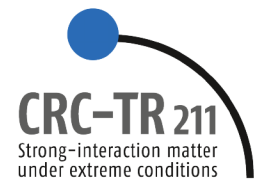


From 22 to 26 June 2026

# Z02-powered HGS-HIRe power week: Bash – From zero to working knowledge

→ aimed at Ph.D. students and young postdocs



Dr. Alessandro Sciarra<sup>†</sup>

Trainer

## Abstract

Modern computational physics has become numerically intensive and structurally complex. Over the past decades, both algorithms and hardware architectures have evolved dramatically, and contemporary research projects routinely rely on articulated, multi-step workflows: simulations and data acquisition, preprocessing, large-scale data handling, post-processing, statistical analysis, visualization, and archiving. Coordinating these phases efficiently is no longer a marginal technical skill; it is a core scientific competence. In this context, mastering a scripting language that natively orchestrates tools, processes, and computing environments is of utmost importance.

This five-days, from-zero lecture aims to bring the audience to a good understanding of Bash and tools nearby, as well as to teach how to be more effective in daily tasks (without forgetting good clean-code practices). Although few technical aspects are left out, this short lecture is very complete and rich in examples and any attendee will be able to fill any possible leftover gap afterwards.

While most scientists today naturally adopt Python for almost any scripting task – often for very good reasons – a solid command of a shell language unlocks a different and complementary level of efficiency. Bash does not compete with Python; it completes it. There are many scenarios in which Python works, but is not the optimal tool: rapid orchestration of command-line programs, file system manipulation at scale, job submission pipelines on clusters, automation of repetitive tasks, environment configuration, or lightweight data processing streams. Confidence in Bash means reducing friction in daily work and gaining direct control over the computational environment.

The training is conceived as a pedagogical and engaging experience, with a dynamic alternation of focused lectures and hands-on sessions. Concepts are immediately put into practice, turning passive understanding into operational competence. There will be ample space for questions, discussion, and exploration of directions suggested by the participants themselves, allowing the course to adapt to the concrete needs of a physics-oriented audience. Exercises are not an appendix but the core of the learning process, ensuring that each participant leaves with practical skills, not only theoretical notions.

Offered in the spirit of life-long learning and requiring essentially no prerequisites, this course invites participants to rethink their workflows from a new perspective. By the end of the training, attendees will not only feel comfortable navigating and scripting in Bash, but will also be able to redesign parts of their computational pipeline more cleanly and efficiently – and, at the very least, will use their shell with greater confidence, precision, and productivity in their everyday research routine.

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<sup>†</sup>sciarra@itp.uni-frankfurt.de

# Course information

## Thematic focus

The training is tailored to PhD students doing computational science who have to deal with software and data on a regular or even daily basis. The main focus is Bash scripting language. The core of the language will be introduced in the very beginning of the course and both language features as well as Unix surrounding tools will be explored more and more throughout the week, enriching the participants section after section.

## Prerequisites

It will be assumed that you have been (or in the best case will be) working with software and data processing *for a while*. Basically, the only prerequisite is knowing the basics of using a shell on a Unix system (or WSL 🐉 on Windows). Knowing some other scripting language to deal with data files, like Python, will enrich your experience, but it is not required. Any previous knowledge of Bash is welcome and this course will refresh, polish and complete it. You will reflect on your knowledge during the course, while discovering and learning Bash.

## Requirements

Every participant is assumed to fulfil the following requirements.

1. **Bring a laptop** to work on during the training<sup>1</sup>.
2. **Make sure to have a recent Bash installed**. Running `bash --version` in your terminal will show which Bash version is available on your system. Any version from `v4.0` onward is sufficient for the course, while `v4.4` or more recent is recommended. If the command is not found, Bash is probably not installed on your system<sup>2</sup>. This situation is uncommon, but in that case you'll need to install it. To install Bash you can refer to online documentation or, as a kick-off, to [this overview](#). If you choose to install a newer version, prefer the latest stable release available through your package manager. If you do not manage to get a recent Bash version working on your machine, **please contact the trainer well in advance before the course**. Note that it is perfectly fine to work over SSH e.g. on your university machine.
3. **Choose an own script and have it ready**. If you ever wrote any Bash script, choose one of those. Picking one not written by yourself but used in your working group is also fine. If you do not have any Bash snippet to bring, pick a script in another language, likely in Python. As rule of thumb, such a small script should be between few tens and some hundreds of lines long, but for sure not longer of ~1000 lines.

## Registration

Registration is simply done by email to [info@hgs-hire.de](mailto:info@hgs-hire.de).

## Further information

This power week has been jointly organized together with the CRC-TR 211 collaboration. In case of a large request, a waiting list will be established and organisers will consider to enlarge the participants number, as far as possible.

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<sup>1</sup>If you do not have one, please contact the trainer.

<sup>2</sup>Or, strictly speaking, it is not available in your `PATH`. If this is the case, you should likely know it.