



NICHOLAS A. BRAKE

Assistant Professor, Civil Engineering Department
Lamar University, P.O. Box 10024, Beaumont, Texas 77710
Tel: (409) 880-8765, Fax: (409) 880-8121, E-mail: nicholas.brake@lamar.edu

BIOGRAPHICAL SKETCH

Dr. Brake was born in Miami, FL. to Cuban and American parents. He attended Miami Sunset Senior High School and Michigan State University (East Lansing, MI, USA), where he received three degrees in civil engineering: B.S. (2005), M.S. (2008), and Ph.D. (2012). During his tenure at Michigan State University, he received a number of accolades and awards: Park-Deaver Scholarship Award (2003-2005), Outstanding Engineering Scholarship Award (2005-2006), Travel Fellowship Award (2010), Outstanding Civil Engineering Teaching Assistant Award (2011), and the Outstanding Civil Engineering Ph.D. Student Award (2012). As a teaching assistant from 2006 to 2011, he taught courses in Soil Mechanics, Civil Engineering Materials, and Introduction to Engineering. In 2011, he was selected by the Department of Civil and Environmental Engineering to be lead instructor of an CE 305: Structural Analysis which had a student enrollment of nearly 40 students. Dr. Brake was also a part of a large pavement engineering research group and was a Research Assistant on a project sponsored by the Michigan Department of Transportation. Dr. Brake completed his dissertation in 2012 entitled “The characterization of a plain concrete equivalent elastic fatigue crack resistance curve under various loading regimes”.

Dr. Brake joined Lamar University in Fall 2012 and has since developed nine courses, three of which were never offered at Lamar before his arrival. The courses include: Project-Based Introduction to Civil Engineering-CVEN 1101, Statics-CVEN 2301, Engineering Material Systems-CVEN 3200, Structural Analysis I-CVEN 3340, Structural Mechanics-ENGR 4301, Reinforced Concrete Design I-CVEN 4380, Advanced Pavement Analysis and Design-ENGR 5301, Structural Dynamics-ENGR 5301, and Undergraduate Research-ENGR 4301. Dr. Brake has received superb evaluations thus far. Dr. Brake was awarded the LU Presidential Faculty Fellowship in Teaching Innovation in 2015 to develop a hands-on project based Introduction to Civil Engineering course and able to publish several papers related to the effort.

Dr. Brake serves on the Transportation Research Board (TRB) technical committee AFN20: Properties of Concrete and has presented his research at several major conferences, some of which include: ASEE in New Orleans (2016), ASCE T&DI in Miami, FL. (2015), TRB in Washington D.C. (2011-2014), International Conference of Concrete Pavements in Quebec City, Quebec (2012) and EUPave in Carmona, Spain (2010).

Dr. Brake is married and has two children. He enjoys to travel and has been fortunate enough to have visited 45/50 states and has travelled to Canada, Central America, and Europe several times. He loves to ski and snowboard and has done so at Vail, Breckenridge, Keystone,

Heavenly, Big Sky, Whitefish Mountain, and Blue Mountain. He also enjoys deep sea fishing and has fished the waters off Key Largo, FL. and caught Mahi-Mahi, Tuna, Grouper, Red and Yellow-Tail Snapper, Shark, Barracuda, King Fish, Mackerel, and Wahoo. He has also fished in Lake Michigan for King Salmon and Lake Huron for Walleye. He also enjoys hiking and on-shore bait and fly fishing in remote areas. He has fished mountain lakes and streams in Northwest Montana near Glacier National Park on several occasions for Rainbow, Cutthroat, and Brown trout. Overall, he loves to explore, learn, and teach his children and students about his real-life and research experiences.

EDUCATION

- Ph.D. Civil Engineering, Michigan State University, East Lansing, Michigan. 2012
- M.S. Civil Engineering, Michigan State University, East Lansing, Michigan. 2008
- B.S. Civil Engineering, Michigan State University, East Lansing, Michigan. 2005

ACADEMIC WORK EXPERIENCE

- 2012 – Current, Assistant Professor, Lamar University, Beaumont, Texas
- Jan. 2012 – Aug. 2012, Lecturer, CEE. Dept., Michigan State University, E. Lansing, MI
- 2006 –2011 Research Assistant, CEE Dept., Michigan State University, E. Lansing, MI
- 2005 –2006 UG Research Assistant, CEE Dept., Michigan State University, E. Lansing, MI

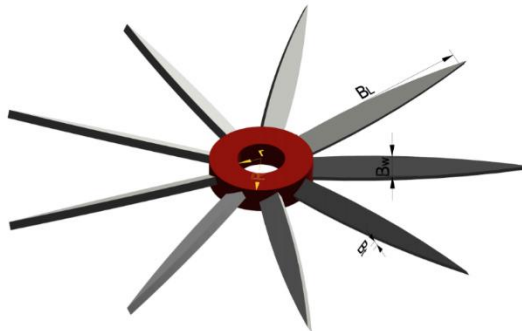
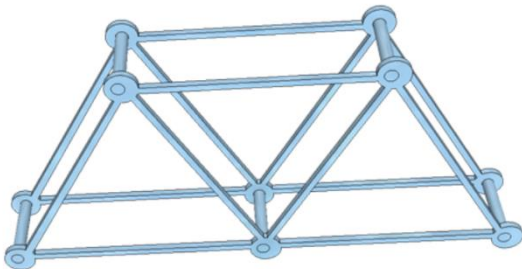
TEACHING

