

# Robert N. Stewart, Ph.D.

*Curriculum Vitae*

April 28th, 2022

## Overview

My work is focused on spatial and spatiotemporal modeling with an emphasis on uncertainty, risk, and decision analytics. Areas of application include population dynamics, maritime safety, urban dynamics, security, energy-water nexus, health, and environmental risk. Quantifying uncertainty and risk as well as understanding the implications of both for decision making is a recurring theme in my work.

## Professional Highlights

27+ years of experience at the nexus of geospatial data, algorithms, and decision support

Developed and deployed significant decision support tools/capabilities across the U.S. Government

65+ peer reviewed publications in journals, conference, book chapters, and technical reports.

10+ years professional service through chair, program committee, panelist, and editorial positions

10+ years serving graduate committees as Joint/Adjunct Faculty at multiple universities

Significant mentoring experience in guiding staff, post docs, and students at various career stages

Successful in acquiring over 22 million in R&D funds from various federal agencies

## Education

Ph.D. Geography, University of Tennessee, 2011

M.S. Mathematics, University of Tennessee, 1995

B.S. Mathematics and Statistics, University of Tennessee, 1992

## Experience

### **Oak Ridge National Laboratory**

*Senior Scientist in GeoAI Group (10/2020 – present)*

Leading multiple projects in a wide array of R&D including machine learning, spatio-temporal analytics, data mining, big data workflows, simulation, visualization, ontology, semantics, and tool development. Work engages a wide range of use cases emerging from population dynamics, maritime safety, geomatics, urban dynamics, security, energy-water nexus, health, environmental risk, and many others.

*Geographic Data Sciences Group/Team Lead (10/2015 – 9/30/2020)*

Oversaw a diverse and talented group of staff, post-docs, interns and students engaged in data science R&D. Research spans a wide spectrum of expertise, including imagery analytics, data mining, modeling and simulation, visualization, machine learning, and other big data challenges applied to a wide range of research domains.

### *Geographic Data Scientist (11/2009 – 9/2015)*

Focused on statistical and computational methods in the areas of spatial and spatiotemporal modeling, with an emphasis on automation, machine learning, uncertainty quantification, data mining, probability modeling, risk, visualization, and decision support. Areas of application include population dynamics, sociocultural/economic analytics, social media analytics, geosciences, and environmental risk.

### **University of Tennessee Senior Research Associate (1994-2009)**

Served as principal investigator, technical lead, and in most cases point of contact with sponsoring agencies such as the Environmental Protection Agency, the Nuclear Regulatory Commission, the Department of Energy, and the Oak Ridge National Laboratory. My effort centered largely on management and development of novel geospatial approaches to environmental risk assessment, decision support, uncertainty quantification, and regulatory compliance. A key outcome of this work was the Spatial Analysis and Decision Assistance (SADA) software program, which presently has over 18,000 registered users in the environmental restoration space. New capabilities from this research laid the framework for future regulatory guidance with spatial analysis as a core factor. SADA is now jointly managed by ORNL and UT, and I continue to serve in a leadership capacity

## **Societies**

IEEE Senior Member (+CIS, +Computer, +GRSS)  
Association of American Geographers (+GISS, +SAM)  
American for Computing Machinery (+SIGKDD, +SIGSPATIAL)  
American Association for the Advancement of Science

## **Service**

Editorial board member of the Transactions in GIS (2022- 2025)

Joint Faculty Professor, University of Tennessee (since 2012)

Ph.D. committees: Evan Ezell (active), Jesse Piburn(active), Janna Caspersen (2018), Master committees: Karessa Manning (2021), Samantha Duchscherer (Math, 2018), Matthew Miller (2017), Jessica Moehl (2014), April Morton (Math, CalPoly, 2012), Apostolis Sambanis, (Public Health, UIC, 2012), Classes: 599 Geographic Thought, 501 Independent Studies

Consortium Partner of TennesseeView, chapter of AmericaView (since 2022)

Chair, American Association of Geographers GISS Specialty Group (2018-2019)

Vice-Chair, American Association of Geographers GISS Specialty Group (2016-2017)

World Health Organization Chemical Risk Network ORNL Liaison (2014-2015)

## **Awards/Honors**

Ecological Society of America Sustainability Science Award for US cities can manage national hydrology and biodiversity using local infrastructure policy, 2021.

DOE Appreciation Letter from Director of the Office of Science for COVID pandemic modeling under the National Virtual Biotechnology Laboratory (NVBL), 2021

Elevated to IEEE Senior Member, 2021

DoD Appreciation Letter from the Pentagon for life saving work in population modeling, 2019.

Oak Ridge National Laboratory Significant Event Award for Spatio-temporal R&D, 2019.

Oak Ridge National Laboratory Significant Event Award for Spatio-temporal R&D, 2019.

EPA Scientific and Technological Achievement Award for Providing Efficient Methods to Remediate and Protect Ecosystems from Chemical Exposures, 2010

## Peer Reviewed Publications

Krapu, C, **R.N. Stewart**, A Rose (2022) "A Review of Bayesian Networks for Spatial Data", Online March 30<sup>th</sup>, 2022, ACM Transactions on Spatial Algorithms and Systems, <https://doi.org/10.1145/3516523>.

