

# SCORE - SINTEF Corporate Project

Our vision is for SINTEF to become recognized as a worldwide leader on Smoothed Particle Hydrodynamics (SPH) modeling for industrial applications.

## What is SPH?

SPH (Smoothed Particle Hydrodynamics) is a fully Lagrangian, meshless numerical method for computations of fluids and solids. Unlike Eulerian methods, such as finite difference or finite volume methods, where matter is transported through the grid, in SPH the nodal points trace material motion by moving together with material. This leads to advantages on certain types of problems that are difficult to handle with Eulerian methods due to excessive numerical diffusion typical for those methods. Such problems include e.g. free surface flows, multiphase flows, mixing, violent motions of solids with large deformations and gradients.

SPH is a relatively new method. It was introduced in astrophysics in the 1970s, and is a standard computational technique in that field nowadays. From the beginning of 1990s, efforts have been made to apply SPH for engineering problems. Certain aspects that are not relevant for astrophysical applications, create challenges in engineering, e.g. treatment of boundary conditions. Resolving those challenges is part of the SCORE project.

## Briefly about the project

The project aims to establish a core programming framework for building a general and customizable SPH simulator for use within SINTEF's application areas. In addition the project aims to demonstrate the value of the collaborative spirit of the project which fosters organizational unity and cross disciplinary research in SINTEF.

Six out of our eight institutes are participating in the project: from the SINTEF foundation; Building and Infrastructure, ICT and Materials and Chemistry and from the incorporated Institutes; MARINTEK, Fisheries and Aquaculture, and Petroleum Research.

The corporate project has a budget of 6MNOK/yr in the period 2011 through 2013.

The project is executed using principles from scrum. The team convenes at least quarterly for three day workshops known as sprints, where overall targets for the next period have been set prior to the workshop and the small steps needed to reach these goals are set and worked on during the sprint. In order to maintain progression the team assembles bi-weekly for so called mini-sprints, where current status and targets are discussed and tasks assigned and worked on. Meeting regularly and physically working together has proven both effective and very stimulating for the team. Thus we have come far in reaching our goal of establishing an integrated SINTEF SPH team.

We will keep you posted on the progress and achievements of the project through these newsletters.

– The SPH Core team.





# SINTEF

Technology for a better society

## ***SCORE contacts in SINTEF institutes***

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