MANIK BARMAN, PH. D., E.I.T.

Assistant Professor

Department of Civil Engineering; Swenson College of Science and Engineering University of Minnesota Duluth (UMD) 254 Sciv, 1405 University Drive, Duluth, MN 55812 Phone: 218 726-6437 (O); 412 370-7019 (M); Email: <u>mbarman@d.umn.edu, barmanmanik@gmail.com</u> Webpage: <u>https://sites.google.com/a/d.umn.edu/dr-manik-barman/home</u>

Career Highlights:

- Dr. Barman is one of the students' favorite instructors for infrastructure materials and pavement engineering related courses at UMD. Students appreciate Dr. Barman's active-learning-format teaching style; students' enrollment runs almost full, e.g., 28 students in pavement rehabilitation class in Spring 2017. He is presently advising 3 MS students and involved with the thesis committee of four other MS students from two different universities. In addition to a Post-Doctoral Associate and graduate students, presently four under-graduate students work in his research group. He advises 25 other undergraduate students as a part of the service to the college.
- His pavement engineering laboratory is capable of conducting cutting edge research on pavement materials; some of the major facilities are: a customized asphalt mixture performance tester (AMPT) for testing cylindrical and beams specimens at any temperature between -34°C and 60°C to characterize the thermal cracking, fatigue, and rutting resistance of asphalt mixtures; a dynamic shear rheometer for testing asphalt binder; facilities for testing post-crack and load transfer behaviors of cement concrete pavements and overlays.
- He conducts research on a range of pavement engineering problems emphasizing on design, materials and sustainability. His current externally funded research projects focus on: (i) establishing criteria for using structural fibers in concrete pavement and overlays, (ii) incorporating fibers' contribution in the concrete pavement and overlay design procedures, (iii) developing best practices manual for pot-hole patches, (iv) cost- and- performance effectiveness of crack sealing methods for asphalt pavements, (v) evaluating performance of high density asphalt mixes.
- In his first two years of service at UMD, he has secured more than \$0.5 M in external research funding from various agencies including Minnesota Department of Transportation, National Road Research Alliance (an alliance of six DOTs and a large number of associates from different parts of the country), St. Louis County, Mn, and American Engineering Testing, Inc.
- He has produced 14 peer-reviewed journal publications (5 more currently in review) and 15 conference papers in addition to several research reports, conference abstracts, presentations and invited talks.
- In past, Dr. Barman was involved with the development the design procedure for the bonded concrete overlay of asphalt pavement, BCOA-ME. This design procedure is currently a part of the latest Pavement ME design software.

EDUCATION

Ph.D. in Civil Engineering

University of Pittsburgh (Pitt), Pittsburgh, PA Dissertation: Joint Performance Characterization of Bonded Whitetopping Overlays Minor: Pavement and Geotechnical Engineering

M. Tech. in Civil Engineering2004Indian Institute of Technology (IIT) Kharagpur, IndiaThesis: Evaluation of Elastic Moduli of Pavement Layers using Falling Weight DeflectometerConcentration: Transportation Engineering

B. Tech. in Civil Engineering	2002
North Eastern Regional Institute of Science and Technology (NERIST), India	
Thesis: Modelling and Simulation of Dissolved Oxygen in Fast Moving Hilly River	

2014

EMPLOYMENTS	
Assistant Professor	08/15 to present
Department of Civil Engineering; Swenson College of Science and Engineering	
University of Minnesota Duluth (UMD)	
	08/01/16 -
Adjunct Assistant Professor	08/21/16
School of Civil Engineering and Environmental Science, The University of Oklahoma	
(OU), Norman, OK [Three weeks supper appointment]	
Research Fellow/ Senior Research Fellow	02/13-08/15
School of Civil Engineering and Environmental Science; Electrical and Computer	
Engineering, The University of Oklahoma (OU), Norman, OK	
Graduate Research Assistant/Teaching Assistant	09/08-01/13
Department of Civil and Environmental Engineering	07/00 01/13
University of Pittsburgh, Pittsburgh, PA	
Lecturer/ Assistant Professor	08/07- 8/08
Department of Civil Engineering	
Indian Institute of Technology (IIT) BHU, Varanasi, India	
Lecturer	05/04- 8/07
Department of Civil Engineering	
National Institute of Technology (NIT) Agartala, India	

RESEARCH EXPERIENCE / GRANTS

Role: Principal Investigator (PI)

1)	Title: Performance Benefits of Fiber-reinforced Concrete Pavement and Overlays
	Principal Investigator (PI): Manik Barman
	Co-principal Investigators (Co- PIs): None
	Sponsor: Pooled fund- DOTs of MN, WI, MI, IL, MO and CA through National Road
	Research Alliance (NRRA); Direct Select
	<i>Total budget:</i> \$149,999
	Start/End: 11-01-2017/10-31-2020

- Title: Cost/Benefit Analysis of the Effectiveness of Crack Sealing Techniques *Principal Investigator (PI)*: Manik Barman *Co-principal Investigators (Co-* PIs): None *Sponsor: LRRB,* Minnesota Department of Transportation (MnDOT) *Total budget:* \$108,504 *Start/End:* 07-01-2017/06-30-2019
- 3) *Title:* Comparison of Performances of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays *Principal Investigator (PI):* Manik Barman *Co-principal Investigators (Co-* PIs): None *Sponsor:* Minnesota Department of Transportation (MnDOT) *Total budget:* \$153,972 Start/End: 07-01-2016/05-31-2018

