

MATTHEW M. CRAWFORD



Affiliation

University of Kentucky
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EDUCATION

- Ph.D. University of Kentucky 2018
Dissertation: Hydrologic monitoring and 2-D electrical resistivity imaging for joint geophysical and geotechnical characterization of shallow colluvial landslides
- M.S. Eastern Kentucky University 2001
Thesis: Geologic mapping and metamorphic petrology of part of the Eastern Piedmont Goochland terrane, Virginia: Evidence for a northward continuation of the Goochland granulite terrane
- B.A. Hanover College (Major: Geology) 1996

EMPLOYMENT

- Research Geologist IV** U. of Kentucky, Kentucky Geological Survey 1/2021 – present
- Landslide hazard and risk assessment
 - Landslide inventory
 - Geophysical and geotechnical investigation of landslides
- Adjunct Faculty** Dept. of Earth & Environmental Sciences, U. of Kentucky 3/2021 – present
- Research Geologist III** U. of Kentucky, Kentucky Geological Survey 11/2006 – 1/2021
- Surficial geologic mapping
 - Landslide inventory
 - Earthquake and karst hazard outreach and communication
- Research Geologist II** U. of Kentucky, Kentucky Geological Survey 4/2001 – 11/2006
- Digital geologic mapping program
 - GIS compilation of geologic map data
- Geologist** Minera Orvana Ltda./Orvana Res. Corp., Santiago, Chile 8/1996 – 5/1997
- Geophysical surveying, geologic mapping, and stratigraphic analysis as part of a gold exploration team

GRANTS AND SPONSORED PROJECTS (awarded and rejected)

- 2024 USDA/U.S. Forest Service, *Cooperative Work on Slope Stability in Kentucky: Landslide Susceptibility for the Jellico Area of the Stearns Ranger District in the Daniel Boone National Forest*, **\$55,317 (CO-PI)**
- 2024 U.S. Geological Survey Cooperative Landslide Hazard Mapping and Assessment Program, *Event-based landslide inventory mapping: Comparisons with the past and advancing hazard assessment in the Appalachian Plateau, Kentucky, USA*, **\$111,959 (CO-PI)**
- 2024 Kentucky Division of Waste Management, *Landslide Monitoring at Maxey Flats Disposal Site*, **\$75,658 (PI)**
- 2023 Kentucky Emergency Management, Department of Military Affairs; FEMA Hazard Mitigation Grant Program, *Enriching Kentucky's Landslide Inventory Database*, **\$103,218 (PI)**
- 2023 Kentucky Emergency Management, Department of Military Affairs, *Commonwealth of Kentucky Enhanced Hazard Mitigation Plan, 2023*, **\$61,810 (PI)**
- 2022 Kentucky Division of Waste Management, *Landslide Monitoring at Maxey Flats Disposal Site*, **\$47,819 (PI)**
- 2022 U.S. Geological Survey, Intergovernmental Personnel Act Program, *Building on Federal and State Landslide Research Collaboration*, **\$50,000 (research advisor)**
- 2021 U.S. Geological Survey, Intergovernmental Personnel Act Program, *Towards a National Landslide Susceptibility Map of the United States*, **\$10,000 (research advisor)**
- 2021 Kentucky Emergency Management, Department of Military Affairs; FEMA Hazard Mitigation Grant Program, *Multi-Jurisdictional Hazard Mitigation Plan for Landslides for the Kentucky River Area Development District* **\$426,000 (PI)**
- 2020 NASA Citizen Science for Earth Systems Program, Announcement NNH20ZDA001N, *Citizen Science to Validate Satellite Soil Moisture and Precipitation Products for Development of Landslide Susceptibility and Forecasting*, **\$1.8 million (CO-PI, rejected)**
- 2018 NASA Kentucky EPSCoR, *Using Satellite Data to Develop Rainfall-Induced Landslide Susceptibility and Forecasting Models*, **\$40,000 (CO-PI)**
- 2017 Kentucky Emergency Management, Department of Military Affairs; FEMA Pre-Disaster Mitigation Grant Program, *Multi-Jurisdictional Hazard Mitigation Plan for Landslides for the Big Sandy Area Development District*, **\$400,000 (PI)**
- 2014 Terracon Foundation, *Hydrologic Monitoring and Geophysical Characterization of Landslides*, **\$2,500**

- 2010 U.S. Geological Survey, *Inventory Mapping and Characterization of Landslides Using LiDAR: Kenton and Campbell Counties, Kentucky*, **\$15,000 (PI)**
- 2007 National Park Service, *Derivative Geologic Map for Mammoth Cave National Park*, **\$2,500 (PI)**

MEDIA INTERVIEWS

Founder and lead of the Kentucky Geological Survey podcast Big Blue Rock Pod
<https://kgsnews.podbean.com/> (2021 – present, 37 episodes)

