RAMEZ HAJJ

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EDUCATION

Ph.D., Civil Engineering, **University of Texas**, Austin, TX 2019
Dissertation: *Origin and evolution of damage and healing in asphalt binders*
M.S., Civil Engineering, **University of Texas**, Austin, TX 2016
Master's Thesis: *Fatigue characterization of asphalt binders using a thin film poker chip test*
B.S., Civil Engineering, **Virginia Tech**, Blacksburg, VA 2014
Minor in Engineering Science and Mechanics

PROFESSIONAL EXPERIENCE

Assistant Professor, University of Illinois, Urbana, IL Jan. 2020 - Present
Graduate Research Assistant, University of Texas, Austin, TX May 2015 - Dec. 2019
Assistant Instructor, University of Texas, Austin, TX Jan. 2019 - May 2019
Graduate Teaching Assistant, University of Texas, Austin, TX May 2015 - Dec. 2016

PUBLICATIONS

Peer Reviewed Journal Articles

1. Filonzi, Angelo, Satyavati Komaragiri, **Ramez Hajj**, Manuel Trevino, Darren Hazelett, Enad Mahmoud, and Amit Bhasin. "A Method to Evaluate the Tensile Strength and Ductility of Asphalt Binders Using a Thin Confined Film." In review in *International Journal of Pavement Engineering.*
2. Lu, Yujia and **Ramez Hajj**. "Development of a finite element framework for modeling flexible pavement maintenance patching." In review in *Journal of Infrastructure Preservation and Resilience.*
3. Asadi, Baabak, Nader Tabatabaee, and **Ramez Hajj**. "Crack-based healing master curves derived from linear amplitude sweep tests: A cohesive healing indicator for asphalt binders." Accepted for publication in *Materials and Structures.*
4. Asadi, Baabak, Nader Tabatabaee, and **Ramez Hajj**. "Use of linear amplitude sweep test as a damage resistance or fracture test to determine the optimum content of asphalt rejuvenator." *Construction and Building Materials.* 300 (2021)
5. Ahmed, Rayhan B., Kamal Hossain, Mike Aurillio, and **Ramez Hajj**. "Effect of rejuvenator type and dosage on rheological properties of short-term aged binders." *Materials and Structures.* 54(109) (2021).
6. Gul, Muhammad Aniq, Kaffayatullah Khan, Md. Kamrul Islam, Faisal I Shalabi, Hasan Ozer, **Ramez Hajj**, and Amit Bhasin. "Developing a performance based mix design and evaluating the influence of various factors on sulfur-extended asphalt." *Construction and Building Materials.* 290 (2021).
7. **Hajj, Ramez** and Scott Young. "An analysis of theoretical and empirical relationships between two asphalt binder cracking parameters." *Road Materials and Pavement Design.* 22(Supp 1) (2021).
8. Ahmed, Rayhan B., Kamal Hossain, and **Ramez Hajj**. "Chemical, morphological, and fundamental properties of rejuvenated asphalt binders." *Journal of Materials in Civil Engineering.* 33(2) (2021).
9. Sreeram, Anand, Zhen Leng, **Ramez Hajj**, Wellington Lorran Gaia Ferreira, Zhifei Tan, and Amit Bhasin. "Fundamental investigation of the interaction mechanism between new and aged binders in binder blends." *International Journal of Pavement Engineering.* Published Online (2020).
10. Filonzi, Angelo, Sang Ki Lee, Wellington Ferreira, **Ramez Hajj**, and Amit Bhasin. "A micro-extraction method for use with 4 mm plate geometry in the Dynamic Shear Rheometer to evaluate asphalt binder rheology." *Construction and Building Materials.* 242 (2020).

11. Sakib, Nazmus, **Ramez Hajj**, Rachel Hure, Ayah Alomari, and Amit Bhasin. "Examining the relationship between bitumen polar fractions, rheological performance benchmarks, and tensile strength." *Journal of Materials in Civil Engineering.* 32 (6) (2020).

