

SCIAZKO LAB.

Energy and Porous Materials

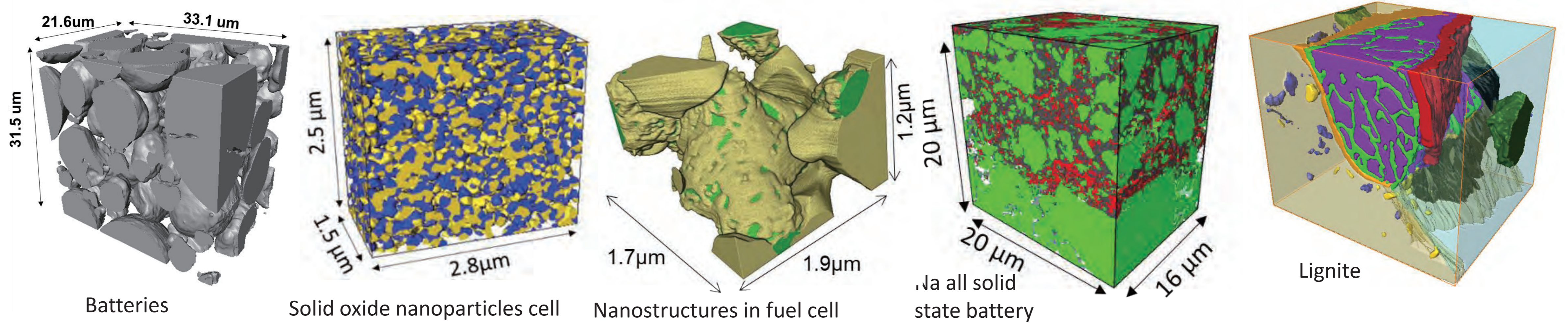
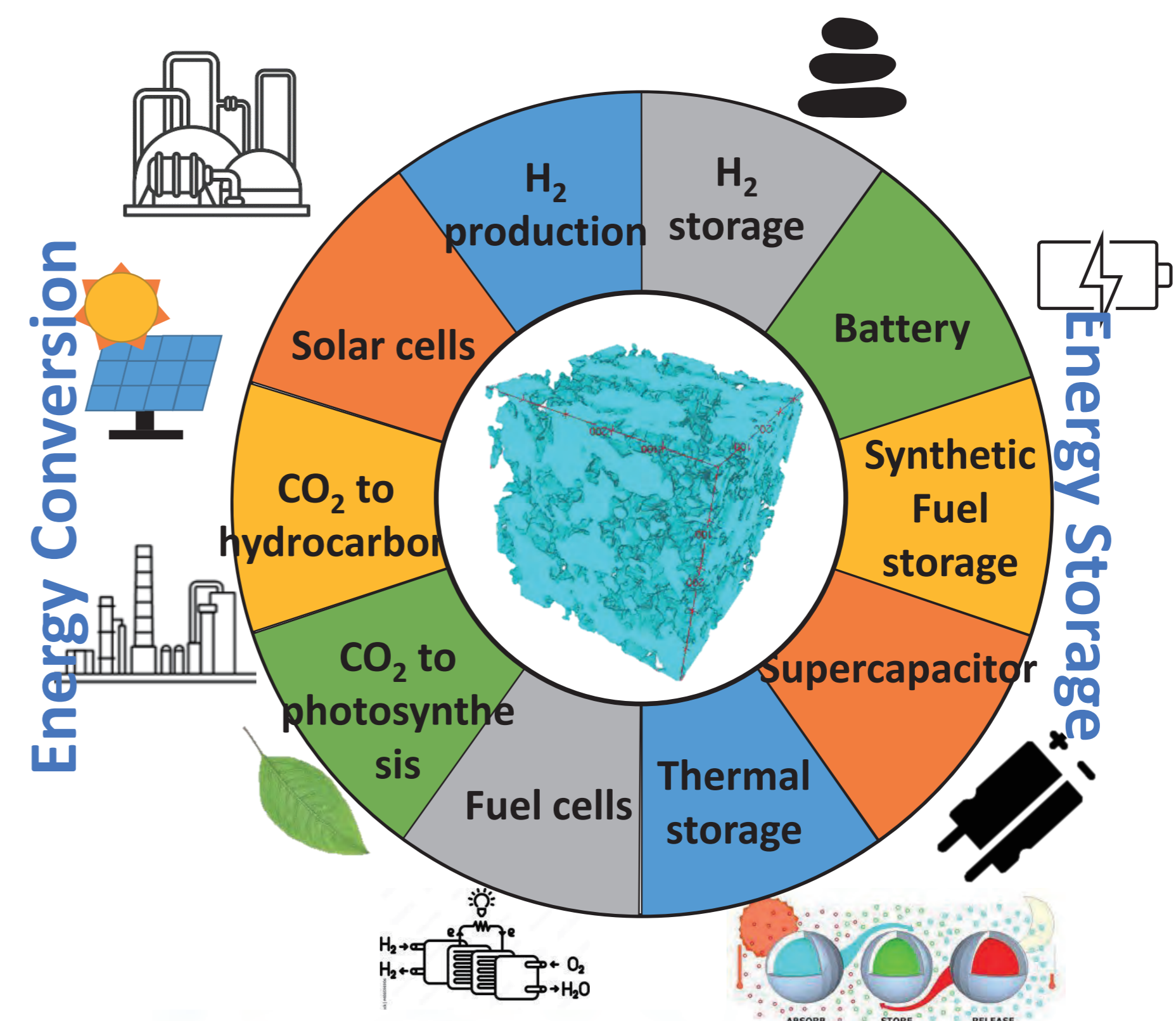


