Research Office
1 University Drive
Athabasca, AB T9S 3A3

Research Assistant Opportunity
Casual Position
Automated Modelling through Grammatical Inference

Position start date: September 1st 2025

Overview: Grammars are well-known, compact techniques for modelling a wide range of generative processes. Lindenmayer systems (L-systems), in particular, have proven effective for modelling cellular processes, especially plant growth. Despite their descriptive power, grammars remain underutilized in modelling because discovering complex models is challenging. This research explores the automatic inference of grammatical models directly from data generated by the process itself. Inferred models are both high accuracy while being easier to produce, with potential applications in medicine, crop development, urban planning, and many other domains.

Specific activities include, but are not limited to:
1. Developing high-quality Python code with a focus on machine learning and logical inference techniques.
2. Conducting literature reviews on applications of grammatical models and grammatical inference.
3. Development and execution of test cases.
4. Data analysis of the results from test cases.
5. Report (or paper) writing.

Qualifications:
- At least intermediate-level Python development skills.
- Intermediate-level C++ preferred.
- Familiarity with machine learning techniques, particularly search algorithms.
- Strong logical reasoning and analytical skills preferred.
- Ability to read and interpret scientific literature preferred.
- Strong writing skills.

The initial research phase will focus on converting existing C++ code into a robust, maintainable Python library. Subsequent phases will involve implementing new techniques for inferring grammars, especially L-systems. Later phases will explore identifying and applying automated modelling through grammatical inference in real-world domains.

Research assistants are not expected to develop novel inference techniques; 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 all 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.