SHREYA VEMUGANTI, PhD

Contact Information

Office: Carson Engineering center, 202 W Boyd St. (Room 424)
Lab: IMMERSE Lab in Fears Lab, 303 Chesapeake St. (Room 101)
Norman, OK, 73019
Email: svemugan@ou.edu

Research Focus

Dr. Vemuganti has research interests in the areas of Structural Engineering and Infrastructure Materials particularly focused on Engineered composites for civil and energy infrastructure, Polymer, bio based and cementitious concrete materials, Nanomodification of polymer resins for fibrous composites, Polymeric 3D printing and interface engineering, Acoustic bandgap materials and phononic sensing.

Education

2016 – 2021	Ph.D. in Civil Engineering, Distinction, Major: Structural Engineering University of New Mexico, Albuquerque, NM, USA *Received Best Outgoing Graduate Award Dissertation: Pseudo-ductile 3D printed Fiber Reinforced Polymer Composites
2014 – 2016	M.S. in Civil Engineering, Major: Structural Engineering University of New Mexico, Albuquerque, NM, USA *Received Graduation speaker Award Thesis: Analysis of Brazilian Split Cylinder using the S Peridynamic L Model
2010 – 2014	B.E. in Civil Engineering, Osmania University, India

Certification

2017 – Present	Engineer Intern, Certificate No. 7389

Professional Experience

2021 - Present	Assistant Professor (Tenure Track) School of Civil Engineering and Environmental Science, University of Oklahoma
2014 – 2021	Graduate Research Assistant Department of Civil Engineering, University of New Mexico
2017 – 2020	Graduate Teaching Assistant Department of Civil Engineering, University of New Mexico
2016, Summer	Research Intern Sandia National Laboratories, New Mexico
2014 – 2016	Bridge Load Rater New Mexico Department of Transportation
2013 – 2014	Engineer Zaki and Associates Consulting Firm

Past and Current Funding/Awards:
(Total award: $1,080,294, Individual credit: $329,124)

3D Printing System for Binder-Based Extrusion; Vemuganti, S. (PI), Floyd. R., Volz. J. Harvey. S., M. Fahes, M. Nollert, $52,000;
Funding organization: OU VPRP SEIP

Development of Design Specifications for Polymer Concrete Structures, Co-PI (70%) with International Code council, $69,284
Funding organization: NEX ACI

Durability Assessment of Binders with Interlayer Reinforcement for 3D Printed Elements, PI (100%), $54,498
Funding organization: Southern Plains Transportation Center

Bond Performance of Advanced Environmentally Friendly Concrete Materials for Rapid Infrastructure Repair and Rehabilitation, Co-PI (33%), $58,710
Funding organization: Southern Plains Transportation Center

Role Of Grout and GFRP Slip Liner on The Circumferential Behavior Of Retrofitted Corroded Metal Culverts, Co-PI (33%), $40,000
Funding organization: IBT/ABC - UTC

MRI: Track 1 Acquisition of a Real-Time Hybrid Simulation Testing System for Cyber-Physical Research and Training, PI: Harvey. S. (28%), Volz, J. (18%), Vemuganti, S. (18%), Pinilla A. (18%), $589,262
Funding organization: National Science Foundation

Collecting Preliminary Data - Emissions of Particles from 3D Printing Using Engineered High Strength Polymer Designs; PI: 100% credit; $3,540 total; with Texas Tech University Karin Ardon-Dryer; 6/1/2023 – 5/1/2024
Funding organization: Stony Brook University

Bond Behavior of Nano-Enhanced Polymer Concrete for Bridge Deck Overlays, PI, 100% credit; $40,000 total; 6/1/2022 – 6/1/2023
Funding organization: ABC UTC

Designing RC Beam Strengthening by Combining FRP Flexural and Shear Strengthening Techniques, PI: 55% credit; $64,000 total; with J. Volz; 10/1/2022 – 10/1/2023
Funding organization: Oklahoma Department of Transportation