Teaching Statement

Dr. Brake is a very passionate and experienced civil engineering educator that has had the opportunity to teach a wide array of courses to students from multiple disciplines and academic ranks. He has taught at the freshman level all the way to the doctoral level. Dr. Brake has taught and/or developed nine different courses: 1) Introduction to Civil Engineering, 2) Statics, 3) Engineering Materials Systems, 4) Structural Analysis I, 5) Structural Analysis II, 6) Structural Dynamics, 7) Pavement Analysis and Design, 8) Reinforced Concrete Design, and 9) Engineering Ethics. He firmly believes in educating students with engaging and collaborative student-centered curricula that builds interpersonal rapport between students and the instructor.

Dr. Brake actively integrates engineering design into lower academic level courses that traditionally are analysis-heavy and do not focus on design principles. He was awarded the Presidential Faculty Fellowship for Teaching Innovation award in 2015 to integrate the engineering design process into a freshman hands-on introduction to engineering experimental course by having students design and build 3D printed objects that require combined uses of computational software, spreadsheets, simplified engineering analytical design equations, hands-on building, testing, and re-design processes. Dr. Brake has also integrated collaborative design-

build projects into large population sophomore engineering courses by utilizing CAD, computational software to deepen students understanding, and increase their confidence and motivation. In his junior level classes, he integrates a full-fledged pre-capstone civil engineering design project that requires students to design, build, and test glue laminated timber beams, and requires the use of structural analysis software and building codes. These projects have been shown to holistically deepen their fundamental understanding of the working principles, and shown to significantly increase student engineering design confidence, motivation, and design effectiveness.



Dr. Brake continuously refines course materials using formative assessment through student feedback and continues to tinker and explore the use of different pedagogies within his courses to maximize inclusiveness and engagement. Dr. Brake is currently exploring the use of online tools and the integration of online social communities of practice to incentivize peer teaching and mentoring using the university productivity suite Microsoft Office365: Microsoft OneDrive, Microsoft Yammer, Microsoft OfficeMix, Microsoft Sway, and Microsoft OneNote. A community of practice is a mutual enterprise that is well understood and continually renegotiated by its members that creates a uniquely organic resource-sharing social entity. Dr. Brake hopes to create an environment where students continuously meet face to face or online, and they, with the instructor, support the educational ecosystem by supplying new content that serves as instructional media for other students. This creates intrinsic and extrinsic motivation within the student population, and supports learning through feedback, reflection, and student coaching/teaching. Dr. Brake is also exploring the use of experiential learning pedagogies within his structural analysis courses, where students actively explore the shapes, geometries, deformed mechanics, and the internal force response of structural systems with the use of 3D printed frames, beams, and finite element software.



Dr. Brake has served as the technical faculty adviser for the student ASCE steel bridge and concrete canoe teams and has travelled with the student teams to various Texas-Mexico Regional Competition locations, including: Arlington, TX., Corpus Christi, TX., Austin, TX., and Tyler, TX. Dr. Brake also served as faculty adviser for Engineers Without Borders and assisted the students with community fundraising events and provided technical advice pertaining to their percolation field design for a Catholic school in Belize. Dr. Brake believes that extra-curricular involvement in engineering clubs, societies, and organizations is a critical component in the student educational experience and is a strong advocate for student participation in these activities. Students gain experience and can apply their knowledge to solve realistic problems which will deepen their understanding of the working principles and supplement the experiential learning experience. Dr. Brake has also served as an undergraduate mentor to five students, two of whom were awarded OUR research grants of \$1,500 to conduct research in the areas of advanced cementitious materials and damage diagnostic techniques under his guidance. He believes a research experience will deepen students understanding and prepare for graduate studies.

Teaching Experience

Michigan State University, East Lansing, MI, 2006-2012

- Course Instructor: CE 305 Intro to Structural Analysis
- Teaching Assistant/Lab Instructor: CE 221 Statics
- Teaching Assistant/Lab Instructor: CE 337 Civil Engineering Materials
- Teaching Assistant/Lab Instructor: CE 312 Soil Mechanics
- Teaching Assistant/Lab Instructor: EGR 101 Intro to Engineering
- Teaching Assistant/Lab Instructor: EGR 102 Intro to Engineering and Computational Analysis

