

Curriculum Vitae

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He is an Associate Professor of embodied artificial intelligence (AI) & robotics and a co-founder of Embodied AI & Neurorobotics Lab, part of Center for BioRobotics (CBR), at the University of Southern Denmark. He was the PI of the Emmy Noether research project for "Neural Control, Memory, and Learning for Complex Behaviors in Multi Sensori-Motor Robotic Systems" at Bernstein Center for Computational Neuroscience (BCCN) Goettingen in Germany and was a postdoctoral fellowship and an invited research fellow of the JSPS and Japan Trust programmes, respectively, at Advanced Telecommunications Research Institute International, Computational Neuroscience Laboratories, Department of Brain Robot Interface, Kyoto, Japan. As author or coauthor, he has published over 80 publications in journals (e.g., Nature Physics, Front. Neural Circuits, IEEE Transactions on Cybernetics) and conferences and his articles have been cited over 800 citations. His H-index is 14 (from google scholar). One of his recent major contributions was a novel approach that exploits the interaction between a passive anisotropic scale-like material (e.g., shark skin) and rough surfaces to enhance locomotion efficiency of a robot walking on inclines and has been reported by Scientific Reports-Nature Journal (Manoonpong et al. Scientific Reports, 2016). He has been PI or co-PI of 12 funded projects. Currently he serves on an Associate Editor of Frontiers in Neuroscience (Neurorobotics) and the editorial board of International Journal of Advanced Robotic Systems (ARS), (Topic: Bioinspired Robotics) and Advances in Robotics Research, Techno press.

Academic Background:

2006: Ph.D. (magna cum laude) in Electrical Engineering and Computer Science at the University of Siegen, Germany, with the thesis entitled "Neural Preprocessing and Control of Reactive Walking Machines". Supervisors: Prof. Dr.-Ing. Hubert Roth and Prof. Dr. rer. nat. Frank Pasemann.

2002: M.Sc. in Mechatronics at Hochschule Ravensburg-Weingarten (University of Applied Sciences Ravensburg-Weingarten), Germany.

2000: B.Eng. (Hons) in Mechanical Engineering at King Mongkut's University of Technology Thonburi, Bangkok, Thailand.

Professional Experience:

Since 06/2016: *Adjunct Faculty* of the Graduate School, Kasetsart University, Bangkok, Thailand.

Since 11/2013: *Associate Professor* of Embodied AI & Robotics at the Maersk Mc-Kinney Moller Institute (MMMI), the University of Southern Denmark, Odense, Denmark.

Interim

06/2016-

07/2016:

Visiting Professor at Nanjing University of Aeronautics and Astronautics, Nanjing, China.

Interim

10/2015-

02/2016:

Scandinavian Visiting Professor (Skandinavische Gastdozentur) at the Christian-

Albrechts-Universitaet zu Kiel (University of Kiel), Kiel, Germany.

Interim

06-08/2015: *Visiting Professor* at King Mongkut's University of Technology Thonburi, Bangkok, Thailand.

Interim

06-08/2011: *Invited research fellow* at ATR Computational Neuroscience Laboratories, Kyoto, Japan.

2011-2014: *Principal investigator* of an Emmy Noether Research project (title: Neural Control, Memory, and Learning for Complex Behaviors in Multi Sensori-Motor Robotic Systems) at the University of Göttingen, Göttingen, Germany.

Interim

01-/07/2010: *JSPS Postdoctoral fellowship* at ATR Computational Neuroscience Laboratories, Kyoto, Japan.

2006-2011: *Postdoc* at Bernstein Center for Computational Neuroscience (BCCN) Göttingen, Germany.

2002-2006: *Research Assistant* at the Fraunhofer Institute for Autonomous Intelligent Systems (AIS, now IAIS), Sankt Augustin, Germany.

Academic Awards and Honors (selected, out of 10):

2015: *Scandinavian Visiting Professor (Skandinavische Gastdozentur) Award* of the Christian-Albrechts-Universitaet zu Kiel.

2013: *Innovation Award 2013-* For Practical Innovation in the Field of Robotics (Highly recommended) from 16th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR).