Bayesian Optimization on Transformative Composite Response for Energy Applications, PI, 100% credit, $5,000 total; 7/1/2022 – 7/1/2023
Funding organization: ORAU Ralph Powe Junior Faculty Enhancement Award

Innovative Pavement Design Using Low Carbon CSA Cement; Co-PI: 33.3% credit; $73,500 total; with J. Volz (Co-PI), R. Floyd (Co-PI); 2/1/22-6/30/23.
Funding organization: Linda Rice & CTS Cement Manufacturing Corporation

Residential Slabs Using Low Carbon CSA Cement, CTS Cement Manufacturing Corporation; Co-PI: 33.3% credit; $82,500 total; with J. Volz (Co-PI), R. Floyd (Co-PI); 2/1/22-6/30/23.
Funding organization: Linda Rice & CTS Cement Manufacturing Corporation

Vemuganti, S., "Junior Faculty Fellowship,", $9,198. (2022 - April 1, 2023).
Funding organization: OU VPRP

Faculty Travel Assistance Award (PI); $1500
Funding organization: OU VPRP

Bibliography

Google Scholar: h-index 6, i10-index: 4; Total citations: 103

Invention

Taha, Mahmoud Reda, John Stormont, Thomas Dewers, Laura L. Pyrak-Nolte, and Shreya Vemuganti. "Cementitious sensors with acoustic stopbands using carbon nanotubes." U.S. Patent 12,019,048, issued June 25, 2024 **Link**

Journal Publications

CSTR-D-24-00244 Ali Akbarpour*, Shreya Vemuganti Experimental Investigation of Nanomodification on the Bond Strength of Polymer Concrete with Sulphate Exposed Concrete Substrate, Submitted to International Journal of Concrete Structures and Materials.

FCS-100490 Adhikari Sijan*, Akbarpour Ali*, Jeffery Volz, Floyd Royce, Vemuganti Shreya, Thermoplastic Carbon Fiber Reinforced Polymer Tapes in Cementitious and Polymer Concretes. Submitted to Functional Composites and Structures

JTCM-24-0160 Abdirahman Haibe* and Vemuganti Shreya, Flexural Response of Cementitious and Polymer Concretes with Nylon based 3D Printed Glass Fiber Composite. Submitted to Journal of Thermoplastic Composite Materials.

Kayondo, Nanziri Esther*, and Shreya Vemuganti. "Understanding the Effect of Carbon Nanotube Core Designs on Controlling Bandgaps and Wave Directionality in Cement." Eng 5, no. 3 (2024): 1811-1822. **Link**

Liever, Alexandra*, Yingtao Liu, and Shreya Vemuganti. "Effect of immediate curing at elevated temperatures on the tensile and interfacial properties of carbon fiber-epoxy composites." Functional Composites and Structures 6, no. 3 (2024): 035001. **Link**

Akbarpour, Ali*, Jeffery Volz, and Shreya Vemuganti. "An Experimental Study Incorporating Carbon Fiber Composite Bars and Wraps for Concrete Performance and Failure Insight." Journal of Composites Science 8, no. 5 (2024): 174. **Link**

Vemuganti, S., Soliman, E., & Taha, M. M. R. (2024). Manipulating interfacial bond for controlling load transfer in 3D printed fiber reinforced polymer composites. Journal of Reinforced Plastics and Composites, 07316844241238502. **Link**

Vemuganti, S., Soliman, E., & Taha, M. R. (2023). Exploiting fiber control for delayed failure in 3D printed fiber reinforced polymer composites. Composites Part B: Engineering, 251, 110495. **Link**

Vemuganti, S., John C. Stormont, Laura J. Pyrak-Nolte, Thomas Dewers, and Mahmoud Reda Taha (2021) "Cement sensors with acoustic bandgaps using carbon nanotubes." Smart Materials and Structures **Link**

Vemuganti. S., Rahman, M.K., Reda Taha, M. M. (2019). Evolution of Elastic Modulus and Creep of Nanoclay Modified Cement Cured Under High Temperature and Pressure, ACI Special publication on Nanomaterials **Link**

