

Mathematical Informatics Research Unit

We deal mainly with fundamental fields and applications concerning mathematical model and analysis, computer science and information processing, big data, and data science.

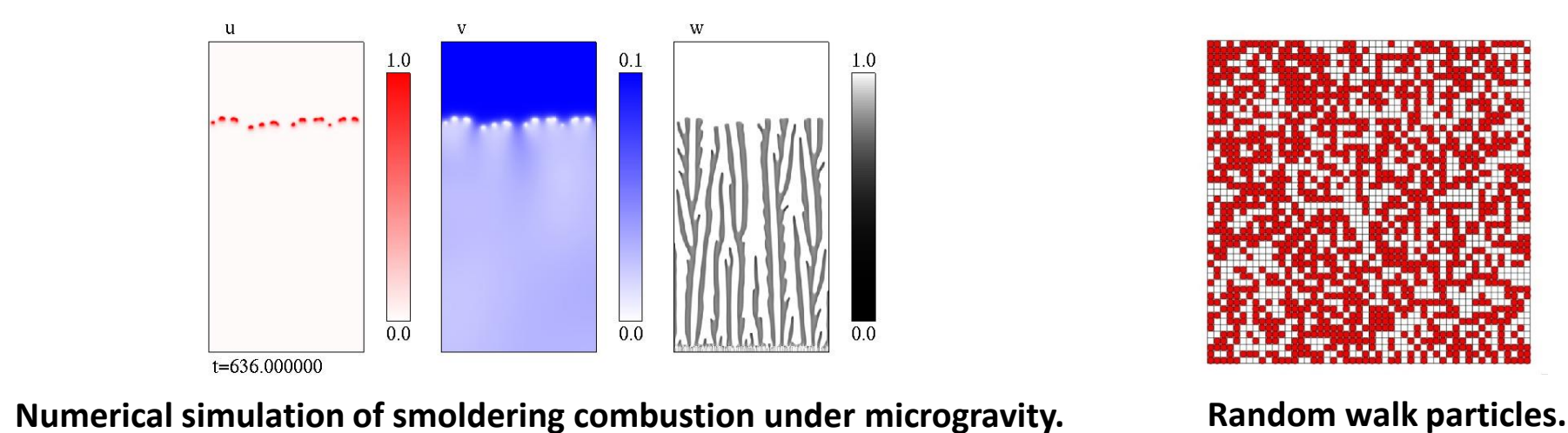
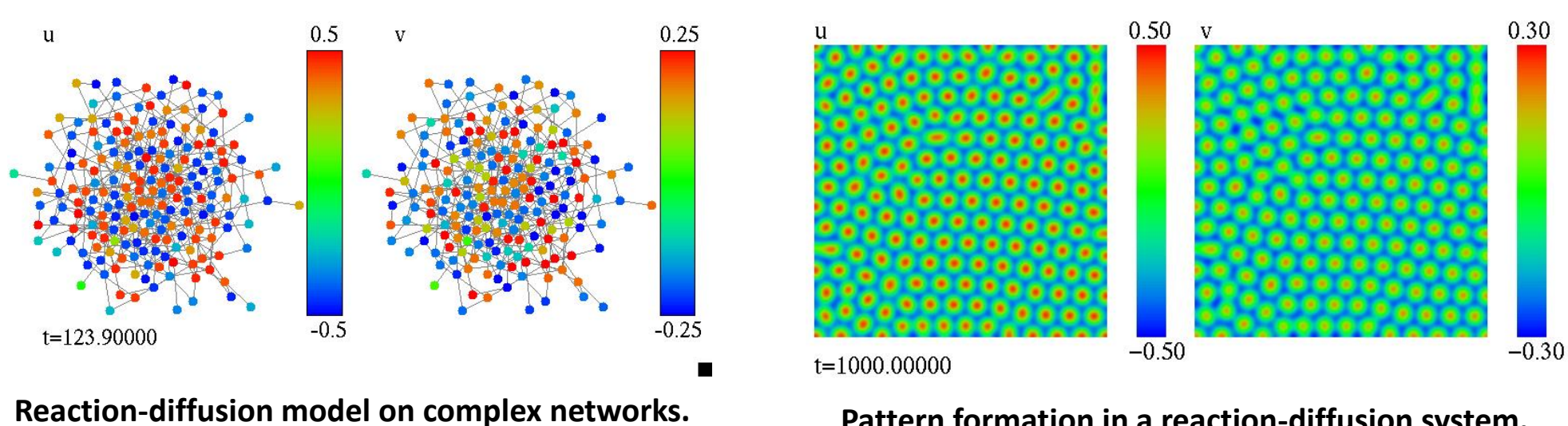
1) Mathematical Model and Analysis

(Example 1) Applied Analysis

: We try to understand complex phenomena through mathematical modeling, numerical simulation and theoretical analysis.

