

# Katherine S. Nelson

Vanderbilt University  
Department of Civil and Environmental Engineering  
Environmental Management and Policy  
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## EDUCATION

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2018 (anticipated)	Ph.D. in Environmental Management and Policy, Vanderbilt University
2016	CERTIFICATE in College Teaching, Vanderbilt Center for Teaching, Vanderbilt University
2009	M.S. in Environmental Engineering, Washington University in St. Louis
2006	B.S. in Environmental Engineering, University of Oklahoma

## FELLOWSHIPS, AWARDS, & LICENSURE

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2017	Funded Visiting Scholar, National Socio-Environmental Synthesis Center (SESYNC) Short Course “Teaching Socio-Environmental Synthesis with Case Studies”
2015-2016	Oak Ridge Institute for Science and Education (ORISE) Graduate Research Fellowship, U.S. Army Corps of Engineers Research Participation Program, ~\$60,000, May 2015 – October 2016
2013-2018	Harold Stirling Vanderbilt Graduate Honor Fellowship, Vanderbilt University
2006-2008	National Science Foundation Graduate Teaching Fellow in K-12 Education, Washington University in St. Louis
2006	Outstanding Senior in Environmental Engineering, University of Oklahoma
2006	Licensed Engineer Intern (EI), Oklahoma State Board of Licensure for Professional Engineers and Land Surveyors, License Number 13480

## GRANTS

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2017	Nashville Metro Water Services, “Converting Vulnerable Landscapes to Resilient and Sustainable Community Assets”, \$62,500, March – December 2017 (co-writer)
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## PUBLICATIONS

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### Peer-Reviewed Journal Articles

- 2017     **Nelson, Katherine, S.**, Janey V. Camp, Craig E. Philip, and Mark D. Abkowitz. "Agent-Based Model of Navigable Inland Waterway Tow Operation Procedures". *Transportation Research Record: Journal of the Transportation Research Board* No. 2611 (2017). doi 10.3141/2611-02.
- 2016     Dundon, Leah A., **Katherine S. Nelson**, Janey Camp, Mark Abkowitz, and Alan Jones. "Using Climate and Weather Data to Support Regional Vulnerability Screening Assessments of Transportation Infrastructure." *Risks* 4.3 (2016): 28.
- 2015     **Nelson, Katherine S.**, Mark D. Abkowitz, and Janey V. Camp. "A method for creating high resolution maps of social vulnerability in the context of environmental hazards." *Applied Geography* 63 (2015): 89-100
- 2013     Wu L, Luderer M, Yang X, Swain C, Zhang H, **Nelson K**, Stacy AJ, Shen B, Lanza GM, Pan D. "Surface Passivation of Carbon Nanoparticles with Branched Macromolecules Influences Near Infrared Bioimaging." *Theranostics* 2013; 3(9):677-686.
- 2013     Lina Wu, Xin Cai, **Kate Nelson**, Ruiying Zhang, Micah Luderer, Gregory M. Lanza, Lihong V. Wang, Baozhong Shen and Dipanjan Pan. "A Green Synthesis of "Home-Made" Carbon Nanoparticle from Honey for Real-Time Photoacoustic Imaging". *Nano Research*. May 2013, Volume 6, Issue 5, pp 312-325.

### Peer-Reviewed Conference Proceedings

- 2017     **Nelson, Katherine, S.**, Janey V. Camp, Craig E. Philip, and Mark D. Abkowitz. "Agent-Based Model of Navigable Inland Waterway Tow Operation Procedures". *Proceedings of the 96<sup>th</sup> Annual Meeting of the Transportation Research Board (TRB)*, Washington D.C. (January 8-12, 2017).
- 2015     **Nelson, Katherine, S.**, Janey V. Camp, Craig E. Philip, and Mark D. Abkowitz. "Paper 123-Navigable Inland Waterway Transportation Modeling: A Conceptual Framework and Modeling Approach for Consideration of Climate Change Induced Extreme Weather Events." *Proceedings of The World Association for Waterborne Transport Infrastructure (PIANC) Smart Rivers 2015 Conference, Argentina*. (September 7-11, 2015).

