

Salman Haider

GIS Analyst | ArcGIS Pro, Spatial Analysis & Python Automation

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Education

University of Calgary

Master of Geographic Information Systems (MGIS)

Calgary, Canada

08/2024 - 05/2026

Arid Agriculture University

Bachelor of Science - Geoinformatics and Earth Observation

Rawalpindi, Pakistan

09/2016 - 10/2020

Experience

University of Calgary

GIS Research Assistant

Calgary, Canada

01/2026 - 04/2026

- Analyzed Calgary's public transit access to fresh food sources to assess food security conditions and identify underserved areas.
- Built a **multimodal transit network** using General Transit Feed Specification (**GTFS**) data, street centreline data, walking connections, and ArcGIS Public Transit Data Model workflows.
- Used ArcGIS Network Analyst to measure 45-minute weekday transit accessibility from residential dissemination areas to grocery stores, supermarkets, and food hubs.
- Identified 12 dissemination areas with no transit access to fresh food destinations** and 32 with limited access, **affecting more than 33,000 Calgary residents**.

BC Ministry of Water, Land and Resource Stewardship

Volunteer Student Research Assistant (Socio-Economic and Technical Analysis Division)

Remote, Canada

10/2025 - 11/2025

- Created **thematic maps** and GIS visualizations in **ArcGIS Pro** to compare greenhouse gas emissions across Canadian provinces.
- Used **Python** and **R** to prepare charts, graphs, and visual summaries of environmental variables that were used by economists and policy analysts in internal presentations and meetings.

Franchise Ready

GIS Analyst

Remote

11/2021 - 08/2024

- Delivered 105+ franchise territory mapping projects**, translating client briefs into GIS datasets, territory maps, reports, ArcGIS Dashboards, and MangoMap web map deliverables.
- Used **ArcGIS Pro**, ArcGIS Business Analyst, ABS Census data, demographic enrichment, competitor and POI data, and service-area analysis to build territory layers based on population, income, target demographics, travel distance, and local market conditions.
- Created balanced franchise territories by combining client requirements with demographic patterns, competitor coverage, existing locations, sales information, POI access, and service-area logic.
- Acted as the GIS point of contact during client follow ups, explaining mapping options, data limitations, territory criteria, and recommendations, while automating repeatable GIS tasks with **Python** and **ArcPy** for geocoding, spatial processing, map production, and quality checks.

Greenage Services

GIS Associate

Islamabad, Pakistan

04/2021 - 11/2021

- Created cadastral and land record maps for a government land record digitization project, converting scanned paper maps of state land into structured GIS datasets.
- Digitized state land parcels, boundaries, and cadastral features in **ArcMap**, while creating and maintaining geodatabases with close attention to geometry and attribute accuracy.
- Used **FME Workbench** to convert AutoCAD plans and drawings into land parcel shapefiles, and supported georeferencing of scanned maps, satellite imagery, and drone imagery using **RTK GPS** ground control points.
- Developed **Python** and OpenCV scripts to organize scanned map records and perform QA/QC checks on geodatabases and shapefiles for incorrect, missing, or misspelled attribute values before final mapping use.

MER Solutions

GIS Technician

Rawalpindi, Pakistan

10/2020 - 04/2021

- Worked on the **Benazir Income Support Program** survey boundary mapping project, georeferencing scanned government maps in **ArcMap** and preparing GIS layers for field surveys.
- Created maps showing survey boundaries, roads, landmarks, dwellings, and other key features to support field teams during data collection.
- Linked household survey records with the correct GIS features and checked demographic, economic, land, and asset information for accuracy.
- Reviewed field survey data and produced maps to support data validation, household location verification, land ownership assessment, and final reporting for the government social support program.

Skills

GIS Platforms:

ArcGIS Pro · ArcGIS Online · ArcGIS Enterprise · ArcGIS Field Maps · ArcGIS Dashboards · ArcGIS StoryMaps · ArcGIS Experience Builder · QGIS · Global Mapper · Mango Maps · GeoServer · Leaflet · Mapbox GL JS · Mapbox Studio · MapTiler · Google Earth Engine · ENVI · ERDAS Imagine · Microsoft Office

Programming & Automation:

Python · ArcPy · SQL · JavaScript · HTML/CSS · Flask · GeoPandas · Shapely · GDAL · FME · PostGIS · PostgreSQL · MS SQL · Docker · Tippecanoe