Kentucky Caves, mountains, lakes, rocks, and even glaciers are focus of new UK podcast,
Lexington Herald Leader, December 28, 2022 <https://www.kentucky.com/article269374892.html>

Landslides and the July 2022 flooding in eastern Kentucky, 88.9 WEKU Eastern Standard
<https://esweku.org/archive/blog/7193345/april-13-2023-eastern-standard>

Landslides and the July 2022 flooding in eastern Kentucky, 88.9 WEKU Rise
<https://www.weku.org/podcast/rise/2023-01-12/rise-episode-1>

Slip Sliding Away: Landslides Follow Flooding As Major Risk To Appalachian Communities,
Ohio Valley Resource, April 9, 2021 <https://ohiovalleyresource.org/2021/04/09/slip-sliding-away-landslides-follow-flooding-as-major-risk-to-appalachian-communities/>

PROFESSIONAL AFFILIATIONS AND SERVICE

- U.S. Geological Survey-National Building Research Organization workshop leader on landslide hazard mapping; supported by USGS and USAID Bureau for Humanitarian Assistance, Colombo, Sri Lanka, October 2–6, 2023
- Research Advisor for the U.S. Geological Survey Mendenhall Research Fellowship Program, 2021–2022 – Towards a National Landslide Susceptibility Map of the United States
- Chair, Geological Society of America Environmental & Engineering Geology Division, 2015–2016
- Participant in the Geological Society of America Hydrogeology and Environmental Engineering Careers and Networking event, GSA Annual Meeting 2019
- Participant in the Geological Society of America Environmental and Engineering Geology Student Career Mentoring Session, GSA Annual Meeting 2018
- Current Member of the Geological Society of America (GSA)
- Current Member of Kentucky Association of Mitigation Managers
- Manuscript reviews for *Journal of Applied Geophysics*, *Bulletin of Engineering Geology and the Environment*, *Landslides*, *Engineering Geology*, *Environmental and Engineering Geoscience*, *Reviews in Geophysics*, *Quarterly Journal of Engineering Geology and Hydrogeology*, *Catena*

- Professional meeting sessions organized or chaired:

Current Trends in Landslide Inventories and Assessments: Innovative Techniques, Collection Methods, Modeling, and Risk Hazards (oral and poster), Geological Society of America 2024 Annual Meeting, with William Burns (Oregon Dept. of Geology and Mineral Industries) Anne Witt (Virginia Dept. of Mines, Minerals, and Energy) and Stephen Slaughter (U.S. Geological Survey)

Looking to the Future of Environmental and Engineering Geology: Environmental and Engineering Geology Division 75th Anniversary, Pardee Keynote Symposia, Geological Society of America 2022 Annual Meeting

Landslide Hazards: Inventories, Hazard Maps, Risk Analysis, and Warning Systems (oral and poster), Geological Society of America 2021 Annual Meeting, with William Burns (Oregon Dept. of Geology and Mineral Industries) Anne Witt (Virginia Dept. of Mines, Minerals, and Energy) and Stephen Slaughter (U.S. Geological Survey)

Landslide Hazard Assessments and Risk Reduction: Data Collection and Modelling Challenges (poster), Geological Society of America 2020 Annual Meeting, with Anne Witt (Virginia Dept. of Mines, Minerals, and Energy) and Robert Mitchell (Western Washington University)

Advances in Geophysical Methods for Characterizing and Monitoring Landslide Hazards (oral and poster), American Geophysical Union 2019 Fall Meeting, with Sebastian Uhlemann (Lawrence Berkeley National Laboratory) and Jim Whiteley (British Geological Survey)

Landslide Inventories, Hazard Assessments, and Risk Reduction (oral), Geological Society of America 2019 Annual Meeting, with Stephen Slaughter (U.S. Geological Survey)

Advances in Landslide Science to Assess Landslide Hazards and Risk (oral and poster), American Geophysical Union 2018 Fall Meeting, with Ben A. Leshchinsky (Oregon St. University), Jonathan W. Godt (U.S. Geological Survey), and Ching Hung (Nat. Cheng Kung University, Taiwan)

Communicating Geologic Hazard and Risk: Sharing Successes, Failures, and Lessons Learned (oral), Geological Society of America 2018 Annual Meeting with Stephen L. Slaughter (Washington Geological Survey) and William J. Burns (Oregon Dept. of Geology and Mineral Industries)

Landslide Inventories, Databases, Hazard Maps, Risk Analysis, and Beyond (poster), Geological Society of America 2017 Annual Meeting, with Stephen L. Slaughter (Washington Geological Survey) and William J. Burns (Oregon Dept. of Geology and Mineral Industries)

Advances in Data Collection and Delivery for Geohazards: Reaching Out to Stakeholders (oral), Geological Society of America 2016 Annual Meeting, with John Wall (North Carolina State), Norman Levine (College of Charleston), and Douglas C. Curl (KGS)