Vemuganti, S., Chennareddy, R., Riad. A., Reda Taha, M. M. (2020). Pultruded GFRP reinforcing bars with nanomodified resin Materials 13, no. 24 (2020): 5710. **Link. Editor's Choice Paper Award**

Vemuganti, S., E. Soliman, Reda Taha, M. M. (2020). 3D-Printed Fiber Reinforced Polymer (FRP) Composites with Discrete Fiber Orientations, MDPI Fibers Journal 2020 **Link. Cover of Issue 9, Volume 8, 2020**

*Student author

Conference Proceedings and Presentations

A. Akbarpour, J. Volz, S. Vemuganti., Effects of FRP Flexural and Shear Strengthening Combined for Reinforced Concrete using Carbon FRP, Structural Engineers Association Fall Conference, December 2023

Abkarpour, A., Vemuganti, S., An Insight into Polymer Concrete Pull Off Strength for Bridge Deck Overlays, OK transportation summer symposium, 2023, Oral Presentation

Liever, A., Kyprioti, A., Vemuganti. S. Optimization of Composite Response for Transformative Reinforcement Applications, OK transportation summer symposium, 2023, Poster

Julio Rojas Meza, Mashhad Fahes, Matthias Nollert, Royce Floyd, Shreya Vemuganti, Jeffery Volz, Utilizing Reliable Non-Destructive Techniques to Quantify Concrete Durability, OK Renewable Energy Conference October 10th, 2023, Poster.

Vemuganti, S., ABC UTC research day, "Bond Behavior of Nano-Enhanced Polymer Concrete for Bridge Deck Overlays." 2022. Oral Presentation.

Haibe, A., Vemuganti, S., ACI Fall 2022 Convention, "Investigation of Flexural Response of Concrete Reinforced with 3D Printed GFRP, "American Concrete Institute, Dallas, Texas. 2022. Oral Presentation, Conference.

Castillo, S., Vemuganti, S., Oklahoma Aerospace & Defense Innovation Institute Symposium, "Investigating Freeze-Thaw Behavior of Nanomodified Fiber Reinforced Polymers." 2022. Poster.

Vemuganti, S., Oklahoma Research Day, "Effect of Nanomodification on Freeze Thaw Behavior of Fiber Reinforced Polymers," SPTC, ABC UTC, ODOT. 2022. Oral Presentation.

Castillo, S., Liever, A., Vemuganti, S., Oklahoma Transportation Research Day, "Investigating Freeze-Thaw Behavior of Nanomodified Fiber-Reinforced Polymers." 2022. Poster.

Kayondo, N. E., Vemuganti, S., 2022 ASEE Midwest Section Conference, "An Undergraduate Research Experience: A Computational Approach to Understand Acoustic Bandgap Features in Cement," ASEE. 2022. Oral Presentation.

Liever, A., Haibe, A., Vemuganti, S., OU Industry Day, "Fiber Reinforced Polymers for Concrete using Nanomodification and 3D Printing." 2022. Poster.

Kayondo, N. E. (Author & Presenter), Vemuganti, S., ACI Spring 2022 convention, "Cementitious Acoustic Bandgap Sensors for Smart Damage Detection," American Concrete Institute, Orlando, Florida. (March 29, 2022). Oral Presentation, Conference.

Kayondo, N. E. (Author & Presenter), Vemuganti, S. (Author), Undergraduate Research Day 2022, "Cementitious Acoustic Bandgap Sensors for Smart Damage Detection." 2022. Oral Presentation.

Kayondo, N. E., Vemuganti, S. "An Undergraduate Research Experience: A Computational Approach to Understand Acoustic Bandgap Features in Cement.", ASEE. (Accepted June 2022)

Vemuganti, S., J C Stormont, L J Pyrak-Nolte, T Dewers and M M Reda Taha., Smart Acoustic Cement Sensors Incorporating Carbon Nanotubes, American concrete institute (ACI) Spring Virtual Convention, March 2021 **Link**

Vemuganti, S., Stormont, J., Han, S.M., Dewers, T. and Pyrak-Nolte, L.J., Reda Taha, M. M. (2018) "Cementitious Sensors with Acoustic Stopbands Using Carbon Nanotubes", Proceedings of Sixth International Symposium on Nanotechnology in

Construction, NICOM6, Hong Kong, China.