(Example 2) Pattern Formation

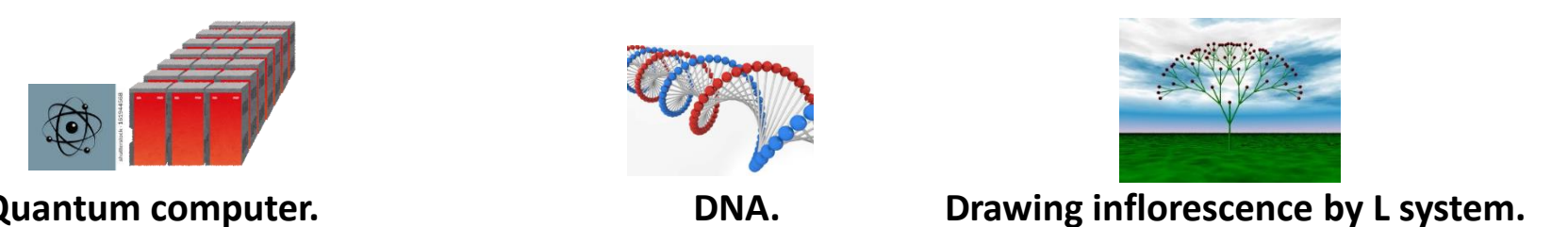
: We study pattern formation problems arising in nature such as animal coat patterns, bacterial colonies, vegetation patterns etc.



2) Computer Science and Information Processing

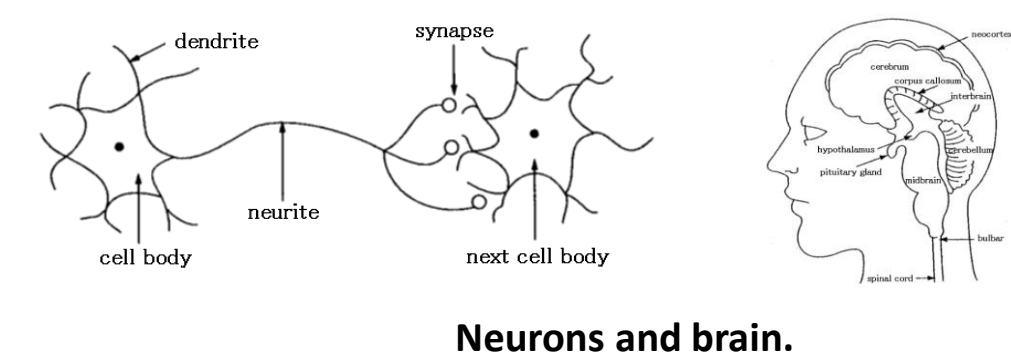
(Example 1) Natural Computing

: We deal with the computational property and the principle of information processing hidden in various phenomena of natural world such as quantum computation, molecular computing, cellular automata, L system.



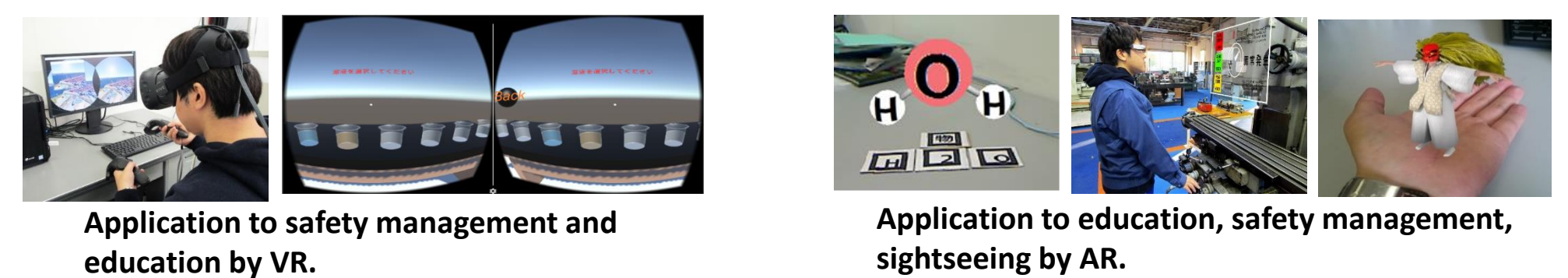
(Example 2) Artificial Intelligence (AI)

