Abdelrahman Samir

Water Resources Engineer | Teaching Assistant at Cairo University

Groundwater Modeler| MSc Candidate

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ABOUT

Highly motivated Water Resources Engineer and Hydrogeologist with strong academic and professional experience in groundwater modeling, hydrogeological assessment, and infrastructure design. Currently a Teaching Assistant at Cairo University and an MSc researcher in Water and Environment Engineering (GPA 4.0/4.0), with research focused on fractured aquifers, groundwater–surface water interaction, and numerical modeling. Demonstrated excellence in both teaching and applied research, delivering undergraduate instruction in hydraulics, and irrigation, and contributing to capacity-building programs for engineers through national and international initiatives.

Professionally experienced in planning, analysis, and detailed design of groundwater control, dewatering, and subsurface drainage systems for large-scale urban, coastal, and infrastructure projects across Egypt, KSA, and the UAE. Proven expertise in developing and calibrating numerical groundwater models (MODFLOW, SEAWAT, MT3D-MS), conducting pumping test analysis, and integrating GIS, programming, and data analytics to support evidence-based decision-making. Skilled at working within multidisciplinary teams, producing full design packages and technical reports, and supporting high-level stakeholders and decision makers through presentations, workshops, and decision support systems.

WORK EXPERIENCE

Teaching Assistant

Irrigation and Hydraulic Engineering Department, Cairo university

[December 2022 – Current]

Faculty of Engineering
Cairo University

- **Teaching Experience:**
  - IHD1110: Civil Engineering Drawing
  - IHD2120: Open channel hydraulics, pipelines hydraulics, and introduction to groundwater hydrology
  - IHD3110: Irrigation & Drainage Engineering
  - IHD3120: Irrigation Design and Hydraulics
  - CVE4800: Irrigation Graduation Project
  - IHDS308: Principles of Irrigation & Drainage

Water Resources Engineer

Emam Consulting Office (ECO)

[December 2023 – Current]

ECO
The Perfect Solution

- Contributing to the planning, analysis, and design of groundwater control systems for large-scale urban and coastal projects.
- Performing hydrogeological assessments, field investigations, and groundwater data interpretation to support design decisions.
- Developing and calibrating numerical groundwater models for evaluating groundwater behavior and system performance.
- Supporting the design of subsurface drainage networks and groundwater lowering solutions, including technical drawings and BoQs.
- Coordinating with multidisciplinary teams, attending site visits, and providing technical input throughout various project stages.

Hydrogeologist | Groundwater Modeler

Center of studies and designs for Water projects Cairo University (CWP)

[October 2021 – December 2023]

- Contributed to national-scale groundwater assessment and development programs across multiple aquifer systems in Egypt.
- Supported the development of numerical groundwater models (MODFLOW, SEAWAT) for evaluating aquifer behavior, safe yield, and seawater intrusion risks.
- Performed pumping test analysis and interpreted hydrogeological datasets to characterize aquifer properties.
- Produced regional and local hydrogeological maps and processed groundwater monitoring data using Python, MATLAB, and GIS tools.
- Participated in technical presentations and workshops with the Ministry of Water Resources and Irrigation, supporting high-level decision-making.
- Worked as an instructor for advanced groundwater modelling training provided to Groundwater Sector engineers
- Participating in developing a Decision Support System (DSS) to aid decision maker to effectively manage groundwater in Egypt
- Contributed to hydraulic design tasks for open channels, pipelines, and pumping stations, including modeling using HEC-RAS and preparation of preliminary engineering drawings and BoQs.

Instructor

Center of Excellence for Water funded by USAID

[August 2023 – September 2023]

Providing sessions as one of the instructors of Water Resources Engineering Workshop carried out by Center of Excellence and USAID.

EDUCATION

Master of Science (MSc.), Water and Environment Engineering

Faculty of Engineering, Cairo University, GPA 4.0 out of 4.0

[March 2023 – Current]

- **Thesis title:** Assessing Effect of Fracture Connectivity on Aquifer Outflow to Depressions Using Percolation Concepts: Application to Siwa Lake
- **Premasters Courses:**
  - Advanced Fluid Mechanics
  - Advanced Hydraulics
  - Stochastic Hydrology
  - Irrigation & Drainage Engineering
  - Technical Writing
  - Programming for Engineers

Bachelor of Science, Civil Engineering

Faculty of Engineering, Cairo University, Rank: 2nd

[September 2016 – July 2021]

- **Graduation Project: ""Wet Utilities and Infrastructure" which includes the design of water transmission lines, pumping stations, water hammer analysis and water hammer protection. "**
- **Main Courses:**
  - Municipal Hydraulics
  - Coastal and Harbor Engineering
  - Fluid Mechanics
  - Open Channel and Pipeline Hydraulics
  - Sanitary Engineering
  - Irrigation Structures Design & Hydraulics
  - Irrigation & Drainage Engineering
  - Pipelines & Pump Stations Design and Water Hammer Analysis
  - Modern Irrigation Systems Design

RESEARCH INTERESTS

- Groundwater Flow Modelling, Groundwater Contaminant Transport, and Saltwater Intrusion Modeling
- Complex Stratigraphy and Fractured Aquifers Modelling
- Groundwater – Surface Water Interaction
- Surface Water Modeling and Hydrology

SIGNIFICANT PROJECTS

- **DESIGN REVIEW OF THE GROUNDWATER CONTROL SYSTEM AND UPDATE OF THE PUMP STATION DAMAC LAGOONS PROJECT, DUBAI, UAE**
  [May 2025 – Present]

