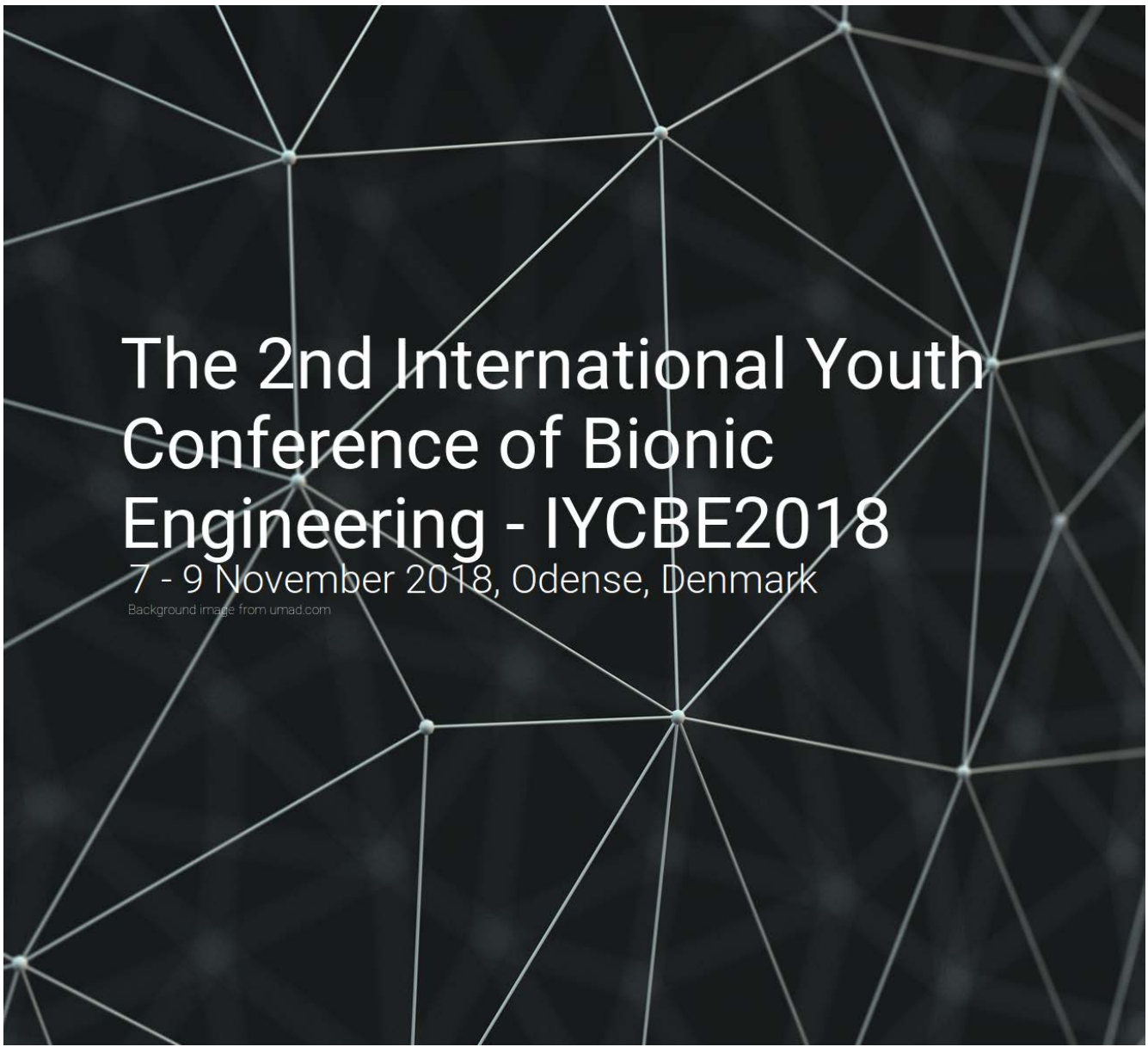


Conference guide

The 2nd International Youth Conference of Bionic Engineering (IYCBE2018)

7-9 November 2018, Odense, Denmark

Organized by the International Bionic Engineering (ISBE)

Conference Guide

Sponsored by

1. Welcome

Welcome to the 2nd International Youth Conference of Bionic Engineering (IYCBE2018). This year's program comprises 9 invited talks and 18 talks by authors submitted papers; together with an exhibition of a further 18 submissions as posters. The three-day program is hosted by Odense at the University of Southern Denmark (SDU), Denmark.

The Conference Chairs thank the authors for their submissions; the members of the Program Committee for timely and informative reviews; frontiers and biomimetics Publishing for their sponsorship; and the attendees for their continued support of the conference.

We hope you enjoy this Denmark incarnation of the IYCBE2018 conference, and your visit to Odense and Denmark.

Poramate Manoonpong

University of Southern Denmark, Denmark/ Nanjing University of Aeronautics & Astronautics, China

Limei Tian

Jilin University, China

Zhiguang Guo

Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, China

2. IYCBE2018 Organization

The 2nd International Youth Conference of Bionic Engineering (IYCBE2018) was organized by the University of Southern Denmark (SDU), Denmark and the International Society of Bionic Engineering (ISBE).

