



# Constraint Horn Clauses for Verification of C++ Object-Oriented Programs

Hochschule München is among the largest German universities of applied sciences, located at the heart of Munich, Germany. The working group "AEMY" focuses on safe, secure and smart systems. Our main working areas include RISC-V processor design, WebAssembly runtime development and open source chip design tools.

Constraint Horn Clauses (CHCs) provide a promising foundation for program verification. They combine first-order logic with background theories (like arithmetic or arrays) and can encode program semantics, invariants, and safety properties in a uniform way. Many state-of-the-art verification tools (e.g., Z3 Spacer, Eldarica, SeaHorn) rely on CHCs as their core representation. Potential areas of focus include:

- Encoding state and invariants of class objects
- Modeling methods, constructors, and destructors as logical transitions
- Handling inheritance and polymorphism in the CHC framework
- Checking safety properties (e.g., memory safety, invariants, assertions)

This project offers an opportunity to gain hands-on experience in static analysis tools and CHCs. For further information or to express your interest feel free to reach out.

If you are interested, please get in touch:

[mario.qosja@hm.edu](mailto:mario.qosja@hm.edu)

Find more on our website:

<https://aemy.cs.hm.edu>

