Worasuchad Haomachai

Postdoctoral Researcher, VISTEC, Thailand

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Research Interests

Machine Learning for Robotics, Bio-inspired Robotics, Information Theory, Bionic Technology

Education

Sep. 2019 –
Jun. 2024 : **PhD, Mechanical Design and Theory**, Nanjing University of Aeronautics and Astronautics

Thesis : Neural Control with Learning for Locomotion of a Gecko-Inspired Robot with a Bendable Body
Advisor : Prof. Poramate Manoonpong

Sep. 2017 –
Aug. 2019 : **Master of Engineering, Robotics and Automation**, King Mongkut's University of Technology Thonburi

Thesis : An Artificial Hormone System for Adaptable Locomotion in a Sea Turtle-Inspired Robot
Advisor : Dr. Pitiwut Teerakittikul

May. 2008 –
Mar. 2012 : **Bachelor of Engineering, Electrical and Communications Engineering**, Mahidol University

Thesis : Developing a Braille Notetaker for the Blind
Advisor : Asst. Prof. Zeng Lertmanorat

Position of Responsibility

Current Position

Aug. 2024 –
Present : **Postdoctoral Researcher at Vidyasirimedhi Institute of Science & Technology (VISTEC)**, Bio-inspired Robotics & Neural Engineering Lab, School of Information Science & Technology, Rayong, Thailand.

Previous Positions

May. 2012 –
Aug. 2017 : **Senior Engineer at AIS-Advanced Info Services Plc.**, Mobile Network Telecommunications Engineer, Bangkok, Thailand.

2015 – 2016 **Organizer, AIS Employee Volunteer**, AIS - Advanced Info Services Plc., Thailand.

2011 **Leader of Mahidol Robotics Club**, Faculty of Engineering Mahidol University, Thailand.

Grants

MOU Research Grant, NII (National Institute of Informatics), Tokyo, Japan. Budget: 1M JP¥.

Co-PI, Fundamental Fund (FF): Basic Research Fund, Thailand. Budget: 432,000 ฿.

PhD grant, Nanjing Government Scholarship. Total amount: 80,000 CN¥.

Master student grant, FIBO Scholarship. Total amount: 189,000 ฿.

Humanoid robot development grant, Thailand Humanoid Robot Soccer Championship 2011. Budget: 100,000 ฿.

Fellowships & Awards

2025   **Outstanding achievements** *that brought recognition to VISTEC* between April 2024 to March 2025

2025   **The finalist award** *the 1st International Symposium on Physical Artificial Intelligence and Robotics (IS-PAIR 2025)* for Lertvittayavivat, Horsuwan, Sison, Manoonpong, Haomachai, in the work entitled: Rubber O-Ring as a Compliant Element in Low-Cost Magnetic Force Sensors for Legged Robot Feet.

2023   **The finalist prize** *the International Society for Bionic Engineering, 7th International Conference on Bionic Engineering 2023,* for Haomachai, Shao, Manoonpong, in the work entitled: Gecko-Inspired Robot with a Bendable and Hybrid Soft-Rigid Adhesive Feet for Agile and Versatile Gecko-like Locomotion.

2019 – 2022   **Nanjing Government Scholarship**, Nanjing University of Aeronautics and Astronautics, China.

2017 – 2018   **FIBO Scholarship**, Institute of Field Robotics (FIBO), King Mongkut's University of Technology Thonburi, Thailand.

Publications

Journal Articles

2024   **Haomachai, Worasuchad**, Zhendong Dai, and Poramate Manoonpong. Transition gradient from standing to traveling waves for energy-efficient slope climbing of a gecko-inspired robot. *IEEE Robotics and Automation Letters*. IEEE, 2024, **(Impact Factor:5.2)**.

2021   **Haomachai, Worasuchad**, Donghao Shao, Wei Wang, Aihong Ji, Zhendong Dai, and Poramate Manoonpong. Lateral undulation of the bendable body of a gecko-inspired robot for energy-efficient inclined surface climbing. *IEEE Robotics and Automation Letters*, volume 6, pages 7917–7924. IEEE, 2021, **(Impact Factor:4.3)**.

