Ehsan Momeni, PhD

GIS Manager, Cumberland County

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Summary

I am the GIS Manager for Cumberland County's Department of Innovation and Technology Services (ITS) in North Carolina, where I lead a team of GIS professionals supporting over 80 internal users, as well as providing services to the public statewide. I also serve on the ITS Management Team, contributing to strategic planning and inclusive practices. With a PhD in Earth Sciences/Urban Planning and a strong background in both academia and industry, I bring innovative, data-driven solutions to local government. In 2025, our work was nationally recognized—Cumberland County was ranked 1st in the state, 3rd in the nation, by the National Association of Counties for excellence in digital innovation and technology use in local government.

I am a reviewer for high-impact academic journals, including *Transactions in GIS* and *Frontiers in Sustainable Cities*. My background includes experience as a university lecturer and membership on a patents committee. Outside of my professional work, I enjoy hiking and landscape photography—especially using drones. In 2015, I was honored as the winner of the photo contest at the Indonesian Cultural Exhibition.

Highest Education

Ph.D. in Earth Sciences/ GIS and Urban Planning, May 2022

Department of Earth Sciences, The University of Memphis, TN

Work History

1- Innovation and Technology Services (ITS), Cumberland County, NC

1-1 GIS Manager | May. 2024– present

Examples of duties include, but are not limited to:

- Providing strategic leadership to a team of GIS professionals by setting goals, aligning initiatives with organizational priorities, and establishing a unified vision for enterprise GIS advancement.
- Serving on the ITS Management Team, providing input into ITS strategic planning and ensuring alignment with the county's goals and objectives.
- Preparing and managing budgets and cost estimates, monitoring expenditures, assessing needs, and allocating or requesting resources.
- Providing input to the Project and Portfolio Management (PPM) team in the planning and prioritization of programs, projects, and operations.
- Hiring Manager; responsible for hiring, mentoring, training, conducting KPI-based performance evaluations, and administering disciplinary actions.
- Conducting R&D to shape the overall strategic vision and ensure optimal use of GIS.
- Performing system administration, technical support, and maintenance for GIS systems, servers, and equipment.
- Developing plans and procedures for the effective integration and ETL of data from various sources into the Enterprise ArcSDE geodatabase, with careful consideration of schemas and metadata.
- Preparing ordinances, regulations, standards, practice documents, reports, proposals, plans, presentations, and other documentation.
- Actively participating in and facilitating staff meetings, while coordinating with internal and external departments, county and city leadership, citizens, and community stakeholders.
- Developing and maintaining comprehensive training plans for end-users on system usage and troubleshooting.
- Evaluating systems for automation opportunities to enhance service delivery and operational efficiency.
- Providing technical and operational support to the GIS Developer and GIS Analyst/Addressing Coordinator to facilitate project success and efficient workflows.

- Serving on the Cumberland County Tech Day 2023 (#CCTECHDAY23) and Tech Day 2024 (#CCTECHDAY24) committees, and contributing insights to the planning of Cumberland County Tech Day 2025 (#CCTECHDAY25).

1-2 GIS Developer | Aug. 2022 – April 2024

Examples of duties included, but are not limited to:

- High-level designing, coding, deploying, and customizing ESRI suites including ArcGIS Desktop and Pro, ArcGIS Online (AGOL), ArcGIS Enterprise, Survey123 Online and Connect, Field Maps, Quick Capture, StoryMaps, Dashboards, and Experience Builder.
- Creating, maintaining, and updating geodatabases for different departments including departments of Emergency Services & 911 support (E911) for CAD (Computer-Aided Dispatch), Planning and Inspection, Transportation, Public Utilities, Information Services, Environmental Health, Engineering, Tax Administration, and others.
- Evaluating and documenting current GIS database designs, schema, and metadata.
- Maintaining GIS source control and versioning systems.
- Creating and maintaining GIS web systems, and ad hoc reports upon request.
- Planning, designing, and developing data integration services, and migrating data from legacy systems into geo-databases.
- Programming and preparing database queries, reports, maps, and optimizing ETL scripts.
- Conducting research on emerging GIS products, services, methods, protocols, and standards, and contributing to the development of related ITS strategic plans. Assisting in drafting, evaluating, and implementing technical standards, laws, ordinances, and regulations.
- Designing and training users in GIS software and applications, and providing technical assistance to users as needed including troubleshooting problems and developing necessary modifications to resolve problems.
- Analyzing user requests for customized GIS software and applications, including modifications, expansions, or enhancements of existing software and applications.
- Coding programs that meet user requests including online and batch programs.
- Providing updates to Chameleon and Animal Control agencies.
- Supporting the Environmental Health Department with data collection and visualization using field maps and handheld GPS units.

