

## **Bachelor Theses**

### ***Past projects:***

1. Mr. Dennis Goldschmidt (2012, Physics, University of Göttingen, Germany): “Adaptive Climbing Behavior of Walking Machines”.
2. Mr. Steffen Zenker (2012, Informatics, University of Göttingen, Germany): “A Vision based Terrain Classification Interface for Walking Machines”.
3. Mr. Patrick Kesper (2012, Physics, University of Göttingen, Germany): “Object Detection and Path Finding Algorithms Based on 2D Laser Range Measurements”.
4. Mr. Julius Faber (2012, Informatics, University of Göttingen, Germany): “Reinforcement Learning on a Predefined Situation Space using a KUKA Lightweight Robot Arm (Simulation)”.
5. Mr. Andrej Filippow (2013, Physics, University of Göttingen, Germany): “The Echo-State Network Applied As a Critic in a Combined Actor - Critic and ICO Controller for the Task of Single - Pole Balancing”.
6. Mr. Eduard Grinke (2013, Physics, University of Göttingen, Germany): “Using Synaptic Plasticity in Minimal Recurrent Networks for Adaptive Obstacle Avoidance of a Walking Robot”.
7. Mr. Ilyas Kuhlemann (2013, Physics, University of Göttingen, Germany): “Analysing a Dynamic Walker’s Gait Stability for Compliant and Rigid Ankles”.
8. Mr. Lars Melchior (2013, Physics, University of Göttingen, Germany): “Evolution of Synaptic Plasticity using Genetic Algorithms in Neural Closed-Loop Systems”.
9. Mr. Stepan Shishkin (2014, Physics, University of Göttingen, Germany): “Comparing Combinatorial Learning with Temporal Difference Learning for the Pole-Balancing Problem”.
10. Mr. Thor Stærk Stenvang and Mr. Mathias Nielsen (2014, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Control and Regulation of the Starkick Football Table”.
11. Mr. Jon Lund (2014, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Control and Motion Planning of a Five Axis Robot Arm”.
12. Mr. Vince Jankovics (2015, Mechatronics, University of Southern Denmark, Denmark): “Artificial Neural Network based Adaptive Complaint Control for Robotic Arms”.
13. Mr. Philipp Hannibal (2015, Physics, University of Göttingen, Germany): “Visualization of Neural Networks”.

14. Mr. Deniel Horvatic (2015, Fakultät für Informatik, Hochschule Mannheim, Germany): “Efficient Reconstruction of Neural Interconnections in Simulated Spiking Neurons”.
15. Mr. Theis Strøm Hansen and Mr. Mathias Thor (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Extending Walk-net towards Emergent Object Manipulation for a Hexapod Robot”.
16. Mr. Martin Bagge Jensen and Skjold Dyre (2016, Software Engineering, University of Southern Denmark, Denmark): “Learning and Utility of Receptive Fields for Generation of Movement Patterns”.
17. Mr. Jevgeni Ignasov (2018, Mechatronics, University of Southern Denmark, Denmark): “The motor control development of a compliant robotic arm”.
18. Ms. Camilla Svane and Camilla Lyng Tobiasen (2018, Integrated Design, University of Southern Denmark, Denmark): “Bio-inspired robot body design for complex behavior”.
19. Mr. Jens Troels Nielsen and Mr. Jeppe Langaa (2018, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Neural control of a pipe climbing robot”.

***Current projects:***

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**Master Theses**

***Past projects:***

1. Mr. Kawee Suwannasit (2010, Mechanical and Aerospace Engineering, King Mongkut's University of Technology, Thailand): “Control for Locomotion and Transformation of a Reconfigurable Spherical Robot into a Three Legged-Wheeled”.
2. Mr. Timo Nachstedt (2013, Physics, University of Göttingen, Germany): “Adaptive Neural Oscillator with Synaptic Plasticity for Robot Locomotion Control”.
3. Mr. Simon Christoph Stein (2013, Physics, University of Göttingen, Germany): “3D Segmentation of Objects and their Parts based on Local Geometric Cues”.
4. Mr. Subhi Barikhan (2014, Informatics, University of Göttingen, Germany): “Multiple CPGs with Local Feedback Mechanisms for Locomotor Adaptation of Hexapod Robots”.
5. Mr. Bassel Zeidan (2014, Informatics, University of Göttingen, Germany): “Intelligent Landmark-Based Navigation System Using Learning Techniques”.
6. Ms. Sromona Chatterjee (2014, Informatics, University of Göttingen, Germany): “Reinforcement Learning with PI2 Algorithm to Generate Motor Primitives of a Complex Snake-Like Robot”.

