Curriculum vitae

Sarah E. Johnson, P.G.

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## EDUCATION

**Ph.D.**, Geology, University of Kentucky, Lexington, KY, *anticipated completion in Summer 2022*

**M.S.**, Geology, Purdue University, West Lafayette, IN

**B.S.**, *summa cum laude,* Geology, City College of New York, New York

## ACADEMIC EXPERIENCE

**Senior Lecturer in Geology**, Northern Kentucky University, Department of Physics, Geology and Engineering Technology. 2002 – present

* Teach geology courses including Geoscience Applications of GIS, Geomorphology, Geologic Field Methods, Economic Geology, Structural Geology, and Careers in Geoscience.
* Collaborate on research and teaching with faculty in geology, biology, and computer science.
* Conduct research involving undergraduate students.

**Geology Program Director**, Northern Kentucky University, Department of Physics, Geology and Engineering Technology. 2018 – 2020, 2021 - present

* Represent the geology program in interactions with students, faculty & staff, and the public.
* Advise and mentor geology students.
* Schedule courses and the faculty to teach them.
* Work with colleagues to assess and improve the geology program by organizing an advisory board, developing program assessments, and revising the geology curriculum.

## PROFESSIONAL EXPERIENCE

**Engineering Geologist**, H.C. Nutting (now Terracon), 2000 – 2002

* Worked in the geotechnical engineering group on landslide remediation, stream bank stabilization, tunnel feasibility, subsurface characterization, rock cut slope and retaining wall design.
* Performed proposal writing, permitting, field work, soil and rock classification, slope stability and hydrologic modeling, writing final reports, and performing inspections during construction.

**Marine Geophysicist**, Schlumberger, 1998 – 2000

* Worked on seismic vessels to process 2D and 3D seismic data for clients.

REFEREED PUBLICATIONS

**Johnson, S. E**., Swallom, M. L., Thigpen, J. R., McGlue, M. M., Dortch, J. M., Gallen, S., Woolery, E. W., Yeager, K., 2022, “The influence of glacial topography on fluvial efficiency in the Teton Range, Wyoming (USA)”. *Earth and Planetary Science Letters,* <https://doi.org/10.1016/j.epsl.2022.117643>

Haneberg, W.C., **Johnson, S.E**. & Gurung, N., 2021, “Response of the Laprak, Nepal, landslide to the 2015 Mw 7.8 Gorkha earthquake”. *Natural Hazards*. <https://doi.org/10.1007/s11069-021-05067-z>.

Amundsen, J., **Johnson, S.E**., Rouse, K., and Wang H., 2017, “Delineation of landslides using LiDAR-derived DEM - a case study in Northern Kentucky and Hamilton County, Ohio”, *Journal of Applied Global Research*, Volume 10, Issue 24, pp. 123-141.

**Johnson, S.E.**, 1997, “1996 Tumalt Creek debris flows and debris avalanches in the Columbia River Gorge east of Portland, Oregon”, in Chen, Cheng-lung, First International Conference on Debris-flow Hazards Mitigation; Mechanics, Prediction and Assessment: American Society of Civil Engineers, New York, NY, United States, p. 395-404.

MANUSCRIPTS IN PROGRESS

Johnson, S.E., Haneberg, W. C, Crawford, M., Bryson, S., “Measuring ground surface elevation changes in a slow-moving colluvial landslide using combinations of regional airborne lidar, UAV lidar, and UAV photogrammetric surveys”, *submitted*.

McGlue, M., Dilworth, J. R., Johnson, H., Yeager, K., Thigpen, R., Woolery, E. W., Brown, S. J., Cearley, C. S., Clark, G., Dixon, T. S., Goldsby, R., Helfrich, A. L., Hodelka, B. N., J**ohnson, S**., Domingos Luz, L., Powell, N. E., Rasbold, G. G., Swanger, W., & Whitehead, S. J., “Impacts of dam emplacement and water level change on sedimentation in Jackson Lake, Grand Teton National Park (Wyoming, USA)”. *In prep.*

## CONFERENCE PRESENTATIONS

**Johnson, S**., Haneberg, W.C., 2021, “Elevation Change Detection Thresholds in a Slow-Moving Colluvium Landslide in the Cincinnati Area Using Combinations of Regional LiDAR, Structure from Motion Photogrammetry, and UAV-LiDAR”, Abstract NH33A-09, presented at 2021 AGU Fall Meeting, 13-17 Dec.

