

Colby W. Brungard

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USA

EDUCATION **Utah State University,** Logan, Utah, USA

Ph.D., Soil Science, August, 2014

M.S., Soil Science, October, 2009

B.S., Physical Geography, December 2006
 • *Valedictorian, College of Natural Resources*

PROFESSIONAL EXPERIENCE **Assistant Professor** Aug 2016–present
Dept. of Plant and Environmental Sciences, New Mexico State University

Post-Doctoral Research Scientist May 2014–Aug 2016
Dept. of Plants, Soils and Climate, Utah State University

PUBLICATIONS *Jha, G., Ulery, A., Lombard, K., VanLeeuen D., **Brungard, C.**, Dari, B., Sihi, D., (submitted 2021 WATE-D-21-00526). Portable X-Ray Fluorescence (PXRF) Analysis of Total Metal(loid)s and Sequential Extraction of Bioavailable Arsenic in Agricultural Soils of Animas Watershed. *Water, Air, Soil Pollution*.
‡ = *postdoc*
* = *graduate*
† = *undergrad*

Brungard, C.W., Nauman, T.W., Duniway, M.C., Veblen, K., Nehring, K., White, D., Salley, S., and Anchang, J. 2021. Regional Ensemble Modeling Reduces Uncertainty for Digital Soil Mapping. *Geoderma*. 397, 114998. <https://doi.org/10.1016/j.geoderma.2021.114998>

*Jha, G., Mukhopadhyay, S., Ulery, A., Lombard, K., Chakraborty, S., Weindorf, D., VanLeeuwen, D., **Brungard, C.**. 2021. Agricultural Soils of the Animas River Watershed: An Elemental Spatiotemporal Analysis via Portable X-ray Fluorescence Spectroscopy after the Gold King Mine Spill. *Journal of Environmental Quality*. <https://access.onlinelibrary.wiley.com/doi/10.1002/jeq2.20209>

‡Fick, S.E., Nauman, T.W, **Brungard, C.W**, Duniway, M.C. 2020. Evaluating natural experiments in ecology: using synthetic controls in assessments of remotely-sensed land-treatment effects. *Ecological Applications* 31(00): e02264. [doi:10.1002/eap.2264](https://doi.org/10.1002/eap.2264)

*Omer, M., Idowu, O., **Brungard, C.**, Ulery, A., Adedokun, B., McMillan, N., Guldan, S. 2020. Visible Near-Infrared Reflectance and Laser-Induced Break-down Spectroscopies for Sensing Soil Quality in Arid and Semiarid Agroecosystems. *Soil Syst.* 4, 42. <https://www.mdpi.com/2571-8789/4/3/42>

Pahlavan-Rad, M.R., Dahmardehb, K., Hadizadehb, M., Keykhab, G., Mohammadniab, N., Gangalic, M., Keikhad, M., Davatgare, N., **Brungard, C.**. 2020. Prediction of soil water infiltration using multiple linear regression and random forest in a dry flood plain, eastern Iran. *Catena.* 194. 104715. doi: 10.1016/j.catena.2020.104715

†Whiting, M., Salley, S.W., James, D.K., Karl, J.W. and **Brungard, C.W.** 2020. Rapid Bulk Density Measurement Using Mobile Device Photogrammetry. *Soil Sci. Soc. Am. J.* 84:3. 811-817. doi:10.1002/saj2.20063

Ross, C.W., Grunwald, S., Vogel, J.G., Markewitz, D., Jokela, E.J., Martin, T.A., Bracho, R., Bacon, A.R., **Brungard, C.W.**, Xiong, X. 2020. Accounting for two-billion tons of stabilized soil carbon, *Science of The Total Environment*, 703 (134615), <https://doi.org/10.1016/j.scitotenv.2019.134615>

Peters, D.C., Burruss, N.D., Okin, G.S., Hatfield, J.L., Scroggs, S.L.P., Huang, H., **Brungard, C.W.**, Yao, J. 2020. Deciphering the past to inform the future: preparing for the next big extreme event. *Front. Ecol. Environ.* 2020. <https://doi.org/10.1002/fee.2194>

Jamshidi, M., Delavar, M., Taghizadehe-Mehrjerdi, R., **Brungard, C.** 2019. Disaggregation of conventional soil map by generating multi realizations of soil class distribution (case study: Saadat Shahr plain, Iran). *Environ Monit Assess* 191, 769 (2019). <https://doi.org/10.1007/s10661-019-7942-x>