Projects

Geo Copilot: Natural Language GIS Tool for ArcGIS Pro

github.com/salman12haider13/arcgis-geo-copilot-llm

ArcGIS Pro | ArcPy | Python | Large Language Models | Geoprocessing | MGIS Capstone

- Developed a custom ArcGIS Pro script tool (Geo Copilot) that enables users to perform geoprocessing tasks using natural language queries, integrating **Large Language Models (GPT-5 and Llama 3.1)** with ArcPy workflows.
- Designed structured reasoning frameworks to translate user intent into executable spatial workflows.
- Evaluated model performance across 36 geospatial test scenarios, achieving up to **91.7%** function selection accuracy and **83.3%** parameter accuracy with GPT-based workflows, and analyzed failure cases related to projection conflicts and multi-step reasoning.

Ord's Kangaroo Rat Habitat Suitability Model

ArcGIS Pro | Suitability Modelling | Raster Analysis | Aspect Analysis | Habitat Mapping | MGIS Project

- Built an ArcGIS Pro habitat suitability model using **Model Builder** for Ord's Kangaroo Rat using DEM, active sand dunes, ecological range sites, unpaved roads, fireguards, and known species occurrence data from CFB Suffield.
- Prepared the analysis datasets by clipping, projecting, and standardizing DEM, road, fireguard, sand dune, and species occurrence layers to a common study area.
- Created the primary habitat model by identifying areas near active sand dunes, extracting dune tops with DEM focal statistics, and selecting south to southwest-facing dune aspects linked to suitable habitat.
- Developed the secondary habitat model using sandy road and fireguard conditions, dune proximity, and road orientation, then combined final rasters using a 70 percent primary habitat and 30 percent secondary habitat weighting.

Brazeau Dam Land Cover Classification and NDVI Time-Series Analysis

Google Earth Engine | JavaScript | ArcGIS Pro | Landsat 5, 7 and 8 | Image Classification | NDVI | MGIS Project

- Built a 4,567 square kilometre remote sensing study area around Brazeau Dam in Google Earth Engine using Landsat 5, Landsat 7, and Landsat 8 imagery.
- Created unsupervised and supervised land cover classifications using **K-Means clustering**, **CART classification**, training samples, validation samples, class remapping, and confusion matrix accuracy assessment.
- Produced NDVI median composites for 1990, 2005, and 2020 to compare vegetation conditions across a long-term time series.
- **Achieved 71.875 percent overall classification accuracy** and found vegetation decline by 2005 followed by recovery trends by 2020.

Namal Lake Desiccation Assessment, 2000 to 2024

Remote Sensing | Google Earth Engine | Python | ArcGIS Pro | ERA5-Land | MNDWI | NDVI | OLS Regression | MGIS Project

- Processed Landsat 7, Landsat 8, and Sentinel-2 imagery in Google Earth Engine to measure Namal Lake surface area change from 2000 to 2024.
- Used **MNDWI** for annual water extraction and NDVI to estimate agricultural expansion around the lake, then built annual median composites and environmental time-series layers.
- Integrated ERA5-Land climate variables including temperature, precipitation, watershed evaporation, and lake surface evaporation, then tested relationships using **standardized OLS regression** in Python.
- Found a statistically significant decline in lake surface area, with agricultural expansion emerging as the strongest negative predictor and an **adjusted R² of 0.594**.

LiDAR and Object-Based Conifer Tree Height Classification

Remote Sensing | ENVI 6.0 | ArcGIS Pro | LiDAR CHM | QuickBird Imagery | Object-Based Image Analysis | SVM | KNN | MGIS Project

- Classified land cover and coniferous tree heights in a Campbell River, British Columbia study area using ENVI 6.0, ArcGIS Pro, QuickBird imagery, and a 1 metre LiDAR Canopy Height Model.
- Used NIR, RGB, and NDVI bands for example-based feature extraction, image segmentation, and training sample creation for roads, large trees, small trees, and clear-cut areas.
- Compared **KNN** and **SVM** classification methods and selected SVM because it performed better for identifying smaller clear-cut patches.
- Created nine LiDAR-based tree height classes from 0 to 45 metres, finding that the 25 to 30 metre class covered the largest area at 307,565 square metres.

