

ASHLEY F. BUSS, Ph.D., E.I.

Civil, Construction and Environmental Engineering
Iowa State University
Ames, Iowa 50011
(563) 880-8098
abuss@iastate.edu

EDUCATIONAL BACKGROUND

- | | |
|---|------------------|
| Ph.D. in Civil Engineering , Degree Conferred: Spring 2014
Iowa State University, Ames, Iowa
Dissertation: "Investigation of sustainable pavement technologies evaluating warm mix asphalt using recycled asphalt materials" | 2011-2014 |
| M.S. in Civil Engineering , Degree Conferred: Fall 2010
Iowa State University, Ames, Iowa
Thesis: "Investigation of Warm Mix Asphalt Using Iowa Aggregates" | 2009-2010 |
| B.S. in Civil Engineering , Degree Conferred: Fall 2008
Iowa State University, Ames, Iowa
Major: Civil Engineering | 2004-2008 |

PROFESSIONAL REGISTRATION

Engineer Intern (E.I.) State of Iowa #17314, July 2009

AWARDS

- Teaching Excellence Award, Spring 2014
- Best paper in sustainable pavement systems, "Warm Mix Asphalt Performance Modeling Using the Mechanistic-Empirical Pavement Design Guide" at the 7th International Conference on Maintenance and Rehabilitation of Pavements and Technical Control, Auckland, New Zealand, August 2012.
- Nelson Lee Memorial Scholarship, Fall 2013.
- Midwest Transportation Center Travel Grant, Fall 2013
- Professional Advancement Grant, Spring 2012
- CCEE Travel Scholarship, Spring 2012

RESEARCH EXPERIENCE

Postdoctoral Research Associate	May 2014-Present
--	-------------------------

Iowa State University
Development of research proposals, technical reports, conference, journal papers and teaching. Continuation of research duties with projects focusing on pavement preservation, asphalt materials evaluation, development of new asphalt mixture additives and asphalt mix design procedures and policies. Currently instructing CE 586, Advanced Asphalt Materials and assisting with geotechnical design for the senior capstone design class this Fall 2014 semester.

Research Assistant/ Teaching Assistant	January 2009- May 2014
---	-------------------------------

Iowa State University
Development of research proposals and technical reports. Development of conference and journal papers to present research findings. Extensive teaching experience in the undergraduate asphalt materials class at Iowa State that is taught for the second half of a semester. Duties have included lecturing as primary instructor for two semesters and teaching the asphalt material laboratory for two semesters. Class sizes were approximately

ASHLEY F. BUSS, Ph.D., E.I.

80 students each semester. Students learn about asphalt mix design and develop their own mixture in the lab. Research duties involved working on both State and industry sponsored projects which included development of detailed experimental plans for evaluating asphalt materials by extensive material testing and subsequent data analysis. I have had the opportunity to collaborate with the Asphalt Paving Association of Iowa to assist in the development of a short course on life cycle cost analysis (LCCA) and with the development of I-PAVE software which provides engineers with pavement design rehabilitation strategies.

Extensive experience in asphalt binder and mixture testing. Asphalt binder test experience includes dynamic shear rheometer, rolling thin film oven, pressure aging vessel and degassing, bending beam rheometer as well as binder extraction and recovery. Experience in binder modification using a shear mill for engineering polymer modified asphalts. Experience in running asphalt compaction equipment including a Superpave gyratory compactor and a linear kneading compactor. Asphalt performance test experience includes indirect tensile strength, dynamic modulus, flow number, bending beam fatigue tests, semi-circular bending test, and Hamburg wheel tracking test.

Undergraduate Research Assistant**May – July 2008**

Women in Science and Engineering summer research internship program through Iowa State University. The research focused on remote sensing in highway pavements. Duties during the internship included developing a literature review and investigating prototypes. Research was funded through the Iowa Highway Research Board. The internship led to the development of the paper, "Embedded Micro-Electromechanical Sensors (MEMS) and Systems for Monitoring Highway Structures and for Infrastructure Management" (ISU Paper, Poster Presentation) as well as a journal paper publication.

