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EDUCATION

University of Wisconsin-Madison, Doctor of Philosophy in Geological Engineering 2012
Advisers: Craig Benson and Tuncer Edil

University of Wisconsin-Madison, Master of Science in Geological Engineering 2009
Adviser: Craig Benson

Bucknell University, Bachelor of Science in Civil & Environmental Engineering 2007

Certifications

OSHA 40-hour HAZWOPER (2012) and 8-hour HAZWOPER refreshers

ACADEMIC AND PROFESSIONAL EXPERIENCE

Assistant Professor in Department of Civil & Environmental Engineering 2015 - present
Colorado State University, Fort Collins, Colorado, USA

Senior Associate in Environmental & Earth Sciences Practice 2012-2015
Exponent Engineering & Scientific Consulting, Bellevue, Washington, USA

Senior Associate in Environmental & Earth Sciences Practice 2012-2013
Exponent Engineering & Scientific Consulting, Natick, Massachusetts, USA

Graduate Teaching Assistant in Geological Engineering 2010
University of Wisconsin, Madison, Wisconsin, USA

Graduate Research Assistant in Geological Engineering 2007-2012
University of Wisconsin, Madison, Wisconsin, USA

RESEARCH & SCHOLARSHIP

Site Director—**The Tailings Center**

Principal Investigator—**University Consortium for Field Focused Contaminant Hydrology**

Areas of Research

Geoenvironmental engineering (environmental geotechnics, contaminant hydrology)

Tailings & mine waste

Geo-water (intersections of geotechnical, hydrologic, hydraulic, and groundwater engineering)

Unsaturated terramechanics

Research Awards

Outstanding Faculty Performance Award, Department of Civil & Environmental Engineering, Colorado State University	2021
<i>Geosynthetics International</i> Best Paper Award for 2018	2018
Richard S. Ladd D18 ASTM Standards Development Award, ASTM International	2011
Outstanding Article on the Practice of Geotechnical Testing, <i>Geotechnical Testing Journal</i>	2010
Michael Baker Jr. Inc. Undergraduate Research in Civil Engineering Award	2006

Refereed Journal Articles

Note: Underlined co-author(s) designates undergraduate or graduate student advisee(s).

- J27. Norris, A., Scalia, J., and Shackelford, C. Mechanisms controlling the hydraulic conductivity of anionic polymer-enhanced geosynthetic clay liners. *Geosynthetics International*. SUBMITTED AUGUST 2021.
- J26. Aghazamani, N., Scalia, J., and Bareither, C. Phase relations for saline slurry-deposited tailings. *Geotechnical Testing Journal*. SUBMITTED AUGUST 2021, REVISE AND RESUBMIT OCTOBER 2021.
- J25. Norris, A., Aghazamani, N., Scalia, J., and Shackelford, C. Hydraulic performance of geosynthetic clay liners comprising anionic polymer-enhanced bentonites. *J. of Geotechnical and Geoenvironmental Engineering*. SUBMITTED JULY 2021, REVISE AND RESUBMIT OCTOBER 2021.
- J24. Gorakhki, M., Bareither, C., and Scalia, J. Hydraulic conductivity testing and destructive sampling of field-scale mine waste test piles. *Canadian Geotechnical Journal*. SUBMITTED JUNE 2021, REVISE AND RE-SUBMIT SEPTEMBER 2021; IN-RE-REVIEW.
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- J23. Norris, A., Scalia, J., and Shackelford. Polymer quantification methods for geosynthetic clay liners enhanced with anionic polymers. *Geotechnical Testing Journal*. ACCEPTED OCT 2021.
- J22. Lund, R., Martin, C., Gates, T., Scalia, J., and Babar, M. (2021). Field evaluation of a polymer sealant for canal seepage reduction. *Agricultural Water Management*. 252(30). DOI: 10.1016/J.AGWAT.2021.106898.
- J21. Gorakhki, M., Bareither, C., Scalia, J., and Aparicio, M. (2021). Hydrologic and environmental behavior of GeoWaste and waste rock in field experimental piles. (2021). *Mining, Metallurgy and Exploration*, Special Issue on Tailings. DOI: 10.1007/S42461-021-00419-6.
- J20. Taher, Z., Scalia, J., and Bareither, C. (2020). Comparative assessment of expansive soil stabilization by commercially available polymers. *Transportation Geotechnics*, 24(9). DOI: 10.1016/J.TRGEO.2020.100387.
- J19. Pauley, M., Niemann, J., Scalia, J., Green, T., Erskine, R., Jones, A., and Grazaitis, P. (2020). Enhanced hydrologic simulation may not improve downscaled soil moisture patterns without improved soil characterization. *Soil Science Society of America J.*, 84(3). DOI: 10.1002/SAJ2.20052.
- J18. Stock, C., Gorakhki, M., Bareither, C., and Scalia, J. (2020). Hydraulic comparison of prescriptive and water balance covers. *J. of Environmental Engineering*, 146(7). DOI: 11.1061/(ASCE)EE.1943-7870.0001733.
- J17. Bareither, C., Benson, C., Cook, E., and Scalia, J. (2020). Hydro-mechanical behavior of municipal solid waste and high-moisture waste mixtures. *Waste Management*, DOI: 10.1016/J.WASMAN.2020.02.030.
- J16. Fritz, C., Scalia, J., Shackelford, C., and Malusis, M. (2020). Determining maximum chemico-osmotic pressure difference across clay membranes. *J. of Geotechnical and Geoenvironmental Engineering*, DOI: 10.1061/(ASCE)GT.4943-5606.0002196.
- J15. Tian, Z., Bareither, C., and Scalia, J. (2020). Development and assessment of a seepage-induced consolidation test apparatus. *Geotechnical Testing J.*, DOI: 10.1520/GTJ20180375.

