

The Tenth International Scientific Conference
on Physics and Control

PhysCon2021

4-8 October
Fudan University
Shanghai, China

International Conference

“Physics and Control 2021”

- **Conference Information**
- **Conference Program**
- **Conference Closing Session**

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Conference Program

Day 1 Oct. 4 Monday

Topic: Keynote Talks

Time*	Speaker	Talk	Chair
14:00-14:30	Prof. Jürgen Kurths (Germany) Prof. Eckehard Schöll (Germany) Prof. Wei Lin (China)	Opening Ceremony & Group Photo	Dr. Wei Yang (Fudan University)
14:30-15:30	Prof. Luonan Chen (China)	Dynamics-based data science	Prof. Wei Lin (Fudan University)
15:30-15:40 Tea break			
15:40-16:40	Prof. Galina Strelkova (Russia)	Peculiarities of relay synchronization in heterogeneous multiplex networks of nonlinear oscillators	Prof. Wei Lin (Fudan University)

16:40-18:00 Meal break

Topic: Control Theory

Time*	Authors & Speaker	Talk	Chair
18:00-18:30	Dr. M. Isabel Garcia-Planas (Spain)	Controllability properties for multi-agent linear systems: a geometric approach	Dr. Huanfei Ma (Soochow University)
18:30-19:00	Prof. Aleksandr Andreev, Prof. Olga Peregudova (Russia)	Nonlinear regulators in the orientation problems of a rigid body rotating around a fixed point	
19:00-19:30	Prof. Jumanazar Khusanov (Uzbekistan), Prof. Azizbek Akhmatov	On the stability of a nonlinear automatic control system with a delayed feedback	
19:30-19:40 Tea Break			
19:40-20:10	Prof. Aleksandr Andreev (Russia), Prof. Olga Peregudova	On global trajectory tracking control of robot manipulators with a delayed feedback	Dr. Huanfei Ma (Soochow University)
20:10-20:40	Dr. Lyubov Shagalova (Russia)	On the solution of the initial-boundary value problem for the Hamilton-Jacobi equation	
20:40-21:10	Dr. Vyacheslav Kurakin (Russia)	Beams monitoring and control by charged particles beams stochastic optics methods	

*Time in Beijing (UTC+8)

Day 2 Oct. 5 Tuesday

Topic: Keynote Talks

Time*	Speaker	Talk	Chair
09:00-10:00	Prof. Ying-Cheng Lai (USA)	Predicting critical transition and system collapse with machine learning	Prof. Yang Tang (East China University of Science and Technology)
10:00-10:10 Tea break			
10:10-11:10	Prof. Jie Sun (China)	Nonlinear and network dynamical systems for a better connected world	Prof. Yang Tang (East China University of Science and Technology)
11:10-14:00 Meal break			

Topic: Nonlinear System and Control

Time*	Authors & Speaker	Talk	Chair
14:00-14:30	Dr. Jakub Sawicki (Germany)	Relay synchronization scenarios in three-layer networks	Dr. Qiang Luo (Fudan University)
14:30-15:00	Prof. Yevgeny Somov (Russia), Dr. Sergey Butyrin, Eng. Sergey Somov	Nonlinear dynamics of autonomous spacecraft control system in initial orientation modes	
15:00-15:10 Tea break			
15:10-15:40	Dr. Aliya Imangazieva (Russia)	Keeping the vessel on a given trajectory in conditions of uncertainty	Dr. Qiang Luo (Fudan University)
15:40-16:10	Dr. Chunbiao Li (China), Mr. Yicheng Jiang, Ms. Xu Ma	Self-reproduction of chaotic bursting in Hindmarsh-Rose neuron	
16:10-18:00 Meal break			

Topic: Collective Dynamics on Networks

Time*	Authors & Speaker	Talk	Chair
18:00-18:30	Prof. Renaud Lambiotte (United Kingdom)	Variance and covariance of distributions on graphs	Dr. Peng Ji (Fudan University)
18:30-19:00	Dr. Chittaranjan Hens (India)	Signal propagation in complex networks	
19:00-19:10 Tea break			
19:10-19:40	Prof. Francisco A. Rodrigues (Brazil)	Predicting dynamical processes in complex networks: a machine learning approach	Dr. Peng Ji (Fudan University)
19:40-20:10	Dr. Xiyun Zhang (China)	Non-equilibrium critical dynamics of cortical activity as fundamental characteristic of sleep and wake micro-architecture	
20:10-20:40	Dr. Spase Petkoski (France)	Personalized brain network models in clinical translation	

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Day 3 Oct. 6 Wednesday			
Topic: Keynote Talks			
Time*	Speaker	Talk	Chair
14:30-15:30	Prof. Ulrike Feudel (Germany)	Transient chaos in complex systems	Dr. Chunhe Li (Fudan University)
15:30-15:40 Tea break			
15:40-16:40	Prof. Celso Grebogi (United Kingdom)	Control of tipping points in stochastic ecological networks	Dr. Chunhe Li (Fudan University)
16:40-18:00 Meal break			
Topic: Adaptation and Machine Learning in Physical Systems			
Time*	Authors & Speaker	Talk	Chair
18:00-18:30	Prof. Alexander Fradkov (Russia)	History of adaptation and machine learning	Dr. Wei Yang (Fudan University)
18:30-19:00	Dr. Sergey Borisenok (Turkey)	Detection and control of epileptiform regime in the Hodgkin-Huxley artificial neural networks via quantum algorithms	
19:00-19:30	Ms. Galina Reneva (Russia), Prof. Alexander Fradkov	Energy synchronization in a network of conservative Hamiltonian systems	
19:30-19:40 Tea Break			
19:40-20:10	Dr. Oleg Shagniev (Russia)	Neural network based synchronization control of the two-rotor vibration setup	Dr. Wei Yang (Fudan University)
20:10-20:40	Ms. Evgeniia Sevasteeva (Russia), Dr. Sergei Plotnikov	A toolkit for gamma rhythm processing, analysis and adaptive modelling	
20:40-21:10	Mr. Danila Semenov (Russia)	Synchronization in the complex heterogeneous networks of Hindmarsh-Rose neurons via adaptive coupling	