7. Mr. Dennis Goldschmidt (2014, Neural Systems and Computation, University of Zurich/ETH Zurich, Switzerland): “Modular Neural Mechanisms for Adaptive Spatial Behavior in Autonomous Robots”.
8. Mr. Johannes Widenka (2015, Informatics, University of Göttingen, Germany): “Application of a Virtual Muscles Model on the two-dimensional biped robot RunBot”.
10. Mr. Patrick Kesper (2015, Physics, University of Göttingen, Germany): “A Probabilistic Approach to Self-Localization and Mapping of Mobile Robots”.
11. Mr. Hans-Joachim Krauch (2015, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Exploration and Object Retrieval with Robot Swarms”.
12. Mr. Ditlev Andersen and Mr. Anders Prier Lindvig (2015, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Visual Segmentation of Potatoes in Cluttered Environments”.
13. Mr. Patrick Stolc and Mr. Giuliano Di Canio (2015, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Adaptive Locomotion Control of Embodied Legged Systems”.
14. Mr. Lasse S. Børresen (2015, Engineering (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Separation of Multiple Sound Sources Using Directional Stereo”.
15. Mr. Stoyan Stoyanov (2015, Engineering (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Brain - Computer Interface for Robot Control”.
16. Mr. Halvor Tram Tramsen (2016, Physics, University of Göttingen, Germany): “Using Anisotropic Friction to Improve Locomotion of Hexapod Robots on Steep Slopes”.
17. Mr. Chris Tryk Lund Sørensen (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Object manipulation in a hexapod robot”.
18. Mr. Dominik Steven Weickgenannt (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Action-Sequence Learning in Mobile Robotics”.
19. Mr. Carlos Moro García (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Multiple time scales of learning for adaptive behavior of mobile robots”.
20. Ms. Imara van Dinten (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “EEG Pattern Recognition”.
21. Mr. Timon Tomás (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Artificial Neural Control of a Prosthetic”.

22. Mr. Martin Bulin (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Classification of terrain based on proprioception sensing for multi-legged walking robot”.
23. Mr. Ignacio Torroba Balmori and Mr. Jorge Rodriguez Marin (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Design, simulation and development of a bipedal locomotion platform for human-like gaits studies”.
24. Mr. Pongsiri Borijindakul (2017, Metrology, Physics, Faculty of Science, Kasetsart University, Thailand) “Softness Measurement and Application to Haptic system for Soft Sample”.
25. Mr. Krzysztof Smyl (2017, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Neural-Based Control System for Autonomous Operation of Drones”.
26. Mr. Michelangelo Setaro (2016, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Affordance learning applied on bio-inspired artificial agent”.
27. Mr. Aditya Kapilavai (2017, Mechatronics Engineering, University of Southern Denmark, Denmark): “Modeling and Control of Dung Beetle-Like Robots”.
28. Mr. Kristoffer Honoré (2017, Engineering (Robot Systems), University of Southern Denmark, Denmark): “EEG-based Motor Control”.
29. Mr. Malte Carstensen (2017, Mechatronics Engineering, University of Southern Denmark, Denmark): “Implementation and Verification of an Adaptive Neural Control Oscillator for Robot Control on a FPGA”.
30. Mr. Aitor Miguel Blanco (2017, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Neural Control of a Millipede-like Robot”.
31. Mr. Nikolaj Schaldemose Reibke (2017, Engineering (Software), University of Southern Denmark, Denmark): “Evolving Robot Control for Object Transportation”.
32. Mr. Gal Gorjup (2017, Mechanical Engineering, University of Ljubljana, Slovenia): “EEG signal processing and classification for advanced human-machine interfaces”.
33. Mr. Arne Devos (2018, Katholieke Universiteit Leuven, Faculty of Engineering Technology, MSc Energy Engineering Technology, Belgium): “ Development of Autonomous Drones for Adaptive Obstacle Avoidance & Object Tracking in Real World Environments”.
34. Mr. Florentijn Degroote (2018, KU Leuven, Technologicampus Gent, Master Industrial Engineering Automation): “Neural control of a compliant gummi arm robot”.
35. Mr. David Thomas Docherty (2018, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Development of speech localisation and multi-sensory fusion”.

36. Mr. Martin Bagge Jensen (2018, Engineering (Software), University of Southern Denmark, Denmark): “Recurrent Neural Network for Movement Prediction of Surrounding Objects”.
37. Mr. Salman Taj (2018, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Modeling, Simulation and Control of a Millipede inspired Robot”.