Honorary Chairs

Julian Vincent, Heriot-Watt University, UK

Luquan Ren, Jilin University, China

General Chair

Poramate Manoonpong, University of Southern Denmark, Denmark

Vice-General Chairs

Limei Tian, Jilin University, China

Zhiguang Guo, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, China

Program Chairs

Jørgen C. Larsen, Xiaofeng Xiong, University of Southern Denmark, Denmark

Local Arrangement Chair

Danish Shaikh, University of Southern Denmark, Denmark

Publication Chair

Jan-Matthias Braun, University of Southern Denmark, Denmark

Registration Chair

Tórur Andreassen, University of Southern Denmark, Denmark

Media Operation Chair

Mathias Thor, University of Southern Denmark, Denmark

Technical Support

Peter Billeschou, University of Southern Denmark, Denmark

Leon Bonde Larsen, University of Southern Denmark, Denmark

David Docherty, University of Southern Denmark, Denmark

Scientific Committee

Aihong Ji (Nanjing University of Aeronautics & Astronautics, China)
Akio Ishiguro (Tohoku University, Japan)
Alexander Sprowitz (Max Planck Institute for Intelligent Systems, Germany)
Auke Jan Ijspeert (École, Polytechnique Fédéale de Lausanne, Switzerland)
Bram Vanderborght (Vrije Universiteit Brussel, Belgium)
Caiming Sun (Chinese University of Hong Kong, Hong Kong)
Christian Tetzlaff (Georg-August University Göttingen, Germany)
Clemens F. Schaber (Kiel University, Germany)
Dai Owaki (Research Institute of Electrical Communication, Tohoku University, Japan)
Daniel Renjewski (Technical University of Munich, Germany)
Daniel Tinello (Graz University of Technology, Austria)
Danish Shaikh (University of Southern Denmark, Denmark)
Dingguo Zhang (Shanghai Jiao Tong University, China)
Emily Baird (Lund University, Sweden)
Florentin Wörgötter (Georg-August University Göttingen, Germany)
Friedrich G. Barth (University of Vienna, Austria)
Fumitoshi Matsuno (Kyoto University, Japan)
Giuseppe Carbone (University of Cassino and Southern Latium, Italy)
Guangming Chen (Nanjing University of Aeronautics & Astronautics, China)
Hongkai Li (Nanjing University of Aeronautics & Astronautics, China)
Huawei Chen (Beihang University, China)
Ji Ke Ju (Nanjing University of Aeronautics & Astronautics, China)
Jorgen C. Larsen (University of Southern Denmark, Denmark)
Limei Tian (Jilin University, China)
Luca Patanè (University of Catania, Italy)
Malte Schilling (University of Bielefeld, Germany)
Masahiro Shimizu (Osaka University, Japan)
Pakpong Chirarattananon (City University of Hong Kong, Hong Kong)
Paolo Arena (University of Catania, Italy)
Pichaya Pattanasattayavong (Vidyasirimedhi Institute of Science and Technology, Thailand)
Poramate Manoonpong (University of Southern Denmark, Denmark/ Nanjing University of Aeronautics & Astronautics, China)
Shinya Aoi (Kyoto University, Japan)
Sridhar Ravi (RMIT University, Australia)
Stanislav Gorb (Kiel University, Germany)
Thierry Darmanin (University of Nice Sophia Antipolis, France)
Thomas Stegmaier (ITV Denkendorf, Germany)
Tobias Seidl (Westfälisches Institut für Bionik, Germany)

Tomas Kulvicius (Georg-August University Göttingen, Germany)
Vinich Promarak (Vidyasirimedhi Institute of Science and Technology, Thailand)
Werasak Surareungchai (King Mongkut's University of Technology, Thailand)
Yang Li (Nanjing University of Aeronautics & Astronautics, China)
Yu Tian (Tsinghua University, China)
Yulia Sandamirskaya (Institute of Neuroinformatics (INI), University and ETH Zurich, Switzerland)
Zhiguang Guo (Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, China)
Zhiwei Yu (Nanjing University of Aeronautics & Astronautics, China)
Zhiwu Han (Jilin University, China)
Zhongyuan Wang (Chinese University of Hong Kong, China)
Zuankai Wang (City University of Hong Kong, Hong Kong)

Sponsoring Institutions

International Society of Bionic Engineering (ISBE)

Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, China

Jilin University, China

Nanjing University of Aeronautics & Astronautics, China

University of Southern Denmark (SDU), Denmark

frontiers https://www.frontiersin.org/

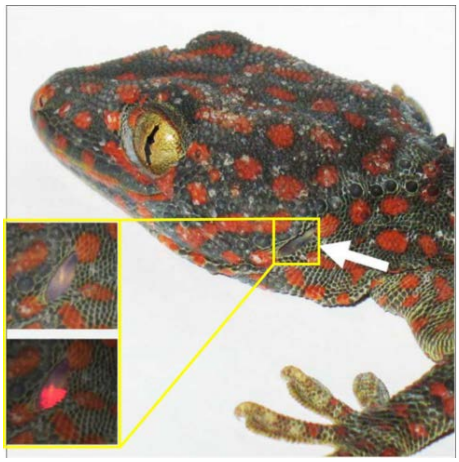
biomimetics https://www.mdpi.com/journal/biomimetics

3. Invited Talks

John Hallam

Prof. John Hallam graduated with First Class Honours in Mathematics from the University of Oxford in 1979, completed a Ph.D. in the Department of Artificial Intelligence at the University of Edinburgh in 1984 and joined the teaching Faculty in that Department in 1985. He established the Edinburgh Mobile Robotics Research Group, having been active in mobile robotics research for almost 25 years. In 2003 he moved to the Maersk Institute at the University of Southern Denmark, where he leads the Embodied Systems unit and is Director of the Centre for BioRobotics. The current focus of his catholic research interest in robotics is in biological modelling using robotic techniques, evolutionary robotics, and collective robotics. He has published around 100 journal and international conference papers on various robotic and non-symbolic computing topics, has designed electronic hardware both for Mobile Robotics Group experiments and commercially, and is the President of the International Society for Adaptive Behaviour (ISAB).

From Lizards to LEGO, and back again?

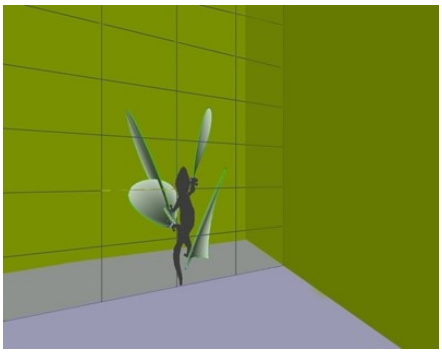


The ears of lizards are, for their size, extremely sensitive to the direction of a sound source over a relatively wide frequency range. They achieve this sensitivity by exploiting the well-understood pressure difference receiver concept. However, the detailed behviour of such a system in the hysical world is very hard to model, which suggests biorobotics may be a fruitful approach. We shall see how building a lizard robot allows study of behaviours supported by the lizard ear, and consider how such knowledge may be exploited in technological innovation.

Zhendong Dai

Prof. Zhendong Dai is the founder and director of Institute of Bio-inspired Structure and Surface Engineering (NUAA), and a tutor of PhD students. He was a post doctor and visiting scientist Max Planck Institute for Developmental Biology, one of evaluation experts for the Department of Automation, Division of Information Technical Sciences, 12th and 13th National Natural Science Fund Committee. He is one of the Chinese delegates of International Institute of Bionic Engineering, an executive member of the council of Chinese Mechanical Engineering in Tribology, a member of the academic committee of the State Key Laboratory of Solid Lubrication, a senior member Chinese Materials Research Society, and a member of Chinese Association for Artificial Intelligence. He is also a member of ASME, SPIE, and IOP. What' s more, he is a member of editorial board of many academic journals such as Journal of Bionic Engineering, International Journal of Vehicle Autonomous System, Tribology and so on. He has authored more than 200 papers, owned 26 patents and published 4 monographs and won several national and provincial Science and Technology Awards.

Biomimetic on gecko locomotion: from biology to engineering

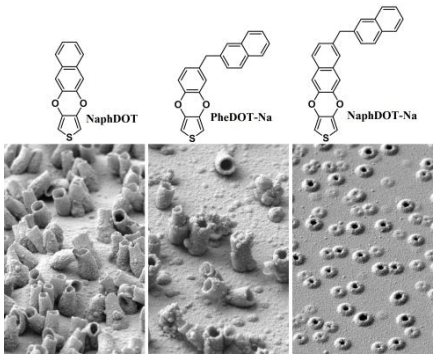


Geckos have been studied for many years for their excellent moving abilities on various substrates, including any inclines, even ceilings, and various rough surfaces. The paper reports our studies on the gecko adhesive mechanism, attaching and detaching dynamics, and gecko-inspired robot for micro-gravity condition. Studies suggested that van der Waals force between seta of gecko and substrate was the mechanism generating adhesion, which is very difficult to keep the distance between setae and substrate under sub-nanometers, here we designed an experiment and measured the contact/ tribo-electrifiction, the results showed the evidence of influence of contact / tribo-electrifiction on adhesion. Our studies show that geckos prefer to detach from substrate by toe abduction, instand of peeling from substrate. We developed gecko-inspired robot and carried out experiments on micro-gravity simulating status.

