Mohammad M. M. Alsahli
Associate Professor of Geographic Information Science and Environment
Department of Geography at Kuwait University
P.O. Box: 68168, Kaifan 71962, State of Kuwait
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Webpages:
Mohmmad Alsahli @ ResearchGate
Mohammad Alsahli @ Google Scholar

Research Interests

- Time Series Remote Sensing and Space-Time Analytics
- Machine Learning Applications in Remote Sensing and GIS
- GIS-Based Spatial Analysis and Environmental Modeling
- Coastal Vulnerability and Environmental Risk Assessment
- Climate Change Adaptation and Mitigation Strategies
- Spatial Decision Support Systems for Environmental Planning

Education

Ph.D. in Geography - Geographic Information Science Track
Department of Geography & Atmospheric Science
University of Kansas, 2009

- Emphasis: Environmental Remote Sensing, GIS, and Spatial Analysis
- Dissertation: *Characterizing Surface Temperature and Clarity of Kuwait's Seawaters Using Remotely Sensed Measurements and GIS Analyses*
- Advisors: Kevin Price (Advisor), Stephen Egbert (Co-advisor)
- Outside Research Skill: Aquatic Ecology

Master's in Geography - Geographic Information Science Track
Department of Geography & Atmospheric Science
University of Kansas, 2006

- Emphasis: Environmental Remote Sensing, GIS, and Spatial Analysis

- Thesis: *Estimating Chlorophyll Concentrations of Kuwait's Coastal Environment Using SeaWiFS and MODIS Satellite Data*
- Advisors: Kevin Price (Advisor)

Bachelor of Geography
Department of Geography, Kuwait University, 2002

- Minor: Sociology

Professional Appointments

Associate Professor of Geographic Information Science and Environment, Department of Geography, Kuwait University (May 2019 – Present)

Assistant Professor of Geographic Information Science and Environment, Department of Geography, Kuwait University (January 2010 – May 2019)

Researcher Assistant, Kansas Applied Remote Sensing (KARS) Program, Kansas Biological Survey & Center for Ecological Research, University of Kansas (2006 – 2008)

Teaching Assistant, Department of Geography, Kuwait University (2003 – 2004)

Administrative and Leadership Roles

- Acting Vice Dean of Admission and Registration Deanship, Kuwait University (April 2023 – August 2023)
- Acting Vice Dean of Student Affairs, College of Social Sciences, Kuwait University (September 2021 – April 2023)
- Director, Applied Geosciences and GIS Master's Program, College of Graduate Studies, Kuwait University (September 2020 – August 2022)
- Head, GIS & RS Consultation Unit, College of Social Sciences, Kuwait University (2010 – 2015)

Research Projects and Grants

- Co-Principal Investigator, "Sustainable Climate Adaptation Strategies for Kuwait," funded by the London School of Economics (LSE) and the Kuwait Foundation for the Advancement of Sciences (KFAS) (£89,896). (2024 – 2026)
- Project Consultant, "Learning from the Past to Build a Better Future: Supporting Urban Flood Resilience in Kuwait," funded by the London School of Economics (LSE) and KFAS (£33,949). (2021 – 2023)
- Project Consultant, "National Adaptation Plan," funded by the United Nations Development Programme (UNDP). (2019)
- Recipient of multiple research grants from the Kuwait University Research Sector totaling over $40,000. (2015 – 2020)
- Project Researcher, "Sea Level Rise Assessment," funded by the United Nations Environment Programme (UNEP) (2012, 2018).

Publications

Peer-Reviewed Journal Articles

Rözer, V., Mehryar, S., & Alsahli, M. M. (2025). Climate change risk trap: Low-carbon spatial restructuring and disaster risk in petroleum-based economies. *Environmental Research Letters*.

Alsahli, M. M. M., & Alhasawi, M. J. H. (2024). Evaluating the impact of sample and cell size variations on the accuracy of Digital Elevation Models for different spatial interpolation techniques: A case study of Sulaibikhat Bay Coast. *Journal of the Social Sciences*. (Accepted April 4, 2024)

Boufeniza, R. L., Jingjia, L., Abdela, K. A., Alsafadi, K., & Alsahli, M. M. (2024). Deep learning for sea surface temperature applications: A comprehensive bibliometric analysis and methodological approach. *Geo: Geography and Environment, 11*(2), e00151.

Al Shammari, E. A., & Alsahli, M. M. (2024). Assessment of coastal vulnerability to natural and anthropogenic factors in the area between Ras Julai'a and Ras Al-Zour, Southern Kuwait. *Journal of the Social Sciences, 52*(3), 179–208.

