

# C. I. Adedeji

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## EDUCATION

### Florida Agricultural and Mechanical University

2019 – May 2023

Ph.D. Civil Engineering - Environmental and Water Resources

GPA: 3.8 / 4.0

**Dissertation:** Development of spatiotemporally distributed machine learning framework to generate in-stream bacteria concentration data using interpretable machine learning.

**Relevant coursework:** Big data analytics, Deep learning in practice, Introduction to Machine Learning, Statistical application for Engineers

### Florida State University

January 2017 – December 2018

M.Sc. Civil Engineering - Environmental and Water Resources

GPA: 3.7 / 4.0

**Relevant coursework:** Statistical applications, Applied Numerical Computing for Scientists and Engineers, High performance computing

### Federal University of Technology, Akure

December 2009 – December 2014

B.Eng. Environmental Engineering

**Relevant coursework:** Linear algebra, Partial Differential Equation, Fourier Series

## EXPERIENCE

### FAMU-FSU College of Engineering, RIDER Center - Graduate Teaching and Research Assistant

January 2017 – Date

- Conducted predictive modeling and simulation, exploratory data analysis, feature engineering, data curation, and synthetic data generation for water quality prediction.

### Multi-Links Ventures Limited – Data Analyst

January 2015 – November 2016

- Conducted, cleaned, and provided modeling and analysis of structured and unstructured data used for major business initiatives. Outcomes include a **15%** reduction in transportation costs resulting in **\$100,000** annual savings.
- Improved demand forecasting that reduced backorders to retail partners.
- Utilized MS SQL, data warehousing, Tableau, and other dashboards/visualization tools for data intelligence and analysis.
- Worked with sales, IT, and marketing teams to optimize key workflows.

### PROXYNET group of companies - Data Analyst & Research Intern

May 2012 – Dec 2013

- Conducted data analytics to support decisions for high-priority enterprise initiatives involving IT/products development, customer service improvement, organizational realignment, and process engineering.
- Used quantitative data gathered to develop an understanding of customer behavior, demographics, and lifecycle. Presented analysis that helped guide company decisions, which has since raised **\$250,000** in seed funding.
- Considered a valuable development team asset, awarded with “Intern appreciation letter” on completing internship.

## ACADEMIC PROJECTS

**ANN, Shapely Additive Explanations (SHAP), Principal Component Analysis (PCA), ANN (Python, Mlxtend, GeoPandas, Rasterio, TensorFlow, Seaborn etc.)**

- Collected data from different open sources both manually and using API's. Performed data cleaning, data exploration, and preprocessing. Identified and extracted most important features using PFI, SHAP and PCA. Created modified features to augment existing data. Performed spatiotemporal modeling and hyperparameter tuning to optimize the performance accuracy. The developed ML model achieved a 90% accuracy.

**ANN, Time Generative Adversarial Network (TGAN), ADASYN (Python, TensorFlow, Plotly)**

- Generated synthetic data to augment existing data and rectify the problem of imbalanced data classes in water quality modeling. Optimized model accuracy and stability with an overall score of 90% and 75% respectively.

**Transfer learning, ANN, LSTM, CNN, ADABOOST, XGBoost, RF (Python, TensorFlow, Plotly)**

- Reconstructed spatiotemporal water quality datasets for both small and large-scale missing values using transfer learning approach, boosting trees and ANN. The developed ML model achieved a 94% accuracy

**X-gboost, DLNN, SVM and Genetic Algorithm (R, Python, GeoPandas, Rasterio, TensorFlow, Seaborn etc.)**

- Applied remote sensing data sentinel-2, sentinel 1 for predicting soil organic carbon based on optimization xgboost model using metaheuristic algorithms and deep learning. The developed ML model achieved 89% accuracy.

**Random Forest Regression, Extra-tree Regression, ElasticNET, XGBoost (Python, Rasterio, PySpatialML, Matplotlib)**

- Augmented the data by generating new spatial features to incorporate spatial autocorrelation in prediction. Predicted the water quality indicators of using temporally and spatially distributed variables. The developed ML model achieved a 95% accuracy

**Linear regression, K-NN (Python, Scikit-learn, Plotly, Bokeh)**

- Predicted house price dynamics in Staten Island, New York using critical explanatory variables. The developed ML model achieved a 98% accuracy

**Principal Components Analysis, K-NN and K-mean Clustering (Python, Scikit-learn, Bokeh)**

- Extracted important features using exploratory data analysis (EDA) and feature Engineering. Predicted the water quality in Apalachicola River Basin using supervised and unsupervised learning.