Landslide, Subsidence, and Debris Flow Hazards: Integrating Engineering Geology Research and Communication Solutions (oral), Geological Society of America 2015 Annual Meeting, with William J. Burns (Oregon Dept. of Geology and Mineral Industries), Lynn M. Highland (U.S. Geological Survey), and Francis K. Rengers (U.S. Geological Survey)

Landslide Inventories, Data, Dissemination, and Risk Reduction (oral), Geological Society of America 2013 Annual Meeting, with William J. Burns (Oregon Dept. of Geology and Mineral Industries) and Lynn M. Highland (U.S. Geological Survey)

PUBLICATIONS

Peer-reviewed journals and book chapters

Crawford, M.M., Koch, H.J., and Dortch, J.M., 2024, Evaluating map quality and model performance through iterative statistics-based landslide susceptibility in eastern Kentucky, *Natural Hazards* [in review]

Woodward, J.B., Mirus, B.B., Wood, N.J., Allstadt, K.E., Leshchinsky, B.A., and **Crawford, M.M.**, 2024, Slope Unit Maker (SUMak): an efficient and parameter-free algorithm for delineating slope units to improve landslide modeling, *Natural Hazards and Earth System Sciences*, 24, <https://doi.org/10.5194/nhess-24-1-2024>

Khabiri, S., **Crawford, M.M.**, Koch, H.J., Haneberg, W.C., and Zhu, Y., 2023, An assessment of negative samples and model structures in landslide susceptibility characterization based on Bayesian network models, *Remote Sensing*, 15, <https://doi.org/10.3390/rs15123200>

Woodard, J.B., Mirus, B.B., **Crawford, M.M.**, Or, D., Leshchinsky, B.A., Allstadt, K.E., and Wood, N.J., 2023, Mapping Landslide Susceptibility Over Large Regions with Sparse Data—A Reality Check, *Journal of Geophysical Research: Earth Surface*, 128, <https://doi.org/10.1029/2022JF006810>

Johnson, S.E., Haneberg, W.C., Bryson, L.S., and **Crawford, M.M.**, 2023, Measuring ground surface elevation changes in a slow-moving colluvial landslide using combinations of regional airborne lidar, UAV lidar, and UAV photogrammetric surveys, *Quarterly Journal of Engineering Geology and Hydrogeology*, <http://doi.org/10.1144/qjgegh2022-078>

Crawford, M.M., Dortch, J.M., Koch, H.J., Zhu, Y., Haneberg, W.C., Wang, Z., and Bryson, L.S., 2022, Landslide risk assessment in eastern Kentucky, USA: Developing a regional scale, limited resource approach, *Remote Sensing*, 14, 6246, <https://doi.org/10.3390/rs14246246>

Dashbold, B., Bryson, L.S., and **Crawford, M.M.**, 2022, Landslide hazard and susceptibility maps derived from satellite and remote sensing data using limit equilibrium analysis and machine learning model, *Natural Hazards*, <https://doi.org/10.1007/s11069-022-05671-7>

Ahmed, F.S., Bryson, L.S., and **Crawford, M.M.**, 2021, Prediction of seasonal variation of in-situ hydrologic behavior using an analytical transient infiltration model, *Engineering Geology*, 294, <https://doi.org/10.1016/j.enggeo.2021.106383>

Crawford, M.M., Dortch, J.M., Koch, H.J., Killen, A.A., Zhu, J., Zhu, Y., Bryson, L.S., and Haneberg, W.C., 2021, Using landslide-inventory for a combined bagged-trees and logistic regression approach to landslide susceptibility in eastern Kentucky, United States, *Quarterly Journal of Engineering Geology and Hydrogeology* <http://doi.org/10.1144/qjegh2020-177>

Mirus, B.B., Jones, E., Baum, R.L., Godt, J.W., Slaughter, S., **Crawford, M.M.**, Lancaster, J., Stanley, T., Kirschbaum, D., Burns, W.J., Schmitt, R., Lindsey, K.O., McCoy, K., 2020, Landslides across the United States: Occurrence, susceptibility, and data limitations, *Landslides*, <http://doi.org/10.1007/s10346-020-01424-4>

Crawford, M.M., Bryson, L.S., Woolery, E.W., and Wang, Z., 2019, Long-term monitoring using soil-water relationships and electrical data to estimate suction stress, *Engineering Geology*, 251, p. 146–157. <https://doi.org/10.1016/j.enggeo.2019.02.015>

Crawford, M.M., Bryson, L.S., Woolery, E.W., and Wang, Z., 2018, Using 2-D electrical resistivity imaging for joint geophysical and geotechnical characterization of shallow landslides, *Journal of Applied Geophysics*, 157, p. 37–46. <https://doi.org/10.1016/j.jappgeo.2018.06.009>

Crawford, M.M., and Bryson, L.S., 2018, Assessment of active landslides using field electrical measurements, *Engineering Geology*, 233, p. 146–159. <https://doi.org/10.1016/j.enggeo.2017.11.012>

