

# LAURA E. DALTON

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## EDUCATION

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**North Carolina State University** *August 2018 - Present (Anticipated Graduation May 2022)*  
Doctor of Philosophy Candidate in Civil Engineering  
Concentration: Structural Engineering and Mechanics  
Thesis: Understanding CO<sub>2</sub> transport and carbonate formation in cement-based materials observed using 3D imaging techniques

**West Virginia University** *August 2015 - December 2016*  
Master of Science in Civil Engineering  
Concentration: Asphalt Technology  
Thesis: Evaluating the Protocol of the Spectrum of Hot-Mix Asphalt Mixes Produced in WV

**West Virginia University** *January 2013 - May 2015*  
Bachelor of Science in Civil Engineering

**West Virginia Wesleyan College** *August 2009 - December 2012*  
Bachelor of Arts in Graphic Design  
Mathematics Minor

## PROFESSIONAL EXPERIENCE

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**University of Eastern Finland** *January 2021 - October 2021*  
*Finnish National Agency for Education (EDUFI) Fellow* *Kuopio, Finland*

**North Carolina State University** *August 2018 - Present*  
*Graduate Research Assistant* *Raleigh, NC*

**Battelle in support of the U. S. Department of Energy's National Energy Technology Laboratory (USDOE NETL)** *August 2018 - Present*  
*Research Scientist (Part Time)* *Morgantown, WV*

**USDOE NETL** *September 2016 - July 2018*  
*Oak Ridge Institute for Science and Education (ORISE) Fellow* *Morgantown, WV*

**West Virginia University** *August 2015 - August 2016*  
*Graduate Research Assistant* *Morgantown, WV*

**USDOE NETL** *September 2016 - July 2018*  
*ORISE Undergraduate Intern* *Morgantown, WV*

**USDOE NETL** *June 2014 - August 2014*  
*Mickey Leland Energy Fellow* *Morgantown, WV*

- Guo, R., **Dalton, L. E.**, Fan, M., McClure, J., Crandall, D., Chen, C. (2020). The Role of the Spatial Heterogeneity and Correlation Length of Surface Wettability on Multiphase Flow in 3D Porous Media. *Advances in Water Resources*, 103763.
- Fan, M., McClure, J. E., Armstrong, R. T., Shabaninejad, M., **Dalton, L. E.**, Crandall, D., and Chen, C. (2020). Influence of Clay Wettability Alteration on Relative Permeability. *Geophysical Research Letters*, 47, e2020GL088545.
- Harbert, W., Goodman, A., Spaulding, R., Haljasmaa, I., Crandall, D., Sanguinito, S., Kutchko, B., Tkach, M., Fuchs, S., Werth, C., Tsotsis, T., **Dalton, L.**, Jessen, K., Shi, Z., and Frailey, S. (2020). CO<sub>2</sub> induced changes in Mount Simon sandstone: Understanding links to post CO<sub>2</sub> injection monitoring, seismicity, and reservoir integrity. *International Journal of Greenhouse Gas Control*, 100, 103109.
- Dalton, L. E.**, Jarvis, K., and Pour-Ghaz, M. (2020). The effect of gas phase solubility on water sorption rate in portland cement mortar observed using X-ray CT. *Transp Porous Med*, 133: 397-411.
- Dalton, L. E.**, Tapriyal, D., Crandall, D., Goodman, A., Fan, S., and Haeri, F. (2020). Contact Angle Measurements using Sessile Drop and Micro-CT Data from Six Sandstones. *Transp Porous Med*, 133: 71-83.
- Haeri, F., Tapriyal, D., Sanguinito, S., Shi, F., Fuchs, S., **Dalton, L. E.**, Baltrus, J., Howard, B., Crandall, D., Matranga, C., and Goodman, A. (2020). CO<sub>2</sub>-Brine Contact Angle Measurements on Navajo, Nugget, Bentheimer, Bandera Brown, Berea, and Mt. Simon Sandstones. *Energy & Fuels*, 34 (5): 6085-6100.
- Dalton, L. E.**, Crandall, D., and Goodman, A. (2020). Characterizing the Evolution of Trapped scCO<sub>2</sub> Curvature in Bentheimer and Nugget Sandstone Pore Geometry. *Geofluids*, 2020.
- Davila, G., **Dalton, L.**, Crandall, D., Garing, C., Werth, C. J., and Druhan, J. L. (2020). Reactive alteration of a Mt. Simon Sandstone due to CO<sub>2</sub>-rich brine displacement. *Geochimica et Cosmochimica Acta*, 271:227-247.
- Akono, A., Druhan, J., Davila, G., Tsotsis, T., Jessen, K., Fuchs, S., Crandall, D., Shi, Z., **Dalton, L.**, Tkach, M. K., Kabir, P., Goodman, A., Frailey, S., and Werth, C. J. (2019). A Review of Geo-Chemical-Mechanical Impacts in Geological Carbon Storage Reservoirs. *Greenhouse Gas Sci Technol*, 0:1-31.
- Fan, M., **Dalton, L. E.**, McClure, J., Ripepi, N., Westman, E., Crandall, D., and Chen, C. (2019). Comprehensive study of the interactions between the critical dimensionless numbers associated with multiphase flow in 3D porous media. *Fuel*, 252: 522-533.
- Dalton, L. E.**, Klise, K., Fuchs, S., Crandall, D., and Goodman, A. (2018). Methods to Measure Contact Angles in scCO<sub>2</sub>-Brine-Sandstone Systems. *Advances in Water Resources*, 122: 278-290.
- Dalton, L. E.**, Brown, S., Moore, J., Crandall, D., and Gill, M. (2018). Laboratory Foamed Cement Curing Evolution Using CT Scanning: Insights from Elevated Pressure Generation. *SPE Drilling & Completion*, September 2018.
- Soong, Y., Crandall, D., Howard, B. H., Haljasmaa, I., **Dalton, L. E.**, Zhang, L., Lin, R., Dilmore, R. M., and McLendon, T. R.. (2018). Permeability and mineral composition evolution of primary seal and reservoir rocks in geologic carbon storage conditions. *Environmental Engineering Science*, 35 (5): 391-400.

