

Bachelor and Master projects:

Make Mathematics  WATERPROOF with type theory and
computer programs

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proofs \cong programs

Did you ever feel that writing down a mathematical proof is a lot like programming? That's no coincidence, because there is a precise correspondence between proofs and programs. It can be used to:

- let a computer verify that a proof is correct,
- interact with a computer program to construct a proof together.

Fantastic software exists for proof verification and interactive theorem proving. So far, it is not mainstream yet, but I believe that it has large potential for mathematics research and education.

Educational software Waterproof

Together with students, we have built the educational software Waterproof. Students can write their proofs within Waterproof, receive hints and a lot of feedback, and finally have their proofs automatically checked.

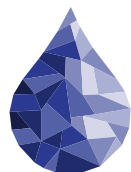
Bachelor and Master projects

In Bachelor and Master projects we investigate how to improve Waterproof, in particular for mathematical analysis and geometry. Some projects focus on the necessary underlying theory, type theory, others focus more on how to approach existing mathematics within type theory, and yet other projects use machine-learning techniques such as reinforcement learning to automate the theorem proving or to provide students with hints.

Try it yourself

You can try Waterproof yourself, by installing it from

`https://github.com/impermeable/waterproof`



WATERPROOF

Read more about Waterproof

You can read more about Waterproof and its philosophy in the [Supremum article \(Supremum 52, no1, page 12\)](#).