Research Office
1 University Drive
Athabasca, AB T9S 3A3

Research Assistant Opportunity
Casual Position
Improving Optimization Algorithms through Novel Heuristics

Position start date: April/May 1st 2026

Overview: Optimization algorithms are often used to solve complex problems across many diverse domains. While existing algorithms can be effective, they can struggle with problems that have complex fitness landscapes or a large number of dimensions. This research explores the design, analysis, and application of novel heuristics to enhance the efficiency, accuracy, and adaptability of optimization methods. The work will emphasize applications in medical research and grammatical inference, with the potential to impact a broad range of other fields.

Specific activities include, but are not limited to:

1. Developing high-quality Python code with a focus on modified, extensible machine learning algorithms.
2. Conducting literature reviews on optimization algorithms.
3. Development and execution of test cases.
4. Data analysis of the results from test cases.
5. Report (or paper) writing.

Qualifications:

- Must have excellent knowledge of the following optimization algorithms: 1) Genetic algorithm, 2) Particle Swarm Optimization, and 3) Ant Colony System. Other optimization algorithms considered a plus.
- Strong Python development skills.
- Strong logical reasoning and analytical skills preferred.
- Ability to read and interpret scientific literature preferred.
- Good writing skills.

The initial research phase will focus on developing a robust, extensible machine learning framework. Existing libraries cannot be used as the goal of the research is to significantly modify how the algorithms function. Subsequent phases will investigate different techniques for enhancing optimization algorithms both for established benchmarks, such as TSPLIB, but also for applications in real-world domains.

Research assistants are not expected to develop novel heuristics; however, any ideas will be considered. Acknowledgment will be provided in publications and in the library README for work completed in any phase. Co-authorship is possible for any phases after the first.

How to apply:

Please send your CV to cbernard@athabascau.ca along with an a short email highlighting how your skill set aligns with the qualifications.

Athabasca University and the researchers are committed and seek to support equity in employment and research opportunities. We strongly encourage applications from Indigenous people, people of colour, people with disabilities, 2SLGBTQ+ people, women, and other historically marginalized groups. Applicants are welcome, but not required, to self-identify in their letter of application.

For more information on this Research Assistant Opportunity, please contact cbernard@athabascau.ca Applications will be accepted until a suitable candidate is found.