Projects

Logistics Routing MVP

github.com/salman12haider13/Logistics-Routing-MVP-Demo

PostGIS | pgRouting | PostgreSQL | Flask | Docker | Leaflet | OpenStreetMap | GeoJSON | MGIS Project

- Built a self-hosted web GIS routing prototype using OpenStreetMap road data, PostgreSQL, PostGIS, pgRouting, Flask, Docker, and Leaflet.
- Designed the full routing workflow from raw OSM PBF data to a routable PostGIS network, including road filtering, topology creation, source and target nodes, travel-time costs, one-way handling, and spatial indexing.
- Developed a Flask backend API that accepts start and end points, routing mode, blocked polygons, traffic-delay points, and route alternative settings.
- Created an interactive Leaflet routing console that returns GeoJSON route geometry, route summaries, distance, travel time, route steps, blocked-zone routing behaviour, and alternative route options.

GEOSS Remote Sensing MVP Workflow for Vegetation Risk and Property Maintenance

Remote Sensing | Python | QGIS | PostgreSQL | PostGIS | Mapbox | AWS | Segment Anything Model | MGIS Project

- Designed a remote sensing MVP workflow for aerial vegetation identification, property risk assessment, and property maintenance planning using a sampled Vancouver study area.
- Proposed a processing pipeline using high-resolution orthophotos, Microsoft building footprints, PostGIS storage, Mapbox visualization, Python, QGIS, AWS processing, and SAM-based segmentation.
- Designed separate workflows for building segmentation, tree canopy extraction, canopy proximity analysis, and moss detection using buffers, clipped imagery, NDVI logic, and GeoJSON outputs.
- Framed the workflow around practical use cases including tree failure risk, moss growth, property damage, insurance risk, and municipal planning support, without presenting it as a full production deployment.

Sentinel-1 SAR Ship Detection Pipeline

Python | Sentinel-1 SAR | Ultralytics YOLO | PyTorch | Rasterio | CUDA | Remote Sensing | Object Detection

- Built a local **Sentinel-1 SAR** ship detection pipeline to identify vessel targets from **VV polarization imagery** extracted from Sentinel-1 SAFE ZIP products.
- Applied an **Ultralytics YOLO26**-based object detection model trained on annotated SAR ship imagery, then evaluated model performance using precision, recall, F1-score.
- Developed a Python preprocessing workflow to convert full Sentinel-1 SAR scenes into 640 × 640 model-ready image patches while preserving raster offsets for post-detection reconstruction.
- Tuned confidence thresholds to balance missed detections and false positives, achieving strong ship detection performance across full-scene Sentinel-1 VV image patches.
- Processed full Sentinel-1 scenes containing more than 2,500 image patches using CUDA-enabled PyTorch for local GPU-based inference.
- Added water-based filtering to reduce land false positives and improve the reliability of final vessel detection outputs.

Courses

FME Desktop: Data Translation for AEC

[LinkedIn](#)

Creating a Web Map in ArcGIS Pro

[Esri](#)

Telling Stories with GIS Maps

[Esri](#)

Using Python for Automation

[LinkedIn](#)

Advanced Python: Working with Databases

[LinkedIn](#)

Generating Service Areas Using ArcGIS Pro

[Esri](#)

Suitability Modeling: Creating a Weighted Suitability Model

[Esri](#)

Performing Supervised Object-Based Image Classification

[Esri](#)

Creating a Map Layout

[Esri](#)

Terrain Analysis Using ArcGIS Pro

[Esri](#)

PostgreSQL: Advanced Queries

[LinkedIn](#)

Location-Enabling Data

[Esri](#)

Building Geoprocessing Models Using ArcGIS Pro

[Esri](#)

Suitability Modeling: Creating a Simple Suitability Model

[Esri](#)

Performing Accuracy Assessment for Image Classification

[Esri](#)

Performing Supervised Pixel-Based Image Classification

[Esri](#)

Labeling Map Features

[Esri](#)

Learning ArcGIS Python Scripting

[LinkedIn](#)

Editing Basics in ArcGIS Pro

[Esri](#)

Mapping Addresses and Places

[Esri](#)

Creating Optimized Routes Using ArcGIS Pro

[Esri](#)

Getting Started with Mapping and Visualization

[Esri](#)

Finding the Closest Facilities Using ArcGIS Pro

[Esri](#)

Coordinate Reference Systems, Projections, and Spatial Data Representation

[GEO University](#)

Courses

Standard First Aid & CPR/AED Level C,
Intermediate

Canadian Red Cross, Expires October 2027