Crawford, M.M., Carpenter, Wang, Z., and Carpenter, N.S., 2016, Earthquake and Landslide Hazard Assessment, Communication, and Mitigation in Kentucky, In: *Geoscience for the Public Good and Global Development: Toward a Sustainable Future*, Wessel G. and Greenburg, J., (eds.), Geological Society of America Special Paper 520, p. 359–369. [https://doi.org/10.1130/2016.2520\(31\)](https://doi.org/10.1130/2016.2520(31))

Crawford, M.M., Zhu, J., and Webb, S.E., 2015, Geologic, geotechnical, and geophysical investigation of a shallow landslide, eastern Kentucky, *Environmental & Engineering Geoscience*, 21, no. 3, p. 181–195. <https://doi.org/10.2113/gsegeosci.21.3.181>

Zhu, J., Taylor, T.P., Currens, J.C., and **Crawford, M.M.**, 2014, Improved karst sinkhole mapping in Kentucky using LiDAR techniques: a pilot study in Floyds Fork Watershed, *Journal of Cave and Karst Studies*, 76, no. 3, p. 207–216. <https://doi.org/10.4311/2013ES0135>

Fei, S., **Crawford, M.**, and Schibig, J., 2010, Assisting natural resource management in Mammoth Cave National Park using geospatial technology, In: Hoalst-Pullen, N., and Patterson, M.W., (eds.), *Geospatial technologies in environmental management*: New York, Springer, p. 49–61. https://doi.org/10.1007/978-90-481-9525-1_4

Conference papers

Chapella, H., Haneberg, W.C., **Crawford, M.M.**, and Shakoor, A., 2018, Landslide inventory and susceptibility models, Prestonsburg 7.5-min quadrangle, Kentucky, USA., In: Shakoor A., Cato, K. (eds.) IAEG/AEG Annual Meeting Proceedings, San Francisco, California, 2018–Volume 1.d https://doi.org/10.1007/978-3-319-93124-1_26

Crawford, M. M., and Bryson, L.S., 2017, Geophysical and geotechnical field correlations for active landslides in Kentucky, In: De Graff, J.V., and Shakoor, A. (eds.), *Landslides: Putting Experience, Knowledge, and Emerging Technologies into Practice*, Proceedings of the 3rd North American Symposium on Landslides, Roanoke, Virginia, USA, Association of Environmental and Engineering Geologists Special Publication 27, p. 851–858.

Crawford, M.M., and Bryson L.S., 2016, Field observations of an active landslide in Kentucky, 1st International Conference on Natural Hazards and Infrastructure, Chania, Greece, June 28-30, 10 p.

Crawford, M.M., 2014, Inventory mapping and characterization of landslides using LiDAR: Kenton and Campbell Counties, Kentucky, Soller, D.R., ed., 2014, Digital Mapping Techniques '11–12 Workshop Proceedings: *U.S. Geological Survey Open-File Report* 2014–1167, 134 p.

Crawford, M. M., 2012, Understanding landslides in Kentucky: Tools and methods to further landslide hazard research. In: Eberhardt, E.; Froese, C.; Turner, K.A.; and Leroueil, S. (eds.), *Landslides and Engineered Slopes*, Proceedings of the 11th International and 2nd North American Symposium on Landslides, Banff, Alberta, Canada, Vol. 1, p. 467–472.

Crawford, M.M., and Andrews, W.M., Jr., 2012, Assessing the early stages of landslide inventory, Soller, D.R., ed., 2012, Digital Mapping Techniques '10—Workshop Proceedings, Sacramento, California, May 16–19, 2010: *U.S. Geological Survey Open-File Report* 2012–1171, 170 p.

Weisenfluh, G.A., Curl, D.C., and **Crawford, M.M.**, 2005, The Kentucky Geological Survey's online geologic map and information system, Soller, D.R., (ed.), 2005, Digital Mapping Techniques '05– Workshop Proceedings: *U.S. Geological Survey Open-File Report* 2005–1428, 268 p.

Kentucky Geological Survey Publications

Crawford, M.M., Koch, H.J., and Dortch, J.M., 2024, Multi-jurisdictional hazard mitigation plan for landslides for the Big Sandy Area Development District, Kentucky: Kentucky Geological Survey, ser. 14, Contract Report 1, 56 p. https://uknowledge.uky.edu/kgs_cr/14/

Crawford, M.M., Zhenming, W., Carpenter, N.S., Schmidt, J., Koch H., Dortch, J., 2023, Reconnaissance of Landslides and Debris Flows Associated with the July 2022 Flooding in Eastern Kentucky: Kentucky Geological Survey, ser. 13, Report of Investigations 13, 14p. <https://doi.org/10.13023/kgs.ri56.13>

Crawford, M.M., Bryson, L.S., Wang, Z., and Woolery, E.W., 2020, Geologic characterization, hydrologic monitoring, and soil-water relationships for landslides in Kentucky, Kentucky Geological Survey, Report of Investigations 11, ser. 13, 27 p.

