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Research Interests

Vulnerability & sustainability indicators, flood hazards, uncertainty analysis, geospatial modeling

Education

- Ph.D., Geography** 2011
University of South Carolina, Columbia, SC. Advisor: Susan Cutter
Dissertation: *Indices of Social Vulnerability to Hazards: Model Uncertainty and Sensitivity*
- M.S., Environmental & Water Resources Engineering** 1999
The University of Texas, Austin, TX. Advisor: David Maidment
Thesis: *Floodplain Mapping Using HEC-RAS and ArcView GIS*
- B.S., Environmental Engineering** 1994
Rice University, Houston, TX.

Teaching

- University of Iowa, Iowa City, IA 2011-present
Regular courses: *Contemporary Environmental Issues, Water Resources, Hazards & Society, Environmental Justice*
Graduate Seminars: *Sustainability Indicators, Transnational Disasters & Global Health, Vulnerability & Environmental Hazards*
- University of South Carolina, Columbia, SC 2010
The Geography of Disasters

Refereed Publications

* Denotes a UI geography student

Burton, C., S. Rufat, and E. Tate (2018). Social Vulnerability. In *Vulnerability and Resilience to Natural Hazards*, eds. S. Fuchs and T. Thaler, 53-81. Cambridge: Cambridge University Press.

Bitterman, P. *, E. Tate, K.J. Van Meter, and N.B. Basu (2016). "Water Security and Rainwater Harvesting: A Conceptual Framework and Candidate Indicators." *Applied Geography*, 76: 75-84.

Carrel, M., S.G. Young*, and E. Tate (2016). "Pigs in Space: Determining the Environmental Justice Landscape of Swine Concentrated Animal Feeding Operations (CAFOs) in Iowa." *International Journal of Environmental Research and Public Health*, 13(9): 849.

Muñoz, C.* and E. Tate (2016). "Unequal Recovery? Federal Resource Distribution after a Midwest Flood Disaster." *International Journal of Environmental Research and Public Health*, 13(5): 507.

- Tate, E.**, A. Strong, T. Kraus, and H. Xiong* (2016). "Flood Recovery and Property Acquisition in Cedar Rapids, Iowa." *Natural Hazards*, 80(3): 2055-2079.
- Rufat, S., **Tate, E.**, C. Burton, and A.S. Maroof* (2015). "Social Vulnerability to Floods: Review of Case Studies and Implications for Measurement." *International Journal of Disaster Risk Reduction*, 14(4): 470-486.
- Tate, E.**, C. Muñoz*, and J. Suchan* (2015). "Uncertainty and Sensitivity Analysis of the HAZUS-MH Flood Model." *Natural Hazards Review*, 16(3): 04014030.
- Van Meter, K.J., N.B. Basu, **E. Tate**, and J. Wyckoff* (2014). "Monsoon Harvests: The Living Legacies of Rainwater Harvesting Systems in South India." *Environmental Science & Technology*, 48(8): 4217-4225.
- Tate, E.** (2013). "Uncertainty Analysis for a Social Vulnerability Index." *Annals of the Association of American Geographers*, 103(3): 526-543.
- Tate, E.** (2012). "Social vulnerability indices: a comparative assessment using uncertainty and sensitivity analysis." *Natural Hazards*, 63(2): 325-347.
- Tate, E.**, C.G. Burton, M. Berry, C.T. Emrich, and S.L. Cutter (2011). "Integrated Hazards Mapping Tool." *Transactions in GIS*, 15(5): 689-706.
- Coles, A., G. Eosco, T. Norton, J. Ruiz, **E. Tate**, and M. Weathers (2011). "Mapping local knowledge of climate change and hazards to inform research, practice, and policy in the Americas." *Gestión y Ambiente*, 14(2): 45-58.
- Tate, E.**, S. L. Cutter, and M. Berry (2010). "Integrated multihazard mapping." *Environment and Planning B: Planning and Design*, 37(4): 646-663.
- Cutter, S. L., L. Barnes, M. Berry, C. Burton, E. Evans, **E. Tate**, and J. Webb (2008). "A place-based model for understanding community resilience to natural disasters." *Global Environmental Change*, 18(4): 598-606.
- Scawthorn, C., N. Blais, H. Seligson, **E. Tate**, E. Mifflin, W. Thomas, J. Murphy, and C. Jones (2006). "HAZUS-MH Flood Loss Estimation Methodology I: Overview and Flood Hazard Characterization." *Natural Hazards Review*, 7(2): 60-71.
- Scawthorn, C., P. Flores, N. Blais, H. Seligson, **E. Tate**, S. Chang, E. Mifflin, W. Thomas, J. Murphy, C. Jones, and M. Lawrence (2006). "HAZUS-MH Flood Loss Estimation Methodology II. Damage and Loss Assessment." *Natural Hazards Review*, 7(2): 72-81.
- Tate, E.**, D. Maidment, F. Olivera and D. Anderson (2002). "Creating a Terrain Model for Floodplain Mapping." *Journal of Hydrologic Engineering*, 7(2): 100-108.