Lamar University, Beaumont, Texas, 2012 – Current*Lecture Courses*

- CVEN 1101 Introduction to Civil Engineering
- CVEN 2301 Statics
- CVEN 3200 Engineering Material Systems
- CVEN 3340/5300 Structural Analysis
- CVEN 4110 Engineering Ethics
- CVEN 4380 Reinforced Concrete Design I
- ENGR 4301/5301 Structural Mechanics
- ENGR 5301 Advanced Pavement Analysis and Design
- ENGR 5301 Structural Dynamics
- CVEN 5301: FE Review-Structural Analysis and Design, Statics, Materials, Soils, Pavements

Independent Study Courses

- ENGR 4301-11: Undergraduate Research
- ENGR 5301-11 Pavement Data Processing
- ENGR 5301-13 Concrete Characterization I
- ENGR 5301-NBR Pavement Performance Modeling

Awards

- Presidential Faculty Fellowship, Lamar University, 2015
- Outstanding Ph.D. Student Award, Michigan State University, 2012
- Outstanding Teaching Assistant Award, Michigan State University, 2011

Other Awards

- Travel Fellowship Award, Michigan State University, 2010
- College of Engineering Scholarship, Michigan State University, 2006
- Park-Deaver Scholarship, Michigan State University, 2003-2005

Teaching Evaluations

Table: Summary of Lecture Courses Developed and Taught Fall 2012-2016

Course	Title	Credit Hours	Year	No. of Students
CVEN 1101	Introduction to Civil Engineering	1	2015-2016	41
CVEN 2301	Statics	3	2012-2016	489
CVEN 3200	Material Systems Engineering	2	2012-2016	75
CVEN 3340	Structural Analysis	3	2012-2016	151
CVEN 4110	Professional Seminar	1	2015-2016	37
CVEN 4380	Reinforced Concrete Design	3	2015	22
CVEN 4301	Structural Mechanics	3	2014-2015	42
CVEN 5301	Structural Dynamics	3	2014	12
CVEN 5388	Pavement Analysis and Design	3	2013	9
				878

Table: Teaching Evaluation Summary Fall 2012-Summer 2016

	Statement	N	Brake Avg., Likert: 0-5
1	Learning objectives explained	699	4.46
2	Helped achieve learning	693	4.4
3	Course material delivered clearly	692	4.41
4	Syllabus was accurate	690	4.54
5	Assignments aided learning	695	4.40
6	Instructor available	692	4.41
7	Instructor stimulated interest	694	4.3
9	I understood the subject matter	694	4.38
10	Overall, the instructor is a good teacher.	698	4.53
11	Learned a lot overall	691	4.36
12	Grade reflects performance	695	4.23
13	I had a strong desire to take this course.	692	3.83
14	I was prepped for class	691	83.4
15	Grade expected	691	4.31
17	Oppor. for class discuss	691	4.31
20	Treats students fairly	677	4.71
21	Grading system fair	676	4.60
22	Grading system clear.	677	4.67
23	Available outside class.	673	4.62
25	Reasonable assignments	675	4.54
26	Returns tests/papers in a timely manner	676	4.72
27	Adequate notice for exams	674	4.78
28	Makes course interesting	676	4.50
30	Fundamental concepts clear.	679	4.65
32	Class attendance worthwhile	678	4.56
33	Answers questions effectively	674	4.60
34	Expected grade?	677	4.37



Figure: Word Cloud of Student Comments

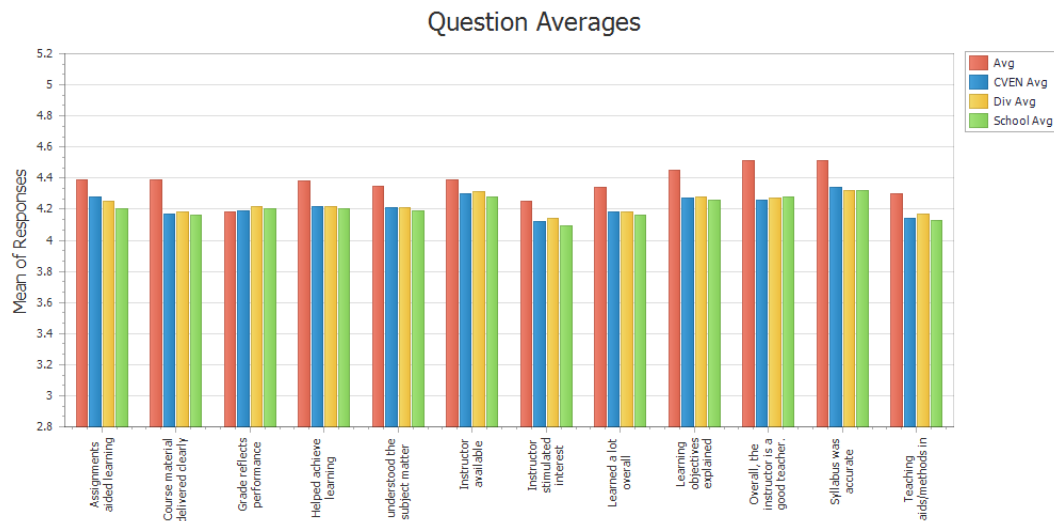


Figure: Teaching Evaluation Compared to Department, College, and University averages

