#### SIMULATION DRASTICALLY CHANGES ENGINEERING



# Center for Research on **Innovative Simulation Software**

Research and Development of HPC Simulation Technology and Industrial Applications of the Technology]

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

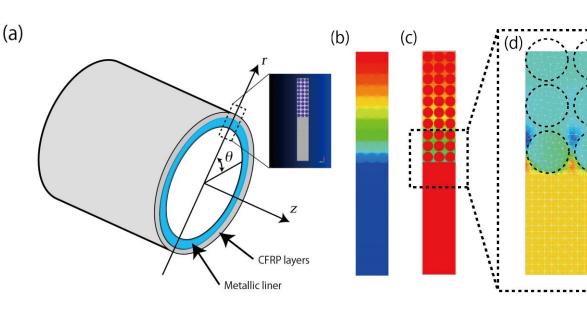
## **Aiming Innovation in MO-NO-DU-KU-RI**

## 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

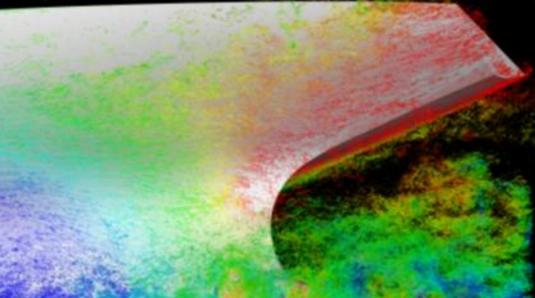
- Conducting world-leading advanced research on hyper-large-scale simulation software
- Strengthening the educational foundation to educate how to make and use hyper-simulation software for industrial application
- Putting R&D results in common industrial use to enhance global competitiveness of domestic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

## **Digital Engineering**

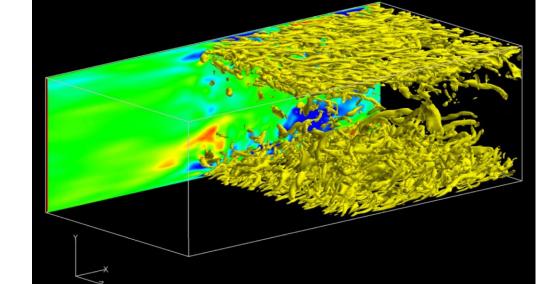


#### Yoshikawa Lab.

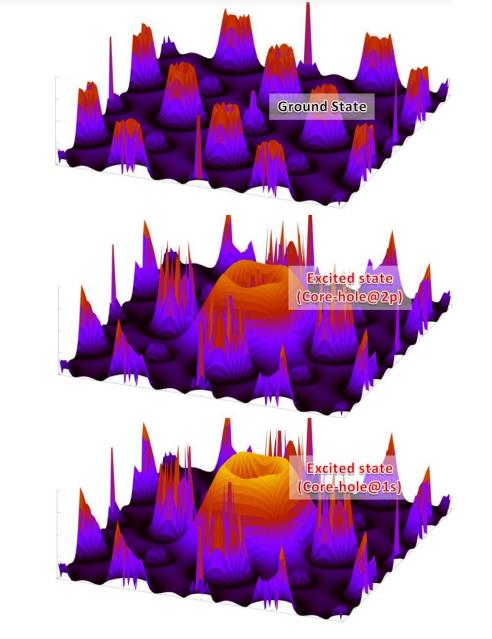
**Meso-scale simulation of residual strain after** curing process of carbon-fiber-reinforced plastic (CFRP) tanks for fuel cell vehicles



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



### Nano-technology



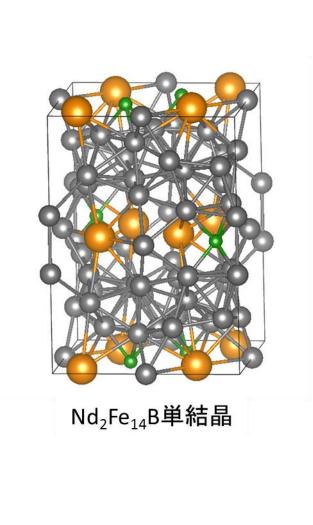
#### Mizoguchi Lab.

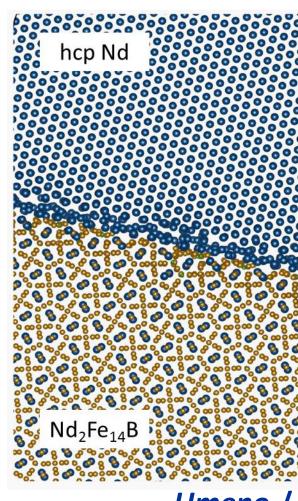
Wave function at the bottom of the conduction band of MgO at (top) ground state, (middle) core-hole state at

