Robert N. Stewart, Ph.D.

Curriculum Vitae
March 2025

Overview

I am an Oak Ridge National Laboratory Distinguished Scientist in the Geospatial Science and Human Security Division, a Bredesen Center Joint Faculty Member, and a Fellow of the American Association of Geographers. My interests lie primarily in the geospatial dimensions of risk and decision making under uncertainty. Areas of application vary widely including population dynamics, environmental risk, maritime safety, transport risk, climate impacts, and change detection. Preferred methods vary but are usually probabilistic in nature and grounded in artificial intelligence, spatio-temporal modeling, spatial statistics, probabilistic graph models, Bayesian reasoning models, and so forth. My work over the past 30+ years has led to many significant modeling and decision support capabilities deployed within the U.S. federal government and contractor ecosystem.

Professional Highlights

American Association of Geographers Fellow

30+ 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

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

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

13+ 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

Over 30 million in R&D funds from US 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
Distinguished Scientist/Interim Section Head (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, energy-water nexus, public health, environmental risk, transportation risk, and many others. Serving since 2/2025 as the Human

Dynamics Section Head responsible for leading five science and technology groups comprised of approximately 80 staff, subcontractors, and students

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 20,000 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

American Association of Geographers (Fellow)
IEEE Senior Member (+CIS, +Computer, +GRSS)
International Society of Bayesian Analysis (+Computational, +EnviBayes)
American Statistical Association (+Defense, +Computational, +Bayesian)
American Association for the Advancement of Science (Section E: Geology and Geography)

Service

IEEE Computational Intelligence Liaison to IEEE USA AI Policy Committee (since 2025)

Advisory Panel for FEMA Natural Hazard Mitigation Needs Assessment report to congress (2023, 2025)

IEEE Computational Intelligence Society Government Actions Committee Chair (since 2023)

International Journal of Geographical Information Science Editorial Board (since 2023)

Transactions in GIS Editorial Board Member (since 2022)

Alan Turing Institute Colouring Cities Research Program External Advisor, UK (since 2023)

Organisation for Economic Cooperation and Development (OECD) Nuclear Energy Agency (NEA) Working Group Member, Paris (Since 2023)

Bredesen Center Data Science Professor, University of Tennessee, ORNL (since 2022)

University of Tennessee Geography and Sustainability, Joint Professor (since 2012)

National Science Foundation Ad-Hoc Reviewer (2022- present)

Chair, American Association of Geographers GISS Specialty Group (2018-2020)

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

JASON Advisory Group, https://en.wikipedia.org/wiki/JASON_(advisory_group) (2015)

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

Courses Taught: UTK 599 Geographic Thought, 501 Independent Studies

Graduate Committee Adjunct Advisor, UIC School of Public Health (2013)

Graduate Committee External Advisor, California Polytechnic Institute (2012)

Graduate Committees

Doctoral Committees

Evan Ezell, UT/ORNL Bredesen Center, Data Science (Active)
Jesse Piburn, UT/Bredesen Center, Data Science (Active)
Dr. Janna Caspersen, UTK Geography, (2018)

Master Committees:

Karessa Manning, UTK Geography (2021)
Samantha Duchscherer, UTK Mathematics (2018)
Matthew Miller, UTK Geography (2017)
Jessica Moehl, UTK Geography (2014) (Chair)
April Morton, CalPoly Mathematics (2012)
Apostolis Sambanis, UIC Public Health (2012)

Awards/Honors

Fellow of the American Association of Geographers (2025)

UT-Battelle Distinguished Researcher Award (2023)

ORNL National Security Sciences Directorate Distinguished Innovation Team Award (2023)

ORNL National Security Sciences Directorate Distinguished Researcher Award (2022)

Ecological Society of America Sustainability Science Award (2021)

DOE Office of Science Director Recognition Letter for COVID pandemic modeling (2021)

Elevation to IEEE Senior Member (2021)

DoD Pentagon Recognition Letter for life saving work in population modeling (2019)

ORNL Significant Event Award for Spatio-temporal R&D (2019)

ORNL Significant Event Award for Spatio-temporal R&D (2014)

EPA Scientific and Technological Achievement Award (2010)

Peer Reviewed Publications

Stipek, C., J Epting, D Adams, V Lebakula, **R.N. Stewart**, C Brelsford, and A Ross, (2025), Empirically Categorzing the Built Environment in Relation to Height, IEEE International Conference on Big Data, pp 5847-5856.

Adams, D., J Gonzales, V Lebakula, D Hughes, and **R.N. Stewart** (in Review), Survey of Change Detection Analysis in the Natural and Built Environment, Nature Geoscience.