12. Filonzi, Angelo, **Ramez Hajj**, Andre Smit, and Amit Bhasin. "Validation of inverse stereology generation of two dimensional area gradations for computational modeling of asphalt mixtures." *Road Materials and Pavement Design.* Published Online (2020).

13. **Hajj, Ramez**, Adam Ramm, Amit Bhasin, and Michael Downer. "Real-time microscopic and rheometric observations of strain-driven cavitation instability underlying micro-crack formation in asphalt binders." *International Journal of Pavement Engineering.* 21 (8) (2020).

14. **Hajj, Ramez**, Angelo Filonzi, Syeda Rahman, and Amit Bhasin. "Considerations for using the 4 mm plate geometry in the Dynamic Shear Rheometer for low temperature evaluation of asphalt binders." *Transportation Research Record: Journal of the Transportation Research Board.* 2673 (11) (2019): 649-659.

15. Sreeram, Anand, Zhen Leng, **Ramez Hajj**, and Amit Bhasin. "Compatibility between aged and unaged binders in bituminous mixtures." *Fuel.* 254 (2019).

16. **Hajj, Ramez**, Angelo Filonzi, Andre Smit, and Amit Bhasin. "Design and performance of mixes for use as an ultra thin overlay." *Journal of Transportation Engineering Part B: Pavements.* 145(3) (2019).

17. Sabaraya, Indu Venu, Angelo Filonzi, **Ramez Hajj**, Dipesh Das, Navid Saleh, and Amit Bhasin. "Investigating the ability of nanomaterials to effectively disperse in asphalt binders for use as a modifier." *Journal of Materials in Civil Engineering.* 30(8) (2018).

18. **Hajj, Ramez** and Amit Bhasin. "The search for a measure of fatigue cracking in asphalt binders- a review of different approaches." *International Journal of Pavement Engineering* 19(3) (2018): 205-219.

19. **Hajj, Ramez**, Rachel Hure, and Amit Bhasin. "Evaluation of stiffness, strength, and ductility of asphalt binders at an intermediate temperature." *Transportation Research Record: Journal of the Transportation Research Board* 2632 (2017): 44-51.

Technical Reports

1. Thompson, Marshall and **Ramez Hajj**. "Flexible Pavement Recycling Techniques: A Summary of Activities." FHWA-ICT-21-017 (2021).

2. **Hajj, Ramez** and Yujia Lu. "Current and Future Best Practices for Pothole Repair in Illinois." FHWA-ICT-21-003 (2021).

3. Filonzi, Angelo, Sang Ki Lee, **Ramez Hajj**, Darren Hazlett, and Amit Bhasin. "Implementing revisions to the allowable maximum Recycled Binder Ratio (RBR) specification." Technical Report No. FHWA/TX-20/0-6947-1. September 2020.

4. **Hajj, Ramez**, Angelo Filonzi, and Amit Bhasin. "Improving the Performance Graded asphalt binder specification." Technical Report No. FHWA/TX-18/0-6925-1. May 2019.

5. Filonzi, Angelo, Indu Venu Sabaraya, **Ramez Hajj**, Dipesh Das, Navid B. Saleh, Amit Bhasin, and Enad Mahmoud. "Evaluating the use of nanomaterials to enhance properties of asphalt binders and mixtures." No. FHWA/TX-17/0-6854-1. September 2018.

6. **Hajj, Ramez**, Angelo Filonzi, Aliasghar Dormohammadi, Cheng Zhu, Vivek Tandon, and Amit Bhasin. "Design and construction of ultra thin overlays as an alternative to seal coats." Technical Report No. FHWA/TX-18/0-6857-1. March 2018.

Conference Proceedings

1. Filonzi, Angelo, **Ramez Hajj**, Satyavati Komaragiri, and Amit Bhasin. "Validation of intermediate and low temperature asphalt binder cracking indicators using asphalt mixture cracking tests." *RILEM International Symposium on Bituminous Materials.* Lyon, France 2020 (Held virtually due to COVID-19).