Rahman, M. K., Vemuganti, S., Reda Taha, M. M., (2018) "Elastic and viscoelastic properties of nanoclay modified oil well cement", Proceedings of Sixth International Symposium on Nanotechnology in Construction, NICOM6, Hong Kong, China.

Vemuganti. S., Cementitious Sensors Exhibiting Stopbands in Acoustic Transmission Spectra, UNM Shared Knowledge Conference poster showcase, 2018 **Link**

Moreu, F., Bleck, B., Vemuganti, S., Rogers, D., & Mascarenas, D. (2017). Augmented reality tools for enhanced structural inspection. Structural Health Monitoring 2017, (SHM) **Link**

Vemuganti, S., Ozdagli, A., Liu, B., Bajric, A., Moreu, F., Brake, M. R., & Troyer, K. (2017). Sensing and rating of vehicle–railroad bridge collision. In Dynamics of Civil Structures, Volume 2 (pp. 227-234). Springer, Cham **Link**

Vemuganti, S., & Moreu, F. (2017). Survey about Bottom Surface Abrasion of Concrete Crossties (No. 17-06121) **Link**

Gomez, L., Vemuganti, S., & Moreu, F. (2017). Invited Student Paper-Cyber-Physical Systems Related to Historic Infrastructure Maintenance (No. 17-06016) **Link**

Vemuganti, S., & Moreu, F. (2017). Survey about Bottom Surface Abrasion of Concrete Crossties (No. 17-06121) **Link**

Vemuganti, S., Ozdagli, A., Liu, B., Bajric, A., Moreu, F., Brake, M. R., & Troyer, K. L. (2016). Impact Rating System for Vehicle Railway Bridge Collision (No. SAND2016-11012C). Sandia National Labs. (SNL-NM), Albuquerque, NM **Link**

Ozdagli, A. I., Moreu, F., Gomez, J. A., Garp, P., & Vemuganti, S. (2016) Data Fusion of Accelerometers with Inclinometers for Reference-free High-Fidelity Displacement Estimation. In 8th European Workshop on Structural Health Monitoring **Link**

Directed student learning

Undergraduate Students

2021	Alexandra Liever (Retained for MS thesis)
2022	Nanziri Esther Kayondo (Retained for MS non-thesis)
2022	Stephanie Castillo
2023	William Jordan (Retained for MS non-thesis)
2024	Trent Rogers

Master's Students – Thesis Committees

Chair (2023 -)	Durability Assessment of Binders with Interlayer Reinforcement for 3D Printed Elements Advisee: (Sijan Adhikari)
Chair (2022 - 2023)	Optimizing Dispersion Stabilization for Nanomodified Fiber-Reinforced Polymers To Study The Effects Of Freeze-Thaw Advisee: Liever, Alexandra.
Member (2022 - 2023)	Performance of Multi-Hazard-Resistant Hollow-Core FRP Concrete-Steel Columns with High-Strength SCC or UHPC Advisee: Milner, Jackson.
Member (2021 - 2022)	Shear In Ultra-High-Performance Concrete Advisee: Martin, Jonathan.
Chair	Investigation Of Flexural Behavior of Reinforced Concrete With 3d Printed Glass Fiber Reinforced Polymer

(2021 - 2022) Advisee: Haibe, Abdirahman

Member (2021 - 2022) Modeling And Designing a Vertical Isolation System Using Properties of Negative Stiffness
Advisee: Stone, Brackett.

