

Steven M Guinn

Senior Research Scientist
Spatial Modeling Group
PO Box 454
Mount Savage, MD 21545

(301) 301-3036 (Home)
(240) 609-6102 (Cell)

steven@spatialmodeling.group

I. Education

Allegany College of MD	Computer Science*	A.S. 2004
Frostburg State University	Computer Science (minor)	
Frostburg State University	Geography, Mapping Sciences **	B.S. 2007
Frostburg State University	Earth Science**	B.S. 2007

* With honors, Summa Cum Laude

** With honors, Cum Laude

II. Professional Experience

2023 – present	Geospatial Modeler, Chesapeake Conservancy.
2019 – 2022	Data Scientist, Integration and Application Network, University of Maryland Center for Environmental Science
2007 - 2022	Faculty Research Assistant III, University of Maryland Center for Environmental Science, Appalachian Laboratory
2015-2016	Adjunct Instructor for GEOG 310 (Fundamentals of Cartography), Frostburg State University
2014	Adjunct Lecture Instructor for 1 section of GEOG 103 (Physical Geography), Frostburg State University
2007	Lab Instructor for 2 sections of GEOG 103 (Physical Geography), Frostburg State University
1994- present	Owner/Operator of SanDesign, a multi-media design and manufacturing business.

Skills:

Programming Languages: Python, Java, JavaScript, SQL, PSQL, C++, R, BASH, IDL, and XML

Operating Systems: Linux, Windows, MAC OSX

Software: ArcGIS, ENVI, QGIS, Microsoft Office, Photoshop, Illustrator, GIMP, Inkscape, Android Studios, GIT

Other: Geographic Information Systems, Remote Sensing, Graphic Design, Cartography, Algorithm development and testing, Data management, High performance computing, Database design and management, Software engineering, System Analysis and Design, Curriculum Development, Field Technician .

III. Research

A. Area of Expertise

Application and integration of computer and ecological sciences to more efficiently model and represent natural phenomena as digital data structures. Primarily focused on (1) developing novel methods that synergistically document, manage, and process large datasets; (2) improve existing models and workflows to decrease processing time or infrastructure requirements; (3) designing and implementing complex data models to improve knowledge and information extraction. (4) Administration and training of GIS software products.

B. Funded Research

UMCES IAN: A report card for the Upper Rio Grande basin, Published 2022. Work performed: Data analysis and management , population modeling, and Heat Vulnerability Index(HVI) modeling. <https://ian.umces.edu/publications/a-report-card-for-the-upper-rio-grande-basin/>

UMCES IAN: 2021 Chesapeake Bay and Watershed Report Card. Published 2022. Work performed: Non tidal watershed data management and analysis, population modeling, economic data management, Social index analysis, and Heat Vulnerability Index(HVI) modeling. <https://ian.umces.edu/publications/2021-chesapeake-bay-and-watershed-report-card/>

UMCES IAN: Chesapeake Bay & Watershed Report Card 2020, Published 2021. Work performed: Non tidal watershed data management and analysis, population modeling, economic data management, Social index analysis, and Heat Vulnerability Index(HVI) modeling. <https://ian.umces.edu/publications/chesapeake-bay-watershed-report-card-2020/>

UMCES IAN: 2020 Mississippi River Watershed Report Card Methods, Published 2021. <https://ian.umces.edu/publications/2020-mississippi-river-watershed-report-card-methods-document/>

UMCES IAN: 2020 Mississippi River Watershed Report Card, Published 2020. Work performed: Dasymetric Population modeling, Wetland loss modeling and analysis, Floodplain population modeling and analysis, Mississippi Basin flood stage analysis, Subbasin nutrient and sedimentation export modeling and analysis.

<https://ian.umces.edu/publications/2020-mississippi-river-watershed-report-card/>

NASA A.46: Earth Science Applications: Ecological Forecasting:2017-2020 “Managing forests for sustainable harvest and wildlife habitat using earth observations and modeling of forest structure and landscape connectivity.”