Conference Proceedings

2025   Binggwong Leung, **Haomachai, Worasuchad**, Joachim Pedersen Winther, Sebastian Risi, and Poramate Manoonpong. Bio-inspired plastic neural networks for zero-shot out-of-distribution generalization in complex animal-inspired robots. In *2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2025) - **Accepted***, 2025.

2024   **Haomachai, Worasuchad**, Zhendong Dai, Yang Li, and Poramate Manoonpong. Neural control and learning with a turning strategy of a gecko-inspired robot with a bendable body. In *2024 9th International Conference on Control and Robotics Engineering (ICCRE)*. IEEE, 2024.

2023   Léonard Chanfreau, **Haomachai, Worasuchad**, and Poramate Manoonpong. Neural control and learning of a gecko-inspired robot for aerial self-righting. In *Climbing and Walking Robots Conference*, pages 147–158. Springer, 2023.

2021   **Haomachai, Worasuchad**, Potiwat Ngamkajornwiwat, Aihong Ji, Zhendong Dai, and Poramate Manoonpong. A sprawling posture robot with a flexible spine for efficient locomotion in various gravity environments from earth, to mars, and the moon. In *Presented at the 2nd Innovation Aviation & Aerospace Industry-International Conference*, volume 28, page 30, 2021.

2019   **Haomachai, Worasuchad** and Pitiwut Teerakittikul. An artificial hormone system for adaptable locomotion in a sea turtle-inspired robot. In *2019 4th International Conference on Control and Robotics Engineering (ICCRE)*, pages 136–141. IEEE, 2019.

Extended Abstract

2025   **Haomachai, Worasuchad**, Rujikorn Charakorn, and Poramate Manoonpong. Neural hebbain plastic control network for adaptive locomotion. In *The 12th International Symposium on Adaptive Motion of Animals and Machines and 2nd LokoAssist Symposium (AMAM/LokoAssist 2025)*, 2025.

2025   Sanhanat Lertvittayavivat, Dhamdhawach Horsuwan, Harn Sison, Poramate Manoonpong, and **Haomachai, Worasuchad**. Rubber o-ring as a compliant element in low-cost magnetic force sensors for legged robot feet. In *The 1st International Symposium on Physical Artificial Intelligence and Robotics (IS-PAIR 2025)*, pages 45–49. Frontiers Media SA, 2025.

2025   Sanhanat Lertvittayavivat, Dhamdhawach Horsuwan, Rujikorn Charakorn, **Haomachai, Worasuchad**, and Poramate Manoonpong. A magnetic field-based foot sensor for legged robots. In *The 12th International Symposium on Adaptive Motion of Animals and Machines and 2nd LokoAssist Symposium (AMAM/LokoAssist 2025)*, 2025.

2025   Chayapol Hansanelak, Rujikorn Charakorn, **Haomachai, Worasuchad**, and Poramate Manoonpong. Improving locomotion learning efficiency of cpg-rbf networks under morphological damage with multiple value functions. In *The 12th International Symposium on Adaptive Motion of Animals and Machines and 2nd LokoAssist Symposium (AMAM/LokoAssist 2025)*, 2025.

2023   **Haomachai, Worasuchad** and Poramate Manoonpong. Can chaos be utilized as exploration noise for locomotion learning? In *The 11th International Symposium on Adaptive Motion of Animals and Machines (AMAM2023)*, pages 53–54. Adaptive Motion of Animals and Machines Organizing Committee, 2023.

Professional Experience

2025   **Workshop**, Super AI Engineer: Artificial Intelligence and Robotics for All on A Hands-on Workshop on Finding, Framing, and Structuring Research Problems, Bangkok, Thailand, 08.05.2025.

2024   **Workshop**, BrainCode-VISTEC WorkShop on Bio-Inspired Robots: How to Make Them Walk Like Animals, Rayong, Thailand, 27.11.2024.