### Book Chapters and Reports

- 2014     **Nelson, Kate**, Patrick Winter, Monica Shokeen, Steven Wang, and Mikhail Y. Berezin. 2014. "Nanoparticles for Bioimaging." *Nanotechnology for Biomedical Imaging and Diagnostics*, 151–92. John Wiley & Sons, Inc. doi. 10.1002/9781118873151.ch6.
- 2010     Daniel E. Giammar, **Katherine Nelson**, James D. Noel, and Yanjiao Xie. "Water Chemistry Effects on Dissolution Rates of Lead Corrosion Products". *Water Research Foundation*. Report 4064. 2010.

## WORKING PAPERS & RESEARCH PROJECTS

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**Nelson, Katherine, S.** and Emily K. Burchfield. “Effects of the Structure of Water Rights on Agricultural Production During Drought. A Spatiotemporal Analysis of California’s Central Valley”. (Revise Resubmit)

Gillespie-Marthaler, Leslie, **Katherine S. Nelson**, Hiba Baroud, David S. Kosson, and Mark Abkowitz. “Vulnerability, Resilience, and Sustainability: Multi-Scale, Dynamic Interactions within Complex Systems and the Need for Integrative Assessment Methods (Part 1 of 2)”. (Revise Resubmit)

**Nelson, Katherine, S.**, Leslie Gillespie-Marthaler, Hiba Baroud, Mark Abkowitz, and David S. Kosson. “Resilience, Sustainability, and Vulnerability: An Integrated and Dynamic Resilience Assessment Framework for Complex Adaptive Systems (Part 2 of 2)”. (Revise Resubmit)

**Nelson, Katherine, S.**, Paul Johnson, and Patricia Dijoseph. “Calibration and Validation of an Agent-based Model of Inland Waterway Tow Traffic”. (In progress)

**Nelson, Katherine, S.** “Application of an Integrated and Dynamic Resilience Assessment Framework to Monitoring Trends and Projections in Community Resilience”. (In progress)

**Nelson, Katherine, S.** and Janey V. Camp. “Estimating the effectiveness of a home buyout program as an urban flood adaptation strategy”. (In progress)

## PRESENTATIONS

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### Paper Presentations

- 2017      **Nelson, Katherine, S.**, Janey V. Camp, Craig E. Philip, and Mark D. Abkowitz. “Agent-Based Model of Navigable Inland Waterway Tow Operation Procedures”. *96<sup>th</sup> Annual Meeting of the Transportation Research Board (TRB), Washington D.C.* (January 8-12, 2017).
- 2016      **Nelson, Katherine S.** and Emily K. Burchfield. “Panel Paper: Does the Structure of Water Rights Impact Agricultural Production During Droughts? A Spatiotemporal Analysis of California's Central Valley”. *Association for Public Policy Analysis & Management 38<sup>th</sup> Annual Fall Research Conference, Washington D.C.* (November 4th, 2016).
- 2016      **Nelson, Katherine, S.**, Janey V. Camp, Craig E. Philip, and Mark D. Abkowitz. “Navigable Inland Waterway Traffic Model for Evaluation of Tow Operation Procedures in the Context of Extreme Weather Events”. *4<sup>th</sup> Biennial TRB-CMTS Research & Development Conference, Washington D.C.* Student Honor Panel. (June 25, 2016).
- 2015      **Kate S. Nelson**, Mark Abkowitz, and Janey Camp. “A Method for Creating High Resolution Maps of Social Vulnerability”. *Association of American Geographers Annual Meeting, Chicago, IL.* (April 25, 2015).

- 2009 Daniel E. Giammar, **Katherine Nelson**, James D. Noel, and Yanjiao Xie. “Formation and Stability of Solid-Phase Lead Corrosion Products in Drinking Water Distribution Systems”. *AWWA Annual Conference and Exposition, San Diego, CA*. (June 14-18, 2009).
- 2009 Daniel E. Giammar, **Katherine Nelson**, James D. Noel, and Yanjiao Xie. “Influence of water chemistry on the stability of lead-containing phases present in drinking water distribution systems”. *237th ACS National Meeting, Salt Lake City, UT*. (March 22-26, 2009).
- 2008 **Katherine Nelson** and Daniel Giammar. “The Influence of Water Chemistry on the Dissolution Rate of a Lead Phosphate Corrosion Product”. *Joint Meeting of the Missouri Water Environment Association and the Missouri Section of the American Water Works Association, Osage Beach, MO*. (March 30 – April 2, 2008).

