Evacuation (IDOT)			
	NE Division, Argonne		
		Tentner, Adrian M.	***User***
	Northern Illinois University		
		E, Manli	***Developer***
		Liu, Lichuan	***Developer***
		Pasupuleti, Lok Aradhya	***User***
		Ronanki, Bharani	***Developer***
Chicago North Side Water Reclaimation Plant Studies			
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
	University of Illinois at Urbana-Champaign		
		Garcia, Marcelo	***Cognizant Engineer***
		Sinha, Sumit	***User***
		Tokyay, Talia Ekin	***User***
CMAP Activity-Based Model			
	CMAP		
		Heither, Craig	***User***
		Stratton, Matt	***User***
		Wies, Kermit	***User***
	FHWA OoP		
		Gardner, Brian	***Cognizant Engineer***
Computational Mechanics Research and Support for Aerodynamics and Hydraulics at TFHRC			
	Northern Illinois University		
		Lanka Venkata, Sudhir Kumar	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
Computer Aided Mix Design (CAMiD) Technical and Analysis Support for Advanced Computational Needs -- Bituminous Mixtures Laboratory at FHWA Turner-Fairbank Research Center			
	FHWA OoP		
		Gibson, Nelson	***User***
	TFHRC		
		Kutay, Muhammed Emin	***Cognizant Engineer***
CRIS Test Modeling			
	NHTSA		
		Kruszewski, Piotr Mateusz	***User***
Design-oriented Scoured Foundation Modeling for Bridge Performance Analysis			
	University of Missouri-Kansas City		
		Chen, ZhiQiang	***User***
Determining Wheel-Soil Interaction Loads using a Meshfree Finite Element Approach			
	NASA JPL		
		Contreras, Michael	***Cognizant Engineer***

Development and Evaluation of Climate Metrics for Aviation based on Climate-Chemistry Modeling Analyses			
	FAA		
		Jacob, Daniel	***Cognizant Engineer***
	University of Illinois at Urbana-Champaign		
		Lee, Huikyo	***User***
		Olsen, Seth	***User***
		Patten, Kenneth	***User***
		Wang, Dong	***User***
		Wuebbles, Donald	***User***
Development and Improvement of Roadside Safety Barriers			
	TFHRC		
		Arispe, Eduardo N.	***User***
		Eigen, Ana Maria	***User***
		Opiela, Kenneth	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***
Development of TRANSIMS Models to Evaluate Traffic Management Plans for Special Events and Construction Projects in the Chicago Business District			
	IIT		
		Lee, Sang Hyuk	***User***
		Lee, YongDoo	***User***
		Li, Zongzhi	***User***
		Rahman, Asadur	***User***
		Veliou, Eirini	***User***
	TRACC, Argonne		
		Ley, Hubert	***Cognizant Engineer***
Development of TRANSIMS Software for use in Parallelization of TRANSIMS			
	AECOM		
		Patnam, Krishna Chandra	***User***
		Roden, David	***Cognizant Engineer***
	Argonne		
		Toonen, Brian R.	***User***
		Yelchuru, Balaji	***User***
	USDOT		
		Gardner, Brian	***Cognizant Engineer***
Development of TRANSIMS Tools and Methodology for the Atlanta Metropolitan Area			
	Georgia Tech		
		Guin, Angshuman	***User***
		Leonard, John	***Cognizant Engineer***
		Shealey, Stephanie Lynne	***User***
	TRACC, Argonne		
		Ley, Hubert	***Cognizant Engineer***

Development of TRANSIMS Visualization Software Metropolis			
	NCSA		
		Betts, Alex	***User***
		Cox, Donna	***User***
		Hall, Matthew	***User***
		Levy, Stuart	***User***
		Patterson, Robert	***User***
	TRACC, Argonne		
		Ley, Hubert	***Cognizant Engineer***
Electromagnetic Shock Absorber			
	Northern Illinois University		
		Fisher, Francisco Lucas	***User***
		Gupta, Abhijit	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***
		Kulak, Ronald F.	***Cognizant Engineer***
Evaluation of Thor Dummy FE Model in Crash Environments			
	NHTSA HID		
		Ridella, Stephen	***Cognizant Engineer***
	University of Virginia		
		Untaroiu, Costin	***User***
FHWA Signal Processing, Data Analysis and Computational Modeling for Highway Applications			
	TFHRC		
		Chintakunta, Satish Reddy	***User***
		Cobb, Lincoln	***Cognizant Engineer***
		Gagarin, N.	***User***
		Mekemson, James Robert	***User***
		Scott, Michael	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***
Geosynthetic-Reinforced Soil Integral Bridge System; Scour Countermeasure Design; Deformation Analysis of Bridge Supported on Shallow Foundations			
	FHWA OoP		
		Hartmann, Joey	***Cognizant Engineer***
		Nicks, Jennifer	***User***
Impact of Wide Base Tires on Pavements - A National Study			
	FHWA IR&D		
		Weaver, Eric	***Cognizant Engineer***
	University of Illinois at Urbana-Champaign		
		Al-Qadi, Imad L.	***User***
		Gamez, Angeli	***User***
		Hernandez, Jaime	***User***
		Ozer, Hasan	***User***