- J14. Malusis, M., Scalia, J., Norris, A., and Shackelford, C. (2020). Effect of chemico-osmosis on solute transport in clay barriers. *Environmental Geotechnics*, DOI: 10.1680/JENGE.17.00109.
- J13. Scalia, J., Benson, C., and Finnegan, M. (2019). Alternative procedures for swell index testing of granular bentonite from GCLs. *Geotechnical Testing J.*, 42(5). DOI: 10.1520/GTJ20180075.
- J12. Herweynen, W., Bareither, C., and Scalia, J. (2019). Shear strength of coal combustion product by vane shear. *Coal Combustion and Gasification Products*. DOI: 10.4177/CCGP-D-19-00001.1.
- J11. Scalia, J., Bohnhoff, G., Shackelford, C., Benson, C., Sample-Lord, K., Malusis, M., and Likos, W. (2018). Enhanced bentonites for containment of inorganic wastes by GCLs. *Geosynthetics International*. DOI: 10.1680/jgein.18.00024. **Selected Best Paper in *Geosynthetics International* for 2018.**
- J10. Ghazi Zadeh, S., Bareither, C., Scalia, J., and Shackelford, C. (2018). Synthetic mining solutions for laboratory testing of geosynthetic clay liners. *J. of Geotechnical and Geoenvironmental Engineering*. DOI: 10.1061/(ASCE)GT.1943-5606.0001953.
- J9. Scalia, J., Bareither, C., and Shackelford, C. (2018). Advancing the use of geosynthetic clay liners as barriers. *Geotechnical Engineering J. of the SEAGS & AGSSEA*, 49(4).
- J8. Scalia, J., Benson, C., Albright, W., Smith, B., and Wang, X. (2017). Properties of barrier components in a composite cover after 14 years of service and differential settlement. *J. of Geotechnical and Geoenvironmental Engineering*, 143(9). DOI: 10.1061/(ASCE)GT.1943-5606.0001744.
- J7. Scalia, J., and Benson, C. H. (2017). Polymer fouling and hydraulic conductivity of mixtures of sodium bentonite and a bentonite-polymer composite. *J. of Geotechnical and Geoenvironmental Engineering*, 143(4). DOI: 10.1061/(ASCE)GT.1943-5606.0001628.
- J6. Scalia, J., Benson, C., Bohnhoff, G., Edil, T., and Shackelford, C. (2014). Long-term hydraulic Conductivity of a bentonite-polymer composite permeated with aggressive inorganic solutions. *J. of Geotechnical and Geoenvironmental Engineering*, 140(3), 04013025.
- J5. Bradshaw, S., Benson, C., and Scalia, J. (2013). Hydration and cation exchange during subgrade hydration and effect on hydraulic conductivity of GCLs. *J. of Geotechnical and Geoenvironmental Engineering*, 139(4), 526-538.
- J4. Scalia, J. and Benson, C. (2011). Hydraulic conductivity of GCLs exhumed from landfill final covers with composite barriers. *J. of Geotechnical and Geoenvironmental Engineering*, 137(1), 1-13.
- J3. Scalia, J. and Benson, C. (2010). Preferential flow in GCLs exhumed from final covers with composite barriers. *Canadian Geotechnical J.*, 47, 1101-1111. DOI: 10.1139/T10-018.
- J2. Scalia, J. and Benson, C. (2010). Effect of permeant water on the hydraulic conductivity of exhumed GCLs. *Geotechnical Testing J.*, 33(3), 1-11.
- J1. Benson, C., Kucukkira, E., and Scalia, J. (2010). Properties of geosynthetics exhumed from a final cover at a solid waste landfill. *Geotextiles and Geomembranes*, 28, 546-556.

Refereed Conference Papers

Notes: *Underlined co-author(s) designates undergraduate or graduate student advisee(s); *designates speaker*

- C27. Norris, A., Scalia, J., Shackelford, C.*, and Benson, C. (2023). Review of methods for quantifying polymer loading of enhanced bentonite geosynthetic clay liners. *Proceedings of the 12th International Conference on Geosynthetics*, postponed to September 2023 Rome, Italy. ABSTRACT ACCEPTED APRIL 2021.
- C26. Shackelford, C.*, and Scalia, J. Semipermeable Membrane Behavior of Geosynthetic Clay Liners. *Proceedings of 7th European Geosynthetics Conference*, September 6-9, 2020 (postponed to 2022), Warsaw, Poland. PAPER ACCEPTED.

