

Curriculum Vitae

C. TYLER DICK, Ph.D., P.E.

Assistant Professor
Department of Civil, Architectural and Environmental Engineering
University of Texas at Austin
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EDUCATION

Ph.D., Civil Engineering **2019**
University of Illinois at Urbana-Champaign

M.S., Civil Engineering **2001**
University of Illinois at Urbana-Champaign

B.Sc., Civil Engineering **1999**
University of Manitoba, Winnipeg, Manitoba, Canada

Doctoral Thesis

Influence of Traffic Complexity and Schedule Flexibility on Railway Classification Yard Capacity and Mainline Performance, University of Illinois at Urbana-Champaign, Urbana, Illinois. May 2019.

Master's Thesis

Factors Affecting the Frequency and Location of Broken Railway Rails and Broken Rail Derailments, University of Illinois at Urbana-Champaign, Urbana, Illinois. May 2001.

Undergraduate Thesis

Impact of New Railway Technology on Grain Transportation in Western Canada, University of Manitoba, Winnipeg, Manitoba, Canada. April 1999.

EMPLOYMENT

Assistant Professor **Aug 2022 – Present**
University of Texas at Austin, Austin, Texas

Research Associate Professor **April 2022 – Aug 2022**
Rail Transportation and Engineering Center (RailTEC),
University of Illinois at Urbana-Champaign, Urbana, Illinois

Lecturer and Principal Railway Research Engineer **Aug 2019 – April 2022**
RailTEC, University of Illinois at Urbana-Champaign, Urbana, Illinois
Member of the Graduate College since 2021

Senior Railway Research Engineer RailTEC, University of Illinois at Urbana-Champaign, Urbana, Illinois	June 2012 – Aug 2019
Senior Rail Engineer HDR Engineering, Fort Worth, Texas Design engineer in rail section of a national civil engineering consulting firm.	Dec 2004 - June 2012
Engineer-in-Training - Rail HDR Engineering, Fort Worth, Texas	Jun 2001 - Dec 2004
Graduate Research Assistant Railroad Engineering Program, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois	June 1999 - May 2001
Intern Projects Officer Transport Canada, Coordination & Grain Unit, Winnipeg, Manitoba, Canada	Summer 1998
Undergraduate Research Assistant University of Manitoba Transport Information Group, Winnipeg, MB, Canada	Summer 1998
Intern Engineering Aid Manitoba Hydro, AC Transmission Planning Department, Winnipeg, MB, Canada	Summer 1996 & Summer 1997

PROFESSIONAL REGISTRATION

1. Licensed Professional Engineer – State of Texas #94982, December 2004-present

PUBLICATIONS

Peer-Reviewed Journal Articles

38. **Dick, C.T.** 2022. Influence of traffic complexity on railway gravity hump classification yard performance and capacity. *Journal of Rail and Rapid Transit*. doi: 10.1177/09544097221127064.
37. Roscoe, G.S., and **C.T. Dick**. 2022. Evaluating fixed, virtual, and moving block control systems on a double track North American freight rail corridor. *International Journal of Transport Development and Integration*. 6(3): 271-282. doi: 10.2495/TDI-V6-N3-271-282.
36. Roscoe, G., and **C.T. Dick**. 2022. Comparing the efficiency and effectiveness of different train following control algorithms for fleets of heavy haul freight trains under moving blocks. *Transportation Research Record: Journal of the Transportation Research Board*. doi: 10.1177/03611981221099917.
35. Zhao, J., and **C.T. Dick**. 2022. Quantitative derailment rate comparison of unit trains at transload terminals and manifest trains at railroad switching and hump classification yards. *Transportation Research Record: Journal of the Transportation Research Board*. doi: 10.1177/03611981221099287.

34. Zhang, Z., C-Y Lin, X. Liu, Z. Bian, **C.T. Dick**, J. Zhao and S.W. Kirkpatrick. 2022. An empirical analysis of freight train derailment rates for unit trains and manifest trains. *Journal of Rail and Rapid Transit*. doi: 10.1177/09544097221080615.
33. Parkes, M.M., **C.T. Dick** and A. Diaz de Rivera. 2022. Effects of hazmat train speed restrictions on train delay performance and railroad line capacity: comparative study with two railway simulation tools. *Transportation Research Record: Journal of the Transportation Research Board*. 2676(1): 131-141. doi: 10.1177/03611981211036878.
32. **Dick, C.T.** 2021. Influence of mainline schedule flexibility and volume variability on railway classification yard performance. *Journal of Rail Transport Planning & Management*. 20: 100269. doi: 10.1016/j.jrtpm.2021.100269.
31. **Dick, C.T.**, J. Zhao, X. Liu and S.W. Kirkpatrick. 2021. Quantifying recent trends in Class 1 freight railroad train length and weight by train type. *Transportation Research Record: Journal of the Transportation Research Board*. 2675(12): 890-903. doi: 10.1177/03611981211031534.
30. **Dick, C.T.** 2021. Quantifying the relative influence of railway hump classification yard performance factors. *Journal of Transportation Engineering, Part A: Systems*. 147(8): 04021037. doi: 10.1061/JTEPBS.0000529.
29. **Dick, C.T.** 2021. Precision scheduled railroading and the need for improved estimates of yard capacity and performance considering traffic complexity. *Transportation Research Record: Journal of the Transportation Research Board*. 2675(10): 411-424. doi: 10.1177/03611981211011486.
28. Diaz de Rivera, A., **C.T. Dick** and M.M. Parkes. 2021. Balancing the service benefits and mainline delay disbenefits of operating shorter freight trains. *Transportation Research Record: Journal of the Transportation Research Board*. 2675(10): 303-316. doi: 10.1177/03611981211011484.
27. Diaz de Rivera, A., and **C.T. Dick**. 2021. Illustrating the implications of moving blocks on railway traffic flow behavior with fundamental diagrams. *Transportation Research Part C: Emerging Technologies*. 123: 102982. doi: 10.1016/j.trc.2021.102982.
26. Diaz de Rivera, A., **C.T. Dick** and L.E. Evans. 2020. Potential for moving blocks and train fleets to enable faster train meets on single-track rail corridors. *Journal of Transportation Engineering, Part A: Systems*. 146(8): 04020077. doi: 10.1061/JTEPBS.0000403.
25. Diaz de Rivera, A., **C.T. Dick** and L.E. Evans. 2020. Improving railway operational efficiency with moving blocks, train fleetings and alternative single-track configurations. *Transportation Research Record: Journal of the Transportation Research Board*. 2674(2): 146-157. doi: 10.1177/0361198120905842.
24. **Dick, C.T.**, P. Lautala and B.W. Schlake. 2019. STEM K-12 outreach as the root of transportation education: experiences from the railway engineering field. *Transportation Research Record: Journal of the Transportation Research Board*. 2673(12): 558-569. doi: 10.1177/0361198119841564.