Brungard, C.W., *Allan, M.J., 2019. Predictive Soil Mapping to Improve the Physical Basis of Distributed Ecohydrological Models in Arid Environments. NM WRI Technical Completion Report No. 382. <https://nmwri.nmsu.edu/tr-382/>

Chaney, N., **Brungard, C.W.**, Herman, J.D., McBratney, A.B., Minasny, B., Morgan, C.L.S., Nauman, T.W., Wood, E.F., Yimam, Y. 2019. POLARIS properties: 30-meter probabilistic maps of soil properties over the contiguous United States. *Water Resources Research*, 55, 29162938. <https://doi.org/10.1029/2018WR022797>

Zeraatpisheh, M., Ayoubi, S., **Brungard, C.**, Finke, P. 2019. Disaggregating and Updating a Legacy Soil Map Using DSMART, Fuzzy c-means and K-means Clustering algorithms in Central Iran. *Geoderma*, 340. pp. 249-258. doi/10.1016/j.geoderma.2019.01.005

Malone, B.P., Minasny, B., **Brungard, C.** 2019. Some methods to improve the utility of conditioned Latin hypercube sampling. *PeerJ* 7:e6451 <https://doi.org/10.7554/peerj.6451>

[//doi.org/10.7717/peerj.6451](https://doi.org/10.7717/peerj.6451)

Pahlavan-Rad, M.R., Dahmardeh, K., **Brungard, C.B.**. 2018. Predicting soil organic carbon concentrations in a low relief landscape, eastern Iran. *Geoderma Regional*. 15. <https://doi.org/10.1016/j.geodrs.2018.e00195>

Peters, D.P.C., Burruss, N.D., Rodriguez, L.L., McVey, D.S., Elias, E.H., Pelzel-McCluskey, A.M., Derner, J.D., Schrader, T.S., Yao, J. Pauszek, S.J., Lombard, J., Archer, S.R., Bestelmeyer, B.T., Browning, D.M., **Brungard, C.W.**, Hatfield, J.L., Hannan, N.P., Herrick, J.E., Okin, G.S., Sala, O.E., Savoy, H., Vivoni, E.R. 2018. An integrated view of complex landscapes: a big data-model integration approach to trans-disciplinary science. *BioScience*, 68:9, pp. 653669. <https://doi.org/10.1093/biosci/biy069> <https://doi.org/10.1093/biosci/biy069>

Fan, Zhasheng, Wills, S., Herrick, J., Nauman, T., **Brungard, C.W.**, Beaudette, D., Levi, M, O'Geen, A. 2018. Approaches for improving field soil identification. *Soil Sci. Soc. Am. Journal*. 82:871-877. doi:10.2136/sssaj2017.09.0337

Ramcharan, A., Hengl, T., Nauman, T., **Brungard, C.W.**, Waltman, S., Wills, S., Thompson, J. 2018. Soil Property and Class Maps of the Conterminous United States at 100-Meter Spatial Resolution. *Soil Sci. Soc. Am. Journal*. 82:186-201. doi:10.2136/sssaj2017.04.0122

Pahlavan-Rad, M.R., Khormali, F., Toomanian, N., **Brungard, C.W.**, Kiani, F., Komaki, C.B., Bogaert, P. 2016. Legacy soil maps as a covariate in digital soil mapping: a case study from Northern Iran. *Geoderma*. 279, 141-148. <http://dx.doi.org/10.1016/j.geoderma.2016.05.014>

Submitted or In-revision

*Gaurav, J., Ulery, A., Lombard, K., VanLeeuwen, D., **Brungard, C.**, Dari, B., Sihi, D.(submitted JEQ-2020-11-0374-TR.R1). Monitoring Total Heavy Metal(loid)s and Bioavailable Arsenic in Agricultural Soils of Animas Watershed, New Mexico (USA). *Ecotoxicology and Environmental Safety*.

‡Fick, S.E., Nauman, T.W, **Brungard, C.W.**, Duniway, M.C. In Prep. What determines the effectiveness of Pinion-Juniper Clearing Treatments? Evidence from the remote sensing archive. *Applied Vegetation Science*.