INSTRUCTIONAL ACTIVITIES**IOWA STATE UNIVERSITY****Instructor-CE 586 Advanced Asphalt Materials****Fall 2014**

Graduate level advanced asphalt materials class which encompasses the study of aggregates, asphalt binders and hot mix asphalt. Students are engaged in understanding the production and handling methods of aggregates and hot mix asphalt characteristics. Students will develop working knowledge of hot mix asphalt design and performance testing. Finally, students will study the construction aspect of hot mix asphalt.

**Assisting with Geotechnical Technical Design-CE 485 Senior Design Capstone
Geotechnical Technical Advisor-CE 485 Senior Design Capstone****Fall 2014****Spring 2014**

Spring 2014 class size of 150, with 19 primary geotechnical designers and 19 secondary designers. Fall 2014's project has 24 primary geotechnical designers and 24 secondary designers. Students work in groups to complete a project to understand the civil engineering design process, interacting with the client, identification of the engineering problems, development of a technical proposal, identification of design criteria, cost estimating, planning and scheduling, codes and standards, development of feasible alternatives, selection of best alternative, and oral presentation.

Teaching Assistant- CE 382 Design of Concretes- Asphalt Materials Portion Class size of 82, conducted five 3-hour laboratory sessions each week, final exam reviews, homework and exam grading. CE 382 students develop and create their own Superpave mix design. Students also perform rotational viscometer tests, volumetric tests and indirect tensile strength.	Fall 2013
Instructor – CE 382 Design of Concretes- Asphalt Materials Portion Developed accelerated summer syllabus, lecturer, exam development, administered grades.	Summer 2012
Instructor- CE 382 Design of Concretes- Asphalt Materials Portion Class size of 85, lecturer for two 1-hour lectures for 8 weeks, supervised five 3-hour laboratory sections for 8-weeks. Homework and exam question development.	Spring 2012
Teaching Assistant- CE 382 Design of Concretes- Asphalt Materials <u>Compiled course documents for ABET Review</u> , conducted a 3 hour laboratory five times each week, final exam reviews, homework and exam grading as well as administered grades.	Fall 2011
Volunteer assistant for Advanced Asphalt Mix Design- CE 586 Assisted students in the laboratory and gave substitute lectures. Laboratory tasks included engineering polymer modified asphalt and performance grade binder testing throughout the semester.	Fall 2010

INDUSTRY EXPERIENCE

Student Co-op, Federal Highway Administration Federal Highway Administration, Ames, Iowa Worked under the direction of the Iowa Division Bridge Engineer performing the National Bridge Inspection Standards (NBIS) Annual Review for the state of Iowa and Annual Report. Additional projects included construction inspections and reports for bridges and drilled shaft construction on I-235 and I-35, pre-construction meetings, assisted with plan and bid tabulation review, attended multiple webinars, local conferences and specification meetings.	January– August 2007
Summer Internships, Clayton County Secondary Roads Clayton County Secondary Roads, Elkader, Iowa Aided in over 250 bridge and culvert inspections, aided in submitting NBIS paperwork via Iowa DOT website, Level 1 PCC technician certified, construction inspection and assisted with implementing asset management software.	May-Aug. 2006 & 2007

PATENTS AND INTELLECUTAL PROPERTY DISCLOSURES

Buss, Ashley; Podolsky, Joseph; Williams, R. Christopher; and Cochran, Eric, “*Beneficial Effects of Distillation Bottoms for Use with Asphalt Binders*”, ISURF No. 04002, disclosed January 17, 2012.