Crawford, M.M. and Bryson, L.S., 2017, Field investigation of an active landslide in Kentucky: A framework to correlate electrical data and shear strength, Kentucky Geological Survey, Report of Investigations 1, ser. 13, 22 p.

Overfield, B.L., Carey, D.I., Weisenfluh, G.A., Wang, R., and **Crawford, M.M.**, 2015, The geologic context of landslide and rockfall maintenance costs in Kentucky, Kentucky Geological Survey, Report of Investigations 34, ser. 12, 54 p.

Crawford, M.M., Zhu, J., and Webb, S.E., 2015, Geologic, geotechnical, and geophysical investigation of a shallow landslide, eastern Kentucky, Kentucky Geological Survey, Report of Investigations 29, ser. 12, 39 p.

Crawford, M.M., 2014, Kentucky Geological Survey landslide inventory: From design to application, Kentucky Geological Survey Information Circular 31, ser. 12, 18 p.

Potter, P.E., Bowers, M., Maynard, J.B., **Crawford, M.M.**, Weisenfluh, G.A., and Agnello, T., 2013, Landslides and your property: Indiana Geological Survey, 1 sheet.

Li, Q., Woolery, E.W., **Crawford, M.M.**, and Vance, D.M., 2013, Seismic velocity database for the New Madrid Seismic Zone and its vicinity, Kentucky Geological Survey, IC_27_12, 15 p.

Crawford, M.M., 2012, Using LiDAR to map landslides in Kenton and Campbell Counties, Kentucky: Kentucky Geological Survey, Report of Investigations 24, ser. 12, 12 p.

Andrews Jr., W.M., **Crawford, M.M.**, and Hickman, J.B., 2002, The Impact of Geology on the Culture and History of Central Kentucky, In: Ettensohn, F.R. and Smath, M.L., (Eds.), Guidebook for geology field trips in Kentucky and adjacent areas (2002 joint meeting of the North-Central Section and Southeastern Section of the Geological Society of America, Lexington, Ky.): Lexington, University of Kentucky, p. 108–128.

Maps

Crawford, M.M., 2011, Geology of Cumberland Gap National Historical Park, Kentucky Geological Survey, MCS_199_12.

Sparks, T.N., Solis, M.P., **Crawford, M.M.**, Greb, S.F., and Anderson, W.H., 2011, Geologic map of the Evansville and West Frankfort 30 x 60 minute quadrangles, western Kentucky, Kentucky Geological Survey, Geologic Map 29, Series 12.

Crawford, M.M., 2010, Geologic map of the Elizabethtown 30 x 60 minute quadrangle: central Kentucky. Kentucky Geological Survey, Geologic Map 23, Series 12.

Crawford, M.M., 2009, Geologic map of the Tell City and Jasper 30 x 60 minute quadrangles: western Kentucky. Kentucky Geological Survey, Geologic Map 18, Series 12.

Crawford, M.M., Olson, R.A., Toomey, R.S., III, and Scoggins, L.J., 2008, Geology of Mammoth Cave National Park, Kentucky, Kentucky Geological Survey, MCS_186_12.

Thompson, M.F., Plauche, S.T, and **Crawford, M.M.**, 2007, Geologic map of the Beaver Dam 30 x 60 minute quadrangle, western Kentucky, Kentucky Geological Survey, Geologic Map 15, Series 12.

Crawford, M.M., 2006, Geologic map of the Madisonville 30 x 60 minute quadrangle: western Kentucky. Kentucky Geological Survey, Geologic Map 12, Series 12.

Crawford, M.M., Beck, E.G., and Williams, D.A., 2005, Generalized geologic map for land-use planning: Hopkins County, Kentucky. Kentucky Geological Survey, MCS_91_12.

Crawford, M.M., 2005, Geologic map of the Hopkinsville 30 x 60 minute quadrangle: western Kentucky. Kentucky Geological Survey, Geologic Map 10, Series 12.

22 Digitally Vectorized Geologic Quadrangles, Kentucky Geological Survey, 2001-2007.

Example citation: **Crawford, M.M.**, 2002, Spatial database of the Garfield quadrangle, Breckinridge County, Kentucky. Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1278. Adapted from Amos, D.H., 1976, Geologic map of the Garfield quadrangle, Breckinridge County, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1278, scale 1:24,000.

6 Surficial Geologic Map Kentucky Geological Survey Contract Reports

Example citation: **Crawford, M.M.**, and Murphy, M.L., Quaternary geologic map of the Quicksand 7.5-minute quadrangle, Kentucky, Kentucky Geological Survey Contract Report 33, Series 12, scale 1:24,000, 1 sheet.

