

# ABOUT ME

I am a proactive researcher building machine learning models for simulation and control. My commitment to applying these to solve real-world challenges is reflected in my research, teaching, outreach, and my hobbies.

# SKILLS

Neural ODEs3D Animation

Inverse problems

Diffusion/Flow matchingGNNs

SimulationTransformers

Differentiable programming

Distributed TrainingCI/CDPDEs

Finite Elements/Volumes

OpenMPMPIUDEs

Foundation ModelsForecasting

Reduced-Order Modelling

- Interpersonal: Teamwork, open-source collaboration, cross-cultural communication
- Work ethic: Rigour, adaptability, efficiency in dynamic and fast-paced environments.

# TOOLS

C/C++CUDAPython

JuliaJAXGitAWSLinux

TensorFlowPyTorchDocker

# RESEARCH INTERESTS

- Model Adaptation
  - Meta-learning, few-shot learning
  - Out-of-distribution generalisation
  - Test-time training, in-context learning
- Machine Learning Systems
  - Computer Vision, Pattern Recognition
  - Linear recurrent architectures
  - Generative AI and foundation models
- Scientific Machine Learning
  - Physics-Informed AI for solving PDEs
  - Spatial simulation of physical systems
  - Differentiable programming at scale

# LANGUAGES

English●●●●●

French●●●●●

Japanese●●●○○

Spanish●●○○○

# ROUSSEL DESMOND NZOYEM

Machine Learning researcher specialising in rapidly adaptable physics-based simulation systems

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# RESEARCH & WORK EXPERIENCE

Visiting Researcher | AMII, University of Alberta | Edmonton, CA

November 2025 — January 2026

- Accelerating in-context learning for world models, with applications to digital twins and character animation
- Hosted by Dr Bahareh Tollooshams

Teaching Assistant | University of Bristol | Bristol, UK

January 2022 — September 2025

- Collaborated with faculty across multiple departments to support 200+ students in AI, HPC, Computer Architecture, and Cloud Computing courses
- Nominated for the Bristol Teaching Awards for excellent lecture quality and student impact

Data Science Internship | SLB (Schlumberger) | Oxford, UK

June 2024 — September 2024

- Scaled Graph Neural Network (GNN) 3D inputs by 10X, enabling production-scale modelling of large-scale PDE systems
- 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 for reservoir simulation

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 differentiable physics simulators (MuJoCo MJX + NVIDIA WARP) for robotics and human body sims
- Accelerated algebraic multigrid solvers by using GNNs, benchmarking across DGL, PyG, and Jraph frameworks

MSc Internship | Jacques-Louis Lions Laboratory (Sorbonne University) | Paris, FR

February 2021 — July 2021

- Developed physics-based generative models for complex, non-linear dynamical systems, simulating ice floe fracture using mass-spring-damper (MSD) systems and 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

- Addressed an inverse problem using a VNet architecture for the supervised reconstruction of a domain's density, with the radiative transfer equation (RTE) solved via a Finite Volume scheme to generate data.

# EDUCATION

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

September 2021 — February 2026

- Thesis: "Learning to Learn Sequential Dynamics: Context-Aware Out-of-Distribution Adaptation for Time Series and Physical Systems", examined by Prof Nathan Kutz and Dr Gabriel Leivas Oliveira
- PhD supervised by Dr. Tom Deakin, Prof. David Barton, and Prof. Simon McIntosh-Smith
- Published 5+ first-author papers at top-tier venues (ICLR, CoLLAs, AAAI, SuperComputing)

MSc in Applied Mathematics (CSMI) | University of Strasbourg | Strasbourg, FR

September 2019 — September 2021

- Theoretical and practical analysis of partial differential equations, signal processing, and deep learning
- Thesis: "Fracturation de floes glace par percussion dans un modèle granulaire", advised by Prof Stéphane Labbé
- 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

# 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

# SERVICES

**Reviewer** for ICLR'25'26

**Top Reviewer** for ICML'25

**Reviewer** for NeurIPS'25

**Reviewer** for TMLR

**Reviewer** for EuroPAR'24

**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 6<sup>th</sup> out of more than 4,000 candidates in the national entrance exam

**GCE A Levels** | Gov. Bilingual High School B'da | Bamenda, CMR  
September 2007 — July 2014

- Série C, with 15.65/20 (mention "Bien")

# RECENT PROJECTS

- MJ-Warp for Spatial Simulation** (*January 2026*)
- Exploring automatic differentiation and gradient-free generalisation (in-simulation) with MuJoCo Warp
  - Ongoing project (code available soon)
- In-Context Learning of Time Series** (*September 2025*)
- Developed a competitive entry for the Singular Stochastic PDE Learning Competition, achieving high-accuracy forecasts of system states under highly noisy conditions
  - Engineered and untangled time-lagged time series to uncover predictive dependencies and empirically test the recently-developed WARP linear recurrent model
- WARP for Weight-Space Learning** (*June 2025*)
- Assembled a team of PhDs and postdocs from UK, France, and the USA to redefined test-time sequence modelling
  - Led to the paper "Weight-Space Linear Recurrent Neural Networks" accepted at ICLR 2026
  - Code: <https://github.com/ddrous/warp>

# SELECTED PUBLICATIONS

- Weight-Space Linear Recurrent Neural Networks**  
RD Nzoyem, N Keshtmand, EC Fernandez, I Tsayem, RS Rodriguez, DAW Barton, T Deakin  
International Conference on Learning Representations (ICLR) 2026
- Language Models Do Not Embed Numbers Continuously**  
A Davies, RD Nzoyem, N Ajmeri, T Silva Filho  
AAAI Student Abstract & Poster Program 2026
- Towards Foundational Models for Dynamical System Reconstruction: Hierarchical Meta-Learning via Mixture of Experts**  
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  
ICLR 2025
- Reevaluating Meta-Learning Optimization Algorithms Through Contextual Self-Modulation**  
RD Nzoyem, DAW Barton, T Deakin  
Conference on Lifelong Learning Agents (CoLLAs) 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

# SELECTED PREPRINTS

- Out-of-Support Generalisation via Weight Space Sequence Modelling**  
RD Nzoyem  
arXiv Preprint 2026
- FLEX: Feature Importance from Layered Counterfactual Explanations**  
N Keshtmand, RD Nzoyem, J Clark,  
arXiv Preprint 2026

## OTHER SERVICES & RESPONSABILITIES

- **24-25th June 2025** — I co-organised the Joint UKRI CDT Conference in Artificial Intelligence, Machine Learning & Advanced Computing Interactive 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

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

**Pr. Christophe Prudh'homme** (IRMA, Unistra)  
prudhomme@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*).