Ezell, E, S Lim, D Anderson, and **R.N. Stewart** (2021) "Community Fabric: Visualizing Communities and Structure in Dynamic Networks." Information Visualization 21, no. 2 (February 2022): 130–42. <https://doi.org/10.1177/14738716211056036>.

**Stewart, R.N.**, J Piburn, S Walters, J Kaufman E Ezell, D Anderson, D Axley, J Grant, B Eaton, A Sorokine, and G Simpson (2021), A Taxonomic Classification Approach for Global Spatio-temporal Data, Spatial Data Science Symposium 2021, University of California at Santa Barbara, <https://doi.org/10.25436/E22S3H>.

McManamay, R, KC Binita, M Allen-Dumas, S Kao, C Brelsford, B Ruddle, J Sanyal, **R.N. Stewart**, and B. Bhaduri, (2021), Reanalysis of water withdrawal for irrigation, electric power, and public supply sectors in the conterminous United States, 1950 to 2016, Water Resources Research, Vol. 57(2) DOI: 10.1029/2020WR027751.

Lunga, D, J Arndt, J Gerrand and **R.N. Stewart** (2021), "ReSFlow: A Remote Sensing Imagery Data-Flow for Improved Model Generalization," in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, vol. 14, pp. 10468-10483, 2021, doi: 10.1109/JSTARS.2021.3119001.

National Virtual Biotechnology Laboratory, (2021) Report on Rapid R&D Solutions to the COVID-19 Crisis, USDOE Office of Science, (**R.N. Stewart** led Near-Real-Time Situational Awareness effort), website ([https://science.osti.gov/-/media/nvbl/pdf/NVBL\\_report.pdf](https://science.osti.gov/-/media/nvbl/pdf/NVBL_report.pdf)).

Erwin, S, **R.N. Stewart**, J Piburn, J Kaufman, A Peluso, B Christian, J Grant, B Bhaduri, N Nagle (2021) A 7-day Moving Window Ensemble for Real-Time Monitoring and Forecasting of COVID-19 Disease Progression, Presentation, SIAM Conference on Computational Sciences and Engineering, March 2021, Fort Worth, TX.

Lunga, D, J Gerrand, L Yang, C Layton, **R.N. Stewart**, (2019) Apache Spark Accelerated Deep Learning Inference for Large Scale Satellite Image Analytics, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing. DOI 10.1109/JSTARS.2019.2

Sorokine, A, **R.N. Stewart** (2019) Replicability and Reproducibility in High-Performance and Cloud Geocomputations, Replicability and Reproducibility in Geospatial Research: A SPARC Workshop, February 2019, Tempe Arizona. DOI DOI 10.17605/OSF.IO/GVP3Q

Sparks, K, K Sims, T Gautam, M Urban, **R.N. Stewart** (2019) Modeling Building Use and Population Distribution Opportunity Using Open Geosocial Data in Urban Areas. Geocomputation 2019, Queenstown, New Zealand, September 18-21.

Duchscherer, S, **R.N. Stewart**, M Urban (2018), revengc: An R package to Reverse Engineer Summarized Data, The R Journal Vol. 10/2, December 2018 ISSN 2073-4859. Zaidi, S., V Chandola, M Allen, J Sanyal, **R.N. Stewart**, B. Bhaduri, and R McManamay, (2018), Machine Learning for energy-water nexus: challenges and opportunities, Big Earth Data, <https://doi.org/10.1080/20964471.2018.1526057>.

Allen, M., S Zaidi, V Chandola, A Morton, C Brelsford, R McManamay, B KC, J Sanyal, **R.N. Stewart**, and B Bhaduri (2018) A Survey of Analytical Methods for Energy-Water Nexus Knowledge Discovery, Big Earth Data, <https://doi.org/10.1080/20964471.2018.1524344>.

Aziz, H.M., B Park, A Morton, **R.N. Stewart**, M Hilliard, and M Maness (2018) A high resolution agent-based model to support walk-bicycle infrastructure investment decisions: A case study with New York City, Transportation, Vol 86, pp. 280-299. doi.org/10.1016/j.trc.2017.11.008.

Aziz, H.M., N Nagle, A Morton, M Hilliard, D White, **R.N. Stewart** (2018) Exploring the impact of walk-bike infrastructure, safety perception, and built-environment on active transportation mode choice: A random parameter model using New York City commuter data, Transportation, Vol 45, pp. 1207-1229. doi.org/10.1007/s11116-017-9760-8.