Conference abstracts

Crawford, M.M., Koch, H.J., and Dortch, J.M., 2024, Evaluating refinement in statistics-based landslide susceptibility modeling through model performance and map quality, Geological Society of America Abstracts with Programs, vol. 56, no. 5, doi:10.1130/abs/2024AM-403302

Crawford, M.M., Koch, H.J., and Dortch, J.M., 2024, Building on landslide susceptibility mapping in Kentucky: assessing the complexity of statistics-based model performance and map quality, Geological Society of America Abstracts with Programs, vol. 56, no. 2 doi: 10.1130/abs/2024SE-398220

Koch, H.J., **Crawford, M.M.**, and Dortch, J.M., 2023, Investigating landslide susceptibility model variation from distributed or subset inventory data, eastern Kentucky, USA, Geological Society of America Abstracts with Programs, vol. 55, no. 6, doi:10.1130/abs/2023AM-390676

Swallow, M., Koch, H.J., Dortch, J.M., and **Crawford, M.M.**, 2023, Evaluating root strength index as indicator of landslide-prone slopes in eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 55, no. 6 doi:10.1130/abs/2023AM-390255

Crawford, M.M., Koch, H.J., Dortch, J.M., and Haneberg, W.C., 2022, Advancing landslide susceptibility mapping through FEMA hazard mitigation projects in eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 54, no. 5, doi:10.1130/abs/2022AM-380672

- Crawford, M.M.**, Dortch, J.M., Koch, H.J., Zhu, Y., and Haneberg, W.C., 2021, Landslide susceptibility and risk mapping in the Big Sandy Area Development District, eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 53, no. 6, doi:10.1130/abs/2021AM-369100
- Crawford, M.M.**, Koch, H.J., Dortch, J.M., Killen, A.A., and Haneberg, W.C., 2020, Landslide-susceptibility and risk assessment, eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 52, no. 6, doi: 10.1130/abs/2020AM-355833
- Crawford, M.M.**, Koch, H.J., Dortch, J.M., and Killen, A.A., 2019, Preliminary landslide mapping and hazard assessment results for Magoffin County, Kentucky, Geological Society of America Abstracts with Programs, vol. 51, no. 5, doi:10.1130/abs/2019AM-339185
- Crawford, M.M.**, Koch, H.J., Dortch, J.M., Killen, A.A., and Haneberg, W.C., 2019, Comparison of LiDAR based landslide hazard assessments for eastern Kentucky, American Geophysical Union Fall Meeting, NH43B-07.
- Crawford, M.M.**, Haneberg, W.C., Wang, Z., and Lynch, M.J., 2018, Landslide and earthquake hazard assessment and communication in Kentucky, Geological Society of America Abstracts with Programs, vol. 50, no. 6, doi: 10.1130/abs/2018AM-319188
- Crawford, M.M.**, Bryson, L.S., Woolery, E.W., and Wang, Z., 2018, Long-term landslide monitoring using soil-water relationships and electrical resistivity tomography to estimate suction stress and shear strength, American Geophysical Union Fall Meeting, NH14A-06.
- Crawford, M.M.**, 2017, Using electrical resistivity to assess landslides: Examples from Kentucky and Pennsylvania, Geological Society of America Abstracts with Programs, vol. 49, no. 6, doi:10.1130/abs/2017AM-303959
- Crawford, M.M.**, and Bryson, L.S., 2016, Geophysical and geotechnical field correlations of the Doe Run landslide, northern Kentucky, Geological Society of America Abstracts with Programs, vol. 48, no. 7, doi:10.1130/abs/2016AM-281392
- Crawford, M.M.**, Zhu, J., and Webb, S., 2014, Geologic, geotechnical, and geophysical investigation of a shallow landslide, eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 46, no. 6, p. 714
- Crawford, M.M.**, 2013, Monitoring and characterization of the Meadowview landslide, Boyd County, Kentucky, Geological Society of America Abstracts with Programs, vol. 45, no. 7, p. 642
- Crawford, M.M.**, Olson, R.A., Toomey, R.S., and Scoggins, L.J., 2008, A new resource for the geology of Mammoth Cave National Park, Geological Society of America Abstracts with Programs, v. 40, No. 5, p. 67.
- Crawford, M.M.**, and Andrews, Jr., W.M., 2008, Surficial geologic mapping in Eastern Kentucky: applications and questions, Geological Society of America Abstracts with Programs, vol. 40, no. 4, p. 5.
- Crawford, M.M.**, and Andrews Jr., W.M., 2008, The Kentucky Geological Survey's landslide initiative, Geological Society of America Abstracts with Programs, vol. 40, no. 6, p. 174.

Crawford, M.M., and Andrews Jr., W.M., 2007, Using GIS to analyze and strengthen delivery of derivative geologic maps: three examples from the Kentucky Geological Survey, Geological Society of America Abstracts with Programs, vol. 39, no. 2, p. 31.

Andrews Jr., W.M., **Crawford, M.M.**, and Kiefer, J.D., 2007, Landslide mapping in Eastern Kentucky, Geological Society of America Abstracts with Programs, vol. 39, no. 2, p. 26.