**Dalton, L. E.**, Crandall, D., Shanley, K., Gill, M., Rosenbaum, E., Moore, J., Chipkin, J., Ahmadi, G., and Kutchko, B. (2018). Foamed Cement Generation Methods: Insights from Macro-Porosity and Void Distribution. *American Concrete Institute Materials Journal*, 115: 89-103.

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— Under Review —

Wang, H., **Dalton, L.**, Fan, M., Guo, R., McClure, J., Crandall, D., and Chen, C. (2021). Deep-learning-based workflow for partial volume segmentation in rock CT images: Application of entropy-assisted indicator kriging and UNet++. Submitted.

**Dalton, L. E.**, Crandall, D., and Pour-Ghaz, M. (2021). Supercritical, liquid, and gas CO<sub>2</sub> transport and carbonate formation in portland cement mortar. Submitted.

**Dalton, L. E.**, LaManna, J., Jones, S., and Pour-Ghaz, M. (2021). Does ITZ influence moisture transport in concrete? *NIST Internal Review*.

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— In Preparation —

Jativa, F. W., **Dalton, L. E.**, Gabr, M., Borden, R., and Pour-Ghaz, M. (2021). CO<sub>2</sub> intermixing as a method to sequester carbon dioxide in cement-based materials. In preparation.

Jativa, F. W., **Dalton, L. E.**, Gabr, M., Borden, R., and Pour-Ghaz, M. (2021). Feasibility of generation of foamed cement grout with CO<sub>2</sub>. In preparation.

## CONFERENCE PRESENTATIONS

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**Dalton, L. E.**, LaManna, J., Jones, S., and Pour-Ghaz, M. Does ITZ influence moisture transport in concrete? ACI Fall 2021 Convention, held virtually, October 2021.

**Dalton, L. E.**, Jarvis, K., and Pour-Ghaz, M. Using X-Ray CT to Understand Greenhouse Gas and Water Migration in Cement-Based Materials. ACI Fall 2020 Convention, held virtually, October 2020.

**Dalton, L. E.**, Jarvis, K., and Pour-Ghaz, M. The effect of gas solubility on water sorption rate in cement-based materials using X-ray CT. ACI Spring 2020 Convention, held virtually, June 2020.

Pour-Ghaz, M., Gabr, M., Borden, R., Jativa, F. W., and **Dalton, L. E.** Innovative Low Permeability concrete materials to reduce the risk of corrosion for foundation anchoring marine hydrokinetic devices. North Carolina Renewable Energy Program Symposium Webinar, held virtually, April 2020.