Nov. 2022 – Apr. 2023 :   **Visiting Ph.D. Student**, Neural Network with Synaptic Plasticity Using the Meta-Learning Hebbian Learning Rule.
Advisor: Prof. Sebastian Risi, *Professor* - IT University of Copenhagen/*Co-founder* – modl.ai

Mar – May 2019   Internship at the Bio-inspired Structure and Surface Engineering (IBSS) lab, Nanjing University of Aeronautics and Astronautics, China.

Mar – May 2011   Internship at the National Electronics and Computer Technology Center (NECTEC), NSTDA, Thailand.

2011   Participated with Thailand Humanoid Robot Soccer Championship 2010 – 2011, King Mongkut's University of Technology North Bangkok, Thailand.

2010   Participated with TPA Robot Contest Thailand Championship 2010, Technology Promotion Association (Thailand – Egypt), King Mongkut's Institute of Technology Ladkrabang, Thailand.

2009   Participated with Thailand Rescue Robot 2009, Thai Robotics Society, Faculty of Engineering Mahidol University, Thailand.

Academic Achievements & Recognitions

Graduate Students Supervised

Jun – Dec 2025 :   Internship Supervisor: *Sensory Plasticity for Robotics Learning.* Student: Nasree Hayeesama-ae, Super AI Engineer, Artificial Intelligence Association of Thailand (AIAT), Thailand.

Jun – Aug 2022   Co-supervisor: *Neural control and learning for self-righting of gecko-inspired robots* Student: Leonard Chanfreau, Institut Polytechnique de Paris – ENSTA Paris, France and also with Embodied AI and Neurorobotics Lab, SDU Biorobotics, the Mærsk Mc-Kinney Møller Institute, the University of Southern Denmark (SDU), Denmark.

Undergraduate Students Supervised

Apr – Nov 2025 : Internship Supervisor: *Neural Plastic Network for Adaptive Locomotion.* Student: Pavaris Asawakijtananont, Institute of Field Robotics, King Mongkut's University of Technology Thonburi, Thailand.

Jul. 2024 – Mar. 2025 : Internship Supervisor: *3D Force Sensors and IMU Integration for Gecko-Inspired Robots.* Student: Sanhanat Lertvittayavivat, Computer Engineering, Prince of Songkla University, Thailand.

Jul – Aug 2022 Internship Supervisor: *Path Following and Navigation of a Gecko-Inspired Robot* Student: Assawayut Khunmaturod, Korea Advanced Institute of Science & Technology (KAIST), South Korea.

Jun – Jul 2022 Internship Supervisor: *Training of a Quadruped Robot Using Reinforcement Learning* Student: Waritwong Sukprasongdee, Department of Mechanical Engineering, Faculty of Engineering, Chulalongkorn University, Thailand.

Jun – Jul 2021 Internship Supervisor: *Development of Electronic Systems in a Gecko-Inspired Robot* Students: Budsakorn Thaiprasert, Pannawat Chimprasert, Thitiya Boontongloun, Department of Electrical Engineering, Faculty of Engineering, Mahidol University, Thailand.

Talks

2025 Spotlight talk, *Rapid Learning Mechanism for Locomotion in Gecko-Inspired Robots*, Kookmin University(KMU)-VISTEC Workshop, VISTEC, Rayong, Thailand, 20.02.2025.

2024 Research talk, *Nature's Intelligence for Physical AI: From Biology to AI and Robotics*, Rangsit University, Bangkok, Thailand, 06.12.2024.

Invited talk, *Robot that Move Like a Gecko*, BrainCode-VISTEC WorkShop, VISTEC, Rayong, Thailand, 27.11.2024.

Research talk, *Nature's Intelligence for Physical AI: From Biology to AI and Robotics*, The Institute of Field Robotics (FIBO), Bangkok, Thailand, 18.11.2024.

Research talk, *Nature's Intelligence for Physical AI: From Biology to AI and Robotics*, Faculty of Engineering, Mahidol University, Nakhon Pathom, Thailand, 13.11.2024.

2023 Invited talk, *Bio-inspired Climbing Legged Robot Design and Control*, China Nanhu Academy of Electronics and Information Technology, China, 23.10.2023.

