

Contents

Straight Swimming Algorithm Used by a Design of Biomimetic Robotic Fish.	1
<i>M.O. Afolayan</i>	
Animal and Robotic Locomotion on Wet Granular Media	13
<i>Hosain Bagheri, Vishwarath Taduru, Sachin Panchal, Shawn White, and Hamidreza Marvi</i>	
Tunable Normal and Shear Force Discrimination by a Plant-Inspired Tactile Sensor for Soft Robotics	25
<i>Afroditi Astreinidi Blandin, Massimo Totaro, Irene Bernardeschi, and Lucia Beccai</i>	
Pop! Observing and Modeling the Legless Self-righting Jumping Mechanism of Click Beetles	35
<i>Ophelia Bolmin, Chengfang Duan, Luis Urrutia, Ahmad M. Abdulla, Alexander M. Hazel, Marianne Alleyne, Alison C. Dunn, and Aimy Wissa</i>	
Bioinspired Magnetic Navigation Using Magnetic Signatures as Waypoints.	48
<i>Brian K. Taylor and Grant Huang</i>	
Jellyfish Inspired Soft Robot Prototype Which Uses Circumferential Contraction for Jet Propulsion.	61
<i>George Bridges, Moritz Raach, and Martin F. Stoelen</i>	
You Made Him Be Alive: Children’s Perceptions of Animacy in a Humanoid Robot	73
<i>David Cameron, Samuel Fernando, Emily C. Collins, Abigail Millings, Michael Szollosy, Roger Moore, Amanda Sharkey, and Tony Prescott</i>	
Analysing the Limitations of Deep Learning for Developmental Robotics	86
<i>Daniel Camilleri and Tony Prescott</i>	
Reducing Training Environments in Evolutionary Robotics Through Ecological Modularity	95
<i>Collin Cappelle, Anton Bernatskiy, and Josh Bongard</i>	
Automated Calibration of a Biomimetic Space-Dependent Model for Zebrafish and Robot Collective Behaviour in a Structured Environment	107
<i>Leo Cazenille, Yohann Chemtob, Frank Bonnet, Alexey Gribovskiy, Francesco Mondada, Nicolas Bredeche, and José Halloy</i>	

Spiking Cooperative Stereo-Matching at 2 ms Latency with Neuromorphic Hardware	119
<i>Georgi Dikov, Mohsen Firouzi, Florian Röhrbein, Jörg Conradt, and Christoph Richter</i>	
Development of Novel Foam-Based Soft Robotic Ring Actuators for a Biomimetic Peristaltic Pumping System	138
<i>Falk Esser, Tibor Steger, David Bach, Tom Masselter, and Thomas Speck</i>	
Introducing Biomimomics: Combining Biomimetics and Comparative Genomics for Constraining Organismal and Technological Complexity	148
<i>Claudio L. Flores Martinez</i>	
Effects of Locomotive Drift in Scale-Invariant Robotic Search Strategies	161
<i>Carlos Garcia-Saura, Eduardo Serrano, Francisco B. Rodriguez, and Pablo Varona</i>	
Simulation of Human Balance Control Using an Inverted Pendulum Model	170
<i>Wade W. Hilts, Nicholas S. Szczecinski, Roger D. Quinn, and Alexander J. Hunt</i>	
Reducing Versatile Bat Wing Conformations to a 1-DoF Machine	181
<i>Jonathan Hoff, Alireza Ramezani, Soon-Jo Chung, and Seth Hutchinson</i>	
Mathematical Modeling to Improve Control of Mesh Body for Peristaltic Locomotion	193
<i>Yifan Huang, Akhil Kandhari, Hillel J. Chiel, Roger D. Quinn, and Kathryn A. Daltorio</i>	
Neuronal Distance Estimation by a Fly-Robot Interface	204
<i>Jiaqi V. Huang and Holger G. Krapp</i>	
Bio-inspired Robot Design Considering Load-Bearing and Kinematic Ontogeny of Chelonioidea Sea Turtles	216
<i>Andrew Jansen, Kevin Sebastian Luck, Joseph Campbell, Heni Ben Amor, and Daniel M. Aukes</i>	
Feather-Inspired Sensor for Stabilizing Unmanned Aerial Vehicles in Turbulent Conditions	230
<i>Christos Kouppas, Martin Pearson, Paul Dean, and Sean Anderson</i>	
Towards Identifying Biological Research Articles in Computer-Aided Biomimetics	242
<i>Ruben Kruiper, Julian F.V. Vincent, Jessica Chen-Burger, and Marc P.Y. Desmulliez</i>	

