



Erlangen Regional
Computing Center



KONWIHR

Competence Network for Scientific High-Performance Computing in Bavaria

Gerhard Wellein, Hans-Joachim Bungartz
Katrin Nusser, Gerasimos Chourdakis



The Idea

Work closely with a Bavarian computing center to improve runtime and scalability of your code:

- Analyze your code's performance
- Discover bottlenecks
- Parallelize & optimize your code
- Optimize your algorithms
- Evaluate alternative architectures



This means:

- Get funding
- Work for some time at the compute center on your project
- Get personal support from HPC experts



Funding: Bavarian Ministry for Science and the Arts

Bayerisches Staatsministerium für
Wissenschaft und Kunst



North: FAU (Prof. Gerhard Wellein, Dr. Katrin Nusser), RRZE



South: TUM (Prof. Hans-Joachim Bungartz, Gerasimos Chourdakis), LRZ



The activities are spreading

Contact your local computing center:

Rechenzentrum TH Deggendorf: Helena Liebelt, Peter Faber

Uni Regensburg: Tilo Wettig

Uni Würzburg: Fakher Assaad, Florian Goth



Universität Regensburg



How To

- Application deadlines: 1st of March / 1st of September
- Types of projects
 - Small (up to 3 months) - 10.000€
 - Large (up to 12 months) - 50.000€
 - Basis projects - 10.000€
- Details on konwihir.de
- Apply via email to info@konwihir.de
- **At the end:**
 - A project report, including references to any publications
 - A short description and a figure for our website

COMPETENCE NETWORK FOR SCIENTIFIC
HIGH PERFORMANCE COMPUTING IN BAVARIA

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ABOUT KONWIHR HOW TO APPLY **PROJECTS** CONTACT

News

KONWIHR Workshop: New Projects 2019
Being in a KONWIHR project means having open communication channels with your host compute centers, as well as being a member of a research community with common challenges and goals... >

Partners


New issue #93 of Quartl published
Issue 93 of the KONWIHR-Quartl is now available. It contains articles on the following topics: [Modeling of Particle Processes](#)...

Quartl
[Rechenzentrum Universität Würzburg](#)
[Rechenzentrum Universität Leoben](#)
[Rechenzentrum TU Deggendorf](#)

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ABOUT KONWIHR HOW TO APPLY PROJECTS CONTACT

Optimizing the Parallel Granular Gas Solver to study the crater formation

Applicant
Prof. Dr. Thorsten Pöschel
Institute for Multiscale Simulation
Friedrich-Alexander Universität Erlangen-Nürnberg

Project Summary
The moving sand dunes, volcanoes and the dense planetary rings are granular systems which consists of countless number of particles. The study of such huge systems is impossible with current particle based methods such as Discrete Element Method (DEM) and Event-Driven Molecular Dynamics (EDMD). However, a hydrodynamical (H-D) method is a suitable alternative to study these phenomena. The hydrodynamic analysis of the granular flow describes the system by average field variables like particle number density, flow velocity and temperature. The time evolution of these quantities is governed by hydrodynamic equations. The solution to these equations provides valuable information about the granular systems.

We developed a granular flow solver that is based on C++ and interfaced with MPI standard to solve the hydrodynamic equations of the granular flow. We did several optimizations to increase the performance and parallel efficiency of the Granular Flow Solver. The optimizations include modifying the MPI communication pattern, the listing of the functions, memory management and eliminating the repetitive operations. These optimizations improved the single-core and parallel efficiency of the solver significantly.

time = 0 second time = 0.5 second time = 1.0 second