23. **Dick, C.T.**, D. Mussanov, L.E. Evans, G.S. Roscoe and T-Y Chang. 2019. Relative capacity and performance of fixed and moving block control systems on North American freight railway lines and shared passenger corridors. *Transportation Research Record: Journal of the Transportation Research Board*. 2673(5): 250–261. doi: 10.1177/0361198119841852.
22. Liu, X. and **C.T. Dick**. 2019. Risk-based optimization of rail defect inspection frequency for petroleum crude oil transportation. *Transportation Research Record: Journal of the Transportation Research Board*. 2672(15): 27-35.
21. **Dick, C.T.**, D. Mussanov and N. Nishio. 2019. Transitioning from flexible to structured heavy haul operations to expand the capacity of single-track shared corridors in North America. *Journal of Rail and Rapid Transit*. 233(6): 629–639. doi: 10.1177/0954409718804427.
20. **Dick, C.T.**, I. Atanassov, F.B. Kippen and D. Mussanov. 2019. Relative train length and the infrastructure required to mitigate delays from operating combinations of normal and over-length freight trains on single-track railway lines in North America. *Journal of Rail and Rapid Transit*. 233(7): 731-742. doi: 10.1177/0954409718809204.
19. Lautala, P.T. and **C.T. Dick**. 2017. Railway Engineering Education Symposium: evolving to rebuild a growing rail academic community. *Transportation Research Record: Journal of the Transportation Research Board*. 2608: 96-104. doi: 10.3141/2608-11.
18. Pengelly, S. and **C.T. Dick**. 2017. Economics and planning of short haul and short line railway intermodal rail service: lessons from past and current operations. *Transportation Research Record: Journal of the Transportation Research Board*. 2608: 104-114. doi: 10.3141/2608-12.
17. Tang, H., **C.T. Dick**, B.M Caughron, X. Feng and C.P.L. Barkan. 2016. Model for optimal selection of projects to improve running time and operating cost efficiency on passenger rail corridors. *Transportation Research Record: Journal of the Transportation Research Board*. 2456: 33-42. doi: 10.3141/2546-05.
16. Liu, X. and **C.T. Dick**. 2016. Risk-based optimization of rail defect inspection frequency for petroleum crude oil transportation. *Transportation Research Record: Journal of the Transportation Research Board*. 2545: 27-35. doi: 10.3141/2545-04.
15. **Dick, C.T.** and D. Mussanov. 2016. Operational schedule flexibility and infrastructure investment: capacity trade-off on single-track railways. *Transportation Research Record: Journal of the Transportation Research Board*. 2546: 1-8. doi: 10.3141/2546-01.
14. Sogin, S.L., Y-C Lai, **C.T. Dick** and C.P.L. Barkan. 2015. Analyzing the transition from single- to double-track railway lines with nonlinear regression analysis. *Journal of Rail and Rapid Transit*. 230(8): 1877-1889. doi: 10.1177/0954409715616998.
13. Tang, H., **C.T. Dick** and X. Feng. 2015. A coordinated train control algorithm to improve regenerative energy receptivity in metro transit systems. *Transportation Research Record: Journal of the Transportation Research Board*. 2534: 48–56. doi: 10.3141/2534-07.

12. Shih, M.-C., **C.T. Dick** and C.P.L. Barkan. 2015. Impact of passenger train capacity and level of service on shared rail corridors with multiple types of freight trains. *Transportation Research Record: Journal of the Transportation Research Board*. 2475: 63-71. doi: 10.3141/2475-08.
11. Lovett, A.H., **C.T. Dick**, C.J. Ruppert, Jr. and C.P.L. Barkan. 2015. Cost and delay of railroad timber and concrete crosstie maintenance and replacement. *Transportation Research Record: Journal of the Transportation Research Board*. 2476: 37-44. doi: 10.3141/2476-06.
10. Fullerton, G.A, G.C. DiDomenico and **C.T. Dick**. 2015. Sensitivity of freight and passenger rail fuel efficiency to infrastructure, equipment and operating factors. *Transportation Research Record: Journal of the Transportation Research Board*. 2476: 59-66. doi: 10.3141/2476-09.
9. DiDomenico, G.C. and **C.T. Dick**. 2015. Methods of analyzing and comparing energy efficiency of passenger rail systems. *Transportation Research Record: Journal of the Transportation Research Board*. 2475: 54-62. doi: 10.3141/2475-07.
8. Atanassov, I. and **C.T. Dick**. 2015. Capacity of single-track railway lines with short sidings to support operation of long freight trains. *Transportation Research Record: Journal of the Transportation Research Board*. 2475: 95-101. doi: 10.3141/2475-12.
7. Shih, M.C., Y-C Lai, **C.T. Dick** and M-H Wu. 2014. Optimization of siding location for single-track lines. *Transportation Research Record: Journal of the Transportation Research Board*. 2448: 71-79. doi: 10.3141/2448-09.
6. Shih, M-C., **C.T. Dick**, S.L. Sogin and C.P.L. Barkan. 2014. Comparison of capacity expansion strategies for single-track railway lines with sparse sidings. *Transportation Research Record: Journal of the Transportation Research Board*. 2448: 53-61. doi: 10.3141/2448-07.
5. Liu, X., A. Lovett, **C.T. Dick**, M.R. Saat and C.P.L. Barkan. 2014. Optimization of rail defect inspection frequency for the improvement of railway transportation safety and efficiency. *Journal of Transportation Engineering*. 140(10). doi: 10.1061/(ASCE)TE.1943-5436.0000697.
4. Sogin, S., Y-C. Lai, **C.T. Dick** and C.P.L. Barkan. 2013. Comparison of capacity of single- and double-track rail lines. *Transportation Research Record: Journal of the Transportation Research Board*. 2374: 111-118. doi: 10.3141/2374-13.
3. **Dick, C.T.**, C.P.L. Barkan, E. Chapman and M.P. Stehly. 2003. Multivariate statistical model for predicting occurrence and location of broken rails. *Transportation Research Record: Journal of the Transportation Research Board*. 1825: 48-55. doi: 10.3141/1825-07.
2. Barkan, C.P.L., **C.T. Dick** and R. Anderson. 2003. Railroad derailment factors affecting hazardous materials transportation risk. *Transportation Research Record: Journal of the Transportation Research Board*. 1825: 64-74. doi: 10.3141/1825-09.
1. **Dick, C.T.** and A.M. Clayton. 2001. Impact of new railway technology on grain transportation in western Canada. *Transportation Research Record: Journal of the Transportation Research Board*. 1742: 45-53. doi: 10.3141/1742-06.

