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Education

Ph.D., University of Wisconsin-Madison, Civil & Environmental Eng.	2017
M.S., University of Wisconsin-Madison, Civil & Environmental Eng.	2014
BS, Middle East Technical University, Ankara-Turkey, Civil Eng.	2012

Academic Appointments

Associate Professor- North Carolina State University, CCEE	2022-present
Assistant Professor- Washington State University, CEE	2017-2022
Research Assistant- University of Wisconsin-Madison, CEE	2012-2017
Teaching Assistant- University of Wisconsin-Madison, CEE	Fall 2013 and Spring 2016

Honors and Awards

WSU CEE Outstanding Junior Faculty Research Award	2022
NSF CAREER Award	2021
ASCE ExCEED Teaching Fellow	2018
Named as a "Rising Star" by MIT Dept. of Civil Eng.	2017
Norman H. Severson Geotechnical Award, University of Wisconsin-Madison	2017
Geotechnical Frontiers Student Travel Grant Award	2017
NSF Travel Award to participate in the Engineering Mechanics Institute Conference	2015
The Clay Minerals Society Meeting Student Travel Grant Award	2014
GeoCongress Student Travel Grant Award	2014
North Carolina State University Women in Engineering Symposium Travel Award	2014
High Honor Graduate, Middle East Technical University	2012

Research Grants (\$2.4M total, \$1.7M as PI)

Active Grants

Translating from kangaroo rat burrows to geotechnical engineering by uncovering fundamental processes, National Science Foundation (CMMI 2049636), 01/22 – 12/24, \$640,590, Role: PI, Collaborators: Haluk Beyenal (WSU ChemE), Clint Collins (Cal State Sacramento, Biology).

CAREER: Spatial quantification of fundamental mechanisms that initiate post-wildfire wetting-induced shallow landslides, National Science Foundation (CMMI 2042688), 01/22 – 12/26, \$567,113.

Past Grants

Post-fire water quality effects of biopolymer and polymer stabilization of burnt Washington hillslopes, State of Washington Water Research Center, 06/21 – 05/22, \$29,732, Role: PI, Collaborator: Amanda Hohner (WSU CEE).

Time-dependent effects of wildfire ash and root decay on hydrologic behavior and shallow landslide susceptibility of wildfire-burnt slopes, National Science Foundation (CMMI 1932129), 08/19–05/22, \$196,286.

Evaluating the contribution of soil organic carbon to improved water-holding capacity through increased compaction resistance, WSU BIOAg Grant Program, 03/20 – 12/21, \$38,737, Role: co-PI, Collaborators (WSU Crop and Soil Science): Gabriel LaHue (PI), Markus Flury, Haly Neely, and Andy Bary.

Utilization and limitations of using recycled asphalt pavement (RAP) as roadway embankment and structural backfill, Illinois Tollway, 01/20 – 12/21, \$149,252, Role: co-PI, Collaborators: Haifang Wen (PI), Balasingam Muhunthan (WSU CEE); and Tuncer Edil (UW-Madison CEE).

Post-wildfire stability and improvement of hillslopes near Pacific Northwest infrastructure to increase mobility, USDOT (PacTrans), 08/19 – 11/21, \$40,000.

Water vapor sorption and hydraulic conductivity of polymer-modified geosynthetic clay liners, GeoTechnical Women Faculty Seed Grant Program, 03/20 – 06/21, \$5,000, Role: PI, Collaborators: Kuo Tian (George Mason CEE).

Evaluation of on-site and in-situ treatment alternatives for contaminated soils, 01/18 – 04/21, \$454,979 Illinois Center for Transportation, Role: co-PI, Collaborators: Amanda Hohner (PI), Xianming Shi, Indranil Chowdhury, Richard Watts (WSU CEE); and James Mueller (Provectus Engineering).

Conversion of common DSP minerals into 2:1 clay-type minerals Phase 2, 03/19 – 07/20, \$163,303 Emirates Global Aluminium, Role: PI, Collaborator: John S. McCloy (WSU MME).

