ROUSSEL DESMOND NZOYEM

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PhD candidate blending machine learning, scientific computing, and high-performance computing solutions for science.

ABOUT

I am a curious and creative problem-solver. Fascinated by how artificial intelligence, maths, and computing intertwine, I develop meta-learning techniques for rapid model adaptation to novel settings. My commitment to lifelong learning is reflected in my research interests, my community outreach, and my hobbies.

SKILLS

Flow Matching | Graphs | Machine learning | Signal processing | HPC | Simulation | Optimisation | Automatic differentiation | Optimal control | CFD | PDEs | Finite Elements/Volumes | OpenMP | MPI | OpenCL | Networks | Web development | Cloud Computing

Multilingual | Flexibility | Teamwork | Adaptability | Rigour | Hard work | Efficiency | Communication

TOOLS

C/C++ | CUDA | Julia | Python | TensorFlow | JAX | Git | PyTorch | Linux | AWS | Docker | LaTeX

LANGUAGES

English ●●●●●
French ●●●●●
Japanese ●●●○○
Spanish ●●○○○

EDUCATION

PhD in Interactive Artificial Intelligence | University of Bristol | Bristol, UK
September 2021 — September 2025

- Combining physics- and data-driven techniques for highly performant simulation and control of PDEs;
- Enhancing neural ordinary differential equations and generative modelling with meta-learning.
- Supervised by Dr Tom Deakin, Pr David Barton, and Pr Simon McIntosh-Smith

MSc in Scientific Computing (CSMI) | University of Strasbourg | Strasbourg, FR
September 2019 — September 2021

- Modelisation, simulation, and optimisation of physical systems on high-performance computing clusters;
- Theoretical and practical concepts on differential equations, signal processing, and deep learning;
- Completed the degree with distinction (FR: Très Bien, UK: 1st, US: 4.0).

Bachelor's degree (BSc) in mathematics | Aix-Marseille University | Marseille, FR
November 2017 — July 2019

- Finalising my BSc with a particular accent on pure mathematical concepts; achieved with 15.25/20.

Advanced technician's degree | Oshima College of Technology | Oshima, JP
April 2017 — June 2019

- Intensive training focusing on mechanical, electrical, and computer science engineering;
- Assembly languages for the CASL and CASL II machines.

Associate degree in computer science | University of the People | Pasadena, USA
January 2017 — April 2019

- Theoretical and applied computer science followed by web and software development projects.
- Assembly language and low-level computer architecture

Associate degree in maths. and phys. sci. | Polytechnique (NASEY) | Yaoundé, CMR
September 2014 — April 2017

- First two years (MSP) consisting of mathematics and physics common core subjects;
- Ranked sixth at the entrance examination amongst more than 4000 candidates;

GCE A-level (Baccalaureate) | Gov. Bilingual High Shcool | Bamenda, CMR
July 2014

- Focused on mathematics, physics, computer science and chemistry;
- Finished top in Cameroon's North-West region with grade A.

RESEARCH EXPERIENCE

Data Science PhD Internship | SLB (Schlumberger) | Abingdon, UK
June 2024 — September 2024

- Scaling Graph Neural Networks (GNNs) as proxy models for carbon capture and storage;
- Focus on computational efficiency with JAX, super-resolution and transfer-learning on large GNNs.

Interactive AI CDT Summer Project | UoB HPC Research Group | Bristol, UK
May 2022 — August 2022

- Improved algebraic multigrid linear solvers with Graph Neural Networks (GNNs);
- Tested several GNN library including the PyTorch-based DGL and the JAX-based Jraph.

MSc Internship | Jacques-Louis Lions Laboratory (Sorbonne University) | Paris, FR
February 2021 — July 2021

- Studied the collapse of the Arctic ice cap via a percussive granular model of the MIZ. Ice floes were modelled with mass-spring-damper systems, and fracture with the Francfort-Marigo model.