- C25. Aghazamani, N., Scalia, J., and Bareither, C. (2021). Assessing the generation of excess pore pressure during undrained compression of unsaturated filtered tailings. *Proceedings of Tailings & Mine Waste 2021*, Banff, Alberta, Canada. University of Alberta, Edmonton, Canada.
- C24. Sample-Lord, K.*, Bohnhoff, G., Malusis, M., Scalia, J., and Shackelford, C. Comparison of coupled solute flux through sodium- and enhanced bentonite barriers leveraging two decades of experimental data. (2021) *Proceedings of the 3rd International Symposium on Coupled Phenomena in Environmental Geotechnics*, Japanese Geotechnical Society Special Publication, 9(2), 37-44. DOI: 10.3208/jgssp.v09.cpeg025.
- C23. Malusis, M.*, Dominijanni, A., Scalia, J., Sample-Lord, K., Bohnhoff, G., Shackelford, C., Manassero, M., and Guarena, N. (2021). Assessing the influence of chemico-osmosis on solute transport in bentonite membranes based on combined phenomenological and physical modeling. *Proceedings of the 3rd International Symposium on Coupled Phenomena in Environmental Geotechnics*, Japanese Geotechnical Society Special Publication, 9(2), 37-44. DOI: 10.3208/jgssp.v09.cpeg023.
- C22. Spencer, D., Hatton, C.*, Bareither, C., Ward, K., and Scalia, J. (2021). Deck hands needed! Experience necessary – addressing the intended qualified tailings professional resource shortage. *Proceedings of the Mine Waste and Tailings Conference 2021*, July 1-2, 2021, Brisbane, Australia, AusIMM, Brisbane, Australia.
- C21. Gorakhki, M., Bareither, C., Scalia, J., and Butters, G. (2020). Hydrologic predictions of saturated and oxygen concentration in a GeoWaste test pile. *Proceedings of Tailings and Mine Waste 2020*, Colorado State University, Fort Collins, CO.
- C.20. Norris, A., Aghazamani, N., Conzelmann, J., Scalia, J., and Shackelford, C. (2020). Hydraulic conductivity of geosynthetic clay liners to synthetic mine waste leachates. *Proceedings of Tailings and Mine Waste 2020*, Colorado State University, Fort Collins, CO.
- C19. Gorakhki, M., Bareither, C.*, Scalia, J., Aparacio, M., and Jacobs, M. (2019). In situ hydraulic conductivity testing of a GeoWaste test pile. *Proceedings of Tailings & Mine Waste 2019*, Vancouver, British Columbia, Canada.
- C18. Gorakhki, M., Bareither, C., Scalia, J.*, and Jacobs, M. (2019). Hydraulic conductivity and soil water retention of waste rock and tailings mixtures. *Proceedings of Geo-Congress 2019*, Philadelphia, Pennsylvania, USA. ASCE, Reston, Virginia, USA.
- C17. Norris, A., Scalia, J., and Shackelford, C. (2018). Fluid indicator test (FIT) for screening the hydraulic conductivity of enhanced bentonites to inorganic aqueous solutions. *Proceedings of the 8th International Congress on Environmental Geotechnics Volume 2*, Oct. 28-Nov. 1, 2018, Hangzhou, China.
- C16. Bareither, C.*, Gorakhki, M., Scalia, J., and Jacobs, M. (2018). Compression Behavior of Filtered Tailings and Waste Rock Mixtures. *Proceedings of Tailings & Mine Waste 2018*, Keystone, Colorado, USA. CSU, Fort Collins, Colorado, USA.
- C15. Herweynen, W.*, Bareither, C., and Scalia, J. (2017). Salinity effects on the consolidation behavior of kaolin. *Proceedings of Tailings & Mine Waste 2017*, Banff, Alberta, Canada. University of Alberta, Edmonton, Canada.
- C14. Bareither, C.*, Ghazi Zadeh, S., Conzelmann, J., Scalia, J., and Shackelford, C. (2017). Evaluation of mechanical and hydraulic properties of geosynthetic clay liners for mining applications. *Proceedings of Tailings & Mine Waste 2017*, Banff, Alberta, Canada. University of Alberta, Edmonton, Canada.
- C13. Malusis, M., Scalia, J.*, Norris, A., and Shackelford, C. (2017). Quantifying the significance of chemico-osmotic counter advection on solute transport through semipermeable clay barriers. *Proceedings of the 2nd International Symposium on Coupled Phenomena in Environmental Geotechnical*, Sept. 6-7, 2017. University of Leeds, Leeds, UK.
- C12. Evans, D.*, Whysner, K., Scalia, J., and Bareither, C. (2017) Work area quantification process to guide CCR construction programs. *2017 World of Coal Ash (WOCA) Conference in Lexington, KY, May 9-11, 2017*, Lexington, Kentucky, USA.

- C11. Conzelmann, J.*, Scalia, J., and Shackelford, C. (2017). Effect of backpressure saturation on the hydraulic conductivity of GCLs. *Proceedings of Geotechnical Frontiers 2017*, Orlando, Florida, USA. GSP No 276, ASCE, Reston, Virginia, USA.
- C10. Conzelmann, J.*, and Scalia, J. (2016). Method and Equipment for Hydraulic Conductivity Measurement of Geosynthetic Clay Liners with Mine Waste Leachates. *Proceedings of Tailings & Mine Waste 2016*. Keystone, Colorado, USA. CSU, Fort Collins, Colorado, USA.
- C9. Scalia, J.*, and Benson, C. (2016). Evaluation of Na-bentonite-polyacrylate mixtures to enhance the chemical resistance of geosynthetic clay liners. *Proceedings of Geo-Chicago 2016: Sustainable Geoenvironmental Systems*, Chicago, Illinois, USA. GSP No. 271, ASCE, Reston, Virginia, USA.
- C8. Shackelford, C.* and Scalia IV, J. (2016). Semipermeable membrane behavior in bentonite-based barriers: Past, present, and future. *GeoVancouver 2016*, Oct. 2-5, 2016, Vancouver, Canada, Canadian Geotechnical Society, paper 4173.
- C7. Albright, W.*, Scalia, J., Benson, C., and Smith, B. (2014). Effects of age and differential settlement on composite barrier components in a landfill final cover. *Proceedings of Waste Management 2014*, Phoenix, Arizona, USA. Waste Management Symposia Inc., Phoenix, Arizona, USA.
- C6. Scalia, J.*, and Benson, C. (2014). Barrier performance of bentonite-polyacrylate nanocomposite to artificial ocean water. *Proceedings of Geo-Congress 2014 Geo-Characterization and Modeling for Sustainability*. GSP No. 234, ASCE, Reston, VA.
- C5. Bohnhoff, G., Shackelford, C., Malusis, M.*, Scalia, J., Benson, C., Edil, T., Di Emidio, G., Katsumi, T., and Mazzieri, F. (2013). Novel bentonites for containment barrier applications. *Proceedings of the 18th International Conference on Soil Mechanics and Geotechnical Engineering 2013*, Delange, P., Desrues, J., Frank, A., Puech, F., Schlosser, F., eds., Presses des Ponts, Paris; 4, 2997-3000.
- C4. Scalia, J.*, Benson, C., and Edil, T. (2013). Bentonite-polyacrylate nanocomposites for containment of aggressive liquids. *Proceedings of the 5th International Young Geotechnical Engineers' Conference 2013*, Paris, France.
- C3. Scalia, J.*, Benson, C., Edil, T., Bohnhoff, G., and Shackelford, C. (2011). GCLs containing bentonite-polymer nanocomposite, *GeoFrontiers 2011 Advances in Geotechnical Engineering*, Dallas, Texas, USA. GSP No. 211, ASCE, Reston, Virginia, USA.
- C2. Benson, C. and Scalia, J.* (2010). Hydraulic conductivity of exhumed GCLs from composite barriers. *Proceedings of the 3rd International Symposium on Geosynthetic Clay Liners*, SKZ – ConSem GmbH, Wurzburg, Germany, 73-82.
- C1. Malusis, M., and Scalia, J.* (2007). Hydraulic conductivity of an activated carbon-amended GCL. *New Peaks in Geotechnics*, Denver, Colorado, USA. GSP No. 163, ASCE, Reston, Virginia, USA.