2012: Distinguished alumni award for outstanding achievements in scientific research from FIBO at 16 year FIBO Homecoming

2011: *Emmy Noether Award* of the German Research Foundation (DFG).

Fellowship Award of the Japan Trust International Research Cooperation Program.

2010: *Fellowship Award* of the Japan Society for the Promotion of Science (JSPS).

2008: *Best Ph.D. thesis Award* in Engineering and Industrial Research category from the Office of the National Research Council of Thailand (NRCT).

Grants, International Collaborations, and Research Project Management:

(Total own funding ca. 3.3 Million Euro)

2018-2021: 1000-plan Program for Young Professionals of China, "NEUrorobotic Technology for advanced Robot mOtor coNtrol (NEUTRON)" project, P.M. = PI, (preparation of grant agreement)

2017-2020: Horizon2020-FETPROACT, "Predictive Neural Information for Proactive Actions: From Monkey Brain to Smart House Control (Plan4Act)" project, P.M. = technical coordinator & PI for SDU component, Project value ca. 4.236M Euro (of which ca. 1M Euro is for SDU-ESRL)

2017-2020: Innovation fund Denmark, "Seamless huMan-robot interactiOn fOr THE support of elderly people (SMOOTH)" project, P.M. = work-package PI, Project value ca. 2.6M Euro (of which ca. 246k Euro is for SDU-ESRL)

2017-2020: Interreg5, "Health Care Assisting Technology (Health-CAT)" project, P.M. = work-package PI, Project value ca. 2.8M Euro (of which ca. 156k Euro is for SDU-ESRL)

2017-2020: HFSP, "A dung beetle's life: how miniature creatures perform extraordinary feats with limited resources (Dlife)" project, P.M. = co-PI, Project value ca. 978k Euro (of which ca. 326k Euro is for SDU-ESRL)

2015-2017: SDU-research funding (Denmark), "Neural Predictive Control for Goal-directed Learning and Multi- scale Adaptation" project, P.M. = PI, Project value ca. 220k Euro

- *2011-2016: Emmy-Noether Program, DFG (Germany), “Neural Control, Memory, and Learning for Complex Behaviors in Multi Sensori-Motor Robotic Systems” project, P.M. = PI, Project value ca. 580k Euro, **Overall funding period was 5 years but it was stopped after 3 years and 10 months (12/2014) due to move to Denmark.*
- 2012-2015: The Strategic Japanese-German Cooperative Program on Computational Neuroscience (Germany), “Haptic Learning” project, P.M. = co-Coordinator & co-PI of the component of University Goettingen, Project value ca. 320k Euro
- 2010-2015: The Federal Ministry of Education and Research (Germany) through Bernstein Center for Computational Neuroscience II (BCCN II, project D1), “Biomechanics and Adaptive Neural Control of Animal and Robot Locomotion” project, P.M. = co-PI, Project value ca. 457k Euro
- 2011: Japan Trust International Research Cooperation Program (NICT), “Neural Learning for Adaptive Human-Humanoid Communication” project, P.M. = PI, Project value 1.5M JPY (ca. 12.8k Euro)
- 2010: Japan Society for the Promotion of Science (JSPS), “Novel Neural Learning Models for Policy Improvement of Dynamic Motion Control” project, P.M. = co-PI, Project value ca. 2.4M JPY (ca. 20.5k Euro)
- 2009: The Office of the Higher Education Commission of Thailand (OHEC), “Neural Control for Reconfigurable Spherical Robots” project, P.M. = co-PI, Project value 142 kTHB (ca. 3.4k Euro)

Industrial and Institute Collaborations:

Otto Bock Healthcare (Germany) in the context of neural control of orthopedic devices.
 Fraunhofer Institute for Intelligent Analysis and Information Systems (IAIS, Germany) for developing bio-inspired walking robots.

Supervision: (currently/total)

Postdocs:	3/5	Ph.D. students:	3/7	
Master students:	8/32	Bachelor students:	1/17	PhD committees: 4

Scientific Focus Areas:

Embodied artificial intelligence, neural control, neurodynamics, learning and memory, robotics, biomechanics, bio-inspired robotics, the control of prosthetic and orthopedic devices.