MSc Internship | Research Institute Mathématiques Avancées (IRMA) | Strasbourg, FR
June 2020 — August 2020

- Inverse problem using ML (VNet) for the supervised reconstruction of a domain's density. The radiative transfer equation (RTE) was solved with a Finite Volume splitting scheme to generate ground truth data.

TEACHING

Teaching Assistant
University of Bristol | Bristol, UK
January 2022 — Present

- Introduction to Artificial Intelligence,
- High-Performance Computing,
- Scientific Computing,
- Engineering Mathematics,
- Etc.

Outreach Ambassador, Widening Participation Tutor
University of Bristol | Bristol, UK
September 2022 — Present
Lead for the CodeMakers initiative: fostering curiosity in young students with after-school programming activities. Delivering STEM sessions to aspiring UoB students.

Volunteer Private Instructor
ExamStar | Bristol, UK
September 2022 — July 2024
Affordable mathematics lessons for primary and secondary school pupils via Zoom and MS Teams.

Volunteer Language Tutor
UoB Global Lounge | Bristol, UK
September 2022 — December 2022
Bi-weekly position as a French language tutor at the Global Lounge's Language Café.

Private Instructor
Complétude | Strasbourg, FR
January 2020 — January 2021
Weekly monitoring of high school students in mathematics and computer science with group tutoring during holidays.

TRAINING & CERTIFICATES

AWS Machine Learning Foundations 2022
Udacity — October 2022

React Front to Back 2022
Packt — September 2022

Deploying a Model for Inference at Production Scale
NVIDIA — August 2022

Introduction to Higher Education (HE) Teaching
UoB — January 2022

Electrotechnique I
EPFL — December 20125

SELECTED PUBLICATIONS

MixER: Better Mixture of Experts Routing for Hierarchical Meta-Learning
RD Nzoyem, G Stevens, A Sahota, DAW Barton, T Deakin
February 2025 — arXiv, SCOPE Workshop @ ICLR 2025

Neural Context Flows for Meta-Learning of Dynamical Systems
RD Nzoyem, DAW Barton, T Deakin
February 2025 — International Conference on Learning Representations (ICLR) 2025

Extending Contextual Self-Modulation: Meta-Learning Across Modalities, Task Dimensionalities, and Data Regimes
RD Nzoyem, DAW Barton, T Deakin
September 2024 — arXiv

A comparison of mesh-free differentiable programming and data-driven strategies for optimal control under PDE constraints
RD Nzoyem, DAW Barton, T Deakin
November 2023 — SuperComputing (SC) 2023 Workshop on AI4S

AWARDS AND SCHOLARSHIPS

CDT Studentship | **UK Research and Innovation** | Bristol, UK
June 2021
Fully-funded scholarship to pursue a PhD within the Interactive AI CDT at the University of Bristol.

MEXT (Monbukagakusho) | **Japanese Government** | Tokyo, JP
November 2016
For this prestigious international scholarship, I was the only one chosen amongst hundreds of candidates.

Fondation Hoffmann | **University of the People (UoPeople)** | Pasadena, USA
April 2017 & April 2018
Scholarship granted (and renewed) to fully support assessment fees.

Excellence Award | **The President of the Republic of Cameroon** | Yaoundé, CMR
July 2015 & July 2016
Prize awarded for two consecutive years for my outstading accomplishments at Polytechnique Yaoundé.

Excellence Award | **PKFokam Institute of Technology** | Yaoundé, CMR
July 2014
For my fourth place at the PKFokam Excellence national mathematical olympiad.

Excellence Award | **Les Brasseries du Cameroun** | Bamenda, CMR
October 2014
Grant awarded to the best student at the GCE A-level in every region of Cameroon.

REFERENCES

Dr. Tom Deakin (HPC Research Group, University of Bristol)
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Pr. David Barton (University of Bristol)
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Pr. Christophe Prudh'homme (IRMA, Unistra)
prudhomm@math.unistra.fr — +33 3 68 85 00 89

HOBBIES

Video games and coding: Fan and designer;
Cinema and music: Composition, documentary movies;
Football: Regular practice at the amateur level;
Traveling: Loves visiting the farthest corners of Earth.