PEER REVIEWED JOURNAL PUBLICATIONS

Published/Accepted

1. Ceylan, H.; K. Gopalakrishnan, S. Kim, P.C. Taylor, M. Prokudin, and **A. Buss** (2013) Highway Infrastructure Health Monitoring Using Micro-Electromechanical Sensors and Systems (MEMS), *Journal of Civil Engineering and Management*, 19(sup1), pp. S188-S201.
<http://www.tandfonline.com/doi/abs/10.3846/13923730.2013.801894?journalCode=tcem20#.VFP1gPnF-aI>
2. Yu, Jianhua; R.C. Williams; **A. Buss**, "Laboratory Evaluation of Warm Mix Asphalt Influence on Theoretical Maximum Specific Gravity." *ASTM Journal of Testing and Evaluation*, Technical Notes DOI: 10.1520/JTE103928, March 2012.
http://www.astm.org/DIGITAL_LIBRARY/JOURNALS/TESTEVAL/PAGES/JTE103928.htm
3. **Buss, A.**, A. Cascione, and R. C. Williams, "Evaluation of Warm Mix Asphalt Containing Recycled Asphalt Shingles", *Construction and Building Materials*, Volume 61, pp.1-9, June 2014.
<http://dx.doi.org/10.1016/j.conbuildmat.2014.02.066>.
4. (Accepted for publication, in press) **Buss, A.**, R. C. Williams, and S. Schram, "The influence of warm mix asphalt on binders in mixes that contain recycled asphalt materials", *Construction and Building Materials*, December 2014.

Under Review or Revision

1. (Resubmitted for review) **Buss, A.**, J. Podolsky, R.C. Williams, and E. Cochran, "Investigation of Isosorbide Distillation Bottoms as a Bio-Based Warm-Mix Additive" Submitted to: *ASCE Journal of Materials in Civil Engineering*, Submitted November 2013.
2. (Resubmitted for Review) Chen, C., R.C. Williams, M.G. Marasinghe, J.C. Ashlock, S. Schram, and **A. Buss**, "Assessment of Composite Pavement Performance by Survival Analysis", Submitted to: *ASCE Journal of Transportation Engineering*, Submitted November 2014.
3. (Resubmitted for review) Podolsky, J., **A. Buss**, R.C. Williams and E. Cochran, "Comparative Performance of Bio-Derived/Chemical Additives in Warm Mix Asphalt at Low Temperature", Submitted to: *Materials and Structures*, Resubmitted December 2014.
4. (Under Review) Buss, A., R.C. Williams, and S. Schram, "Evaluation of Moisture Susceptibility Tests for Warm Mix Asphalt" *International Journal of Solids and Structures*. Submitted December 2014.
5. Podolsky, J., **A. Buss**, R.C. Williams, "Investigation of Warm Mix Asphalt Performance with and without select bio-derived/chemical additives in Iowa using AASHTOWare Pavement M-E Design" Expected Re-Submittal in January 2015.
6. (Under development) Buss, A., R.C. Williams, "Evaluation of Dynamic Modulus using Split-Plot Repeated Measures", Technical Note. Expected submittal to *ASTM Journal of Testing and Evaluation* in January 2015.

PEER REVIEWED CONFERENCE PAPERS

1. **Buss, A.**, Y. Kuang, R.C. Williams, J. Bausano, A. Cascione, and S. Schram, "Influence of Warm-Mix Asphalt Additive and Dosage Rate on Construction and Performance of Bituminous Pavements", Accepted for Presentation and to be included in the Annual Compendium of Papers for the 93rd Annual Meeting of the Transportation Research Board, January 2014.
2. **Buss, A.**; R.C. Williams.; S. Schram.; A.N. Kvasnak, "Investigation of Warm-mix Asphalt using Iowa Aggregates", Annual Compendium of Papers for the 90th Annual Meeting of the Transportation Research Board, January 2011.