Improvements of LS-Dyna Models for Off-Road Traffic Accident Analysis			
	Kineticorp		
		Carter, Neal	***User***
		Rose, Nathan	***User***
		Zhu, Ling	***User***
Inner Nozzle Flow characterization of Biodiesel from Different Feedstocks			
	Argonne		
		Som, Sibendu	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
	US DOE EERE Vehicle Tech Prog		
		Stork, Kevin	***Cognizant Engineer***
In-situ Load Rating of Highway Bridges			
	University of Virginia		
		Chase, Robert Paul	***User***
		Chase, Steven Bradley	***Cognizant Engineer***
		Jin, Shuang	***User***
Investigation of Bridge Pier and Abutment Scour Using Large Eddy Simulation			
	University of Iowa		
		Constantinescu, Serban George	***Cognizant Engineer***
		Dunn, Mark	***User***
		Miyawaki, Shinjiro	***User***
		Tokyay, Talia Ekin	***User***
		Yuksel Ozan, Ayse	***User***
Investigation of Impact Factors for FDOT Bridges; and the Best Practices in Construction of Paratransit Buses			
	FAMU-FSU		
		Gepner, Bronislaw Dominik	***User***
		Kwasniewski, Leslaw	***User***
		Siervogel, Jeff	***User***
		Taft Ford, Eduardo E.	***User***
		Wekezer, Jerry	***User***
	Florida Department of Transportation		
		Westbrook, Robert	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***
Investigation of Occupant Injury Mechanism in Vehicle Small Overlap Impacts			
	NHTSA		
		Parent, Daniel	***Cognizant Engineer***
	University of Virginia		
		Crandall, Jeff	***User***
		Yue, Neng	***User***

Investigation of Occupant Response in Vehicle Crash			
	NHTSA		
		Parent, Daniel	***Cognizant Engineer***
	University of Virginia		
		Bollapragada, Varun	***User***
		Panzer, Matthew Brian	***User***
		Park, Gwansik	***User***
		Poulard, David	***User***
		Shin, Jae Ho	***User***
		Zhang, Qi	***User***
Investigation of River Flow and Transport Processes Using High Resolution Eddy Resolving CFD Simulations			
	South Florida Water Management District		
		Zeng, Jie	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
	University of Iowa		
		Chang, Kyoungsik	***User***
		Constantinescu, Serban George	***Cognizant Engineer***
		Kashyap, Shalini	***User***
		Steenhauer, Kate	***User***
		Suhodolova, Tatiana	***User***
Large Eddy Simulation of Interaction of Turbulent Flow with a Porous Media			
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
	University of Illinois at Urbana-Champaign		
		Samala, Rahul	***User***
		Vanka, Pratap	***User***
Large Scale Evacuation Planning with Microscopic Traffic Simulation			
	ORNL		
		Liu, Cheng	***User***
		Lu, Wei	***User***
Management			
	ES Division, Argonne		
		Drucker, Harvey	***Manager***
	TRACC, Argonne		
		Ley, Hubert	***Manager***
		Tate, Gail	***Manager***
		Weber, David	***Manager***

