National Industry PhD Program: Enhancing Parameter Efficiency in Large-Scale Transformer Models through Low-Rank and High-Frequency Representations

Adelaide University and the Commonwealth Bank of Australia invite applications for this industry PhD project, improving the parameter efficiency of large-scale transformer models.

Program overview

Degree

Doctor of Philosophy

Research area

Computer Science

Mathematics

Academic supervisor

Professor Simon Lucey

Industry partner

Commonwealth Bank of Australia

Expected commencement

2026

The successful candidate will receive:

- Admission to a PhD program at Adelaide University;
- An Adelaide University Research Scholarship for 4 years, paid at $53,635 p.a., and a tuition fee waiver;
- Supervision from research specialists at Adelaide University and CommBank;
- Industry embedment with CommBank; and
- Access to professional development opportunities through the University's Graduate Research and Innovation Training program.

Project details

This PhD project will explore novel approaches to improving the parameter efficiency of large-scale transformer models, such as Vision Transformers (ViTs) and Large Language Models (LLMs), with a focus on reducing fine-tuning and training costs without sacrificing model performance. It will build upon recent advances in low-rank matrix adaptation techniques (e.g., LoRA) and extend preliminary work that introduces high-frequency sinusoidal augmentation to improve the expressive capacity of low-rank matrices.

The outcomes of this project will directly support CommBank's strategic goal of building and maintaining sovereign, high-performing transformer models while reducing compute costs. It has broad implications for the financial sector, where LLMs and ViTs must operate efficiently under constraints such as low latency, high trust, and secure onshore infrastructure. The work will also contribute to global research on efficient deep learning, offering insights into scalable, performant transformer architectures.

This project will be undertaken in collaboration with Prof Simon Lucey of the School of Computer Science and Information Technology, and research specialists at CommBank. The student will located with the CommBank Centre for

Foundational AI Research at the Australian Institute of Machine Learning, Adelaide University City campus.

Eligibility Requirements

This opportunity is open to both domestic and international students who can meet the requirements for PhD admission at Adelaide University (including English language proficiency in the relevant academic area), and who can demonstrate suitable academic experience in Mathematics or Computer Science (through a high-quality Honours or Master's degree). Selection criteria include:

Academic Qualifications

• Completion of a four-year undergraduate degree in Mathematics or Computer Science (Honours), or a Master's degree in Mathematics or Computer Science.

Research Experience

• Demonstrated ability to conduct

research in Artificial Intelligence.
• Highly desirable: publications in AI-relevant conferences or journals.

In addition, the successful applicant should be able to demonstrate the following attributes:
• Foundational knowledge in machine learning and deep learning.
• Proficiency in programming languages such as Python and C++, with some experience using relevant tools and frameworks.

The successful candidate must be able to enrol as a full-time PhD student at the University in the year of the offer. They must remain based in Adelaide, South Australia for the duration of the award.

Students that have previously completed a PhD program are, unfortunately, ineligible for the National Industry PhD Program.

Application Process

To apply, please email the following documents to CommBank Centre Manager Rosa Pearson (rosa.pearson@adelaide.edu.au) with the subject line 'National Industry PhD Program application':

- CV
- Cover Letter (of not more than 2 pages) outlining your interest in the PhD project and describing how your background and research area align with the project
- Degree certificates and relevant academic transcripts, with translations of non-English documentation

Applications close on **27 February 2025**. Please note that applications will be shortlisted on a rolling basis, and the scholarship advertisement may be withdrawn early if a suitable candidate is identified.

About the National Industry PhD Program

The National Industry PhD Program is an Australian Government initiative to enhance workforce mobility among graduate researchers, and to promote knowledge transfer between academia and industries across all areas. PhD candidates under this program are connected with academic supervisors and industry-based researchers, to co-design innovative, applied research projects. Through their doctoral candidature, students will experience research in both university and industry settings, and undertake specialised training in research translation and commercialisation.

General Enquiries

For further information about the National Industry PhD Program, or research degrees at Adelaide University, please contact the Adelaide University Graduate Research School