2- The University of Memphis, Memphis, TN | Aug. 2016 - May 2022

Graduate Research and Teaching Assistant

- As a Research Assistant (RA), I collaborated with faculty members from the Departments of Earth Sciences and also City and Regional Planning on projects addressing urban phenomena. By utilizing GIS, image processing, programming, and advanced statistical methods, I analyzed remote sensing data—such as digital elevation models (DEM), radar, LiDAR, and GPS—as well as field data—such as property assessments, central business districts, road networks, and various land-use categories (residential, commercial, industrial) — to address urban-related issues. This work contributed to a deeper understanding of complex urban challenge. Among my projects are:
  - Memphis 3.0; the City of Memphis' first comprehensive plan that won Tennessee's Outstanding Plan Award in 2019
  - Finding the optimal school location in Stowe, VT
  - Analyzing urban sprawl and blight properties in Shelby County, TN
  - Spatial modeling and forecasting of urban growth in Shelby County, TN
  - Analyzing and interpreting travel behavior of commuters in Shelby County, TN
  - Analyzing and interpreting biking demands in the City of Memphis and Shelby County, TN
  - Identifying demands for public transportation in the City of Memphis and Shelby County, TN
  - Detecting vulnerable urban areas to floods
- As a Teacher Assistant (TA), I have taught to more than 450 students in over 16 classes.

3- National Cartographic Center, Tehran, Iran | March 2010 - March 2015

GIS and Remote Sensing Specialist/Researcher

- The National Cartographic Center (NCC) is the leading organization for collecting, processing, mapping, and updating geospatial data. As a researcher and GIS and remote sensing specialist, I explored various datasets and methodologies to update the nationwide geodatabase of maps. Each GIS-ready map contained over 20 distinct data layers, including buildings, major roads, secondary roads, property types, railways, and more. Using statistical packages (e.g. Matlab and SPSS), GIS software (e.g. ArcGIS, QGIS, and PCI Geomatica), and programming (e.g. Python), I extracted and mapped various features. While working at NCC, I successfully published several research articles, instructional guides, and manuals.

- I also served as the NCC's representative to the President's Deputy of Strategic Planning for the evaluation of patents and innovations.

4- Visiting Faculty at different universities, Iran | 2008-2014

From 2008 to 2014, while working at the National Cartographic Center (NCC), I served as a visiting faculty member at several universities. I taught technical courses including Remote Sensing, GIS, Photogrammetry, and Land Surveying. Notably, some of these institutions, such as K. N. Toosi University of Technology and the University of Science and Technology, are among the top-ranked universities in the country.

Selected Technical Certifications/Experience

- Make an Impact with Modern Geo Apps, ESRI
- CJIS, FBI
- Location-Enabling Data, ESRI
- Going Places with Spatial Analysis, ESRI
- Cartography, ESRI
- Python for Everyone, ESRI
- CITI Program: Conducting No More Than Minimal Risk Research
- SETI@home computation, The University of California, CA
- Image and video processing, Statement of accomplishment, Duke University, NC

Honors and Awards

- 1st in the state, 3rd in the country, for its population category in NACo's 2025 Digital Counties Survey Awards
- 2nd place for its population category in NACo's 2024 Digital Counties Survey Awards
- Graduate Assistantship, The University of Memphis, TN
- Best photograph, the Indonesian Cultural Exhibition photo contest
- Image Processing Expert, National Cartographic Center
- Best paper, 18th National Conference and Exhibition on Geomatics and International Conference of ISPRS WGII/4

Volunteer Works

- Diversity, Equity, and Inclusion Advisory (DEI) Committee member, Cumberland County, NC
- Geographic Information System Specialist, URISA'S GISCorp
- Peer reviewer, journal of Transactions in GIS (TGIS)
- Peer reviewer, journal of Frontiers in Sustainable Cities
- Representative for evaluation of innovations, Department of Strategic Planning and Control
- Fire service volunteer