SERVICE

Professional Service

Professional Committee Memberships

- Member and Secretary, Transportation Research Board AFN20: Properties of Concrete, 2013-current
- Committee Friend, Transportation Research Record: AFN10: Basic Research and Emerging Technologies Related to Concrete
- Committee Friend, Transportation Research Record: AFD50: Design and Rehabilitation of Concrete Pavements

Professional Society Membership

- Member, Chi Epsilon
- Member, International Society of Concrete Pavements (ISCP)
- Associate Member, American Society of Civil Engineers (ASCE)
- Member, American Society of Engineering Education (ASEE)

Journal/Conference Paper Referee

- Reviewer: Engineering Fracture Mechanics, 5 Reviews
- Reviewer: Construction and Building Materials, 1 Review
- Reviewer: Advances in Structural Engineering, 1 Review
- Reviewer: American Society of Engineering Education, 2 Reviews
- Reviewer: Transportation Research Record: AFN20: Properties of Concrete, 8 Reviews
- Reviewer: International Journal of Pavement Engineering, 3 Reviews
- Reviewer: ASCE Journal of Civil Engineering Materials, 2 Reviews
- Reviewer: Transportation Research Record: AFD50: Design and Rehabilitation of Concrete Pavements, 8 Reviews
- Reviewer: Road Materials and Pavement Design, 1 Review
- Reviewer: Transportation Research Record: AFN10: Basic Research and Emerging Technologies Related to Concrete, 2 Reviews

No. of Reviews: 33

Service as a Commentator, Panelist, Discussant at Professional Meetings

- Invited Speaker, Lamar University STEM Teacher Workshop: “Building Student Confidence and Motivation with Hands-on Engineering Design Projects,” 2017
- Presiding Officer, Transportation Research Board Lectern Session: Properties of Concrete: Testing and Specifications, Washington, D.C., 2017
- Panelist, LU STEM Teacher’s Workshop, Beaumont, TX., June 2016
- Presiding Officer and Moderator, Transportation Research Board Workshop: Use of Sensors in Highway Concrete Applications, Washington, D.C., 2016

University Service

Lamar University, Beaumont, Texas, Aug. 2012 – Current

Civil and Environmental Engineering Department

- Faculty Senate Representative, 2016-Present
- Faculty Development Leave sub-committee, 2016-Present
- CEE UG Curriculum Chair
- High School Open House Host and Presenter, 2012-2016
- CEE Department Chair Search Committee Member, 2016
- CEE Visiting Professor Structural Engineering search committee chair, 2015
- Chi-Epsilon Dinner, 2012-2016
- Technical Faculty Adviser and Chaperone: Steel Bridge Team and Concrete Canoe Team; travelled with team to Corpus Christi, Tyler, Arlington, and Austin, TX.
- SACS & ABET: Engineering Materials, Engineering Ethics, 2014 & 2016

College of Engineering

- Faculty Adviser, Engineers Without Borders, 2013-2015
- C.O.E. Dean search committee member, 2014 & 2015
- Research and Teaching Laboratory Safety Committee, 2015
- BSIT Transfer and Retention Committee, 2016
- K-12 Outreach: Introduction of Girls to Engineering Lab and Research Presentation, 2015
- K-12 Outreach: LITE Engineering Summer Camp: “Introduction to civil engineering and hands-on exercises”, 2014-2016
- STEM Educator Outreach: Presenter: “Building Student Confidence and Motivation with Hands-On Engineering Design Projects”, 2017
- STEM Educator Outreach: Presenter: “Effective Engineering Teaching: From Theoretical to Real-World Applications”, 2014
- Graduation Commencement Marshal, 2013

Lamar State College, Port Arthur, 2014-2015

- K-12 Outreach: LITE Engineering Summer Camp: “Introduction to civil engineering and hands-on exercises”, 2014-2015

Attended Conferences, Seminars, Competitions, and Events

- Transportation Research Board Conference, Washington, D.C., January 2017
- American Society of Engineering Education, New Orleans, June 2016
- Transportation Research Board Conference, Washington, D.C., January 2016
- Texas Society of Professional Engineers-Sabine, 2016
- Faculty Entrepreneurial Bootcamp, Lamar University, 2016
- American Society and Civil Engineers T&DI, Miami, FL., June 2015
- Transportation Research Board Conference, Washington, D.C., January 2015
- Texas Society of Professional Engineers-Sabine, 2015
- Concrete Canoe Competition, Tyler, TX, April 2014
- Southeast Texas Entrepreneur Conference-Speaker: Jack Gill, April 2014
- Texas Society of Professional Engineers-Sabine, 2014
- Texas Department of Transportation IC Workshop, Houston, TX, February 2014
- Transportation Research Board Conference, Washington, D.C., January 2014
- Steel Bridge Competition, Arlington, TX, December 2013
- Texas Society of Professional Engineers-Sabine, 2013
- Texas Department of Transportation RFP Workshop, Austin, TX, July 2013
- Portland Cement Association Professor’s Workshop, Skokie, Illinois, July 2013
- Transportation Research Board Conference, Washington, D.C., January 2013
- International Conference of Concrete Pavements, Quebec City, Quebec, June 2012
- Transportation Research Board Conference, Washington, D.C., January 2012
- EUPave Advanced Concrete Pavement Workshop, Carmona, Spain, October 2010