Peer-Reviewed Proceedings

61. Kang, D., J. Zhao, **C.T. Dick**, X. Liu, Z. Bian, S.W. Kirkpatrick and C-Y. Lin. 2022. Comparing the risk of rail transport of hazardous materials in unit trains versus manifest trains. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Denver, Colorado, August 2022.
60. Roscoe, G.S., and **C.T. Dick**. 2022. Evaluating the effectiveness of virtual and moving block control systems on a long and complex North American freight rail corridor. In: *Proceedings of the 13th World Congress on Railway Research*, Birmingham, UK, June 2022.
59. **Dick, C.T.**, and G.S. Roscoe. 2022. Comparing different train following control algorithms for platoons of freight trains operating with moving blocks. In: *Proceedings of the 13th World Congress on Railway Research*, Birmingham, UK, June 2022.
58. Roscoe, G.S., and **C.T. Dick**. 2021. Incremental free path heuristic algorithm for deadlock-free train dispatching on long complex North American rail corridors. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 9th International Conference on Railway Operations Modelling and Analysis*, Beijing, China, Virtual Event, November 2021.
57. Zhao, J., and **C.T. Dick**. 2021. Quantifying the influence of volume variability in railway hump classification yards with AnyLogic simulation. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 9th International Conference on Railway Operations Modelling and Analysis*, Beijing, China, Virtual Event, November 2021.
56. Chan, C-L., H. Yang, Y. Ouyang and **C.T. Dick**. 2021. Greedy time-order heuristic for deadlock-free train dispatching and simulation on single-track rail corridors. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 9th International Conference on Railway Operations Modelling and Analysis*, Beijing, China, Virtual Event, November 2021.
55. **Dick, C.T.**, G.S. Roscoe and F. Bedini Jacobini. 2021. Leveraging connected highway vehicle platooning technology to improve the efficiency and effectiveness of train fleeting under moving blocks. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Virtual Event, September 2021.
54. Evans, L.E., and **C.T. Dick**. 2020. Understanding influences on student pursuit of railway education and careers. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Virtual Event, September 2020.
53. Diaz de Rivera, A., **C.T. Dick** and M.M. Parkes. 2020. Using advanced PTC with moving blocks to improve the operational feasibility of short trains on single-track rail corridors. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Virtual Event, September 2020.
52. **Dick, C.T.** 2020. Quantifying the relative influence of classification yard performance factors. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Virtual Event, September 2020.

51. **Dick, C.T.** and N. Nishio. 2019. Influence of traffic complexity on railway gravity hump classification yard capacity. In: *Proceedings of the 12th World Congress on Railway Research*, Tokyo, Japan, October 2019.
50. Chang, T-Y., D. Mussanov and **C.T. Dick**. 2019. Simulating railcar transit times under different carload freight railway operating strategies. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 8th International Conference on Railway Operations Modelling and Analysis*, Norrkoping, Sweden, June 2019.
49. Chen, W.B., M.J. Pugh and **C.T. Dick**. 2019. Investigating highway-rail intermodal terminal capacity relationships via simulation. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 8th International Conference on Railway Operations Modelling and Analysis*, Norrkoping, Sweden, June 2019.
48. Diaz de Rivera, A., **C.T. Dick** and L.E. Evans. 2019. Train flow shockwaves on freight railways operating under moving block control systems. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 8th International Conference on Railway Operations Modelling and Analysis*, Norrkoping, Sweden, June 2019.
47. **Dick, C.T.** and N. Nishio. 2019. Influence of mainline schedule flexibility and volume variability on railway classification yard performance. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 8th International Conference on Railway Operations Modelling and Analysis*, Norrkoping, Sweden, June 2019.
46. Wang, Z., D. Mussanov and **C.T. Dick**. 2019. Scheduling and routing roaming conductors to support single-person crew operations on North American freight railways. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 8th International Conference on Railway Operations Modelling and Analysis*, Norrkoping, Sweden, June 2019.
45. **Dick, C.T.**, P. Lautala and B.W. Schlake. 2018. STEM outreach to K-12 students: the root of railway engineering education. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Chicago, Illinois, September 2018.
44. Sehitoglu, T., D. Mussanov and **C.T. Dick**. 2018. Operational schedule flexibility, train velocity and the performance reliability of single-track railways. In: *Proceedings of Transportation Research Board 97th Annual Conference*, Washington, DC, USA.
43. Lovett, A.H., **C.T. Dick** and C.P.L. Barkan. 2017. Predicting the occurrence and cost of temporary speed restrictions on North American freight lines. In: *Proceedings of the 11th International Heavy Haul Association Conference*, Cape Town, South Africa, September 2017.
42. Mussanov, D., N. Nishio and **C.T. Dick**. 2017. Building capacity through structured heavy haul operations on single-track shared corridors in North America. In: *Proceedings of the 11th International Heavy Haul Association Conference*, Cape Town, South Africa, September 2017.

41. Shih, M.-C., **C.T. Dick** and C.P.L. Barkan. 2017. A parametric model of the train delay distribution to improve planning of heavy haul cycle times. In: *Proceedings of the 11th International Heavy Haul Association Conference*, Cape Town, South Africa, September 2017.
40. Kippen, F.B., and **C.T. Dick**. 2017. Incremental capacity in transitioning from double to triple track on shared freight and commuter rail corridors in North America. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 7th International Conference on Railway Operations Modelling and Analysis*, Lille, France, April 2017.
39. Lovett, A.H., **C.T. Dick** and C.P.L. Barkan. 2017. Predicting the cost and operational impacts of slow orders on rail lines in North America. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 7th International Conference on Railway Operations Modelling and Analysis*, Lille, France, April 2017.
38. Mussanov, D., N. Nishio and **C.T. Dick**. 2017. Delay performance of different train types under combinations of structured and flexible operations on single-track railway lines in North America. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 7th International Conference on Railway Operations Modelling and Analysis*, Lille, France, April 2017.
37. Shih, M.-C., **C.T. Dick** and C.P.L. Barkan. 2017. A decision support screening tool for infrastructure capacity planning on single-track lines. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 7th International Conference on Railway Operations Modelling and Analysis*, Lille, France, April 2017.
36. Shih, M.-C., **C.T. Dick**, and C.P.L. Barkan. 2017. A parametric model of the train delay distribution based on traffic conflicts. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 7th International Conference on Railway Operations Modelling and Analysis*, Lille, France, April 2017.
35. **Dick, C.T.**, L. Sehgal, C.J. Ruppert Jr. and S. Gujuran. 2016. Superelevation optimization for mixed freight and higher-speed passenger trains. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Orlando, Florida, August 2016.
34. Lautala, P.T., **C.T. Dick**, D. Rizos and D.B. Clarke. 2015. Toward the next generation of railroad professionals – collaboration by NURail and rail industry. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Minneapolis, Minnesota, September 2015.
33. Shih, M.-C., **C.T. Dick** and Y.-C. Lai. 2015. Optimizing location and length of passing sidings on single-track lines for long heavy-haul freight trains. In: *Proceedings of the International Heavy Haul Association Conference*, Perth, Australia, June 2015.
32. Fullerton, G.A. and **C.T. Dick**. 2015. Operational considerations of transitioning to emerging ultra-low emission locomotive technologies for heavy-haul freight rail applications. In: *Proceedings of the International Heavy Haul Association Conference*, Perth, Australia, June 2015.