Book Chapters

1. Antipova, A., **Momeni, E.**, Banai, R. (April 2022). Analysis of Urban Sprawl and Blight Using Shannon Entropy Index: A Case Study of Memphis, Tennessee. In U. Chatterjee, A. Biswas, J. Mukherjee & S. Majumdar (Eds.). *Advances in Urbanism, Smart Cities, and Sustainability* (Chapter 17, pp. 299-322). Boca Raton, FL: Taylor & Francis Group CRC Press. DOI: 10.1201/9781003126195-21
2. Antipova, A., **Momeni, E.**, Banai, R. (April 2022). Urban Sprawl, Blight, and the COVID-19 Pandemic. In U. Chatterjee, A. Biswas, J. Mukherjee & S. Majumdar (Eds.). *Advances in Urbanism, Smart Cities, and Sustainability* (Chapter 15, pp. 263-281). Boca Raton, FL: Taylor & Francis Group CRC Press. DOI: 10.1201/9781003126195-19

Selected Publications

1. **Momeni, E.**, Antipova, A. (March 2023). Cellular Automata (CA) and Urban Expansion. *2023 North Carolina Geographic Information Systems (2023 NCGIS), Winston-Salem, NC*. DOI: 10.13140/RG.2.2.11324.41604
2. Banai, R., **Momeni, E.** (Jan 2023). The Neighborhood Impact of Industrial Blight: A Path Analysis. *Geoscape*, 16(2):132-147. DOI: 10.2478/geosc-2022-0011
3. **Momeni, E.**, Antipova, A. (July 2022). A micro-level analysis of commuting and urban land using the Simpson's index and socio-demographic factors. *Applied Geography*, 145 (2022) 102755. DOI: https://doi.org/10.1016/j.apgeog.2022.102755

4. **Momeni, E.** (May 2022). Optimizing pattern-based calibration of Cellular Automata by Imperialistic Competitive Algorithm (Publication No. 2022.29065262) [Doctoral dissertation, University of Memphis]. *ProQuest Dissertations and Theses database.*
5. Banai, R., **Momeni, E.** (April 2022). The Neighborhood Impact of Industrial Blight: A Path Analysis. *50th Annual Conference on Urban Affairs Association (UAA),* Washington DC, April 12-14, 2022. DOI: 10.13140/RG.2.2.17388.44164
6. Antipova, A., **Momeni, E.** (August 2021). Unemployment in socially disadvantaged communities in Tennessee, US, during the COVID-19. *Frontiers in Sustainable Cities.* DOI: 10.3389/frsc.2021.726489
7. Banai, R., Antipova, A., **Momeni, E.** (June 2021). Mapping the morphology of sprawl and blight: A note on entropy. *GeoScape*, 15(1), 1-18. DOI: 10.2478/geosc-2021-0001
8. **Momeni, E.**, Ali Farzan, I., Antipova, A. (March 2021). Obesity and Overweight vs. COVID-19 Confirmed Cases and Deaths in the United States. *The 33rd Annual Student Research Forum (SRF)*, University of Memphis, Memphis, TN. DOI: 10.13140/RG.2.2.12893.13289
9. Antipova, A., Ray, M. A., **Momeni, E.** (Nov. 2020). Analysis of Burden of Disease in socially disadvantaged areas through mapping of geographical inequalities in COVID-19 morbidity and mortality. *75th Annual Conference of the Southeastern Division of the American Association of Geographers (SEDAAG).* DOI: 10.13140/RG.2.2.27992.62720
10. **Momeni, E.**, Antipova, A. (2020). Pattern-based calibration of cellular automata by genetic algorithm and Shannon relative entropy. Transactions in GIS, 2020;00:1–17. DOI: https://doi.org/10.1111/tgis.12646
11. **Momeni, E.**, Sahebi, M. R., & Mohammadzadeh, A. (2020). Classification of high-resolution satellite images using fuzzy logics into decision tree. *Malaysian Journal of Geosciences*, 4(1), 07-12. DOI: http://doi.org/10.26480/mjg.01.2020.07.12
12. **Momeni, E.** (2019). Estimation of biking demands in Shelby County, TN, using demographics. *The 31st Annual Student Research Forum*, University of Memphis, Memphis, TN. DOI: 10.13140/RG.2.2.29770.59845
13. **Momeni, E.**, Fard, F. S. N. & Haghi, H. (2018). Accuracy Assessment of GeoEye-1 Satellite Images for Updating Large-Scale Maps in Iran. *Journal of Geography & Natural Disasters,* Vol 8(1):219. DOI: 10.4172/2167-0587.1000219.