UMCES IAN: Western Lake Erie 1st Report Card, Published 2020. Work performed: Cartographic and Graphic design.

<https://ian.umces.edu/publications/western-lake-erie-1st-report-card/>

UMCES IAN: 2020 Verde River Watershed Report Card, Published 2020. Work performed: Dasymetric Population modeling and Affordable Housing Analysis.

<https://ian.umces.edu/publications/2020-verde-river-watershed-report-card/>

UMCES IAN: 2019 Chesapeake Bay & Watershed Report Card, Published 2019. Work performed: Development of watershed water quality indicator and Non tidal watershed data management and analysis.

<https://ian.umces.edu/publications/2019-chesapeake-bay-watershed-report-card/>

NPS: Dendroecological analysis of dominant tree species at NCRN forest monitoring plots: wood production and canopy responses to climate variability:2017-2018

National Science Foundation, Plant Genomics Research Program, 2013-2016 “The genomic basis for adaptation to warmer, earlier growing seasons in balsam poplar: synergistic use of genome scans, remote sensing of phenology, and geospatial modeling.” PI: S Keller; CoIs: AJ Elmore, MC Fitzpatrick, D Nelson, and C Stylinski.

National Aeronautics and Space Administration, Terrestrial Ecology Program, Title: “Assessing the influence of local phenology on the response of forest productivity to changes in growing season length” PI: AJ Elmore; CoI: D Nelson

NOAA Maryland Sea Grant, Title: “Modeling the role of stream burial and landscape connectivity on aquatic community composition and sensitivity to climate and land-use change” PI: MC Fitzpatrick; CoI: AJ Elmore

National Park Service, 2010-2012, Title: “Modeling Coastal Vulnerability for Tidal Reaches of the Potomac and Anacostia Rivers” PI: AJ Elmore; CoIs: MC Fitzpatrick, KAM Engelhardt, G Sanders

NOAA Maryland Sea Grant, 2009-2011, Title: “Investigating impacts of headwater stream burial during development on downstream nutrient export to Chesapeake Bay” PI: AJ Elmore; CoIs: JP Julian and S Kaushal.

C. Publications

Swanwick, RH, QD Read, SM Guinn, MA Williamson, KL Hondula and AJ Elmore (2022) Dasymetric population mapping based on US census data and 30-m gridded estimates of impervious surface. *Sci Data* 9, 523. <https://doi.org/10.1038/s41597-022-01603-z>

Leveraging the NEON Airborne Observation Platform for socio-environmental systems research; (2021) Ordway, E. M., A. J. Elmore, S. Kolstoe, J. E. Quinn, R. Swanwick, M. Cattau, D. Taillie, S. M. Guinn, K. D. Chadwick, J. W. Atkins, R. E. Blake, M. Chapman, K. Cobourn, T. Goulden, M. R. Helmus, K. Hondula, C. Hritz, J. Jensen, J. P. Julian, Y. Kuwayama, V. Lulla, D. O’Leary, D. R. Nelson, J. P. Ocon, S. Pau, G. E. Ponce-Campos, C. Portillo-Quintero, N. G. Pricope, R. G. Rivero, L. Schneider, M. Steele, M. G. Tulbure, M. A. Williamson, and C. Wilson. *Ecosphere* 12(6):e03640. 10.1002/ecs2.3640

Genetic Structure of Maryland Brook Trout Populations: Management Implications for a Threatened Species; Morgan et al. S Guinn, *Cartography* 2021 North American Journal of Fisheries Management published by Wiley Periodicals LLC on behalf of American Fisheries Society
ISSN: 0275-5947 print / 1548-8675 online
DOI: 10.1002/nafm.10618

Elmore, A.J., D. Nelson, S.M. Guinn, and R. Paulman. 2017. Landsat-based Phenology and Tree Ring Characterization, Eastern US Forests, 1984-2013. ORNL DAAC, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1369>

Elmore, A. J., Craine, J. M., Nelson, D. M., & Guinn, S. M. (2017). Continental scale variability of foliar nitrogen and carbon isotopes in *Populus balsamifera* and their relationships with climate. *Scientific reports*, 7(1), 7759.