2. **Hajj, Ramez**, Adam Ramm, Kiran Mohanraj, Amit Bhasin, and Michael Downer. "Micro-scale observations of fatigue damage mechanism in asphalt binder." *AM3P 2020: Advances in Materials, Pavement Performance, and Prediction.* San Antonio, TX. 2020.

3. **Hajj, Ramez** and Amit Bhasin. "Importance of triaxial stress state on asphalt binder tensile failure." *AM3P 2020: Advances in Materials, Pavement Performance, and Prediction.* San Antonio, TX. 2020.

4. **Hajj, Ramez**, Adam Ramm, Nazmus Sakib, Amit Bhasin, and Michael Downer. "Relation of modified bitumen microstructure to cracking indicators." *Proceedings of AM3P 2018: Advances in Materials, Pavement Performance, and Prediction.* Accepted for publication and presentation. Doha, Qatar, 2018.

5. Komaragiri, Satyavati, Angelo Filonzi, **Ramez Hajj**, Arash Motamed, and Amit Bhasin. "Three-dimensional profiler for performance evaluation of chip seals." *Proceedings of AM3P 2018: Advances in Materials, Pavement Performance, and Prediction.* Accepted for publication and presentation. Doha, Qatar, 2018.

6. Sakib, Nazmus, Adam Ramm, **Ramez Hajj**, Amit Bhasin, and Michael Downer. "Bulk microstructures in bitumen and its influence on rheology." *Proceedings of AM3P 2018: Advances in Materials, Pavement Performance, and Prediction.* Accepted for publication and presentation. Doha, Qatar, 2018.

7. Tehrani, Mehran, Ayoub Y. Boroujeni, **Ramez Hajj**, and Marwan Al-Haik. "Mechanical characterization of a hybrid carbon nanotube/carbon fiber reinforced composite." *Proceedings of the ASME 2013 International Mechanical Engineering Congress and Exposition*: 1-5. San Diego, CA, 2013.

Non-Peer Reviewed Articles

1. **Hajj, Ramez**. "Finding thinner strength: ultra thin overlays can have more muscle." *Roads & Bridges* March 2018: 42-46.

SELECTED PRESENTATIONS

1. **Hajj, Ramez** and Scott Young. "An analysis of theoretical and empirical relationships between two asphalt binder cracking parameters." In *9th European Asphalt Technology Association (EATA) Conference.* Vienna, Austria, June 2021.

2. **Hajj, Ramez**. "Connecting Asphalt Material Properties to Flexible Pavement Performance." In *Illinois Transportation and Highway Engineering Conference.* Urbana, IL, March 2021 (Held virtually due to COVID-19).

3. **Hajj, Ramez***. "Sustainable asphalt paving solutions for the 21st century." In *International Student and Faculty Development Program on Role of Transportation Engineers Toward Sustainable Roads and Traffic Safety.* Shri Vishnu Engineering College for Women, Bhimavaram, India, February 2021 (Virtual Talk).

4. Filonzi, Angelo, **Ramez Hajj**, Satyavati Komaragiri, and Amit Bhasin. "Validation of intermediate and low temperature asphalt binder cracking indicators using asphalt mixture cracking tests." *RILEM International Symposium on Bituminous Materials.* Lyon, France, December 2020 (Held virtually due to COVID-19).

5. **Hajj, Ramez**, Adam Ramm, Kiran Mohanraj, Amit Bhasin, and Michael Downer. "Micro-scale observations of fatigue damage mechanism in asphalt binder." *AM3P 2020: Advances in Materials, Pavement Performance, and Prediction.* San Antonio, TX, August 2020 (Held virtually due to COVID-19).

6. **Hajj, Ramez** and Amit Bhasin. "Importance of triaxial stress state on asphalt binder tensile failure." *AM3P 2020: Advances in Materials, Pavement Performance, and Prediction.* San Antonio, TX, August 2020 (Held virtually due to COVID-19).

7. **Hajj, Ramez**. "Fundamental and empirical relationships between binder cracking indicators." *57th Petersen Asphalt Research Conference.* Laramie, WY, June 2020 (Held virtually due to COVID-19).