Department of Mechanical and Biofunctional Systems

Thermal and Electrochemical Processes Engineering
 Department of Mechanical Engineering, Graduate School of Engineering <https://sites.google.com/g.ecc.u-tokyo.ac.jp/sciazkolab/>

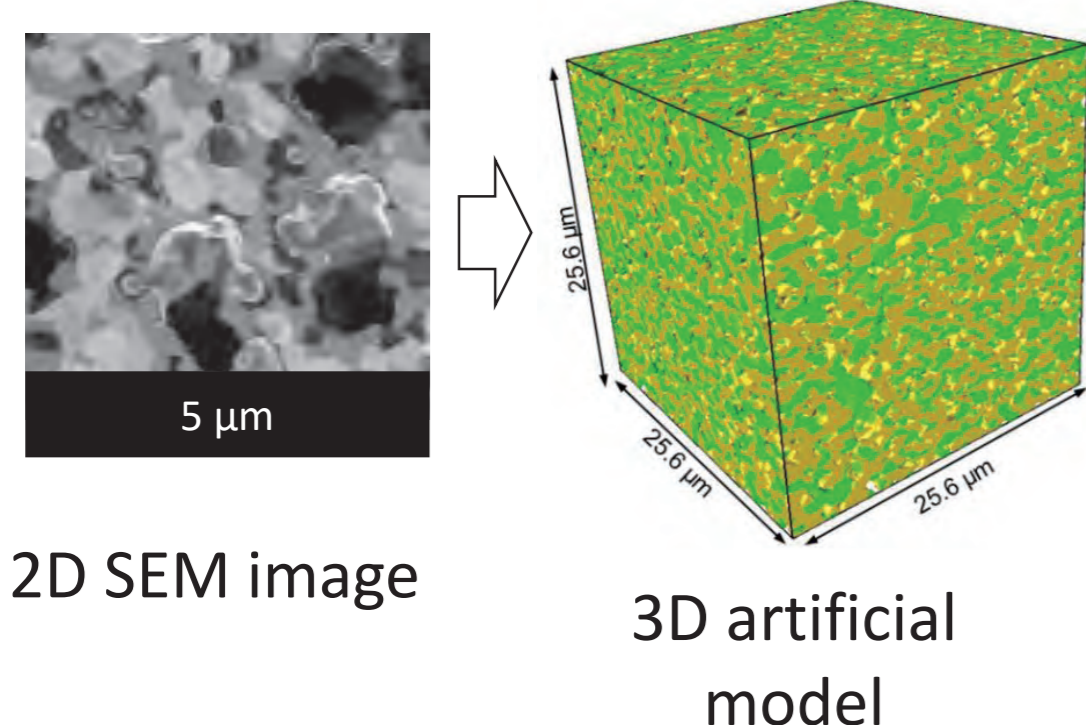
Porous materials in fuel processing and energy technologies

Efficient energy utilization and fuel processing are crucial from the technological, environmental and social points of view. Numerous energy conversion technologies rely on porous structures. Within our laboratory, we specialize in the production and utilization of synthetic fuels alongside electrochemical reactions within electrolysis, fuel cell and batteries systems. Our emphasis lies in understanding the intricate relationship between the **microstructures** of energy devices, their **performance**, and the mechanisms leading to **degradation**.