Craine, J., Cannon, M., Elmore, A., Guinn, S., & Fierer, N. (2017). DNA metabarcoding potentially reveals multi-assemblage eutrophication responses in an eastern North American river. *bioRxiv*, 186452.

Cadol, D, AJ Elmore, SM Guinn, KAM Engelhardt, G Sanders (2016) Modeled tradeoffs between developed land protection and tidal habitat maintenance during rising sea levels. *PlosONE* 11(10): e0164875

Elmore, AJ, D Cadol, SM Guinn, GM Sanders, KAM Engelhardt, and MC Fitzpatrick. 2015. Spatially Explicit Modeling of Coastal Vegetation Change Associated with Projected Sea Level Rise: The Potomac Estuary. *Natural Resource Data Series* NPS/NCRN/NRR—2015/1034. National Park Service, Fort Collins, Colorado.

Elmore, A. J., S. M. Guinn, and G. Sanders (2013) Vegetation structure within the National Capital Region Network using LiDAR data and analysis: Prince William Forest Park, Catoctin Mountain Park, C & O Canal National Historical Park, and Harpers Ferry National Historical Park. Natural Resource Data Series NPS/NCRN/NRDS 2013/475. National Park Service, Fort Collins, Colorado

Elmore, AJ, JP Julian, SM Guinn, MC Fitzpatrick (2013) Potential stream density in midAtlantic U.S. watersheds. PLOS One, 8(8):e74819:1-15

Elmore, AJ, SM Guinn, BJ Minsley, and AD Richardson. (2012) Landscape controls on the timing of spring, autumn, and growing season length in mid-Atlantic forests. *Global Change Biology*, 18(2):656-674

Julian, JP, AJ Elmore, SM Guinn. (2012) A physiographic analysis of channel head locations along a mountains to sea continuum in the Mid-Atlantic United States. *Geomorphology*, 177-178: 194-203.

Elmore, AJ and SM Guinn (2010) Synergistic use of Landsat Multispectral Scanner with GIRAS land-cover data to retrieve impervious surface area for the Potomac River Basin in 1975. *Remote Sensing of Environment*, 114:2384-2391

Conference presentations

Elmore, AJ, SM Guinn, D Cadol, K Engelhardt, MC Fitzpatrick (2012) Modeling coastal vulnerability for tidal reaches of the Potomac and Anacostia rivers. AGU Chapman conference, Hydrogeomorphic Feedbacks and Sea Level Rise in Tidal Freshwater River Ecosystems

Elmore, AJ, Julian, J, Guinn, SM, Weitzell, R, Fitzpatrick, MC (2011) A River Runs Under It: Modeling the Distribution of Streams and Stream Burial in Large River Basins, Abstract B31B-0327 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.

Guinn, SM, AJ Elmore, T Mourad, B Wee, A Collins, D Kirschtel, W Dennison (2011) The Potomac River Basin as a landscape-scale classroom for exploring the future of environmental decisions, 96th Annual Meeting of the Ecological Society of America, Austin, TX.

Julian, J, AJ Elmore, SM Guinn, MC Fitzpatrick (2011) Where do streams really begin?: An ecoregion perspective in the Mid-Atlantic U.S., 96th Annual Meeting of the Ecological Society of America, Austin, TX.

Elmore, AJ and Guinn, SM (2011) Fine-grain analyses of landscape controls on average forest phenology for mid-Atlantic forests. US-International Association for Landscape Ecology, Annual Meeting, Portland, OR, USA.

Elmore, AJ and SM Guinn (2010) Summer green down in forests as a predictor of the availability of belowground resources and response to global warming. 95th Annual Meeting of the Ecological Society of America, Pittsburgh, PA

Elmore, AJ, SM Guinn, JP Julian, R Weitzell (2011) Headwater stream channel mapping and impact assessment in the mid-Atlantic, USA, Geological Society of America Northeastern/North-Central Section Meeting, Pittsburgh, PA