MATTHEW M. CRAWFORD

Affiliation
University of Kentucky
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EDUCATION

Ph.D. University of Kentucky (Geological Sciences, 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 (Geology, 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 (Geology, 1996)

EMPLOYMENT

Research Geologist IV U. of Kentucky, Kentucky Geological Survey 1/2021 – present
- Landslide hazard and risk assessment
- Hydrologic and geotechnical investigation of landslides
- Support of karst and earthquake hazard assessment
- Geologic hazard outreach and communication

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 mapping
- Geophysical and geotechnical investigation of landslides
- Karst hazard assessment, earthquake 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 and geologic mapping as part of a gold exploration team

GRANTS AND SPONSORED PROJECTS (submitted, awarded, rejected; PI, CO-I, and participant)

2025 Kentucky Division of Waste Management, *Landslide Monitoring at Maxey Flats Disposal Site*, **$74,548 (PI, submitted)**

2025 Kentucky Emergency Management, Department of Military Affairs; FEMA Hazard Mitigation Grant Program, *Multi-Jurisdictional Hazard Mitigation Plan for Landslides for the FIVCO Area Development District* **$327,338 (PI, submitted)**

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 Nat. 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 KY Div. of Waste Management, *Landslide Monitoring at Maxey Flats Disposal Site*, **$75,658 (PI)**

2023 KY Emergency Management, Department of Military Affairs; FEMA Hazard Mitigation Grant Program, *Enriching Kentucky's Landslide Inventory Database*, **$103,218 (PI)**

2023 KY Emergency Management, Department of Military Affairs, *Commonwealth of Kentucky Enhanced Hazard Mitigation Plan*, 2023, **$61,810 (PI)**

2023 National Science Foundation EPSCoR project *Climate Resilience through Multidisciplinary Big Data Learning, Prediction and Building Response Systems* (CLIMBS), University of Kentucky **(~$20,000,000, Research participant)**

2022 KY Div. 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 KY 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, *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 KY 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)**

AWARDS

2025 **Geological Society of America Fellow, "***Society Fellowship is an honor bestowed by election at the GSA Council meeting. GSA members are nominated by other GSA members in recognition of a sustained record of distinguished contributions to the geosciences and the Geological Society of America through such avenues as publications, applied research, teaching, administration of geological programs, contributing to the public awareness of geology, leadership of professional organizations, and taking on editorial, bibliographic, and library responsibilities."*

2025 **Stewardship and Outreach Award**, Kentucky Section of the American Institute of Professional Geologists, in recognition of the Big Blue RockPod podcast.

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.

ENGAGEMENT, SERVICE, & PROFESSIONAL AFFILIATIONS

- Workshop: Organized and taught a short course titled *Landslide Mapping Using Lidar and Ortho-Imagery in a GIS–Building Fundamental Mapping Skills for the Next Generation of Landslide Scientists*, Geological Society of America Connects 2025 (co-led with William Burns (Oregon Dept. of Geology and Mineral Industries) and Stephen Slaughter (U.S. Geological Survey)
- Workshop: Organized and taught *Understanding and Using KGS Landslide Data,* Kentucky Geological Survey Annual Meeting, 6/10/2025
- Workshop: 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
- Chair, Geological Society of America Environmental & Engineering Geology Division, 2015–2016
- Co-founded the Geological Society of America Environmental & Engineering Geology Division Landslide Committee

- Participant in the U.S. Geological Survey National Landslide Risk Reduction Working Group (NLHRR) and co-lead on the NLHRR Interest Group *Landslides in the Eastern U.S.*
- Research Advisor for the U.S. Geological Survey Mendenhall Research Fellowship Program, 2021–2022 – Towards a National Landslide Susceptibility Map of the United States
- Participant in the Geological Society of America Hydrogeology and Environmental Engineering Careers and Networking event, GSA Connects 2025
- 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
- Founder and lead of the Kentucky Geological Survey podcast *The Big Blue Rock Pod* https://kgsnews.podbean.com/ (2021 – present, 49 episodes)
- Participant in the Kentucky Silver Jackets Team Meetings. The U.S. Army Corp of Engineers based multi-agency team supports collaborative solutions to state natural hazard and risk priorities (current)
- Current Member of the Geological Society of America (GSA)
- Current Member of Kentucky Association of Mitigation Managers
- Kentucky Association of Mitigation Managers Advisory Board (2023 – present)