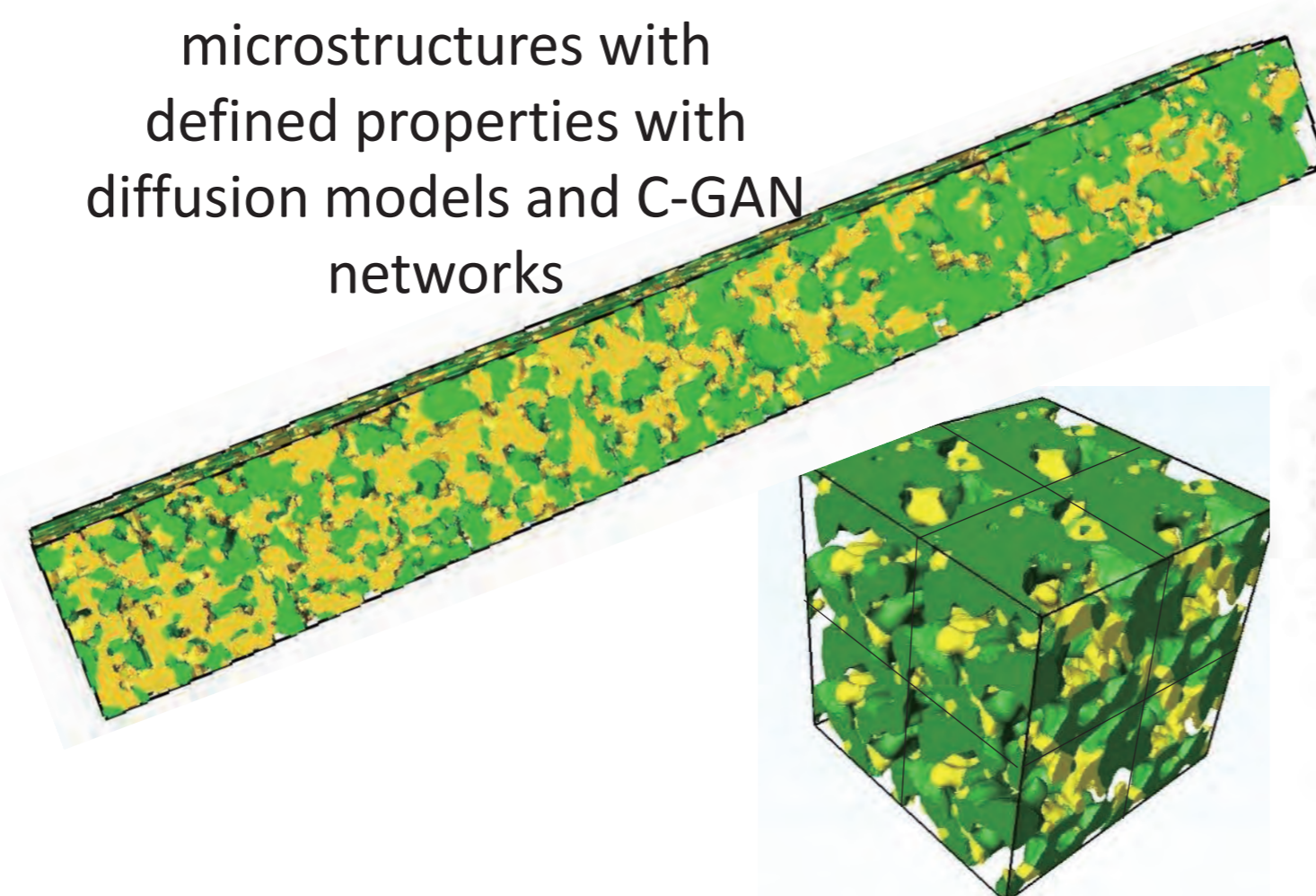


Prediction of porous materials' microstructure and its evolution using machine learning