Modeling Hot Mix Asphalt Compaction - Technical Support for Pavement Design and Performance Modeling Team			
	Delft University of Technology		
		Jonsthovel, Tom Bernard	***User***
		Koneru, Saradhi	***User***
		Liu, X.	***User***
		Scarpas, Athanasios	***User***
	FHWA NDE		
		Kasbergen, Cornelis	***User***
		Weaver, Eric	***Cognizant Engineer***
	Texas A&M		
		Masad, Eyad	***User***
Modeling Soil-Structure Interaction in the Presence of Large Soil Deformations			
	TRACC, Argonne		
		Bojanowski, Cezary	***User***
		Kulak, Ronald F.	***User***
Moreno Valley TRANSIMS Transportation Modeling/ITS			
	FHWA OoP		
		Gardner, Brian	***Cognizant Engineer***
	Moreno Valley		
		Gross, Mark	***User***
		Keller, James	***User***
		Kerenyi, John	***Cognizant Engineer***
		Lloyd, Michael David	***User***
		Minard, Mark	***User***
		Van Simaeys Jr, Julien	***User***
MOVES (Motor Vehicle Emission Simulator), Modeling emissions from on road vehicles			
	EPA Office of Transportation and Air Qualilty		
		Aikman, William Russell	***Cognizant Engineer***
		Beardsley, Megan	
		Brzezinski, David	***User***
		Choi, Jongwoo David	***User***
		Church, Thomas Michael	***User***
		Faler, Wesley Gordon	***User***
		Glover, Ed	***User***
		Kahan, Ari	***User***
		Maciag, Ted	***User***
		Michaels, Harvey	***Cognizant Engineer***
		Shyu, Gwo Ching	***User***
	TRACC, Argonne		
		Ley, Hubert	***Cognizant Engineer***
MOVES Air Pollutant Emission Analysis for the GREET Model			
	Argonne		
		Burnham, Andrew	***User***

NCAC Finite Element Models Assessment			
	George Washington University		
		Marzougui, Dhafer	***User***
		Tahan, Fadi	***User***
	TFHRC		
		Opiela, Kenneth	***Cognizant Engineer***
NHTSA Human Injury Research Division			
	NHTSA		
		Parent, Daniel	***User***
	NHTSA HID		
		Takhounts, Erik	***Cognizant Engineer***
Nonlinear Analysis of Cable-Stayed Bridge Cables			
	Northern Illinois University		
		Balpande, Rohit Suresh	***User***
		Gupta, Abhijit	***Cognizant Engineer***
		Vannemreddi, S.	***User***
		Vannemreddy, B.	***User***
	TRACC, Argonne		
		Kulak, Ronald F.	***Cognizant Engineer***
Numerical Investigation of Single Point Incremental Forming			
	Northwestern University		
		Cao, Jian	***Cognizant Engineer***
		Huang, Ying	***User***
Open Channel Flow, Bridge Hydraulics, and Bridge Scour			
	Northern Illinois University		
		Biswas, Dipankar	***User***
		Edwards, Christopher M.	***User***
		Elapolu, Phani Ganesh	***User***
		Kostic, Milivoje	***Cognizant Engineer***
		Majumdar, Pradip	***Cognizant Engineer***
		Pati, Vishnu Vardhan Reddy	***User***
		Tulimilli, Bhaskar Rao	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
Picoscopic Modeling of Transportation Systems			
	UMASS Amherst		
		Collura, John	***Cognizant Engineer***
		Leiner, Gabriel	***User***
Ricardo CRADA			
	Argonne Tribology Section		
		Demas, Nicholaos G.	***User***
		Erck, Robert A.	***User***
		Fenske, George R.	***Cognizant Engineer***

RTSTEP: Regional Transportation Simulation Tool for Evacuation Planning			
	AECOM		
		Choi, Jongwoo David	***User***
		Gregerson, Christopher	***User***
		Patnam, Krishna Chandra	***User***
		Roden, David	***User***
		Santhanam, Srividya	***User***
		Singuluri, Sashank	***User***
	CDOT		
		Emmanuel, Abraham	***Advisor***
	City of Chicago - Office of Emergency Management		
		Halac, Yilmaz	***Sponsor***
	IIT		
		Arthur, Christina	***User***
		Liu, Yi	***User***
		Liu, Yifang	***User***
		Lu, Xi	***User***
		Qu, Fei	***User***
		Yi, Bo	***User***
		Zhong, Yaoqian	***User***
		Zhou, Bei	***User***
	Northern Illinois University		
		Moraga, Reinaldo J.	***User***
		Tanaka, Raul Augusto Alvarez	***User***
		Zhang, Quan	***User***
	TRACC, Argonne		
		Auld, Joshua	***Developer***
		Holifield, Justin	***User***
		Hope, Michael	***Developer***
		Kang, Sherry	***User***
		Park, Young Soo	***User***
		Qualls, Timothy	***User***
		Sokolov, Vadim O.	***Cognizant Engineer***
		Zhang, Kuilin	***Developer***
SACOG TRANSIMS Implementation			
	Resource Systems Group, Inc		
		Bowman, John L.	***User***
		Bradley, Mark Andrew	***User***
		Castiglione, Joseph	***User***
		Lawe, Stephen	***User***
		Mulandi, James	***User***
		Rentz, Erich	***User***
	USDOT		
		Gardner, Brian	***Cognizant Engineer***
		Grady, Brian Robert	***Cognizant Engineer***