**Johnson, S**., Swallom, M. L., Thigpen, J. R., McGlue, M. M., Woolery, E. W., Dortch, J., Gallen, S., & Yeager, K. 2021. “Post-glacial fluvial inefficiency”, presented at GSA Connects 2021 in Portland, OR. <https://doi.org/10.1130/abs/2021AM-371378>

McGlue, M., Dilworth, J. R., Johnson, H., Yeager, K., Thigpen, J. R., Woolery, E. W., Brown, S. J., Cearley, C. S., Clark, G., Dixon, T. S., Goldsby, R., Helfrich, A. L., Hodelka, B. N., J**ohnson, S**., Domingos Luz, L., Powell, N. E., Rasbold, G. G., Swanger, W., & Whitehead, S. J., 2021. “Sublacustrine geomorphology and deepwater chemostratigraphy reveal effects of dam installation at Jackson Lake (Wyoming, USA)”, presented at GSA Connects 2021 in Portland, OR. <https://doi.org/10.1130/abs/2021AM-365379>

**Johnson, S.**, and Haneberg, W.C., 2020. “Documenting decadal scale landslide movement using sequential LiDAR and structure from motion digital elevation models in the Cincinnati and Northern Kentucky Metropolitan Area”, Abstract NH009-0004, presented at 2020 AGU Fall Meeting, 1-17 Dec.

**Johnson, S.**, Swallom, M., Thigpen, J. R., McGlue, M. M., and Woolery, E. W., 2020. “A comparison of post-glacial sediment volumes from source to sink in Moran and Snowshoe Canyons, Teton Range, Wyoming”, presented at the Geological Society of America 2020 Connects Online. <https://doi.org/10.1130/abs/2020AM-356159>

Helfrich, A. L., Swallom, M., **Johnson, S.**, Thigpen, J. R., McGlue, M. M., Woolery, E. W., Brown, S. J., and McQuarrie, N., 2019. “Utilizing apatite (U-Th)/He analysis, landscape and kinematic modeling to examine the relative efficacy of Climatic and Tectonic Forcing in an Active Tectonic System Teton Range, WY”, poster presented at the Geological Society of America, Phoenix, AZ. [10.1130/abs/2019AM-338520](http://dx.doi.org/10.1130/abs/2019AM-338520)

**Johnson, S.**, Thigpen, J. R., McGlue, M. M., Woolery. 2019. “Preliminary quantification of sediment storage in Moran and Avalanche Canyons in Grand Teton National Park, Wyoming, USA.”, poster presented at the Geological Society of America Southeastern Section, Charleston, SC.

**Johnson, S**., Edwards, T., Johnson, M., Brown, C., Peterson, C., 2018, “Landslide inventory of Northern Kentucky using differential elevation maps derived from sequential LiDAR surveys”, poster presented at the Geological Society of America National Meeting, Indianapolis, IN.

Roenker, B., Olson R., Faller, T., Ivey, Z., **Johnson, S**., Wang, H., 2018, “Using sequential LiDAR to monitor and catalog recently active landslides in Kenton and Campbell counties in Northern Kentucky”, poster presented at the Geological Society of America Southeastern Section, Knoxville, TN.

Haneberg, W. C., & **Johnson, S**., 2017. “Double gaussian filtering to suppress noise and improve identification of new landslides on DEM difference maps”. presented at Geological Society of America National Meeting, Seattle, WA. <https://doi.org/10.1130/abs/2017AM-305313>

**Johnson, S.,** Olson R., Roenker, B., 2017 “Using sequential LiDAR to monitor and catalog recently active landslides in Kenton and Campbell counties in Northern Kentucky, poster presented at the Geological Society of America National Meeting, Seattle, WA.

**Johnson, S**., 2011, “Identification and Delineation of Previously Unreported Landslides in Cincinnati and Northern Kentucky Using LiDAR-Derived Maps”, presented at the Association of Engineering Geologists National Meeting, Anchorage.

## OTHER PRESENTATIONS

**Johnson, S.**, and Haneberg, W.C., 2021. “Documenting decadal scale landslide movement using sequential LiDAR and structure from motion digital elevation models in the Cincinnati and Northern Kentucky Metropolitan Area”, presented at the KGS Annual Seminar, May 20, 2021.

Dortch, Jason M., Hammond, M., **Johnson, S.**, and Koch, H., 2021. “LASTiff, what is it and why do I need it?”, Kentucky Geological Survey Seminar Series.

**Johnson, S.** 2019. “Using LiDAR, unmanned aerial vehicles & Structure from motion to detect & monitor landslides in Kentucky.” Presented at the Geoscience Alumni Research Symposium, University of Kentucky.

**Johnson, S**., 2011, “Landslide detection using LiDAR”, presentation for the AEG Ohio River Valley section meeting.

**Johnson, S**., 2010, “Tumalt Creek, Oregon debris flows revisited”, invited speaker, University of Cincinnati Geology Colloquia Series, February, 2010.

## SELECT UNDERGRADUTE RESEARCH PRESENTATIONS

Nelson, M., “Modeling Carter Caves: Structure-from-Motion Photogrammetry”, 2021 NKU CINSAM Celebration of Student Research and Creativity.

