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. My commitment to lifelong learning is reflected in my research interests, my community outreach, and my hobbies.

SKILLS

Transformers | Linear RNNs | Physical AI | Diffusion/Flow matching | GNNs | Simulation | Optimisation | Differentiable programming | Optimal control | CFD | PDEs | Finite Elements/Volumes | OpenMP | MPI | OpenCL | Web dev. | Inverse dynamics | Cloud Computing

Interpersonal: Teamwork, cross-cultural communication (fluent in 4 languages).

Work ethic: Rigour, adaptability, efficiency in dynamic and fast-paced environments.

TOOLS

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

RESEARCH INTERESTS

Artificial General Intelligence
- Out-of-distribution generalisation
- Test-time training

Physical AI
- Physics-informed machine learning
- Robotic simulation & spatial computing

ML Systems
- Linear recurrence
- Hardware-aware training
- Etc.

LANGUAGES

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

EDUCATION

PhD in Machine Learning (Interactive AI) | University of Bristol | Bristol, UK
September 2021 — (Anticipated 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 and spatial computing;
- 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 analysis of partial differential equations, signal processing, and deep learning;
- Completed the degree with exceptional distinction (**FR**: 18.1/20—Excellent, **UK**: 1st, **US**: 4.0).

BSc in Mathematics | Aix-Marseille University | Marseille, FR
November 2017 — July 2019
- Strong accent on statistics, algebra, advanced calculus, and numerical analysis; achieved with 15.25/20.

Associate degree in 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 6th out of more than 4,000 candidates in the national entrance exam.

RESEARCH & WORK EXPERIENCE

Teaching Assistant | University of Bristol | Bristol, UK
January 2022 — Present
- Supported **MSc** units—Introduction to AI, High-Performance Computing, Computer Architecture, Cloud Computing—and **BSc** units—Scientific Computing, Engineering Mathematics (EMAT) 1&2.
- Received one Bristol Teaching Awards nomination for preparing and delivering lectures for EMAT.

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;
- Lead to my MSc thesis "Fracturing of ice floes by impact in a granular mode", 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.

OUTREACH & VOLUNTEERING

Outreach Ambassador, Widening Participation Tutor
University of Bristol | Bristol, UK
September 2022 — Present
I lead the CodeMakers initiative to foster curiosity in young students with after-school programming activities. We also deliver 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.

Volunteer Staff
University of Bristol | Bristol, UK
September 2022
I worked aboard the SS Great Britain to set up and evaluate exhibitions for the FUTURES Festival of Discovery.

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
arXiv Preprint (2025)

Reevaluating Meta-Learning Optimization Algorithms Through Contextual Self-Modulation
RD Nzoyem, DAW Barton, T Deakin
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
SCOPE Workshop @ ICLR 2025

Neural Context Flows for Meta-Learning of Dynamical Systems
RD Nzoyem, DAW Barton, T Deakin
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
SuperComputing (SC) 2023 Workshop on AI4S

MOST RECENT PROJECTS

WARP (*June 2025*)
- Assembled a team of PhDs and postdocs from UK, France, and the USA to redefined test-time sequence modelling
- Led to the preprint "Weight-Space Linear Recurrent Neural Networks"
- Code: https://github.com/ddrous/warp

MJ-Warp (*May 2025*)
- Exploring automatic differentiation and gradient-free generalisation in-simulation with the open-source MuJoCo Warp
- Ongoing project (code available soon)

AWARDS AND SCHOLARSHIPS

- **Financial Assistance** by **CRM** (*May 2025*) — Assistance for all expenses to attend the Mathematical Foundations of Data Science thematic programme at the CRM in Montréal.
- **Financial Assistance** by **ICLR** (*March 2025*) — Funding for registration, travel, and accommodation to present multiple research papers at ICLR'25 in Singapore.
- **CDT Studentship** by **UK Research and Innovation** (*June 2021*) — Fully-funded scholarship to pursue a PhD within the Interactive AI CDT at the University of Bristol.
- **MEXT (Monbukagakusho)** by **The Japanese Government** (*November 2016*) — For this prestigious international scholarship, I was the only one chosen amongst hundreds of candidates.
- **Fondation Hoffmann** by **University of the People** (*April 2017 & April 2018*) — Scholarship granted (and renewed) to fully support assessment fees.
- **Excellence Award** by **The President of the Republic of Cameroon** (*July 2015 & July 2016*) — Prize awarded for two consecutive years for my outstanding accomplishments at Polytechnique Yaoundé.
- **Excellence Award** by **PKFokam Institute of Technology** (*July 2014*) — For my fourth place at the PKFokam Excellence national mathematical olympiad.
- **Excellence Award** by **Les Brasseries du Cameroun** (*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 & PERSONAL SKILLS

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.
Languages: English & French (*native*), Japanese (*proficient*), Spanish (*basic*).