Member (2021 - 2022) Evaluation Of the Service Life of Ultra-High- Performance Concrete as a Building Material For Link Slab Bridge Joints
Advisee: Reed, Clay

Member (2021 - 2022) Assessment Of Ultra-High-Performance-Concrete (UHPC) Properties Using Different Steel and Synthetic Fibers
Advisee: Banik, Dip

Member (2021 - 2022) Application of Basalt Fiber Reinforced Polymer Rebar for Prestressed Concrete Beams
Advisee: Somatri, Wassime

Doctoral Students – Dissertation Committees

Member (2023 -) Advisee: Cody Black - Advisor: Jeffery Volz

Member (2022 -) Advisee: Alfredo Becerril - Advisor: Zahed Siddique

Chair (2022 -) Advisee: Akbarpour, Ali

Member (2021 -) Advisee: Ahmadi, Mujtaba - Advisor: Royce Floyd

Member (2021 -) Advisee: Villalobos Vega, Esteban - Advisor: Scott Harvey

Student Achievements

Nanziri Esther Kayondo, 2nd place, Undergraduate Research Day
Nanziri Esther Kayondo, Engineering Research Fellowship Scholarship
Nanziri Esther Kayondo, ACI presenter certificate
Abdirahman Haibe, Tomorrow's Engineer Scholarship
Abdirahman Haibe, ACI presenter certificate
Stephanie Castillo, OU Undergraduate Research and Creative Activity Fellowship
Stephanie Castillo, OU Undergraduate Research and Creative Activity Ambassador
Stephanie Castillo, Boeing Scholarship, OU GCOE
Stephanie Castillo, Louis C. Bailey Scholarship, OU GCOE
Stephanie Castillo, Oklahoma TRD, 2nd place, poster competition
Ali Akbarpour, Alumni and Foundation Recruitment PhD student Fellowship
Alexandra Liever, Internship at Tinker air force base
Alexandra Liever, Oklahoma TRD, 2nd place, poster competition

Teaching

Fall 2024	CEES 5020 Advanced Materials
Spring 22-24	CEES 3403 Materials
Spring 22 - 24	CEES 5010 Independent study
Fall 23	CEES 5010 Problems class
Fall 22	CEES 4423 Internship
Fall 22	CEES 5723 Reinforced Concrete Design with Fiber Reinforced Polymers
Fall 17 - 19	CE 305 Infrastructure Material Science Laboratory, UNM
Spring 17	CE 371 Structures for Construction, UNM
Fall, 16	CE 302 Mechanics of Materials, UNM
Spring, 16	CE 498/598 Advanced Structural Dynamics, UNM

Outreach

2024	Faculty advisor, OU FYRE program
2022 & 2023	Faculty advisor, NSF Research Experience for Teachers (NSF-RET) program
July 29, 2022	Summer Bridge Engineering Seminar Panelist
2014-2019	School of Engineering open house
2018	Laboratory visit, Hoover Middle School
2017	Dream Builders at the National Hispanic Cultural Center
2016	STEM Outreach activities to encourage women into Science
2016	Hands-on engineering learning sessions with 25 middle school students
2016	Shake it up in Engineering, STEM class
2015	La Cueva high school, Albuquerque, New Mexico

Editorial and Honorary Society Positions

Secretary	American Concrete Institute 241-TG2 Nanoscale Fiber Reinforced Concrete
Leader	Alda Center's Women in STEM Leadership Program
Mentor	Honors Research Assistant Program
Mentor	Oklahoma Louis Stokes Alliance for Minority Participation
Co-editor	Special issue in journal of recent progress in materials **Link**
Reviewer	Journal of ASTM Materials Performance and Characterization
Reviewer	Journal of Construction and Building Materials
Reviewer	MDPI Journal of Applied Sciences
Reviewer	MDPI Journal of Polymers
Reviewer	Journal of Rock Mechanics and Geotechnical Engineering
Reviewer	Journal of Case Studies in Construction Materials
Reviewer	Journal of Composite Materials
Reviewer	Journal of Materials in Civil Engineering
Member	American Concrete Institute
Member	ACI Committee 241, Nanotechnology of Concrete
Member	American Society of Civil Engineers
Member	Women in Engineering, OU
Member	CEES Structural Engineering Faculty Search Committee
Organizer	16th International Congress on Polymers in Concrete, D.C.