Conversion of common DSP minerals into 2:1 clay, 05/04/18 - 03/04/2019, \$49,945 Emirates Global Aluminium, Role: PI, Collaborator: John S. McCloy (WSU MME).

Strength and stiffness of unsaturated clay in relation to internal stress state, 05/18 – 08/19, \$15,371 WSU Seed Grant.

Teaching Grants (\$13,500)

Received \$10,000 from CPL to improve Geotechnical Engineering teaching laboratories, January 2020.

Received \$3,500 emergency funding from WSU Office of the Provost to improve the online delivery of CE 317 laboratory (purchased #200 sieves and shipped to students for a soil classification activity), January 2021.

Publications and Presentations (Google Scholar citations: 286, h-index: 9)

^C: corresponding author, ^U: paper with undergraduate student, ^G: paper with graduate students advised/mentored at WSU

Refereed Journal Publications

16^G. Bollinger, D., Erickson, J., Stone-Weiss, N., Lere-Adams, J., Karcher, S., Akin, I.D., and McCloy, J.S., 2021, “Structure of amorphous aluminosilicates obtained from mineral transformation: potential path for partial remediation of alkaline waste,” *Environmental Advances*, doi: <https://doi.org/10.1016/j.envadv.2021.100136>.

15. Lee, J., Fratta, D., Akin, I.D., 2021, “Shear strength and stiffness behavior of fine-grained soils at different surface hydration conditions,” *Canadian Geotechnical Journal*, doi: <https://doi.org/10.1139/cgj-2021-0033>.

- 14^{G,C}. Akin, I.D., Potter, L.S., and Edil, T.B., 2021, “Implications of interparticle forces on resilient and shear modulus of unsaturated compacted kaolinite,” *J. Geotech. Geoenviron. Eng.*, doi: 10.1061/(ASCE)GT.1943-5606.0002692.
- 13^{G,C}. Akin, I.D., and Akinleye, T.O., 2021, “Water vapor sorption behavior of wildfire-burnt soil,” *J. Geotech. Geoenviron. Eng.*, doi: 10.1061/(ASCE)GT.1943-5606.0002648.
- 12^{U,C}. Akin, I.D., Garnica, S.S., Robichaud, P.R., and Brown, R.E., 2021, “Surficial stabilization of wildfire-burnt hillslopes using xanthan gum and polyacrylamide,” *Geotechnical and Geological Engineering*, <https://doi.org/10.1007/s10706-021-01951-4>
- 11^{G,C}. Shariq, A.F., H. Beyenal, and I.D. Akin. 2021. “Biofilm addition improves sand strength over a wide range of saturations.” *Biofilm*, doi: <https://doi.org/10.1016/j.biofilm.2021.100050>.
10. Martinez, A., DeJong, J., Akin, I., Aleali, A., Arson, C., Atkinson, J., Bandini, P., Baser, T., Borela, R., Boulanger, R., Burrall, M., Chen, Y., Collins, C., Cortes, D., Dai, S., DeJong, T., Del Dottore, E., Dorgan, K., Fragaszy, R., Frost, D., Full, R., Ghayoomi, M., Goldman, D., Gravish, N., Guzman, I.L., Hambleton, J., Hawkes, E., Helms, M., Hu, D.L., Huang, L., Huang, S., Hunt, C., Irschick, D., Lin, H., Lingwall, B., Marr, W.A., Mazzolai, B., McInroe, B., Murthy, T., O’Hara, K., Porter, M., Sadek, S., Sanchez, M., Santamarina, C., Shao, L., Sharp, J., Stuart, H., Stutz, H.H., Summers, A.P., Tao, J., Tolley, M., Treers, L., Turnbull, K., Valdes, R., van Passen, L., Viggiani, G., Wilson, D., Wu, W., Yu, X. and Zheng, J. 2021. “Bio-inspired Geotechnical Engineering: Principles, Current Work, Opportunities and Challenges,” 2021, *Géotechnique*, doi: <https://doi.org/10.1680/jgeot.20.P.170>.
- 9^C. Akin, I.D., and Likos, W.J., 2020, “Relationship between water vapor sorption kinetics and clay surface properties,” *J. Geotech. Geoenviron. Eng.*, 146(9): 06020015.
- 8^C. Akin, I.D., and Likos, W.J., 2020, “Suction stress of clay over a wide range of saturations,” *Geotechnical and Geological Engineering*, doi: <https://doi.org/10.1007/s10706-019-01016-7>.
7. Smitchger, J.A., Weeden, N., Akin, I., and Warketin, T., 2020, “Stress equation for a cantilever beam: a model of lodging resistance in field pea,” *Int. Agrophys.*, 34(2): 213-222.
6. Akin, I.D., and Likos, W.J., 2017, “Implications of surface hydration and capillary condensation to strength and stiffness of compacted clay,” *J. Eng. Mech.*, doi:10.1061/(ASCE)EM.1943-7889.0001265.
5. Akin, I.D., and Likos, W.J., 2017, “Brazilian tensile strength testing of compacted clay,” *Geotech. Test. J.*, doi: 10.1520/GTJ20160180.
4. Akin, I.D., and Likos, W.J., 2016, “Single-point and multi-point water sorption methods for specific surface areas of clay,” *Geotech. Test. J.*, Vol. 39 (2): 291-300.
3. Akin, I.D., and Likos, W.J., 2016, “Evaluation of isotherm models for water vapor sorption behavior of expansive clays,” *J. Perf. Const. Fac.*, doi: 10.1061/(ASCE)CF.1943-5509.0000899.
2. Khorshidi, M., Lu, N., Akin, I.D., and Likos, W.J., 2016, “Intrinsic relation between specific surface area and soil water retention,” *J. Geotech. Geoenviron. Eng.*, doi: 10.1061/(ASCE)GT.1943-5606.0001572.
1. Akin, I.D., and Likos, W.J., 2014, “Specific surface area of clay using water vapor and EGME sorption methods,” *Geotech. Test. J.*, Vol.37 (6): 1-12.