Stipek, C., T Hauser, D Adams, J Epting, C Breslford, J Moehl, P Dias, J Piburn, and **R.N. Stewart** (2024), Inferring Building Height from Footprint Morphology Data, Nature Reports. Nature Scientific Reports 14, 18651 (2024). https://doi.org/10.1038/s41598-024-66467-2

Kaufman, J., **R.N. Stewart**, D Maguire, & A Sorokine (2024). Evaluation of Digital Nautical Chart data for confirmation and expansion of GeoNames data. Cartography and Geographic Information Science, 51 (4), 631–643. https://doi-org.utk.idm.oclc.org/10.1080/15230406.2024.2363806

Krapu, C., **R.N. Stewart**, K Kurte, N Hayes, A Rose, A Sorokine, and M Urban (2023) A Bayesian Model for multivariate discrete data using spatial and expert information with application to inferring building attributes, Spatial Statistics, Volume 55. https://doi.org/10.1016/j.spasta.2023.100745

Urban, M, **R.N. Stewart**, S Basford, Z Palmer, and J Kaufman (2023), Estimating Building Occupancy: A machine learning system for day, night, and episodic events, Natural Hazards, Vol 116, pp 2417-2436, https://doi.org/10.1007/s11069-022-05772-3.

Tuccillo J., **R.N. Stewart**, A Rose, N Trombley, J Moehl, N Nagle, and B Bhaduri (2022) UrbanPop: A spatial microsimulation framework for exploring demographic influences on human dynamics, Applied Geography, Volume 151. https://doi.org/10.1016/j.apgeog.2022.102844

Maguire, D., J Kaufman, A Sorokine, and **R.N. Stewart** (2022) Enhancing and validating GeoNames data with Digital Nautical Charts data: A case study in the mapping of freeform Map Labels, AutoCarto 2022 Extended Abstract, Redlands, CA, Nov 2-4.

Stewart, R.N., S Erwin, J Piburn, N Nagle, J Kaufman, A Peluso, J Blair Christian, J Grant, A Sorokine, and B Bhaduri (2022), Near Real-Time Monitoring and Forecasting of COVID-19 Situational Awareness, Applied Geography, Vol 146, pp 102759. https://doi.org/10.1016/j.apgeog.2022.102759

Krapu, C, **R.N. Stewart**, A Rose (2022) “A Review of Bayesian Networks for Spatial Data”, Online March 30th, 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

(Febuary 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), https://doi.org/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, https://doi.org/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_021822.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. https://doi.org/10.1109/JSTARS.2019.2959707

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. https://doi.org/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-GridSegmentation 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, Vol 114 (36) 9581-9586.

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. https://doi.org/10.1073/pnas.1706201114

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. Accesible 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 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) Minisymposterium: 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 3rd, 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/6mg271rn

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 (https://trace.tennessee.edu/utk_graddiss/1130/)

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

S.T. Purucker, C.J.E. Welsh, **R.N. Stewart**, P. Starzec, (2007) Use of habitat-contamination

spatial correlation to determine when to perform a spatially explicit ecological risk assessment, Ecological Modelling, Volume 204, Issues 1–2, 2007, Pages 180-192, https://doi.org/10.1016/j.ecolmodel.2006.12.032.

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

Invited Speaker/Panelist, Short Courses, and Workshops

Panelist, Building Data Together: An International Workshop on Building-related Open Microdata Technical Workshop, OECD Paris, January 24th, 2025.

Speaker/Panelist, Building Level Attribution for Urban-Scale Modeling and Simulation, NSF Workshop on Implication of Urban Scale Occupant Behavior for Resilient Building Design, Operation and Policy Making, Syracuse, NY. May 13, 2024.

Session Chair, Detailed Guesstimates: The Art of Sampling, Simplifying, and Scaling a Feasible Distribution of Global Building Assets, Co-chairs Charles Huyck (ImageCat), Kishor Jaiswal (USGS) American Geophysical Union Fall Meeting, December 2023.

Speaker GeoAI for Rich Attribution and Mapping of the Built Environment, Alan Turing Institute, London. September 11, 2023. (https://www.turing.ac.uk/people/robert-stewart).

Speaker: Overview of Global Building Intelligence, Human Planet Forum, Columbia University, NY, July 2023

Speaker: Overview of Global Building Intelligence, USGS National Earthquake Center, April 2023

Co-chair for AGU Annual Meeting 2022 Session U53: Mapping the Built Environment: New Data, Advances and Challenges in Creating Detailed Understanding of Building Characteristics from Materials to Occupancy. Chicago, Il, December 11-16, 2022.

Speaker/Panelist: Nuclear Energy Association Workshop on Innovative Techniques and Technologies, talk titled “A Geospatial Based Decision Framework for Extending MARSSIM, Regulatory Principles into the Subsurface”, Boulogne-Billancourt, France, November 2022

SpatioTemporal Computing Workshop: Setting the ST 5-10 Year Research Agenda. University of Washington, Seattle, Washington, August 18-19, 2022.

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

Co-Chair for ACM SIGKDD DeepSpatial Workshop 2022, Washington D.C.

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

Co-Chair for ACM SIGKDD DeepSpatial Workshop 2021.

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

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

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

Speaker: *What Can(‘t) SADA Do for You?*, University of Illinois at Chicago (invited speaker), 5/2013

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

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

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.

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

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

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

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

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.