Sims, K, G Thakur, K Sparks, M Urban, A Rose, and **R.N. Stewart** (2018) *Dynamically-Spaced Geo-Grid Segmentation for Weighted Point Sampling on a Polygon Map Layer*, Leibniz International Proceedings in Informatics series, 10.4230/LIPIcs.GISCIENCE.2018.58, GIScience 2018, Melbourne, Australia

Byung Hoon Park, H M Abdul Aziz, A Morton, **R.N. Stewart** (2018) High performance Data Driven Agent-based Modeling Framework for Simulation of Commute Mode Choices in Metropolitan Area. 21st IEEE International Conference on Intelligent Transportation System, November 4-7, 2018, Hawaii, USA. doi.org/10.1109/ITSC.2018.8569232

Weber, E, V Seaman, **R.N. Stewart**, T Bird, A Tatem, J McKee, B Bhaduri, J Moehl, and A Reith (2018), *Census-independent population mapping in northern Nigeria*, Remote Sensing of Environment, In Press <https://doi.org/10.1016/j.rse.2017.09.024>)

Morton, A., J Piburn, R McManamay, N Nagle, **R.N. Stewart**, and V. Chandola (2017), Leveraging Advances in Population Modeling to Support Energy and Water Nexus Knowledge Discovery, American Geophysical Union Fall Meeting, 12/15 – 12/17, New Orleans (poster).

McManamay, R., M Allen, J Piburn, J Sanyal, **R.N. Stewart**, B Bhaduri (2017), Using Dynamic Time Warping and Data Forensics to Examine Tradeoffs among Land-Energy-Water Networks Across the Conterminous United States, American Geophysical Union Fall Meeting, 12/15 – 12/17, New Orleans (poster).

Morton, A., J Piburn, **R.N. Stewart**, R McManamay, N Nagle (2017) A High-Resolution Spatially-Explicit Statistical Framework for Estimating Residential Electricity Consumption. Proceedings of the 2017 Grace Hopper Celebration of Women in Computing. Orlando, FL. October 4, 2017.

McManamay, R, S Nair, C DeRolph, B Ruddell, A Morton, **R.N. Stewart**, M Troia, L Tran, H Kim, and B Budhendra (2017) *US Cities can manage national hydrology and biodiversity using local infrastructure policy*, Proceedings of the National Academy of Sciences, currently online at [www.pnas.org](http://www.pnas.org).

Sorokine, A and **R.N. Stewart** (2017) Spatio-temporal Data Model for Integrating Evolving Nation-level Datasets, ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences, Vol 4, pp. 69-76, DOI 10.5194/isprs-annals-IV-4-W2-47-2017.

Piburn, J, **R.N. Stewart**, A Myers, A Sorokine, D Axley, D Anderson, J Burdette, C Biddle, A Hohl, R Eberle, J Kaufman, and A Morton (2017), *The World Spatiotemporal Analytics and Mapping Project (WSTAMP): Further Progress in Discovering, Exploring, and Mapping Spatiotemporal Patterns Across the World's Largest Open Source Data Sets*, ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences, Vol 4, pp 199-205.

Piburn, J, **R.N. Stewart**, and A Morton (2017) *A Simple Spatially Weighted Measure of Temporal Stability for Data with Limited Temporal Observations*, ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences, Vol 4, pp 47-51. DOI: 10.5194/isprs-annals-IV-4-W2-47-2017

Morton, A, J Piburn, N Nagle, H M Aziz, S Duchscherer and **R.N. Stewart** (2017), *A Simulation Approach for Modeling High-Resolution Daytime Commuter Travel Flows and Distributions of Worker Subpopulations*, Geocomputation 2017 Shortpaper, Leeds UK, September 2017.

Sparks, K, G Thakur, M Urban, and **R.N. Stewart** (2017) *Temporal Signatures of Shops' and Restaurants' Opening and Closing Times at Global, Country, and City Scales*, Geocomputation 2017 Shortpaper, Leeds UK, September 2017. Accessible at <http://www.geocomputation.org/2017/papers/51.pdf>.

**R.N. Stewart**, M Urban, D Anderson, S Duchscherer, D Axley, and J Piburn (2017), *Towards a Virtual Reality Elicitation of Building Occupancy*, Geocomputation 2017 Shortpaper, Leeds UK, September 2017. Accessible at <http://www.geocomputation.org/2017/papers/52.pdf>.

Piburn, J, **R.N. Stewart** and A Morton, (2017) *An Approximate Entropy Based Approach for Quantifying Stability in Spatio-Temporal Data with Limited Temporal Observations*, Geocomputation 2017 Shortpaper, Leeds UK, September 2017. Accessible at <http://www.geocomputation.org/2017/papers/55.pdf>.

**Stewart, R.N.**, J Piburn, E Weber, M Urban, A Morton, G Thakur, and B Bhaduri (2017). *Can Social Media Play a Role in the Development of Building Occupancy Curves?* Advances in Geocomputation: Geocomputation 2015--The 13th International

Conference. D. A. Griffith, Y. Chun and D. J. Dean. Cham, Springer International Publishing: 59-66.

Piburn, J, A Morton, and **R.N. Stewart** (2017). Attribute Portfolio Distance: A Dynamic Time Warping based approach to comparing and detecting common spatiotemporal patterns among multi-attribute data portfolios. *Advances in Geocomputation: Geocomputation 2015--The 13th International Conference*. D. A. Griffith, Y. Chun and D. J. Dean. Cham, Springer International Publishing: 197-205.