: We try to investigate various applications of artificial intelligence (AI) such as reinforcement learning and deep learning.



(Example 3) Virtual Technology

: We are challenging study to apply virtual technologies such as VR, AR, MR to various industries.

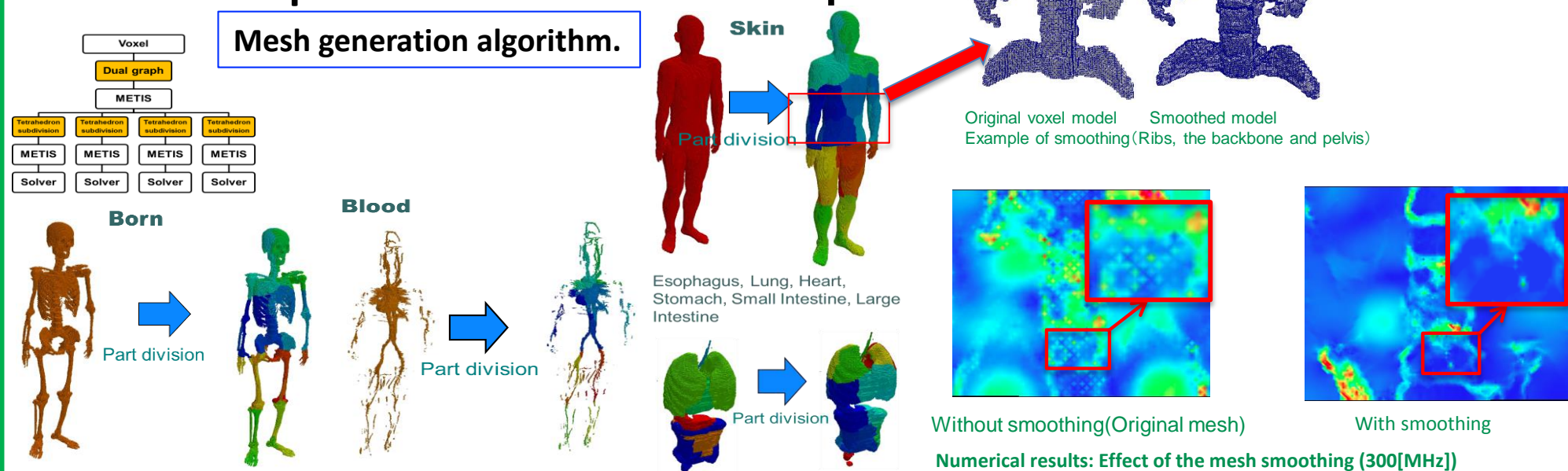


3) Big Data

(Example 1) Simulation and Visualization

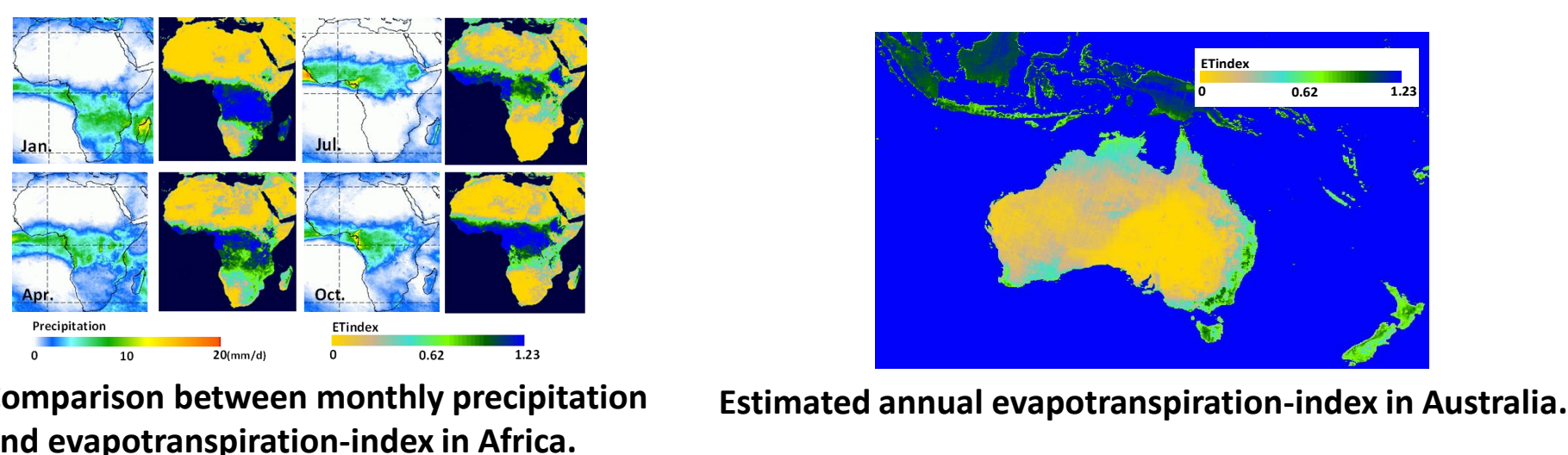
: We study the methodology of a parallel electromagnetic field analysis for estimation inside human body using high-resolution anatomical human body models.

1. Making dual graph by input data (numerical human voxel model)
2. Subdivision of voxel to tetrahedron in each part at after part division
3. Division of part to subdomain in each part



(Example 2) Remote Sensing

: We research the influence of the global environment mechanism and human activities on the global environment by big data through remote sensing.