8. **Hajj, Ramez***. "Fundamental investigation of microstructural damage mechanism in asphalt materials." *Kent Seminar, Illinois Center for Transportation.* Rantoul, IL, Feb. 2020.

9. **Hajj, Ramez***. "Prediction and characterization of failure-inducing instabilities in asphalt materials." *Construction Materials Seminar, University of Illinois at Urbana-Champaign.* Urbana, IL, Feb. 2020.
10. **Hajj, Ramez**. "Origins and evolution of instabilities and healing in asphalt binders." *The University of Illinois at Urbana-Champaign.* Urbana, IL, Feb. 2019.
11. **Hajj, Ramez**, Syeda Rahman, and Amit Bhasin. "Three-dimensional finite element analysis to determine the stress state of bitumen in asphalt concrete mixes." In: *EMI 2018 Conference.* Cambridge, MA, June 2018.
12. **Hajj, Ramez**, Adam Ramm, Nazmus Sakib, Amit Bhasin, and Michael Downer. "Relation of modified bitumen microstructure to cracking indicators." In: *AM3P 2018: Advances in Materials, Pavement Performance, and Prediction.* Doha, Qatar, April 2018.
13. Sakib, Nazmus, Adam Ramm, **Ramez Hajj**, Amit Bhasin, and Michael Downer. "Bulk microstructures in bitumen and its influence on rheology." In: *AM3P 2018: Advances in Materials, Pavement Performance, and Prediction.* Doha, Qatar, April 2018.
14. **Hajj, Ramez**. "Improvement of Senior design capstones by extending their lengths and scopes." In: *2018 ASEE Gulf-Southwest Section Annual Meeting.* Austin, TX, April 2018.
15. **Hajj, Ramez**, Angelo Filonzi, Andre Smit, and Amit Bhasin. "Design and performance of mixes for use as an ultra thin overlay." In: *Transportation Research Board 97th Annual Meeting.* Washington, DC, January 2018. (Awarded *Practice Ready Paper* at TRB Annual Meeting)
16. Filonzi, Angelo, **Ramez Hajj**, Andre Smit, and Amit Bhasin. "Validating inverse stereology methods to create two dimensional area gradations for computational modeling." In: *Transportation Research Board 97th Annual Meeting.* Washington, DC, January 2018.
17. Filonzi, Angelo, **Ramez Hajj**, Indu Venu Sabaraya, Dipesh Das, Navid Saleh, and Amit Bhasin. "Investigating the ability of nanomaterials to effectively disperse in asphalt binders for use as a modifier." In: *Transportation Research Board 97th Annual Meeting.* Washington, DC, January 2018.
18. **Hajj, Ramez**. "Connecting microstructure, composition, and rheology of asphalt binders." In: *6th International Transportation PhD Student Symposium.* Urbana, IL, October 2017.
19. **Hajj, Ramez**, Rachel Hure, and Amit Bhasin. "Evaluation of stiffness, strength, and ductility of asphalt binders at intermediate temperature." In: *Transportation Research Board 96th Annual Meeting.* Washington, DC, January 2017.
20. **Hajj, Ramez** and Amit Bhasin. "Stiffness, strength, and ductility-based evaluation of asphalt binders for intermediate temperature performance." In: *EMI 2016 International Conference.* Metz, France, October 2016.

*invited talk

EXTERNAL RESEARCH GRANTS

1. HMA pothole maintenance best practices. *Illinois Department of Transportation.* May 2020 - January 2021: $36,000.
2. Flexible pavement recycling techniques. (Co-PI with Marshall Thompson and David Lippert) *Illinois Department of Transportation.* August 2020 - July 2021: $125,220.
3. Flexible pavement design (full-depth and rubblization). (Co-PI with Marshall Thompson and David Lippert) *Illinois Department of Transportation.* August 2020 - July 2021: $125,220.
4. Mechanistic-Empirical (M-E) Design Procedures for Flexible Pavements. (Co-PI: Marshall Thompson) *Illinois Department of Transportation.* May 2021 - May 2024: $350,000.
5. Development of Freeze-Thaw Resistant Porous Asphalt Mixtures for Southern Lake Michigan Flexible Pavements. *Illinois-Indiana Sea Grant Faculty Scholars Program.* June 2021 - May 2022: $18,000.