Conference Presentations (Abstracts)

Notes: *Underlined co-author(s) designates undergraduate or graduate student advisee(s); *designates speaker*

- Pr8. Anthony, M., Scalia, J., and Sale, T. (2021). Forecasting benzene concentrations in legacy petroleum impacted aquifers. *Hydrology Days 2021*, March 30-31, 2021, Fort Collins, Colorado, USA. Virtual.
- Pr7. Gates, T.*, Lund, R., Scalia, J., and Babar, M. (2020). Effective and affordable canal seepage control using polymer sealants. *American Water Resources Association Colorado – Colorado Groundwater Association Annual Symposium*, Aug. 31 to Sept 2, 2020. Virtual.
- Pr6. Binder, J.*, Scalia, J., Niemann, J. (2020). Developing a method to measure and predict moisture-variable soil strength. *Hydrology Days 2020*, Fort Collins, Colorado, USA.
- Pr5. Scalia, J.*, and Sale, T. (2019). Advantages and limitations of the observational method in remediation. University Consortium for Field-Focused Groundwater Research, Annual Progress Meeting, June 4-6, 2019, Guelph, Ontario, Canada.

- Pr4. Pauly, M.*, Niemann, J., Scalia, J., Green, T., and Erskine, R. (2019). Assessing impacts of soil hydrology on patterns of soil moisture and surface soil strength. *Hydrology Days 2019*, Fort Collins, Colorado, USA.
- Pr3. Scalia, J.*, and Benson, C. (2018). Evaluation of the Effect of Subgrade Water Content on GCL Hydration and Hydraulic Conductivity. *Geo-Institute Web-Conference, Geoenvironmental Engineering*, Aug. 23, 2018.
- Pr2. Stock, C.*, Bareither, C., and Scalia, J. (2017). Water balance cover for landfills and current research at Larimer County Landfill. *2017 Colorado SWANA Annual Conference*, Sept. 13-17, 2017, Steamboat Springs, Colorado, USA.
- Pr1. Conzelmann, J.*, and Scalia, J. (2017). Hydraulic conductivity of geosynthetic clay liners in mining applications. *Hydrology Days 2017*, Fort Collins, Colorado, USA.

Posters

- Po4. Jones, A.*, Andales, A., Burzynski, A., Chavez, J., David, O., Fletcher, S., Forsythe, J., Goodliff, M., Grazaitis, P., Kidder, S., Kliever, A., McGovern, C., Niemann, J., Pauly, M., Scalia, J., and Smith, G. (2020). Integrative hydrometeorological applications using precipitation, soil moisture, and water vapor using phone apps, GIS, and data assimilation. *AMS Annual Meeting, 34th Conference on Hydrology*, Jan. 12-16, 2020, Boston, MA, poster 1102.
- Po3. Gorakhi, M., Kent, T., Bareither, C., and Scalia, J. (2019). Field columns to evaluate hydrological behavior of water-balance covers consisting of mixtures of mine tailings and waste rock. Smart Mining: Resources for a Connected World, Society of Mining Engineers, Denver, Colorado, USA.
- Po2. Scalia, J. (2018). Research focus areas. 2nd US University Council on Geotechnical Engineering Education (USUCGER) Career Workshop for Junior Faculty, Case Western Reserve University, Cleveland, Ohio, USA.
- Po1. Shackelford, C., Bohnhoff, G., Benson, C., Scalia, J., Edil, T., Xu, H., Darlington, J., and Olsta, J. (2009). Bentonite-polymer nanocomposites for geoenvironmental applications. *NSF CMMI Research and Innovation Conference 2009*, NSF, Arlington, Virginia, USA.