31. Atanassov, I. and **C.T. Dick**. 2015. Delay and required infrastructure investment to operate long freight trains on single-track railways with short sidings. In: *Proceedings of the International Heavy Haul Association Conference*, Perth, Australia, June 2015.
30. Tang, H., **C.T. Dick**, B.M. Caughron, X. Feng and C.P.L. Barkan. 2015. A project selection model for improving running time and operating cost efficiency on a passenger rail corridor. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
29. Tang, H., **C.T. Dick** and X. Feng. 2015. Optimization of train speed profiles for a metro transit system by genetic algorithms. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
28. Shih, M.-C., **C.T. Dick** and Y.-C. Lai. 2015. Optimization of siding location for single-track lines with non-uniform track speed. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
27. Lovett, A.H., **C.T. Dick** and C.P.L. Barkan. 2015. Determining freight train delay costs on railroad lines in North America. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
26. Fullerton, G., **C.T. Dick**, T. Hwang and Y. Ouyang. 2015. Exchange point delay and mode shift associated with regional deployment of alternative locomotive technology on the North American line-haul freight network. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
25. DiDomenico, G.C. and **C.T. Dick**. 2015. Influence of system characteristics and scheduling patterns on commuter rail energy efficiency. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
24. Atanassov, I. and **C.T. Dick**. 2015. Incremental capacity in transitioning from double to triple track on shared rail corridors. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 6th International Conference on Railway Operations Modelling and Analysis*, Tokyo, Japan, March 2015.
23. Atanassov, I. and **C.T. Dick**. 2015. Influence of siding connection length, position, and order on the incremental capacity of transitioning from single to double track. In: *Proceedings of Transportation Research Board 94th Annual Conference*, Washington, DC, January 2015.
22. **Dick, C.T.** and L.E. Brown. 2014. Design of bulk railway terminals for the shale oil and gas industry. In: *Proceedings of the 2014 ASCE Shale Energy Engineering Conference*, Pittsburgh, PA, July 2014.

21. Liu, X., **C.T. Dick** and M.R. Saat. 2014. Optimizing ultrasonic rail defect inspection to improve transportation safety and efficiency. In: *Proceedings of the Second ASCE Transportation and Development Institute Congress*, Orlando, FL, June 2014, pp. 765-774.
20. Tang, H., Q. Wang and **C.T. Dick**. 2014. Optimizing train speed profiles to improve regeneration efficiency of transit operations. In: *Proceedings of the 2014 Joint Rail Conference*, Colorado Springs, CO, 2014.
19. Fullerton, G., G.C. DiDomenico, M-C. Shih and **C.T. Dick**. 2014. Congestion as a source of variation in passenger and freight railway fuel efficiency. In: *Proceedings of the 2014 Joint Rail Conference*, Colorado Springs, CO, April 2014.
18. DiDomenico, G.C. and **C.T. Dick**. 2014. Analysis of trends in commuter rail energy efficiency. In: *Proceedings of the 2014 Joint Rail Conference*, Colorado Springs, CO, April 2014.
17. **Dick, C.T.** and J.R. Dirnberger. 2014. Advancing the science of yard design and operations with the CSX Hump Yard Simulation System. In: *Proceedings of the 2014 Joint Rail Conference*, Colorado Springs, CO, April 2014.
16. Atanassov, I., **C.T. Dick** and C.P.L. Barkan. 2014. Siding spacing and the incremental capacity of the transition from single to double track. In: *Proceedings of the 2014 Joint Rail Conference*, Colorado Springs, CO, April 2014.
15. Liu, X., **C.T. Dick**, M.R. Saat and C.P.L. Barkan. 2014. Optimization of rail defect inspection frequency to reduce railroad hazardous materials transportation risk. In: *Proceedings of Transportation Research Board 93rd Annual Conference*, Washington, DC, January 2014.
14. Lovett, A.H., M.R. Saat, **C.T. Dick**, C. Ruppert and C.P.L. Barkan. 2013. Development of an integrated railroad track maintenance model. In: *Proceedings of the 2013 World Congress on Railway Research*, Sydney, Australia, November 2013.
13. Chadwick, S.G., **C.T. Dick**, M.R. Saat and C.P.L. Barkan. 2013. Statistical modeling of freight train derailments at highway-rail level crossings. In: *Proceedings of the 2013 World Congress on Railway Research*, Sydney, Australia, November 2013.
12. Liu, X., **C.T. Dick**, A.H. Lovett, M.R. Saat and C.P.L. Barkan. 2013. Seasonal effect on the optimization of rail defect inspection frequency. In: *Proceedings of the ASME 2013 Rail Transportation Division Fall Technical Conference*, Altoona, PA, October 2013.
11. Lovett, A.H., C.P.L. Barkan and **C.T. Dick**. 2013. An integrated model for the evaluation and planning of railroad track maintenance. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Indianapolis, Indiana, September 2013.
10. Chadwick, S.G., M.R. Saat, **C.T. Dick** and C.P.L. Barkan. 2013. Decreasing derailment occurrence and severity at highway-rail grade crossings. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Indianapolis, Indiana, September 2013.

9. Caughron, B.M., **C. T. Dick** and C.P.L. Barkan. 2013. A project selection model for improving running time on passenger rail corridors. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Indianapolis, Indiana, September 2013.
8. Sogin, S., **C.T. Dick**, Y-C. Lai and C.P.L. Barkan. 2013. Analyzing the incremental transition from single to double track railway lines. In: *Proceedings of the International Association of Railway Operations Research (IAROR) 5th International Seminar on Railway Operations Modelling and Analysis*, Copenhagen, Denmark, May 2013.
7. Sogin, S., **C.T. Dick**, Y-C. Lai and C.P.L. Barkan. 2013. Analyzing the progression from single to double track networks. In: *Proceedings of the Joint Rail Conference*, Knoxville, TN, April 2013.
6. Lovett, A.H., **C.T. Dick**, C.J. Ruppert Jr., M.R. Saat and C.P.L. Barkan. 2013. Development of an integrated model for the evaluation and planning of railroad track maintenance. In: *Proceedings of the Joint Rail Conference*, Knoxville, TN, April 2013.
5. Lautala, P.T., **C.T. Dick**, J.L. McKinney and D.B. Clarke. 2013. Railway Engineering Education Symposium (REES) - Universities and industry collaborate to develop railway education. In: *Proceedings of the Joint Rail Conference*, Knoxville, TN, April 2013.
4. **Dick, C.T.** 2008. Alignment analysis and comparison techniques for small railroad projects in the 21st century. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Salt Lake City, Utah, September 2008.
3. **Dick, C.T.**, C.P.L. Barkan, E. Chapman and M.P. Stehly. 2002. Predicting the Occurrence of Broken Rails: A Quantitative Approach. In: *Proceedings of the American Railway Engineering and Maintenance-of-Way Association Annual Conference*, Washington DC, September 2002.
2. **Dick, C.T.**, C.P.L. Barkan, E. Chapman and M.P. Stehly. 2001. Analysis of factors affecting the location and frequency of broken rails. In: *Proceedings of the World Congress on Railway Research*, Cologne, Germany, 2001.
1. **Dick, C.T.** and C.P.L. Barkan. 2000. Railway digital base maps, location referencing systems and interoperability of Positive Train Control systems. In: *Proceedings of Transportation Research Board 79th Annual Conference*, Washington, DC, January 2000.