***Current projects:***

38. Mr. Binggwong Leung (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “Neural control of a dung beetle robot”.
39. Mr. Vatsanai Jaiton (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “Neural control of autonomous drones for inspection”.
40. Mr. Donghao Shao (current, Institute of Bio-inspired Structure and Surface Engineering, Nanjing University of Aeronautics and Astronautics (NUAA), China): “CPG-based climbing robot control”.
41. Ms. Carolin Nowak (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Reactive control for smooth object approaching of a mobile robot”.
42. Mr. Carlos Viescas Huerta (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Locomotion control of a dung beetle robot”.
43. Mr. Ricardo Alexandre Ribeiro Fonseca Rodrigues Do Carmo (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “EMG-Based Prosthetic Hand Control”.
44. Mr. Daniel Holst Hviid (2018, individual study, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Motion sequence control of a bio-inspired robot using spiking neural networks”.
45. Mr. Mathias Thor (2018, individual study, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Modular Robot Framework”.

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**Diploma Thesis (Equivalent to Master Thesis)**

***Past project:***

1. Ms. Silke Steingrube (2007, Physics, University of Göttingen): “Chaos Control in Neuromodules and Application to Gait Generation”.

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**PhD Theses**

***Past projects:***

1. Mr. Guanjiao Ren - PhD Internship from School of Automation Science and Electrical Engineering, Beihang University of China - (2014): “Multiple CPGs-Based Control of Walking Machines”.
2. Mr. Jan-Matthias Braun (2015, Physics, University of Göttingen): “Advanced Neural Control for Adaptive Orthotic Devices”.
3. Mr. Sakyasingha Dasgupta: (2015, Physics, University of Göttingen): “Dynamics of Learning and Memory in Large Recurrent Neural Networks”.
4. Mr. Xiaofeng Xiong (2015, Informatics, University of Göttingen): “ Neuromechanical Model for Dynamic Walking”.

***Current project:***

5. Mr. Nol Chindapol (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Multi-scale Model of Coral Growth in the Context of Morphological Computation and Plasticity”.
6. Mr. Peter Billeschou (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “The development of a dung beetle-inspired robot for multiple functions”.
7. Mr. Nan-Sheng Huang (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Neural network implementation on FPGA”.
8. Mr. Mathias Thor (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Adaptive locomotion control of legged robots”.
9. Ms. Becky Steckhahn-Strohmer (current, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Behavioural improvement of tactile sensing in a hexapod robot”.
10. Mr. Pongsiri Borijindakul (current, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China):”Smart foot design and control for versatile climbing robots”.
11. Ms. Lasri Wafae (current, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China):” Neural control with minimal force feedback and muscle models for adaptive compliance manipulation and continuous complex trajectory following”.
12. Mr. Sun Tao (current, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China):”Adaptive sensorimotor coordination for self-organized locomotion and adaptation of legged robots”.
13. Mr. Potiwat Ngamkajornwiwat (current, Institute of Field Robotics, King Mongkut’s University of Technology Thonburi, Thailand): “Artificial Hormone Network for Adaptive Robots”.

14. Mr. Chaicharn Akkawutvanich (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “Adaptive Neural Control for Exoskeleton”.
15. Mr. Muhammad Bilal Khan (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “An Inchworm-Inspired Crawling Robot”.
16. Mr. Jettanan Homchanthanakul (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “Decentralized neural control and learning for adaptive legged robot locomotion”.
17. Mr. Puchong Soisudarat (current, School of Information Science & Technology, Vidyasirimedhi Institute of Science & Technology (VISTEC), Thailand): “Intelligent Service Robot for effective Human-Machine Interaction”.