Book Chapters

- B3. Thiel, R., Scalia, J., and Yesiller, N. Final covers for landfills and waste piles. (IN PRESS). ASCE, Geo-Institute, *Geoenvironmental Engineering Practice Manual*.
- B2. Scalia, J., and Shackelford, C. Contaminant fate & transport of liquids and gases. (IN PRESS). ASCE, Geo-Institute, *Geoenvironmental Engineering Practice Manual*.
- B1. Benson, C. and Scalia, J. (2010). Chapter 10: Hydrologic performance of final covers containing GCLs, in *Geosynthetic Clay Liners for Waste Containment Facilities*, A. Bouazza and J. Bowders, eds., CRC Press, Boca Raton, FL, 203-211.

Articles

- A1. Bigham, G., Mohsen, F., Mesard, P., and Scalia, J. (2013). Promise and pitfalls of modeling for environmental litigators, *Exponent Environmental Perspectives* (Volume 1). Available online at: http://www.exponent.com/files/Uploads/Documents/Newsletters/EP_2013_Vol_1.pdf.

Reports

Notes: *Underlined co-author(s) designates undergraduate or graduate student advisee(s).*

- R5. Taher, Z., Scalia, J., and Bareither, C. Expansive soil mitigation for transportation earthworks by polymer amendment. Mountain Plains Consortium Final Report. IN REVIEW.
- R4. Scalia, J., Cammarere, M., Niemann, J., Jones, A., and Gemeinhart, K. (2018). Annex D – Soil strength Estimation Overview in Next Generation NATO Reference Mobility Model. NATO STO AVT-248 Final Report.

- R3. Bareither, C., Scalia, J., Gorakhki, M., Borja Castillo, R., and Kent, T. (2017). Evaluation of hydraulic conductivity and moisture retention characteristics of GeoWaste. Colorado State University, Fort Collins, CO.
- R2. Benson, C., Albright, W., Fratta, D., Tinjum, J., Kucukkirca, E., Lee, S., Scalia, J., Schlicht, P., and Wang, X. (2011). Engineering covers for waste containment changes in engineering properties & implications for long-term performance assessment, NUREG/CR-7028, Office of Research, U.S. Nuclear Regulatory Commission, Washington.
- R1. Benson, C., Kucukkirca, E., and Scalia, J. (2008). Properties of geosynthetics exhumed from the seven Mile Creek Landfill Eau Claire, Wisconsin, Geo Engineering Report No. 08-22, University of Wisconsin, Madison, Wisconsin.

Standards & Standard Operating Procedures

- S4. Lyverse, M., Scalia, J., and Sale, T. (2019). Bank stabilization – installation guidance, SMO Standard Operating Procedure, Chevron.
- S3. Lyverse, M., Scalia, J., and Sale, T. (2019). Oleophilic bio barrier (OBB) installation, SMO Standard Operating Procedure, Chevron.
- S2. Lyverse, M., Sale, T., and Scalia, J. (2018). Environmental management technology Q&A: oleophilic biobarrier evaluation, testing, design, and implementation, Technology Standard, Chevron.
- S1. Bradshaw, S., Scalia, J., Benson, C., and Rauen, T. (2010). Standard D7503, Standard test method for measuring the exchange complex and cation exchange capacity of inorganic fine-grained soils, *Annual Book of Standards*, ASTM Intl., 04.09.

Patents

- P1. Sale, T., Ham, J., Gallo, W., Askarani, K., Fierrie, Z., Scalia, J. (2021). Devices and methods for measuring temperature, oxidation reduction potential, and water-level within a subsurface formation. Patent No 10,901,117. Issued 2021-01-26.

Invited Presentations & Short Courses

Universities

Colorado School of Mines, University of Colorado-Boulder, University of Wisconsin-Madison

Conferences and Short Courses

Tailings Continuum, Tailings Center, Fundamentals of Tailings Short Course 1 – Introduction to Tailings Engineering, August 26, 2021.

Financial Assurance for TSF Closure Panel Session Moderator, Tailings Center, Fundamentals of Tailings Short Course 6 – Fundamentals of Tailings, July 8, 2021.

Designing for TSF Closure Panel Session Moderator, Tailings Center, Fundamentals of Tailings Short Course 6 – Fundamentals of Tailings, July 1, 2021.

Introduction to Tailings Geotechnics, Tailings Center Tailings for Regulators (ADEQ), June 14, 2021.

Geosynthetics Conference Geosynthetics Learning Zone Introduction Series, Environmental Applications, Houston, Texas USA, Feb. 10-13, 2019.

Invited Young Lecture, 8th International Congress on Environmental Geotechnics, Hangzhou, China, Oct. 28 – Nov. 1, 2018. (Declined due to coinciding birth of child)

External Sponsored Research

Total raised research dollars as Principal Investigator (PI) = \$1,100,000 and as Co-PI = \$1,159,000