14. **Momeni, E.** & Antipova, A. (2018). A Time-Series Study of Socio-demographic and Land Use/Cover Factors and Travel Behavior in Memphis and Shelby County, TN. *73rd Annual Conference of the Southeastern Division of the American Association of Geographers (SEDAAG)*, Johnson City, TN. DOI: 10.13140/RG.2.2.27254.01609
15. **Momeni, E.** (2018). Identifying demands for public transportation in Shelby County based on demographics. *The 30th Annual Student Research Forum (SRF)*, University of Memphis, Memphis, TN. DOI: 10.13140/RG.2.2.23898.57284
16. **Momeni, E.**, Saati, A., Kiavarz, M., & Naeeni, F. (2014). Precision and accuracy assessment of digital surface model generated by Ultracam digital aerial images. *Geomatics 93*, 21st National Conference and Exhibition, Tehran: Iranian National Cartographic Center.
17. **Momeni, E.**, Keshmiri, & Z., Rabiea, B. (2014). Feasibility of updating 1:25000 maps using zy3 satellite images. *Geomatics 93*, 21st National Conference and Exhibition, Tehran: Iranian National Cartographic Center.
18. **Momeni, E.**, Saati, A. R., Kiavarz, M., & Fard, F. S. N. (2012). *Instruction for generating DSM using UltraCam aerial images*. Tehran, Iranian National Cartographic Center.
19. **Momeni, E.** (2012). *Instruction for triangulation of IRS-P5 satellite images by ERDAS-LPS*. Tehran, Iranian National Cartographic Center.
20. Bagheri, S. M. P., **Momeni, E.**, & Fard, F. S. N. (2011). Updating urban maps using GeoEye stereo pair satellite images. *Shahrnegar*, 55(12), 103-112.
21. Hashemian, M. S., Rabiei, B., & **Momeni E.** (2011). *A Comparison of IRS-P5 and ALOS-Prism for Revision of 1:25000 Scale Topographic Maps*. 7th International Symposium on Digital Earth, Perth Convention and Exhibition Centre, Australia.
22. Fard, F. S. N., **Momeni, E.**, & Haghi, H. (2011). *A comprehensive study on potential and capability of GeoEye-1 satellite images for updating 1:2000 large scale topographic maps in Iran*. International Society for Photogrammetry and Remote Sensing, Tehran, Iran.
23. **Momeni, E.** (2011). Satellite Image Classification by Tree Method and Fuzzy Algorithm (Master thesis). K. N. Toosi University of Technology.
    DOI: 10.13140/RG.2.2.13622.52807
24. Hashemian, M. S., Rabiei, B., & **Momeni E.** (2011). *A Comparison of IRS-P5 and ALOS-Prism for Revision of 1:25000 Maps*. Geomatics 90, 18th National Conference and Exhibition, Tehran: Iranian National Cartographic Center. COI: GEO90_100

25. **Momeni, E.**, Abzal, A., & Varshosaz, M. (2010). Calibration of the non-metric camera using a test field, and evaluation of effective elements in the accuracy of measurements. *Geomatics 89*, 17th National Conference and Exhibition, Tehran: Iranian National Cartographic Center.
26. Asl, S. D., **Momeni, E.**, & Mokhtarzade, M. (2010). *Statistical-based method for straight line extraction*. American Society for Photogrammetry and Remote Sensing, San Diego, CA.
27. **Momeni, E.** (2010). *Evaluation of Models for Detecting Vulnerable Areas to Flooding by Photogrammetry, Remote Sensing and GIS Technologies* (Master Seminar). K. N. Toosi University of Technology. DOI: 10.13140/RG.2.2.14251.67361