Alsahli, M. M., & Alkandary, D. S. (2024). Climate change vulnerability of Kuwait: A cross-sectoral assessment. *Arabian Journal of Geosciences, 17*(6), 183. https://doi.org/10.1007/s12517-024-11992-7

Nazeer, M., Alsahli, M. M. M., Nichol, J. E., Pan, J., Wu, W., Bilal, M., & Saeed, U. (2023). A novel three-band macroalgae detection index (TMI) for aquatic environments. *International Journal of Remote Sensing, 44*(7), 2359–2381. https://doi.org/10.1080/01431161.2023.2202339

Alsahli, M. M. M., & Al-Harbi, M. (2023). Environmental justice in Kuwait metropolitan area: A spatial analysis of land-use impact on environmental quality variability. *Local Environment, 28*(1), 80–98. https://doi.org/10.1080/13549839.2022.2119378

Alsahli, M. M. M., & Nazeer, M. (2022). Modeling Secchi Disk Depth over the North Arabian Gulf Waters Using MODIS and MERIS Images. *PFG – Journal of Photogrammetry, Remote Sensing and Geoinformation Science, 90*(2), 177–189. https://doi.org/10.1007/s41064-021-00189-2

Alsahli, M. M. M., & Nazeer, M. (2021). Spatiotemporal variability of Secchi depths of the North Arabian Gulf over the last two decades. *Estuarine, Coastal and Shelf Science, 260*, 1074–1087. https://doi.org/10.1016/j.ecss.2021.107487

Abou Samra, R. M., El-Gammal, M., Al-Mutairi, N., Alsahli, M. M., & Ibrahim, M. S. (2021). GIS-based approach to estimate sea level rise impacts on Damietta coast, Egypt. *Arabian Journal of Geosciences, 14*(6), 429. https://doi.org/10.1007/s12517-021-06810-3

Al-Mutairi, N., Alsahli, M., El-Gammal, M., Ibrahim, M., & Samra, R. A. (2021). Environmental and economic impacts of rising sea levels: A case study in Kuwait's coastal zone. *Ocean & Coastal Management, 205*, 105572. https://doi.org/10.1016/j.ocecoaman.2021.105572

Nazeer, M., Bilal, M., Nichol, J. E., Wu, W., Alsahli, M. M., Shahzad, M. I., & Gayen, B. K. (2020). First experiences with the Landsat-8 aquatic reflectance product: Evaluation of the regional and ocean color algorithms in a coastal environment. *Remote Sensing, 12*(12), 1938. https://doi.org/10.3390/rs12121938

Boufeniza, R. L., Alsahli, M. M., Bachari, N. I., & Bachari, F. H. (2020). Spatio-temporal quantification and distribution of diatoms and dinoflagellates associated with algal blooms and human activities in Algiers Bay (Algeria) using Landsat-8 satellite imagery. *Regional Studies in Marine Science, 36*, 101311. https://doi.org/10.1016/j.rsma.2020.101311

Alsahli, M. M., & Almutairi, F. Kh. (2019). Change of northern Kuwait shoreline and its related physical factors. *Journal of Social Sciences, 47*(1), 147–179. (In Arabic)

Al-Mutairi, N., Alsahli, M., Ibrahim, M., Abou Samra, R., & El-Gammal, M. (2019). Spatial enhancement of DEM using interpolation methods: a case study of Kuwait's coastal zones. American Journal of Remote Sensing, 7(1), 5-12.

Alsahli, M. M. M., & Al-Harbi, M. (2018). Allocating optimum sites for air quality monitoring stations using GIS suitability analysis. *Urban Climate, 24*, 875–886. https://doi.org/10.1016/j.uclim.2017.11.001

Nazeer, M., Bilal, M., Alsahli, M., Shahzad, M., & Waqas, A. (2017). Evaluation of empirical and machine learning algorithms for estimation of coastal water quality parameters. *ISPRS International Journal of Geo-Information, 6*(11), 360. https://doi.org/10.3390/ijgi6110360

Aldousari, E. A., & Alsahli, M. M. M. (2016). Studying the spatial distribution of asthma patients in the State of Kuwait using GIS. *Journal of Social Sciences, 45*(1), 11–35.