Model

WSU Suction-Based LISA: A probabilistic slope stability model to evaluate wetting-induced shallow landslide susceptibility of hillslopes.

Technical Reports

- 5^G. Wen, H., Barzegar, M., Mivechi, M., Akin, I., Muhunthan, B., and Edil, T., 2022, "Utilization and limitations of using recycled asphalt pavement (RAP) as roadway embankment material," Illinois Tollway.
- 4^C. Akin, I.D., 2021, "Post-wildfire stability and improvement of hillslopes near PNW transportation infrastructure to increase mobility," Pacific Northwest Transportation Consortium.
- 3^{G,C}. Akinleye, T., Akin, I.D., Hohner, A., Chowdhury, I., Watts, R., Shi, X., Dutmer, B., Mueller, J., and Moody, W. 2021, "Evaluation of electrochemical treatment for removal of arsenic and manganese from field soil," Illinois Center for Transportation.
- 2^G. Pelletier, A., Hohner, A., Akin, I.D., Chowdhury, I., Watts, R., Shi, X., Dutmer, B., and Mueller, J. 2021, "Bench-scale electrochemical treatment of co-contaminated clayey soil," Illinois Center for Transportation.
1. Hohner, A.K., Pelletier, A., Akin, I., Chowdhury, I., Watts, R., Shi, X., Dutmer, B., and Mueller, J., 2020, "Summary of Illinois regulations and review of treatment alternatives for contaminated soils in right-of-ways," Illinois Center for Transportation.

Refereed Conference Publications and Conference Presentations

- 6^{G,C}. Ahmed, A., Hohner, A.K., Robichaud, P.R., and Akin, I.D., 2022, "Geoenvironmental impacts of post-wildfire hillslope stabilization with xanthan gum and polyacrylamide," GeoCongress 2022, Charlotte, NC.
- 5^{G,C}. Akinleye, T.O., Hohner, A.K., Shi, X., and Akin, I.D., 2022, "Influence of Electrochemical Remediation on the Hydraulic and Mechanical Behavior of a Metal-Contaminated Clayey Soil," GeoCongress 2022, Charlotte, NC.
4. Akin, I.D., Chen, J., Benson, C.H., and Likos, W.J., 2018, "Evaluation of water vapor sorption and electrical conductivity methods to determine bentonite content of a soil-bentonite barrier," IFCEE 2018, Orlando, FL.
3. Akin, I.D., and Likos, W.J., 2017, "Tensile strength and stiffness of compacted clay between residual saturation and air-entry," Geotechnical Frontiers, Orlando, FL.
2. Akin, I.D., Chen, J., Likos, W.J., and Benson, C.H., 2017, "Water vapor sorption of bentonite-polymer mixtures contracted with aggressive leachates," Geotechnical Frontiers, Orlando, FL.
1. Akin, I.D., and Likos, W.J., 2016, "Water vapor sorption of polymer-modified bentonites", Geo-Chicago, Chicago, IL.