Reports

Tate, E. et al. (2015). National Flood Hazard Layer–Hazus-MH Integration Proof of Concept Report. Risk MAP CDS HAZUS Modernization Phase 1, Task 4. Federal Emergency Management Agency.

Christiansen, L. et al. (2014). The University of Iowa Biomass Energy Sustainability Index: A decision-making tool for the University of Iowa Biomass Partnership Project. Leopold Center Completed Grant Reports. Paper 492.

Solis, P. et al. (2011). Climate Change and Hazards in the Americas: International Interdisciplinary Research Directions and Opportunities. Washington, DC: Association of American Geographers.

Cutter, S. L., L. Barnes, M. Berry, C. Burton, E. Evans, **E. Tate**, and J. Webb (2008). Community and regional resilience: Perspectives from hazards, disasters, and emergency management. CARRI Research Report 1. Oak Ridge National Lab: Community and Regional Resilience Initiative.

Grants and Funding

External

US National Science Foundation. 2016-2021. Co-PI for "*NRT-INFEWS: Paths to sustainable food-energy-water systems in resource-limited communities*." \$2,999,869. With David Cwiertny (PI), and Co-PIs Michelle Scherer, Craig Just, and Gabrielle Villarini.

US Department of Housing & Urban Development. 2016-2021. Co-I for "*Iowa Watershed Approach for Urban and Rural Resilience*." \$6,471,876. With Larry Weber (PI), and Co-PIs Craig Just, Julie Kearney, Valerie Decker, Ibrahim Demir, Keith Schilling, Allen Bradley, Christopher Jones, and Witold Krajewski.

Center for Global and Regional Environmental Research. 2016-18. Principal Investigator for "*Quantifying Salinization Vulnerability of Municipal Water Supplies from Winter Road Maintenance: A Case Study in Eastern Iowa*." \$34,103.

The Nature Conservancy (2015-17). Principal Investigator for "*Economic Benefits of Agricultural Practices Flood Loss Estimation for the Middle Cedar River Watershed*." \$47,017. With Nathan Young (Co-PI).

US National Science Foundation, WSC Category 1 (2015-2018). Senior Personnel for "Decision Processes, Climate Change, and Water Resources in the Agricultural Midwest." \$599,383. With Adam Ward (PI), Co-PIs Kajsia Dalrymple and Scott Spak, and Co-Investigators Sara Mitchell, Heather Sander, Ananya Sen Gupta, and Aaron Strong.

NiyamIT (2014-15). Principal Investigator for "*Proof of Concept: Linking HAZUS-MH and the NFHL*." \$23,497.

US National Science Foundation, Infrastructure Management and Extreme Events (2013-2017). Principal Investigator for "*Measuring Social Vulnerability -- Reducing Uncertainty and Validating Indicators*." \$166,840.

US National Science Foundation, Dynamics of Coupled Natural and Human Systems (2012-2016). Co-Principal Investigator for "*Monsoon Harvests: Assessing the Impact of Distributed Storage Tanks on the Vulnerability of Subsistence-Level Agriculture in Tamil Nadu, India.*" \$249,919. With Nandita Basu (PI) and Craig Just (Co-PI).

US National Science Foundation, Graduate Research Fellowship. 2008-2011. "*An Integrated Approach to Hazards Vulnerability Assessment.*" \$121,500.

Internal

University of Iowa, Water Sustainability Initiative Seed Grant. 2016. Principal Investigator for "*Public Engagement through the Peoples' Weather Map.*" \$4,648.

University of Iowa, Water Sustainability Initiative Seed Grant. 2014-15. Co-Principal Investigator for "*Water Sustainability: Indicators and Governance.*" \$4,992. With Kajsa Dalrymple (Co-PI) and Aaron Strong (Co-PI).