Alsahli, M. M. M., & AlHasem, A. M. (2016). Vulnerability of Kuwait coast to sea level rise. *Geografisk Tidsskrift-Danish Journal of Geography, 116*(1), 56–70. https://doi.org/10.1080/00167223.2015.1121403

Book Chapters and Reports

AlHasem, A., Alsahli, M., & Al-Hussainan, H. (2024). *Introduction to Physical Geography*. Afaaq Publishing, Kuwait. (ISBN: 978-1-78752-912-0)

Rozer, V., Mehryar, S., & Alsahli, M. M. (2024). The climate change risk reduction trap: Low carbon spatial economic restructuring and disaster risk in Kuwait. *LSE Middle East Centre Kuwait Programme Paper Series (26)*. London: London School of Economics Middle East Centre.

Al-Dousari, A. M., Alsahli, M., Al-Awadhi, J., Al-Enezi, A. K., & Al-Dousari, N. M. (2022). Sand dunes in Kuwait: Morphometric and chemical characteristics. In A. el-Aziz Abd el-Aal, J. Al-Awadi, & A.-D. Ali (Eds.), *The Geology of Kuwait* (pp. 51 - 82). Springer.

Alsahli, M., & Aldababseh, A. (2019). Climate hazard and vulnerability analysis. In A. Hadad (Ed.), *Kuwait National Adaptation Plan 2019–2030* (pp. 78–114). Environmental Protection Authority (EPA), Kuwait.

Alsahli, M., Redha, A., & Altheyabi, N. (2019). Vulnerability assessment and adaptation of potential sea level rise for coastal area of Kuwait. In M. Alharbi (Ed.), *The State of Kuwait Second National Communication* (pp. 65–88). Environmental Protection Authority (EPA), Kuwait.

Redouane, L. B., et al. (2017). Estimation of dinoflagellate and diatoms algae in Algiers Bay from Landsat satellite data. In A. Kallel, M. Ksibi, H. B. Dhia, & N. Khélifi (Eds.), *Recent Advances in Environmental Science from the Euro-Mediterranean and Surrounding Regions* (pp. 1795–1796). Springer.

Alsahli, M. M. (2012). Vulnerability assessment and adaptation of potential sea level rise for coastal area of Kuwait. In *Kuwait's Initial National Communication under the United Nations Framework Convention on Climate Change* (UNEP Report).

Teaching Experience

Undergraduate Courses

- GIS Applications
- Introduction to GIS
- Geography of Human and Environment
- Geo-Technologies in Physical Geography Studies
- Technologies in Environmental Studies

- Interpretation of Aerial Photography and Satellite Imagery
- Biogeography
- Introduction to Physical Geography
- Remote Sensing I
- Geography of the Arab World
- Spatial Analysis

Graduate Courses

- Basics of Remote Sensing
- Advanced Remote Sensing
- Remote Sensing and GIS
- Special Topics in Geospatial Studies
- Spatial Analysis

Graduate Supervision

Ph.D. Students

- Boufeniza Redoune. Dissertation Title: Evaluation of Color and Water Quality in Algiers Coast from Multispectral Satellite Data. (Institution: Higher national school of marine science and coastal planning). Spring 2021. *Co-adviser*
- Nawaf Almutairi. Dissertation Title: Environmental Impacts of Sea Level Rise on Kuwait and Damietta. (Institution: Environmental Sciences Department, Damietta University). Spring 2019. *Co-adviser*

Master's Students

- Anfal Alenezi. The spatiotemporal correlation between runoff and water clarity in Kuwait Bay. Spring 2023.
- Lailah Alshammari. Intercomparison of image classification methods and machine learning techniques at different spatial resolutions. Spring 2023.
- Fahad Alenezi. Spatial variability of trace metals and water quality parameters of the intertidal zone of Sulaibikhat Bay. Fall 2022.
- Mohammad Alroomi. Short-Term Variation of Sulaibikhat Bay Shoreline Using Global Navigation Satellite System Data. Fall 2022.
- Nasser Alhousaini, Spatial distributions of water quality indicators in coral reef communities near “Qaru Island”. Spring 2021.
- Mansour Alhasawi. Establishing Digital Elevation Model Geodatabase Using GNSS Data and Spatial Interpolation. Spring 2021.
- Eman Alsammeri. Impact of the shoreline change on the coastal area, a study of the area between Ras Julai'a and Ras al-Zour, South Kuwait (*In Arabic*). Fall 2020.
- Sara Abd Al Nasser: Studying the Spatial and Temporal Distributions of Salinity within Kuwait Seawater. Spring 2019. Supervisor
- Ohoud Aseeri. Thesis Title. Vulnerability of the Kuwait Lands to Desertification (*In Arabic*). Spring 2018.
- Fatima Almutairi. Thesis Title: Detecting the shoreline change of Kuwait by spatial data integration (*In Arabic*). Summer 2017.
- Abdullatif Al-Yaqout – Fall 2014. Project Title: Assessing the impact of stormwater network discharge on Kuwait coastal environments using remotely sensed data and GIS. Fall 2014.