Other Conference Presentations

5. Akin, I.D., 2021, "Geoenvironmental impacts of post-wildfire hillslope stabilization with xanthan gum and polyacrylamide," ASCE Geo-Institute Web Conference.
- 4^G. Bollinger, D.L., McCloy, J.S, and Akin, I.D., 2020, "Transformation of sodalite/cancrinite minerals to and from clays in the context of industrial wastes," The Clay Minerals Society Annual Meeting, Richland, WA.
- 3^G. Potter, L.S., and Akin, I.D., 2018, "Implications of internal stress state on resilient modulus of subgrade materials," GeoCongress 2018 GeoPoster Competition.
2. Akin, I.D., 2015, "Mechanical implications of clay surface hydration and capillary condensation," Engineering Mechanics Institute Conference, Stanford, CA
1. Akin, I.D., 2014, "Specific surface area of clayey soils by ethylene glycol monoethyl ether and water vapor sorption methods," The Clay Minerals Society Annual Meeting, College Station, TX.

Non-refereed Publication and Presentation

Likos, W.J., and Akin, I.D., 2016, “Transitions in unsaturated soil mechanics,” NSF Workshop on Geotechnical Fundamentals in the Face of New World Challenges, Washington, DC.

Invited Presentations at Workshops/Meetings and Seminars

Georgia Tech, Atlanta, GA, 2022. “Soil water retention mechanisms and implications to soil mechanical behavior”

Penn State, State College, PA, 2022. “Soil water retention mechanisms and implications to soil mechanical behavior”

North Carolina State University, Raleigh, NC, 2022. “Soil water retention mechanisms and implications to soil mechanical behavior with a focus on wildfire slope stability issues”

University of Florida, Gainesville, FL, 2022. “Soil water retention mechanisms and implications to soil mechanical behavior”

The Ohio State University, Columbus, OH 2022. “Soil water retention mechanisms and implications to soil mechanical behavior”

University of Massachusetts Amherst, Amherst, MA, 2022. “Post-wildfire slope stability”

METU 510 Seminar, Middle East Technical University, Ankara, Turkey, 2021. “Evolution in soil properties of a burnt slope over time”

University of Massachusetts Dartmouth, Dartmouth, MA, 2021. “Evolution in soil properties of a burnt slope over time”

UCLA, Los Angeles, CA, 2021. “Evolution in soil properties of a burnt slope over time after a wildfire and implications to hillslope stability”

Tufts University, Medford, MA, 2021. “Soil water retention mechanisms and implications to soil mechanical behavior”

Colorado School of Mines, Golden, CO, 2020. “Soil water retention mechanisms and implications to engineering behavior”

WSU ChemE Seminars, Pullman, WA, 2020. “Soil water retention mechanisms and implications to mechanical behavior”

METU Seminar Series, Middle East Technical University, Ankara, Turkey, 2019. “Post-wildfire slope stability”

WSU Porous Media Research Cluster Seminar, Pullman, WA, 2018. “Unsaturated geoenvironmental and biogeotechnics research at WSU”

2nd USUCGER Workshop for the Early Career Geotechnical Faculty, Cleveland, OH, 2018. “Self-healing hydraulic barriers for waste containment”

MIT Rising Stars Workshop, Boston, MA, 2017. “Internal stress state of unsaturated clay”

Geological, Mining, and Geotechnical Engineering 2nd Technical Conference and Alumni Reunion, UW-Madison, Madison, WI, 2017. “Suction stress of compacted clay over the entire range of saturation”

Graduate and Undergraduate Students Supervised

Graduate Students (Advisor)

Tirkes*, S., PhD student, WSU CEE, 01/22 -

Demir, M., MS student, WSU CEE 01/22 -

Ahmed, Alishan, PhD candidate, WSU CEE, 01/21-

Potter, L.S., MS student, WSU CEE, “Implications of internal stress state to resilient and shear modulus of unsaturated clay,” 01/18 – 11/21 (graduated as non-thesis).

