



## Swathi Mohandas Surekha

**Nationality:** Indian **Place of birth:** Mangalore, India

**Phone number:** (+91) 9481848578 **Email address:** [swathims1491@gmail.com](mailto:swathims1491@gmail.com)

**Website:** <https://www.swathims.com/>

**Home:** 103, Vinayaka Apartment, Ladyhill, 575006, Mangalore, Karnataka (India)

### ABOUT ME.

Dynamic sustainability analyst and environmental researcher with over 5+ years of international research and professional experience in remote sensing, plant disease detection, and environmental data science, combining deep learning-based image analysis with hydrogeological and geospatial modelling. Holds a Master of Science in Hydrogeology and Environmental Geoscience from the University of Göttingen, Germany, and is an Erasmus Mundus scholar. Possesses advanced expertise in environmental artificial intelligence, including the development of convolutional neural networks for crop disease image classification and artificial neural network (ANN) models for environmental time-series prediction and forecasting. Experienced in three-dimensional groundwater and coupled thermal-hydraulic modelling using FEFLOW and MODFLOW, hydrogeological field investigations, tracer studies, and data-integrated hydrological analysis using Python, R, and GIS.

### RESEARCH & PROFESSIONAL EXPERIENCE

#### ANALYST

YCRAI Pvt. Ltd, BANGALORE, INDIA [ 01/01/2023 – Current]

- Built an AI-driven rice disease detection system using CNN-based image classification, delivering disease prediction with confidence scores and treatment recommendations to support sustainable agriculture.
- Designed an AI-based plant disease detection system using CNNs and transfer learning (MobileNetV2, VGG16, DenseNet121, InceptionV3) to classify leaf conditions, achieving ~98% validation accuracy for sustainable agriculture.
- Developed real-time water monitoring dashboards integrating IoT and GIS layers to support urban resilience planning.
- Performed Lifecycle Assessment (LCA) modelling and SQL-based environmental analytics recommending low-emission material alternatives (~20% lower carbon footprint).

#### RESEARCHER

NATIONAL WATER & ENERGY CENTRE (NWEC), AL AIN, UNITED ARAB EMIRATES [ 01/01/2021 – 31/12/2022]

- Directed field sampling campaigns for 200+ coastal wells, reducing pollution by 15% and improving desalination.
- Engineered numerical models of saltwater intrusion using FEFLOW to optimize aquifer recharge and pumping strategies, advancing sustainable groundwater management in coastal UAE.
- Applied SQL, Python, and interactive dashboards to streamline water quality and contaminant analysis, improving stakeholder decision-making by 30%.

#### TEAM LEADER

SMUNCH.CO, BERLIN, GERMANY [ 01/05/2019 – 30/07/2020]

- Managed a 15-member operational team, improving workflow efficiency and service quality using data-driven planning.

#### RIDER OPERATION SPECIALIST

DELIVERY HERO SE, BERLIN, GERMANY [ 01/08/2018 – 30/07/2019]

- Coordinated operations across 80+ daily orders, improving system performance through route and demand analytics.

#### STUDENT RESEARCH ASSISTANT

GEORG AUGUST UNIVERSITÄT GÖTTINGEN, GERMANY [ 01/06/2016 – 14/06/2017]

- Simulated coupled heat and fluid transport in fractured geothermal reservoirs using FEFLOW.
- Modeled heat transport in a 2 km × 0.5 km geothermal reservoir, demonstrating that fractures >1 mm significantly influence thermal breakthrough and establishing temperature as a natural tracer for fracture characterization under TRENDS project on tracer-assisted Malm geothermal reservoir evaluation in the Munich area.



## EDUCATION

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### Master of Science (M.Sc.) Hydrogeology and Environmental Geoscience

 Georg August Universität Göttingen, Germany [ 01/10/2014 – 30/06/2017]

**Final grade:** 1.7 | **Thesis:** Heat as an artificial tracer for forced-gradient flow in the subsurface on simulating of fluid temperature sensitivity to hydraulic aperture and thermal width values of major vertical fractures in a geothermal reservoir using FEFLOW

### Bachelor of Engineering (B.E) Biotechnology Engineering

 NMAM Institute of Technology, Nitte, India [ 01/09/2009 – 30/09/2013]

**Final grade:** 1.6 | **Thesis:** Production of Bioethanol from Enzyme Pretreated Oil Seed Cake.

## HONOURS AND AWARDS

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### Erasmus Mundus Action II NAMASTE (Networking and Mobility Actions for Sustainable Technology and Environment in India) at Georg-August-Universität Göttingen, Germany.