Oral Presentation and Interactive Poster

2025 Interactive poster, *Neural Hebbain Plastic Control Network for Adaptive Locomotion*, The 12th International Symposium on Adaptive Motion of Animals and Machines and 2nd LokoAssist Symposium (AMAM/LokoAssist 2025), Darmstadt, Germany, 10.07.2025.

Interactive poster, *A Magnetic Field-based Foot Sensor for Legged Robots*, The 12th International Symposium on Adaptive Motion of Animals and Machines and 2nd LokoAssist Symposium (AMAM/LokoAssist 2025), Darmstadt, Germany, 09.07.2025.

2024 Oral presentation, *Transition Gradient from Standing to Traveling Waves for Energy-Efficient Slope Climbing of a Gecko-Inspired Robot*, 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Abu Dhabi, UAE, 17.10.2024.

Oral presentation, *Neural Control and Learning with a Turning Strategy of a Gecko-Inspired Robot with a Bendable Body*, the 2024 9th International Conference on Control and Robotics Engineering, Osaka, Japan, 11.05.2024.

2023 Oral presentation (online), *Neural Control and Learning of a Gecko-Inspired Robot for Aerial Self-Righting*, the 26th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR), Florianópolis, Brazil, 04.10.2023.

Interactive poster, *Can Chaos Be Utilized as Exploration Noise for Locomotion Learning?*, the 11th International Symposium on Adaptive Motion of Animals and Machines (AMAM), Kobe, Japan, 07.06.2023.

2021 Oral presentation (online), *Lateral Undulation of The Bendable Body of a Gecko-Inspired robot for Energy-Efficient Inclined Surface climbing*, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Prague, Czech Republic, 30.09.2021.

Oral presentation (online), *A Sprawling Posture Robot with a Flexible Spine for Efficient Locomotion in Various Gravity Environments from Earth, to Mars, and the Moon*, Innovation Aviation & Aerospace Industry – International Conference 2021, Chiang Mai, Thailand, 30.06.2021.

2019 Oral presentation, *An Artificial Hormone System for Adaptable Locomotion in a Sea Turtle-Inspired Robot*, the 2019 4th International Conference on Control and Robotics Engineering (ICCRE), Nanjing, China, 23.04.2019.

Teaching

Teaching Assistantship

Fall, 2020 – 2023 : **0510202F: Adaptive Locomotion Control From Animals to Robots**.
Nanjing University of Aeronautics and Astronautics (NUAA), China.

Spring, 2018 : **FRA121: Electronic Circuits for Robotics and Automation Engineering**.
Institute of Field Robotics (FIBO), KMUTT, Thailand.

Fall, 2017 : **FRA221: Digital Electronics**.
Institute of Field Robotics (FIBO), KMUTT, Thailand.

Professional Activities and Outreach

Editorships

Topic coordinators of a special issue on "Physical AI and Robotics – Outputs from IS-PAIR 2025 and Beyond", Frontiers in Neurorobotics as well as Frontiers in Robotics and AI, to appear Feb, 2025.

Conference Organization

Vice-General Chair, the 1st International Symposium on Physical Artificial Intelligence and Robotics (IS-PAIR2025), January 28-29 2025, Rayong, Thailand.

Reviewer

Journal:

IEEE Robotics and Automation Letters (RA-L)

Conferences:

IEEE International Conference on Robotics and Automation (ICRA)

International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR)

Membership

IEEE (Institute of Electrical and Electronic Engineers)

ISBE (International Society of Bionic Engineering)

EI (Embodied Intelligence Conference)

Selected Press Coverage

Addoobot *Slalom: A Gecko-Inspired Robot with Lateral Body Undulation*, Apr 2024
Weixin *A Gecko-like Robot with a Bendable Body that Can Climb Hills Stably*, Dec 2021
IEEE Spectrum *Lateral Undulation of the Bendable Body of a Gecko-Inspired Robot*, Nov 2021

Language Knowledge

Thai native • English intermediate • Chinese basic