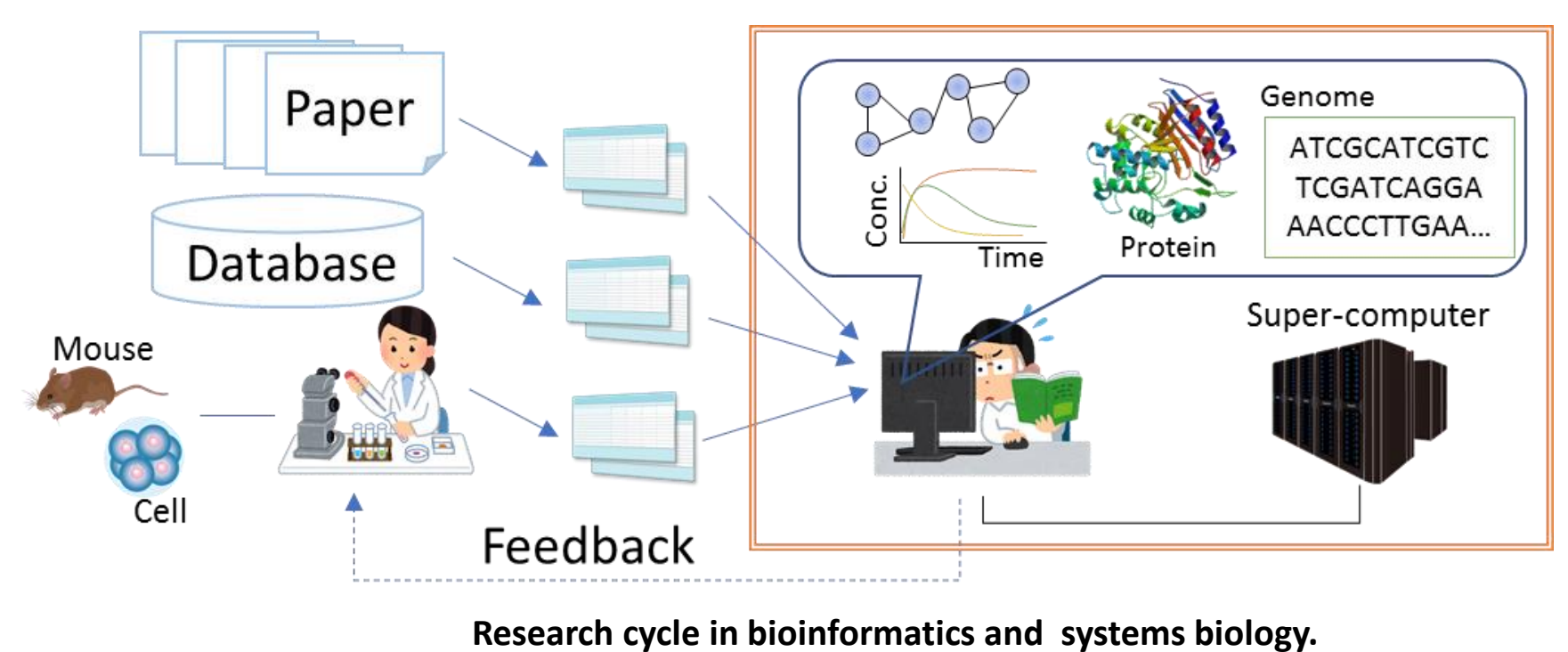
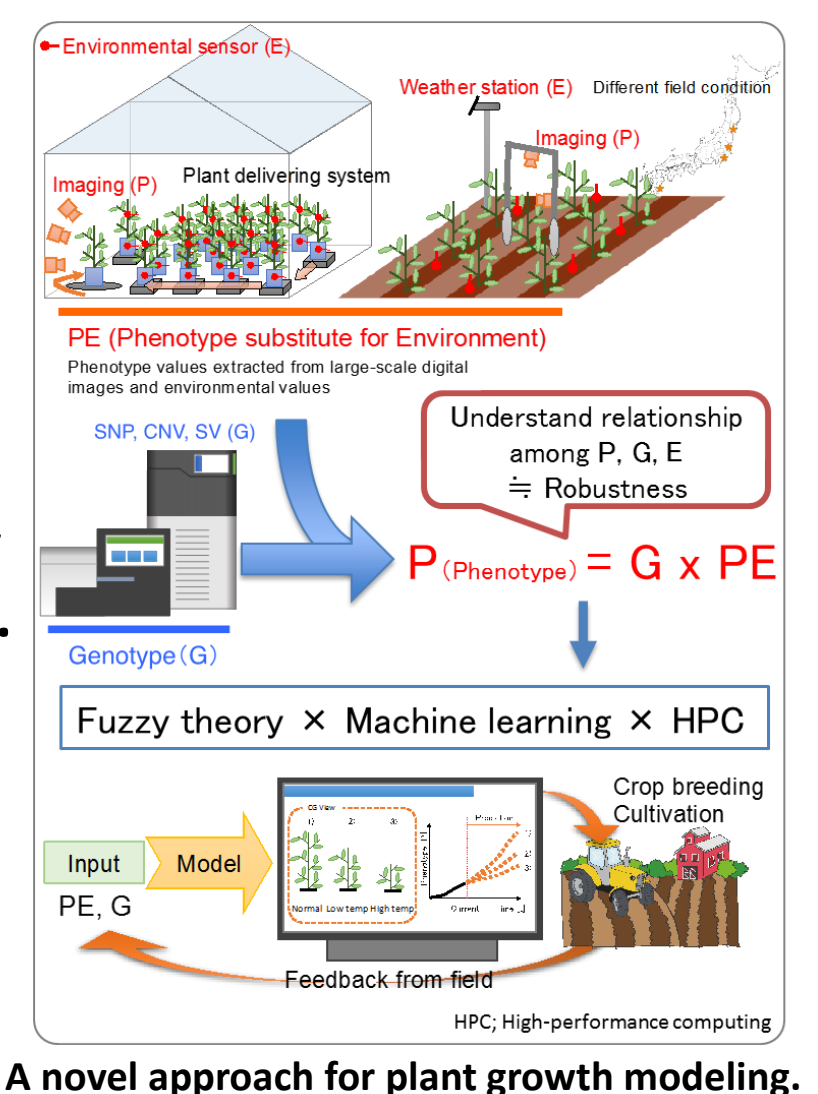
4) Data Science

(Example 1) Genome and Environment

: We study a novel approach for plant growth modeling based on comprehensive genome-environment interactions using large-scale digital images.

(Example 2) Bioinformatics and Systems Biology

: We study biological systems at molecular level. To shed light on the systems and feedback to medical diagnosis and drug development, we develop algorithms and software tools for analyzing numerous biological data, such as proteome and transcriptome.



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