International Conference on the Simulation of Adaptive Behavior

Tuesday 14 August 2018 - Friday 17 August 2018
Frankfurt Institute for Advanced Studies

Conference Scientific Programme
Conference Programme Tuesday 14th August

The first joint workshop on Biology-inspired robotics and Robotics-inspired Biology (BIRRIB) The BIRRIB workshop is jointly organized by two HFSP (Human Frontier Science Program)-funded projects: Biology-inspired robotics: A dung beetle’s life “how miniature creatures perform extraordinary feats with limited resources” (http://dlife.sdu.dk/), Robotics-inspired biology: Decoding flexibility of motor control by studying amphibious locomotion (http://www.rie.c.tohoku.ac.jp/riecnovest/special/21/index.html ). The workshop aims to present and discuss how robotics and biology can effectively interact to gain a better understanding of the principles underlying complex biological behaviors and to develop a novel bio-inspired robotic technology for solving complex sensorimotor coordination and control problems of systems with many degrees of freedom. Program 9:00 Workshop start 9:00–9:15 Brief Introduction, announcements Biology-inspired robotics: 9:15–9:45 Locomotion and Navigation in dung beetles (Emily Baird) 9:45–10:15 Leg kinematics and labour division in dung beetles (Nienke Bijma) 10:15–10:45 Bio-inspired robotics: From dung beetles to Robots (Poramate Manoonpong) 10:45–11:15 Robotics-inspired biology: 12:30–13:00 Engineering tools to study sensory motor control in lamprey (Paez Coy Laura Isabel & Jonathan Patrick Arregui O’Neill) 13:00–13:30 Decoding Flexibility of Motor Control Underlying Amphibious Locomotion of Centipedes (Kotaro Yasui) 13:30–14:00 Locomotor flexibility of Polypterus senegalus (Keegan Lutek) 14:00–15:00 Discussion & Closing Wednesday 15th August 9:00 - 9:30 Conference Registration 9:30 - 9:45 Welcome 9:45 - 10:45 First keynote speaker - Prof. Jan Peters 10:45 - 11:15 Coffee Break Learning and Adaptation 11:15-11:45 Deep Feedback Learning, Bernd Porr and Paul Miller 11:45-12:15 Deep Reinforcement Learning with Risk-Seeking Exploration, Nat Dilokthanakul and Murray Shanahan 12:15 - 14:00 Lunch 14:00-14:30 Neural Control and Synaptic Plasticity for Adaptive Obstacle Avoidance of Autonomous Robots, Christian Koed Pedersen and Poramate Manoonpong 14:30-15:00 Homeostatic Neural Network for Adaptive Control: Examination and Comparison, Oleg Nikitin and Olga Lukyanova 15:00-15:30 Online Gait Adaptation on a Hexapod Robot using an Improved Artificial Hormone Mechanism, Potiwan Ngamkajornwiwat, Pitiwut Teerakittikul and Poramate Manoonpong 15:30 - 16:00 Coffee Break Perception 16:00-16:30 An Active Efficient Coding Model of Binocular Vision Development under Normal and Abnormal Rearing Conditions, Lukas Klímsch, Johann Schneider, Alexander Lelais, Bertram Shi and Jochen Triesch 16:30-17:00 Detecting a Sphere Object with an Array of Magnetic Sensors, Byungmun Kang and Daeeun Kim 18:00 Welcome at FIAS with nibbles/drinks Thursday 16th August 9:00 - 10:00 Second keynote speaker - Prof. Koh Hosoda 10:00 - 10:15 Spotlight Poster Presentations (two slides and two minutes) Minimal Model for Body-limb Coordination in Quadruped High-Speed Running, Akira Fukuhara, Yukihiro Koizumi, Shura Suzuki, Takeshi Kano and Akio Ishiguro Transfer of a Quadruped Locomotion Controller from Simulation to Robot, Gabriel Urbain, Alexander Vandesompele, Francis Wyffels and Joni Dambre Cylindrical Terrain Classification using a Compliant Robot Foot with a Flexible Tactile-Array Sensor for Legged Robots, Pongsiri Borijindakul, Noparit Jinuntuya, Alin Drimus and Poramate Manoonpong Hierarchical Integration of Foveal and Peripheral Vision for Vergence Control by Active Efficient Coding, Zhetuo Zhao, Jochen Triesch and Bertram Shi Simulation of Heterogeneous Robot Swarm in Resource Transportation System, Seulgee Kim and Daeeun Kim Isotopic Inheritance: a Topological Approach to Genotype Transfer, Olga Lukyanova and Oleg Nikitin 10:15 - 11:30 Coffee break with poster session Collective and Social Behavior 11:30 - 12:00 Bee-Inspired Self-Organizing Flexible Manufacturing System for Mass Personalization, Rotimi Ogunsakin, Nikolay Mehandjiev and César Marín 12:00-12:30 Impact of Mobility Mode on Innovation Dissemination: An Agent-Based Simulation Modeling, Sanad Al-Maskari, Kashif Zia, Arshad Muhammad and Dinesh Saini 12:30 - 14:00 Lunch 14:00 - 15:00 Third keynote speaker - Prof. Auke Jan Ijspeert 15:00 - 15:30 Coffee Break Motor Control 15:30-16:00 Decentralized Control Scheme for Coupling between Undulatory and Peristaltic Locomotion, Takeshi Kano, Naoki Matsui and Akio Ishiguro 16:00-16:30 Gait Transition between Simple and Complex Locomotion in Humanoid Robots, Sidhharthkumar Vaghani, Yuxiang Pan, Fred Hamker and John Nassour 16:30 - 17:00 Towards Rich Motion Skills with the Lightweight Quadruped Robot Serval - a Design, Control and Experimental Study, Peter Eckert, Anja E. M. Schmerbauch, Tomislav Horvat, Katja Söhnlein, Martin S. Fischer, Hartmut Witte and Auke J. Ijspeert 19:00 Social Dinner Friday 17th August 9:00 - 10:00 Fourth keynote speaker - Dr. Tom Froese 10:00
- 10:30 Coffee Break

Action Selection and Navigation 10:30-11:00
An Artificial Circadian System for a Slow and Persistent Robot, Matthew O'Brien and Ronald Arkin

11:00-11:30 A Hybrid Visual-Model based Robot Control Strategy for Micro Ground Robots, Cheng Hu, Qinbing Fu, Tian Liu and Shigang Yue Animat Approach and Methodology

11:30-12:00 A Probabilistic Interpretation of PID Controllers using Active Inference, Manuel Baltieri and Christopher L. Buckley

12:00-12:10 Closing Remarks for the Conference

12:10-13:30 Lunch