RESEARCH

Research Statement

Dr. Brake's research interests are in the development of reclaimed recycled construction materials including construction waste: recycled concrete aggregate; coal combustion residuals: bottom ash, fly ash, ponded ash; industrial waste: fluidized bed combustion ash, oil drilling sludge, steel slag, and spent catalysts; and the reclamation of natural materials: dredged soil; quasi-brittle fatigue fracture mechanics; electromagnetic transport properties of cementitious media; and experiential engineering design education.

In reclaimed materials domain, he has used different techniques to refine and reuse the waste material by both chemical and mechanical processes through nano-pulverization with high energy ball mills. Dr. Brake is especially interested in how reclaimed materials can be used as soil subgrade replacement and/or as a cement replacement and how the bulk mechanical properties are altered or impacted by the additions of the reclaimed material. He has worked extensively on the enhancement of coal bottom ash residuals through chemical doping and mechanical pulverization. He has been able to significantly increase the mechanical strength of binary blended cementitious composites using ultra-fine landfilled coal bottom ash.

Dr. Brake also conducts research on advanced cementitious composites containing doped piezoresistive carbon fiber semi-conductors, and nano-ferrimagnetic powders and magnetic permeability properties for self-sensing and wireless power transfer applications, respectively. Dr. Brake is also interested in using reclaimed materials for the same applications. His research in this area requires collaboration from multiple disciplines, including materials science, robotics and automation, and power and electronics. He has written several papers and research grants in this domain and intends to continue to search for new cost-effective solutions to enhance the self-sensing and electromagnetic transport properties of construction-based cementitious materials. Ferrimagnetic doped cements can enhance the magnetic permeability of a cement composite which facilitates wireless power transfer can increase the power transfer efficiency by nearly 40% and decrease the electric vehicle dynamic charging time. Using electrochemical impedance analysis, Dr. Brake can deconstruct the electromagnetic transport mechanisms through fiber-fiber, and fiber/matrix interfaces and optimize ferromagnetic dosage rates to maximize wireless power transfer.

Dr. Brake is interested in structural analysis and design of various civil infrastructure systems, including concrete pavements, concrete pile walls, and offshore concrete-steel-concrete sandwich shells. He has written several papers in this area and continues to conduct research concrete pavement fatigue damage which includes both bulk initiation and crack propagation mechanisms. He is interested in how the complex mechanisms governing the fatigue fracture within concrete pavements can be modeled using computationally efficient algorithms like closed-form simple polynomials or machine learning algorithms like artificial neural networks. These models can be used to predict both the crack resistance and crack growth under random truck-traffic loads and environmentally induced moisture and thermal gradients. Much of his time is devoted to interpreting concrete fatigue fracture data and developing new models to efficiently characterize

the damage mechanism which is necessary in structural systems involving high cycle loading activity.

Dr. Brake conducts several mechanical, physical, electrochemical, and thermogravimetric tests to characterize the recycled materials. Some of the equipment that he uses extensively includes: servo-hydraulic mechanical actuators for fracture and fatigue testing; air permeability apparatus for fineness measurement; SEM/EDX for microstructural and chemical analysis; XRD for crystal phase identification; thermogravimetric analysis for cement hydration kinetics and pozzolanic reactivity, penetration apparatus for cement setting; and electrochemical impedance analyzers for conductivity, magnetic permeability, and fiber dispersion characterization.

Dr. Brake also conducts research in engineering design education. He conducts summative quantitative and qualitative assessments measuring student learning, design self-efficacy and effectiveness, and collaboration within his courses that he treats with various engineering design interventions. He also has interest in developing methods to incentivize philanthropic peer teaching with grading structures that account for student social impact within a community of practice and how to best utilize this grading paradigm within the classroom and team-based design activities. Dr. Brake also has interest in how students learn within stationary and mobile university makerspaces and how they can be used to deepen student understanding, and how they can be used to promote diversity and inclusiveness within a student population. In addition, he is also interested in better understanding how symbiotic e-learning communities of practice, can help support engineering design activities within stationary and mobile makerspaces.