Morton, A, N Nagle, J Piburn, **R.N. Stewart**, R McManamay (2017). *Hybrid Dasymetric and Machine Learning Approach to High-Resolution Residential Electricity Consumption Modeling* In *Advances in Geocomputation: Geocomputation 2015--The 13th International Conference*. D. A. Griffith, Y. Chun and D. J. Dean. Cham, Springer International Publishing: 47-58.

**Stewart, R.N.**, A Myers, D Axley, A Sorokine, and J Piburn (2017) Minisymposium: World SpatioTemporal Analytics and Mapping Project (WSTAMP): Cloud Implementation of Open Source Algorithms and Data Stores for Sustainable, Scalable Analysis of Space-Time Data. Society for Industrial and Applied Mathematics (SIAM) Conference on Computational Science and Engineering, February 27- March 3<sup>rd</sup>, 2017, Atlanta, GA.

Morton, A, J Piburn, R McManamay, N Nagle, **R.N. Stewart** (2016), *A Dasymmetric-Based Monte Carlo Simulation approach to the Probabilistic Analysis of Spatial Variables*. International Conference on GIScience Short Paper Proceedings, Montreal Canada. Volume 1 (1), pp. 208 – 211. <http://escholarship.org/uc/item/9hf8b2wb>

Thakur, G, K Sparks, **R.N. Stewart**, M Urban, and B Bhaduri, (2016), *Curating Transient Population in Urban Dynamics System*, International Conference on GIScience Short Paper Proceedings, Montreal Canada. Volume 1 (1), pp. 300 – 303. <http://escholarship.org/uc/item/971896bp#page-1>

**Stewart, R.N.**, C Wilkerson, E Ragan, M Agreda, D White, S Duchscherer, and J Piburn (2016) *A 3D Virtual Environment for Spatio-Temporal Analysis: Theoretical Approach, Proof of Concept, and User Study*. International Conference on GIScience Short Paper Proceedings, Montreal Canada. Volume 1 (1), pp. 280 – 283. <http://escholarship.org/uc/item/6mq271rn>

**Stewart, R.N.**, M Urban, S Duchscherer, J Kaufman, A Morton, G Thakur, J Piburn, J Moehl (2016) *A Bayesian Machine Learning Model for Estimating Building Occupancy from Open Source Data*, *Natural Hazards* 81 (3).

**Stewart, R.N.**, J Piburn, A Sorokine, A Myers, and D White (2015) World Spatiotemporal Analytics and Mapping Project (WSTAMP): Discovering, Exploring, and Mapping Spatiotemporal Patterns across the World's Largest Open Source Geographic Data Sets, *ISPRS Annals of Photogrammetry, Remote Sensing, and Spatial Information Sciences*. Volume II-4W2.

**Stewart, R.N.**, K Tucker, and F Dolislager (2015) *SADA: A Free Geospatial Human Health Risk Tool*, Society of Toxicology Annual Meeting, San Diego, CA.

Thakur, G., B Bhaduri, J Piburn, K Sims, **R.N. Stewart**, M Urban (2015). PlanetSense: A Real-time Streaming and Spatio-temporal Analytics Platform for Gathering Geo-spatial Intelligence from Open Source Data, *ACM Sigspatial*, Seattle, WA. (Among top 3 vision papers)

**Stewart, R.N.**, M Urban, J Weaver, and D White. A Geographic Data Fusion Model for Estimating Quantitative Population Dynamics from Qualitative Survey Data. *Journal of GEOINT Science*. (2015)

Bhaduri, B., E Bright, A Rose, C Liu, M Urban, and **R.N. Stewart** (2014), Data Driven Approach for High Population Distribution and Dynamics Models, Winter Simulation Conference, Savannah, Georgia

**Stewart, R.N.** D White, M Urban, A Morton, C Webster, M Stoyanov, E Bright, and B Bhaduri (2013) *Uncertainty quantification techniques for population density estimates derived from sparse open source data*. Proceedings of the SPIE: Geospatial InfoFusion III (refereed) 8747: 874705-874705.

**Stewart, R.N.** (2012) *A Subsurface Decision Model for Supporting Environmental Compliance*, NUREG/CR-7021. Washington, D.C., United States Nuclear Regulatory Commission.

**Stewart, R.N.** (2011). A Geospatial Based Decision Framework for Extending MARSSIM Regulatory Principles into the Subsurface. Doctoral Dissertation, Department of Geography at the University of Tennessee

**Stewart, R.N.** and S.T. Purucker (2011) An environmental decision support system for spatial assessment and selective remediation. *Environmental Modelling & Software* 26(6): 751-760

Mahmoud, M., Y Liu, H Hartmann, S Stewart, T Wagener, D Semmens, **R.N. Stewart**, H.V. Gupta, D Dominguez, F Dominguez, D Hulse, R Letcher, B Rashleigh, C Smith, R Street, J Ticehurst, M Twery, H van Delden, R Waldick, D White, L Winter. (2009). *A Formal Framework for Scenario Development to Support Environmental Decision Making*. *Environmental Modelling & Software*. 24(7): 798-808.