Andrews Jr., W.M., **Crawford, M.M.**, 2007, Geological mapping and integrated data delivery for landslide assessment in Kentucky, Geological Society of America Abstracts with Programs, vol. 39, no. 6, p. 135.

Crawford, M.M., Olson, R.A., Toomey, R.S., and Scoggins, L.J., 2007, Derivative geologic map of Mammoth Cave National Park: a joint project between the National Park Service and the Kentucky Geological Survey, Geological Society of America Abstracts with Programs, vol. 39, no. 6, p. 376.

Currens, J.C., **Crawford, M.M.**, and Paylor, R.L., 2005, Karst potential and development indices: tools for mapping karst using GIS, Geological Society of America Abstracts with Programs, vol. 37, no. 2, pg. 48.

Carey, D.I., Beck, E.G., **Crawford, M.M.**, Davidson, B.O., Greb, S.F., Noger, M.C., Smath, R.A., and Williams, D.A., 2005, Land-use planning maps: soils and geology, Geological Society of America Abstracts with Programs, vol. 37, no. 7, p. 541.

Crawford, M.M., 2004, Digital geologic data and a new karst potential index map: A work in progress, Geological Society of America Abstracts with Programs, vol. 36, no. 2, p. 137.
Weisenfluh, G.A., Curl, D.C.,

COURSES TAUGHT

- Assistant Adjunct Faculty, Dept. of Earth & Environmental Sciences, U. of Kentucky
 - Advisor: Erin Wilburn, M.S., Fall 2022 – Spring 2024
 - EES 782: Data Acquisition and Processing (Independent Study) – Spring 2023
 - Serving on M.S. committees for current students Maxwell Mickelson and Hudson Koch
- Adjunct Instructor Georgetown College, General Geology F2004 – S2011
- Authorized Environmental Systems Research Institute (ESRI) instructor 2004 – 2010
Taught Introduction to ArcGIS classes, conducted 2-3 classes per year teaching the basics of ArcGIS

AWARDS

- 2023 **Director's Award**, Kentucky Geological Survey, Exceptional service for the reconnaissance of landslides associated with the July 2022 flooding in eastern Kentucky
- 2022 **Director's Award**, Kentucky Geological Survey, Exceptional service for the Radon on the Radar field work
- 2017 **Certificate of Meritorious Service**, from the Geological Society of America Environmental and Engineering Geology Division for efforts made on behalf of the Division.
- 2008 **Poster Contest Winner**, *Geology of Mammoth Cave National Park, Kentucky*, Kentucky GIS Conference, Lexington, Ky.

OTHER ACTIVITIES

- Federal Aviation Administration Remote Pilot certification, Small Unmanned Aircraft System, #476910 (current)
- Proficient in modeling and visualization software Quick Terrain Modeler (Applied Imagery)
- Entry-level experience with MATLAB
- Entry-level experience with statistical software program JMP
- Technical training for YellowScan UAV software and visualization
- Proficient in electrical resistivity surveying using the AGI SuperSting
- Experience in conducting triaxial compression (CU) tests using Trautwein-GeoTac Triaxial Loading System and associated TruePath software
- Proficient in GIS software ArcPro and ArcGIS 10.x (ESRI)

SELECTED PRESENTATIONS

Evaluating refinements in statistics-based landslide susceptibility modeling through model performance and map quality, Geological Society of America Annual Meeting, Anaheim, CA, 9/23/2024

Landslide susceptibility and risk in eastern Kentucky: An update for the Kentucky River Area Development District, Kentucky Association of Mitigation Managers annual conference, Prestonsburg, KY, 9/19/2023

Advancing landslide susceptibility mapping through FEMA hazard mitigation projects in eastern Kentucky, Geological Society of America Annual Meeting, Denver, CO, 10/12/2022

Landslide susceptibility and risk mapping in the Big Sandy Area Development District, eastern Kentucky, Geological Society of America Annual Meeting, Portland, OR, 10/11/2021

Landslide-susceptibility mapping and risk assessment, eastern Kentucky, Geological Society of America Meeting, 10/29/2020 [virtual poster presentation]

Landslide hazard and risk assessment for the Big Sandy Area Development District multi-Jurisdictional hazard mitigation plan, Kentucky Association of Mitigation Managers conference, 9/23/2020 [virtual presentation]

Landslide susceptibility and risk in eastern Kentucky, U.S. Geological Survey Landslide Hazards Program Seminar, 9/16/2020 [virtual presentation]

Landslide susceptibility and risk: Update on the FEMA pre-disaster mitigation project, Kentucky Geological Survey Internal Seminar, 8/7/2020, [virtual presentation]

Comparison of LiDAR based landslide hazard assessments for eastern Kentucky, American Geophysical Union Fall Meeting, San Francisco, CA, 12/12/2019