Reports

5. **Dick, C.T.**, D.B. Work, K. Zhang, B. Zou, G.S. Roscoe, P. Choobchian, Y. Wang and Y-C Hung. 2022. *Leveraging Connected Highway Vehicle Platooning Technology to Improve the Efficiency and Effectiveness of Train Fleeting Under Moving Blocks*. US Department of Transportation, Federal Railroad Administration, Final Report DOT/FRA/ORD-22/29. Washington, DC, USA.
4. **Dick, C.T.**, C.J. Ruppert Jr., L. Sehgal and S. Gujuran. 2019. *Mixed Freight and Higher-Speed Passenger Trains: Framework for Superelevation Design*. US Department of Transportation, Federal Railroad Administration, Final Report DOT/FRA/ORD-19/42. Washington, DC, USA.

3. **Dick, C.T.**, Y. Ouyang, and G. Fullerton. 2016. *Transitioning to a Zero or Near-Zero Emission Line-Haul Freight Rail System in California: Operational and Economic Considerations*. Final Report. State of California Air Resources Board. Sacramento, CA, USA.
2. English, G., **C.T. Dick** and J. Lawson. 2016. *Comparison of Passenger Rail Energy Consumption with Competing Modes*. National Cooperative Rail Research Program (NCRRP) Report #3. NCRRP Project No. 02-01. Transportation Research Board of the National Academies. Washington, DC, USA.
1. **Dick, C.T.**, M-C. Shih, Y. Ouyang, and K. Zaazaa. 2015. *Survey of Railroad Capacity Modeling and Service Design Tools*. US Department of Transportation, Federal Railroad Administration, Final Report DOT/FRA/ORD-XX/XX. Washington, DC, USA. (In Press).

Presentations and Invited Talks

53. "Intermodal Transfer Challenges in the Freight Rail Industry." ASCE International Conference on Transportation & Development, Seattle, WA, June 2022.
52. "Influence of Mainline Schedule Flexibility and Volume Variability on Railway Classification Yard Performance." INFORMS Conference, Virtual Event, November 2020.
51. "Network Efficiency Cycle: Quantifying Yard and Mainline Railway Capacity and Performance Connections." INFORMS Railway Applications Section International Webinar Speaker Series, Virtual Event, October 2020.
50. "Operational Aspects of Precision Scheduled Railroading (PSR)." Midwest Rail Conference, Virtual Event hosted by Michigan Technological University, August 2020.
49. "Optimizing Superelevation for Mixed Freight and Higher-Speed Passenger Trains." Transportation Research Board 99th Annual Conference, Washington, DC, January 2020.
48. "STEM Outreach to K-12 Students: The Root of Railway Engineering Education." National Railroad Construction and Maintenance Association 42nd Annual Conference, San Diego, CA, January 2020.
47. "Scheduling and Routing Roaming Conductors to Support Single-Person Crew Operations on North American Freight Railways." INFORMS Conference, Seattle, WA, October 2019.
46. "Investigating Highway-Rail Intermodal Terminal Capacity Relationships via Simulation." INFORMS Conference, Seattle, WA, October 2019.
45. "Influence of Mainline Schedule Flexibility and Volume Variability on Railway Classification Yard Performance." 2019 TRB Summerail Conference, St. Louis, MO, July 2019.
44. "Interaction Between Yard and Mainline Capacity in Railway Network Performance." INFORMS Conference, Phoenix, AZ, November 2018.
43. "Traffic Complexity and the Performance of Railway Classification Yards." INFORMS Conference, Phoenix, AZ, November 2018.

42. "Sustainable Yard Conversions Considering Operations and Engineering." American Railway Engineering and Maintenance-of-Way Association 2018 Annual Conference, Chicago, Illinois, September 2018.
41. "Influence of Traffic Complexity on Railway Hump Classification Yard Capacity." 2018 TRB Summerail Conference, Chattanooga, TN, August 2018.
40. "Operational Considerations in Transitioning to Alternative and Emerging Locomotive Technologies for Line-Haul Freight Rail Applications." Transportation Research Board 97th Annual Conference, Washington, DC, January 2018.
39. "Prediction of Arrival Times of Freight Traffic on US Railroads using Support vector Regression." Big Data in Railroad Maintenance Planning Conference, Newark, DE, December 2017.
38. "Markov Chain Modeling of Track Geometry Deterioration." Big Data in Railroad Maintenance Planning Conference, Newark, DE, December 2017.
37. "Investigating the Relationship Between Volume, Blocking Complexity And Railway Classification Yard Performance With Simulation." INFORMS Conference, Houston, TX, October 2017.
36. "Railway Operations Education at the University of Illinois at Urbana-Champaign." INFORMS Conference, Houston, TX, October 2017.
35. "Capacity of Single-Track Railway Lines with Short Sidings to Support Operation of Long Freight Trains." RTC Users Conference, Fort Worth, TX, August 2017.
34. "Operational Schedule Flexibility and the Performance of Single-Track Railways." Midwest Rail Conference, Kalamazoo, MI, August 2017.
33. "Introduction to Railway Capacity." 2017 Passenger Railway Engineering Education Symposium, Los Angeles, CA, July 2017.
32. "Introduction to Locomotives and Vehicles." 2017 Passenger Railway Engineering Education Symposium, Los Angeles, CA, July 2017.
31. "Introduction to Yards and Facilities." 2017 Passenger Railway Engineering Education Symposium, Los Angeles, CA, July 2017.
30. "Leveraging Big Data for Maintenance-of-Way and Safety." Rail Insights Conf., Chicago, IL, June 2017.
29. "Making Money by Design: The Business of Engineering Consultants through the Lens of Railroad Projects." University of Illinois at Urbana-Champaign AREMA Student Chapter General Meeting, Urbana, IL, January 2017.
28. "Data Driven Methods to Improve Train ETAs for Effective Track Maintenance Planning." Big Data in Railroad Maintenance Planning Conference, Newark, DE, December 2016.