Norman, J., Purucker, S.T., **Stewart, R.N.**, Back, P.-E., Englelke, F., 2008. Framework for optimizing the evaluation of data from contaminated soil in Sweden. Conference proceedings of ConSoil 2008, 10th International Conference on Soil-Water Systems; Milan, Italy

**Stewart, R.N.**, Purucker, S.T., 2006. *SADA: A Freeware Decision Support Tool Integrating GIS, Sample design, Spatial Modeling, and Risk Assessment*. Proceedings of the Third Biennial Meeting of the International Environmental Modelling and Software Society, Burlington, Vermont.

**Stewart, R.N.**, Purucker S.T. 2004. *Incorporating Secondary Information Into Environmental Sampling Designs*. Joint Proceedings of the Sixth International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences and the 15th Annual Conference of the International Environmetrics Society

Lyon, B.F., Purucker, S.T., **Stewart, R.N.**, 1994. *The Value of Perfect Information: How Much is a Crystal Ball Worth?* Proceedings of the International Specialty Conference. Cost Effective Acquisition and Utilization of Data in the Management of Hazardous Waste Sites. Air & Waste Management Association. Pittsburgh, PA. CONF-940386-2:44-55.

## Book Chapters

Thakur G, K Sims, H Mao, J Piburn, K Sparks, M Urban, **R.N. Stewart**, E Weber, B Bhaduri (2018) Utilizing Geo-Located Sensors and Social Media Insight for Research in Population Dynamics and Land Classification in Human Dynamics Research in Smart and Connected Communities, Springer. doi.org/10.1007/978-3-319-73247-3\_2

Purucker, S.T., **R.N. Stewart**, and J Wulff (2015) A spatial decision support system for efficient environmental assessment and remediation. In Madden, M., Allen, E., (Eds.) Landscape Analysis Using Geospatial Tools (accepted), Springer-Verlag.

Purucker, S. T., **R. N. Stewart**, and C. J. Welsh (2009) *SADA: Ecological Risk Based Decision Support System for Selective Remediation*. Chapter 11, A. Marcomini, G.W. Suter, and A. Critto (ed.), Decision Support Systems for Risk Based Management of Contaminated Sites. Springer Science + Business Media, LLC, New York, NY, pgs. 239-256.

Liu, Y., M Mahmoud, H Hartmann, S Stewart, T Wagener, D Semmens, **R.N. Stewart**, H Gupta, D Dominguez, D Hulse, R Letcher, B Rashleigh, C Smith, R Street, J Ticehurst, M Twery, H van Delden, R Waldick, D White, and L Winter., (2008), *Formal scenario development for environmental impact assessment studies*, Developments in Integrated Environmental Assessment, edited by Jakeman, A., A. Voinov, A. E. Rizzoli, and S. Chen, Elsevier. Volume 3: 145-162

Voinov, A., R Hood, J Daues, H Assaf, and **Stewart, R.N.** (2008) *Building a Community Modelling and Information Sharing Culture* In Developments In Integrated Environmental Assessment, edited by Jakeman, A., A. Voinov, A. E. Rizzoli, and S. Chen, Elsevier. Volume 3: 345-366

Modis, K, H-L Yu, G Christakos, **R.N. Stewart** and G Papantonopoulos (2007). “*BME-generated temperature maps of the Nea Kessani geothermal field*”, Invited chapter, In Geothermal Energy Research Frontiers, Columbus, F. (ed.), Nova Science Publ., Inc., Hauppauge, NY

## Invited Speaker, Panelist, Short Courses, and Workshops

Program Committee Member ACM SIGKDD 2022, Washington D.C.

Co-Chair for ACM SIGKDD DeepSpatial Workshop 2022.

Keynote Speaker, 6<sup>th</sup> IEEE Workshop on Big Spatial Data, talk titled “Uncertainty Revisited” part of IEEE Big Data 2021, December 15<sup>th</sup>, 2021.

Co-Chair for ACM SIGKDD DeepSpatial Workshop 2021.

Invited Panelist, AAG Annual Meeting Panel on Spatiotemporal Sciences April 9th, 2021

Invited Panelist, Open-Source Software in Geography: Theories, Developments, and Pathways toward Openness II, Boston, AAG 2017 Annual Meeting.

Invited Panelist, Spatial Data Mining and Big Data Analytics (chair: Diansheng Guo), Association of American Geographers Annual Meeting, San Francisco , CA.



Invited Speaker, *What Can('t) SADA Do for You?*, University of Illinois at Chicago (invited speaker), 5/2013

Invited Panelist, 2013. Application of SADA for 3D Subsurface Characterization and Suggested Approach for Volumetric Compliance with Decommissioning Dose Criteria, Waste Management Symposium, February 24<sup>th</sup>-28<sup>th</sup>, Phoenix (invited panelist, Panel Session 87: Characterization for Decommissioning and Waste Management)

Invited Speaker, *Spatial Analysis and Decision Assistance Version 5 Overview*, Midwestern States Risk Assessment Symposium, Indianapolis, IN. 2009

Invited Speaker., Spatial Analysis and Decision Assistance (SADA): An integration of spatial analysis, risk, sample design, and GIS, Interagency Steering Committee on Multimedia Environmental Models Public Workshop, Rockville, MD. 2009.