Thierry Darmanin

Since 2009, I'm Associate Professor in the laboratory NICE Lab of the Université Côte d'Azur. Inspired by species found in Nature, the aim of my works is to prepare superhydrophobic and superoleophobic biomimetic surfaces with controlled and well-defined nanostructures in order to find a relationship between geometrical parameters and the surface wetting properties. This work allows to obtain, in 10 years, an international reputation in this field with more than 150 publications and as invited keynote speaker in international conferences. The electropolymerization, used to obtain these surface properties, allows in one step: (i) the electropolymerization of the monomer, (ii) a fast deposition of conducting polymer films which have (iii) peculiar opto-electronic properties with (iv) multiple possible switchable wettabilities. Moreover, the surface structures can be easily tuned with the electrochemical parameters but also with the chemical design of the monomers. My main skill concerns the control of surface nanostructures (nanofibers, nanotubes, nanosheets...) and the wettability (adhesion / antiadhesion) of various liquids on these structured surfaces. Very recently, my research could reach porous nanostructures such as arrays of vertically aligned nanotubes in organic solvent, without any surfactant, using a templateless electropolymerization process. Moreover, the surfaces displayed high hydrophobicity and extremely high water adhesion (parahydrophobic surfaces) due to the presence of these nanotubes. I am also interested by the electropolymerization on already pre-structured substrates (meshes, microplotted substrates...) in order to amplify the phenomena. In order to prepare smarter materials My projects also concern the introduction of other functions sensitive to different stimuli.

Tunable Conducting Polymer Nanotubes with Special Wetting Properties

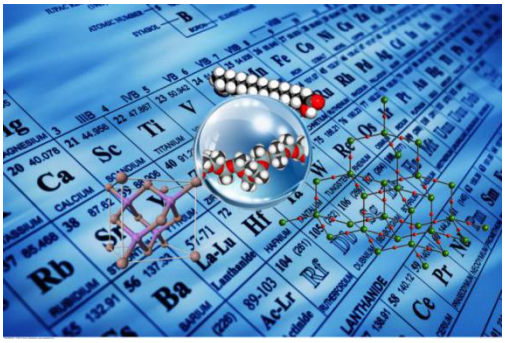


The control in the surface structures is fundamental for many applications such for the wetting properties. In particular, nanotubes were found to be excellent candidates because the surface properties are highly dependent on their diameter, the height or their porosity. The preparation of highly ordered nanotubes often needs complex processes such as the use the template or lithographic process. The templateless electropolymerization is an excellent alternative for the formation of porous structures such as nanotubes. In 2003, Shi et al. reported for the first time the formation of nanotubes by electropolymerization of pyrrole in an aqueous solution containing a surfactant. In this process, gas bubbles released from water (O2 and/or H2 following the polymerization process) are responsible of the formation of nanotubes. Very recently, we show this possibility in organic solvent (trace water is sufficient) and without surfactant. The monomer plays a special role in the stabilization of gas bubbles and the formation of porous structures. Here, I will present most of the results obtained in our group in this domain.

Zhiguang Guo

Professor Zhiguang Guo, received his PhD from Lanzhou Institute of Chemical Physics (LICP), Chinese Academy of Sciences (CAS) in 2007. From Sep 2008 to Mar 2011, he worked in Funds of National Research Science (FNRS), Belgium, as a "Charge de Researcher". During Feb 2009 to Feb 2010, he worked in Department of Physics, University of Oxford, UK, as a visiting scholar. From 2011, he is a full professor in LICP financed by "Top Hundred Talents" program of CAS. He is an associated editor of RSC Adv, and the Chairman for both the youth committee of International Society of Bionic Engineering and the youth committee of the Tribology Society of China. Till now, he has published more than 160 papers about the biomimetic tribology, especially focusing on its surface chemistry and physics.

Bioinspired Separation Materials for Liquid Lubricants

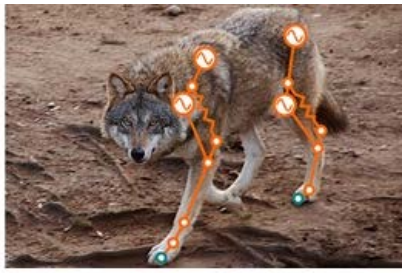


Friction is two faces, one is helpful for human beings, and the other is harmful, which can make a lot of loss for materials, energy, sizes and so on. Lubrication is an effective way to reduce friction by various kinds of lubricants. Among them, liquid lubrications are the most used due to their excellent properties, compared solid lubricants. Once water was mixed into the liquid lubricant, it will largely reduce the lubrication efficiency by hindering the formation of lubrication films and forming more serve corrosion wear for metal frictional pairs. How to remove water from liquid lubricants is still a challenge for us. Herein, some interesting researches will be introduced, which were done in our research group in the past six years. This will open a new route for the separation of oil/water mixtures.

Alexander SprÖwitz

Alexander SprÖwitz received his PhD in 2010 working with Modular Robots at EPFL in Switzerland, after studying Mechatronics in Ilmenau, Germany. He runs an independent research group at the Max Planck Institute for Intelligent Systems in Stuttgart, Germany. His group develops new robotic and control approaches to understand the underlying principles of legged locomotion. This interdisciplinary approach includes cooperative work i.e. with Biologists, by designing and running robots and their simulations, and comparing data of running robots with that of running animals.

Implementing and Testing Bioinspired Mechanisms on Robots to Understand Legged Locomotion

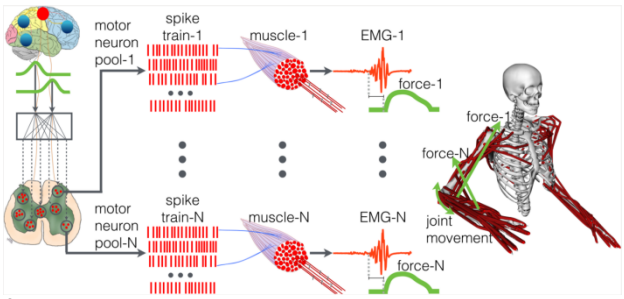


Animals run dynamically yet with high robustness. The underlying principles of legged locomotion are still poorly understood. Interdisciplinary research indicates the existence of mechanisms – blueprints – embedded in mechanics and neurocontrol. Such blueprints are found in the morphological design of mammalian legs as leg segmentation ratios, pantographic leg structures, multiarticulate muscles-tendons, and compliant muscle-tendon structures. Neuromuscular control blueprints are for example pattern generators responsible for locomotion rhythm generation. Blueprints could have evolved to counter performance limitations due to mechanical and neurocontrol restrictions of i.e. biological tissue. Here we base our discussion on findings and insights from implementing biomechanical and control blueprints into legged robots. I.e. Cheetah-cub robot is the first quadruped robot between 0.5kg and 30kg to reach a dynamic speed of Froude 1.3, while trotting in 3D, and in a feed-forward control mode. We apply bioinspired robot- and controller designs to produce rich and biomechanically relevant locomotion data. Recordings from running robotic experiments help us analyzing and comparing robotic and biological legged systems. We will discuss these and other examples also from Biology and Biomechanics indicating the existence of dynamic legged locomotion modes which can rely on feed-forward control patters, in combination with potentially bioinspired leg and robot designs.