Project	Role & Other Investigators	Source of Funding	Period
Surficial Soil Moisture and Soil Strength Predictions Using Multi-Scale Remote Data Products	Co-PI, with Jeff Niemann, CSU, PI, & Andy Jones, CSU, Co-PI	U.S. Department of Defense-Army Research Office	2021-2023 (Active)
Developing Best Practices for Managing Canal Seepage Using Biopolymer Sealants	PI , with Tim Gates, CSU, Co-PI	Colorado Agricultural Experiment Station	2020-2023 (Active)
Environmental Sensor-Based Monitoring	Co-PI, with Tom Sale, CSU, PI	Chevron	2020-2022 (Active)
Advancing Oleophilic BioBarrier (OBB), & Non-Tidal OBB Remedies	PI , with Tom Sale, CSU, Co-PI	Chevron	2019-2022 (Active)
Identification and Validation of Remotely Operated Screening Methods for Assessment of Embedded Oil in Sediments	PI , with Tom Sale, CSU, Co-PI	Chevron	2019-2021 (Active)
Evaluation and Management of High-Moisture Waste Disposal in Municipal Solid Waste Landfills	PI , with Chris Bareither, CSU, Co-PI, Craig Benson, UVA, Co-PI	Environmental Research & Education Foundation (EREF)	2018-2021 (Active)
Map Based Terrain Mobility Analysis Tool	Co-PI, with Jeff Niemann, CSU, PI, & Andy Jones, CSU, Co-PI	U.S. Department of Defense-Army Research Office	2018-2021 (Complete)
Advancing Natural Source Zone Depletion (NSZD) Remedies	Co-PI, with Tom Sale, CSU, PI	Chevron	2018-2021 (Complete)
Compressibility and Hydraulic Conductivity Testing of Mine Tailings	PI , with Chris Bareither, CSU, Co-PI	AECOM	2018-2020 (Complete)
Representative Testing of Expansive Soil Treatment Technologies for Transportation Earthworks	PI , with Chris Bareither, CSU, Co-PI	Mountain Plains Consortium (MPC)	2017-2021 (Complete)
Expansive Soil Mitigation by Commercial Polymers	PI , with Chris Bareither, CSU, Co-PI	Mountain Plains Consortium (MPC)	2016-2019 (Complete)
Determination of Terrain Ponding for Logistics Emplacement and Planning – Phase II, (Travel Supplement)	Co-PI, with Jeff Niemann, CSU, PI, & Andy Jones, CSU, Co-PI	U.S. Department of Defense-Army Research Office	2018 (Complete)
Preliminary Geotechnical Work Area Quantification	PI , with Chris Bareither, CSU, Co-PI	RECON Inc.	2018 (Complete)
Terrain Ponding Integration with PAWTL (Supplement for Army SBIR subcontract project)	Co-PI, with Jeff Niemann, CSU, PI, & Andy Jones, CSU, Co-PI	U.S. Department of Defense-Army Research Office	2017-2018 (Complete)
Evaluation of Hydraulic Conductivity and Moisture Retention Characteristics of GeoWaste	Co-PI, with Chris Bareither, CSU, PI	GoldCorp	2017 (Complete)

Internal Research Support

Total raised research dollars = \$539,000 (includes proceeds from Tailings & Mine Waste conferences)

Project / Equipment	Investigators	Source of Funding	Period
<i>Geotechnical and Geoenvironmental Engineering Research Related to Tailings and Mine Waste</i>	with Chris Bareither	Tailings and Mine Waste Conference	2021-2022
<i>Borland Research Equipment Proposal: A Boat</i>	with Tim Gates	Borland Committee, CEE, CSU	2021
<i>Borland Research Equipment Proposal: Anaerobic/ Aerobic Bench Scale/ Pilot Scale Respirometer</i>	with Sybil Sharvelle, Susan De Long, Kenneth Carlson, Chris Bareither	Borland Committee, CEE, CSU	2021
<i>Borland Research Equipment Proposal: Nitrogen Evaporator</i>	with Jens Blotevogel, Andrea Hanson, Tiezheng Tong, Tom Sale	Borland Committee, CEE, CSU	2021
<i>Borland Research Equipment Proposal: StreamPro Acoustic Doppler Current Profiler</i>	with Tim Gates, Karan Venayagamoorthy	Borland Committee, CEE, CSU	2020
<i>Geotechnical and Geoenvironmental Engineering Research Related to Tailings and Mine Waste</i>	with Chris Bareither	Tailings and Mine Waste Conference	2019-2020
<i>Geotechnical and Geoenvironmental Engineering Research Related to Tailings and Mine Waste</i>	with Chris Bareither	Tailings and Mine Waste Conference	2017-2019
<i>Borland Research Equipment Proposal: Experimental Research in Geoenvironmental Engineering Using HYDRUS</i>	with Chris Bareither	Borland Committee, CEE, CSU	2017
<i>Borland Research Equipment Proposal: Monitoring Indoor Air Quality due to Contaminated Tap Water Use and/or Infiltration through Foundation of the Buildings due to Contaminated Groundwater and Soil</i>	with Ken Carlson, Pinar Omur-Ozbek, Ellison Carter	Borland Committee, CEE, CSU	2017
<i>Geotechnical and Geoenvironmental Engineering Research Related to Tailings and Mine Waste</i>	with Chris Bareither	Tailings and Mine Waste Conference	2015-2017
<i>Borland Research Equipment Proposal: Experimental Research in Geoenvironmental Engineering</i>	with Chris Bareither	Borland Committee, CEE, CSU	2015

TEACHING & ADVISINGAreas of Teaching

Geotechnical Engineering
 Environmental Geotechnics
 Geoenvironmental Engineering
 Tailings & Mine Waste

Teaching Awards and Honors

Nominated for 2020 Best Teacher Award, sponsored by the Colorado State University Alumni Association (1 of 3 teachers in college nominated)	2020
Faculty Award for Excellence in Teaching, Department of Civil & Environmental Engineering, Colorado State University	2018
ASCE Excellence in Civil Engineering Education (ExCEEEd) Fellow	2016

Courses Taught

Total number of students taught: 565

Course Number	Course Title	Year	Semester	Number of Students	Semester Score ¹
CIVE 355	Introduction to Geotechnical Engineering	2016	Spring	56	4.89
		2017	Spring	46	4.85
		2018	Spring	52	4.92
		2018	Fall	72	4.93
		2019	Spring	76	--- ²
		2019	Fall	71	--- ²
CIVE 558	Environmental Containment Systems	2015	Fall	9	4.75
		2017	Fall	14	5.00
		2019	Fall	20	--- ²
CIVE 559	Special Topics (Unsaturated Soil Geotechnics)	2018	Fall	15	4.86
CIVE 559	Special Topics (Fundamentals of Soil Behavior)	2021	Fall	28	--- ²
CIVE 638	Contaminant Transport	2020	Fall	7	--- ²
CIVE 657	Oral Communications in Geo-Engineering	2020	Spring	10	--- ²
CIVE 658	Remediation and Subsurface Containment	2016	Fall	15	5.00