- 4) *Title:* Comprehensive Field Evaluation of Asphalt Patching Techniques and Development of Best Practices Manual and Simple Decision Tree *Principal Investigator (PI):* Manik Barman *Co-principal Investigators (Co-* PIs): Jay Dailey, Eshan Dave *Sponsor:* Minnesota Department of Transportation (MnDOT) *Total budget:* \$87,106 Start/End: 04-30-2014/06-30-2017
- 5) Title: Purchase of Asphalt Mixture Performance Tester (AMPT)/ Asphalt Standard Tester behavior of concrete Principal Investigator (PI): Manik Barman Co-principal Investigators (Co- PIs): None Sponsor: Office of the Vice President for Research, University of Minnesota Total budget: \$120,000 (University of Minnesota System - \$60,000; UMD's match - \$60,000) Start/End: 07-01-2016/06-30-2016
- 6) Title: Developing Civil Engineering Outreach Kits Targeting Early Elementary, Late Elementary, Middle, and High School Audiences Principal Investigator (PI): Manik Barman Co-principal Investigators (Co- PIs): Mary Christiansen, David Saftner, and Rebecca Teasley Sponsor: Office of the Vice President for Research, University of Minnesota Total budget: \$3,000 Start/End: 08-01-2016/08-31-2017
- 7) Title: Disc-Shaped Compact Tension Testing For Local Government/ Cracking Resistance of Asphalt Mixtures with and without Fiber Reinforcement Principal Investigator (PI): Manik Barman Co-principal Investigators (Co- PIs): None Sponsor: St. Louis County, Minnesota Total budget: \$6,587 Start/End: 02-29-2016/05-31-2016
- Title: Development of test setups for characterization of flexural strength and load transfer behavior of concrete Principal Investigator (PI): Manik Barman Co-principal Investigators (Co- PIs): None Sponsor: University of Minnesota Duluth Amount: \$3,000; Start/End: 01-15-2016/12-15-2016

Role: Co-PI

 Title: Experimental and Computational Investigations of High Density Asphalt Mixtures Principal Investigator (PI): Dr. Mihai Marasteanu, University of Minnesota Twin Cities Co-principal Investigators (Co- PIs): Manik Barman Sponsor: TRIG/LRRB, Minnesota Department of Transportation (MnDOT) Total budget: \$148,023; UMD share: \$10,000 Start/End: 07-01-2017/06-30-2019

- Title: Influence of Fiber Dosage on the Residual Strength Ratio of Fiber Reinforced Concrete Principal Investigator (PI): Dr. Mary Christiansen, University of Minnesota Duluth Co-principal Investigators (Co- PIs): Manik Barman Sponsor: American Engineering Testing (AET) Total budget: \$4,999; Start/End: 07-01-2017/09-30-2017
- Title: Development of Special Provision for Mix Design of Foamed-WMA Containing RAP PI: Musharraf Zaman Co-principal Investigators(Co- PIs): Rouzbeh Ghabchi and Manik Barman Sponsor: Southern Plain Transportation Center (SPTC) Total budget: \$79,917 Start/End: 01-04-2016/03-31-2017
- 4) *Title:* Recommended Fatigue Test for Oklahoma Department of Transportation *PI:* Musharraf Zaman *Co-principal Investigators(Co- PIs)*: Sesh Commuri, Dharamveer Singh and Manik Barman, *Sponsor:* Oklahoma Department of Transportation *Total budget:* \$533,347 *Start/End:* 10-01-2012 /10-31-/2016
- 5) Title: Development of Special Provisions for Intelligent Compaction of Stabilized Soil Subgrades Principal Investigator (PI): Sesh Communi Co-principal Investigators(Co- PIs): Musharraf Zaman and Manik Barman Sponsor: Oklahoma Department of Transportation, Volvo Construction Equipment and Haskell-Lemon Construction Company Total budget: \$193,898 Start/End: 10-01-2014/09-30-2016
- *Title:* Technology Transfer Support for Intelligent Compaction of Pavements *PI:* Sesh Commuri *Co-PIs:* Musharraf Zaman and **Manik Barman** *Sponsor:* Volvo Construction Equipment *Total budget:* \$119,960 *Start/End:* 01-01-2014/12-31-2014

Role: Lead Researcher

 Title: Evaluation of Performance of Asphalt Pavements Constructed using Intelligent Compaction Techniques *PI*: Sesh Commuri *Sponsor*: Oklahoma Department of Transportation *Start/End*: 10/01/2012 - 10/31/2014

Role: Researcher

 Title: Fatigue Performance of Asphalt Pavements Containing RAS and RAP PI: Musharraf Zaman Sponsor: Oklahoma Department of Transportation Start/End: 10/01/2012 - 12/31/2014

- Title: Pavement Evaluation using a Portable Lightweight Deflectometer PI: Sesh Commuri Sponsor: Oklahoma Transportation Center Start/End: 10-01-2011/06-30-2013
- Title: Continuous Real-Time Measurement of Quality During the Compaction of Subgrade Soils *Principal Investigator*: Sesh Commuri *Sponsor*: Oklahoma Transportation Center *Start/End*: 03-01-2010/07-31-2013