Massimo Sartori

Dr Massimo Sartori received the M.Sc. degree in computer engineering (2007) and the Ph.D. degree in information and communication science and technologies (2011) from the University of Padova (Italy). From 2011 to 2015, he was a Postdoctoral Fellow at the Institute of Neurorehabilitation Systems, University Medical Center GÖttingen (Germany) where he became Junior Research Group Leader in 2016. He was a Visiting Scholar at the University of Western Australia, (2009-2010), at the Centre for Musculoskeletal Research at Griffith University, (2011) and at the NIH National Center for Simulation in Rehabilitation Research (NCSRR) at Stanford University (2013). Dr. Sartori led work packages on neuro-mechanical modelling and prosthetic technologies in international projects including the ERC Advanced Grant DEMOVE (2011-2016), the FP7 EU Project H2R (2013-2016) and the BMBF Innovation Cluster INOPRO (2016-2020). He served as Scientific Advisory Board member in the FP7 EU Project BioMot (2013-2016). In 2017 he was appointed Assistant Professor at the Department of Biomechanical Engineering, University of Twente (The Netherlands). He was Guest Associate Editor of the IEEE Transactions on Biomedical Engineering (2015-2016) and currently is Guest Editor in the Frontiers in Computational Neuroscience. In 2014 and 2016 he received an NCSRR OpenSim Fellowship and the NIH-NCSRR Outstanding Research Award respectively. In 2017 he was awarded a H2020 Marie Skłodowska-Curie Individual Fellowship.

Neuro-Mechanical Modelling for Man-Machine Interaction

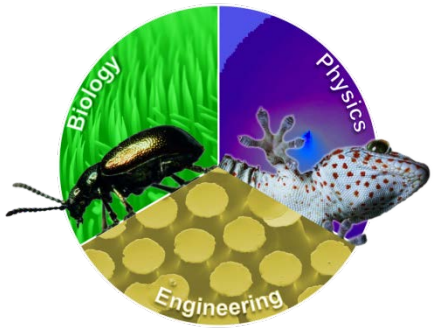


The development of personalized neurorehabilitation and augmentation technologies requires the profound understanding of the neuro-mechanical processes underlying an individual's motor function, impairment, and recovery. A major challenge is the difficulty of accessing the in vivo neural activity underlying human movement concurrently with the resulting mechanical forces elicited at the musculoskeletal level. Key factors for addressing this challenge are the development of techniques for interfacing with the human nervous system and for the accurate decoding of the resulting motor function under neurophysiological control. In this presentation, I will discuss clinically viable methods for accessing the neural information underlying an individual's movement from electrophysiological recordings and the development of subject-specific neuromusculoskeletal modeling formulations that can translate neural inputs into the resulting mechanical output. I will then outline how this paradigm enables establishing effective solutions for replacing or restoring movement in impaired individuals and for developing bio-inspired controllers for wearable technologies.

Lars Heepe

Lars Heepe is a junior research group leader at the department of Functional Morphology and Biomechanics at the Zoological Institute of Kiel University, Germany. He received a B.S. degree in Engineering Physics from The Jena University of Applied Sciences, Germany in 2008. In 2011 he received a M.S. in Scientific Instruments from The Jena University of Applied Sciences. After that, he joined Prof. Stanislav N. Gorb's group at Kiel University where he obtained his Ph.D. in Biophysics in 2014. In 2014 he was awarded with the Best Dissertation Award of the Faculty of Mathematics and Natural Sciences, Kiel University, Germany and in 2015 he received the Fraunhofer UMSICHT Science Award. His research interests include the adhesion, friction and contact mechanics of biological and biologically inspired attachment systems, the development of space-, time- and force-resolved in situ tribometry techniques, and on surfaces preventing marine biofouling.

Biological and Biomimetic Surfaces: Adhesion, Friction, and Applications

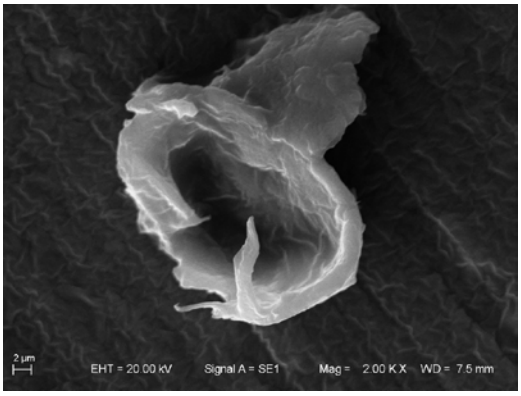


In the animal kingdom, adhesion and friction play a fundamental role to secure locomotion on a variety of natural surfaces and is therefore of great importance in e.g. ceiling walk, prey capturing, and defence against predators. Previous comparative experimental studies on biological systems showed that their attachment organs are a non-trivial combination of structural (geometrical) features and material properties, which allow some animals, such as insects, spiders, and geckos to adhere to and to walk on vertical walls and ceiling. During the past two decades, numerous studies have been done in order to understand the physical principles underlying the performance of those attachment systems, which are, of course, also very interesting from the biomimetics point of view. In the present seminar the functional principles of biological adhesive systems are discussed as well as the recent progress with artificial bio-inspired surfaces.

Limei Tian

Professor Limei Tian mainly focuses on the design and experiment study of bionic functional surface related to the drag reduction, efficiency enhancement, anti-fouling and wear-resisting in the fluid medium, bionic information processing, the bionic model establishment, the numerical simulation and the physical model experiment of above bionic functional surface, and application of above bionic functional surface in the engineering. More than 40 academic articles were published in the international journals, three patents have been successfully transformed into enterprises, one of invention patent was won a gold prize in the second patent award of Jilin province, 2 scientific and technological achievements of Jilin province were obtained.

Non-bactericidal coating of bionic surfaces used for anti-biofouling



Biofouling in marine environments has been a problem in particular for the shipping industry. Biofouling is a hierarchical event in time and bacterial biofilms are important initiators for the successful settlement of marine invertebrate larvae. Therefore, if we can inhibit the formation of biofilm, then the biofouling can be prevented in the first place. Paint coatings or other coatings that tend to prevent or inhibit the growth of marine organisms on submerged surfaces, and it can be broadly categorized into biocidal and non-biocidal coatings. Usually, biocidal coatings release a biocide or a combination of biocides at the substrate water interface and have an environmental risk at the same time. In addition, bacteria can develop resistance against antibacterial agents, and the durability of the target surface may not be sufficient to maintain long-term antibacterial behavior. Recently, non-toxic antifouling paints such as “Foul-release” coatings are being increasingly available in the market.

