



Center for Research on Innovative Simulation Software

[Research and Development of Advanced Simulation used in Industry]

<http://www.ciss.iis.u-tokyo.ac.jp/english/>

Aiming at Innovation in MO-NO-DU-KU-RI

Advanced simulation software drastically changes engineering

For developing leading-edge technologies to simulate all processes from material development to disposal and meeting the demands of building a sustainable society, Center for Research on Innovative Simulation Software (CISS) is reconstructing and dramatically strengthening core competencies in dynamics and developing fundamental technologies that are implemented to advanced simulation software. We aim at

- ◆ Conducting world-leading advanced research on hyper-large-scale simulation software
- ◆ Strengthening the educational foundation to educate how to make and use hyper-simulation software for industrial application
- ◆ Putting R&D results in common industrial use to enhance global competitiveness of domestic engineering

Center Director	Center Vice Director														
YOSHIKAWA, Nobuhiro <i>Professor</i>	UMENO, Yoshitaka <i>Professor</i>	HAMBA, Fujihiko <i>Professor*</i>	KATO, Chisachi <i>Professor</i>	OSHIMA, Marie <i>Professor*</i>	SATO, Fumitoshi <i>Professor</i>	HASEGAWA, Yosuke <i>Professor</i>	MIZOGUCHI, Teruyasu <i>Professor*</i>	INOUE, Junya <i>Professor*</i>	OOKA, Ryozo <i>Professor*</i>	ONO, Kenji <i>Visiting Prof.</i>	FURUKAWA, Akira <i>Associate Prof.*</i>	TOCHIGI, Eita <i>Associate Prof.*</i>	NAGAI, Kohei <i>Associate Prof.</i>	KIKUMOTO, Hideki <i>Associate Prof.*</i>	KUBO, Atsushi <i>Assisutant Prof.</i>

* Cooperative members

Introduction of the Research

Building New Discipline of Integrated Mechanics

Function of Materials

- J. Inoue**
Data-driven approach to understand and predict steel microstructures and their properties
- N. Yoshikawa**
Developing high pressure hydrogen tank supported by meso-scale simulation
- E. Tochigi**
Local strain analysis based on atomic-resolution in situ TEM
- C. Kato**
Absolute vorticity in a centrifugal blower
- F. Hamba**
Contours of kinetic energy of turbulent diffusion in rotating system.

Development of Cutting-edge Simulation Software Packages

- Y. Umemo**
Deformation of Polycarbonate by Coarse-Grained Particle Model Simulation
- M. Oshima**
Schematic of integrated simulation system "M-SPhyR Circulation" (Multi-scale and physics simulator for circulation)

Probability and Quantum Computational Science

- K. Nagai**
Failure of RC beam-column joint by RBMS
- A. Furukawa**
particle configurations of glass-forming liquids under shear flow
- F. Sato**
Highest occupied molecular orbital of insulin drawn by cloud-like model
- R. Ooka**
Analyses of flowfield in and around building using Lattice Boltzmann Method
- H. Kikumoto**
Identification of pollutant sources in an urban space by applying turbulence and statistical analysis

Fluid and Thermal Physics

- Y. Hasegawa**
Instantaneous turbulent flow over a flat plate under optimal control for heat transfer enhancement and friction drag suppression
- K. Ono**
Web-based workflow system WHEEL

Example of Major National Project being Promoted by CISS

Program for Promoting Researches on the Supercomputer Fugaku:
Drastic acceleration of the industrial applications of HPC through AI and research and development of new computational methods for the next era (2023-2025)

- Overview: We will prove that industrial applications of HPC can be drastically accelerated by the use of AI and will implement the results of the research in a broad range of manufacturing fields. In addition, we will develop new computational methods, which will serve as the basis for the HPC in the next era.
- Responsible organization: The Univ. of Tokyo; Kobe Univ.; Toyohashi Univ. of Tech.; Nihon Univ.; Meiji Univ.; RIKEN; Shipbuilding Research Centre of Japan.; Honda R&D Co., Ltd.

(Courtesy of Shipbuilding Research Centre of Japan)