Refereed Publications

1. Mahmud, Mohammad H., Elmahmoud, Weam, Barzegaran, M.R., **Brake, Nicholas, A.** (2017). Efficient Wireless Power Charging of Electric Vehicle by modifying the magnetic characteristics of the medium. DOI 10.1109/TMAG.2017.2654164, *IEEE Transactions on Magnetic*
2. T. Thuy Minh Nguyen, Saeed Rabbanifar, **Nicholas A. Brake**, Qin Qian, Kyle Kibodeaux, Harold E. Crochet, Soheil Oruji, Remington Whitt, Joshua Farrow, Brandon Blaire, Paul Bernazzani, Mien Jao. (2017). Stabilization of Silty Clayey Dredged Material. *ASCE J. Geotechnical and Geoenvironmental. Eng.* Under Review
3. Oruji, Soheil, **Brake, Nicholas, A.**, Guduru, Ramesh, Rabbanifar, Saeed, Nalluri, Likhith,. (2017). Ultra-fine coal bottom ash as a partial cement replacement to mitigate ASR expansion. *J. Civ. Eng. Mat.*, Under Review
4. **Brake, Nicholas, A.**, Jao, Mien, Su, Dan. (2017). Increasing confidence by integrating 3D printing and design-build-test projects into a civil engineering curriculum. *Journal of Professional Issues in Engineering Education and Practice*, Under Review
5. Oruji, Soheil, **Brake, Nicholas, A.**, Nalluri, Likhith, Guduru, Ramesh. Effects of ultra-fine high-volume bottom ash replacement on mortar compressive strength and workability. *Construction and Building Materials*, Under Review
6. **Brake, Nicholas, A.**, Chatti, Karim. Cohesive stress and fatigue crack resistance characterization of fully supported plain concrete beams. *Road Materials and Pavement Design*, Under Review

7. **Brake, Nicholas, A.**, Allahdadi, Hamid., Adam, Fatih., (2016). Flexural strength and fracture size effects of pervious concrete. *Construction and Building Materials*, 113, 536-543.
8. Mahmud, Mohammad H., Elmahmoud, Weam, Barzegaran, M.R., **Brake, Nicholas, A.** (2016). Efficient Wireless Power Charging of Electric Vehicle by modifying the magnetic characteristics of the medium. *IEEE CEFC*, Miami, FL. Nov. 13-16. DOI: 10.1109/CEFC.2016.7816009
9. **Brake, Nicholas A.**, Chatti, Karim. (2016). Equivalent crack, fracture size effect, and cohesive stress zone of plain concrete under quasi-static and variable high-cycle fatigue loading, *ASCE J. Civ. Eng. Mat.*, doi: 10.161/(ASCE)MT.1943-5533.0001766
10. Thang, Vul, Marshall, P., **Brake, Nicholas A.** (2016). Studed Bond Enhancement for SCS sandwich shells, *Ocean Engineering*, 32-41, 124.
11. **Brake, Nicholas A.**, Curry, James. (2016). The impact of a one-credit introductory engineering course on engineering self-efficacy: seminar v. project-based. In *American Society of Engineering Education*, New Orleans, June 26-28.
12. **Brake, Nicholas A.** (2016). A pre-capstone junior-level structural and materials design project for civil engineering students: glue laminated timber design, In *American Society of Engineering Education*, New Orleans, June 26-28.
13. **Brake, Nicholas A.**, Adam, Fatih. (2016). Integrating a 3D printer and a truss optimization project in Statics, In *American Society of Engineering Education*, New Orleans, June 26-28.
14. **Brake, Nicholas A.**, Chatti, Karim. (2016). Characterizing non-linear fatigue crack growth and size effect in plain concrete beams with a hybrid effective crack and cohesive zone model. In *RILEM: 8th International Conference on Pavement Cracking*, Nantes, France. June 7-9.
15. Sudani, Ghassan A., **Brake, Nicholas. A.**, Jao, Mien. (2015). Stability of Footings Adjacent to Pile-Walls, *ASCE International Journal of Geomechanics*, 15(6).
16. **Brake, Nicholas A.**, Allahdadi, Hamid., Adam, Fatih, Carillo, Nicholas., Mason, Murphy. (2015). Residual strength of pervious concrete under static and impact loading, In *Airfield and Highway Pavement Conference*. Miami, FL. June 7-10.
17. Thang, Vul, Marshall, Peter W., **Brake, Nicholas. A.**, (2014). Bond Enhancement in Curved Sandwich Shells. In *International Conference and Exhibition on Performance of Ships and Structures in Ice*, Banff, Alberta, Canada. July 28-31.
18. **Brake, Nicholas A.**, Chatti, Karim. (2013). Prediction of size effect and non-linear crack growth in plain concrete under fatigue loading, *Engineering Fracture Mechanics*, 109, 169-185.
19. **Brake, Nicholas A.**, Adam, Fatih. (2013). Accelerated fatigue damage of a rigid pavement overlying a sub-surface void: a computational analysis, In *Proceedings of the Transportation Research Board*.
20. **Brake, Nicholas A.**, Chatti, Karim. (2012). Prediction of transient and steady state flexural fatigue crack propagation in concrete using a cyclic R-curve, *J. Eng. Mech.* 138(4), 371-378.
21. **Brake, Nicholas A.**, Chatti, Karim. (2012). The effect of non-linear damage accumulation on fatigue cracking predictions in concrete pavements, In *Proceedings of the Transportation Research Board*.
22. **Brake, Nicholas A.**, Chatti, Karim. (2012). *Plain concrete cyclic crack resistance curves under constant and variable amplitude loading*, In *RILEM, 7th International Conference on Pavement Cracking*, Delft, The Netherlands, June 20-22.