Invited Lecturer: ITRC ARAMS/SADA Conference October, 2008. Kennebunkport, ME, SADA Short Course

Invited Lecturer, USEPA, TRIAD Conference June 10th-12th, 2008 in Amherst, MA. SADA Short Course.

Invited Lecturer, State of Illinois, Department of Natural Resources May 21-22nd, 2008. SADA Short Course

Lecturer University of Tennessee SADA Training, Knoxville, TN, April 23rd-25th, 2008. SADA Short Course

Invited Lecturer, University of Helsinki, Short Course, "Overview of Environmental Methods in SADA", Helsinki, May 2007.

Lecturer, Uranium Recovery Workshop, SADA Short Course, Denver CO, May 2007.

Lecturer, University of Tennessee, Short Course, "Environmental Assessment Methods Using SADA", Knoxville, TN, April 2007.

Invited Speaker, *Human health and ecological risk assessment with Spatial Analysis and Decision Assistance (SADA) Freeware*. Office of Solid Waste and Emergency Response, Technology Innovation Program, CLU-IN Studio Internet Seminar (presentation), 2007

Invited Speaker Uses of Spatial Analysis and Decision Assistance. Office of Solid Waste and Emergency Response, Technology Innovation Program, CLU-IN Studio Internet Seminar.

Invited Speaker, Stewart, R.N., 2006. SADA: A Freeware Decision Support Tool Integrating GIS, Sample design, Spatial Modeling, and Risk Assessment, Graduate Seminar, Department of Geography, UTK, Knoxville, TN

Lecturer, University of Tennessee, "Environmental Assessment Methods Using SADA", Knoxville, TN, 25-27 October 2006.

Invited Lecturer, Swedish Geotechnical Institute, Goteborg, Sweden, 10-12 May 2006. SADA Short Course

Lecturer, University of Tennessee, "Environmental Assessment Methods Using SADA", Knoxville, TN, 26-28 April 2006.

Lecturer, University of Tennessee, "Environmental Assessment Methods Using SADA", Knoxville, TN, 5-7 October 2005.

Invited Lecturer, Swedish Geotechnical Institute, Goteborg, Sweden, 12-15 September 2005. SADA Short Course.

Invited Lecturer, US Naval Facilities Engineering Command (NAVFAC) SADA Workshop, Philadelphia, Pennsylvania, 2-3 August 2005.

Lecturer, University of Tennessee, "Environmental Assessment Methods Using SADA", Knoxville, TN, 23-25 February 2005

Invited Lecturer, Petróleo Brasileiro SA (Petrobras), Rio de Janeiro, Brazil, 16-20 Aug 2004 SADA Workshop.

Invited Lecturer: FIELDS/SADA 2003 Training Conference in Chicago, 5-7 March 2003.

Keynote Speaker/Co-organizer, Spatial Analysis and Decision Assistance Overview Opening remarks at the annual EPA FIELDS/SADA Conference, Denver, Colorado, 2001

Invited Speaker/Co-Organizer, Stewart, R.N., 2000. *Geostatistically Based Sampling Strategies*, FIELDS/SADA 2000 Annual EPA Conference, Chicago Illinois.

Invited Lecturer: Geospatial Methods For Environmental Decision Making and Cost Benefit Analysis, Fifth Course on Mathematical Ecology at The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, 2000.

## Technical Reports

Piburn, J., **R.N. Stewart**, J Kaufman, A Sorokine, E Axley (2020) COVID-19 Data Curation Effort: An Initial analysis of the Data, ORNL Technical Memorandum, ORNL/TM-2021/2329.

Lunga, D. H Alemohammad, Y Liu, S Newsam, F Pacifici, H Santos-Villalobos, E Shook, **R.N. Stewart**, S Voisin, L Yang, and B Bhaduri (2019). The Trillion Pixel GeoAI Challenge Workshop, ORNL September 26-27, 2019. OSTI Identifier 1606744.

Bhaduri, B., AJ Simon, M Allen, J Sanyal, **R.N. Stewart**, R McManamay, (2018), Energy-Water Nexus Knowledge Discovery Framework, Experts' Meeting, Technical Report, ORNL/TM-2017/753, Available through OSTI.

Norrman, J., Purucker, S.T., Back, P.-E., Engelke, F., **Stewart, R.N.**, 2009. Metodik för statistik utvärdering av miljötekniska undersökningar I jord (Method for statistical evaluation of environmental soil investigations). Naturvårdsverket (Swedish Environmental Protection Agency), Rapport 5932. ISBN 978-91-620-5932-3.

Starzec, P., Purucker, S.T., **Stewart, R.N.**, 2006. Kvantifiering och presentation av osäkerheter i riskbedömning och beslutsprocess: exemplifiering med fallstudier. Rapportutkast (Swedish).

**Stewart, R.N.** and Gogolak, C. 2003. *Viable Geobayesian Approach for Supporting and*

*Characterizing 2d and 3d Sampling Designs*, US Nuclear Regulatory Commission Letter Report, April 2003.

**Stewart, R.N.**, 2002. *Evaluation of Terminated Licenses Parts 30, 40, and 70: The Terminated License Tracking System*, NUREG/CR-6669, United States Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards.