**EBK regression, Kriging/Cokriging Interpolation, Spline interpolation, Areal Interpolation, Radial Basis Functions and Diffusion interpolation**

- Prediction of dissolved oxygen concentration in Chesapeake Bay using geospatial Interpolation (**Python, ArcGIS Pro, Geostatistical wizard**)

## CORE COMPETENCE

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- Data modeling (Statistical, Machine learning, Deep learning)
- Data collection using API's & Data curation
- Exploratory data analysis (EDA)
- Deep learning hyper-parameter tuning
- Data preprocessing, augmentation, and enrichment (Cleaning, Transformation etc.)
- Time series analysis (ARIMA, SARIMA etc.)
- Deep Neural Networks architectures e.g., CNN, LSTM, ANFIS.
- Machine Learning optimization (Genetic algorithm, SGD, ADAM)
- Feature engineering (selection and extraction) and dimensionality reduction techniques (PCA, RFE, PDP, SFS, RBA etc.)
- Explainable AI (Shapely Addictive Explanations (SHAP), LIME etc.)
- Synthetic data generation, missing data imputation and balancing (Time-series GAN, ADASYN, Transfer Learning hybridized models e.g., TrLSTM, TrADABOOST)
- Geospatial modeling and analysis (EBK Regression Interpolation, Geographically Weighed Regression, Hotspot analysis, Suitability modeling etc.).

## TECHNICAL SKILLS

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- **Programing languages:** Python, R, SQL, MATLAB.
- **Libraries:** TensorFlow, Keras, NumPy, Pandas, Scikit-learn, PyTorch, PySpark, PyCaret, Requests, Beautiful Soup, GeoPandas, NLTK, CARET etc.
- **Visualization:** Seaborn, Plotly, Bokeh, Tableau.
- **Platforms and Tools:** CUDA Toolkit, Bitbucket, Gitlab, GitHub, AWS, OpenMP, AutoML, MLJar, RAPIDS ecosystem, Google Prediction API, AWS SageMaker, Gensim, Apache Hadoop, Neural designer, H2Oai, ArcGIS Pro.
- **Machine Learning:** Regression, Classification, Clustering, Image processing, Natural Language Processing, Decision Modeling, Data Mining.
- **Certifications:** Nvidia fundamentals of deep learning; MITx Introduction to Computational Thinking and Data Science, Python for Data Science, NLP with Python

## HONORS AND AWARDS

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• Florida A&M University ARP HBGI Graduate Students Grant	2021
• Florida A&M University Foundation Scholarship	2021
• BAF (Bill Anderson Fund) Fellowship	2021
• Almeta Monroe Turner Women in STEM Scholarship	2021
• SISE (UIC Summer Institute of Sustainability and Energy) Fellowship	2021
• FACT (Findable, Accessible, Interoperable, and Reusable Data Cyber Training) Fellowship	2021
• American Water Resources Association – Florida section Graduate Students Grant	2021
• Florida State University Graduate Student Scholarship Award	2018
• Florida State University Travel grant	2017
• Famu-Fsu College of Engineering Dean's Graduate Student Scholarship Award	2017
• Famu-Fsu Engineering poster competition – First place	2017

## PRESENTATION AND ABSTRACT ACCEPTANCE

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- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun (2022). Predicting in-stream nutrient, suspended solids, and dissolved oxygen concentrations using machine learning techniques and spatiotemporal analyses. **HydroML Symposium on bigdata Machine Learning in Hydrology and Water Resources**
- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun and Clayton Clark. Development of spatiotemporally explicit machine learning models to estimate in-stream bacteria concentration in inland watersheds. **ASCE World Environmental & Water Resources Congress**

## PUBLICATIONS

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- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun (2022). Predicting in-stream nutrient, suspended solids, and dissolved oxygen concentrations using machine learning techniques and spatiotemporal analyses (*In progress*)
- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun and Clayton Clark (2022). Development of spatiotemporally explicit and dynamic machine learning models to estimate in-stream bacteria concentration in inland watersheds (*Submitted*)
- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun and Clayton Clark (2022). Generation of spatiotemporal bacteria data using Time Generative Adversarial Network and Adaptive Synthetic Sampling Algorithm (*In progress*)
- **Itunu C. Adedeji**, Ebrahim Ahmadisharaf, Yanshuo Sun and Clayton Clark (2022). Transfer learning approach in generating spatiotemporal in-stream bacteria data (*In progress*).
- Zhiming Z. and **Itunu A.** (2018). "Chemical-free Recovery of Elemental Selenium from Selenate-Contaminated Water by a System Combining Biological Reactor, Bacterium-Nanoparticle Separator, and Tangential Flow Filter in a Continuous-Flow System". *Environmental Science and Technology*. (*Published*) <https://pubs.acs.org/doi/pdf/10.1021/acs.est.8b04544>