

Duy Le

Research Engineer | PhD

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SUMMARY

Computational research engineer with PhD specialising in physics-informed machine learning and large-scale simulation. Experienced in building end-to-end ML systems, from simulation data generation to distributed training on HPC GPU clusters. Strong focus on scalable system design, performance optimisation, and physically consistent modelling.

SKILLS

Technologies: PyTorch, TensorFlow, Slurm, Python, NumPy, SciPy

Core Areas: Deep learning, multi-node GPU systems, HPC, surrogate modelling, physics-informed machine learning

Additional: Data pipelines, experiment tracking, performance optimisation, Linux systems

EXPERIENCE

PhD Researcher – Computational Modelling & Machine Learning

2022 – 2026

Federation University & CSIRO Data61

Australia

- Designed neural surrogate models for 3D granular flow that approximate discrete element method (DEM) simulations, reducing simulation runtime up to 130x while maintaining physically consistent behaviour through energy and momentum constraints.
- Implemented a Slurm multi-node pipeline (4 x H100 GPUs) that cut end-to-end training time from 48h to 12h (4x), enabling 3x more weekly experiments and supporting 10k–50k-timestep neural surrogate rollouts.
- Developed end-to-end ML workflows covering simulation, data preprocessing, model training, and evaluation on HPC systems.
- Optimized training pipeline: reduced GPU memory footprint by 30% enabling a 2x batch-size increase, cut I/O bottlenecks by 40% via parallel preprocessing and sharded datasets, and increased training throughput 2.5x for large-scale experiments.
- Implemented physics-based constraints (energy, momentum) to stabilise long-horizon predictions.
- Collaborated with CSIRO researchers on model design and domain-specific evaluation metrics.
- First-author on 6 peer-reviewed papers (ICANN 2024, Powder Technology 2026). Delivered a surrogate inference pipeline that accelerated lab experiment turnaround by 10–100x, reducing simulation-to-decision time from days to hours for collaborators.

PROJECTS

Neural Surrogate for 3D Granular Flow

Developed a deep learning model using continuous convolution to generalise across industrial systems (hopper, rotating drum, mixer) with stable long-horizon rollout.

HPC Simulation & Training Pipeline

Designed an automated Slurm-based pipeline integrating physics simulation and ML training with multi-node execution.

Physical Metrics Evaluation Toolkit

Implemented analysis tools for granular flow statistics, including kinetic energy, collision metrics, and flow behaviour.

PUBLICATIONS

Duy Le, Gary W. Delaney, Linh Nguyen, Truong Phung, David Howard, Gayan Kahandawa, Manzur Murshed, “A Neural Network Surrogate for Modelling Granular Flow Dynamics in Industrial Applications with Dynamic Boundary Conditions,” *Powder Technology*, 2026.

Duy Le, Linh Nguyen, Truong Phung, David Howard, Gayan Kahandawa, Manzur Murshed, Gary W. Delaney, “Machine Learning Accelerated Prediction of 3D Granular Flows in Hoppers,” *The 33rd International Conference on Artificial Neural Networks (ICANN)*, 2024.

Duy Le and Linh Nguyen, “Simple linear iterative clustering based low-cost pseudo-LiDAR for 3D object detection in autonomous driving,” *Multimedia Tools and Applications*, 2023.

Duy Le and Linh Nguyen, “An Efficient Force-Feedback Hand Exoskeleton for Haptic Applications,” *International Journal of Intelligent Robotics and Applications (IJIRA)*, 2021.

EDUCATION

Federation University Australia

Australia

PhD in Computational Modelling & Deep Learning

2026

– Thesis: Accelerated Surrogate Modelling of Granular Materials using Artificial Neural Networks

Australian National University

Australia

Master of Engineering (Mechatronics), High Distinction (GPA: 6.2/7)

2021

Ho Chi Minh City University of Technology

Vietnam

Bachelor of Engineering (PFIEV Honours, Mechatronics)

2018

ADDITIONAL INFORMATION

Unrestricted work rights in Australia

Experience collaborating across academia and industry

Strong scientific communication (papers, presentations)