6. Design of Rubberized Asphalt Cement Mix for Reduction of Ballast Damage at the Bottom of Concrete Ties - Phase IA. *TRAMMCO, LLC.* August 2021 - December 2021: $23,474.
7. Bridge deck and pavement rapid-assessment using AI structural sensing and augmented reality. (Co-PI with Ann Sychterz, Lesley Sneed, and Eric Shaffer) *Discovery Partners Institute.* January 2022 - December 2022: $125,000.

INTERNAL RESEARCH GRANTS

1. Enabling self-healing in flexible and rigid pavement via advanced micro-capsules. *Smart Transportation Infrastructure Initiative.* March 2021 - March 2022: $50,000. (Co-PI: Nishant Garg)
2. Computer Vision-Based Vehicle Classification Framework. *New Frontiers Initiative.* May 2021 - September 2021: $16,670.

GRADUATE STUDENTS SUPERVISED

Doctoral Students

1. Yujia Lu (May 2020 - Present); Dissertation Title: *TBA.*
2. Renan Maia (January 2021 - Present); Dissertation Title: *TBA.*
3. Babak Asadi (August 2021 - Present); Dissertation Title: *TBA.*

Masters Students

1. Abhilash Vyas (August 2021 - Present); Thesis Title: *TBA.*

COURSES TAUGHT

1. CEE 310 - Pavement Design II (Spring 2021)*
2. CEE 310 - Introduction to Transportation Engineering (Spring 2021)*
3. CEE 405 - Asphalt Materials I (Fall 2020)*
4. CEE 310 - Introduction to Transportation Engineering (Spring 2020)
5. ME 210/302 - Engineering Design Graphics (Spring 2019, UT-Austin)

* Awarded "List of Teachers Ranked as Excellent By Their Students"

ACTIVITIES AND SERVICE

Professional Committee Memberships

1. Member and Committee Research Coordinator, AKM 20 - Standing Committee on Asphalt Binders, Transportation Research Board, 2020 - Present
2. Member, AKM 40(1) - Subcommittee on Advanced Models to Understand Behavior and Performance of Asphalt Mixtures, 2021 - Present

Grant Reviewer

1. External Proposal Reviewer, Research Grants Council (RGC) of Hong Kong, 2020 - Present
2. External Proposal Reviewer, Swiss National Science Foundation (SNSF), 2021 - Present

Conference Committees

1. Planning Committee, 62nd Illinois Bituminous Paving Conference, 2021. Champaign, IL.

2. Asphalt Materials and Pavements Committee, Transportation Consortium of South-Central States (Tran-SET) Conference, 2021. Jonesboro, AR.
3. Young Committee, International Symposium on Frontiers of Road and Airport Engineering, 2021. Delft, The Netherlands.
4. Planning Committee, 61st Illinois Bituminous Paving Conference, 2020. Champaign, IL.
5. Youth Committee, Transportation Research Congress, 2020. Hangzhou, China.

Editorial Board for Academic Journals

1. Topics Editorial Board Member, Sustainable Chemical Engineering and Technology Section *Sustainability*. 2020 - Present.