23. **Brake, Nicholas A.**, Chatti, Karim. (2012). Evaluation of the linear damage assumption in JPCP bottom-up fatigue cracking. In *10th International Conference on Concrete Pavements*, Quebec City, Canada. July 8-12.
24. Rhimi, Mohamed, **Brake, Nicholas A.**, Lajnef, Nizar, Chatti, Karim. (2012). *Damage Assessment of concrete using compressed data from a self-powered sensor*, In the *Proceedings of Transportation Research Board*.
25. Chatti, Karim, Manik, A., **Brake, Nicholas A.** (2008). Effect of axle configurations on fatigue and faulting of concrete pavements, In *10th International Symposium on Heavy Vehicle Transport Technology*, Paris, France.
26. Chatti, Karim, **Brake, Nicholas A.**, Salama, Hassan, Haider, S.W. (2008). *The effect of different axle configurations on the fatigue life of plain cement concrete*, RILEM, 6th International Conference on Pavement Cracking, Chicago, Illinois. June 16-18.

Conference Presentations

1. **Brake, Nicholas A.**, Curry, James. (2016). The impact of a one-credit introductory engineering course on engineering self-efficacy: seminar v. project-based. In *American Society of Engineering Education*, New Orleans, June 26-28.
2. **Brake, Nicholas A.** (2016). A pre-capstone junior-level structural and materials design project for civil engineering students: glue laminated timber design, In *American Society of Engineering Education*, New Orleans, June 26-28.
3. **Brake, Nicholas A.**, Adam, Fatih. (2016). Integrating a 3D printer and a truss optimization project in Statics, In *American Society of Engineering Education*, New Orleans, June 26-28.
4. **Brake, Nicholas A.**, Allahdadi, Hamid., Adam, Fatih, Carillo, Nicholas., Mason, Murphy. (2015). Residual strength of pervious concrete under static and impact loading, In *Airfield and Highway Pavement Conference*. Miami, FL. June 7-10.
5. **Brake, Nicholas A.**, Adam, Fatih. (2013). Accelerated fatigue damage of a rigid pavement overlying a sub-surface void: a computational analysis, In *Proceedings of the Transportation Research Board*.
6. **Brake, Nicholas A.**, Chatti, Karim. (2012). The effect of non-linear damage accumulation on fatigue cracking predictions in concrete pavements, In *Proceedings of the Transportation Research Board*.
7. **Brake, Nicholas A.**, Chatti, Karim. (2012). Evaluation of the linear damage assumption in JPCP bottom-up fatigue cracking. In *10th International Conference on Concrete Pavements*, Quebec City, Canada. July 8-12.

Professional Reports

1. Chatti, Karim., Manik, Anshu., Salama, Hassan., Haider, Syed.W., **Brake, Nicholas A.**, El Mohtar, Chadi. (2009). "Effect of Michigan Multi-Axle Trucks on Pavement Distress", MDOT Report # RC-1504, Lansing, Michigan
2. Allahdadi, Hamid, **Brake, Nicholas, A.** (2015). "Detection of Chemical Attack in Self-Sensing Concrete, Lamar University", LU REG Final Report.

3. **Brake, Nicholas, A.** (2016). “Enhancing Freshman Civil Engineering Student Engagement with Project Based and Peer Assisted Learning: CVEN 1101-Project Based Introduction to Engineering”, Lamar University, Presidential Faculty Fellowship Final Report.
4. **Brake, Nicholas, A.** (2016). “Development of an enhanced nano-reinforcement cocktail to improve the performance of recycled concrete aggregate”, LU REG Final Report.

Dissertation/Thesis Supervision

1. Weam Elmahmoud, M.S. Thesis: “Experimental analysis of fine impregnated electrically conductive powders in Portland cement”. December 2016
2. Fatih Adam, D.E. Dissertation: “Structural Analysis of a rigid pavement overlaying a sub-surface void”, December 2015
3. Samson Negeri, M.S. Thesis: “The effects of heavy multiple axle trucks on rigid pavement distress in various climatic regions”, May 2014
4. Vul Thang, M.S. Thesis: “Studded bond enhancement for SCS sandwich shells”, August 2014
5. Ghassan Sudani, D.E. Dissertation: “Stability of shallow foundations adjacent to spaced pile-row”, 2013
6. Ali Banaa, M.S. Thesis: “Early age damage quantification of actively restrained concrete using inverse analysis”, December 2014
7. Sina Nejad, D.E. Dissertation: “Protection of petrochemical facilities from accidental and manmade threats”, December 2014