Role: Graduate Research Assistant

- Title: Development of Bonded Concrete Overlay of Asphalt Pavements Mechanistic-Empirical Design Guide (BCOA-ME)
 PI: Julie M. Vandenbossche Sponsor: Federal Highway Administration Pooled Fund study, MnDOT lead
- Title: Construction, Instrumentation and Data Analysis for three Different Composite Pavement Sections at the Minnesota Road Research facility (MnROAD) *PI*: Julie M. Vandenbossche Sponsor: Second Strategic Highway Research Program (SHRP2), Transportation Research Board
- Title: Sensitivity Analysis to Evaluate (Validate) the Models of the NCHRP 1-37A Mechanistic-Empirical Rigid Pavement Design Guide Procedure *PI*: Julie M. Vandenbossche Sponsor: Federal Highway Administration
- Title: Instrumentation of three Jointed Plain Concrete Pavement (JPCP) sections in Pennsylvania PI: Julie M. Vandenbossche Sponsor: Pennsylvania Department of Transportation (PennDOT)

PUBLICATIONS

Journal Papers

- 1. **Barman, M.** (*corresponding author*), Hansen, B., Burnham, T., and Masten, M. "*Post-Crack Performance of Structural Fiber Reinforced Concrete for Concrete Overlays*," Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, 2017, In Review.
- 2. Barman, M., Vandenbossche, J. M., and Janssen, D. "Small-Scale Test Method for Characterizing Joint/Crack Performance for Concrete Pavements," Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, 2017, In Review.
- 3. Arshadi, A., Ghabchi, R., Ali, S. A., Barman, M., Zaman, M., and Commuri, S. "Semi-Circular Bending (SCB) Test on Lab-Produced, Plant-Produced, and Field Warm Mix Asphalts," Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, 2017, In Review.
- 4. Imran, A., **Barman, M.**, Commuri, S., Zaman, M., and Nazari, M. "An Artificial Neural Network Based Intelligent Compaction Analyzer for Real-time Estimation of Subgrade Quality," International Journal of Geomechanics, ASCE, 2017. In Second Stage Review.

- Barman, M., Ghabchi, R., Singh, D., Zaman, M., Commuri, S. "Fatigue Performance Characterization of Asphalt Mixes Using Indirect Tension Test Data," Journal of Construction and Building Materials, Elsevier, 2017, In Review.
- Barman, M., Vandenbossche, J. M., and Li, Z. "Influence of Interface Bond on the Performance of Thin and Ultra-thin Concrete Overlays on Asphalt Pavement," Journal of Transportation Engineering, Part B: Pavements, ASCE, 2017, ISSN 2573-5438, DOI: 10.1061/JPEODX.0000010.
- Imran, S.A., Commuri, S., Barman, M., Zaman, M., and Beainy, F., "Modelling the Dynamics of Asphalt-Roller Interaction during Compaction," Journal of Construction Engineering and Management, ASCE, 2017, DOI: 10.1061/(ASCE)CO.1943-7862.0001293.
- 8. **Barman, M.** (*corresponding author*), Nazari, M., Imran, S.A., Commuri, S., Zaman, M., Beainy, F., and Singh, D.V. "*Quality Control of Subgrade Soil Using Intelligent Compaction*," Journal of Innovative Infrastructure Solutions, Springer, Innov. Infrastruct. Solut. 1:23, 2016. Published online.
- Ghabchi, R., Barman, M., Singh, D., Zaman, M., Mubaraki, M. L. "Comparison of Laboratory Performance of Asphalt Mixes Containing Different Proportions of RAP and RAS," Journal of Construction and Building Materials, Elsevier, 124, 2016. Pp. 343–351
- Barman, M. (corresponding author), Nazari, M., Imran, S.A., Commuri, S., Zaman, M. "Quality Improvement of Subgrade Using Intelligent Compaction," Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, No. 2579, Vol. 2, Washington, DC, 2016. pp. 59-69.
- 11. Sachs, G. S., Vandenbossche, J. M., Li, Z., and **Barman, M**. "Accounting for Temperature Susceptibility of Asphalt Stiffness when Designing Bonded Concrete Overlays of Asphalt (BCOA) Pavements," Journal of Transportation Engineering, ASCE, 2016. 10.1061/(ASCE)TE.1943-5436.0000861, 04016040.
- Imran, S.A., Barman, M. (corresponding author), Nazari, M., Commuri, S., Zaman, M. "Continuous Monitoring of Subgrade Stiffness during Compaction," Transportation Research Procedia, Elsevier, Vol. 17, 2016, pp 617-625.
- 13. Barman, M., Vandenbossche, J. M., Pandey, B. B. and Singh, D. V. "Current Design Concepts for Bonded Concrete Overlays of Asphalt Pavements," Journal of Indian Road Congress, India, 2015. In Review.
- Barman, M., Vandenbossche, J. M. and Li, Z. "Characterization of Load Transfer Behavior for Bonded Concrete Overlays of Asphalt," Transportation Research Record: Journal of the Transportation Research Board, No. 2524, Vol. 2, Transportation Research Board of the National Academies, Washington, DC, 2015, pp. 143-151.
- 15. Vandenbossche, J. M., **Barman, M.** and Nolan-Kremm, J. "Using Surface Texture Measurements of Crack Surface to Establish a Joint Spring Stiffness Representing the Shear Transfer Capacity," Transportation Research Record: Journal of the Transportation Research Board, No. 2441, Transportation Research Board of the National Academies, Washington, DC, 2014, pp. 13-19.
- 16. Vandenbossche, J. M. and Barman, M. "Bonded Whitetopping Overlay Design Considerations for Prevention of Reflection Cracking, Joint Sealing, and the use of Dowel Bars," Transportation Research Record: Journal of the Transportation Research Board, No. 1809, Transportation Research Board of the National Academies, Washington, DC, 2010, pp. 3-11.
- 17. Pal, M., Majumder, K., Barman M., and Sarkar, D. "Study of Strength, CBR, Resistivity and Conductivity of Soil-Jute mixture," August, 2010, Indian Highways, IRC, Vol. 38, pp. 53-62.