3. **Buss, A.** and R.C. Williams, “Warm Mix Asphalt Performance Modeling Using the Mechanistic-Empirical Pavement Design Guide”, paper submitted, 7th RILEM International Conference on Cracking in Pavements, Delft, The Netherlands, June 20-22, 2012.
4. **Buss, A.;** R.C. Williams, “Evaluation of Warm Mix Asphalt using the Mechanistic-Empirical Pavement Design Guide,” paper submitted, 7th International Conference on Maintenance and Rehabilitation of Pavements and Technical Control, Auckland, New Zealand, August, 2012.
5. (Abstract accepted, paper under development) Podolsky, J., **A. Buss**, R.C. Williams, E. Cochran, “Rejuvenation of Vacuum Tower Bottoms through Bio-derived Materials for Use in Paving Flexible Roadways” International Conference on Bio-based Building Materials (ICBBM), 21st-24th June 2015 in Clermont Ferrand, France.

ABSTRACTS AND TECHNICAL PRESENTATIONS

Buss, A. and R.C. Williams, “Binder performance evaluation of Warm Mix Asphalt”, 2013 Petersen Asphalt Research Conference, Laramie, WY, July 15-17, 2013.

Buss, A., Joseph Podolsky, R.C. Williams, E. Cochran, “Binder evaluation of a Bio-Based Warm-Mix Additive” Pavement Performance Prediction Symposium, 2012 Petersen Asphalt Research Conference, Laramie, WY, July 12, 2012.

Buss, A. and Williams, R.C., “Investigation of Warm Mix Asphalt Using Iowa Aggregates”, Greater Iowa Asphalt Conference, Des Moines, Iowa. March 2, 2012.

Buss, A. and R.C. Williams, “Investigation of Warm Mix Asphalt in Iowa”, 2011 Mid-Continent Transportation Research Symposium, Ames, IA, August 18-19, 2011.

Buss, A. and R.C. Williams, “Field Investigation of Warm Mix Asphalt”, 2010 Mid-Continent Transpiration Research symposium, Madison, WI. August 19-20, 2010.

Buss, A.; R.C. Williams; M. Rashwan; A. Kvasnak; T. Breakah, “Investigation of Warm-Mix Asphalt Performance Using the Mechanistic-Empirical Pavement Design Guide”, Mid-Continent Transportation Research Symposium. InTrans Publications, Ames, IA. August 20-21, 2009.

TECHNICAL REPORTS FOR OWNER-AGENCIES AND INDUSTRY

Buss, A. and R.C. Williams, “Warm Mix Asphalt Phase II: Evaluation of WMA Quality Assurance Testing Protocols”, Final Report, Iowa Highway Research Board Project TR-635, September 2013. Retrieved on November 22, 2013 from: <http://www.intrans.iastate.edu/research/projects/detail/?projectID=-529140120>

Williams, R. C., **A. Buss**, and M. Rashwan, “Investigation of Warm Mix Asphalt Using Iowa Aggregates”, Final Report, Iowa Highway Research Board, 2010. Retrieved on May 11, 2013 from: http://www.intrans.iastate.edu/reports/williams_tr_599_wma_report_w_cvr2.pdf

Williams, R. C., E. Cochran, Eric; **A. Buss**, and J. Podolsky, “Investigation of Distillation Bottoms as a Warm Mix Asphalt Additive”, Submitted to: Archer-Daniels Midland, December 2011.

Marasteanu, M., W. Buttlar, H. Bahia, R.C. Williams, et al., “Investigation of Low Temperature Cracking in Asphalt Pavements National Pooled Fund Study- Phase II”, Report No. MN/RC 2012-23, August 2012. Retrieved on May 5, 2013 from: <http://www.lrrb.org/media/reports/201223.pdf>

Ceylan, H.; K. Gopalakrishnana, P. Taylor, P. Shrotriya, S. Kim, M. Prokudin, S. Wang, **A. Buss**, J. Zhang, “A Feasibility Study on Embedded Micro-Electromechanical Sensors and Systems (MEMS) for Monitoring Highway Structures”, Iowa Highway Research Board Project TR-575, June 2011. Retrieved on May 11, 2013 from: http://www.intrans.iastate.edu/reports/tr-575_ceylan_mems_w_cvr.pdf