Short Courses Organized & Managed

Tailings Center – Fundamentals of Tailings, Short Course 1, TSF Introduction to Tailings Engineering, August 23, 2021 (30 students)

Tailings Center – Fundamentals of Tailings, Short Course 6, TSF Closure and Reclamation, June 28, 2021, to July 8, 2021 (43 students)

Tailings Center – Tailings for Regulators, Introduction to Tailings Geotechnics, June 14-18, 2021 (26 students)

Pedagogical Training

2nd US University Council on Geotechnical Engineering Education (USUCGER) Career Workshop for Junior Faculty, Case Western Reserve University, Cleveland, Ohio, USA (2018)

Walter Scott, Jr. College of Engineering Master Teaching Initiative Workshops (regular attendee; 2017-present)

IGS-NA Educate the Educator (EtE), Kingston, Ontario, Canada (2017)

ASCE Excellence in Civil Engineering Education (ExCEED), West Point, NY (2016)

Funded Teaching Initiatives

Total raised for teaching initiatives = \$20,000

Initiative	Funder	Funding	Funding Period
<i>Enhancing Undergraduate Dam Education via Instrumented Physical Models</i>	Engineering Student Technology Committee (ESTC)	\$10,000	2016 (complete)
<i>Data Acquisition Upgrade for Undergraduate Geotechnical Engineering Lab</i>	Engineering Student Technology Committee (ESTC)	\$10,000	2016 (complete)

¹ Based on response to question #23 of standard student course survey: “How do you rate this instructor?” where 5 = excellent, 4 = above average, 3 = average, 2 = below average, 1 = poor.

² CSU discontinued quantitative student course surveys in Spring 2019.

Graduate Students Supervised*PhD Students*

Bindner, Joseph – To be determined	expected spring 2025
Lund, Rehman ^(TKG) – Use of biopolymers for canal seepage mitigation	expected fall 2022
Taher, Zana ^(CAB) – Hydro-mechanical behavior of filtered tailings	expected fall 2021
Neelufar, Aghazamani – Large-strain consolidation of heterogeneous mine tailings	expected fall 2021
Norris, Anna ^(CDS) – Mechanisms of interaction between bentonite and anionic polymers in enhanced geosynthetic clay liners	2021

MS Students

Matthew, Bullock – Remote sensing of soil moisture and strength using multiscale data products	expected spring 2023
Jacobs, Samuel – Developing the next generation of containment systems	expected spring 2023
VanTilburg, Charlie ^(TCS) – Innovative monitoring of environmental sites	expected spring 2022
Hale, Cameron ^(CAB) – Effect of initial conditions on critical state line of filtered tailings	expected spring 2022
Ciraula, Andrew ^(CAB) – Shear strength of high-moisture waste in landfills	expected fall 2021
Anthony, Mary ‘Ragan’ ^(TCS) – Longevity of benzene at oil contaminated sites	expected fall 2021
Sweeney, Donovan – State of practice and state of art in mine water treatment	expected summer 2021
DeBiasi, Marina ^(TCS) – Enhanced oleophilic bio-barriers for non-tidal settings	2021
Spenser, Louise ^(CAB) – Characterizing tailings professional labor demand	2021
Hogan, Wes ^(TCS) – Internet of things monitoring of the oxidation reduction potential in an oleophilic bio-barrier	2020
Vander Vis, Kimberly ^(CAB) – Electroosmotic dewatering of mine tailings	2020
Sitler, Katie ^(TCS) – Identification and validation of screening methods for assessment of the sheening potential of embedded oil in sediments	2020
Bindner, Joseph ^(JDN) – Procedure for measurement of surficial soil strength by bevameter	2020
Keene, Anthony ^(CIT) – Estimating interstitial discharge and velocity in flow in riprap and gabion engineering applications	2019
Pauley, Matt ^(JDN) – Modeling and field evaluation of the strength of surface soils for vehicle mobility	2019
Herweynen, Wes ^(CAB) – Shear strength of coal combustion products using the vane shear test	2018
Popang, Monika Aprianti ^(CDS) – Selected factors affecting measurement of the hydraulic conductivity of geosynthetic clay liners (GCLs)	2018
Taher, Zana ^(CAB) – Expansive soil mitigation by polymer technologies	2017
Fritz, Cameron ^(CDS) – Limiting clay membrane behavior in waste containment applications	2017
Tian, Zhengguang ^(CAB) – Development of a seepage induced consolidation apparatus	2017
Conzelmann, Joel – Effect of backpressure saturation on geosynthetic clay liner (GCL) hydraulic conductivity testing	2017

^(CDS) Co-advised with Charles D. Shackelford^(TKG) Co-advised with Timothy K. Gates^(CAB) Co-advised with Christopher A. Bareither^(TIS) Co-advised with Thomas C. Sale^(JDN) Co-advised with Jeffrey D. Niemann^(CIT) Co-advised with Christopher I. Thornton*Undergraduate Students*