Deep Dynamic Programming: Optimal Control with Continuous Model Learning of a Nonlinear Muscle Actuated Arm. 255
Andrew G. Lonsberry, Alexander J. Lonsberry, and Roger D. Quinn

An Adaptive Modular Recurrent Cerebellum-Inspired Controller. 267
Kiyan Maheri, Alexander Lenz, and Martin J. Pearson

Stimulus Control for Semi-autonomous Computer Canine-Training 279
John J. Majikes, Sherrie Yuschak, Katherine Walker, Rita Brugarolas, Sean Mealin, Marc Foster, Alper Bozkurt, Barbara Sherman, and David L. Roberts

Exploiting Morphology of a Soft Manipulator for Assistive Tasks. 291
Mariangela Manti, Thomas George Thuruthel, Francesco Paolo Falotico, Andrea Pratesi, Egidio Falotico, Matteo Cianchetti, and Cecilia Laschi

Autonomous Thrust-Assisted Perching of a Fixed-Wing UAV on Vertical Surfaces 302
Dino Mehanovic, John Bass, Thomas Courteau, David Rancourt, and Alexis Lussier Desbiens

An Integrated Compliant Fabric Skin Softens, Lightens, and Simplifies a Mesh Robot. 315
Anna Mehringer, Akhil Kandhari, Hillel Chiel, Roger Quinn, and Kathryn Daltorio

Causal Biomimesis: Self-replication as Evolutionary Consequence. 328
Gabriel Axel Montes

Non-ordinary Consciousness for Artificial Intelligence. 348
Gabriel Axel Montes

A Biomimetic Vocalisation System for MiRo 363
Roger K. Moore and Ben Mitchinson

A Scalable Neuro-inspired Robot Controller Integrating a Machine Learning Algorithm and a Spiking Cerebellar-Like Network. 375
Ismael Baira Ojeda, Silvia Tolu, and Henrik H. Lund

Behavior-State Dependent Modulation of Perception Based on a Model of Conditioning. 387
Jordi-Ysard Puigbò, Miguel Ángel Gonzalez-Ballester, and Paul F.M.J. Verschure

Describing Robotic Bat Flight with Stable Periodic Orbits 394
Alireza Ramezani, Syed Usman Ahmed, Jonathan Hoff, Soon-Jo Chung, and Seth Hutchinson

Research of a Lensless Artificial Compound Eye	406
<i>Gasper Škulj and Drago Bračun</i>	
Development of a Bio-inspired Knee Joint Mechanism for a Bipedal Robot.	418
<i>Alexander G. Steele, Alexander Hunt, and Appolinaire C. Etoundi</i>	
Predator Evasion by a Robocrab	428
<i>Theodoros Stouraitis, Evripidis Gkaniias, Jan M. Hemmi, and Barbara Webb</i>	
MantisBot Changes Stepping Speed by Entraining CPGs to Positive Velocity Feedback.	440
<i>Nicholas S. Szczecinski and Roger D. Quinn</i>	
EvoBot: Towards a Robot-Chemostat for Culturing and Maintaining Microbial Fuel Cells (MFCs)	453
<i>Pavlina Theodosiou, Andres Faina, Farzad Nejatimoharrami, Kasper Stoy, John Greenman, Chris Melhuish, and Ioannis Ieropoulos</i>	
Using Deep Autoencoders to Investigate Image Matching in Visual Navigation	465
<i>Christopher Walker, Paul Graham, and Andrew Philippides</i>	
3D-Printed Biohybrid Robots Powered by Neuromuscular Tissue Circuits from <i>Aplysia californica</i>	475
<i>Victoria A. Webster, Fletcher R. Young, Jill M. Patel, Gabrielle N. Scariano, Ozan Akkus, Umut A. Gurkan, Hillel J. Chiel, and Roger D. Quinn</i>	
Self-organising Thermoregulatory Huddling in a Model of Soft Deformable Littermates	487
<i>Stuart P. Wilson</i>	
Bio-inspired Tensegrity Soft Modular Robots	497
<i>D. Zappetti, S. Mintchev, J. Shintake, and D. Floreano</i>	
Consciousness as an Evolutionary Game-Theoretic Strategy	509
<i>Xerxes D. Arsiwalla, Ivan Herreros, Clement Moulin-Frier, and Paul Verschure</i>	
Using the Robot Operating System for Biomimetic Research	515
<i>Alexander Billington, Gabriel Walton, Joseph Whitbread, and Michael Mangan</i>	
Modeling of Bioinspired Apical Extension in a Soft Robot.	522
<i>Laura H. Blumenschein, Allison M. Okamura, and Elliot W. Hawkes</i>	