- Barman, M. and Pandey, B. B. "Backcalculation of Layer Moduli of Concrete Pavement by Falling Weight Deflectometer," Journal of the Indian Road Congress, IRC, Vol. 69, Part-3, New Delhi, India, 2009, pp. 205-211.
- 19. Barman, M. and Pandey, B. B. "A Simple Algorithm for Evaluation Rural Road using Falling Weight Deflectometer," Highway Research Bulletin, Indian Road Congress, IRC, Vol. 75, New Delhi, 2006, pp. 69-75.

Conference Papers

- Barman, M. (corresponding author), Ghabchi, R., Singh, D.V., Zaman, M., and Commuri, S., "A Novel Approach for Fatigue Performance Characterization of Asphalt Mixes Using Indirect Tension Test Data," Presented in the 96th Annual Meeting of Transportation Research Board. Transportation Research Board of the National Academies, Jan 8-12, 2017, Washington, DC.
- 2. Burnham, T. R., Huerta, S. B., and **Barman, M.**, "*Characterizing the Movement of Thin Concrete Overlay Panels Subject to Truck Loads*," Proceedings of 11th International Conference on Concrete Pavements, ISCP, August 28-31, 2016, San Antonio, TX.
- Barman, M., and Vandenbossche, J. M. "Effects of Bond on the Performance of Thin and Ultra-thin Concrete Overlays on Asphalt Pavement," Transportation Research Board of the National Academies, Presented in the 95th Annual Meeting of Transportation Research Board. Jan 10-14, 2016, Washington, DC.
- 4. **Barman, M.** (*corresponding author*), Ghabchi, R., Singh, D. V., Zaman, M., and Commuri, S. "A *Comparative Evaluation of Three Different Fatigue Test Methods for Asphalt Mixes*" Proceedings of the Third Conference of Transportation Research Board Group of India, December 17-20, 2015.
- Barman, M. (corresponding author), Imran, S.A., Nazari, M., Commuri, S. and Zaman, M. "Intelligent Compaction of Stabilized Subgrade of Flexible Pavement," International Foundations Congress and Equipment EXPO, IFCEE-2015, San Antonio, Texas. March 17-21, 2015, Published in the ASCE Geotechnical Special Publication No. 256, IFCEE 2015 © ASCE 2015, pp 2554-2566.
- Barman, M. (corresponding author), Ghabchi, R., Singh, D. V., Zaman, M., Commuri, S., and Hobson, K. "Evaluation of fatigue performance of asphalt mixes using Semi-Circular Bend and Four Point Beam Fatigue test methods," Computer Methods and Recent Advances in Geomechanics, Taylor and Francis Group, London, 2014, pp. 459- 464.
- Barman, M., Vandenbossche, J. M., Pandey, B. B. and Singh, D. V. "A Discussion on the Primary Distresses of Bonded Whitetopping to Recommend Improvements to the Indian Design Procedure," Proceedings of the 11th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries, TPMDC, IIT Bombay, India, December 10-12, 2014.
- 8. **Barman, M.** (*corresponding author*), Nazari, M., Imran, S.A., Commuri, S., Zaman, M., Beainy, F., and Singh, D.V. "Application of Intelligent Compaction Technique in Real-Time Evaluation of Compaction Level During Construction of Subgrade," Published in the 93rd Annual Meeting Compendium of Papers, Transportation Research Board, Washington DC, 2014.
- Barman, M., Vandenbossche, J. M., Li, Z., Adams, T., Ramirez, L., Strommen, R. and Palek, L. "Development of Innovative Techniques for Instrumentation of Composite Pavement Sections at MnROAD," Presented in the 91st Annual Meeting Compendium of Papers, Transportation Research Board, January, 2012. Washington DC.

- Vandenbossche, J. M., Barman, M., Li, Z. and Adams, T. S. "Development of Innovative Techniques for the Instrumentation of Composite and Wet on Wet Pavement Sections at MnROAD," Proceedings of the 10th International Conference on Concrete Pavements, ISCP, July 8-12, 2012, Quebec City, Canada.
- Pal, M., Majumdar, K., Barman, M., and Sarkar, D. "Study of CBR and Electrical Conductivity of Soil-Jute Mixture", International Conference on pavement Engineering, February 14 – 15, 2009 College of Engineering & Technology, Bhubaneswar PP 39-43.
- Barman, M. (corresponding author), Pal., M., Roy., R. B., and Biswas, H. "Application of GIS in Soil Characterization," Proc. of the International Conference on Civil Engineering in the New Millennium: Opportunities and Challenges" (CENeM-2007), 150th Year Anniversary Conference at Bengal Engineering and Science University, Shibpur, India, Vol. III, 2008, pp. 1426-1432.
- 13. Pal, M. and **Barman, M.** "Study of CBR of Soil Jute Mix and its application in Rural Road," Proc. of the National Conference and Exposition on Rural Roads, 22-24, May, 2007, Bigyan Bhawan, New Delhi, India, pp: 103-110.
- 14. Pal, M. and **Barman, M.** "*Prediction of Remaining Life of an Exiting Rotary Intersection: A case study*," National Conference on Application and Communication Technologies in Urban Infrastructure Planning and Management, Jaya Engineering College, Chennai, India, 2005, pp: 70-75
- Saha, S., Saha, A., Barman, M. (corresponding author), Sharma, R.P. and Pal, M. "Manufacturing of Bricks using Local Tilla Soil," NIRMAN, 7th Be-ennial General Conference, State Engineers Association, Tripura, India, 2006, pp: 20-28.