Professional and Academic Service

Curriculum Development and Program Innovation

- Updated the master's program curriculum in Applied Geosciences and Geographic Information Science (2023).
- Developed new undergraduate graduation tracks for Applied Geography and Geographic Information Systems, Department of Geography (2021).
- Developed integrated tracks combining GIS with Human Geography and GIS with Physical Geography, Department of Geography (2016).

Committee Membership and Leadership

1. Department of Geography:
   - Chair, Academic Accreditation Committee (2024 - Present).
   - Member, Hiring Committee (2016, 2021, 2023 - Present).
   - Chair, Joint Master's Program Committee with the Department of Earth and Environmental Sciences (2020 -2022).
   - Chair, Academic Affairs and Course Equivalency Committee (2012–2021).

2. College of Social Sciences:
   - Chair, Cultural and Library Committee (2021–2022).
   - Member, Academic Accreditation Committee (2018, 2024 - Present).
   - Member, Consultation and Training Committee.

3. University Level:
   - Editorial Board Member, Journal of Social Sciences (2024– Present).
   - Member, Authorship, Translation, and Publishing Committee, Kuwait University (2022).
   - Editorial Board Member, Journal of Gulf and Arabian Peninsula Studies (2016–2017).

Peer Reviewing for International Journals

- Earth Systems and Environment
- Environmental Engineering and Management Journal
- Estuarine, Coastal and Shelf Science
- Geocarto International
- Geo-spatial Information Science
- GIScience & Remote Sensing
- Journal of Environmental Management
- Journal of Urban Planning and Development
- Marine Pollution Bulletin
- Ocean and Coastal Management
- Continental Shelf Research
- Regional Studies in Marine Science

Updated lists on Publons, Verified Profile: Publons Link

Peer Reviewing for Arabic Journals

- Journal of the Kuwait Geographical Society
- Journal of Gulf and Arabian Peninsula Studies

Research Proposal and Report Reviewing

- Reviewer for funded research proposals and final research reports for the Research Sector, Kuwait University.

Editorial Board Memberships

- Editorial Board Member, Journal of Social Sciences (since October 2024 – present).
- Guest Associate Editor, Journal of Marine Science and Engineering (specific Q2 Marine Science Journal) (2019).
- Editorial Board Member, Journal of Gulf and Arabian Peninsula Studies (2016–2017).

Workshops and Training

- Workshop. Title: Introduction to R language for geographers. Organizer: Geography Department, College of Social Sciences, Kuwait University. November 2023.
- Workshop. Title: Introduction to R language for geographers. Organizer: Consultation Unit of Remote Sensing and GIS at College of Social Sciences, Kuwait University. April 2019.
- Giving a training Course on remote sensing basics. Organizer: Al-Khawarezmi Center, Kuwait University. March 2015.
- Giving a training Course on Spatial Analysis Basics at the College of Social Sciences, Kuwait University. 1-3 December 2014.
- Giving a workshop on Data Scientific Presentation and Visualization at the College of Social Sciences, Kuwait University. February 2014.
- Giving a workshop on Geographic Information System, Importance and Applications for Kuwait Association of Engineers. 6-5-2012.

Conference Presentations

- Alsahli, M. (2025, February). *Climate vulnerability assessment in Kuwait: Current challenges and future projections*. Sixth Arab Regional Platform for Disaster Risk Reduction, "Building Resilient Arab Communities: From Understanding to Action," Kuwait. Organized by UNDP.
- Alsahli, M., & Nazeer, M. (2024, September). *Spatiotemporal variability of Secchi depths of the North Arabian Gulf over the last two decades*. ECSA 60: Implementing Science-Based Solutions and Strategies for Coastal Resilience, Hangzhou, China.
- Alsahli, M., & Al-Harbi, M. (2024, January). *Environmental justice in Kuwait metropolitan area: A spatial analysis of land-use impact on environmental quality variability*. HKU-Urban Systems Institute (USI) Inaugural Conference: Towards New Paradigms for Urban Research, The University of Hong Kong, Hong Kong.