### Poster Presentations

- 2016 **Gillespie-Marthaler, Leslie** and Katherine S. Nelson. “Resilience, Sustainability, and Vulnerability: Multi-Scale, Dynamic Interactions within Complex Systems and an Integrative Assessment Method”. *Society for Risk Analysis Annual Meeting, San Diego, California* (December 11<sup>th</sup>-15<sup>th</sup>, 2016).
- 2016 Gillespie-Marthaler, Leslie and **Katherine S. Nelson**. “Poster Paper: Resilience, Sustainability, and Vulnerability: Multi-Scale, Dynamic Interactions within Complex Systems and an Integrative Assessment Method”. *Association for Public Policy Analysis & Management 38<sup>th</sup> Annual Fall Research Conference, Washington D.C.* (November 4th, 2016).
- 2014 **Kate Nelson**. “Environmental Justice Considerations Involving Rail Transport of Hazardous Materials”. *Logistics, Trade and Transportation (LTT) Symposium, Gulfport, Mississippi*. (February 26-27, 2014).

### Invited Oral Presentations

- 2012 **Kate Nelson**. “Washington University Nano Research Facility: Analytical capabilities, projects and collaborative opportunities for researchers”. *PerkinElmer Inspiring Innovation Tour, St. Louis, MO*. (November 1, 2012).

### RESEARCH & PROFFESIONAL EXPERIENCE

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- 2014 Graduate Research Assistant, Vanderbilt Center for Transportation and Operational Resilience, Vanderbilt University
- 2011 Lab Manager and Senior Scientist, Nano Research Facility, Washington University in St. Louis

- 2010      Research Scientist, Nano Research Facility, Washington University in St. Louis
- 2009      Research and Lab Assistant, Aquatic Chemistry Lab, Washington University in St. Louis
- 2006      Graduate Research Assistant, Aquatic Chemistry Lab, Washington University in St. Louis

## TEACHING EXPERIENCE

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- 2016      Guest Lecturer, Introduction to Environmental Engineering (undergraduate lecture course), Department of Civil & Environmental Engineering, Vanderbilt University
- 2016      Assistant Instructor, Geospatial Technologies (K-12 teacher professional development), Metropolitan Nashville Public Schools
- 2016      Guest Lecturer, Enterprise Risk Management (undergraduate/graduate seminar), Department of Civil & Environmental Engineering, Vanderbilt University
- 2015      Guest Lecturer, Introduction to Spatial Analysis and Modeling Using GIS in Research Applications (graduate seminar), College of Education and Human Development, Vanderbilt University
- 2013      Teaching Assistant, Introduction to Environmental Engineering (undergraduate lecture course), Department of Civil & Environmental Engineering, Vanderbilt University
- 2006      National Science Foundation Graduate Teaching Fellow in K-12 Education (part-time co-teacher), Environmental Science, Gateway Middle School, St. Louis Public School District

## SERVICE

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### Mentoring & Outreach

- 2016      Volunteer Instructor, Simplifying Complexity: The Wild World of Human-Environment Interactions, Tennessee Women in Science, Technology, Engineering & Research (TWISTER) STEM conference for girls in 9th to 12th grades
- 2012      Summer Focus Program Student Mentor, Effects of Gold Nanoparticles on *Danio rerio* (Zebrafish) Embryos, Washington University in St. Louis
- 2011      Research Experience for Teachers Program Mentor, Effects of Silver Nanoparticles on the Growth of *Arabidopsis thaliana*, Washington University in St. Louis

### Professional Service

- 2015      Reviewer for Applied Geography

## PROFESSIONAL AFFILIATIONS

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Association for Public Policy Analysis and Management (APPAM)  
Association of American Geographers (AAG)  
American Society of Civil Engineers (ASCE)  
American Geophysical Union (AGU)  
Society for Risk Analysis (SRA)

## TECHNICAL EXPERTISE

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R (Statistical Programming Language)	QGIS
Matlab	NetLogo
Python	AnyLogic
SPSS	LaTeX
ArcGIS	

## REFERENCES

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**Mark Abkowitz** (Advisor)  
Professor, Civil and Environmental Engineering  
Vanderbilt University  
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**Johnathan Gilligan**  
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**Hiba Baroud**  
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