## Georgia Institute of Technology.

# Special Guest Lecture in Robotics



### Intelligent Machines Inspired by Living Systems

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#### October 23, 2024 | 12:15 p.m - 1:15 p.m. Callaway Manufacturing Research Building Auditorium [Room 101]

**Abstract:** Living systems, like walking animals, can quickly develop their gaits within minutes of birth. This is due to their neural locomotion control circuits, which are genetically encoded. They can quickly adapt their leg movement to navigate various terrains and even take proactive steps to avoid colliding with an obstacle. Furthermore, in addition to locomotion, they can also use their legs/limbs to perform diverse complex autonomous behaviors, such as object manipulation and transportation. Biological studies reveal that these capabilities arise from the interplay of their biomechanics (e.g., structures, muscles, and materials) and neural mechanisms with plasticity and memory (brain).

In this talk, I will present "how we can realize biomechanics and neural mechanisms inspired by living systems for machines so they can become more intelligent like their biological counterparts". I will also demonstrate that this nature-inspired approach not only advances robotics technology for real-world applications but also provides insights into fundamental scientific questions about motion intelligence and adaptability. Ultimately, it may bring us closer to the goal of creating truly intelligent machines.

**Bio:** Poramate Manoonpong is a Professor at the School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), located in Rayong, Thailand. He also serves as the head of the Research Center for Advanced Robotics and Intelligent Automation (ARIA) at VISTEC. Additionally, he holds a concurrent appointment as a Professor of Biorobotics at the University of Southern Denmark (SDU).

The central goal of his research is to understand "how biomechanics and brain-like mechanisms can be realized in robots so they can become more intelligent like living creatures?". According to this, his team has developed bio-inspired behaving robots with general bio-inspired machine learning methods and could show that these robots can acquire complex behaviors with learning and adaptation. In addition to this, his team also focuses on transferring biomechanical and neural developments of robots to other real-world applications, like inspection, healthcare, industry, service.



The research results of his groups have been featured in news outlets, such as IEEE Spectrum (Video Friday), Advanced Science News, TechXplore, the cover page of Nature Machine Intelligence (Vol. 4, No. 2, February 2022), the cover page of Advanced Intelligent Systems (Vol. 4, No. 1, January 2022), the cover page of Advanced theory and Simulations (Vol. 6, No. 8, August 2023).

#### **Co-Hosted by the Physics of Living Systems & the Institute for Robotics and Intelligent Machines**