Project Chrono

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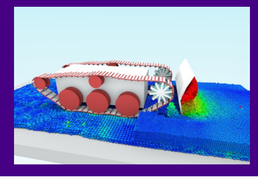
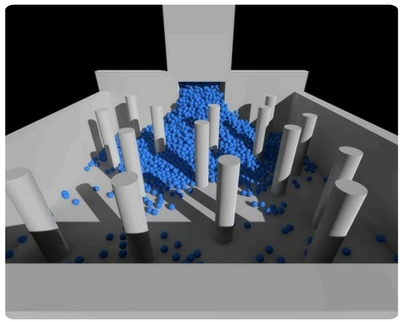


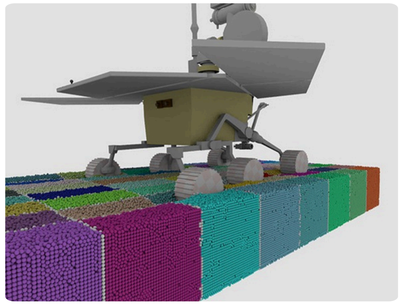
Background:

Project Chrono is an open-source physics simulation framework supporting multibody dynamics, fluid-solid interactions, and vehicle simulations, widely used by researchers, industry professionals, and government agencies.

Technologies:

Chrono relies on Eigen3 as its core dependency, integrates optional libraries like Blaze and Thrust, and supports parallelization via MPI, OpenMP, CUDA, and more, reflecting its scale and configurability.



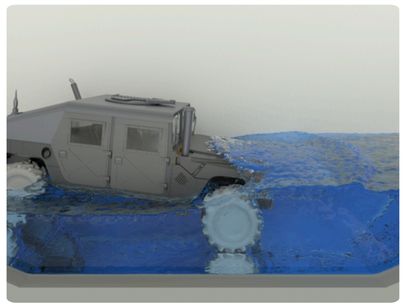


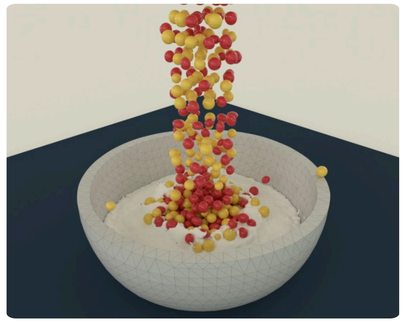
Roadblocks:

We initially struggled with finding the correct paths for required libraries (Eigen3, Blaze) and lacked full visualization capabilities due to missing HPC visualization software on the cluster.

Analysis & Insights:

We would like to find a significant bug we are capable of fixing, or at least a few small ones. Currently, one of the main issues people seem to have with Chrono is installation. There is an installation guide on the ProjectChrono website that we could revamp to include solutions to common problems that people encounter. For another more technological contribution, a user recently found some inefficiencies in the arithmetic throughout the code. For example, Chrono often uses std::pow(x,3) instead of x*x*x (which is the more readable option in my opinion). The user who reported the issue found that making this change made a significant impact on performance.





Contributions & Conclusion:

we dont currently have this, but here we will go into detail about contributions we made, why we made them, and the impact they had. This will include results of testing we did (and what those tests were).

References:

Further information, source code, and community discussions are available on the Project Chrono GitHub (Chrono) and official Google Group forum.

Design by Faith Forman

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