Tshenolo Daumas

Applied mathematician and aspiring computational scientist with experience in Python programming, Machine Learning and Bioinformatics.

Cape Town, South Africa
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EDUCATION

MSc Applied Mathematics
Stellenbosch University, *South Africa*

Jan 2020 - Dec 2021

Thesis title:
The Impact of Peptide Flanking Residues on Predicting Peptide-MHC-II Interactions using Convolutional Neural Networks.

Supervisors:
Prof. Wilfred Ndifon - AIMS, Global Network.
Dr Bubacarr Bah - Stellenbosch University and AIMS, South Africa.
Dr Abdoelnaser Degoot - AIMS, Rwanda.

Thesis link

Structured MSc in Mathematical Sciences
University of Cape Town, *South Africa*
African Institute for Mathematical Sciences, *South Africa*

Jan 2019 - Nov 2019

Thesis title:
Convolutional Neural Network Model for Prediction of MHC-II Peptides Interactions.

Supervisors:
Prof. Wilfred Ndifon - AIMS, Global Network.
Dr Abdoelnaser Degoot - AIMS, Rwanda.

Coursework:
Python and Julia Programming, SageMath, Statistics, Differential Equations, Algebraic Biology, Asymptotics & Perturbation Methods and Data Science.

Thesis link

BSc (Honours) Applied Mathematics
Stellenbosch University, *South Africa*

Jan 2016 - Dec 2018

Project title:
Estimating Point Source Parameters using Nonlinear Least-Squares Techniques.

Supervisors:

RESEARCH INTERESTS

- Applied Mathematics
- Machine Learning
- Artificial Intelligence
- Data Science
- Computational Biology
- Bioinformatics
- Immunology
- Genomics

SKILLS

Python - Proficient
R Programming - Intermediate
SageMath -Intermediate
Machine Learning - Proficient
Problem Solving - Proficient
Statistics - Intermediate

Deep Learning Libraries:
- Keras
- Scikit-Learn
- Tensorflow
- NumPy, Pandas & SciPy

Visualisation Libraries:
- Matplotlib
- Seaborn
- Scanpy

AWARDS

AIMS-Tuebingen Data Science Fellowship Scholarship
Issued to 5 candidates from all AIMS centres by the Cluster of Excellence Machine Learning: New Perspectives for Science, University

Prof. Oleg Smirnov - Rhodes University and South African Radio Observatory, South Africa.

Coursework:

Numerical Methods, PDEs, Digital Image Processing, Graph Theory, Statistical Pattern Recognition, Machine Learning with Tensorflow.

BSc Mathematical Sciences
University of Johannesburg, *South Africa*

Jan 2012 - Dec 2014

Specialisation: Applied Mathematics and Mathematics

PROJECTS

AIMS-Tuebingen Data Science and AI Fellowship
Eberhard Karls University of Tübingen, Germany

Feb 2022 - Oct 2022

Project title:

Empirical Investigation of the Influence of Input Data on Popular Representation Learning Methods in Single-Cell Biology.

Project description:

Dimensionality reduction methods such as PCA, t-SNE and UMAP are often used for the visualisation of cell type structures in high-dimensional single-cell data. In this project, the sensitivity of dimensionality reduction methods regarding the composition of input data in large single-cell biology studies is investigated.

Supervisors:

Prof. Manfred Claassen - University of Tübingen, Germany.

TEACHING EXPERIENCE

Graduate Teaching Assistant
African Institute for Mathematical Sciences, *South Africa*

Jan 2023 - PRESENT

- Tutoring master's students in pure and applied mathematics, physics, and computer sciences.
- Advising and assisting students on research projects in concert with their project supervisors.
- Advocating for students and facilitating communication with lecturers and the administration.
- Administrative tasks such as content consultation, assignment marking, exam invigilation and grade compiling.
- Involvement in student development, academic welfare and progress.

of Tuebingen · Feb 2022

DSI-CSIR Interbursary Support Programme
Issued by The Department of Science and Innovation and the Council for Scientific and Industrial Research for master's studies · Jan 2020

Ben and Mary Turok Award for Excellent Achievement
Issued by AIMS, SA. Annually awarded to a top performing South African student for academic excellence in the Structured master's degree, donated by Prof Neil Turok, the founder of AIMS · Nov 2019

Structured Masters' in Mathematical Science Scholarship
Issued by National Research Foundation– African Institute for Mathematical Sciences for master's degree · Jan 2019

South African Square Kilometre Array Project Honours Bursary
Issued by National Research Foundation– South African Radio Astronomy Observatory for bachelors honour's degree · Jan 2016

LANGUAGES

English - Fluent
Setswana - Fluent
Kiswahili - Intermediate
isiZulu - Intermediate
German - A1.2 Basic

OUTREACH AND WORKSHOPS

Deep Learning Indaba - Tunis, Tunisia

University Applied Mathematics Tutor
Stellenbosch University, *South Africa*

Jul 2016 - Jun 2018

Tutored first and second year applied mathematics modules: Numerical Methods, Probability Theory and Statistics, Matrix Methods, Dynamics, Fourier Analysis, Vector Analysis, Modelling in Mechanics and Differential Equations.
Invigilation of exams and marking of tutorials and test scripts.

University Mathematics Tutor
University of Johannesburg, *South Africa*

Jan 2013 - Dec 2014

Tutored first and second year mathematics modules: Single and Multivariable Calculus, Sequences, Series and Vector Calculus and Linear Algebra.
Invigilation of exams and marking of tutorials and test scripts.

INDUSTRY EXPERIENCE

Junior Scientific Developer
South African Radio Astronomy Observatory, *South Africa*

Apr 2016 - Jul 2018

Problem solving, Development of optimization methods for the use of Radio Interferometers and Radio Astronomy Research.

Contact: Prof Oleg Smirnov
- oms@ska.ac.za

Junior Telescope Operator
South African Radio Astronomy Observatory, *South Africa*

Jan 2015 - Apr 2016

Operating the KAT7 and MeerKAT telescope. Monitoring and troubleshooting telescope sensor issues. Running Radio Astronomy observations and performing Quality Assurance checks on data files produced from observations.

Contact: Ms Audrey Dikgale
- audrey@ska.ac.za

Aug 2022

An annual meeting of the African machine learning and AI community with the mission to Strengthen African AI.

Gene Golub SIAM Summer School – Kigali, Rwanda

Aug 2021

The topic of the school was, Theory and Practice of Deep Learning. My team's project was on the ADAM optimizer used in Neural Network models.

AIMS–Women In STEM mentorship – Cape Town, South Africa

Nov 2019

Served as a panellist at the African Institute for Mathematical Sciences Women in Science, Technology, Engineering and Mathematics mentoring event where the theme was "Breaking the Glass Ceiling".

3rd DARA Big Data Africa School – Cape Town, South Africa

Oct 2019

Introduction to fundamental data science tools and techniques to develop skills in working with extremely large datasets. My team's project was on Tumour isolation using image segmentation in 4D medical imaging.

Deep Learning Indaba – Cape Town, South Africa

Aug 2018

Philippi Career Day – Cape Town, South Africa

Jul 2018

Professionals were invited to give career guidance to high school learners from Philippi township in Cape Town. This was a personal effort and I hope to repeat.