

SINGA Awards – IHPC Projects

Name:	Dr Alex K.H. Lee	Programme :	Large Scale Complex Systems
Designation :	Research Scientist	Email:	leekh@ihpc.a-star.edu.sg
Research Area/ Theme			
<ul style="list-style-type: none"> • Discipline: Mechanical/Aerospace Engineering • Area: Computational Fluid Structure Interaction <ul style="list-style-type: none"> ○ Discontinuous Galerkin Methods ○ Hybrid Meshes ○ Turbulence Modelling 			
Proposed Project Title:	Fluid-Structure Interaction Coupling using Discontinuous Galerkin Methods on General Hybrid Meshes		
<i>Please provide a short write-up of the proposed project (s)</i>			
<p>The project aims at proposing new and efficient solutions for the numerical simulation of physical phenomena related to complex flows in interaction (fluid-structure interactions). Scientific activities sweep a large range from physical modeling to design and analysis of numerical methods. A particular emphasis is put on the validation of the methods proposed on realistic configurations and their algorithmic - possibly parallel - implementation.</p> <p>Our research topics mainly concern fluid dynamics. We study possible partitioned procedures for the transient solution of fluid – structure interactions, and more precisely the coupling in time between solvers for the fluid and the structure, aiming at constructing new, stable, and efficient algorithms (originally, applications to incompressible fluids were considered: wind engineering of structures and hemodynamics in biomedical engineering). These algorithms can be used also for time-subcycling by subdomain in wave propagation problems. Finally, in more standard compressible CFD, we consider viscous fluids with complex state laws and solve Navier-Stokes equations based on a perfect gas law solver modified using a relaxation method.</p>			