Conference Abstracts/ Podium- and Poster-Presentations

- 1. Barman, M., Butler, S., Pilz, J., and Hansen, B. "Use of Fibers, Reclaimed Asphalt Pavement and Taconite in Asphalt Mixtures for Cold Climate Regions" 2017 TRB Summer Workshop Duluth, Minnesota, July 18-21, 2017.
- 2. **Barman, M.** *"Research in Civil Engineering: Implementation and Collaboration, "Tripura Institute of Technology (TIT), Agartala, India, July 4, 2016. Invited Speaker.*
- 3. **Barman, M.** *"Research in Pavement Engineering: Implementation and Collaboration,"* Indian Institute of Technology Roorkee, Roorkee, India, June 2, 2016. Invited Speaker.
- 4. **Barman, M.** (Author & Presenter). "Cost/Benefit Analysis of the Effectiveness of Crack Sealing Techniques," LRRB Meeting, Minnesota Department of Transportation, St. Paul, Minnesota. (December 2016).
- 5. **Barman, M.**, and Vandenbossche, J. M. "*Effects of Bond on the Performance of Thin and Ultra-thin Concrete Overlays on Asphalt Pavement*," 95th Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, Jan 10-14, 2016. Podium presentation.
- Ghabchi, R., Barman, M., Singh, D., Zaman, M., Mubaraki, M. L. "Comparison of Laboratory Performance of Asphalt Mixes Containing Different Proportions of RAP and RAS," 95th Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, Jan 10-14, 2016. Poster presentation.
- 7. Barman, M., Vandenbossche, J., and Janssen, D. J. "Development of a Beam Test for Characterizing Load Transfer," AFD 70- Pavement Rehabilitation Committee meeting. 95th Annual Meeting of the

Transportation Research Board of the National Academies, Washington, DC, Jan 10-14, 2016. Podium presentation.

- 8. **Barman, M.** "Performance Comparison of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays," MnDOT's LRRB Research Meeting, MnDOT, December 10, Minneapolis, MN, 2015. Podium presentation.
- 9. Barman, M. "Performance Comparison of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays," MnDOT's TRIG Research Meeting, MnDOT, December 3, Shoreview, MN, 2015. Podium presentation.
- 10. Barman, M. "A Small-Scale Test Method for Joint Load Transfer Behavior of Concrete Pavements and Whitetoppings," Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, December 2, Duluth, MN, 2015. Podium presentation. (Invited).
- 11. **Barman, M.** "Intelligent Compaction of Pavement Subgrade and Asphalt Layers," Department of Civil Engineering, University of Minnesota Duluth, October 9, Duluth, MN, 2015. Podium presentation. (Invited).
- 12. Barman, M., Singh, D. V., Ghabchi., R., Zaman, M., and Commuri, S. "Fatigue Characterization of Asphalt Mixes using Test Methods with Monotonic Loading," Airfield and -Highway Pavement Conference, June 7-10, 2015, Miami, FL. Abstract accepted.
- 13. **Barman, M.** and Vandenbossche, J. M. "An Investigation of the Seasonal Changes in Load Transfer Efficiency with Changes in Crack Width for Whitetopping," Airfield and -Highway Pavement Conference, June 7-10, 2015, Miami, FL. Abstract accepted.
- 14. Zaman, M., Ghabchi, R., and **Barman, M.**, "*Fatigue Performance of Asphalt Pavements Containing RAS and RAP*," Oklahoma Department of Transportation, OK. March, 12, 2015. Podium presentation.
- 15. Barman, M., Vandenbossche, J. M. and Li, Z. "Characterization of Load Transfer Behavior for Bonded Concrete Overlays of Asphalt," 94th Annual Meeting of the Transportation Research Board of the National Academies, Washington, DC, January 11-15, 2015, Podium presentation.
- 16. **Barman, M.** "Intelligent Compaction of Stabilized Subgrade," AFS 10- Transportation Earthwork Committee meeting, 94th Annual Meeting of the Transportation Research Board of the National Academies, January 11-15, 2015, Washington DC. Podium presentation.
- 17. **Barman, M.** "Application of the Oklahoma University Developed Intelligent Compaction Analyzer in Evaluating the Compaction Level of Subgrade and Asphalt Layers During Compaction," Young Professional Events, 94th Annual Meeting of the Transportation Research Board, January 11-15, 2015, Washington DC. Podium presentation.
- Barman, M., Ghabchi, R., Singh, D.V., Zaman, M. and Commuri, S. "A Comparative Evaluation of Different Fatigue Testing Methods for Asphalt Mixes," Oklahoma Transportation Research Day, Oklahoma City, OK, October 21, 2014. Poster Presentation.
- 19. Nazari, M., Barman, M., Imran, S. A., Zaman, M., Commuri, S. "*Estimation of Stabilized Subgrade Moduli Using the Intelligent Compaction Analyzer*," Oklahoma Transportation Research Day, Oklahoma City, OK, October 21, 2014. Poster Presentation.
- Ghabchi, R., Barman, M., Singh, D. V., and Zaman, M. "Fatigue Performance of Asphalt Pavements Containing RAS and RAP," Oklahoma Transportation Research Day, Oklahoma City, OK, October 21, 2014. Poster Presentation. (Won First Prize)

