

Welcome to AI-Assisted Programming!

A Hands-On Workshop for PhD Researchers

Course Description

This three-day course introduces PhD researchers to the principles and practices of AI-assisted programming. You will learn to work effectively with agentic AI coding assistants, such as OpenCode, Claude Code, and other open-source alternatives, to accelerate your research workflows. The course runs **1–3 September 2026** at **Helmut Schmidt University Hamburg**.

The course emphasizes practical application. On the first two days, you build a shared example project in guided hands-on labs, covering version control, planning, verification, and critical evaluation of AI-generated code. On the final day, you apply the complete workflow to a programming project of your own and present the results. This gives you firsthand experience with both the capabilities and limitations of these systems.

Learning Outcomes

By the end of this course, you will be able to:

- Apply version control fundamentals: use Git to track changes, manage AI-generated code, and maintain reproducible research workflows.
- Work with agentic coding assistants: set up and operate an AI coding agent, manage its permissions and context, and apply the core loop of exploring, planning, implementing, and verifying.
- Plan effectively with AI: structure projects, write detailed specifications, and use AI to refine problem definitions before writing code.
- Verify and test AI-generated code: give agents automated checks, apply test-driven practices, and confirm that generated code does what it claims.
- Evaluate AI output critically: identify security risks, licensing concerns, and common failure modes, and know when not to delegate to AI.
- Extend AI capabilities with external tools: configure MCP servers for domain-specific context and equip agents with reusable skills for recurring tasks.
- Apply AI across the research workflow: use AI agents for literature research and reference management, and draft scientific text with rigorous cross-checking of claims and citations.
- Communicate technical work effectively: present a completed project, including demonstration, process reflection, and actionable insights for peers.

How This Website Works

Each session has a lecture page. Click the “RevealJS” link in the top-right corner of a lecture page to view the slides in your browser; a PDF export is also available from the same spot.

Labs are step-by-step pages meant to stay open next to your editor while you work. Each lab includes checkpoints marked with git tags, so you can catch up if you fall behind or want to jump ahead.

The chat assistant in the sidebar answers questions about course content, so use it whenever you need a pointer back to the right page.

Before the Course

Before you arrive, complete the steps on the [Setup](#) page. In particular, apply for the free Zed student plan at least one week before the course starts.

Questions

Reach out any time at vlcek@beyondsimulations.com.

Bibliography