## **Student Projects**

### ***Past projects:***

1. Mr. Birk Urmersbach – Bachelor Student (2009, Biology, University of Göttingen, Germany): “Single Insect-Like Leg with Adaptive Motion Control”.
2. Mr. Johannes Schröder-Schetelig – Diploma Student (2008, Physics, University of Göttingen, Germany): “Using Efference Copy and a Forward Internal Model for Adaptive Biped Walking”.
3. Mr. Tobias Jahn – Bachelor Student (2012, Physics, University of Göttingen, Germany): “Simple Sound Localization Using Three Microphones in a Plane and E-puck Interface”.
4. Mr. Felix Maischner, Mr. Henning Stark, Mr. Julius Strake, Mr. Vitali Telezki, and Mr. Marina Eckermann – Bachelor Students (2013, Physics, University of Göttingen, Germany): “Sound Localization and Obstacle Avoidance of E-puck mobile robots”.
5. Mr. Ditlev Andersen – Master Student (2014, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Intelligent Control of a Semi-Active Suspension System for Improved Road Holding and Vehicle Handling”.
6. Ms. Imara van Dinten (2014, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Moving problem solving robot(s) Multi agent A\*”.
7. Mr. Kenneth Korsgaard Meyer (2014, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “AI controller for a sailboat”.
8. Mr. Giuliano Di Canio and Mr. Patrick Stolc (2014, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Exploring Energy Consumption of a Bio-inspired Robotic Leg with a Passive Tarsus Component: An Embodied AI approach”.

9. Mr. Stoyan Stoyanov – Master Student (2014, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Energy Acquisition in Robots using Solar Power”.
10. Mr. Carlos Moro Garcia (2015, Engineering (Robot Systems), University of Southern Denmark, Denmark): “A Software Framework for Artificial Intelligence”.
11. Mr. Dominik Steven Weickgenannt (2015, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Action-Sequence Learning in Mobile Robotics”.
12. Mr. Krzysztof Smyl (2015, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Obstacle Avoidance System Utilising Neural Receptive Fields Approach”.
13. Mr. Michelangelo Setaro (2015, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Adaptive locomotion control of a hexapod robot”.
14. Mr. Chris Tryk Lund Sørensen (2015, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Pushing object in simulation with a hexapod robot”.
15. Mr. Timon Tomás (2015, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Approximation of EMG/EEG signals with a Radial Basis Function Neural Network”.
16. Ms. Nienke Nadine Bijma (2016, internship, Universität Kiel, Germany): “The dung beetle *Geotrupes stercorarius* as an inspiration for robot locomotion”.
17. Mr. Theis Strøm Hansen and Mr. Mathias Thor (2017, individual study, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Extending the Walknet controller to manipulate objects”.
18. Mr. Almir Mehanovic (2017, individual study, Engineering (Software Engineering), University of Southern Denmark, Denmark): “Evolving robot morphology with genetic algorithms”.
19. Mr. Jevgeni Ignasov (2017, internship, Mechatronics, University of Southern Denmark, Denmark): “Robotic Foot Inspired by Insect Tarsus”.
20. Mr. Jettanan Homchanthanakul (2017, internship, Engineering (Robot Systems), Institute of Field Robotics King Mongkut’s University of Technology Thonburi, Thailand): “Using of artificial hormones to improve robot locomotion in changing environments”.
21. Mr. Siribhop Yooyongchuen (2017, student exchange, Engineering, King Mongkut’s University of Technology North Bangkok, Thailand): “A mobile robot with a lizard ear system”.
22. Mr. Saran Singhsathitsukh (2017, student exchange, Engineering, Sirindhorn International Institute of Technology, Thammasat University, Thailand): “Locokit Leg Redesign”.



23. Mr. Pulkit Saluja (2017, internship, Electronics and Communication Engineering, JECRC Univerisity, Jaipur, India): “Novel Foot Sensor Design for Legged Robots”.
24. Mr. Christian Koed Pedersen (2017, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Neural Control for Autonomous Collision Avoidance for Drones”.
25. Mr. Arthicha Srisuchinnawong (2018, internship, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China): “Application of artificial hormone in a gecko robot”.
26. Mr. Natthiphong Yaidi (2018, internship, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China): “Design and control of a gecko robot with backbone joints”.
27. Mr. Kittipod Punthai (2018, internship, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China): “Simulation of a Dog Robot”.
28. Mr. Thanat Ngamwongsakollert (2018, internship, Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, China): “Tracking motion of gecko experiments for locomotion of a gecko robot”.

***Current projects:***

29. Mr. Matheshwaran Pitchai (2018, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Gait optimization of a 6-legged walking dung-beetle robot using Gaussian mixture model (GMM) and PI<sup>2</sup> algorithm”.
30. Mr. Ada Varga (2018, AI4 project, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Correlation-based neural control for obstacle avoidance”.
31. Mr. Jens Troels Nielsen and Mr. Jeppe Langaa (2018, individual study, Engineering (Robot Systems), University of Southern Denmark, Denmark): “Extending the pipebot controller”.

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Finished projects: 89

Remaining project: 25

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***Postdocs:***

1. Jan Mathias, Plan4Act, SDU
  2. Xiaofeng, DLife, SDU
  3. Nat, Deep RL, VISTEC
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