- Manuscript reviews for *Journal of Applied Geophysics, Natural Hazards, Bulletin of Engineering Geology and the Environment, Landslides, Engineering Geology, Environmental and Engineering Geoscience, Reviews in Geophysics, Quarterly Journal of Engineering Geology and Hydrogeology, and Catena*

- Invited Speaking Appearances (no abstract)

  Natural Hazards Research and Applications Workshop, Panelist: *Data for a Hazard Ready Nation*, 7/14/2025, Broomfield, CO

  Kentucky Association of Mapping Professionals, Quarterly Meeting, State of the State Geospatial Programs, *Elevation and Aerial Imagery Applications: Project Updates from the Kentucky Geological Survey*, 5/14/2025, Frankfort, KY

  Indiana University, Department of Earth and Atmospheric Sciences Colloquium, *The Landslide Hazards Program at the Kentucky Geological Survey: Research, Opportunities, and the Future,* 12/2/2024

  Northern Kentucky University, Department of Physics, Geology, and Engineering Technology, *Careers in Geoscience: A State Survey Perspective*, 11/19/2021

  Eastern Kentucky University, Department of Physics, Geosciences, and Astronomy, *Landslide Hazards: An Overview of Occurrences, Challenges, and Research From a Global to a Local Scale*, 10/28/2021

  Congressional Hazards Caucus Alliance 2019 Briefing Series, *Addressing Landslides in Kentucky: A State Perspective*, 6/7/2019, Washington, D.C

Hanover College, Geology Department, *Landslides in Kentucky: Tools and Methodologies to Further Hazard Assessment,* 2/18/2018

- Professional meeting sessions organized or chaired (last 10 years)

  Landslide Inventory Mapping and Next Steps: Assessing Susceptibility, Hazard Models, Risk, and Policy (oral) Geological Society of America Connects 2025, with William Burns (Oregon Dept. of Geology and Mineral Industries) and Stephen Slaughter (U.S. Geological Survey)

  Current Trends in Landslide Inventories and Assessments: Innovative Techniques, Collection Methods, Modeling, and Risk Hazards (oral and poster), Geological Society of America Connects 2024, 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 Connects 2022

  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)

PUBLICATIONS

Peer-reviewed journals, data sets, and book chapters

Scheip, C., **Crawford, M.**, Koch, H.J., and Bibbins, E., Reconsidering the magnitude of convective storms in triggering landslide events in the Appalachian Plateau, USA, *Geophysical Research Letters,* [submitted]

Schaefer, L.N., Rengers, F.K., Mirus, B.B., Toney, L.D., Allstadt, K.E., Wooten, R., Moor, P., Burgi, P.M., Witt, A., Bilderback, E.L., Bauer, J., Korte, D., **Crawford, M.M.**, 2025, Insights into widespread landsliding in southern Appalachia from Hurricane Helene, *GSA Today*, [accepted]

Crawford, M.M., Koch, H.J., and Dortch, J.M, 2025, Evaluating map quality and model performance through iterative statistics-based landslide susceptibility in eastern Kentucky, *Natural Hazards,* https://doi.org/10.1007/s11069-025-07255-7

Burgi, P.M., Toney, L.D., Collins, E.A., Murphy, C.R., Ellison, S.M., Schmitt, R.G., Allstadt, K.E., Bedinger, E.C., Belair, G.M., Bilderback, E.L., Dunlap, L.R.C.C., Cattanach, B., **Crawford, M.M.**, Einbund, M.M., Fitzpatrick, F.A., Frost, D. J., Grant, A.R.R, Hageman, S. J., Hartman, C., Heckert, A.B., Hoch, O.J., Johnson, B., Jones, E.S., Jurgevich, J., Karantanellis, E., Korte, D., Martinez, S.N., Merschat, A.J., Miles, C.P., Sas, R., Schaefer, L.N., Scheip, C., Soobitsky, R., Trantham, B., Witt, A., 2024, Preliminary Landslide Inventory for Landslides Triggered by Hurricane Helene (September 2024): *U.S. Geological Survey data release*, https://doi.org/10.5066/P14CHGKS.