  - Reviewing the designed groundwater control system
  - Developing a 3D geological model for the study areas
  - Developing a regional 3D numerical groundwater model for DAMAC study areas
  - Updating the pump station design
  - Designing groundwater lowering networks

- **THE STUDY AND DETAILED DESIGN FOR GROUNDWATER LOWERING NETWORKS AT FIVE MUNICIPALITIES, KSA**
  [December 2023 – Present]

  - Data collection from different authorities and data gap filling from field work
  - Groundwater and geotechnical reports that studies groundwater levels, subsurface lithology, and water quality
  - Development of numerical groundwater models using MODFLOW
  - Groundwater control alternatives evaluation using the numerical model
  - Performing cost benefit analysis for optimum alternative selection
  - Preparing presentations and attending workshops for presenting alternatives to decision makers
  - Detailed design package production including plans, profiles, typical details, as well as design reports, BoQ, specifications, and tender documents

- **GROUNDWATER MODELLING AND IDENTIFICATION OF CRITICAL ZONES AND SOLUTIONS HAPTOWN – MOSTAKBAL CITY – NEW CAIRO:**
  [January 2025 – April 2025]

  - Using borehole data and geophysical investigations to develop 3D geologic models for the subsurface layers
  - The groundwater numerical modelling was used to delineate the critical areas that need subsurface interventions
  - The results obtained from the modelling results and the site visits were integrated for proposing appropriate solution measures

- **SOUTH TERMINAL REFURBISHMENT AT KING ABDULAZIZ INTERNATIONAL AIRPORT (KAIA), JEDDAH, KSA:**
  [June 2024 – August 2024]

  - Developing 3D groundwater model for the current conditions
  - Proposing a dewatering wells system for groundwater lowering and evaluating the solution using the calibrated groundwater model
  - Producing a full detailed design package including plans, profiles, typical details, technical specifications, BoQ, and a design report.

- **PROJECT TO STUDY THE REHABILITATION OF POLLUTED HOTSPOTS RESULTING FROM INDUSTRIAL POLLUTION, KSA**
  [May 2024 – July 2024]

  - Developing 3D groundwater model for the current conditions
  - Running MODFLOW and MT3D-MS codes to simulate the current conditions as well as the future after implementation of solutions
  - Provide the recommended set of solutions to be implemented in each polluted hotspot

- **STUDY TO DETERMINE THE POTENTIAL AND SAFE YIELD OF GROUNDWATER AQUIFERS, EGYPT (PHASE TWO)**
  [October 2021 – December 2023]

  - Data analysis and validation of all the groundwater levels and quality data received from all over Egypt
  - Studying and modeling the complex systems and geological formations for groundwater aquifers located in Eastern desert, Western desert, Nile Valley, and Sinai
  - Participating in developing a decision support system (DSS) tool to evaluate groundwater potential in specific regions, including the preparation of spatial layers for transmissivity, aquifer thickness, storage parameters, drawdown, pumping stresses, and water quality indicators layers to support regional groundwater allocation and management.
  - Pumping test analysis for 100+ pumping tests held in Egypt covering all reclamation areas at deferent aquifer layers
  - Assisting in Updating Hydrogeological Maps
  - Worked as an instructor for advanced groundwater modelling training provided to Groundwater Sector engineers
  - Preparing presentations and attending workshops that take place at the Ministry of Water Resources to present the project status and findings to decision makers

- **DESIGN OF THE CONVEYANCE PATH FOR AGRICULTURAL DRAINAGE FROM SIWA OASIS TO AIN EL-GANBI DEPRESSION, SIWA, EGYPT**
  [October 2021 – March 2022]

  - Determination of the optimum horizontal alignment for the proposed drainage path through topographic and geospatial analysis
  - Hydraulic design for both open channels and closed conduits (pipe) systems, ensuring capacity and stability under various flow conditions
  - Lifting stations design, including selection of pump types, head calculations, and station layout
  - Development of 1D HEC-RAS models for the existing drains to simulate existing hydraulic behavior and support design decisions
  - Preparation of preliminary engineering drawings and bill of quantities (BoQ) for all project components

COURSES AND CERTIFICATIONS

Data Analysis Professional from Udacity [June 2022]

- Data analysis professional track from Udacity: https://graduation.udacity.com/confirm/DXVC7YP2

SKILLS

Professional Skills

Groundwater Modeling / Data Visualization / Hydrology/ Pumping Tests Analysis / Geologic Modelling/ Data analysis/ Groundwater Management

Computer skills

- MS Excel / MS Word / MS PowerPoint / Tableau / SketchUp
- GMS (MODFLOW – MT3D – SEAWAT) / FloPy/ HYDRUS / AquiferTest / (SEEP/W)/ SEEP3D/ Leapfrog
- HEC-RAS /WMS / HEC-HMS / HyFrAn/ HEC-SSP/ HY-8/ FlowMaster/ WaterGEMS/ SewerGEMS
- ArcGIS / QGIS / ArcPy / Global Mapper/ AutoCAD/ Civil3D

Programming Skills (Python)

LANGUAGES

- **Arabic:** Native
- **English:** Professional working proficiency
- **French:** Elementary proficiency

ADDITIONAL ACTIVITIES

Benaa Student Activity (Team Head)

Helping with providing learning materials for undergraduate civil engineering students