

# LUHAN CHENG

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## To Whom It May Concern:

My name is Luhan Cheng, a computer science (Honours) graduate (GPA 3.5/4) from Monash University. I'm applying for the position of PhD on the topic of knowledge mining at CIRES.

Machine learning provides researchers abilities to computationally generalize knowledge base from large volume of unstructured or semi-structured data. I believe it is critical to understand the entirety of the data processing pipeline to develop efficient knowledge processing algorithm.

I first encountered machine learning during my vacation internship at CSIRO. I was working on implementing a state-of-the-art method for estimating uncertainty in a large-scale convolutional neural network that is part of the crystallography image processing pipeline. I have since then dived into multiple sub-fields of artificial intelligence, including multi-agent reinforcement learning, meta-learning, and self-supervised learning. And I later was involved in multiple inter-disciplinary machine learning projects. I believe that a robust knowledge mining model will be an ensemble of natural language models, meta-learning models and domain adaption algorithms.

I have a concrete theoretical background. I'm interested in the numeric method, information theory and optimization. In one of the most influential international HPC competition, I undertook the task to optimize high-performance conjugate gradient (HPCG), which is a metric for benchmarking how well a HPG system deals with sparse matrix. The skills of optimising real-world applications will be especially crucial for knowledge mining algorithms, which generally consume large amount of computational power.

I'm capable of extending my knowledge to real-world scenarios. Currently, I'm working as Junior higher performance computing consultant at Monash eResearch Centre supporting one of the largest super-computers for biomedical imaging in Australia. At the same time, I'm leading an engineering students' team that set the mission of empowering and engaging student, researchers, and community with artificial intelligence.

In my free time, I explore many emerging technologies that I found interested or entertaining. For example, I developed my own variational auto-encoder in Mathematica as the mean of learning Mathematic. And when I attempted to learn Infrastructure as Code, I developed my own Minecraft Server on AWS using Terraform as deployment tool and Ansible as provision tool.

I hope my qualification and experience would be suitable for the position, I am more than happy to provide further information or attending interviews. Thank you for your time and consideration.

Sincerely,

**Luhan Cheng**