Prior to NMSU

Chaney, N.W., Hempel, J.W., McBratney, A.B., Nauman, T.W., **Brungard, C.W.**, Odgers, N., Wood, E.F. 2016. POLARIS: A 30-meter Probabilistic Soil Series Map of the Contiguous United States. *Geoderma*. 274, 54-67. doi:10.1016/j.geoderma.2016.03.025

Brungard, C.W., Boettinger, J.L., Hipps, L.E. 2015. Wind Erosion Potential of Lacustrine and Alluvial Soils Before and After Disturbance in the Eastern Great Basin, USA: Estimating Threshold Friction Velocity Using Easier-to-Measure Soil Properties. *Aeolian Research*, 18, pp. 185-203.

Brungard, C.W., Boettinger, J.L., Duniway, M.C., Wills, S.A., Edwards Jr., T.C. 2015. Machine learning for predicting soil classes in three arid landscapes. *Geoderma*, 239–240, pp. 68-83.

Pahlavan Rad, M.R., Toomanian, N., Khormali, F., **Brungard, C.W.**, Komaki, C.B., Bogaert, P. 2014. Updating soil survey maps using random forest and conditioned Latin hypercube sampling in the loess derived soils of northern Iran. *Geoderma*, 232–234, pp.97–106.

Brungard, C.W., Boettinger, J.L. 2012. Spatial prediction of biological soil crust classes: value added DSM from soil survey, in: Minasny, B., Malone, B.P., McBratney, A. (Eds.), *Digital Soil Assessments and Beyond: Proceedings of the 5th Global Workshop on Digital Soil Mapping*. CRC Press, Sydney Australia, pp. 57-60.

Brungard, C.W., Boettinger, J.L. 2010. Application of Conditioned Latin Hypercube Sampling for Digital Soil Mapping of Arid Rangelands in Utah, USA, in: Boettinger, J.L., Howell, D.W., Moore, A.C., Hartemink, A.E., Kienast-Brown, S. (Eds.), *Digital Soil Mapping: Bridging Research, Production, and Environmental Application, and Operation*. Springer, Dordrecht, pp. 67-78.

Non-Peer Reviewed

Brungard, C., Johanson, J. 2015. The gates locked! I cant get to the exact sampling spot ... can I sample nearby? *Pedometron*, 37, pp. 8-10.

TEACHING	SOIL 252 SOILS (3 cr)	F 2018, 2020
	ES 391 Internship (2 cr)	Sp 2018
	SOIL 472 Soil Morphology & Classification (4 cr)	F 2017, 2018, 2019, 2020
	SOIL 500 Geostatistics I and II (2 cr)	F 2017, Sp 2018
	SOIL 500 Soil Judging (1 cr)	Sp 2018
	AGRO/HORT/SOIL 590/694 Graduate Seminar (1 cr)	Sp 2017, 2018; F 2017
	SOIL 650 Advanced Multivariable Classification (1–3) cr	Sp 2019
	<i>F = Fall, Sp = Spring</i>	

EXTERNAL FUNDING Cooperative Project: USDA Natural Resources Conservation Service. 2020 2022. "Digital Soil Mapping of Ecological and Edaphic Properties in the Rio Puerco Watershed, NM". PI: Brungard (credit 100%). \$145,000.

Cooperative Project: USDI Bureau of Land Management. 2019 2022. "Digital soil mapping to support ecological site identification". PI: Brungard (credit

100%). \$336,487.

Cooperative Project: USDA Natural Resources Conservation Service. 2019 2020. "2020 Western Region Cooperative Soil Survey Conference". PI: Brungard (credit 100%). \$15,000.

Cooperative Project: United States Geological Survey. 2019 2021. "Applying new tools for land management". PI: Brungard (credit 100%). \$30,998.

Cooperative Project: National Park Service. 2019 2022."Soils Mapping on Valles Caldera in Support of Forest Restoration and Fire Management", PI: Brungard (credit 100%). \$36,469.

Competitive grant: USDA Natural Resources Conservation Service. 2019 2021. "Seamless, regionally-specific raster soil property maps to support interpretations". PI: Brungard (credit 100%). \$69,988.

Cooperative Project: USDA Natural Resources Conservation Service. 2019 2023. "Integrative Geospatial Mapping of New Mexico's Acequias". PI: Bueneman, M. (credit 95%) CoPI: Brungard, C. (credit 5%). \$175,000.

Competitive grant: USDA Natural Resources Conservation Service. 2018 2021. "New Tools for the Evaluation of Conservation Practice Effectiveness". PI: Brungard (credit 100%). \$154,936.