SANDAG Activity-Based Model			
	SANDAG		
		Daniels, Clint	***Cognizant Engineer***
		Sun, Wu	***User***
SIMon Brain Model			
	NHTSA HID		
		Ridella, Stephen	***Cognizant Engineer***
		Takhounts, Erik	***User***
	USDOT		
		Hasija, Vikas	***User***
Simulation Analysis of an Integrated Model System for the Region of Southern California Association of Governments			
	SCAG		
		Cheng, Hao	***User***
		Cho, Joongkoo	***User***
		Cho, Sungbin	***User***
		Choi, Simon	***User***
		Hu, Hsi-Hwa	***User***
		Huang, Guoxiong	***User***
		Lee, Cheol-Ho	***User***
		Ryu, Sung Ho	***User***
		Sangkapichai, Mana	***User***
		Wen, Frank	***Cognizant Engineer***
		Yoon, Sung Su	***User***
		Zhang, Yongping	***User***
	UCSB		
		Chen, Yali	***User***
	University of Texas-Austin		
		Paleti, Rajesh	***User***
Simulation of Bridge Pier Failure from Flood Loading			
	TRACC, Argonne		
		Bojanowski, Cezary	***User***
		Kulak, Ronald F.	***User***
Snowdrift Mitigation			
	University of Iowa		
		Basnet, Keshav	***User***
		Constantinescu, Serban George	***Cognizant Engineer***
Software Testing			
	CD-adapco		
		Reynolds, Robert	***Vendor***
		Schnepper, Carol	***Vendor***
	NE Division, Argonne		
		Thomas, Justin W.	***User***
SToRM-Cluster; Computation River Hydraulics and Transfer			
	USGS		
		Simoes, Francisco J.M.	***Cognizant Engineer***

Structural Performance of Flexible Pavements			
	Louisana TRC		
		Chen, Xingwei	***Cognizant Engineer***
		Zhang, Zhao	***User***
Structural Testing Laboratory Computational Mechanics Research; Finite Element Modeling of Highway Structures			
	TFHRC		
		Adams, Michael	***User***
		Beshah, Fassil	***Cognizant Engineer***
		Chen, Linfeng	***User***
		Graybeal, Ben	***User***
		Greene, Gary	***User***
		Ocel, Justin	***User***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***
Study of Erosion Mechanisms at Piers of Rectangular Shape using Eddy Resolving Techniques and use of the Databases for Improvement of RANS Scour Models			
	TFHRC		
		Kerenyi, Kornel	***Cognizant Engineer***
	University of Iowa		
		Cheng, Zhengyang	***User***
		Constantinescu, Serban George	***Cognizant Engineer***
		Koken, Mete	***User***
		Yuksel Ozan, Ayse	***User***
Study of the Rate of Deterioration of Bridges and Pavements as Affected by Trucks			
	Clemson University		
		Amirkhanian, Serji	***Cognizant Engineer***
		Chowdhary, Ronnie	***User***
		Dunning, Anne	***User***
		Pang, Wei Chiang	***User***
		Putman, Brad	***User***
		Swanka, Merrill	***Cognizant Engineer***
	TRACC, Argonne		
		Bojanowski, Cezary	***Cognizant Engineer***

