ROUSSEL DESMOND NZOYEM

PhD candidate blending machine learning, scientific computing, and HPC solutions for science.

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ABOUT ME

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

SKILLS

Transformers | Linear RNNs | Sequential data
Diffusion/Flow matching | GNNs
Simulation | Optimisation | Automatic differentiation
Optimal control | CFD | PDEs | Finite Elements/Volumes
OpenMP | MPI | OpenCL
Web dev. | Data visualisaton | Cloud Computing

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

TOOLS

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

LANGUAGES

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

EDUCATION

PhD in Machine Learning (Interactive AI) | University of Bristol | Bristol, UK
September 2021 — September 2025

- Meta-learning, test-time training, and parameter efficient fine-tuning for OoD generalisation;
- Physics-informed neural networks and generative models for sequential data;
- Supervised by Dr Tom Deakin, Pr David Barton, and Pr Simon McIntosh-Smith.

MSc in Applied Mathematics (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 exceptional distinction (**FR**: 18.1/20—Excellent, **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 (Mechatronics) | 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.

WORK EXPERIENCE

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

- Scaled by 10X Graph Neural Networks (GNNs) inputs for proxy modelling of carbon capture and storage;
- Implemented novel JAX GNN layers using Jraph, and achieved 2X speedup compared to PyTorch's PyG;
- Achieved zero-shot super-resolution and transfer learning from small to large graphs.

PhD Summer Projects | HPC Research Group & Bristol Robotics Lab. | Bristol, UK
May 2022 — August 2022

- Extensively explored path planning and stable grasping under disturbance within Mujoco;
- Integrated NVIDIA's WARP and Mujoco's MJX for robotic spatial simulation and control (follow-up work);
- Accelerated algebraic multigrid linear solvers with GNNs, benchmarking DGL, PyG, and Jraph.

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

- Theoretically studied the collapse of the Arctic ice cap via a percussive granular model. Ice floes were modelled with mass-spring-damper (MSD) systems, and fracture with the Francfort-Marigo model;
- Developed an interactive software for MSD percussion and fracture simulation using Python's Flask;
- Supervised by Prof. Stéphane Labbé.

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.

Webmaster | Musica International | Strasbourg, FR
September 2019 — November 2019

- Maintenance of a database composed of millions of scores, along with the showcase website (part-time).

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 2015

SELECTED PUBLICATIONS

Weight-Space Linear Recurrent Neural Networks
RD Nzoyem, N Keshtmand, I Tsayem, DAW Barton, T Deakin
May 2025 arXiv Preprint

Reevaluating Meta-Learning Optimization Algorithms Through Contextual Self-Modulation
RD Nzoyem, DAW Barton, T Deakin
May 2025 Conference on Lifelong Learning Agents (CoLLAs) 2025

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

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

Financial Assistance | **International Conf. on Learning Representations (ICLR)** | Singapore, SG
March 2025
Funding for registration, travel, and accommodation to present multiple research papers at ICLR'25 in Singapore.

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 outstanding 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)
David.Barton@bristol.ac.uk — *+44 11 74 56 00 18*

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.