To develop environmentally benign non-fouling surfaces is a multi-disciplinary task which requires a systems approach and input from many fields of science and technology. The rationale for these approaches was to design an anti-adhesion surface, which would prevent the initial attachment of bacteria, therefore preventing the subsequent formation of a biofilm. Anti-adhesion surfaces may repel or resist the initial attachment of bacteria by either exhibiting an anti-biofouling affect or by inactivating any cells coming into contact with the surface. Antifouling coatings that do not release biocides, such as silicone elastomers, have been considered environmentally benign. Silicone elastomers based foul-release coatings have an adjusted elasticity and lower surface energy than traditional biocidal coatings. On these surfaces, the adhesion strength of marine microorganisms is low and they break off under shear stress generated by hydrodynamic drag. Moreover, in the early stages of biofilm formation, physical interactions are the first forces experienced by the fouling organisms and adhesion is frequently determined by the physicochemical surface properties. The physical property of charge is important for the adhesion of bacteria owing to themselves carry a negative surface charge. The electrostatic interactions directly influence adhesion of bacteria. In this paper, we used silicone elastomers (SE) as substrate, and doped graphene as composite materials preparing the high elasticity materials (GSE). The surface of this material was negatively charged, so it could prevent the adhesion of bacteria. On the other hand, the surfaces of GSE were modified tentacle structure (TS-GSE) inspiring by the antifouling properties of soft coral surface. This bionic surface of TS-GSE had harmonic vibration effect under

the stimulus of a fluid medium, so it could reduce the adhesion strength of fouling providing foul release basis. We texted the bactericidal surface of quaternary ammonium salt doped TS-GSE (TS-QGSE) as well.

Jørgen Christian Larsen

Associate Prof. Jørgen Christian Larsen received his B.Eng degree in Science in Computer Systems Engineeringin 2008 from the Maersk Mc-Kinney Moller Institute, University of Southern Denmark, and a M.Sc. degree in Robot Systems Engineering 2011, from the Maersk Mc-Kinney Moller Institute, University of Southern Denmark. Simultaneously with studying for the master degree he also started working as a Ph.D student on the EU Project Locomorph, which resulted in a Ph.D. degree in Robotic Systems in 2013 also from the Maersk Mc-Kinney Moller Institute, University of Southern Denmark. Currently, he is an Associate Professor in Embedded electronics and Artificial Intelligence at the University of Southern Denmark. His research interests cover areas from Embodied Artificial Intelligence, Embedded Electronics, FPGA control and design, and Advanced Computer Systems. Over the years he has published at various conferences and scientific Journals and taken part in several large international research projects. In 2018 he also joined the "Information Science and Technology" department at VISTEC, Thailand as an Adjunct Faculty member. Also, he is CEO and Co-CEO of two companies in Denmark and is a board member in both companies and non-profit unions.

Proactive neural information-based smart house control

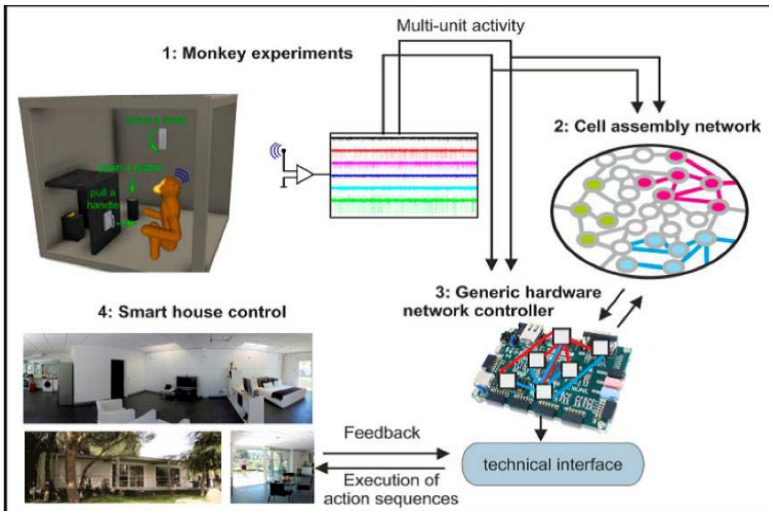


Imagen if you will a future where we do not have to actively control the devices we use daily. Instead, actions will be taken on our behalf that fits our needs and intention. That is a long-term vision, and the EU project - PLAN4Act – is an attempt to do just that.

In the talk I will give you an overview of the project and our status with details of the work done from SDU side on the implementation of Neural Networks in FPGA based embedded controllers and go into why we have selected this specific method.

4. Conference Programme

Time	Day 1 (7. Nov)	Day 2 (8. Nov)	Day 3 (9. Nov)
08:15 - 08:45	Registration	Registration	Registration
08:15 - 08:45	Welcome		
09:00 - 10:00	**John Hallam** : From Lizards to LEGO, and back again?	**Thierry Darmanin** : Tunable Conducting Polymer Nanotubes with Special Wetting Properties	**Massimo Sartori** : Neuro-Mechanical Modelling for Man-Machine Interaction
10:00 - 11:00	**Zhendong Dai** : Biomimetic on gecko locomotion: revealing the biology mechanism and developing robot for engineering	**Zhiguang Guo** : Bioinspired Separation Materials for Liquid Lubricants	**Lars Heepe** : Biological and Biomimetic Surfaces: Adhesion, Friction, and Applications
11:00 - 11:30	Coffee break		
11:30 - 12:45	**Oral presentations A**	**Jørgen Christian Larsen:** FPGA implementation of neural mechanisms for proactive smart house control	**Oral presentations E**
12:45 - 14:30	Lunch break		
14:30 - 15:30	**Limei Tian** : Non-bactericidal coating of bionic surfaces used for anti-biofouling	**Alexander Spröwitz** : Implementing and Testing Bioinspired Mechanisms on Robots to Understand Legged Locomotion	**Oral presentations F**
15:30 - 16:30	**Oral presentations B**	**Oral presentations C**	—
16:35 - 18:30	**Lab tour**	**Oral presentations D**	— —
19:30 -	**Welcome reception**	**Banquet**	—

Note that each paper presentation in the oral presentations consists of a **15-minute talk and 5-minute questions**.

