

# ABOUT ME

A creative problem-solver fascinated by the intersection of machine learning, computer graphics, and vision. I build the next wave of generative models and simulation technologies, leveraging my deep experience in HPC, differentiable programming, and meta-learning to create realistic and immersive virtual worlds.

# SKILLS

Transformers

Linear RNNs

Physical AI

Diffusion/Flow matching

GNNs

Simulation

Optimisation

Differentiable programming

Optimal control

CFD

PDEs

Finite Elements/Volumes

OpenMP

MPI

OpenCL

Computer Vision

3D Graphics

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

Machine Learning

- Out-of-distribution generalisation
- Test-time training, in-context learning

Simulation

- AI for partial differential equations
- Computer graphics & photorealism

High-Performance Computing

- Parallelisation algorithms
- Efficient linear recurrence inference
- Hardware-aware distributed training

# LANGUAGES

English

French

Japanese

Spanish

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# ROUSSEL DESMOND NZOYEM

PhD researcher specialising in Machine Learning for 3D simulation, Computer Graphics, and Generative AI, with expertise in HPC and meta-learning.

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# 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
- Led 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, with the radiative transfer equation (RTE) solved via a Finite Volume splitting scheme to generate ground truth data

# EDUCATION

PhD in Machine Learning (Interactive AI) | University of Bristol | Bristol, UK

September 2021 — (Anticipated February 2026)

- 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

- Modélisation, 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

# RECENT PROJECTS

MJ-Warp (September 2025)

- Developed novel control algorithms for robotic manipulation in highly realistic physics simulations by integrating NVIDIA WARP with MuJoCo's MJX, directly aligning with research in AI for simulation and VR environments.

# 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

# OTHER SERVICES

- Reviewer** for ICLR'25
- Top Reviewer** for ICML'25
- Reviewer** for NeurIPS'25
- Reviewer** for TMLR
- Reviewer** for EuroPAR'24

# SELECTED PUBLICATIONS

- 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
- Neural Context Flows for Meta-Learning of Dynamical Systems**  
[RD Nzoyem](#), DAW Barton, T Deakin  
International Conference on Learning Representations (ICLR) 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

# SELECTED PREPRINTS

- Weight-Space Linear Recurrent Neural Networks**  
[RD Nzoyem](#), N Keshtmand, I Tsayem, DAW Barton, T Deakin  
arXiv Preprint (2025)
- Language Models Do Not Embed Numbers Continuously**  
A Davies, [RD Nzoyem](#), N Ajmeri, T Silva Filho  
arXiv Preprint (2025)
- FLEX: Feature Importance from Layered Counterfactual Explanations**  
N Keshtmand, [RD Nzoyem](#), J Clark,  
(2025)
- Learning to Learn Sequential Dynamics**  
[RD Nzoyem](#)  
(2025)

# SERVICES & RESPONSIBILITIES

- 24-25th June 2025** — I co-organised the Joint UKRI CDT Conference in Artificial Intelligence, Machine Learning & Advanced ComputingInteractive Artificial Intelligence / Practice-Oriented Artificial Intelligence
- 26-27th March 2024** — I co-organised The Interactive AI Spring Research Conference

# TALKS

- (10 June 2025, University of Bristol, Bristol, UK) **Workshop on Scientific Machine Learning in the Faculty of Engineering** — "[Weight-Space Linear Recurrent Neural Networks](#)"
- (13 Feb 2025, University of Bristol, Bristol, UK) **EPS Seminar Series + Engineering Design Society** — "[Neural Context Flows for Meta-Learning of Dynamical Systems](#)"
- (13 Nov 2024, Institute of Physics, London, UK) **2nd workshop on Physics Enhancing Machine Learning in Applied Mechanics** — "[Differentiable Programming for Mesh-Free Fluid Control](#)"
- (10 Mar 2023, CMU Africa, Kigali, Rwanda) **Graduate Degree Student Seminar** — "[Emerging Techniques and Applications of Graph Neural Networks](#)"

# AWARDS AND SCHOLARSHIPS

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- **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

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**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](mailto:prudhomm@math.unistra.fr) — +33 3 68 85 00 89

## HOBBIES & PERSONAL SKILLS

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**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*).