27. "UAV-based Visual Data Analytics for Railway Inspection, Maintenance and Construction Performance Monitoring." Big Data in Railroad Maintenance Planning Conference, Newark, DE, December 2016.
26. "STEM: The Root of Railway Engineering Education." The Railway Academic Conference: 2016 Railway Engineering Education Symposium, Urbana, IL, July 2016.
25. "Track Geometry Tutorial." The Railway Academic Conference: 2016 Railway Engineering Education Symposium, Urbana, IL, July 2016.
24. "Introduction to Motive Power." The Railway Academic Conference: 2016 Railway Engineering Education Symposium, Urbana, IL, July 2016.
23. "Current State of Yard Engineering Design for the North American Railway Industry." KTH Marshalling Yard Workshop, Stockholm, Sweden, May 2016.
22. "Operational Schedule Flexibility and Infrastructure Investment: a Capacity Trade-off on Single Track Railways." Workshop on International Approaches to Capacity of Shared Freight and Passenger Rail Lines, Birmingham, UK, May 2016.
21. "University Research on UAVs for Construction Inspection and Possible Applications for Railway Inspection & Maintenance." Transportation Research Board 95th Annual Conference, Washington, DC, January 2016.
20. "Rail Transportation Engineering Big Data and Analytics at the University of Illinois at Urbana-Champaign." Big Data in Railroad Maintenance Planning Conference, Newark, DE, December 2015.
19. "Methods of Analyzing and Comparing the Energy Efficiency of Passenger Rail Systems to Competing Modes." 17th Railroad Environmental Conference, Urbana, IL, October 2015.
18. "Incremental Capacity Expansion of Single-Track Rail Lines for Multiple Types of Trains." 2015 TRB Summerail Conference, Urbana, IL, August 2015.
17. "Introduction to Railway Software." 2015 Passenger Railway Engineering Education Symposium, Philadelphia, PA, July 2015.
16. "Introduction to Railway Capacity." 2015 Passenger Railway Engineering Education Symposium, Philadelphia, PA, July 2015.
15. "Optimal Grade Crossing Project Selection for Improved Running Time on Passenger Rail Corridors." 2014 Global Level Crossing Safety & Trespass Prevention Symposium, Urbana, IL, August 2014.
14. "Introduction to Railway Capacity." 2014 Railway Engineering Education Symposium, Overland Park, KS, July 2014.
13. "Railway Alignment Design and Geometry." 2014 Railway Engineering Education Symposium, Overland Park, KS, July 2014.

12. "Springfield, Illinois Rail Improvements Project Minority Participation Plan." 2014 Joint Rail Conference, Colorado Springs, CO, April 2014.
11. "Cost of Railway Congestion." Transportation Research Board 93rd Annual Conference, Washington, DC, January 2014.
10. "Robustness and Reliability Concepts for Railway Operations." CSX Transportation Yard of the Future Workshop, Jacksonville, FL, August 2013.
9. "Current State of Yard Engineering Design for the North American Railroad Industry." CSX Transportation Yard of the Future Workshop, Jacksonville, FL, August 2013.
8. "The Business Side of Railroad Engineering Consultants." University of Illinois at Urbana-Champaign AREMA Student Chapter General Meeting, Urbana, IL, January 2013.
7. "Untangling the Texas Tarantula: Improvements at Fort Worth's Tower 55 Interlocking." RailTEC Seminar, Urbana, IL, December 2011.
6. "The End of the Remarkable Railway Engineering Renaissance?" HDR National Transportation Conference, Omaha, NE, March 2011.
5. "Railway Alignment Design and Geometry." 2010 Railway Engineering Education Symposium, Overland Park, KS, June 2010.
4. "Introduction to Rail Yard Design." CEE 411 Guest Lecture, University of Illinois at Urbana-Champaign, Urbana, IL, February 2009.
3. "Railroad Engineering for Highway Engineers, Highway Engineering for Railroad Engineers: Cross-Training the Future Design Community." HDR National Transportation Conf., Omaha, NE, June 2008.
2. "Route Selection and Design of a Coal Shuttle Railroad: Experiences of a Recent Railroad Engineering Graduate." University of Illinois W.W. Hay Railroad Engineering Seminar, Urbana, IL, February 2008.
1. "Industrial Rail Clients: Not to be Overlooked." HDR National Transportation Conference, Phoenix, AZ, July 2006.

RESEARCH**Research Activities at the University of Illinois Rail Transportation and Engineering Center (RailTEC)**

Successful proposals developed and led as PI or Co-PI

**New funding and projects selected but in contract negotiation shown in italics*

Year	Title	Sponsor	# PIs / Lead PI (if not Dick)	Funding (Total)	Funding (This PI)
2022- 2024*	<i>Rail Corridor Life-Cycle Assessment (LCA) Framework, Factors and Models</i>	<i>Federal Railroad Administration (FRA)</i>	1	\$167,500	\$167,500
2022- 2024*	<i>Transformative Rail Architecture to Decarbonize Freight</i>	<i>Dept. of Energy, Advanced Research Projects Agency– Energy (ARPA-E)</i>	1	\$245,000	\$245,000
2022	Study of Rail Corridor Traffic and Topography to Prioritize Battery Electric Locomotive Deployment	Wabtec Corporation	1	\$90,000	\$90,000
2022	Yard Derailment Rate Analysis for Rail Corridor Risk Management System (RCRMS) Updates	Association of American Railroads (AAR)	1	\$37,000	\$37,000
2021- 2022	ALTRIOS - Advanced Locomotive Technology and Rail Infrastructure Optimization System	Dept. of Energy, Advanced Research Projects Agency– Energy (ARPA-E)	3	\$949,545	\$315,000
2021- 2024	Expanding Summer Youth Programs in Rail through Virtual Learning and a National Campus Network	Federal Railroad Administration (FRA)	1	\$74,000	\$74,000
2021- 2022	Mainline and Terminal Capacity of Rail Operations with Self-Propelled Autonomous Railcars	Parallel Systems	1	\$20,000	\$20,000
2019- 2022	Risk Analysis Methodology for Hazardous Material Unit and Manifest Trains	Federal Railroad Administration (FRA)	2	\$175,000	\$175,000
2019- 2021	Leveraging Connected Highway Vehicle Platooning Technology to Improve the Efficiency and Effectiveness of Train Fleeting (Intelligent Railroad Systems BAA)	Federal Railroad Administration (FRA)	4	\$399,840	\$125,000

