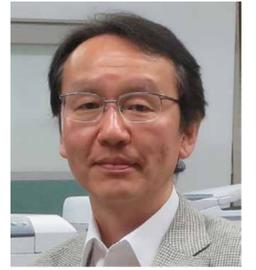


# KAWAGUCHI LAB.

## Spatial Structures as Architectures for Human Beings



Department of Human and Social Systems

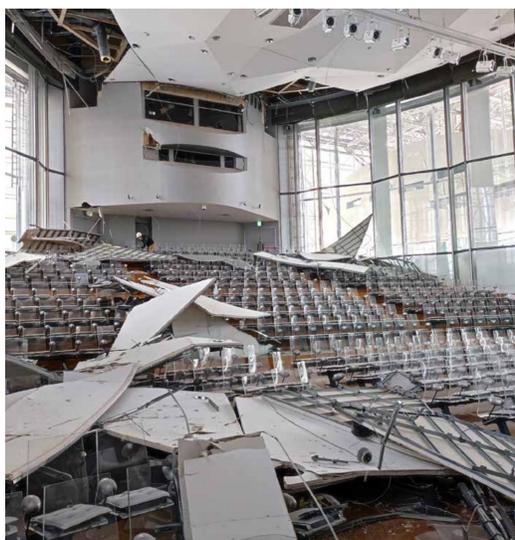
Building Structure, Spatial Structure  
Department of Architecture, Graduate School of Engineering

<http://space.iis.u-tokyo.ac.jp>

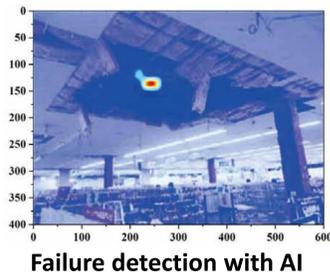
## Safety of Large Roof Buildings

Ceilings in large roof buildings such as gymnasiums and halls tend to be high and large. In the buildings, however, falling of ceiling panels and lighting equipment have often occurred irrespective of earthquakes. If once small damage to the ceiling was found, the buildings cannot serve as shelters which are frequently requested functions during disasters.

Failures of non-structural components have occurred in many large roof buildings, not only during earthquakes. Harming people due to the falling of ceiling panels had occurred as well. We have been investigating the safety of large roof buildings and developing the method to prevent the falling of ceilings.



Failures of ceilings in  
2022 Fukushima Earthquake



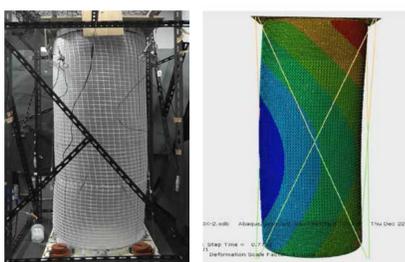
Seismic damper devices  
for narrow walls



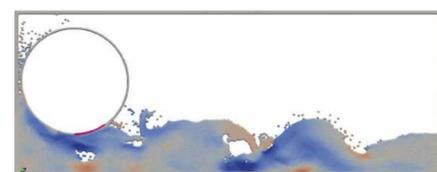
Real-scale tests of the safety net



Ceiling reinforcement with cables



Compression experiments and  
behavior analysis of air tubes



Simulation of air membrane shelter  
using MPS method

## Structural Performance of Buildings

We have been researching and developing various buildings which practically use advantages of spatial structure. The application of living plants for building structures is also investigated.



Construction of tensegrity  
structures



Investigation on swallowing  
behavior of plants



Air membrane shelter



Preservation of historical  
shell architectures