Nelson, M., Modeling Carter Caves with structure from motion photogrammetry: 3-Dimensional cave survey”, 2020 NKU CINSAM Celebration of Student Research and Creativity.

Peterson, C., Kim K., Correa, E., “Modeling methods of X-Cave system using stereo depth sensor data”, 2020 NKU CINSAM Celebration of Student Research and Creativity.

Owens, J., Peterson, C., “Integrated modeling and geophysical evaluations of floods in Kentucky”; NKU Celebration, Spring, 2019, Co-Sponsor

Peterson, Cameron, “Creation of digital elevation models using scanning airborne laser altimetry (LiDAR)”, Kentucky Academy of Science, Berea, KY, Fall, 2019, Poster won 3rd place at KAS. Co-sponsor.

Nelson, M., 2019, "Assessing effects of wetland soil moisture on flood progress in Kentucky using multi-temporal satellite data”, AGU National Meeting, San Francisco, 2019. Co-sponsor.

Olivan, Lars., Martin D., Groeschen, J., 2018, “Mapping X-Cave in the Carter Caves system”, 2018 NKU CINSAM Celebration of Student Research and Creativity.

Iles, D., 2017, “Using LiDAR to gage stream restoration over time” 2017 NKU CINSAM Celebration of Student Research and Creativity.

Ollier, K., 2015, “Coral and algae distribution along the Belize Barrier Reef” 2015 NKU Heather Bullen Celebration of Student Research and Creativity.

Cole, H., 2015 “Comparison of living coral and algal growth in the Belize Barrier Reef system”, 2015 NKU Heather Bullen Celebration of Student Research and Creativity.

Vogelpohl, B., 2015, “Identification of landslide failure planes through varying geophysical methods” 2015 NKU CINSAM Celebration of Student Research and Creativity.

Rouse, K., 2011, “Landslide detection using LiDAR data, Kenton and Campbell County, Kentucky”, 2011 NKU CINSAM Celebration of Student Research and Creativity.

Williams, L., 2010, “Surface and groundwater connections in heavily mined communities derived from chemical analysis of water samples”, KAS 2010 annual meeting, poster presentation, won best geology poster.

Glassmeyer, M., 2009, “Depositional environment of the Split Rock Conglomerate”, KAS 2009 annual meeting, poster presentation.

Webster, J.; Robertson, D.; Johnson, S., 2009, “The ecology and geology of coral reefs: changes since the 1970s”, KAS annual meeting, poster presentation.

Amundsen, Jesse, Johnson, S., 2009, “Improving approximations of the Mohr-Coulomb failure envelope”, 2009 GSA National Conference, poster presentation, Portland, OR.

O’Brian, Alice, Johnson, S., 2009, “Soil and landslide hazard map for Split Rock Conservation Park”, NKU Celebration 2009, poster presentation.

## PROPSALS AND FUNDING

2021 NKU University Research Council Distinguished Fellowship, not selected. *Measuring Landslide Movement in Northern Kentucky Using Unmanned Aerial Vehicles and Structure from Motion (SfM) Photogrammetry.*

2020 University of Wyoming National Park Service Small Grant Program, $5000, not funded

*Quantifying post-glacial sediment storage and denudation rates in the Teton Range, Wyoming*

2019 Kentucky-NASA EPSCoR, $52,504, not funded

*Research capacity building in radar remote sensing for natural disaster management: A machine learning approach (Co-PI)*

2019 NKU Center for Integrated Science and Math (CINSAM), funded $12,304

*IMAGE- Integrated modeling and geophysical evaluations of floods in Kentucky (Co-PI)*

2019 NKU Center for Integrated Science and Math (CINSAM), $11,800, not funded

*Mapping landslide displacements in northern Kentucky using Structure from Motion (SfM) and image correlation from Unmanned Air Vehicles (UAVs) (PI)*

2018 Kentucky Water Resources Research Institute, not funded
*IMAGE – Integrated modeling and geophysical evaluation of floods in Kentucky (Co-PI)*

2018 NKU Center for Integrated Science and Math (CINSAM), funded $13,240

*Using sequential LiDAR to identify & catalog landslides in Kenton and Campbell counties (PI)*

2018 NKU Collaborative Faculty Student Project Award (CFSPA), funded $4,720

*Using wequential LiDAR to identify & catalog landslides in Kenton and Campbell counties (PI)*

2015 NKU Undergraduate Research Council Award for Student Research & Creative Activity Abroad, funded $2000, *Examining the complex interaction between the geological structure and ecological health of coral reefs in Belize (Co-PI)*

## SELECT CONSULTING PROJECTS

**Johnson, S**., Rome, B., 2002-2003, “Biostabilization of Twin Creek channel at North Warren County Wellfield, Warren County, OH”.

