

# **Mathematical Modeling for Complex Systems and Brain-morphic AI**

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The brain is a typical example of complex systems.

In this plenary talk, first I explain theory and applications of mathematical modeling for complex systems which we have been developing (1,2). Second, as its application to theoretical brainscience, I review progress in mathematical models of neurons and neural networks with nonlinear dynamics, including history of the research of neural networks and that of AI. Third, I explore a possibility of modeling higher brain functions such as attention (3), which may open wide applications for industries. Finally, on the basis of these studies, I provide a view of brain-morphic AI as well as a new direction of neuro-inspired hardware systems (4,5).

## **References**

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