Wednesday 7th November

8:15 - 8:45 **Conference Registration**

8:45 - 9:00 **Welcome**

9:00 - 10:00 **Invited speaker - Prof. John Hallam**

10:00 - 11:00 **Invited speaker - Prof. Zhendong Dai**

11:00 - 11:30 **Coffee break**

Oral presentations A

11:30-11:50 Using joint-torque for a cost-effective bio-inspired odometer for legged robots

Authors: Barbara Schlögl, Dieter Schramm, and Tobias Seidl

11:55-12:15 Bionic Architecture Design and Energy-Efficient Locomotion for High-Payload Quadrupedal Robot over Rough Terrain

Authors: Jing Lin, Zhongyuan Wang, Caiming Sun, and Aidong Zhang

12:20-12:40 Indigenous Extension Orthosis for Severe Limb Length Discrepancy

Authors: Rahul Krishnan, Harish Mohan T , and Ravi Sankaran

12:45 - 14:30 Lunch

14:30-15:30 **Invited speaker - Prof. Limei Tian**

Oral presentations B

15:30-15:50 Effect of hardness combination of bionic soft and hard composite surfaces on wear resistance under dry sliding condition

Authors: Xiuyun Pang, Peng Zhang, Haifeng Zhang, Hong Zhou, Zhengwei Gu, and Zhihui Zhang

15:50-16:10 Mechanical Design and Experimental Characterization of Soft Modular Continuum Robot for Surgical Application

Authors: Jorn Jansen, M. Wildan Gifari, Hamid Naghibi, Momen Abayazid, and Stefano Stramigioli

16:10 - 16:30 A bioinspired switchable superamphiphobic surface with deformable properties

Authors: Hujun Wang, Zhihui Zhang, Xiujuan Li, Zhenquan Cui, Cheng Luo, Yanlong Shao, and Luquan Ren

16:45 - 18:30 **Lab tour**

19:30 - 22:00 **Welcome reception**

Thursday 8th November

8:30 - 9:00 **Conference Registration**

9:00 - 10:00 **Invited speaker - Prof. Thierry Darmanin**

10:00 - 11:00 **Invited speaker - Prof. Zhiguang Guo**

11:00 - 11:30 **Coffee break**

11:30 - 12:30 **Invited speaker - Prof. Jørgen Christian Larsen**

12:45 - 14:30 Lunch

14:30-15:30 **Invited speaker - Dr. Alexander Spröwitz**

Oral presentations C

15:30-15:50 A one-step optic flow-based distance estimation strategy with monocular camera and IMU Measurement

Authors: Shixin Tan and Pakpong Chirarattananon

15:50-16:10 A gecko-like robot with neural CPG-based locomotion control

Authors: Donghao Shao, Tao Sun, Zhendong Dai, Weijia Zong, Yu Gu, and Poramate Manoonpong

Oral presentations D

16:30-16:50 A Gecko-inspired Soft Robot

Authors: Lars Schiller and Arthur Seibel

16:50-17:10 Hydrogel microcrawlers steered by light

Authors: Ivan Rehor, Charlie Maslen, Burak Eral, and Willem Kegel

17:10 - 17:30 P(VDF-TrFE) based artificial hydrodynamic receptor inspired by the canal lateral line system of cavefish

Authors: Zhiqiang Ma, Yuanhang Xu, Deyuan Zhang, and Yonggang Jiang

17:30 - 17:50 Synchronous measurement of forces, real contact areas and tribo-charge between substrate and toes of freely-moving gecko

Authors: Buxiang Zhang, Qi Liu, Yu Gu, Yi Song, Jing Tao, and Zhendong Dai

19:30 - 22:00 **Banquet**

Friday 9th November

9:00 - 10:00 **Invited speaker - Prof. Massimo Sartori**

10:00 - 11:00 **Invited speaker - Dr. Lars Heepe**

11:00 - 11:30 **Coffee break**

Oral presentations E

11:30-11:50 Self-organized quadruped locomotion and body attitude stabilization under adaptive neural control and reflexes

Authors: Tao Sun, Zhendong Dai, and Poramate Manoonpong

11:55-12:15 MORF - Modular Robot Framework

Authors: Mathias Thor, Jørgen Christian Larsen, and Poramate Manoonpong

12:20-12:40 Computational modeling of soft actuator of an MR-compatible robotic phantom that mimics the respiratory motion of the human liver

Authors:Nehal Mathur, Hamid Naghibi, Momen Abayazid, and Stefano Stramigioli

12:45 - 14:30 Lunch

Oral presentations F

14:30-14:50 A Robotic Gripper Inspired by an Insect Tarsus

Authors: Jevgeni Ignasov, Jorgen Christian Larsen, Stanislav Gorb, and Poramate Manoonpong

14:50-15:10 New approach to actuate biomimetic soft robots with smart bending materials: implementation for an IPMC-driven jellyfish robot

Authors: Qi Wang, Andres Hunt, Arnout Fritz, Max Lucassen, Matthijs van Reeuwijk, Duncan van Sliedregt, Tijmen Nederkoorn, Sjoerd van der Voort, Jelle van Steekelenburg, Oyono de Armada, Hans Goosen, Hassan Hosseinnia, and Fred van Keulen

15:10 - 15:30 An Omnidirectional Movement Control for a Hexapod Robot

Authors: Yaguang Zhu, Liang Zhang, Tong Guo, and Yongsheng Wu

5. Conference Location

The conference will be held on campus at the University of Southern Denmark. The exact location of the auditorium for the conference is shown on the campus map in the "City".

6. Arrival Instructions

Getting to Odense from Copenhagen airport:

There is a train station directly below Terminal 3 at Copenhagen airport. Trains to Odense run every 30 min. from the airport, and it takes about 1.5 hours to reach Odense with 1 stop in Copenhagen train station, where you may have to change trains. The ticket office as well as ticket machines are located in Terminal 3. Alternatively, you can also book your train ticket in advance, online on http://www.dsb.dk/en/#open. You will then receive the ticket as a PDF file via e-mail, which you must then print out to show the conductor inside the train if asked. If you choose this option, you will also have to show a valid ID to the conductor.

Getting to Copenhagen airport from Odense:

Trains to Copenhagen and Copenhagen airport run every 30 min. from Odense train station, and it takes about 1.5 hours to reach Copenhagen airport with 1 stop in Copenhagen train station, where you may have to change trains. The ticket office as well as ticket machines are located inside Odense train station. Alternatively, you can also book your train ticket in advance, online on http://www.dsb.dk/en/#open. You will then receive the ticket as a PDF file via e-mail, which you must then print out to show the conductor inside the train if asked.

Getting to University of Southern Denmark from the train station/hotels:

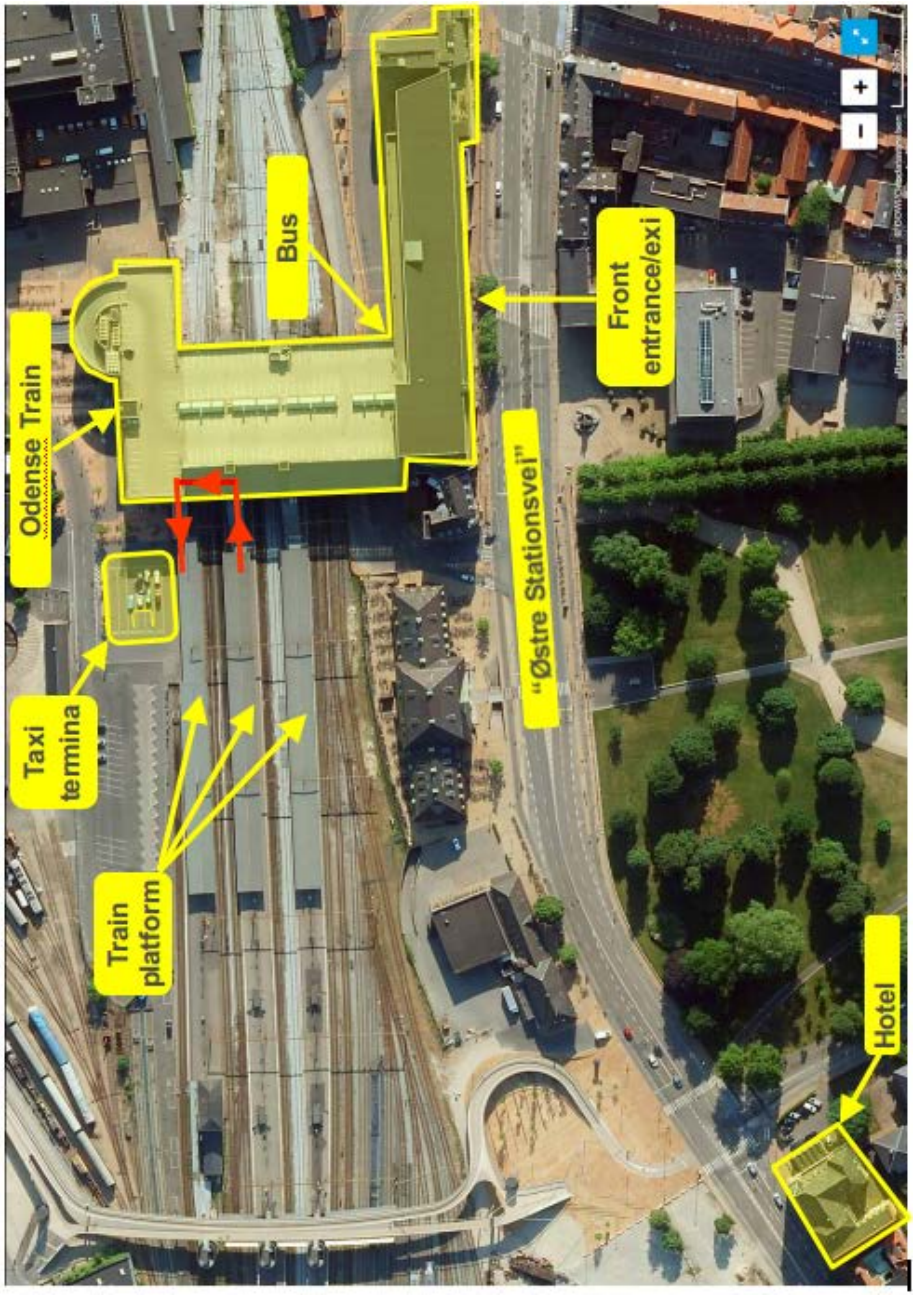
A bus has been arranged for conference participants for the travel between the train station/hotels. The pick-up/drop-off point for the bus is shown on the city map at the end of this booklet. See the bus schedule below:

	Wednesday, 07-11-2018	**Thursday, 08-11-2018**	**Friday, 09-11-2018**
Departure from hotels	**07:45**	**07:45**	**07:45**
Departure from SDU	**21:30**	**19:00**	**17:30**

Getting to University of Southern Denmark from the train station via taxi and city busses:

If you are arriving later during the day or have missed the bus, there are taxi and city bus options available. Taxis are standing behind the Odense train station (see the aerial photo on the next page). Please follow the **red** arrows in the aerial photo to find your way to the taxi terminal from the train platform. A taxi from the train station to University of Southern Denmark (a ~5 km ride) will cost approximately DKK 170/-. Although taxis in Denmark accept payment via both cash and major credit cards, paying by cash is recommended.

For those who prefer to use the public city busses, the bus terminal is under the roof of Odense train station (see the aerial photo on the next page). Bus numbers **41, 44, 44E** and **151L** go every 5-6 minutes to the University of Southern Denmark (it is the last stop on the route). Bus tickets must be purchased on the bus with **cash only**. A single bus ticket for one journey is valid for 1 hour from the time of purchase and costs DKK 24/-. It is also possible to buy a day ticket that costs DKK 40/- and is valid only for the day on which it is purchased.



7. Lunch

Lunch tickets will be provided to all conference attendees at the time of registration at the conference registration desk. These tickets can be used in the University of Southern Denmark cafeteria for one meal each day of the conference. The cafeteria is located inside the main campus building, quite close to the conference auditorium, and serves vegan, vegetarian and non-vegetarian meal options. The location of the cafeteria is shown on the campus map on the next page of this booklet. Members of the Embodied Systems for Robotics and Learning (ESRL) research unit will be available outside the conference auditorium to assist you with finding your way to the cafeteria.