Addressing landslides in Kentucky: A state perspective, Congressional Hazards Caucus, Hazards Caucus Alliance 2019 Briefing Series, Landslide science: nationwide risk reduction applications, Washington, D.C., 6/7/2019

Geologic hazard assessment at KGS: Research, project updates, and LiDAR, Kentucky Association of Mitigation Managers conference, Kentucky Dam Village State Park, 9/18/2019

Long-Term Landslide Monitoring Using Soil-Water Relationships and Electrical-Resistivity Tomography to Estimate Suction Stress and Shear Strength, American Geophysical Union Fall Meeting, Washington, D.C., 12/10/2018

Landslide and earthquake hazard assessment and communication in Kentucky, Geological Society of America Annual Meeting, Indianapolis, IN, 11/6/2018

Landslides in Kentucky: Tools and Methodologies to Further Hazard Assessment Kentucky Association of Mitigation Managers Regional Training, Jenny Wiley State Park, KY, 5/23/2018

Geologic Hazards in Kentucky: Tools and Methodologies to Further Hazard Assessment Kentucky Association of Mitigation Managers Regional Training, Calvert City, KY, 5/10/2018

Using Electrical Resistivity to Assess Landslides: Examples From Kentucky and Pennsylvania, Geological Society of America Annual Meeting, Seattle, WA, 10/23/2017

Landslides, in Kentucky: Mapping Modeling, & Collaboration, Kentucky Association of Mitigation Managers conference, Kentucky Dam Village State Park, 8/30/2017

Geo-electrical and Geotechnical Field Correlations for Active Landslides in Kentucky, North American Symposium on Landslides, Roanoke, VA, 6/8/2017

Electrical resistivity imaging of a multiple rockslide, Pittsburgh, PA, KGS Annual Seminar, poster, 5/19/2017

Research, Data Dissemination, and Service on Geologic Hazards at the KGS, for the Kentucky Association of Mitigation Managers regional training meeting, Grayson, KY., 4/25/2017

Research, Data Delivery, and Hazard Assessment at the Kentucky Geological Survey, Kentucky Association of Mitigation Managers conference, Kentucky Dam Village State Park, 8/23/2016

Landslide Hazards, Kentucky Energy and Environment Cabinet/Dept. of Environmental Protection's GIS day, Frankfort, KY., 11/18/2015

The Kentucky Geological Survey Landslide Program: From Inventory to Targeted Research, Geological Society of America's annual meeting, Baltimore, MD, 11/2/2015

The Kentucky Geological Survey: A Geologic Hazard Management Overview, Kentucky Association of Mitigation Managers conference, Lake Cumberland, KY, 8/24/2015

The Kentucky Geological Survey Landslide Program: An Overview, Geohazards in Transportation in the Appalachian Region forum, Huntington, WV, 8/6/2015

Landslides in Kentucky: Inventory, Data Delivery, and Collaboration, Association of Environmental and Engineering Geologists professional landslide forum, Seattle, WA, 2/26/2015

Geologic, geotechnical, and geophysical investigation of a shallow landslide, eastern Kentucky (poster), Geological Society of America Annual Meeting, Vancouver, BC, Canada, 10/22/2014
Landslides in Kentucky, Kentucky Association of Mitigation Managers conference, Lake Barkley State Resort Park, Cadiz, KY, 9/10/2014

Landslides in Kentucky, Kentucky Emergency Management Quarterly Director's Meeting, Burlington, KY, 7/10/2014

Discovering Landforms, Kentucky Geological Survey Annual Meeting, Lexington, KY, 5/16/2014

Electrical Resistivity From A Geohazards and Engineering Perspective, Kentucky Geotechnical Engineering Group, Frankfort, KY, 4/16/2014

Using LiDAR to Map Landslides in Kenton and Campbell Counties, Kentucky, Kentucky GIS Conference, Louisville, KY, 9/27/2012

Monitoring and Characterization of the Meadowview Landslide, Boyd County, Kentucky: Preliminary Results, Geological Society of America Meeting, Denver, CO, 10/29/2013

Understanding landslides in Kentucky: Tools and methods to further landslide hazard research, International and N. American Symposium on Landslides, Banff, AB, Canada, 6/3-8/2012

Using LiDAR to map landslides in Kenton and Campbell Counties, Ky., Kentucky Transportation Cabinet GIS Conference, 3/29/2012

Geologic hazards in Kentucky, KY Emergency Management and Lexington-Fayette County Urban Government hazard mitigation meeting, Lexington, KY, 3/21/2012

Inventory mapping and characterization of landslides using LiDAR: Kenton and Campbell Counties, Geological Society of America Annual Meeting, Minneapolis, MN, 10/10/2011

Surficial Geologic Mapping Applied to Landslide Research, KY Association of Mapping Professionals Geospatial Summit, Frankfort, KY, 9/9-10/2009

Surficial geologic mapping in eastern Kentucky: applications and questions; SE Section Geological Society of America Meeting, Charlotte, NC, 4/10/2008