**Stewart, R.N.** 2001. Test and Evaluation of the Proof-of-Concept Version of SADA Incorporating Bayesian Geostatistics, US Nuclear Regulatory Commission Letter Report.

**Stewart, R.N.** Purucker, S.T. 2000. *Geospatial Decision Frameworks for Remedial Design and Secondary Sampling* NATO/CCMS Special Session on Decision Support Tools Number 245. EPA 542-R-01-002.

**Stewart, R.N.**, Armstrong, A.Q., James, B.R., Douthat, D.M., Purucker, S.T., 1995. *Cost Versus Risk Reduction in Remedial Action: A Decision Framework*. ORNL/TM 13143

Douthat, D., **Stewart, R.N.**, Armstrong, A.Q., 1995. *Fixed Capital Investments for the Uranium Soils Integrated Demonstration Soils Treatment Technologies*, prepared for the Office of Technology Development at DOE.

Douthat, D., **Stewart, R.N.**, Armstrong, A.Q., 1995. *Cost Results from the 1994 Fernald Characterization Field Demonstration for Uranium-Contaminated Soils*, prepared for the Office of Technology Development at DOE.

Douthat, D., **Stewart, R.N.**, Armstrong, A.Q., 1995. *Operating and Life-Cycle Costs for Uranium-Contaminated Soil Treatment Technologies*, prepared for the Office of Technology Development.

**Stewart, R.N.**, Purucker, S.T., Lyon, B.F., 1995. *Geostatistical Applications in Environmental Remediation*. ES/ER/TM 146.

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## Other Talks/Presentations

Sorokine, A., J Kaufman, J Piburn, and **R.N. Stewart** (2020) Active Learning Approach to Record Linking in Large Geodatasets, AutoCarto 2020, 23<sup>rd</sup> International Research Symposium on Computer-based Cartography, May 2020, Redlands, CA.

Urban, M., **R.N. Stewart**, J Kaufman (2019) Reporting Populations at Risk Through Building Occupancy, AGU Meeting, December 2019, San Francisco, CA.

Bragg, L., J Piburn, M Urban and **R.N. Stewart** (2018) Cultural Factors that Drive Occupancy Numbers in Manufacturing, American Association of Geographers Annual Meeting, New Orleans.

**Stewart, R.N.**, Wilkerson, C., Ragan, E. (2016) ST World: Spatiotemporal Analytics Within a Prototype Serious Gaming Environment Association of American Geographers Annual Meeting, San Francisco , CA.

Piburn, J, **R.N. Stewart** (2015) Using non-linear data mining algorithms for exploring global spatiotemporal trends, Conference on Complex Systems, Tempe, AZ

**Stewart, R.N.**, J Piburn, A Sorokine, and A Myers, (2015) WSTAMP: Discovering, Exploring, and Mapping Patterns of Strategic Importance from SpatioTemporal Data Across Major Global Vendors, Conference on Complex Systems, Tempe, AZ.

**Stewart, R.N.**, J Piburn, A Myers, D White, A Sorokine, 2015, *The World Spatiotemporal Analysis and Mapping Project (World STAMP)*. Association of American Geographers Annual Meeting, Chicago, IL.

Duchscherer, S., **R.N. Stewart**, M Urban, *Reverse Engineering Census Summary Data for Population Density Estimation*, (2015) Association of American Geographers Annual Meeting, Chicago, IL.

Morton, A., Stewart, **R.N. Stewart**, S. Duchschereer, and M. Urban, (2015), *A Bayesian Model for Estimating Building Occupancy: Integrating Data, Knowledge, and Uncertainty in an Open Source Environment*, Association of American Geographers Annual Meeting, Chicago, IL.

Piburn, J., **R.N. Stewart**, 2015, Using Dynamic Time Warping for Finding and Assessing Spatiotemporal Trends in Large Global Datasets: applications and findings from the World STAMP Project, Association of American Geographers Annual Meeting, Chicago, IL

Moehl, J., **R.N. Stewart**, N. Nagle, 2015, *Comparing Demographic Household Modeling Techniques*, Association of American Geographers Annual Meeting, Chicago, IL

Urban, M., **R.N. Stewart**, A Myers, D Axley, E Bright, 2015, *Open Source Occupancy Modeling and Services*, Association of American Geographers Annual Meeting, Chicago, IL.

**Stewart, R.N.**, A Rose, E Bright, 2014 Spatial Analysis and Decision Assistance: A Free Program Integrating LandScan High Resolution Population Datasets with Advanced Spatiotemporal Risk-Based Decision Support Models. Association of American Geographers Annual Meeting, Tampa, FL.

Sorokine, A, **R.N. Stewart**, 2014, *Multiperspective Database Architecture for Spatiotemporal Geodatasets*, Association of American Geographers Annual Meeting, Tampa, FL

Urban, M, **R.N. Stewart**, A Myers, D Axley, and E Bright, 2014, *Occupancy Modeling Framework Overview*, Association of American Geographers Annual Meeting, Tampa, FL.

**Stewart, R.N.**, Bright, Eddie, Rose, Amy, McGinn, Wilson. *Enriching Risk Based Decision Support Models with Large Scale, High Resolution Population Data*, Society for Risk Analysis Annual Meeting, December 8<sup>th</sup>-11<sup>th</sup>, 2013. Baltimore, MD.