- A Full Scholarship was awarded for a Master Degree (WiSe 2015 – SoSe 2017). Date of Award: 25.09.2015

### Housing Scholarship at Theological Stift at Georg-August-Universität Göttingen, Germany

- Held a Housing scholarship at the Theological Stift (WiSe 2014 – SoSe 2017). Date of Award: 01.10.2014

## SKILLS

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### Hydrogeological & Geospatial Tools

Groundwater Modelling (MODFLOW / FEFLOW) | Sediment transport and Contamination modelling | pumping tests (AQTESOLV) | Hydrochemical analysis | Coupled Heat & Fluid Flow | Contaminant Transport | Remote Sensing | ArcGIS | QGIS | LULC Classification | DEM Analysis | Raster/Vector Hydrological Processing | Field sampling (rivers, wells) | Geophysical surveys (GPR, resistivity, seismic) | Well logging| Tracer test

### Programming & Data Analytics

Image classification (CNN) | AI (ANN) | Transfer Learning | Python | TensorFlow | Keras | Machine Learning | Python (Pandas, NumPy, Matplotlib, Seaborn) | SQL | R | Power BI | Tableau | Data Visualization | Regression Analysis | MATLAB | Time-series and multivariate data analysis (cross-correlation, regression)

### Indicator Development & Modelling

Sustainability Metrics | SDG Indicators | Urban-Rural Linkages | ESG Scoring | Groundwater-Rainfall Correlation Models | Spatial Statistics | Life Cycle Assessment (LCA) | Environmental Impact Assessment (EIA)

### Research & Collaboration

Scientific Writing | Interdisciplinary Teamwork | Literature Reviews | Stakeholder Engagement | Project Management

## PROJECTS

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**AI-based Rice Disease Detection from Leaf Images:** Automated classification of rice leaf diseases using CNN-based image classification, enabling early disease identification with confidence scores for treatment recommendations to support sustainable agriculture. 🛠️ Tools: Python, TensorFlow, Keras, CNNs, NumPy, Matplotlib, Scikit-learn

**Plant Disease Classification using Deep Learning:** Built and evaluated CNN-based and MobileNetV2 transfer learning models to classify 15 plant disease classes from leaf images, achieving ~92% validation accuracy for real-world agricultural decision support. 🌱 Tools: Python, TensorFlow, Keras, MobileNetV2, CNNs, ImageDataGenerator, Matplotlib, Seaborn.

**GeoAI-based Water Body Detection from Satellite Imagery:** Automated surface water detection by training a deep learning segmentation model on satellite imagery, streamlining mapping workflows across multiple geospatial formats.

🛠️ Tools: Python, Jupyter, OpenCV, Rasterio, PyTorch, OpenGeoAI



**Developing Correlation Maps Between Rainfall Variability and Groundwater Levels using GIS:** Performed automated spatial and temporal correlation analysis of rainfall and groundwater data to reveal aquifer response trends across diverse regions. 🌐 Tools: QGIS, ArcGIS, Python, Pandas, GeoPandas.

**Land Use and Cover Classification of Saint George Basin, Australia:** Assessed anthropogenic land cover change and its impact on water retention by applying supervised classification and spatial metrics. 📊 Tools: ArcGIS, Remote Sensing

**Geophysical Investigations of Subsurface Fluids:** Identified fluid-bearing zones and subsurface properties through field-based geophysical methods including GPR, resistivity, seismic, and well logging. 📄 Tools: GPR, Resistivity Meter, Seismograph, Geophysical Logging Tools.

**Groundwater Abstraction Optimization and Contamination Modeling:** Optimized sustainable groundwater abstraction and modeled contaminant transport from surrounding sources using Visual MODFLOW simulations. 📄 Tools: Visual MODFLOW, Water Quality Data, Contaminant Transport Models.

**Bibliometric Analysis of Seawater Intrusion Research:** Quantitative analysis of global seawater intrusion literature (1970–2021) using Scopus data to identify research trends, key contributors, collaboration networks, and emerging themes in coastal aquifer studies. 📄 Tools: R, Bibliometrix, Biblioshiny, Scopus.

**Fault Tree Analysis for SWRO Desalination Plant Performance Optimization:** Enhanced reliability of desalination processes by applying fault tree analysis to identify system vulnerabilities and propose mitigation measures. 🔍 Tools: FTA Software, Risk Assessment, Process Engineering.

**Critical Review: Impact of Brine Disposal from Desalination Plants on Marine Ecosystems:** Evaluated the ecological impact of brine effluent and proposed environmentally conscious disposal strategies based on comparative global studies. 🌐 Tools: Literature Meta-analysis, Environmental Impact Assessment (EIA).

## 📄 PUBLICATIONS

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Mohandas Surekha S., Ghergut J., Khaleefah N., Sauter M. (2018): *Fluid temperature sensitivity to hydraulic aperture and thermal width values of major vertical fractures in forced-gradient flow*. DGMK-Tagungsberichte, Bd. 2018-1 [ISBN: 978-3-941721-86-9], Deutsche Gesellschaft für Mineralöl und Kohle, Hamburg, 601-609.

Poster Presentation: Mohandas Surekha, S., Sherif, M., & Sefelnasr, A. (2022). *Management of Seawater Intrusion in Coastal Aquifers: Present and Future Challenge*. In International Conference on Water Resources Management and Sustainability: Solutions for Arid Regions (WMS-Expo 2020), Dubai, UAE

## 📄 CERTIFICATES

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Google Analytics – Google

Unilever Supply Chain Data Analyst Professional Certificate – Coursera

Lean Six Sigma – Green Belt & Black Belt – Anexas Europe

Data Analysis with Python, Data Visualization with Python, Database and SQL for Data Science -IBM

Diploma in Project Management – Alison

Applied Remote Sensing – Georg-August-Universität Göttingen, Germany

## 🌐 LANGUAGE SKILLS

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Fluent: English | Tulu | Hindi | Kannada

Immediate: German

## 📄 HOBBIES AND INTERESTS

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Hiking, Seasonal traveling, learning new fact every day, Experimenting new cuisines, home brewed Dunkelweizen Beer and Glühwein, for the winter.