University of Iowa, Old Gold Fellowship. 2012-2013. "*A Sensitivity Analysis of the HAZUS Flood Model.*" \$6,000.

University of Iowa, Center for Global and Regional Environmental Research. 2012. Co-Principal Investigator for "*Flood Recovery in Cedar Rapids.*" \$6,417. With Aaron Strong (Co-PI).

University of South Carolina, Graduate School Fellowship, 2006-2010, \$32,000.

Service

Chair, Hazards, Risks, and Disasters Specialty Group (2017-present). Association of American Geographers.

Committee on Urban Flooding in the United States (2017-present). National Academies of Sciences.

Director of Graduate Studies (2015-present). University of Iowa, Department of Geographical and Sustainability Sciences.

Co-Director, Hazards, Risks, and Disasters Specialty Group (2015-2017). Association of American Geographers.

Receiver Council (2015-16). William Averette Anderson Fund. <http://billandersonfund.org/>.

Workshop Session Moderator (September 5, 2014). National Academy of Sciences Workshop – "Measures of Community Resilience: From Lessons Learned to Lessons Applied." Washington, DC.

Adaptation and Hazards Indicators Working Group (2013-2015). National Climate Assessment. Developing a framework and indicators for adaptive capacities and action in the context of climate change hazards.

HAZUS Flood Committee (2011-2014). National Institute of Building Sciences. Federal advisory board for the development of the HAZUS-MH flood loss estimation software.

Journal Reviewer

- Hazards: Earthquake Spectra, Journal of Hydrology, Journal of Flood Risk Management, International Journal of Disaster Risk Reduction, International Journal of Disaster Risk Science, Natural Hazards, Natural Hazards Review
- Geography: Annals of the Association of American Geographers, Applied Geography, The Southwestern Geographer
- GIScience: Computers, Environment, and Urban Systems, International Journal of Geographical Information Science, Transactions in GIS
- Nature-Society: Climate Risk Management, Climatic Change, Environment and Planning B: Planning and Design, Environmental Science & Technology, Global Environmental Change, Health and Place; Journal of Coastal Conservation, The Anthropocene Review, Weather Climate & Society
- Other: Journal of Planning Education and Research, PLoS One

Honors

Fellow: Enabling the Next Generation of Hazards & Disasters Researchers, 2014-2016. National Science Foundation.

Gilbert F. White Award, 2012. Hazards Specialty Group, Association of American Geographers. Awarded for best dissertation in the field of hazards geography.

Presentations

Invited Talks

"Risk and Social Vulnerability to Floods." National Socio-Environmental Synthesis Center (SESYNC). April 3, 2018.

"Risk, Vulnerability, and Resilience to Floods." University of North Carolina, Department of Geography. January 26, 2018.

"Measuring Vulnerability and Resilience to Floods." Auburn University, Department of Geosciences. March 2, 2017.

"Measuring Vulnerability and Resilience to Floods." Changing Change: Thoughts and Actions for Sustainable Environments Workshop and Speaker Series. Iowa State University, Department of Community and Regional Planning. January 23, 2017.

"Human-Environment Indicators for Vulnerability and Sustainability." Arizona State University, School of Geographical Sciences & Urban Planning. October 24, 2014.

"Index Validation." INQUIMUS Workshop, Keynote Talk: Spatial indicators and assessment of vulnerability and resilience, Salzburg, Austria. September 17, 2014.

External Conferences & Workshops

"Preparing for the Dissertation Defense." Bill Anderson Fund and 41st Annual Hazards Research and Applications Workshop, Broomfield, Colorado. July 9, 2016.

"Addressing Environmental Challenges with Spatial Analysis Research." University of Iowa Geospatial Consortium, Vision Development Workshop, Gurgaon, Ahmedabad, Pudicherry, and Madurai, India. June 20-July 1, 2016.

"Monsoon Harvests: The Living Legacies of Rainwater Harvesting Systems in South India." Iowa City Foreign Relations Council, Iowa City, IA. October 8, 2015.

"Negotiating Your First Job." Bill Anderson Fund and 40th Annual Hazards Research and Applications Workshop, Broomfield, Colorado. July 19, 2015.

"Flood Recovery and Property Acquisition in Cedar Rapids, Iowa." Annual Meeting of the Association of American Geographers, Chicago, IL. April 25, 2015.