- 21. Imran, S.A., Barman, M., Nazari, M., Commuri, S., Zaman, M. "Application of Intelligent Asphalt Compaction Analyzer (IACA) in Improving the Compaction Quality of Asphalt Pavement," 89th Annual Meeting, Association of Asphalt Paving Technology, Atlanta, GA, March 16-19, 2014. Poster presented.
- 22. **Barman, M.** "*Effect of Structural Fibers on Joint Performance in Bonded Concrete Overlays*," AFD 70- Pavement Rehabilitation Standing Committee Meeting, 93rd Annual Meeting of the Transportation Research Board, Washington DC. January 12-16, 2014. Podium Presentation.
- Nazari, M., Imran, S.A., Barman, M., Singh, D. V., Commuri, S., and Zaman, M. "Characterization of Resilient Modulus for Chemically Stabilized Pavement Subgrade," GPiS 2013, Oklahoma University, Oklahoma, Norman OK, April 05, 2013. Poster presented.
- 24. Nazari, M., **Barman, M.**, Imran, S.A., Commuri, S., and Zaman, M. "Application of ICA in Real Time Evaluation of Stiffness during the Compaction of Stabilized Subgrade," ODOT-OTC Research Day, Department of Transportation, Oklahoma, September 12, 2013. Poster presentation.
- 25. Barman, M., Ghabchi, R., Singh, D.V., Zaman, M. and Commuri, S. "Evaluation of Fatigue Performance Testing Procedures using Virgin and Reclaimed Asphalt Mixes," ODOT-OTC Research Day, Department of Transportation, Oklahoma, September 12, 2013. Poster presentation.
- 26. **Barman, M.** and Vandenbossche, J. M. "*Temperature Dependent HMA modulus in Whitetopping Design Procedure*," 10th International Conference on Concrete Pavements, ISCP, July 8-12, 2012, Quebec City, Canada. Poster presentation.
- 27. Vandenbossche, J. M., **Barman, M.**, Dufalla, N., Li, Z. and Mu, F. "*Pitt Bonded Concrete Over Asphalt Design Procedure*," American Concrete Paving Association Chapter/State Mid-year Meeting, Kansas City, MO, May 2012. Podium presentation.
- 28. Vandenbossche, J. M., Barman, M., Dufalla, N., Li, Z. and Mu, F. "*Pitt Bonded Concrete Over Asphalt Design Procedure*," National Concrete Consortium, Oklahoma City, OK, April 2012.
- 29. Vandenbossche, J. M., **Barman, M.**, Dufalla, N., Li, Z. and Mu, F. "21st Century Whitetopping *Thickness Design*," 51st Annual Concrete Paving Workshop, Mankato MN, March 2012.

Research Reports

- 1. Dailey, J., Dave, E., **Barman, M.** and Kostick, R. D. "Comprehensive Field Evaluation of Asphalt Patching Methods and Development of Simple Decision Trees and a Best Practices Manual: Final Report" Maplewood, MN: Minnesota Department of Transportation, 2017.
- 2. Hansen, B., and **Barman, M.** "Comparison of Performances of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays: Task 3 Report- Flexural Performance of Fiber Reinforced Concrete" Maplewood, MN: Minnesota Department of Transportation, 2017.
- 3. Rahman, T. U., **Barman, M.**, and Hansen, B. "Comparison of Performances of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays: Task 2 Report-Establishment of test setups and test procedures," Maplewood, MN: Minnesota Department of Transportation, 2017.
- 4. Hansen, B., **Barman, M.**, and Rahman, T. U. "Comparison of Performances of Structural Fibers and Development of a Specification for using Structural Fibers in Thin Concrete Overlays: Task 1 Report-Literature Review," Maplewood, MN: Minnesota Department of Transportation, 2016.