**Dalton, L. E.**, LaManna, J., Jacobs, S., Jarvis, K., and Pour-Ghaz, M. Simultaneous X-ray and Neutron Tomography of Unsaturated Moisture Flow in Concrete. 10th Advances in Cement-Based Materials, Champaign, IL, June 2019.

**Dalton, L. E.**, Tapriyal, D., Crandall, D., Goodman, A. Contact Angles in scCO<sub>2</sub>-Brine-Sandstone Systems using Sessile Drop and Micro-CT Imaging. American Institute of Chemical Engineers 2018 Annual Meeting, Pittsburgh, PA, October 2018.

**Dalton, L. E.**, Klise, K., Fuchs, S., Crandall, D., and Goodman, A. Manual and Automated In Situ Contact Angle Measurements of scCO<sub>2</sub> and Brine in Sandstone Cores Using Micro-CT Imaging – A Correlation to Pore Connectivity. InterPore 10th Annual Meeting, New Orleans, LA, May 2018.

**Dalton, L. E.**, Crandall, D., Goodman, A., and King, S. Evaluation of Methods to Measure Contact Angles of Supercritical CO<sub>2</sub> and Brine in Sandstone Cores Using Micro-CT Imaging. Geological Society of America Annual Meeting, Seattle, WA, October 2017.

**Dalton, L. E.**, Crandall, D., Goodman, A., and King, S. In Situ Contact Angle Measurements of Supercritical CO<sub>2</sub>, Brine, and Sandstone Cores Using Micro-CT Imaging. Microscopy & Microanalysis Annual Meeting, St. Louis, MO, August 2017.

## PROPOSALS

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National Science Foundation (NSF), Submitted	2021
Title: Understanding carbonate formation in hydrated and unhydrated phases of portland cement-based materials exposed to gas, liquid, and supercritical CO <sub>2</sub>	
North Carolina Renewable Energy Ocean Program (NCREOP), Rejected	2021
Title: Large-Area Sensing Skin for Marine Hydrokinetic Devices	
NIST Center for Research (NCNR) Proposal for Neutron Imaging Facility, Accepted	2020
Title: Hybrid Tri-Modality Tomography of Unsaturated Moisture Flow in Cementitious Material Title: Large-Area Sensing Skin for Marine Hydrokinetic Devices	
NCNR Proposal for Neutron Imaging Facility, Partially Accepted	2019
Title: Hybrid Tri-Modality Tomography of Unsaturated Moisture Flow in Cementitious Material	

## AWARDS & FELLOWSHIPS

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Digital Rocks Portal Porous Media Visualization Static Image Challenge (2nd place)	2021
Fulbright EDUFI Fellowship	2020 - 2021
Society of Petroleum Engineers (SPE) Outstanding Technical Reviewer Award	2019
NCSU Graduate Student Association Travel Assistance Award	2019
NCSU Provost's Doctoral Fellowship	2018 - 2019

## TEACHING EXPERIENCE

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CE 332 Materials of Construction (3 semesters)	Fall 2019 - Fall 2020
NCSU Preparing the Professoriate Program (CE 332)	2021 - 2022
CE 594 Nondestructive Evaluation of Concrete (2 semesters)	Fall 2020, 2021

## PROFESSIONAL AFFILIATIONS

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American Society of Civil Engineers	2018 - Present
American Concrete Institute	2018 - Present

## WORKSHOPS, TRAININGS, & CERTIFICATIONS

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Auditing Neutron Scatter for Soft Matter Course offered by NIST	Fall 2021
Carnegie Mellon University CEE Rising Stars Workshop	2020 - 2021
Leadership in Energy and Environmental Design (LEED) Green Associate	2017 - Present
FEI PerGeos Software Training, Houston, TX	2017
Engineer in Training, WV, Certified / Passed FE	2015

## SERVICE

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### University

NCSU Graduate Student Fellowship Workshop Panelist	2020
NCSU We are Women in Engineering Poster Presenter	2019
NCSU Undergraduate Research Info-Session Poster Presenter	2019

### Disciplinary

SPE Technical Reviewer	2018
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### Community

SW PA Regional Science Olympiad Thermodynamics Competition Supervisor	2018
Assistant Coach for Marion County U-15 Girls Soccer Team	2018