"A Sensitivity Analysis of the HAZUS Flood Model." 39th Annual Hazards Research and Applications Workshop, IRCD Researchers Meeting, Broomfield, CO. June 26, 2014.

"Monsoon Harvests: The Living Legacies of Rainwater Harvesting Systems in South India." Annual Meeting of the Association of American Geographers, Tampa, FL. April 9, 2014.

"A Sensitivity Analysis of the HAZUS Flood Model." Annual Meeting of the Association of American Geographers, Los Angeles, CA. April 9, 2013.

"Social vulnerability indices: a comparative assessment using uncertainty & sensitivity analysis." 37th Annual Hazards Research and Applications Workshop, IRCD Researchers Meeting, Broomfield, CO. July 18, 2012.

"Social Response to Flood Warnings." Iowa Water Conference. Ames, IA. March 7, 2012.

"Uncertainty Analysis for a Social Vulnerability Index." Annual Meeting of the Association of American Geographers, New York, NY. February 25, 2012.

"Uncertainty and sensitivity analysis of a social vulnerability index." 36th Annual Hazards Research and Applications Workshop, IRCD Researchers Meeting. Broomfield, CO. July 13, 2011.

University of Iowa

"Measuring Vulnerability and Resilience to Floods." Civil & Environmental Engineering Department Colloquium. February 24, 2017.

"Social Sustainability." University of Iowa, Green Greek Lecture Series. September 13, 2016.

“Monsoon Harvests: The Living Legacies of Rainwater Harvesting Systems in South India.” Feeding the World: Challenges for Water Quality and Quantity. Forckenbrock Series on Public Policy. UI Public Policy Center. Iowa City, IA. April 9, 2015.

"Flood Vulnerability." Environmental Sciences Seminar. February 12, 2015.

"Vulnerability & Sustainability: Indicators for Social Dimensions." Diversity Councils Lunch & Learn Series, African American Council. February 19, 2013.

“Hazards and Disasters: The Vulnerability Perspective.” Natural Disasters and Humanitarian Aid Workshop. November 10, 2012.

“Perspectives on Flood Vulnerability.” IIHR Colloquium.” October 10, 2012.

“Reliability of Social Vulnerability Indicators.” Social Science Interdisciplinary Group Colloquium.” February 29, 2012.

“Sensitivity Analysis for Natural Hazards Vulnerability Modeling.” Department of Geoscience Colloquium.” January 20, 2012.

“Social Vulnerability to Natural Hazards: Modeling and Mapping Approaches.” Water Sustainability Initiative Colloquium. October 11, 2011.

Experience

Associate Professor

Department of Geography, University of Iowa 2017-present
Director of Graduate Studies 2015-present

Assistant Professor

Department of Geography, University of Iowa, Iowa City, IA 2011-2017

Graduate Research Associate

Department of Geography, University of South Carolina, Columbia, SC 2006-2011

- Methodology and geospatial software development for social vulnerability indicators, multi-hazard analysis, and global sensitivity analysis.
- Webmaster for the Hazards Vulnerability and Research Institute

Software Development Manager

Lenocker & Associates, Orange, CA 2005-2006
Developed GIS applications and utilities to aid novice civil engineering users of ArcGIS.

Project Engineer

ABS Consulting, Inc., Irvine, CA 1999-2005

Lead GIS developer for flood hazard analysis modules of the HAZUS-MH loss estimation model.

- Developed flood hazard methodology, application prototypes, and Visual Basic code.
- Evaluated flood hazard and damage methodology through proof-of-concept testing.
- Presented methodology and software at national conferences and FEMA committee meetings.

- Designed and delivered software training courses for floodplain managers, emergency managers, and FEMA personnel.

Graduate Research Assistant

The University of Texas, Austin, TX

1997-1999

- Developed methodology to automate floodplain terrain modeling.
- Linked the HEC-RAS hydraulic model and ArcView GIS to enable 2D and 3D floodplain visualization and analysis.

Associate Project Engineer

Roy F. Weston, Inc., Houston and Austin, TX

1993-1998

- Created and implemented plans for environmental sampling and analysis for sites in the EPA CERCLA/SARA program.
- Collected soil, water, and waste samples and interpreted the laboratory results.
- Authored reports and analyzed data for environmental site assessments, remedial investigations, and risk assessments.