Year	Title	Sponsor	# PIs / Lead PI (if not Dick)	Funding (Total)	Funding (This PI)
2019-2020	Relative Capacity and Performance of Fixed and Moving Block Train Control Systems	NURail University Transportation Center (USDOT)	1	\$90,000	\$90,000
2019-2021	Guidebook for Railway-themed K-12 STEM Outreach Activities	National Railroad Construction and Maintenance Association	1	\$15,000	\$15,000
2019-2021	Guidebook for Railway-themed K-12 STEM Outreach Activities	NURail University Transportation Center (USDOT)	1	\$45,000	\$45,000
2018-2020	Capacity and Performance of Advanced Positive Train Control – Phase 2	Class 1 Railroad	3	\$373,000	\$200,000
2017-2018	Capacity and Performance of Advanced Positive Train Control – Phase 1	Class 1 Railroad	1	\$47,000	\$47,000
2017-2019	Machine Learning Prediction of Traction Motor Failures	CRRC China	2 / Work	\$200,000	\$100,000
2017-2019	Quantifying Intermodal Facility Capacity Factor Interactions through Simulation	NURail University Transportation Center (USDOT)	1	\$100,000	\$100,000
2017-2018	US Rail Transit and Intercity Passenger Rail Market Research	CRRC China	1	\$97,103	\$97,103
2016-2020	Blocking Capacity and Level of Service in Railway Hump Classification Yards	NURail University Transportation Center (USDOT)	1	\$100,000	\$100,000
2016-2018	Train Delay and Railway Line Capacity Under Combinations of Structured and Flexible Operations	NURail University Transportation Center (USDOT)	1	\$100,000	\$100,000
2015-2016	Mixed Freight and Higher-Speed Passenger Trains: Guidance on Superelevation for Railway Curves	Federal Railroad Administration (FRA)	2	\$100,000	\$75,000
2014-2015	Survey of Railroad Capacity Modeling and Service Design Tools	Federal Railroad Administration (FRA)	2	\$78,700	\$78,700
2014-2015	Factors Affecting Commuter Rail Energy Efficiency	NURail University Transportation Center (USDOT)	1	\$43,000	\$43,000

Year	Title	Sponsor	# PIs / Lead PI (if not Dick)	Funding (Total)	Funding (This PI)
2013- 2019	Hump Classification Yard Simulation System (HYSS) Research Support	CSX Transportation	1	\$2,700	\$2,700
2013- 2016	Capacity Evaluation and Infrastructure Planning Techniques for Operation of Freight and Higher-Speed Passenger Trains on Shared Railway Corridors	NURail University Transportation Center (USDOT)	1	\$122,000	\$122,000
2013- 2016	Railroad Decision Support Tools for Track Maintenance	NURail University Transportation Center (USDOT)	1	\$100,000	\$100,000
2013- 2015	Spacing and Length of Passing Sidings and the Incremental Capacity of Single Track Rail Lines	NURail University Transportation Center (USDOT)	1	\$82,000	\$82,000
2013- 2016	Comparison of Passenger Rail Energy Consumption and Emissions with Competing Modes	National Cooperative Railroad Research Program (NCRRP)	1	\$165,000	\$165,000
2013- 2016	Transitioning to a Near-Zero Emission Line-Haul Freight Rail System in California: Operational and Economic Considerations	California Air Resources Board	3	\$400,000	\$350,000
2012- Present	Effects of Passenger Train Operating Practices and Scheduling on Rail Line Capacity and Operating Efficiency	Association of American Railroads (AAR)	1	\$215,000	\$215,000
Total funding awarded to date:				\$4,220,888	\$2,963,503
<i>Total funding including awards in negotiation:</i>				<i>\$4,633,388</i>	<i>\$3,376,003</i>

Student Researchers Supervised or Co-Supervised at UIUC RailTEC (*degree awarded)*Ph.D. Students*

6. Steven Shi	2021-Present	(Research Supervisor, co-advised with C.P.L. Barkan)
5. Geordie Roscoe	2021-Present	(Research Supervisor, co-advised with C.P.L. Barkan)
4. Jiayi Zhao	2020-Present	(Research Supervisor, co-advised with C.P.L. Barkan)
3. Haichuan Tang	2013-2015*	(Research Supervisor, SWJTU Visiting Scholar)
2. Alexander Lovett	2013-2017*	(Research Supervisor, co-advised with C.P.L. Barkan)
1. Mei-Cheng Shih	2012-2017*	(Research Supervisor, co-advised with C.P.L. Barkan)

M.S. Students (Thesis)

5. Geordie Roscoe	2019-2021*	(Research Supervisor, co-advised with C.P.L. Barkan)
4. Ivan Atanassov	2013-2015*	(Research Supervisor, co-advised with C.P.L. Barkan)
3. Giovanni DiDomenico	2013-2015*	(Research Supervisor, co-advised with C.P.L. Barkan)
2. Samuel Sogin	2012-2013*	(Research Supervisor, co-advised with C.P.L. Barkan)
1. Brennan Caughron	2012-2013*	(Research Supervisor, co-advised with C.P.L. Barkan)

M.S. Students (Non-Thesis)

16. Shashank Muddana	2022-Present	(Research Supervisor)
15. Michael Copley	2022-Present	(Research Supervisor)
14. Matt Parkes	2022-Present	(Research Supervisor)
13. Lee Evans	2019-2020*	(Research Supervisor)
12. Jiayi Zhao	2019-2020*	(Research Supervisor)
11. Michael Pugh	2018-2019*	(Research Supervisor)
10. Adrian Diaz De Rivera	2018-2020*	(Research Supervisor)
9. James Chan	2018-2020*	(Research Supervisor)
8. Wesley Chen	2017-2019*	(Research Supervisor)
7. Stan Chang	2017-2019*	(Research Supervisor)
6. Zezhou Wang	2017-2018*	(Research Supervisor)
5. Darkhan Mussanov	2016-2018*	(Research Supervisor)
4. Nao Nishio	2016-2018*	(Research Supervisor)
3. Bradford Kippen III	2015-2016*	(Research Supervisor)
2. Garrett Fullerton	2013-2015*	(Research Supervisor)
1. Alexander Lovett	2012-2013*	(Research Supervisor)

Undergraduate Students

15. Thomas Stogin	2021-present
14. Jake Wagoner	2021-Present
13. Jiayi Zhao	2019*
12. Daniel Holmes	2018-2021*
11. Matt Parkes	2018-2021*
10. Nathan Jenni	2018-2019*
9. Lee Evans	2017-2019*
8. Geordie Roscoe	2017-2019*
7. Jacob Rajlich	2017*
6. Michael Pugh	2017-2018*
5. Sean Pengelly	2015-2017*
4. Darkhan Mussanov	2014-2016*

- 3. Nao Nishio 2013*
- 2. Ivan Atanassov 2012-2013*
- 1. Taskin Sehitoglu 2012-2017*

TEACHING

Courses Taught and Developed

University of Illinois at Urbana-Champaign

- 7. RailTEC Short Course: Railroad Project Design
 - Summer 2022 – Instructor (58 students)
 - Summer 2021 – Instructor (53 students)

- 6. Railroad Track Engineering (CEE 409)
 - Fall 2018 – Guest Instructor (38 students)

- 5. High-Speed Rail Planning (CEE 498HRP)
 - Fall 2016 – Co-Instructor (19 students)

- 4. RailTEC Short Course: Railway Engineering
 - Summer 2019 – Co-Instructor (22 students)
 - Summer 2018 – Co-Instructor (19 students)
 - Summer 2017 – Co-Instructor (17 students)
 - Summer 2016 – Co-Instructor (17 students)
 - Summer 2015 – Developed significant course content and Co-Instructor (9 students)