Akinleye*, T.O., MS student, WSU CEE, “Geotechnical properties of metal-contaminated clay after electrical remediation,” 08/19 – 05/21.

Shehrin*, T., MS student, WSU CEE, “A probabilistic slope stability model for wetting-induced shallow landslides,” 05/19 – 12/20.

Shariq, A. F., MS, WSU CEE, “Suction stress characteristic curve of biofilm- and biopolymer-enhanced sand,” 08/18 – 09/20.

Graduate Students (Committee Member)

Whitehead, R., PhD, WSU Math

Umtoniwase, A*., MS, WSU CEE

Lundgreen, C., PhD, WSU CEE

Manawadu, A.*, PhD, WSU CEE

Barzegar, M., PhD, WSU CEE

Tohidi, V.*, PhD, WSU CEE

Cantrell, L., PhD, WSU CEE

Bollinger, D.L., PhD, WSU MME

Honarvarnazari, M., PhD, WSU CEE

Mivechi, M., MS, WSU CEE

Sattarov, S., MS, WSU CEE

Lim, J., MS, WSU CEE

Undergraduate Students

McKailee Beck*, WSU CEE, “Cation exchange capacity of wildfire-burnt soil and ash,” 09/21 – 08/22.
Christopher Watt, WSU CEE, “Suction stress characteristic curve of xanthan gum enhanced sand,” 09/21 – 08/22.

Li Wright*, WSU CEE, “Water retention behavior of polymer-modified geosynthetic clay liners,” 03/21-01/22.

Zechariah Rodino, WSU CEE, “Suction stress characteristic curve of cement-stabilized sand,” 09/21 – 03/22.

Steven Litalien*, UI CEE, “Indoor rainfall simulation experiments on wildfire-burnt soil,” 09/21 – 12/21.

Diana Logan*, WSU MME, “Remolded shear strength of wildfire-burnt soil,” 03/21- 09/21.

Andrea Carpenter*, WSU CEE, “Shear strength of wildfire-burnt surface soil after multiple wet-dry cycles,” 01/20 – 03/20.

Amariah Del Mar*, WSU EECS, “Updating LISA code with suction stress,” 08/19 – 01/21.

Ivy Woltering*, WSU CEE “1. Water retention behavior of polymer-modified geosynthetic clay liners
2. Water vapor sorption of wildfire-burnt soil,” 09/19 – 03/20.

Sophia Garnica*, WSU CEE, “Grain size distribution and plasticity of wildfire-burnt soil over time,” 07/19 – 03/20.

Zachary Stewart, WSU CEE “Scaling down the standard cation exchange capacity test,” 09/19 – 03/20.

Cheyenne Ness*, WSU CEE, “Bentonite content of soil-bentonite barriers (Li-method)” 07/19 – 02/20.

Julian Silva*, WSU ChEBE, “Unconfined compressive strength of biofilm-enhanced sand,” 06/19 – 09/19.

Youjin Kim*, WSU ChEBE, “Unconfined compressive strength of biofilm-enhanced sand,” 01/19 – 06/19.

Eric Larson, WSU CEE, “Bentonite content of soil-bentonite barriers (Na-method),” 09/18 – 06/19.

Levi Potter, WSU CEE, “Resilient modulus of compacted kaolinite in a wide range of saturations,” 08/17 – 01/18.

Miranda Sachtschale*, UW-Madison CEE “Bentonite content of soil-bentonite barriers (TSPP-method),” 10/16 – 05/17.

Evan Beyer, UW-Madison CEE, “Effects on loading rate on tensile strength of compacted clay”09/15 – 04/16.