A Biomechanical Characterization of Plant Root Tissues by Dynamic Nanindentation Technique for Biomimetic Technologies. 532
Benedetta Calusi, Francesca Tramacere, Carlo Filippeschi, Nicola M. Pugno, and Barbara Mazzolai

Biomimetic Creatures Teach Mechanical Systems Design. 537
Matthew A. Estrada, John C. Kegelman, J. Christian Gerdes, and Mark R. Cutkosky

Soft Fingers with Controllable Compliance to Enable Realization of Low Cost Grippers 544
Keng-Yu Lin and Satyandra K. Gupta

Self-organisation of Spatial Behaviour in a Kilobot Swarm. 551
Calum Imrie and J. Michael Herrmann

Bio-inspired Design of a Double-Sided Crawling Robot. 562
Jong-Eun Lee, Gwang-Pil Jung, and Kyu-Jin Cho

A Closed Loop Shape Control for Bio-inspired Soft Arms 567
Dario Lunni, Matteo Cianchetti, Egidio Falotico, Cecilia Laschi, and Barbara Mazzolai

Learning Modular Sequences in the Striatum 574
Giovanni Maffei, Jordi-Ysard Puigbò, and Paul F.M.J. Verschure

Spermbots: Concept and Applications 579
Mariana Medina-Sánchez, Veronika Magdanz, Lukas Schwarz, Haifeng Xu, and Oliver G. Schmidt

An Insect-Scale Bioinspired Flapping-Wing-Mechanism for Micro Aerial Vehicle Development 589
Kenneth C. Moses, Nathaniel I. Michaels, Joel Hauerwas, Mark Willis, and Roger D. Quinn

Geometric Mechanics Applied to Tetrapod Locomotion on Granular Media 595
Yasemin Ozkan Aydin, Baxi Chong, Chaohui Gong, Jennifer M. Rieser, Jeffery W. Rankin, Krijn Michel, Alfredo G. Niecieza, John Hutchinson, Howie Choset, and Daniel I. Goldman

Bioinspired Grippers for Natural Curved Surface Perching 604
William R.T. Roderick, Hao Jiang, Shiquan Wang, David Lentink, and Mark R. Cutkosky

Collisional Diffraction Emerges from Simple Control of Limbless Locomotion	611
<i>Perrin E. Schiebel, Jennifer M. Rieser, Alex M. Hubbard, Lillian Chen, and Daniel I. Goldman</i>	
Binocular Vision Using Synthetic Nervous Systems	619
<i>Anna Sedlackova, Nicholas S. Szczecinski, and Roger D. Quinn</i>	
Cell Patterning Method by Vibratory Stimuli	626
<i>Ippei Tashiro, Masahiro Shimizu, and Koh Hosoda</i>	
Dry Adhesion of Artificial Gecko Setae Fabricated via Direct Laser Lithography	631
<i>Omar Tricinci, Eric V. Eason, Carlo Filippeschi, Alessio Mondini, Barbara Mazzolai, Nicola M. Pugno, Mark R. Cutkosky, Francesco Greco, and Virgilio Mattoli</i>	
Gesture Recognition Through Classification of Acoustic Muscle Sensing for Prosthetic Control (Extended Abstract)	637
<i>Samuel Wilson and Ravi Vaidyanathan</i>	
Erratum to: Bio-inspired Design of a Double-Sided Crawling Robot	E1
<i>Jong-Eun Lee, Gwang-Pil Jung, and Kyu-Jin Cho</i>	
Author Index	643



<http://www.springer.com/978-3-319-63536-1>

Biomimetic and Biohybrid Systems

6th International Conference, Living Machines 2017,

Stanford, CA, USA, July 26–28, 2017, Proceedings

Mangan, M.; Cutkosky, M.; Mura, A.; Verschure, P.F.M.J.;

Prescott, T.; Lepora, N. (Eds.)

2017, XVIII, 645 p. 328 illus., Softcover

ISBN: 978-3-319-63536-1