Crawford, M.M., Bibbins, E.M, and Koch, H.J., 2024. Kentucky Geological Survey landslide inventory [2024-04]: *Kentucky Geological Survey Research Data*, https://doi.org/10.13023/kgs.data.2022.01.

Swallom, M.L., Koch, H.J., Dortch, J.M., **Crawford, M.M.**, Thigpen, J.R., and Andrews, W.M., 2024, Evaluating root strength index as an indicator of landslide-prone slopes in eastern Kentucky, *Landslides*, https://doi.org/10.1007/s10346-024-02384-9

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/qjegh2022-078

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)

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/gseegeosci.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

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., Koch, H.J., Dortch, J.M., and Haneberg, W.C., 2022, Landslide Susceptibility Map of Floyd County, Kentucky: Kentucky Geological Survey, ser. 13, Contract Report 45, 1 p. https://doi.org/10.13023/kgs.13.ct.45.2022
(4 other Contract Reports were also published in 2022 including Magoffin, Martin, Johnson and Pike)

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.

Published Conference Abstracts

Crawford, M.M., Scheip, C.M., Koch, H.J., and Bibbins E.M, 2025, Comparisons of Historical and Event Landslide Inventories Using Lidar Change Detection: Rethinking Landslide Activity in Big Storms, Geological Society of America Abstracts with Program, vol. 57, no. 6, doi: 10.1130/abs/2025AM-7884

Lauren N Schaefer, Eric Bilderback, Kate Allstadt, Kelli Baxstrom, Emily Bedinger, Gina Belair, Paula Burgi, Corina Cerovski-Darriau,…**Matthew Crawford** and Denny Capps, Multi-agency landslide emergency response efforts and insights after Hurricane Helene, American Geophysical Union Annual Meeting, NH11D-01, December 9–13, 2024, Washington, D.C.

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

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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

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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

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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.

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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.

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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.

ACADEMIC ENGAGEMENT AND COURSES TAUGHT

- Assistant Adjunct Faculty, Dept. of Earth & Environmental Sciences, U. of Kentucky
  - Advisor: Evelyn Bibbins and Ryan Ramsey, M.S., Fall 2025 – present
  - Advisor: Erin Wilburn, M.S., Fall 2022 – Spring 2024
  - Advising Committee: Hudson Koch, PhD., Fall 2022 – present
  - EES 782: Data Acquisition and Processing (Independent Study) Spring 2023
- Adjunct Instructor Georgetown College, General Geology Fall 2004 – Spring 2011
- Authorized Environmental Systems Research Institute (ESRI) instructor 2004 – 2010
  Taught Introduction to ArcGIS classes, conducted 2-3 classes/year teaching the basics of ArcGIS

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 and statistical software program JMP
- 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)

MEDIA RELATIONS AND INTERVIEWS

Landslides in Appalachia, Dave Malkoff, CBS News, September 20, 2024

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/

SELECTED PRESENTATIONS

Comparisons of Historical and Event Landslide Inventories Using Lidar Change Detection: Rethinking Landslide Activity in Big Storms, Geological Society of America Annual Meeting (GSA Connects), San Antonio, TX, 10/20/2025

Landslides Susceptibility and Risk through FEMA Hazard Mitigation Grants: Tips and Guidelines for Use Kentucky Association of Mitigation Managers Annual Conference, Corbin, KY, 9/17/2025

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

Landslide Susceptibility and Risk: Kentucky Geological Survey Project Updates, Kentucky Association of Mitigation Managers Annual Conference, Owensboro, KY, 9/17/2024

Assessing Landslide Susceptibility and Risk in Eastern KY Through FEMA HMGP Projects, Kentucky Association of Mitigation Managers Region IV Training, Hazard, KY, 3/19/2024

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 (GSA Connects), 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