* indicates students from underrepresented groups

Teaching

WSU CE 317- Geotechnical Engineering

Fall 17 (63 students), Spring 18 (46 students), Spring 19 (64 students), Spring 20 (60 students), Spring 21 (56 students).

WSU CE 425/525- Soil and Site Improvement

Fall 18 (38 students), Fall 19 (53 students), Fall 20 (44 students), Fall 21 (28 students).

WSU CE 511- Unsaturated Soil Mechanics

Spring 19 (6 students), Spring 20 (4 students), Spring 21 (6 students), Spring 22 (7 students).

WSU CE 580/600- Graduate Seminar

Fall 18 (21 students), Fall 20 (10 students).

Guest Lectures

WSU CE 580- Graduate Seminar

Fall 2020: “The international recipe”

Fall 2019: “Post-wildfire slope stability”

Fall 2018: “Unsaturated geoenvironmental and biogeotechnics research at WSU”

Fall 2017: “Suction stress characteristic curve of compacted clay”

Service Activities

Reviewer

National Science Foundation: 4 ad-hoc (3 CMMI/ECI, 1 EAR/GI), 1 panel (CMMI/ECI)

Journal paper: Journal of Geotechnical and Geoenvironmental Engineering, Geotechnical Testing Journal, Computers and Geotechnics, Canadian Geotechnical Journal, Géotechnique Letters, Environmental Geotechnics, Geotechnical and Geological Engineering, Journal of Testing and Evaluation, Vadose Zone Journal

Conference paper: Geotechnical Frontiers 2017, PanAm UNSAT 2017, GeoCongress 2019, IFCEE 2021, GeoCongress 2022.

Other: G-I Geoenvironmental Engineering Committee Practice Manual, 2022 GeoPoster Competition

Associate Editor

Environmental Geotechnics 12/21 – present.

Conference Organizing Committee

ASCE GI Geoenvironmental Engineering Specialty Conference 2024

Session Co-Chair

GeoCongress 2023, GeoCongress 2022, IFCEE 2021, GeoCongress 2020, PanAm UNSAT 2017.

University Service

NC State: Undergraduate committee member

WSU: Undergraduate committee member, undergraduate mentor, participated in ABET accreditation in 2019, member of structural engineering faculty search committee in 2021/22.

Service as a student leader (UW-Madison)

Student Leadership Council Representative, Geo-Institute Graduate Student Organization (2016-2017)

Vice President of Outreach- Geo-Institute Graduate Student Organization (2015-2016)

Graduate Mentor of University of Wisconsin-Madison at Nazarbayev University-Kazakhstan (2015).

Membership in Professional Organizations

International Society for Soil Mechanics and Geotechnical Engineering- member

American Society of Civil Engineers- associate member

Geo-Institute Unsaturated Soils Committee- member

Geo-Institute Geoenvironmental Engineering Committee- member (and chair of the awards subcommittee)

US Universities Council on Geotechnical Engineering Research- member

TRB AKG40 Mechanics and Drainage of Saturated and Unsaturated Geomaterials – member

TRB AKG30 Geoenvironmental and Climatic Impacts on Geomaterials – member

International Geosynthetics Society North America – member

Geotechnical Extreme Events Reconnaissance – member

Most Recent Invited Professional Development Activities

NSF NHERI RAPID Intensive Training Workshop, Seattle, WA, 2022.

American Society for Engineering Education National Effective Teaching Institutes (NETI) Workshop, online, 2020.

The ExCEED Community Exchange series, 2020, online.

USUCGER Teaching Strategies and Resources Workshop, Minneapolis, MN, 2020.

IGS Educate the Educators Workshop, San Diego, CA, 2019.

NSF 1st International Workshop on Bio-inspired Geotechnics, Pacific Grove, CA, 2019.

ASCE ExCEED Workshop, West Point, NY, 2018.

2nd USUCGER Workshop for the Early Career Geotechnical Faculty, Cleveland, OH, 2018.

Connecting Women Faculty in Geotechnical Engineering Workshop Part 1 and Part 2, NSF, Washington, DC, 2017, and Orlando, FL, 2018.