Organized Workshops (selected):

- 2017: Workshop on Bio-inspired Robotics, Bangkok, Thailand (supported by OHEC Thailand)
- 2017: Workshop on Bio-inspired control for interlimb coordination and adaptation in legged robots at SWARM 2017: The Second International Symposium on Swarm Behavior and Bio-Inspired Robotics, Kyoto, Japan
- 2016: Danish-Embodied Artificial Intelligence Workshop, Odense, Denmark
- 2016: Tutorial on Exploiting Soft Materials, Biomechanical Structures, and Neural Mechanisms for Adaptive Locomotion at the 14th International Conference on the Simulation of Adaptive Behavior (SAB2016), Aberystwyth, UK
- 2015: Workshop on Embodied sensorimotor interaction: from locomotion to collective behavior at the SWARM2015 conference, Kyoto, Japan
- 2008-2013: Workshop, Girls’Day-Mädchen-Zukunftstag at Bernstein Center for Computational Neuroscience (BCCN), University of Göttingen, Germany

Scientific Activities (selected):

- Since 2016 Vice-Chairman of the Youth Commission of International Society of Bionic Engineering (ISBE)
- 2016: Guest Associate Editor of *Frontiers in Neurorobotics* on a Special Topic
- Since 2015 Associate Editor, *Frontiers in Neurorobotics* (part of *Frontiers in Neuroscience*)
- Since 2014 Coordinator of the RETURN project of ATPER
- Since 2013 Editorial Board of *Advances in Robotics Research (ARR)*
Editorial Board of *International Journal of Advanced Robotic Systems (ARS)*
- Since 2009 The Coordinator of Association of Thai Professionals in Europe (ATPER)

Other Scientific Activities/Robot Demo can be seen at <http://manoonpong.com/events.html>

Teaching Experience (selected):

University of Southern Denmark, Denmark

- Tools of Artificial intelligence course (AI2),
- Adaptive Embodied Locomotion Control Systems course (AI3),
- Project in Artificial Intelligence course (AI4)

University of Kiel, Germany

- Embodied Artificial Intelligence

University of Goettingen, Germany

- Artificial Intelligence & Robotics

Publication Activity: Peer reviewed publications: > 80; Citations in total: 808; H-index: 14 (from Google scholar)

List of Selected Publications:

See <http://manoonpong.com/Publications.html> for a complete list.

Refereed Journal Publications [selected, out of 30]

1. Braun, J.M.; Wörgötter, F.; **Manoonpong, P.** (2017) Modular Neural Mechanisms with User Feedback for Adaptive, Personalizable Knee-Ankle-Foot-Orthoses, *Front. Neurorobot.* (conditionally accepted)
2. Goldschmidt, D.; **Manoonpong, P.**; Dasgupta, S. (2017) A neurocomputational model of goal-directed navigation in insect-inspired embodied agents, *Front. Neurorobot.* 11:20. doi: 10.3389/fnbot.2017.00020 (JIF = 1.723, SJR = 1.05)
3. Shaikh, D and **Manoonpong, P.** (2017) An adaptive neural mechanism for acoustic motion perception with varying sparsity, *Front. Neurorobot.* 11:11. doi: 10.3389/fnbot.2017.00011
4. Nachstedt, T.; Tetzlaff, C.; **Manoonpong, P.** (2017) Fast Dynamical Coupling Enhances Frequency Adaptation of Oscillators for Robotic Locomotion Control, *Front. Neurorobot.* 11:14. doi: 10.3389/fnbot.2017.00014
5. **Manoonpong, P.**; Petersen, D.; Kovalev, A.; Woergoetter, F.; Gorb, S.; Spinner, M.; Heepe, L. (2016) Enhanced Locomotion Efficiency of a Bio-inspired Walking Robot using Contact Surfaces with Frictional Anisotropy, *Scientific Reports/Nature journal* 6(39455) doi:10.1038/srep39455
6. Di Canio, G.; Stoyanov, S.; Larsen, J.C.; Hallam, J.; Kovalev, A.; Kleinteich, T.; Gorb, S.N.; **Manoonpong, P.** (2016) A Robot Leg with Compliant Tarsus and its Neural Control for Efficient and Adaptive Locomotion on Complex Terrains, *Artificial Life and Robotics* 21, pp.