**Johnson, S**., Mathis, H., 2002, “Cut slope recommendations, KY 1274 Menifee County”.

**Johnson, S**., Gilb, S., 2002, “Slope stability analysis and segmental retaining wall design”, Hillside Ave. and Anderson Ferry.

**Johnson, S**., Rome B., 2002, “Hydraulic modeling for proposed biostabilization of Little Miami Creek in Milford, OH”.

**Johnson, S**., Zhou, S., Gilb, S., 2000, “Geotechnical study of proposed mine access tunnels Liter’s Quarry, Oldham County, KY”.

**Johnson, S**., Webb, G., 2000, “Peak particle velocity (ppv) monitoring near high pressure gas mains during blasting at AA highway and Thelma Lee Drive”.

## LICENSING & CERTIFICATIONS

Licensed Professional Geologist in Kentucky (license #260854)
FAA Part 107 Remote Pilot Certificate (license # 4320067).

## ADDITIONAL CONFERENCES AND COURSES

2017, Kentucky Geological Survey “Kentucky Landslide Meeting”, Somerset, KY

2015, KY-AIPG Professional Development Conference "Geophysical Techniques and Applications - Non-Invasive Methods for Subsurface Characterization and Interpretation", Lexington, KY

2014, National Association of Geoscience Teachers Cutting Edge Workshop “Innovative Approaches to Teaching Sedimentary Geology, Geomorphology, and Paleontology” in St. Paul, MN

2004, Chautauqua Course “Contrasting Volcanism at Mount Shasta and the Medicine Lake Volcano”, College of the Siskiyous, Weed, CA

## SOFTWARE

Geographic Information Systems: ESRI ArcGIS, GRASS, ENVI
Coding: MATLAB, Python
LiDAR Processing: Yellowscan CloudStation, Applanix POSPac
Photogrammetry & Structure from Motion: Agisoft Metshape, Cosi-CORR
Landscape Modeling: Landlab, GeoPAT
Synthetic Aperture Radar: SNAP
Publishing: Adobe Illustrator, Adobe Lightroom

## ACADEMIC SCHOLARSHIPS & HONORS

2019-2021, KGS-EES Commonwealth Research Assistantship in Earth and Environmental Sciences

2020-2021 FERM grant, in support of graduate research

2019-2021 Brown McFarland grant, in support of graduate travel to professional meetings

Multiple years - Identified by graduating seniors as having greatest impact on their academic and personal development

Michael C. Gardener Memorial Award, in support of graduate research

Cedric J. Newby Scholarship, in support of graduate research

Linda Horn Memorial Fund Scholarship, in support of graduate research

Teaching Assistantship, Purdue University

Award for Best Calculus Final at City College of New York

Undergraduate Teaching Assistantship, City College of New York

Phi Beta Kappa

## TEACHING EXPERIENCE

Careers in Geoscience, 2020 - present

Earth Science Applications of GIS, 2015 - present

Geomorphology, 2004 - present

Ecology and Geology of Coral Reefs, taught in Belize, 2007 - present

Geologic Field Methods, taught in Colorado, 2011 - 2017

Structural Geology, 2004 - 2018

Economic Geology, 2011- present

This Dangerous Earth, online and face-to-face, 2007 - present

Earth Science with lab, 2002 - 2016

## FIELD TRIPS LED

Introduction to geologic field methods in Colorado, two weeks, co-leader

Ecology and geology of coral reefs in Belize, 9 days, co-leader

Structural geology, Virginia and Pennsylvania, 3-4 days, co-leader

Karst geology of Carter Caves, Kentucky 1-2 day

Glacial and coastal geology of northern Ohio and Kelly’s Island, 2-days

Landslides in northern Kentucky, 1 day

Glacial geomorphology of southern Ohio and northern Kentucky, 1 day

Geology of Red River Gorge, 1 day

Kentucky River Fault, 1 day

MVT sulfide deposits, Kentucky, 1 day

## MEMBERSHIPS

AGU – American Geophysical Union

GSA – Geological Society of America

## ACADEMIC SERVICE

* 7 departmental search committees (4 tenure-track, 2 non-tenure track renewable, 1 staff)
* Chair of department seminar committee (2020-2021)
* College budget committee (2021)
* NKU STEM recruitment and retention committee
* Department of Physics, Geology and Engineering Technology scholarship committee
* NKU Faculty Student Collaborative Grant reviewer (2018)
* Student Publication and Presentation Award reviewer (2019-2021)
* Editor of the department newsletter (2010-2016)
* Designed and maintained department web pages (2004-2018)

## OUTREACH ACTIVITIES

2019 Mayerson Student Philanthropy Project (Ecology and Geology of Coral Reefs)

2016 and 2014 NKU summer STEM Camp

2009-2012 Co-organized Science Night at a Cincinnati Public School

2002-2010 Faculty Coordinator for the Northern Kentucky Earth Space Science Alliance