**Stewart, R.N.** and White, D. 2013. *Towards a 3D Virtual Gaming Environment for Spatiotemporal Analytics*, Association of American Geographers Annual Meeting, Los Angeles, CA, April 9<sup>th</sup>-13<sup>th</sup>

Sorokine, A. and **Stewart, R.N.** 2013. *Ontology-driven Geographic Database Design for Spatiotemporal Data Mining*, Association of American Geographers Annual Meeting, Los Angeles, CA, April 9<sup>th</sup>-13<sup>th</sup>

- Morton, A. and **Stewart, R.N.** 2013. *A Spatiotemporal Process Model for Capturing Museum Visitation Dynamics*. Association of American Geographers Annual Meeting, Los Angeles, CA, April 9<sup>th</sup>-13<sup>th</sup>.
- Moehl, J and **Stewart, R.N.** 2013. *Relating Indicators and Economic Growth*. Association of American Geographers Annual Meeting, Los Angeles, CA, April 9<sup>th</sup>-13<sup>th</sup>.
- Urban, M. and **Stewart, R.N.** 2013. *Developing Uncertainty in Population Density Data*. Association of American Geographers Annual Meeting, Los Angeles, CA, April 9<sup>th</sup>-13<sup>th</sup>.
- Stewart, R.N.** and Urban, M., and Morton, A. 2012. *Population Density Tables: Incorporating socio-cultural dynamics in estimating small area populations at risk*, Society for Risk Analysis Annual Meeting, December 8<sup>th</sup>-14<sup>th</sup>, San Francisco, CA.
- Stewart, R.N.** and Urban, M, 2012. Eliciting and Transforming Population Density Knowledge into a Bayesian Prior Probability Distribution, Association Of American Geographers Annual Meeting, New York, NY.
- Conley, J. and **Stewart, R.N.**, 2011. Using Fine Resolution Population Data and Spatial Interaction Modeling to Estimate Risk from Airborne Toxic Releases, The 11<sup>th</sup> International Conference of Geocomputation, London.
- Urban, M., Bright, E., **Stewart, R.N.**, Lee, R., and Sylvester, L., 2011 *Creating a Database for Demographic and Socio-cultural Characteristics*, Association of American Geographers Annual Meeting, Seattle, WA.
- Stewart, R.N.**, 2010. A Geostatistically Informed Environmental Sampling Design for Improving Boundary Delineation of Contaminated Areas, Association of American Geographers Annual Meeting, Washington D.C
- Stewart, R.N.**, Purucker, S.T., Powers, G.E., 2007. *SADA: A Freeware Decision Support Tool Integrating GIS, Sample design, Spatial Modeling, and Risk Assessment*. Proceedings of the International Symposium on Environmental Software Systems, Prague, Czech Republic.
- Stewart, R.N.**, 2007, Purucker, S.T., 2007. SADA: A freeware decision support tool integrating GIS, sample design, spatial modeling, and environmental risk assessment. 233rd American Chemical Society National Meeting, Chicago, IL.
- Stewart, R.N.**, 2006. SADA: A Freeware Decision Support Tool Integrating GIS, Sample design, Spatial Modeling, and Risk Assessment, East Tennessee Geographic Information Systems Conference, October, 2006.
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- Stewart, R.N.**, Purucker S.T., Powers, G.E, 2005. *Spatial Approaches for Subsurface Sample Design, Characterization, and Decision Support*, Proceedings of the ANS Topical Meeting on Decommissioning, Decontamination, & Reutilization, Denver, Colorado
- Stewart, R.N.**, Purucker, S.T. 2003. *Geospatially-Based Secondary Sample Designs*, Society for Risk Analysis World Congress on Risk, Belgium
- Stewart, R.N.**, Purucker, S.T. 2003. *Geospatially-Based Secondary Sample Designs*,

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Purucker, S.T., **Stewart, R.N.**, Welsh, C.J.E., 2003. *Secondary Sample Designs for Risk Assessment*. Society for Risk Analysis; Baltimore, Maryland, (poster).

**Stewart, R.N.**, Purucker, S.T., 2003. *Initial Sample Designs for Risk Assessment*. Society for Risk Analysis; Baltimore, Maryland, (poster)

Purucker, S.T., **Stewart, R.N.**, 2002. SADA: Freeware to Assist in Integrating Ecological and Human Health Risk Assessment with Geostatistical Analyses. Society for Risk Analysis; New Orleans, Louisiana, (poster)

**Stewart, R.N.**, Purucker, S.T., Dolislager, F.G., Clauberg, M., 2001. Spatial Analysis and Decision Assistance (SADA): Incorporation of Geospatial Statistical Analysis into Risk Assessment Based Decision Making. Society for Risk Analysis; Seattle, Washington, (poster).

**Stewart, R.N.**, 1998. *Geostatistics in Environmental Decision Making*, A presentation given to the National Institute for Environmental Renewal in Pennsylvania covering the contribution of spatial statistics in providing a clear and defensible decision framework.

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