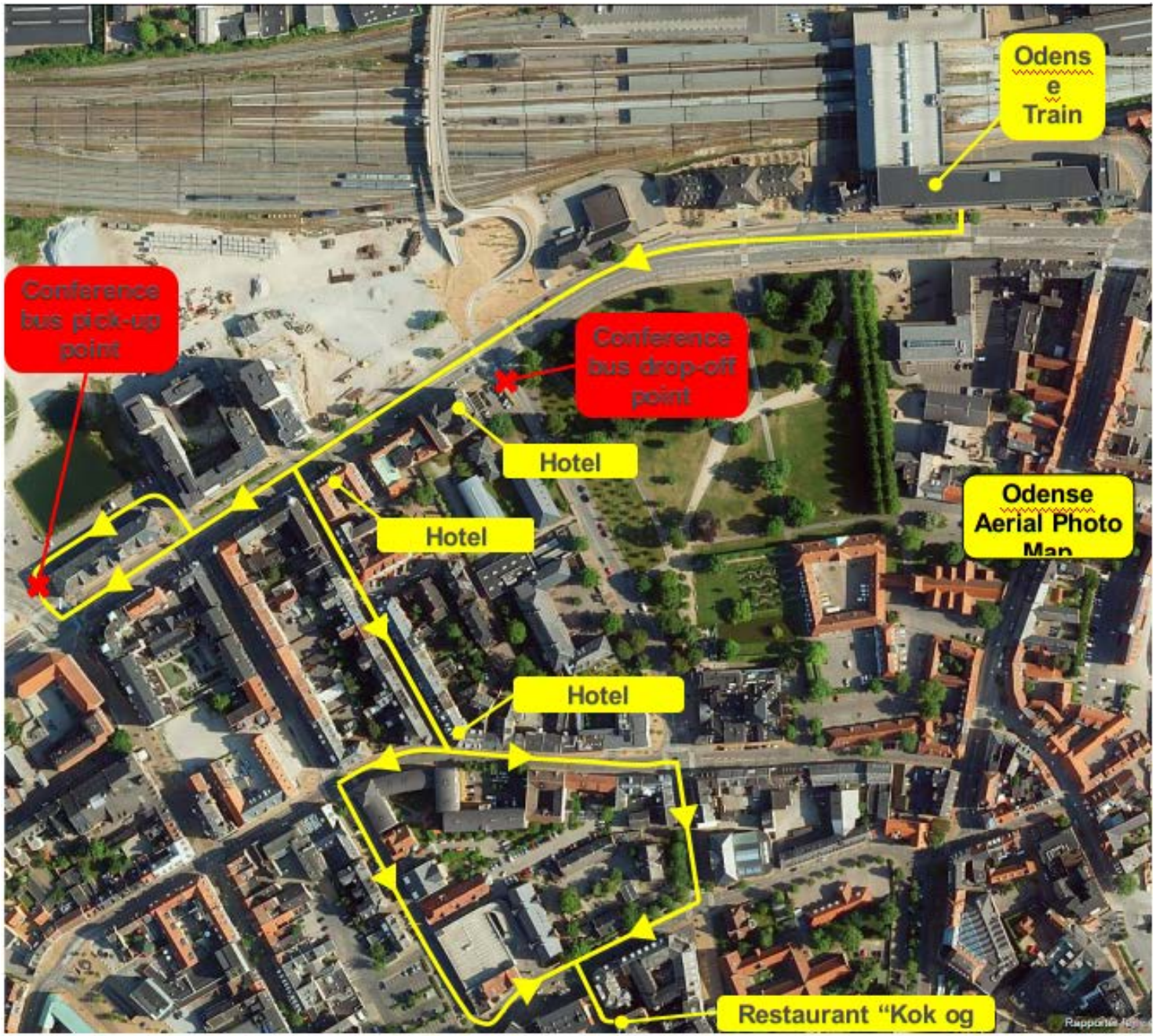
8. Welcome Reception

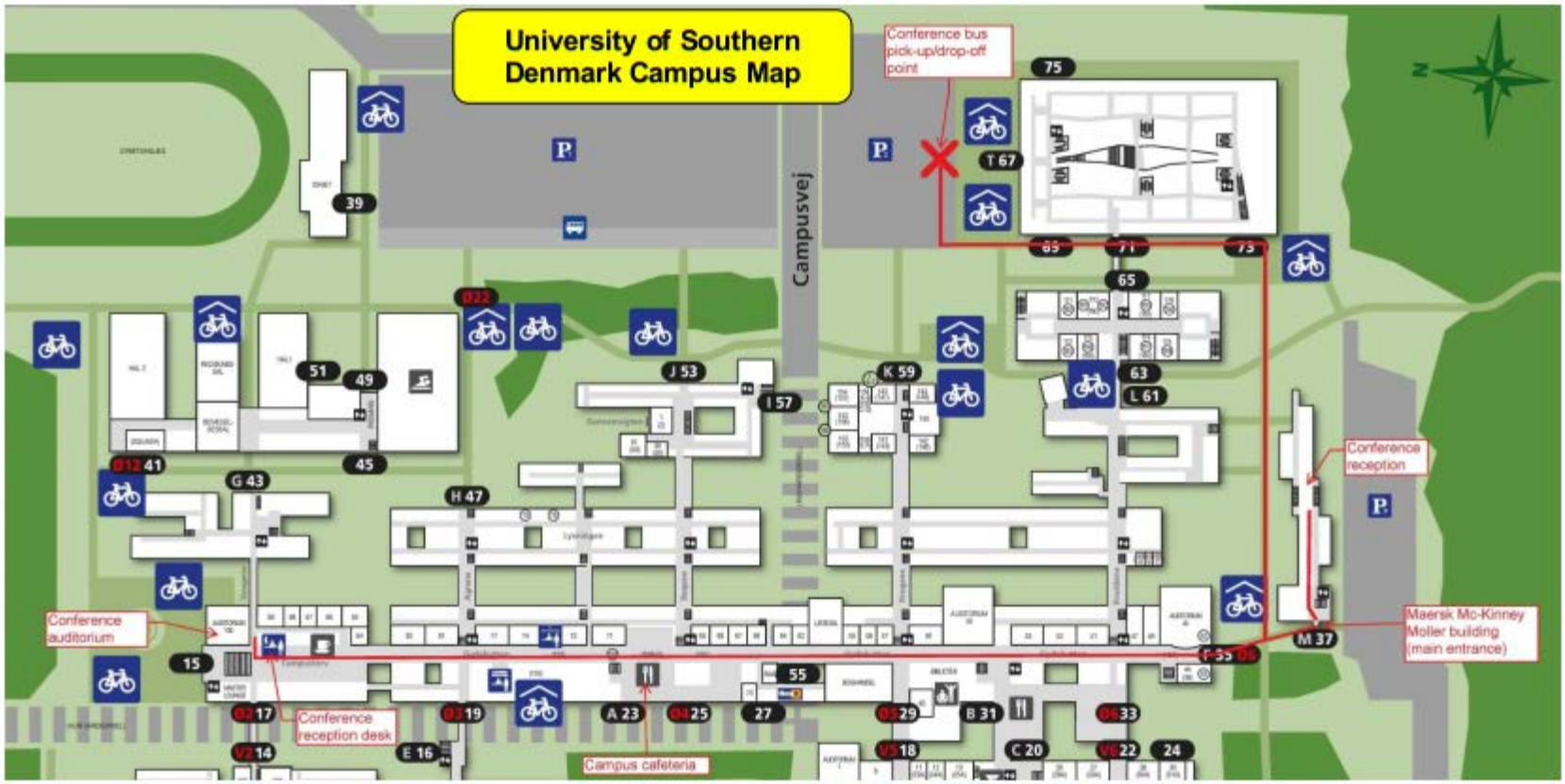
The welcome reception will be held in the Mærsk Mc-Kinney Møller Institute (MMMI) building. The location of the MMMI building is shown on the campus map on the next page of this booklet. There will be a bus available to take the conference participants back to the hotels after the reception. Members of the ESRL research unit will be available outside the conference auditorium to assist you with finding your way to the MMMI building and to the bus after the reception. Please note the bus schedule in the "Arrival instructions" section of this booklet. If you miss the bus, please contact an available ESRL member or use the emergency contact numbers listed in the "Emergency contact information" section to assist you.

9. Conference Banquet

The conference banquet will be held at the very popular restaurant Kok og Vin, which serves French-inspired cuisine. The restaurant is located in Odense city centre and is less than 10 minutes by foot from Odense train station, and within 7 minutes by foot from all the hotels listed on the IYCBE 2018 conference website (Hotel Plaza, Hotel Ansgar and Hotel Windsor). Please refer to the city centre map in the "Relevant Maps" section to find the location of the restaurant. There will be a bus available to take the conference participants to the restaurant. Please note the bus schedule in the "Arrival instructions" section of this booklet. If you miss the bus, please contact an available ESRL member or use the emergency contact numbers listed in the "Emergency contact information" section to assist you.

10. Relevant Maps (Street Map, Aerial Photo Map and SDU Campus Map)


Odense Train
Conference bus pick-up point
Conference bus drop-off point
Hotel
Hotel
Odense Aerial Photo Map
Hotel
Restaurant "Kok og


University of Southern Denmark Campus Map
Conference bus pick-up/drop-off point
Campusvej
Conference reception
Maersk Mc-Kinney Moller building (main entrance)
Conference auditorium
Conference reception desk
Campus cafeteria
N

11. Emergency contact information

If you need to contact the conference organisers in case of delays, assistance with finding your way in the city, sickness or other medical emergency, contact information of the local chairs for the conference is listed below:

Danish Shaikh: Mobile phone/WhatsApp number: **+45-24823899**, Skype ID: **danish_bizkit**

Xiaofeng Xiang: Mobile number: **+45-50201644**, WeChat (微信): **LenonXXF** (please note 'IYCBE2018')