Mg2p orbital, and (bottom)

core-hole state at Mg1s

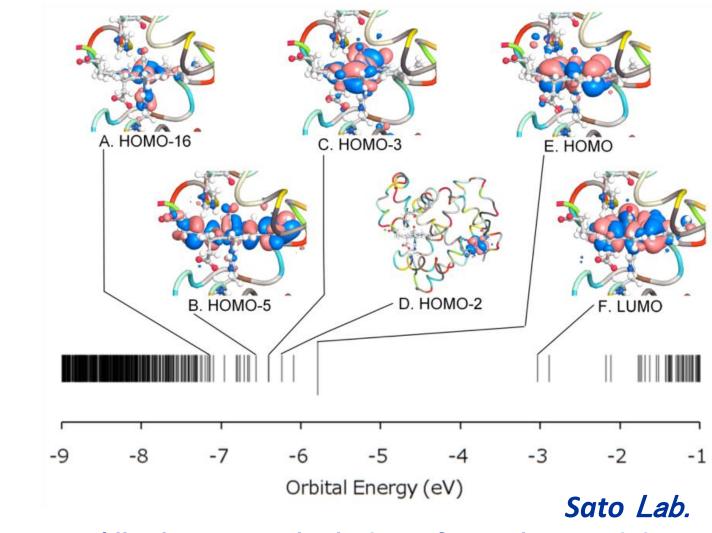
orbital





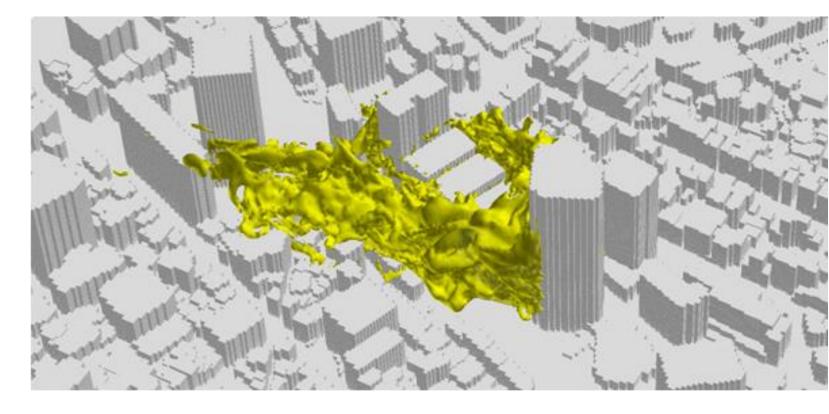
Umeno Lab.

#### **Atomistic modeling of interface of NdFeB** (neodymium magnet)



All-electron calculation of metal-containing protein (MbCO)

## **Disaster Mitigation**





Large Eddy Simulation for Diffusion of Hazardous Materials in Buildings Complex

Hamba Lab.

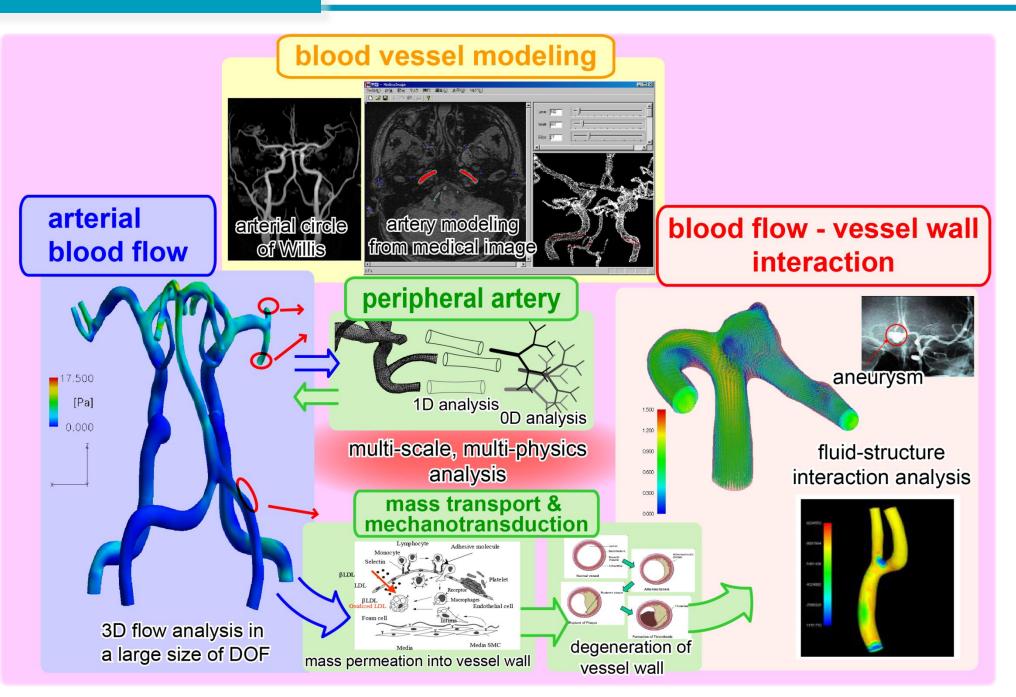
Hasegawa Lab.

C. Kato Lab.

Large-scale fluid-flow computation for ship hydrodynamics that uses 32 billion grids

Analysis of velocity field in turbulent channel flow for hybrid **RANS/LES** simulation

### **Medical Support**



Ohshima Lab.

Schematic illustration of integrated simulation system "M-SPhyR Circulation" (Multi-Scale and Physics SimulatoR for Circulation)