- Rözer, V., Alsahli, M., & Mehryar, S. (2023, April). *Rapid urbanisation and flash flood risk in desert regions: The example of Kuwait*. EGU General Assembly, Vienna, Austria. https://doi.org/10.5194/egusphere-egu23-5580
- Alsahli, M. M., & Al-Harbi, M. (2019, October). *Allocating optimum sites for air quality monitoring stations using GIS suitability analysis*. 15th International Conference on Atmospheric Sciences and Applications to Air Quality, Kuala Lumpur, Malaysia.
- Alsahli, M. M. (2017, November). Challenges of sea level rise on Kuwait coastal area. Our Seas: Theories, Data and Policies Conference, Organized by Kuwait Foundation for the Advancement of Science (KFAS), Kuwait.
- Redouane, L. B., Houma, F. B., Alsahli, M., el Bachari Nour, I., Chekroun, N., Boudjema, S., & Benm'barek, G. (2017, November). *Estimation of dinoflagellate and diatoms algae in Algiers Bay from Landsat satellite data*. Euro-Mediterranean Conference for Environmental Integration, Springer, Cham.
- Alsahli, M. M. M., & AlHasem, A. M. (2014, April). *Vulnerability of Kuwait coast to sea level rise*. The Association of American Geographers Conference, Tampa, Florida, USA.
- Alsahli, M., Price, K., Fautin, D., Egbert, S., & Buddemeier, R. (2011, October). *Modeling Kuwait seawater clarity: A spatial-temporal study using remote sensing and GIS*. Applied Geography Conference, Redlands, California, USA.
- Alsahli, M. (2009, October). *Studying spatial and temporal variability of Kuwait sea surface temperature using MODIS remotely sensed data*. Applied Geography Conference, Baton Rouge, Louisiana, USA.

Fieldwork Experience

- **Multispectral UAV Surveys (2021–2025):** Conducted 15+ hours of drone-based aerial surveying using multispectral cameras for environmental monitoring, shoreline mapping, and vegetation analysis.
- **Coastal Water Quality Monitoring (2018–2023):** Conducted field voyages focused on water quality variable detection and spectral analysis of seawater bodies across Kuwait's marine environments.
- **Soil and Vegetation Study, Al-Abdali Agricultural Area (February 2022):** Analyzed soil properties and blue panic grass reflectance using UAV multispectral imaging and field measurements.
- **Shoreline Change Detection, Kuwait Bay (September 2016):** Mapped shoreline variability using UAV-based remote sensing surveys.
- **Oceanographic Surveys, Offshore Kuwait (2007):** Collected water quality data at eight offshore sites for coastal environmental monitoring.
- **Coastal Environmental Assessment, Kuwait (2005):** Assessed ecological status along Kuwait's coastal zones through in situ fieldwork.
- **Biogeography Field Techniques, University of Kansas (2005):** Conducted landscape-level biogeographic surveys and laboratory analyses.
- **Geomorphology Field Survey, Al-Dhuba'eya, Kuwait (1999):** Investigated Nebkha (vegetated dune) formations in southern Kuwait.

Technical Skills

UAV Operation and Aerial Surveying

- Operation of multirotor drones for aerial surveying (15+ flight hours).
- Multispectral and RGB camera calibration, flight planning, and data logging.
- UAV image preprocessing and photogrammetry using Agisoft Metashape.

Field Remote Sensing and Spectral Data Collection

- Collection of field remote sensing reflectance using spectroradiometers (e.g., MSR16R and Ocean Optics Spectrometer).
- Device calibration, radiometric correction, and quality control of field spectral measurements.
- Field campaigns integrating in situ spectral data with drone and satellite observations.

Water Quality Monitoring and Analysis

- Measurement of key water quality indicators: water clarity (Secchi disk), turbidity, sea surface temperature (SST), dissolved oxygen (DO), and pH.
- Use of portable and laboratory instruments for water sampling, calibration, and quality assurance.
- Experience in integrating field water quality data with remote sensing and GIS analysis.

GIS and Remote Sensing Software

- ArcGIS, QGIS, ENVI, ERDAS Imagine, SNAP, SeaDAS for spatial analysis, remote sensing image processing, and geospatial modeling.

Programming and Scripting

- R and Python for spatial analysis, data visualization, remote sensing automation, and machine learning applications.

Data Visualization and Reporting

- Preparation of scientific maps, spatial models, and technical reports using GIS platforms, RStudio and cartographic design tools.

Languages

- Arabic (Native)
- English (Fluent)

Awards and Honors

- Research Reward for Q1 Publications, Kuwait University (2021)
- Scientific Poster Award, Kuwait University (2021)
- Kuwait University Graduate Scholarships (Master's and Ph.D. Programs)

Professional Memberships

- Kuwait Association of Geographers (Since 2011)
- American Society of Photogrammetry & Remote Sensing (ASPRS) (Since 2005)

References

Available upon request.