Systems Administation			
	CIS, Argonne		
		Dust, James	***SysAdmin***
		Hall, Corey	***SysAdmin***
		Hilden, Michael	***SysAdmin***
		Schmitz, Corby B.	***SysAdmin***
		Winkler, Linda	***SysAdmin***
	MCS Division, Argonne		
		Valdes, John P.	***SysAdmin***
	TRACC, Argonne		
		Amiot, Lawrence W.	***SysAdmin***
		Bernard, Jon	***SysAdmin***
		Kolpacki, Penny	***SysAdmin***
		Mihalo, William E.	***SysAdmin***
		Nowakowski, Waldemar	***SysAdmin***
		Reitzer, Joe	***SysAdmin***
		Schmitt, Robert	***SysAdmin***
Temecula Traffic Circulation Analysis of Alternate Networks			
	City of Temecula		
		Pina, Art	***User***
	Moreno Valley		
		Kerenyi, John	***Cognizant Engineer***
	WILLDAN		
		Smith, Ruth	***User***
Time Domain Fatigue Simulation of Metals			
	Northern Illinois University		
		Balpande, Rohit Suresh	***User***
		Gupta, Abhijit	***Cognizant Engineer***
Traffic Simulation of St. Louis Transportation Network for Earthquake Impact Assessment			
	Newmark Civil Engineering Laboratory		
		Elnashai, Amr S.	***Cognizant Engineer***
		Spencer, William F.	***Cognizant Engineer***
	University of Illinois at Urbana-Champaign		
		Chang, Liang	***User***
Transient Structural Dynamics of Bridges Subjected to Traffic, Seismic and Blast Loadings			
	TRACC, Argonne		
		Bojanowski, Cezary	***User***
		Kulak, Ronald F.	***User***
TRANSIMS Configuration Control, Testing, Automation, and Software Release			
	AECOM		
		Roden, David	***User***
	Northern Illinois University		
		Malar, K	***Developer***
	USDOT		
		Ducca, Fred	***Cognizant Engineer***
		Gardner, Brian	***Cognizant Engineer***

TRANSIMS Evacuation Traffic Models of New Orleans and Houston			
	Louisiana State University		
		Dixit, Vinayak	***User***
		Montz, Thomas	***User***
		Wolshon, Brian	***Cognizant Engineer***
		Zhang, Zongjie	***User***
TRANSIMS Technology and Tools development technical assistance for the development Buffalo USA/Canadian Region cross-border model.			
	USDOT		
		Chase, Robert Paul	***User***
		Mekuria, Maaza	***Cognizant Engineer***
		Smith, Scott	***Cognizant Engineer***
TRANSIMS Traffic Simulation Software Development/Parallelization			
	Northern Illinois University		
		Kanaga-Nayagam, Kanesa	***User***
	TRACC, Argonne		
		Hope, Michael	***User***
		Ley, Hubert	***Cognizant Engineer***
Unspecified			
	Argonne		
		Faber, Merlyn	
		Nguyen, Vu	
		Pinkerton, Scott	
	Arizona State University		
		Pendyala, Ram	***User***
		Plotz, Joseph	***User***
		Volosin, Sarah Elia	***User***
	Chrysler		
		Zhu, Yuhua	
	MCS Division, Argonne		
		Kim, Jong G.	
	Medical College of Wisconsin		
		Hallman, Jason	***User***
	Michigan Technological University		
		Stanton, Brett	
	Northern Illinois University		
		Kuppa, Lakshmi Pratyusha	***User***
	South Carolina Department of Transportation		
		Zwanka, Merrill	
	TRACC, Argonne		
		Balcerzak, Marcin	***User***
	University of Iowa		
		Jahra, Fatima	***User***
	USDOT		
		Rudd, Rodney W	

Update LA DOTD Policy on Pile Driving Vibration Management			
	Louisana TRC		
		Gautreau, Garvin	***User***
	TRACC, Argonne		
		Lottes, Steven A.	***Cognizant Engineer***
	Worcester Polytechnic Institute		
		Tao, Mingjiang	***User***
		Zhang, Mo	***User***
Using TRANSIMS to Quantify the Impacts of Planned Transportation Projects on Congestion and Air Quality			
	Georgia Regional Transportation Authority		
		Davis, Curt	***User***
		Goodwin, Robert	***User***
		Pihl, Eric	***User***
		Rousseau, Guy	***User***
		Zuehlke, Kai	***User***
	TRACC, Argonne		
		Ley, Hubert	***Cognizant Engineer***
Vehicle Stability under High Winds			
	Northern Illinois University		
		Patil, Rohan Satish	***User***
Wind Loads on Highway Sign and Traffic Signal Structures			
	University of Iowa		
		Constantinescu, Serban George	***Cognizant Engineer***
		Miyawaki, Shinjiro	***User***
		Tokyay, Talia Ekin	***User***