Cooperative Project: West Virginia University (subaward). Funding agency: USDA Natural Resources Conservation Service. 2018 2022. "Continuous Soil Properties Initiative". PI: Brungard (credit 100%). \$92,290.

Competitive grant: National Science Foundation. Major Research Instrumentation. 2018. Acquisition of an ASD FieldSpec 4 Hi-Res Spectroradiometer at NMSU. PI: Bueneman, M (credit 95%). CoPI: Brungard C. (credit 5%). \$118,400.

Competitive grant: National Science Foundation. 2018. Long Term Research at the Jornada Basin (LTER VII). Lead PI: Peters, D. CoPI: Brungard (credit 7%). \$6,762,000.

Cooperative Project: United States Forest Service. 2018 2022. Digital Soil Mapping of the Cascades Region to Support Forest Service Management Interpretations. PI: Brungard (credit 100%). \$258,466.

Cooperative Project: Utah State University (subaward). Funding agency: Utah Division of Wildlife Resources. 2017 2021. Interactive effects of soils and browsing on sagebrush: implications of restoration success. PI: Brungard (credit 100%). \$13,508

Cooperative Project: USDA Natural Resources Conservation Service. 2017

2021. Quantitative Definition of Land Resource Units and Ecological Sites in the Southwest. PI: Brungard (credit 50%). CoPI: Brown (credit 50%). \$249,998

Cooperative Project: United States Geological Survey. 2017–2021. Cooperative Ecosystem Studies Unit, Colorado Plateau CESU. PI: Brungard (credit 100%). \$45,995

Cooperative Project: NM Water Resources Research Institute. 2017–2018. Digital Soil Mapping for Improving Hydrological Modeling of NM Water Resources. PI: Brungard (credit 100%). \$45,285

Cooperative Project: USDI Bureau of Land Management. 2017–2022. Tools and Techniques for Biological Soil Crust Survey. PI: Brungard (credit 80%). Co-PI: Pietrasiak (credit 20%). \$65,978

PROFESSIONAL
PRESENTATIONS
(* = STUDENT)

*Winsor, H., Brungard, C.W. 2021. Mining Conceptual Soil-Landscape Models from Soil Survey. National Cooperative Soil Survey Conference. Auburn, AL (virtual). <https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=nrcseprd1779623>

Brehm, J.R., Brungard, C.W. 2021. InteRpretations: Soil Interpretations outside of NASIS. National Cooperative Soil Survey Webinar. <https://www.youtube.com/watch?v=93e5hlc6vto>

Brehm, J., Nauman, T., Brungard, C. InteRpretations: An R-based soil interpretations engine using gridded soil and environmental datasets. 2020 ASA-CSSA-SSSA International Annual Meeting. Virtual. <https://scisoc.confex.com/scisoc/2020am/meetingapp.cgi/Paper/127448>

Kienast-Brown, S., Thompson, J.A., D'avello, T., Brungard, C. 2019. 77-1 Soils2026 and Digital Soil Mapping: Foundation for the Future of Soils Information and Conservation Activities. 2019 ASA-CSSA-SSSA International Annual Meeting. San Antonio, TX.

Winsor, H., Brungard, C. 2020. Land Resource Units as Soil Systems. Society for Rangeland Management, Denver, CO.

*Omer, M., Idowu, O., Brungard, C., Ulery, A., Adedokun, B., McMillan, N., Guldan, S. 2019. Measuring soil quality using spectroscopic techniques. 5th Global Workshop on Proximal Soil Sensing. Columbia, MO.

Brungard, C., Nauman, T., Duniway, M. 2019. 77-2 Global or Regional Models? 2019 ASA-CSSA-SSSA International Annual Meeting. San Antonio, TX.