274–281, DOI 10.1007/s10015-016-0296-3

7. Xiong, X.; Woergoetter, F.; **Manoonpong, P.** (2015) Adaptive and Energy Efficient Walking in a Hexapod Robot under Neuromechanical Control and Sensorimotor Learning, *IEEE Transactions on Cybernetics* 99, DOI: 10.1109/TCYB.2015.2479237
8. Grinke, E.; Tetzlaff, C.; Wörgötter, F.; **Manoonpong, P.** (2015) Synaptic plasticity in a recurrent neural network for versatile and adaptive behaviors of a walking robot. *Front. Neurobot.* 9:11. doi: 10.3389/fnbot.2015.00011
9. Ren, G.; Chen, W.; Dasgupta, S.; Kolodziejcki, C.; Wörgötter, F.; **Manoonpong, P.** (2015) Multiple Chaotic Central Pattern Generators with Learning for Legged Locomotion and Malfunction Compensation. *Information Sciences* 294, 666–682 (Cited by 2, info. from Google scholar)
10. Dasgupta, S.; Woergoetter, F.; **Manoonpong, P.** (2014) Neuromodulatory Adaptive Combination of Correlation-based Learning in Cerebellum and Reward-based Learning in Basal Ganglia for Goal-directed Behavior Control. *Front. Neural Circuits* 8: 00126, ISSN=1662-5110, DOI: 10.3389/fncir.2014.00126 (Cited by 3, info. from Google scholar)
11. Goldschmidt, D.; Wörgötter F.; **Manoonpong, P.** (2014) Biologically-Inspired Adaptive Obstacle Negotiation Behavior of Hexapod Robots. *Front. Neurobot.* 8:3. DOI:10.3389/fnbot.2014.00003 (Cited by 3, info. from Google scholar)
12. Dasgupta, S.; Wörgötter, F.; **Manoonpong, P.** (2013) Information Dynamics based Self-Adaptive Reservoir for Delay Temporal Memory Tasks. *Evolving Systems*, DOI: 10.1007/s12530-013-9080-y (Cited by 17, info. from Google scholar)
13. **Manoonpong, P.**; Parlitz, U.; Wörgötter, F. (2013) Neural Control and Adaptive Neural Forward Models for Insect-like, Energy-Efficient, and Adaptable Locomotion of Walking Machines, *Frontiers in Neural Circuits*, 7: 12, DOI: 10.3389/fncir.2013.00012 (Cited by 16, info. from Google scholar)
14. Steingrube, S.; Timme, M.; Wörgötter, F.; **Manoonpong, P.** (2010) Self-Organized Adaptation of Simple Neural Circuits Enables Complex Robot Behavior, *Nature Physics* 6, 224-230 (Cited by 87, info. from Google scholar)
15. **Manoonpong, P.**; Wörgötter, F. (2009) Efference Copies in Neural Control of Dynamic Biped Walking. *Robotics and Autonomous Systems* 57(11), 1140-1153 (Cited by 21, info. from Google scholar)
16. **Manoonpong, P.**; Geng, T.; Kulvicius, T.; Porr, B.; Wörgötter, F. (2007) Adaptive, Fast Walking in a Biped Robot under Neuronal Control and Learning, *Public Library of Science Computational Biology* (PLoS CB) 3(7), e134, doi:10.1371/journal.pcbi.0030134 (Cited by 87, info. from Google scholar)

Book:

1. **Manoonpong, P.** (2007) Neural Preprocessing and Control of Reactive Walking Machines: Towards Versatile Artificial Perception-Action Systems (Cognitive Technologies) (Hardcover), Springer-Verlag (Cited by 20, info. from Google scholar)

Refereed Conference Publications [selected, out of 57]:

1. Shaikh, D.; **Manoonpong, P.** (2017) A Neural Circuit for Acoustic Navigation combining Heterosynaptic and Non-synaptic Plasticity that learns Stable Trajectories. In Proceedings of the 18th International Conference on Engineering Applications of Neural Networks, accepted
2. Shaikh, D.; **Manoonpong, P.**; Tuxworth, G.; Bodenhagen, L. (2017) Multisensory guidance of goal-oriented behaviour of legged robots. 20th International Conference on Climbing and

Walking Robots and the Support Technologies for Mobile Machines (CLAWAR), Mobile Service Robotics, accepted

3. Sørensen, C.T.L and **Manoonpong, P.** (2016) Modular Neural Control for Object Transportation of a Bio-inspired Hexapod Robot, Simulation of Adaptive Behavior (SAB) 2016, Springer, (Lecture Notes in Computer Science, Vol. 9825), p. 67-78
4. Di Canio, G.; Stoyanov, S.; Balmori, I.T.; Larsen, J.C.; **Manoonpong, P.** (2016) Adaptive Combinatorial Neural Control for Robust Locomotion of a Biped Robot, Simulation of Adaptive Behavior (SAB) 2016, Springer, (Lecture Notes in Computer Science, Vol. 9825),p. 317-328
5. Goldschmidt, D.; Dasgupta, S.; Wörgötter, F.; **Manoonpong, P.** (2015) A Neural Path Integration Mechanism for Adaptive Vector Navigation in Autonomous Agents. The 2015 International Joint Conference on Neural Networks (IJCNN) DIO: 10.1109/IJCNN.2015.7280400, pp. 1-8
6. Chatterjee, S.; Nachstedt, T.; Wörgötter, F.; Tamosiunaite, M.; **Manoonpong, P.**; Enomoto, Y.; Ariizumi, R; and Matsuno, F. (2014) Reinforcement Learning Approach to Generate Goal-directed Locomotion of a Snake-Like Robot with Screw-Drive Units, Proceedings of the RAAD 23rd International Conference on Robotics in Alpe-Adria-Danube Region, IEEE catalog number 34043 (Best Student Paper Award)
7. Barikhan, S.S.; Wörgötter, F.; **Manoonpong, P.** (2014) Multiple Decoupled CPGs with Local Sensory Feedback for Adaptive Locomotion Behaviors of Bio-inspired Walking Robots. Simulation of Adaptive Behavior (SAB) 2014, LNAI 8575, pp. 65–75, 2014
8. Braun, J.M.; Wörgötter, F.; **Manoonpong, P.** (2014) Internal Models Support Specific Gaits in Orthotic Devices. 17th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR), Mobile Service Robotics, No. 17, pp. 539-546
9. **Manoonpong, P.**; Dasgupta, S.; Goldschmidt, D.; Wörgötter, F. (2014) Reservoir-based Online Adaptive Forward Models with Neural Control for Complex Locomotion in a Hexapod Robot. The 2014 International Joint Conference on Neural Networks (IJCNN 2014), pp. 3295 - 3302, DOI: 10.1109/IJCNN.2014.6889405 (Cited by 1, info. from Google scholar)
10. Nachstedt, T.; Wörgötter, F.; **Manoonpong, P.**; Arrizumi, R.; Ambe, Y.; Matsuno, F. (2013) Adaptive Neural Oscillator with Synaptic Plasticity Enabling Stable Self Tuning of Snake-Like Robot with Screw-Drive Mechanism. IEEE International Conference on Robotics and Automation (ICRA 2013), Germany, pp. 3374-3380.
11. Dasgupta, S.; Wörgötter, F.; Morimoto, J.; **Manoonpong, P.** (2013) Neural Combinatorial Learning of Goal-directed Behavior with Reservoir Critic and Reward Modulated Hebbian Plasticity. IEEE International Conference on Systems, Man, and Cybernetics 2013 Conference, part SMC2013:C12, pp. 993-1000 (Cited by 5, info. from Google scholar)
12. Ambe, Y.; Nachstedt, T.; **Manoonpong, P.**; Woergoetter, F.; Aoi, S. and Matsuno, F. (2013) Stability Analysis of a Hexapod Robot Driven by Distributed Nonlinear Oscillators with a Phase Modulation Mechanism. the 2013 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2013), pp. 5087-5092 (Cited by 1, info. from Google scholar)