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

High performance simulation software drastically changes engineering

Center for Research on Innovative Simulation Software (CISS) was found to conduct R&D on the advanced and practical computational science simulation software utilizing hyper-large-scale simulations represented by “Kei” for the next hyper-simulation era. 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

Introduction of the Research

Manufacturing

- C. Kato
  Absolute vorticity in a centrifugal blower

- N. Yoshikawa
  Developing high pressure hydrogen tank supported by meso-scale simulation

- F. Hamba
  Contours of kinetic energy of turbulent diffusion in rotating system. Red denotes right-handed helical motion and blue denotes left-handed helical motion

- Y. Hasegawa
  Instantaneous turbulent flow over a flat plate under optimal control for heat transfer enhancement and friction drag suppression

Design of Molecular and Nanoscale Materials and Devices

- F. Sato
  Highest occupied molecular orbital of insulin drawn by cloud-like model

- T. Mizoguchi
  Wave function at the bottom of the conduction band of MgO at (top) ground state, (middle) core-hole state at Mg2p orbital, and (bottom) core-hole state at Mg1s orbital

- Y. Umeno
  Deformation of Polycarbonate by Coarse-Grained Particle Model Simulation

Medical engineering and Environmental Building Science

- M. Oshima
  Schematic of integrated simulation system “M-SPhyR Circulation” (Multi-scale and physics simulator for circulation)

- R. Ooka
  Analyses of flowfield in and around building using Lattice Boltzmann Method

- K. Ono
  Web-based workflow system WHEEL

- K. Nagai
  Failure of RC beam-column joint by RBSM

Major National Project being Promoted by CISS

Program for Promoting Researches on the Supercomputer Fugaku:
Research and development of innovative fluid-dynamics simulations for performance predictions by using Fugaku (2020-2022)

- Overview: We develop application software, by which optimal performance of HPCI (High Performance Computing Infrastructure), including supercomputer Fugaku, is got and manufacturing processes are changed.
- Responsible organization: The Univ. of Tokyo; Kobe Univ.; Kyushu Univ.; Iwate Univ.; Toyohashi Univ. of Tech.; Univ. of Yamanashi; RIKEN