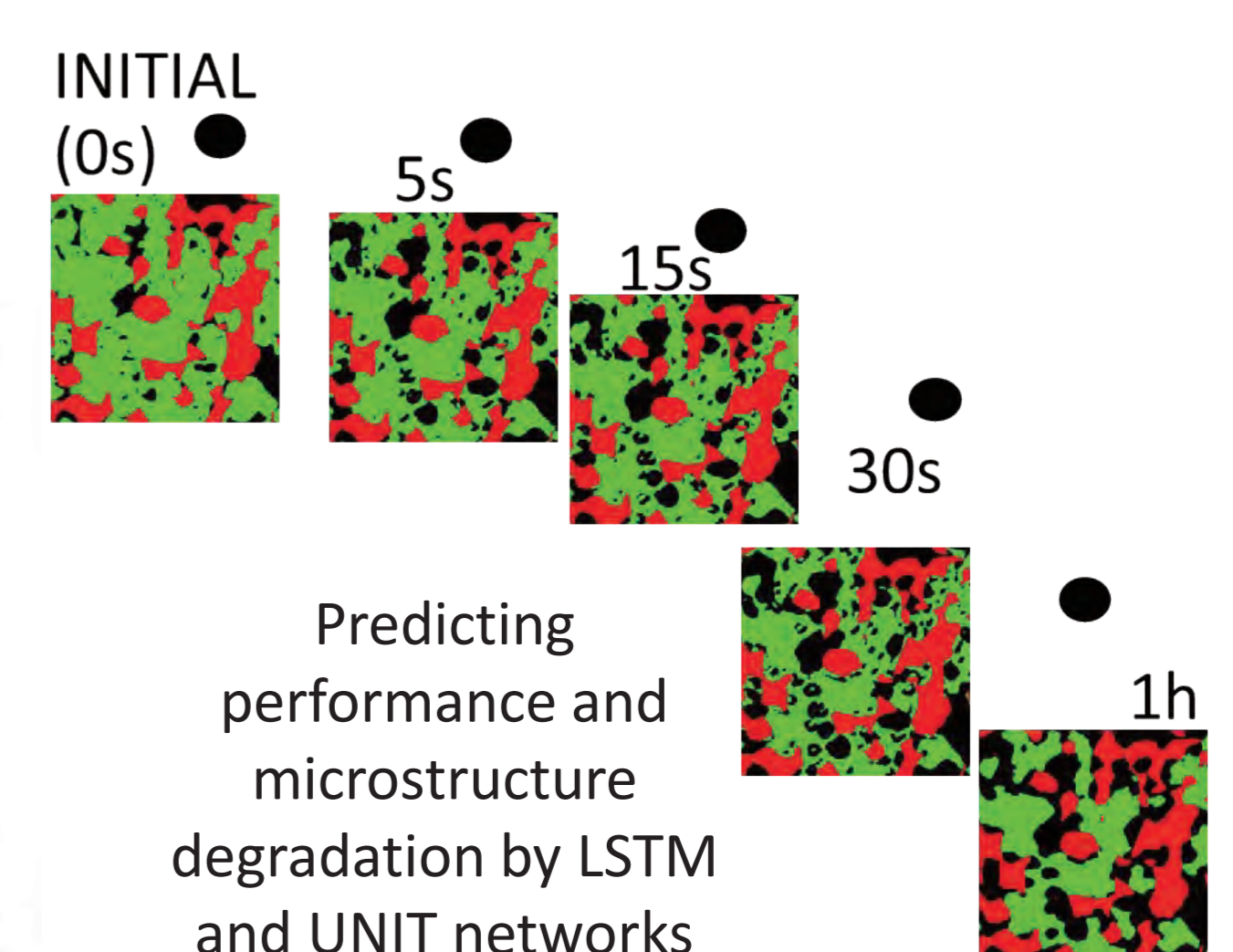
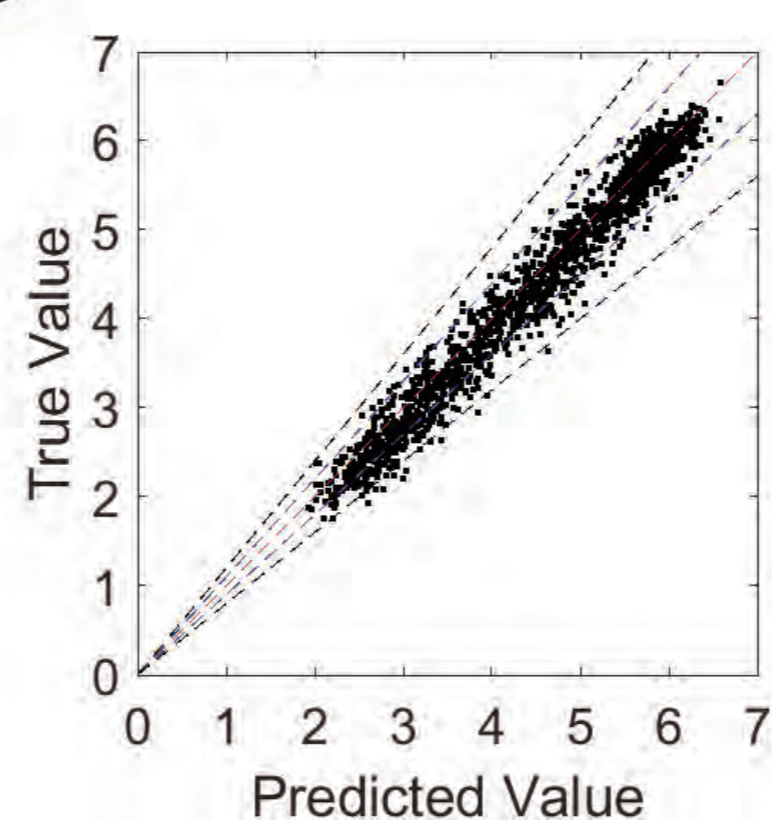
Improving the measurement by super-resolution, segmentation algorithms and 3D reconstruction from 2D image