Celie Brockett – Canal seepage mitigation by polymer sealants	Spring 2021 to present
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Angelita Chavez Cazarez – Canal seepage mitigation by polymer sealants	Spring 2021
Theresa O'Donnell-Sloan – Anionic polymer adsorption on bentonite	Spring 2021
Thomas Mayer – Oil-particulate aggregate sheen screening column testing	2019-2020
Riley McCullough – Particle size distributions of field-produced GeoWaste	2019-2020
Evans, Sarah – Enhanced bentonite hydraulic behavior	2018
Thompson, Justin – Engineering dam education	Summer 2016

Exchange Students

Saeed, Fizah – MS student from Mehran University of Engineering and Technology (MUET) in Jamshoro, Pakistan; U.S.-Pakistan Center for Advanced Studies in Water exchange program	2019
Memon, Awais – MS student from MUET in Jamshoro, Pakistan; exchange as part of U.S.-Pakistan Center for Advanced Studies in Water	2019
Nizamani, Nadir – MS student from MUET in Jamshoro, Pakistan; exchange as part of U.S.-Pakistan Center for Advanced Studies in Water	2018

SERVICE

Service Awards and Honors

ASTM International Emerging Professional (EP)	2018
Early Career Geotech Faculty Workshop Selected Participant, Case Western Reserve University	2018
U.S. Delegate, 5 th International Young Geotechnical Engineering Conference, Paris, France	2013
Severson Outstanding Geotechnical Graduate Student Award, University of Wisconsin	2012
U.S. Representative, 1 st U.S.-India Workshop on Global Geoenvironmental Engineering Challenges, New Dehli, India	2010

Professional Societies

American Society of Civil Engineers (ASCE)	2004 - present
Geo-Institute of ASCE (2009-present)	
Geoenvironmental technical committee (2016-present)	
Awards Sub-Committee Chair (2019-present)	
International Activities Committee (IAC), Strategic Plan Working Group (2017)	
CSU Graduate Student Organization (GSO) Faculty Advisor (2018-present)	
ASTM International	2016 - present
D18 Soil and Rock (voting member)	
D18.04 Hydrologic Properties of Soil & Rock	
D35 Geosynthetics (voting member)	
D35.04 Geosynthetic Clay Liners	
Technical Contact for Work Item WK64139 (Standard Guide for Polymer Amended Bentonites) (2018-present)	
International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)	2015 - present
Order of the Engineer	2012 - present
Society for Mining, Metallurgy & Exploration (SME)	2020 - present
Tailings Technical Committee (2020-present)	
Filtered Tailings Technical Sub-Committee (2021-present)	
CSU Student Chapter Faculty Advisor (2020-present)	

Colorado Section Awards Committee (2021-present)

United States Universities Council on Geotechnical Engineering (USUCGER) 2015 - present

Editorial Roles

Editorial Board Member, *Canadian Geotechnical Journal* 2017 - present

Editorial Board Member, *Geosynthetics International* 2019 - present

Editorial Board Member, *Environmental Geotechnics* 2020 - present

Reviewer for over 20 international journals, including: 2009 - present

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|--|---|
| <i>Applied Clay Sciences</i> | <i>Journal of Geotechnical & Geoenvironmental Engineering</i> |
| <i>Coal Combustion & Gasification Products</i> | <i>Journal of Environmental Engineering</i> |
| <i>Engineering Geology</i> | <i>Journal of Hazardous Materials</i> |
| <i>Environmental Geotechnics</i> | <i>Journal of Materials in Civil Engineering</i> |
| <i>Geomechanics for Energy and the Environment</i> | <i>Materials & Manufacturing Processes</i> |
| <i>Géotechnique Letters</i> | <i>Separation Science & Technology</i> |
| <i>Geotechnical & Geological Engineering</i> | <i>Soil Science Society of America Journal</i> |
| <i>Geotechnical Testing Journal</i> | <i>Soils & Foundation Journal</i> |
| <i>Geotextiles & Geomembranes</i> | <i>Vadose Zone Journal</i> |
| <i>International Journal of Mining</i> | <i>Waste Management</i> |
| <i>Reclamation & Environment</i> | |

Conference Organization

Major Role

Tailings and Mine Waste '20, Keystone, Colorado, USA, Nov. 15-18, 2020.

Tailings and Mine Waste '18, Keystone, Colorado, USA, Sept. 30 - Oct. 2, 2018.

Tailings and Mine Waste '16, Keystone, Colorado, USA, Oct. 3-5, 2016.

Minor Role

Geosynthetics Conference, Other Environmental Topics session co-chair, Houston, Texas USA, Feb. 10-13, 2019.

Geotechnical Frontiers, Bentonite Barrier Materials session co-chair, Orlando, Florida USA, March 12-15, 2017.

Geo-Chicago 2016: Sustainability, Energy and the Geoenvironment, Bentonite Barrier Materials session co-chair, Chicago, Illinois, USA, Aug. 15-17, 2016.

University Service

College Level

College of Engineering Strategic Plan Development Committee (SPDC), Walter Scott, Jr. 2021

College of Engineering, CSU

College of Engineering Technology Committee (CETC), Walter Scott, Jr. College of Engineering, CSU 2017 - 2019

Engineering Student Technology Committee (ESTC) faculty representative, Walter Scott, Jr. College of Engineering, CSU 2017 - 2019

Walter Scott, Jr. College of Engineering Diversity, Equity, and Inclusion (DEI) Committee 2020 - present

Department Level

Diversity, Equity, and Inclusion (DEI) Committee 2019 - present
Committee Chair (2019-present)

Graduate Instruction Committee	2017 - 2018
Graduate Admissions Committee	2016 - 2020
Undergraduate Instruction Committee	2015 - 2016
<u>External Service</u>	
University of Wisconsin-Madison, Board of Visitors for Geological Engineering Program	2018 - present