Fabusuyi Akindele Aroge

Energy Systems
Data Scientist
Simon Fraser University (SFU), Vancouver, Canada

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I research energy system performance characteristics using computational, statistical and signal processing techniques.

- I am currently a researcher at FCReL, SFU, working on zero-emission fuel cell efficiency improvement, leveraging advanced 3D X-ray image analysis.
- I maintain a technical blog, Playground, to share tutorials and opinions related to statistics, data science, scientific computing, and beyond.
- I invest a significant amount of time in teaching computational and statistical methods to undergraduate students.
- Outside my employment, I participate in the broader data science community.

Education

PhD 2019-present
Department of Sustainable Energy Engineering, Simon Fraser University, Canada
advised by Prof. Erik Kjeang
Focus: Understanding fuel cell water transport using *operando* X-ray imaging.

MS 2017-2019
Department of Electrical Engineering, University of Cape Town, Cape Town, South Africa
advised by Paul Barendse
Thesis: Impedance Spectroscopy Techniques for Condition Monitoring of Polymer Electrolyte Membrane Fuel Cells

BS 2009-2014
Federal University of Tech., Akure, Nigeria
Major: Electrical & Electronics Engineering

Others

Micro Masters Jan. 2019-Dec. 2019
Institute for Data, Systems, and Society Massachusetts Institute of Technology (MIT)
Modules: Probability | Machine Learning with Python: from Linear Models to Deep Learning | Fundamentals of Statistics | Data Analysis in Social Science—Assessing Your Knowledge

MOOCs List of online courses and specializations completed.

Computing

I have some active computing projects, including packages developed as part of some of my theses. See my github profile (https://github.com/akin-aroge) for details.

Skills

- Experienced (industry & academia) data scientist, with a specialization in scientific computing, including visualization, data mining and machine learning.
- Python Language with over 4 years of experience particularly with the Python scientific stack (NumPy, Pandas, matplotlib, scikit-Learn, SciPy).
- Experience with a variety of tools and languages, including SQL, R, bash, Git, Jupyter notebooks, MATLAB, LaTeX, Microsoft Azure cloud computing platform.
- Author of *Playground*, a Python blog covering scientific computing, visualization, statistics, and related topics: https://akin-aroge.github.io/

Experience

updated January 2, 2022

Employment

FCReL, SFU Doctoral Research Associate,
2019–present *Fuel Cell Research Lab, School of Sustainable Energy Engineering, Vancouver*

- I have developed an image analysis technique for quantifying liquid water in radiographic images
- I have developed a technique for summarizing fuel cell water interactions using principal component analysis
- I have developed a computational framework for analyzing fuel cell water instabilities during X-ray imaging.

Sun Lab, SFU Data Scientist (Bio-informatics),
Fall 2021 *Sun Research Lab, Department of Chemistry, Vancouver*

- I developed data engineering pipelines in python to automate analysis of body-wide transcriptome data
- I investigated differential gene expressions and organ relationships for mouse disease models
- I developed network visualizations of body-wide transcriptome profiles to inform analysis and interpretation of results, using Python

Rhino Africa Data Scientist
Jan.–Dec. 2018 *Rhino Africa, Cape Town, South Africa*

- I implemented an optimised personnel schedule algorithm which reduced customer turnaround time from 17hrs to 7hrs
- I developed a time series analysis model showing the key variables influencing daily customer request rates to aid planning
- Investigated the impact of the water crisis in Cape Town on the business using internal and external data sources (such as tweets) to inform business strategy
- I also provided technical advice on various analytical projects and products across the business

AMES, UCT Research Associate
2017–2018 *Advanced Machines & Energy Systems (AMES) Lab, University of Cape Town, South Africa.*

- I designed and developed (hardware & software) a novel low-cost diagnostic system for rapidly assessing fuel cell performance using composite signals
- I developed relevant computational libraries for automated signal processing and analysis for the research lab using MATLAB and Python programming languages
- I developed and published new methods for assessing fuel cell real-time performance using wavelet analysis

Co-Creation Hub Data Analyst (Intern)
Oct. 2016–Jan. 2017 *Co-Creation Hub, Yaba, Lagos, Nigeria.*

- I processed and analyzed survey towards researching the Tech. Talent Gap in Nigeria
- I informed strategy on the national coverage of startup incubation program using demographic and temporal data
- I was responsible for assessing and making recommendations for the startup idea submission data collection system

GENI Remote Energy Research Associate
Sep. 2013–Feb. 2014 *Global Energy Network Institute (GENI), San Diego, California, USA*

- I conducted research on behalf of the institute on important energy issues in Nigeria such as energy efficiency, renewable energy integration and smart grid prospect
- I published a culminating research article titled, The Smart Grid and Renewable Energy Integration in Nigeria

Volunteering

Advisory Council As a member of the Developmental Advisory Council, SFU Strategic Sustainability Plan, I advised on the relevant components on the constitution of the advisory council.
Fall 2020

Mastercard Mentorship As a Mastercard mentor, I provided practical guidance, motivation and support to two mentees in the areas of academic trajectory, and navigating the university life in general.
2018-2019

Simunye As a member of Simunye, I joined other members to build a support system for the homeless around Rondebosch, Cape Town, South Africa.
2018-2019

Teaching

BUS 336 TA: Data and Decisions II
Summer 2021 *Simon Fraser University*

SEE 241 TA: Measurement and Data Analysis
Summer 2021 *Simon Fraser University*

BUS 232 TA: Data and Decisions I
Spring 2021 *Simon Fraser University*

SEE 242 TA: Computational Methods for Engineers
Spring 2020 & 2021 *Simon Fraser University*

AWARDS & HONORS

TELUS Grad Award Awarded the *TELUS Graduate Award*. School of Sustainable Energy Engineering, SFU.
2021

NRF, UCT National Research Foundation (NRF) *research grant nomination* award. UCT.
2019

UCT Scholarship UCT International Postgraduate Student Scholarship award
2018

IEEE ICAST Recipient of the *Best paper award* in the 14th session of the 6th IEEE ICAST conference
2014

PUBLICATIONS

Articles

[1] F.A. Aroge. *et al.* *Method for Analyzing 2D X-Ray Transmission Images for Operando Liquid Water Distribution in a Polymer Electrolyte Fuel Cell* ECS Meeting Abstracts, 2021

[2] F.A. Aroge, P. Barendse, *Multi-Frequency Signal Synthesis for Accurate Fuel Cell Impedance Estimation* IEEE Energy Conversion Congress and Exposition (ECCE), 2019

[3] F.A. Aroge, P. Barendse. *Signal Injection by Active Load Modulation for PEM Fuel Cell Diagnostics* IEEE PES/IAS PowerAfrica, 2018

[4] F.A. Aroge, P. Barendse. *Time-Frequency Analysis of the Chirp Response for Rapid Electrochemical Impedance Estimation* IEEE Energy Conversion Congress and Exposition (ECCE), 2018

[5] O. Oladeji, F.A. Aroge. *Priority-based autonomous load control in dynamic pricing environments* IEEE 6th International Conference on Adaptive Science & Technology (ICAST), 2014 **(Adjudged *Best paper in the 14th session of the 6th ICAST*)**

[6] F.A. Aroge, P. Meisen. *The Smart Grid and Renewable Energy Integration in Nigeria* IEEE Energy Conversion Congress and Exposition (ECCE), 2018