- 3. Railway Terminal Design and Operations (CEE 598RTD/CEE 511)
 - Fall 2020 – Instructor (23 students)
 - Fall 2017 – Primary Instructor (14 students)
 - Fall 2014 – Developed Course and Primary Instructor (23 students)

- 2. Railroad Project Design and Construction (CEE 411)
 - Spring 2022 – Instructor (25 students)
 - Spring 2021 – Instructor (16 students)
 - Spring 2020 – Instructor (20 students)
 - Spring 2019 – Co-Instructor (17 students)
 - Spring 2018 – Co-Instructor (19 students)
 - Spring 2017 – Co-Instructor (34 students)
 - Spring 2016 – Co-Instructor (33 students)
 - Spring 2015 – Co-Instructor (26 students)
 - Spring 2014 – Co-Instructor (42 students)
 - Spring 2013 – Developed significant lecture content and Co-Instructor (45 students)

- 1. Railroad Transportation Engineering (CEE 408)
 - Fall 2018 – Guest Instructor (34 students)
 - Fall 2016 – Guest Instructor (27 students)
 - Fall 2015 – Guest Instructor (37 students)
 - Fall 2014 – Guest Instructor (49 students)

Fall 2013 – Redeveloped Course and Co-Instructor (40 students)

Fall 2012 – Developed significant lecture content and Guest Instructor (45 students)

HDR Engineering

1. HDR Advanced Yard Design Course

Summer 2012 – Co-Instructor (10 students)

Summer 2011 – Developed significant course content and Co-Instructor (10 students)

SERVICE

Service to the Profession

8. Journal of Rail Transport Planning & Management

Associate Editor and Editorial Board Member, 2022-present

7. Rail Infrastructure and Vehicle Inspection Technology Conference (RIVIT)

Co-organizer, 2017

6. International Association of Railway Operations Research (IAROR)

Board Member, 2015-Present

Member, Scientific Advisory Committee, 10th International Conference on Railway Operations Modelling and Analysis, Belgrade, Serbia, April 2023 (in planning)

Member, Scientific Advisory Committee, 9th International Conference on Railway Operations Modelling and Analysis, Beijing, China, November 2021

Member, Scientific Advisory Committee, 8th International Conference on Railway Operations Modelling and Analysis, Norrkoping, Sweden, June 2019

Member, Scientific Advisory Committee, 7th International Conference on Railway Operations Modelling and Analysis, Lille, France, April 2017

5. INFORMS Railway Applications Section

Public Relations Officer, 2016

Problem Solving Competition Organizing Committee and Judge, 2014-Present

Session Co-Organizer, “Yard and Terminal Operations”, 2020 Annual Meeting

Session Co-Organizer, “Yard and Terminal Operations”, 2018 Annual Meeting

Session Co-Organizer, “Yard and Terminal Operations”, 2016 Annual Meeting

Session Co-Organizer, “Railway Applications of Big Data”, 2014 Annual Meeting

Session Co-Organizer, “University Rail Capacity Research”, 2013 Annual Meeting

4. Transportation Research Board (TRB)

Chair, Rail Capacity Joint Subcommittee (of AR040, AR030, AP070, AT010, AR010), 2017-Present

Member, Committee AR040 Freight Rail Transportation, 2018-Present

Member, Committee AR030 Railroad Operating Technologies, 2015-Present

Paper Review Coordinator, Committee AR030 Railroad Operating Technologies, 2016-Present

Research Coordinator, Committee AR030 Railroad Operating Technologies, 2016-2017

Session Organizer, Railway Capacity Hybrid Session, 2020 Annual Conference

Session Organizer, Railway Capacity Hybrid Session, 2019 Annual Conference

Session Organizer, Railway Capacity Hybrid Session, 2018 Annual Conference

Organizer, “Cost of Railway Congestion” Workshop, 2014 Annual Conference
Paper Reviewer, 2008-Present

3. American Railway Engineering and Maintenance-of-Way Association (AREMA)
Secretary, Committee 16 – Economics of Railway Engineering and Operations, 2020-Present
University of Illinois Student Chapter, Faculty Advisor, 2013-2022
Co-Project Manager, 2010 Railway Engineering Education Symposium
Contributor, Committee 14, Yards and Terminals, 2010-Present
Member, Committee 24 – Education and Training, 2009-Present
Member, Committee 16 – Economics of Railway Engineering and Operations, 2008-Present
2. American Society of Civil Engineers (ASCE)
Chair, T&DI Rail Committee, 2022-Present
Member, T&DI Rail Committee, 2008-Present
1. Institute of Transportation Engineers (ITE)
University of Illinois Student Chapter, Vice-President, 1999-2000
University of Illinois Student Chapter, Treasurer, 1999-2000

Memberships in Professional Associations

5. American Public Transportation Association, member, 2014-Present
4. International Association of Railway Operations Research, member, 2013-Present
3. INFORMS Railway Applications Section, member, 2012-Present
2. American Railway Engineering and Maintenance-of-Way Association, member, 2001-Present
1. American Society of Civil Engineers, member, 2001-Present

HONORS AND AWARDS

16. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railroad Project Design and Construction (CEE 411), Spring 2022.
15. Excellent rating on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railroad Project Design and Construction (CEE 411), Spring 2021.
14. Excellent rating on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railway Terminal Design & Operations (CEE 598 RTD), Fall 2020.
13. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railroad Project Design and Construction (CEE 411), Spring 2020.
12. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railroad Project Design and Construction (CEE 411), Spring 2019.
11. Paper selected in February 2019 for the *Transportation Research Record: Journal of the Transportation Research Board* special issue featuring the most cited TRB papers of 2016 and 2017.
10. Paper selected in March 2018 for *Journal of Rail and Rapid Transit* special issue featuring the best papers from the 2017 International Heavy Haul Association Conference in Cape Town, South Africa.
9. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railroad Project Design and Construction (CEE 411), Spring 2018.
8. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railway Terminal Design & Operations (CEE 598 RTD), Fall 2017.

7. Outstanding (Top 10%) on UIUC “List of Teachers Ranked as Excellent By Their Students” for Railway Terminal Design & Operations (CEE 598 RTD), Fall 2014.
6. Recognized as an HDR Professional Associate for technical expertise in the areas of railway alignment studies and classification yard design, 2009.
5. HDR Crystal Pathfinder Award (Team), BNSF East Africa Rail Study, 2010.
4. Natural Sciences and Engineering Research Council of Canada, Postgraduate Scholarship, 1999.
3. University of Manitoba, Lieutenant James Wallace Black Memorial Prize (Best Undergraduate Thesis in Civil Engineering), 1999.
2. University of Manitoba, Faculty of Engineering Medal in Civil Engineering (Graduation with highest standing in Department of Civil Engineering), 1999.
1. University of Manitoba, University Gold Medal (Graduation with highest standing in Faculty of Engineering), 1999.