Advanced Degrees Awarded to Graduate School Students for Computational Fluid Dynamics Work Done on TRACC High Performance Computer Clusters on Problems of Importance to the FHWA Turner-Fairbank Highway Research Center and U.S. DOT

1. Bishwadipa Das Adhikary, “Flow and Pressure Scour Analysis of an Open Channel Flow Having an Inundated Bridge Deck under Various Flooding Conditions,” M.S. Thesis, Northern Illinois University, July 2008
2. Dipankar Biswas, “Development of an Iterative Scouring Procedure for Implementation in CFD Code for Open Channel Flow under Different Bridge Flooding Conditions,” M.S. Thesis, Northern Illinois University, June 2009
3. Afzal Bushra, “Computational Fluid Dynamic Analysis of Hydrodynamic Forces on Inundated Bridge Decks and the Effect of Scaling,” Ph.D. Thesis, University of Nebraska, November 2009
4. Bhaskar Rao Tulimilli, “Development of a Three-dimensional Scouring Methodology and its Implementation in Commercial CFD Code for Open Channel Flow Over a flooded Bridge Deck,” M.S. Thesis, Northern Illinois University, June 2010
5. Phani Ganesh, Development of Three-Dimensional Iterative Methodology Using a Commercial CFD Code For Flow Scouring Around Bridge Piers, M.S. Thesis, Northern Illinois University, October 2010
6. Vishnu Vardhan Reddy Pati, “CFD Modeling and Analysis of Flow through Culverts,” M.S. Thesis, Northern Illinois University, October 2010
7. Zhaoding Xie, “Theoretical and Numerical Research on Sediment Transport in Pressurised Flow Conditions,” Ph.D. Thesis, University of Nebraska, July 2011
8. Chris Edwards, “3-D Mesh Morphing Iterative Methodology for Flow Scouring Around Bridge Piers Implemented in a Commercial CFD Code,” M.S. Thesis, Northern Illinois University, August 2011
9. Yuan Zhai, “Time-Dependent Scour Depth under Bridge-Submerged Flow,” M.S. Thesis, University of Nebraska, May 2010
10. Yuan Zhai, “CFD Modeling of Fish Passage in Large Culvert and Assistance for Culvert Design with Fish Passage,” Ph.D. Thesis, University of Nebraska, July 2013

Dr. Steven Lottes, Argonne TRACC, served on the thesis committees for Bishwadipa Das Adhikary, Dipankar Biswas, Bhaskar Rao Tulimilli, Phani Ganesh, Chris Edwards, and Vishnu Vardhan Reddy Pati.

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Advanced Degrees Awarded to Graduate School Students for Computational Structural Mechanics Work Done on TRACC High Performance Computer Clusters on Problems of Importance to the U.S. DOT

1. Rohan Patil, “Stability of Single-Unit Truck under Wind Loading”, M.S. Thesis, Northern Illinois University, December 2011, directed by Abijith Gupta
2. Francesco Lucas Fisher, “Design of a Semi-Active Controllable Electromagnetic Shock Absorber”, M.S. Thesis, Northern Illinois University, December 2011, directed by Abijith Gupta
3. Eduardo E. Taft Ford, “Dynamic Interaction Between Heavy Vehicles and Highway Bridges”, M.S. Thesis, Florida State University, October 2010, directed by Jerry Wekezer
4. Bharathi Vannemreddy, “Aerodynamic Vibrations of Stay Cables of a Cable Stayed Bridge”, M.S. Thesis, Northern Illinois University, August 2010, directed by Abijith Gupta
5. Srihari Vannemreddi, “Numerical Modeling of Stay Cables and Stay Cable Bridges” , M.S. Thesis, Northern Illinois University, August 2010, directed by Abijith Gupta
6. Sharnie Earle, “Evaluation of Dynamic Load Allowance Factors for Reinforced Concrete Highway Bridges”, M.S. Thesis, Florida State University, April 2010, directed by Jerry Wekezer

Dr. Ronald F. Kulak served on the thesis committees for Rohan Patil, Francesco Lucas Fisher, Bharathi Vannemreddy, and Srihari Vannemreddi

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Energy Systems Division
Argonne National Laboratory
9700 South Cass Avenue, Bldg. 222
Argonne, IL 60439-4854

www.anl.gov

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