- 5. Barman, M., Hansen, B., & Dailey, J. "Disc-Shaped Compact Tension Testing For Local Government (Final Report)," Duluth: St. Louis County, Duluth, MN, 2016.
- 6. **Barman, M.**, Arshadi, A., Ghabchi, R., Zaman, M., Singh, D., & Commuri, S. Recommended Fatigue Test for Oklahoma Department of Transportation (Final Report). Oklahoma City, OK: Oklahoma Department of Transportation, 2016.
- 7. **Barman, M.**, Ghabchi, R., Singh, D. V, Arshadi, A., Zaman, M., and Commuri, S. *"Recommended Fatigue Test for Oklahoma Department of Transportation,"* 3rd Year Annual Report for the Project ODOT SP&R Item #2243, submitted to Oklahoma Department of Transportation, Oklahoma City, USA, October, 2015.
- Ghabchi, R., Zaman, M., Barman, M., Singh, D. Boeck, D. L. "Fatigue Performance of Asphalt Pavements Containing RAS and RAP," Oklahoma Department of Transportation Materials & Research Division, ODOT SPR Item Number 2245, FINAL REPORT ~ FHWA-OK-15-01, Oklahoma City, OK, 2015.
- Commuri, S., Zaman, M., Barman, M., Nazari, M., Imran, S.A., Beainy, F. "Evaluation of Performance of Asphalt Pavements Constructed using Intelligent Compaction Techniques," Final Report for the Project ODOT SP&R Item #2246, submitted to Oklahoma Department of Transportation, Oklahoma City, USA, December, 2014.
- Zaman, M., Commuri, S., Barman, M., Ghabchi, R., and Singh, D.V. "Recommended Fatigue Test for Oklahoma Department of Transportation," 2nd Year Annual Report for the Project ODOT SP&R Item #2243, submitted to Oklahoma Department of Transportation, Oklahoma City, USA, October, 2014.
- 11. Commuri, S., Zaman, M., Barman, M., Nazari, M., Imran, S.A., Beainy, F., Singh, D.V. "*Real-time measurement of quality during the compaction of subgrade soils*," Final Report for the Project OTCREOS10.1-11-F, submitted to the Oklahoma Transportation Center, July, 2013.
- Commuri, S., Zaman, M., Beainy, F., Singh, D.V., Nazari, M., Imran, S.A., Barman, M. "Pavement Evaluation Using a Portable Lightweight Deflectometer," Final Report for the Project OTCREOS11.1-14-F, submitted to the Oklahoma Transportation Center, June, 2013.
- Commuri, S., Zaman, M., Barman, M., Nazari, M., Imran, S.A., Beainy, F. "Evaluation of Performance of Asphalt Pavements Constructed using Intelligent Compaction Techniques," First Year Annual Report for the Project ODOT SP&R Item #2246, submitted to Oklahoma Department of Transportation, Oklahoma City, October 2013.
- Commuri, S., Zaman, M., Barman, M., Nazari, M., Imran, S.A., Beainy, F. "Continuous Real-Time Measurement of Pavement Quality during Construction," submitted to Volvo Construction Equipment, Shippensburg, PA, December, 2013.
- 15. Zaman, M., Commuri, S., Barman, M., Ghabchi, R., and Singh, D.V. "Recommended Fatigue Test for Oklahoma Department of Transportation," 1st Year Annual Report for Project ODOT SP&R Item #2243, submitted to Oklahoma Department of Transportation, Oklahoma City, October 2013.
- 16. Adams, T., Barman, M., Geary, M., Li, Z., Mu, F., Nassiri, S., Vandenbossche, J. M. "Instrumentation of three Composite Pavements at MnROAD," Prepared for SHRP 2 R21, University of Pittsburgh, Pittsburgh, PA, 2011.
- 17. Barman, M., Dufalla, N., Li, Z., Mu, F. and Vandenbossche, J. M. "Development of a Rational Mechanistic-Empirical Based Design Guide for Thin and Ultra-Thin Whitetopping. Task 4 Report: Climatic Considerations," FHWA Pooled Fund Study TPF 5-65, Report submitted to MnDOT, 2011.

- Barman, M., Vandenbossche, J. M., Mu, F. and Gatti, K. "Development of a Rational Mechanistic-Empirical Based Design Guide for Thin and Ultra-Thin Whitetopping. Task 1 Report: Compilation and Review of Existing Data and Information," FHWA Pooled Fund Study TPF 5-65, Report submitted to MnDOT, 2010.
- Vandenbossche, J. M., Mu, F., Ramirez, L. R., Barman, M., Nassiri, S. and Gatti, K. "Evaluation of the NCHRP 1-37A Mechanistic-Empirical Rigid Pavement Design Guide Procedure, Task 5: Prepare and Execute a Sensitivity Analysis to Evaluate (Validate) the Models," FHWA Project DTFH61-05-P-00094, Report submitted to FHWA, 2008.
- 20. Mu, F., Vandenbossche, J, Nassiri, S., **Barman, M.**, Ramirez, L.C., and Gatti, K.A. "*Prepare and Execute Analysis to Evaluate the MEPDG Models*," Tasks 4 & 5 Reports for Federal Highway Administration (FHWA), FHWA Project DTFH61-05-P-00094, FHWA Project DTFH61-05-P-00094, Report submitted to FHWA, 2009.
- 21. Barman, M., Sharma, R. P. and Pal, M. "Investigation for Application of Locally available Laterite Soil in Manufacturing of Bricks," Final Report, submitted to the Pollution control Board, Govt. of Tripura, Agartala, India, 2007.

TEACHING EXPERIENCE

Course Developer and Instructor (through active learning), UMD

- CE4318/CE5318: Pavement Repair, Maintenance, Preservation and Management Systems (Pavement Rehabilitation) [Fall 2015: Enrolment – 16; Spring 2017: Enrolment - 28]
- CE4316/CE5316: Pavement Analysis and Design [Spring 2016: Enrolment 20; Fall 2016: Enrolment – 21]
- CE3027: Infrastructure Materials [Fall 2016: Enrolment 30, Spring 2017: Enrolment 23]

Teaching Assistant, Pitt

- Pavement Design and Analysis
- o Pavement Maintenance and Rehabilitation
- o Components, Properties and Design of Portland Cement Concrete

Instructor, IIT BHU, India

- o Advanced Transportation Engineering
- Pavement Evaluation, Rehabilitation and Maintenance
- o Survey Laboratory

Instructor, NIT Agartala, India

- o Numerical Methods and Computer Programming
- Strength of Materials
- Pavement Engineering
- Transportation Engineering and Soil Mechanics Laboratory
- Survey Laboratory

Teaching related grants

Title: Developing Civil Engineering Outreach Kits Targeting Early Elementary, Late Elementary, Middle, and High School Audiences

PI: Manik Barman

Co-principal Investigators (Co- PIs): Dave Saftner, Mary Christiansen, Rebecca Teasley and, *Sponsor:* University of Minnesota Duluth, Chancellor's Small Grants *Total budget:* \$3,000 *Start/End:* 08-29-2016/04-28-2017 [Instruction/Active]

Advising

Master Degree

- o Jared Much, Civil Engineering, MS., UMD; Thesis advisor and committee chair (2017 present)*
- Md. Towhid Ur Rahman, Civil Engineering M S., UMD; Thesis advisor and committee chair (2016 2017, terminated)*
- Miranda Anderson, Civil Engineering MS, UMD. Thesis committee chair (2015 2017, completed).
- o Bryce Hansen, Civil Engineering MS, UMD. Thesis advisor and committee chair (2016 present)*
- Harry Rodin III, Civil Engineering MS, Washington State University, Pullman, WA, Thesis committee member (2017-present)
- Rudrakshi Biswas, Civil Engineering MS, UMD. Thesis committee member (2015 2017, completed).
- Chelsea Hoplin, Civil Engineering MS, UMD. Thesis committee member (2015 2016, completed).