Technical Reviewer for Academic Journals

1. Construction and Building Materials (Elsevier)
2. Mechanics of Materials (Elsevier)
3. Transportation Geotechnics (Elsevier)
4. International Journal of Pavement Engineering (Taylor & Francis)
5. Road Materials and Pavement Design (Taylor & Francis)
6. Journal of Engineering Mechanics (ASCE)
7. Journal of Materials in Civil Engineering (ASCE)
8. Journal of Transportation Engineering Part B: Pavements (ASCE)
9. Journal of Cold Regions Engineering (ASCE)
10. Materials and Structures (Springer)
11. Energy & Fuels (ACS Publications)
12. Journal of Testing and Evaluation (ASTM)
13. Science Progress (SAGE Publishing)
14. Transportation Research Record: Journal of the Transportation Research Board (SAGE Publishing)
15. International Journal of Pavement Research and Technology (Springer Nature)
16. Transportation in Developing Economies (Springer Nature)
17. Advances in Civil Engineering (Hindawi)
18. Advances in Materials Science and Engineering (Hindawi)
19. Applied Sciences (MDPI)
20. Coatings (MDPI)
21. Materials (MDPI)
22. Sustainability (MDPI)

Professional Society Memberships

1. Academic Member, Academy of Pavement Science and Engineering (APSE).
2. Associate Member, American Society of Civil Engineers (ASCE)
3. Member, Association of Asphalt Paving Technologists (AAPT)

4. Member, Engineering Mechanics Institute (EMI), ASCE
5. Member, International Union of Laboratories and Experts in Construction Materials, Systems, and Structures (RILEM)

Ph.D. Committee Member

1. Punit Singvhi, Ph.D. Civil Engienering (2021). University of Illinois, Urbana, IL. Dissertation title: *Engineered bio-based additives for asphalt binder modification to improve the long-term cracking performance of asphalt concrete.* Advisor: Imad Al-Qadi.
2. Zehui Zhu, Ph.D. Civil Engineering (2022). University of Illinois, Urbana, IL. Dissertation title: *Practical and continuous crack development measurements of asphalt concrete specimens.* Advisor: Imad Al-Qadi.
3. Qingqing Cao, Ph.D. Civil Engineering (2022). University of Illinois, Urbana, IL. Dissertation title: *Algorithms for Asphalt Concrete Density and Moisture Content Prediction Using Ground Penetrating Radar Data.* Advisor: Imad Al-Qadi.
4. Xiuyu Liu, Ph.D. Civil Engineering (2022). University of Illinois, Urbana, IL. Dissertation title: *Influence of Road Roughness on Vehicle Fuel Consumption and Dynamic Loading.* Advisor: Imad Al-Qadi.
5. Jose Rivera, Ph.D. Civil Engineering (2022). University of Illinois, Urbana, IL. Dissertation title: *TBA.* Advisor: Imad Al-Qadi.
6. Kiran Mohanraj, Ph.D. Civil Engineering (2022). University of Texas, Austin, TX. Dissertation title: *TBA.* Advisor: Amit Bhasin.

M.S. Committee Member

1. Renan Maia, M.S. Civil Engineering (2020). Universidade Federal do Ceara, Fortaleza, Brazil. Thesis title: *Contributions for a safety-based approach for asphalt mixtures evaluation using digital image processing and traffic microsimulation.* Advisor: Veronica Teixeira Franco Castelo Branco.
2. Mohammed Fakhreddine, M.S. Civil Engineering (2021). American University of Beirut, Beirut, Lebanon. Thesis title: *Eavluation of the moisture susceptibility of asphalt mixtures using the direct tension test at the binder and mastic scales.* Advisor: Ghassan Chehab.

UIUC Service

1. Diversity Committee, Grainger College of Engineering (2020 - Present)
2. Faculty Affiliate, IDEA Institute, (2020 - Present)- served as faculty lead for Anti-Racism Task Force
3. Chair, Search Committee, Research Engineer, Illinois Center for Transportation (2021)
4. Search Committee, Senior Research Scientist, Illinois Center for Transportation (2020) (successful search)
5. Grainger College of Engineering Ombudsmen Position Development Committee (2020)

AWARDS

1. Outstanding Reviewer, Journal of Materials in Civil Engineering, *American Society of Civil Engineers (ASCE)* (2020).
2. Levenick Teaching Sustainability Fellowship, *Institute for Sustainability, Energy, and Environment, University of Illinois at Urbana-Champaign* (2021).
3. Professional Development Grant, *European Union Center, University of Illinois at Urbana-Champaign* (2021).