Undergraduate Research Project Supervision

1. Hayden Rice, Fracture and fatigue toughness of treated recycled aggregate concrete, 2017
2. Kyle Edwards, Durable magnetic cements for vehicle wireless charging applications, OUR Research Fellowship, 2016
3. Michael Bourne, “A low-cost next generation pavement damage detection technique”, Lamar University OUR Research Fellowship, 2014
4. Nicholas Carillo, Billy Wilson, Murphy Mason, “Fracture resistance and size effect of high performance pervious concretes”, Undergraduate Research, 2014

Dissertation/Thesis Committee Member

1. Md Hazzaz Mahmud, “Efficient Wireless Power Charging of Electric Vehicle by modifying the magnetic characteristics of the medium”, 2016
2. Jeremy John Adams, “Vapor pressure prediction in reflow for stacked-chip packages by convection-diffusion model”, 2015
3. Md Aviquzzaman, “Analysis of plug-in hybrid electric vehicles’ utility factors using gps-based longitudinal travel data”, 2014
4. Md Hafizur Rahman, “Probability analysis of vessel collisions and groundings in southeast Texas waterways”, 2014
5. Ozgur Taner, “Analytical and Numerical Analysis of 2D electromigration driven vacancy transport equation”, 2014

Research Grants

1. External: National Science Foundation: “MRI: Acquisition of a Nanoindenter for Advanced Materials Research and Education at Lamar University” (2017). \$395,805, **Senior Personnel, Pending**
2. External: National Science Foundation: “IUSE/PFE:RED: Professional Education for Opportunities and Planetary Leadership in Engineering (PEOPLE)” (2017). \$1,893,744, **Co-PI, Pending**
3. Internal: Lamar University: Center for Advances in Port Management: “Strategic Port Asset Management Framework,” (2017). \$35,000, **Co-PI, Pending**
4. External: National Science Foundation: “Exploring the Use of Blended Digital Learning and Mobile Maker Tools in an Interdisciplinary Freshman Entrepreneurial Experience” (2016). \$226,712, **PI, Pending**
5. External: National Science Foundation: “Collaborative Research: Holistically Enhanced Dynamic Wireless Power Charging System for Electric Vehicles through Robotics, Electromagnetic Optimization, and Pavement Modification.” (2016). \$233,232, **Co-PI, Pending**
6. External: TXDOT: “Develop System to Render Mechanistic-Empirical Traffic Data for Pavement Design” (2016). \$56,866, **PI, Not Awarded**
7. External: National Science Foundation: “RET: RET SITE: Incorporating Engineering Design and Manufacturing into High School Curriculum”, (2016). \$545,380. **Co-PI, Awarded.**
8. Internal: LOI Visionary Initiative Project: “Energy Efficient Building Material: Polymer-reinforced Bricks”, \$300,00, (2016). **Co-PI, Not Awarded.**
9. Internal: LOI Visionary Initiative Project: “A Comprehensive Role of Lamar University in Enhancing STEM Education of Southeast Texas Region” (2016) \$242,000, **Co-PI, Not Awarded.**
10. Internal: LOI Visionary Initiative Project: “The Interdisciplinary Freshman Experience at Lamar University” (2016). \$120,000, **Senior Personnel, Awarded.**
11. Internal: Presidential Faculty Fellowship: “Enhancing Freshman Civil Engineering Student Engagement with Project Based and Peer Assisted Learning: ENGR 1101-Project Based Introduction to Engineering”, \$14,255, (2015). **PI, Awarded.**
12. Internal: Research Enhancement Grant: “Development of an enhanced nano-reinforcement cocktail to improve the performance of recycled concrete aggregate”, (2015). \$5,000, **PI, Awarded.**
13. Internal: Office of Undergraduate Research OUR Award: “The development of a cost-effective conductive concrete for highway infrastructure applications”, (2015). \$1,500, **OUR Adviser, Awarded.**
14. External: National Science Foundation, IUSE: “P.O.I.S.E.: Peer Organized and contextualized assisted learning in calculus I to Improve Self-Efficacy and stem Engagement,” (2014). \$198,894, **PI, Not Awarded.**
15. External: TXDOT: “Updated Testing Procedures for Long Life Heavy Duty Stabilized Bases” (2013). \$147,356, **PI, Not Awarded**
16. Internal: Research Enhancement Grant: “Detection of chemical attack in self-sensing concrete”, (2014). \$5,000, **PI, Awarded**
17. Internal: Presidential Faculty Fellowship: “Enhancing infrastructure-to-human communication with the use of smart concrete and mobile devices”, (2014). \$15,000, **PI, Not Awarded**
18. Internal: Office of Undergraduate Research OUR Award: “A low cost next-generation

- pavement damage detection technique” (2014). \$1,500, **OUR Adviser, Awarded.**
19. External: TuffSeal Inc.: “The reduction of NO_x concentrations using a high-performance polymer modified micro overlay” (2013). \$10,454, **PI, Not Awarded.**