Under-graduate Research Assistant

- Jake Pilz, (2016 2017, completed)*
- Sam Butler, (2016 completed)*
- Noah Tapper (2017 Present)*
- Lucas Kari (2017 Present)*
- Taylor Brennecke (2017 Present).
- * Works in my externally funded projects

Under-graduate student advisee

25 civil engineering undergrad students

SERVICE TO UNIVERSITY/COLLEGE/DEPARTMENT/ COMMUNITY

UMD

- Member, Curriculum committee, Swenson College of Science and Engineering, UMD (Aug 2017present)
- o Chair, Laboratory Committee, Department of Civil Engineering. (August 2016 Present).
- o <u>Council Member</u>, University Employees of Color. (November 2015 Present).
- Reviewer, UROP project proposals.

Public/External/Community

- o Judge, NE MN Regional Science Fair, February 7, 2016.
- o Judge, ASCE Bridge competition, February 28, 2016.
- Team lead for Edible asphalt outreach activity, March 30, 2017

SERVICE TO THE DISCIPLINE/PROFESSION

- Scientific Committee Member, GeoMEast 2017 International Congress, Sharm El-Sheikh, Egypt. (July 22, 2016 - July 20, 2017).
- *Editor/ Session Chair*, GeoChina 2018 at Zhejiang University, HangZhou, China. (May 6, 2016 July 31, 2018).
- Associate Member, National Road Research Alliance (NRRA), Minnesota, United States. (July 1, 2016 June 30, 2019).
- *Member*, Transportation Research Record, Standing Committee on Transportation Earthworks (AFD50), Washington, D.C., USA. (April 2017 March 2019).
- *Young member*, Transportation Research Record, Standing Committee on Transportation Earthworks (AFD70), Washington, D.C., USA. (April 2015 March 2017).
- *Young member*, Transportation Research Record, Standing Committee on Pavement Rehabilitation Committee (AFD70), Washington, D.C., USA. (April 2011 March 2017).

AWARDS AND HONORS

- Complimentary registration for presenting student poster, 10th International Conference on Concrete Pavements being held July 8-12, 2012 in Quebec City, Quebec, Canada.
- Indian Road Congress Commendation Certificate for the Year 2009. Paper No.545 "Backcalculation of Layer Moduli of Concrete Pavement by Falling Weight Deflectometer" (Only two research papers were awarded in 2009). <u>http://irc.org.in/ENU/knowledge/Pages/Awards-details.aspx?AwardType=Commendation%20Certificate</u>
- Sir J. C. Bose Award (Young Researcher of the state for the year 2006-2007) for the Project, *"Investigation for Application of Locally available Laterite Soil in Manufacturing of Bricks."* Department of Science and Technology, Govt. of Tripura, India. <u>http://www.tscst.nic.in/Awardee-1</u>
- Gate Fellowship during M. Tech, Ministry of Human Resource Department, Govt. of India, 2002-2004.
- Innovation Potential of Students Projects 2002 at Bachelor level (**National Award**) for the B. Tech Thesis Project, "*Modelling and Simulation of Dissolved Oxygen in fast moving Hilly River*." Indian National Academy of Engineers, INAE.

PROFESSIONAL MEMBERSHIPS

- o Engineer in Training, National Council of Examiners for Engineering and Surveying (NCEES)
- o Member, International Society for Concrete Pavements, Inc. (ISCP)
- o Associate Member, American Society of Civil Engineers (ASCE)
- *Member*, American Concrete Institute (ACI)
- *Member,* American Concrete Pavement Association (ACPA)
- Life Member, Indian Road Congress (IRC), India
- Member, Institution of Engineers (IEI), India

RESEARCH PAPER/GRANT REVIEW

Research papers

- International Journal of Pavement Engineering, Taylor and Francis
- Innovative Infrastructure Solutions, Springer
- Construction and Building Materials, Elsevier
- Transportation Research Record, Journal of the Transportation Research Board
- 11th International Conference on Concrete Pavements, International Society of Concrete Pavement (ISCP), August 28-31, 2016, San Antonio, TX
- 11th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries, TPMDC, IIT Bombay, India, December 10-12, 2014
- 3rd Conference of Transportation Research Group of India (CTRG), Kolkata, India, December 17-20, 2015

Research grants

- Southern Plain Transportation Center (SPTC)
- UROP projects, UMD

LEADERSHIP ROLE DURING STUDENT LIFE

- *Executive Board Member*, Engineering Graduate Student Organization, University of Pittsburgh, 2011-2012, (Represented ~150 Graduate Students)
- *President*, Bengali Student Association, University of Pittsburgh, 2009-2011 (Represented ~50 Students)
- *Executive Board Member*, Bengali Association of Pittsburgh, 2009-2011 (Represented ~200 Families)
- *President*, Indian Graduate Student Association, University of Pittsburgh, 2009-2010 (Represented ~600 students)
- Assembly Board Member, Graduate and Professional Student Association, University of Pittsburgh, 2009-2010 (Represented ~10,000 Graduate students)