*Whiting, M. Salley, S. Brungard, C. 2019. 327-6 Rapid Bulk Density Measurement Using Mobile Device Photogrammetry. 2019 ASA-CSSA-SSSA Interna-

- tional Annual Meeting. San Antonio, TX.
- Winsor, H. Brungard, C. 2019. Poster 1157. Land Resource Units as Soil Systems. 2019 ASA-CSSA-SSSA International Annual Meeting. San Antonio, TX.
- *Hunter Winsor, Brungard, C. 2019. Land Resource Units as Soil Systems. 2019 National Cooperative Soil Survey National Conference, Narragansett, RI.
- Brungard, C., Nauman, T., Duniway, M. 2019. Global or Regional Models? Joint workshop for Digital Soil Mapping and GlobalSoilMap. Santiago, Chile.
- *Mikayla, A., Ghimire, R., Brungard, C., Begna, S. Angadi, S. 2019. 18-6: Understanding Spatial Variability of Soil Health Indicators for Forage Corn Production in Eastern New Mexico. Soil Science Society of America International Soils Meeting, San Diego, CA.
- *Omer, M., Idowu, O.J., Brungard, C., Ulery, A., VanLeeuwen, D., Guldan, S. 2019. 99-7: Visible Near-Infrared Reflectance and Laser-Induced Breakdown Spectroscopies for Assessment of Arid Soil Quality. Soil Science Society of America International Soils Meeting, San Diego, CA.
- *Gutierrez, J., Brungard, C., Dubois, D., Cao, H. 2018. Classifying video imagery from weather station cameras, Rocky Mountain Advanced Computing Consortium Symposium, Boulder. CO.
- Brungard, C. 2018. Results of soil moisture sampling for the GROWSA study site. LTER symposia. Scottsdale, AZ.
- Brungard, C., 2018. SOILGRIDS 100. Invited web-presentation. College Station TX.
- *Allan, M., Ghimire, R., Brungard, C., Benga, S. 2018. Evaluating spatiotemporal variability of soil properties for sustainable corn production in Eastern New Mexico. NMSU Research Week.
- *Di Stefano, S., Brungard, C., Karl, J., Stauffer, N., McCord, S. 2018. Evaluation of the Automated Reference Toolset for Oil and Gas Reclamation on Colorado Rangelands. Society for Range Management, Sparks, NV.
- *Allan, M., Ghimire, R., Brungard, C., Benga, S. 2017. Understanding soil spatial variability for sustainable forage corn production in Eastern New Mexico. The New Mexico Sustainable Agriculture Conference, Los Lunas, NM.
- *Gutierrez, J., Flaherty, S., Brungard, C., Cao, H., Dubois, D., Bean, M., Bleiweiss, M. 2017. Early Warning Dust Forecasting, Rocky Mountain Advanced Computing Consortium Symposium, Boulder. CO.
- Brungard, C., 2017. Predictive Soil Mapping for Ecological and Hydrological Applications LTER Summer Symposia, Las Cruces, NM.

Malone, B, Brungard, C., Minasny, B., McBratney, A. 2017. Useful applications of conditioned Latin hypercube sample for digital soil mapping. Abstract # 186. Pedometrics 2017, Wageningen, NL.

Brungard, C., Lopez-Brody, N. 2017. Thermal remote sensing for digital soil mapping. Abstract # 147. Pedometrics 2017, Wageningen, NL.

Pahlavan-Rad, M., Shahriari, Ali, Hadizadeh, M. Eftekhari, K., Brungard, C. 2017. Predicting soil organic carbon in Ap horizons in Sistan region, eastern Iran. Abstract # 234. Pedometrics 2017, Wageningen, NL.

Pahlavan-Rad, M., Moghaddam, A.R.A., Dahmardeh, K. Brungard. C. 2017. Digital mapping of soil salinity in eastern Iran. Abstract # 245. Pedometrics 2017, Wageningen, NL.

SERVICE

Departmental Service

- Curriculum, Scholarship & Student Assessment committees. Space Ad Hoc Committee.

Professional Service

- Chair-elect, Pedology Division, Soil Science Society of America
- University Host, Western Region Cooperative Soil Survey Conference, 2020. (Virtual).
- Chair, Western Region Research Needs Committee, USDA-Natural Resources Conservation Service.
- Co-chair, Research Needs Committee, USDA-Natural Resources Conservation Service.
- Digital Soil Mapping Team, USDA-Natural Resources Conservation Service.
- Host and guest lecturer, Soil Geomorphic Institute, USDA-Natural Resources Conservation Service.
- LandPKS soil technical committee.
- Scientific Program Committee, Pedometrics 2019, Guelph, CA.
- Scientific Program Committee, Pedometrics 2017, Wageningen, NL.

Manuscript Review

Archives of Agronomy and Soil Science, European Journal of Soil Science, Geoderma, Geomorphology, PeerJ, Photogrammetric Engineering & Remote Sensing, PlosOne, Soil Science Society of America Journal, Journal of Arid Environments