PROPOSALS

(Submitted for Evaluation and Presented Dec. 3, 2014) Investigators: Gransberg (PI), **Buss (Co-PI)** (in collaboration with Thomas Wood and Ed Johnson from MnDOT)

Project: Alternatives to Seal Coat Methods

Sponsor: Minnesota Department of Transportation

Duration: July 2015 to July 2017

Funding: \$69,831

Proposal by: Ashley Buss, Thomas Wood (MnDOT), Doug Gransberg

Contribution: Proposal, budget, and schedule development

Investigators: Grewell (PI), Cochran (Co-PI), Madbouly (Co-PI), Rosentrater (Co-PI), Chen (Co-PI), Williams (Co-PI) (This project is large and multi-disciplinary in nature)

Project: Development of adhesives, paint and coatings from acrylated glycerol

<http://portal.nifa.usda.gov/web/crisprojectpages/1004249-development-of-adhesives-paint-and-coatings-from-acrylated-glycerol.html>

Sponsor: United States Department of Agriculture- National Institute of Food and Agriculture

Duration: September 2014 to September 2017

Funding: \$1,039,069

Contribution: Assisted with preliminary materials testing, compilation of relevant standards, and proposal development

Investigators: Williams (PI)

Project: Distillation Bottoms as a Warm Mix Asphalt Technology

Sponsor: Iowa Energy Center

Duration: July 2012 to June 2014

Funding: \$103,194

Proposal by: Ashley Buss and R. Christopher Williams

Contribution: Collaborated in development of the proposal and experimental plan, conducted materials testing, analysis of data and development of report.

Investigator: Williams (PI)

Project: Warm Mix Asphalt Phase II: Evaluation of WMA Quality Assurance Testing Protocols-TR-635

Sponsor: Iowa Department of Transportation

Duration: June 2011 to May 2013

Funding: \$174,991

Proposal by: Ashley Buss and R. Christopher Williams

Contribution: Collaborated in development of the proposal and experimental plan, conducted materials testing, analysis of data and development of report.

Investigators: Williams (PI) and Cochran (co-PI);

Project: Investigation of Distillation Bottoms as a Warm Mix Asphalt Additive

Sponsor: Archer Daniels Midland

Duration: February 2011 to July 2011

Funding: \$55,393

Proposal by: Ashley Buss and R. Christopher Williams

Contribution: Collaborated in the development of the experimental plan, conducted binder and material testing, performed analysis and compiled project report.

SERVICE ON COMMITTEES

CCEE Graduate Student Council Member (Fall 2010-Spring 2014) Review and approval of travel scholarship applications. Served as a representative for graduate students in the Civil, Construction and Environmental Engineering Department. Assisted in organizing CCEE Graduate Student Research Showcase and Poster competition.

SUPERVISION AND TRAINING OF UNDERGRADUATE STUDENTS

Grace Marie Mercado- Department of Civil, Construction and Environmental Engineering. Performed research in the Asphalt Materials Lab from summer 2014 to present.

Neil Wysocki- Department of Civil, Construction and Environmental Engineering and Masters of Business Administration. Performed research in the Advanced Asphalt Materials Lab from August 2012 to May 2013.

Matthew Kirby- Department of Civil, Construction and Environmental Engineering. Performed research in the Asphalt Materials Lab from summer 2010 to summer 2012.

REVIEWER, PEER REVIEW JOURNALS AND GRANTING AGENCIES

<i>Journals and Granting Agencies</i>	<i>Number of Reviews</i>
ASTM Journal of Testing and Evaluation	5
Transportation Research Board	4
International Journal of Construction and Building Materials	2
ASCE Journal of Materials in Civil Engineering	1