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

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

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.

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.

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

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

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

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

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

Arndt, J., A Sorokine, J Wohlgemuth, A Potnis, and **R.N. Stewart** (2024), Nautical Charts Technical Report, ORNL/SPR-2023/3176.

Hughes, D., C Tate, **R.N.Stewart,** (2024) Way Forward Proposal for Change Detection, ORNL/TM-2024/3263.

Piburn, J., J Kaufman, A Sorokine, **R.N. Stewart** (2022) DOE COVID-19 Data Curation Effort: Overview of Initial Data Collection, ORNL Technical Memorandum, ORNL/TM-2022/1496.

Piburn, J., **R.N. Stewart**, J Kaufman, A Sorokine, E Axley (2021) 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.

Purucker, S.T., Lyon, B.F., Nanstad, L.D., **Stewart, R.N**., 1994. Decision Support for CERCLA Investigations: An Introduction to Decision Analysis Applications. ES/ER/TM-134

Selected Talks/Abstracts/Posters/Presentations

Stewart, R.N., P Sankhe, J Piburn, M Lindgren, J Kaufman, J Moehl, and E Axley (2024) Linking Building Data, Engineering Knowledge, and Sociocultural Fators: Bayesian Estimation for those Tough to Find Attributes, Poster, AGU Annual Meeting Washington. D.C., December.

Woody, C., **R.N. Stewart**, M Urban (2024), Mapping Residential Building Occupancy in Accra, Ghana: Integrating Satellite Imagery and Monte Carlo Simulations to Estimate Population Density. AGU Annual Meeting Washington. D.C., December.

Sankhe, P**., R.N. Stewart,** M Lindgren, J Piburn (2024), Bayesian Inferencing of Building Level Attributes on a Global Scale (poster). International Society for Bayesian Analysis, Venice, July 2024.

Piburn, J., M Urban, K Sparks, **R.N. Stewart**, N Nagle, and G Thakur (2024) Evaluating Diversity of Place Type Occupancy Dynamics through Google Popular Times (3rd place poster), NSF 1st International Workshop on Building and Simulation, Syracuse University, May

13-14, Syracuse, NY.

Kaufman, J, **R.N. Stewart** (2023) Finding the World: What on Earth is Global Building Intelligence, FOSS4GNA, Baltimore, MD, 10/23/2023.

Global Building Intelligence (2023), **R.N. Stewart** Flat Iron Institute, New York, NY.

Krapu, C., N Hayes, R.N. Stewart, A Rose, A Sorokine, and K Kurte, (2022) Distributed Inference for a Spatial Bayesian Network with Application to Natural Hazard Risk Assessment, Annual American Statistical Association's Joint Statistical Meeting 2022, Washington D.C., August 6th – 11th.

King, D., L Yang, D Lunga, J Arndt, J Bowman, **R.N. Stewart** (2021), Deep Feature Extraction for Unsupervised Learning of Geophysical Datasets, AGU Fall Meeting Abstracts 2021, New Orleans, LA, December 13-17. IN42B-03.

Yang, Lunga, King, Arndt, **R.N. Stewart** (2021), Exploring Spatially Distributed Deep Learning Models for Global Gravitational Mapping, AGU Fall Meeting (2021), Abstracts 2021, New Orleans, LA, December 13-17. EP12C-05.

Sorokine, A., J Kaufman, J Piburn, and **R.N. Stewart** (2020) Active Learning Approach to Record Linking in Large Geodatasets, AutoCarto 2020, 23rd 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. Duchscherer, 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 8th-11th, 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 9th-13th

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 9th-13th

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 9th-13th.

Moehl, J and **Stewart, R.N.** 2013. *Relating Indicators and Economic Growth*. Association of American Geographers Annual Meeting, Los Angeles, CA, April 9th-13th.

Urban, M. and **Stewart, R.N.** 2013. *Developing Uncertainty in Population Density Data*. Association of American Geographers Annual Meeting, Los Angeles, CA, April 9th-13th.

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 8th-14th, 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 11th 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.

Stewart, R.N., 2006. SADA: A Freeware Decision Support Tool Integrating GIS, Sample design, Spatial Modeling, and Radiological Assessment, Health Physics Society Midyear, Knoxville, TN.

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

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Stewart, R.N., Purucker, S.T. 2003. *Geospatially-Based Secondary Sample Designs*, Society for Risk Analysis World Congress on Risk, Belgium

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.

Media

Data Science teams analyzed COVID-19 data for early pandemic response, ORNL News July 2022, https://www.ornl.gov/news/data-science-teams-analyzed-covid-19-data-early-pandemic-response

World-Class Science Takes on the COVID -19 Pandemic, ORNL Production, April 2020, https://www.youtube.com/watch?v=-okT36zYdD0 (map work featured 3:30 – 3:42)

Tech Corner: The Value of Visualization, WSTAMP, NGA In the Know, May 22nd, 2017.

Funding

Total funding from a variety of Federal agencies exceeds 30 million dollars (as of September 2024). Details possible upon request.