Interactive exhibit: Skin-age estimation

# Yoshikawa Lab.

### [New Frontiers of Solid Mechanics via Simulation Integrated Material Testing]

Center for Research on Innovative Simulation Software

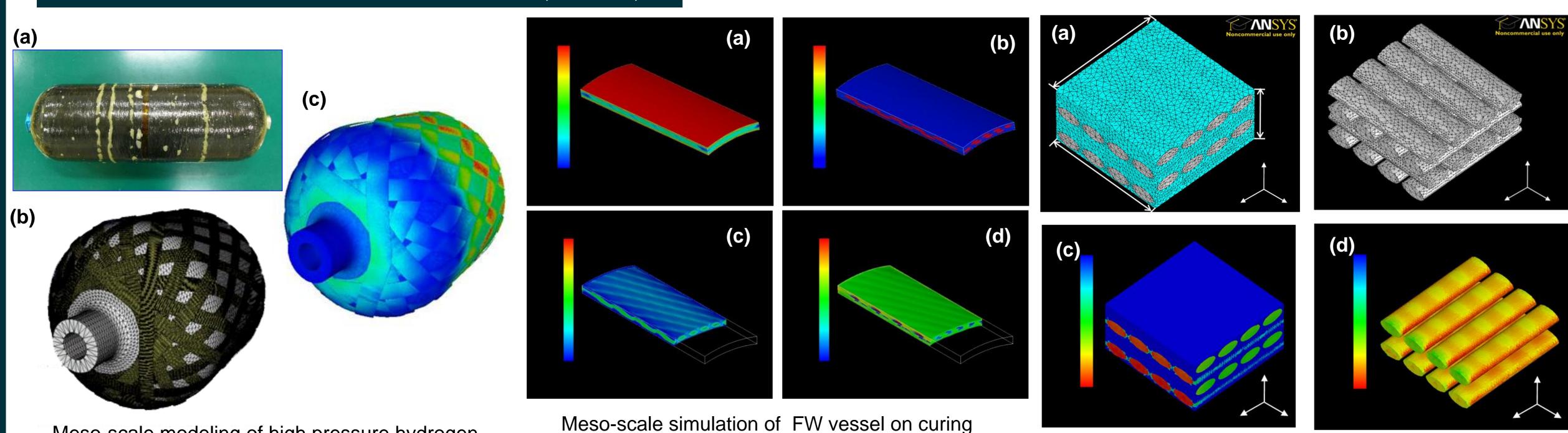
http://www.young.iis.u-tokyo.ac.jp

Multi-scale solid mechanics

Graduate school of engineering, Department of Mechanical Engineering

## New Frontiers of Solid Mechanics via Simulation-Integrated Material Testing

### Carbon Fiber Reinforced Plastic (CFRP)



- Meso-scale modeling of high pressure hydrogen tank for fuel-cell vehicle
- (a) Type III FRP vessel (b) FEM model
- Mises stress distribution

- process
- (c) Residual strain (d) Residual stress
- (a) Temperature (b) Degree of cure

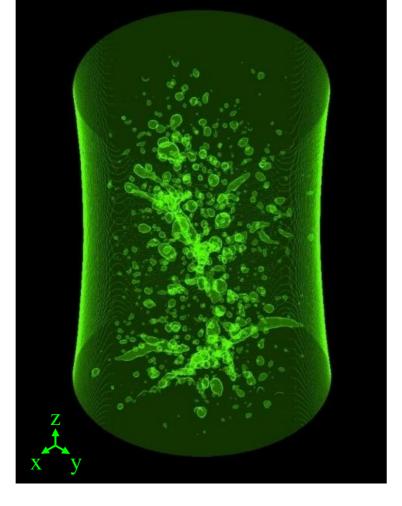
Meso-scale damage propagation analysis of laminate. FEM models for (a) Resin, (b) fiber bundle.

Estimated stiffness deterioration in (c) resin, (d) fiber bundle.

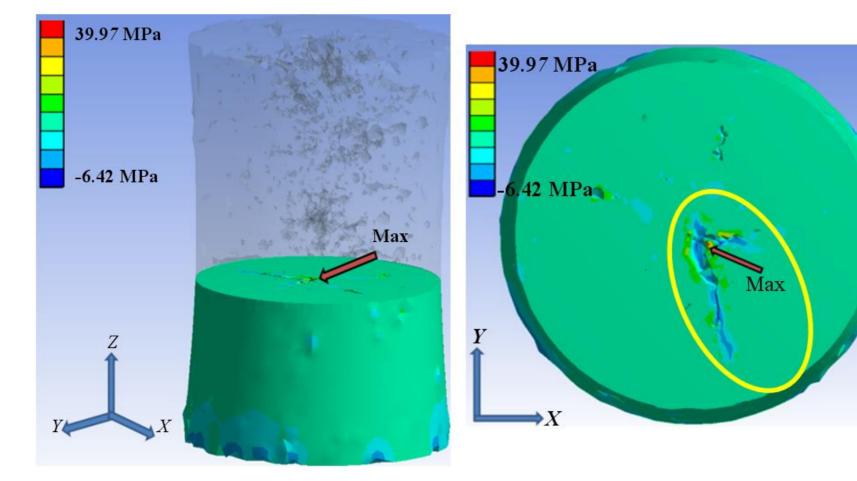
#### **Aluminum die cast**



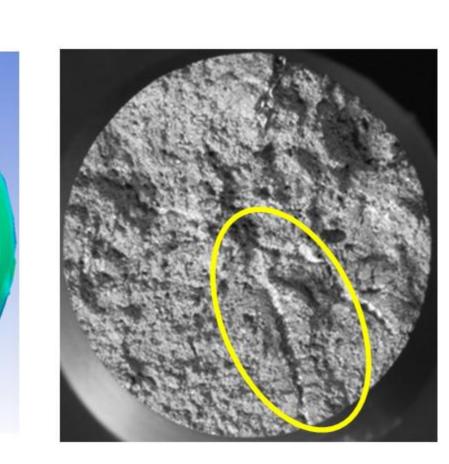
Automobile parts by aluminum die casting



3D porosity distribution obtained by X-ray CT



Prediction of fatigue crack initiation site by principal stress



Fractographical proof