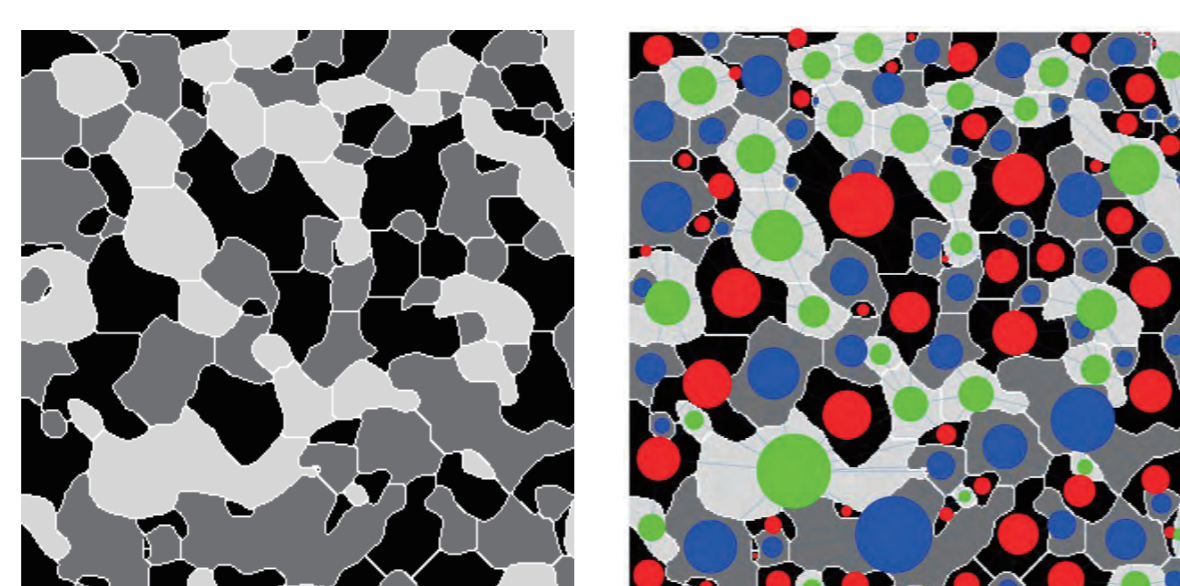
Generating artificial microstructures with defined properties with diffusion models and C-GAN networks



Predicting 3D parameters from 2D cross-section with CNN network



Graph neural networks for microstructures



Active learning