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Day 4 Oct. 7 Thursday

Topic: Control of Power Grids

Time*	Authors & Speaker	Talk	Chair
14:00-14:30	Prof. Ekehard Schöll (Germany)	What adaptive neuronal networks teach us about power grids	Prof. Ekehard Schöll (Technische Universität Berlin)
14:30-15:00	Prof. Johannes Schiffer (Germany)	PMU-based dynamic state and parameter estimation in multi-machine power systems	
15:00-15:30	Mr. Michael Lindner (Germany)	NetworkDynamics.jl -- Simulating complex network dynamics in Julia	
15:30-15:40 Tea break			
15:40-16:10	Dr. Melvyn Tyloo (Switzerland)	Fault detection and probing in high-voltage power networks	Prof. Ekehard Schöll (Technische Universität Berlin)
16:10-16:40	Dr. Serhiy Yanchuk (Germany), Dr. Rico Berner, Prof. Ekehard Schöll	Solitary and splay states in the Kuramoto model with inertia	
16:40-18:00 Meal break			
Topic: Control of Power Grids			
Time*	Authors & Speaker	Talk	Chair
18:00-18:30	Dr. Tim Ritmeester, Prof. Hildegard Meyer-Ortmanns (Germany)	Controlling arbitrage on the energy market by price policies	Prof. Jürgen Kurths (Humboldt University)
18:30-19:00	Dr. Giulia Ruzzene (Spain), Dr. Damià Gomila, Prof. Pere Colet	Using batteries for frequency control in power grids	
19:00-19:30	Dr. Simona Olmi (Italy), Dr. Carl H. Totz, Prof. Ekehard Schöll	Control of synchronization in two-layer power grids	
19:30-19:40 Tea Break			
19:40-20:10	Prof. Benjamín A. Carreras, Prof. Pere Colet (Spain), Dr. José M. Reynolds-Barredo, Dr. Damià Gomila	Resilience and efficiency of the power grid with high penetration of renewable energy sources: the Balearic Islands as a case study	Prof. Jürgen Kurths (Humboldt University)
20:10-20:40	Dr. Chao Duan (USA)	Hierarchically coordinated power flow control for enhancing rotor angle and frequency stability with demand-side flexibility	
20:40-21:10	Prof. Philippe Jacquod (Switzerland)	Evaluating and optimizing the robustness of high voltage power grids under power outages and fluctuations	
21:10-21:40	Dr. Xiaozhu Zhang , (Germany) Prof. Marc Timme	Predicting risks in fluctuation driven power grids	
21:40-22:10	Dr. Benjamin Schäfer (Norway), Dr. Leonardo Rydin Gorjão, Mr. Johannes Kruse, Dr. Dirk Witthaut	Predicting power grid frequency dynamics	

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Day 5 Oct. 8 Friday

Topic: Computational Algorithms and Methods

Time*	Authors & Speaker	Talk	Chair
14:00-14:30	Dr. Alexander Oschepkov (Russia)	Modeling the control processes of the size population of microorganisms using modulated microwave radiation	Dr. Siyang Leng (Fudan University)
14:30-15:00	Dr. Vladimir Nebylov (Russia), Dr. Alexander Knyazhsky, Dr. Alexander Nebylov	Method of forming a conflict-free 4D trajectory of a low-flying vehicle, taking into account the parameters of observed conflict objects motion	
15:00-15:30	Prof. Sergej Ermakov, Dr. Liudmila Vladimirova Dr. Irina Rubtsova (Russia), Mr. Alexey Rubanik	Genetic stochastic method of global extremum search for multivariable function	
15:30-15:40 Tea break			
15:40-16:10	Ms. Alena Mastiukova (Russia), Dr. Vladimir Gritsev, Dr. Denis Kurlov, Dr. Aleksey Fedorov	Free fock parafermions in the tight-binding model with dissipation	Dr. Siyang Leng (Fudan University)
16:10-16:40	Eng. Nikolay Litvinov (Russia)	Global variables control of a Josephson junctions array	

16:40-18:00 Meal break

Topic: Dynamical System and its Analytical Analysis

Time*	Authors & Speaker	Talk	Chair
18:00-18:30	Prof. Maxim Shamolin (Russia)	Integrable homogeneous dissipative dynamical systems with four degrees of freedom	Dr. Shu Zhang (Tongji University)
18:30-19:00	Prof. Boris Andrievsky, Ms. Iuliia Zaitceva (Russia), Prof. Nikolay Kuznetsov	Bifurcation analysis of the pilot-vehicle systems with an actuator saturation	
19:00-19:30	Dr. Valery A. Gaiko (Belarus)	Global dynamics of a planar polynomial mechanical system	
19:30-19:40 Tea Break			
19:40-20:10	Dr. Yaqian Chen (China), Prof. Yan-Mei Kang	Emergency of beta oscillations in a resonance model for parkinson's disease	Dr. Shu Zhang (Tongji University)
20:10-20:40	Prof. M. Isabel Garcia-Planas (Spain), Dr. A. Chanes-Espigares	Characterization of linear Hamiltonian systems using linear algebra techniques: a review	
20:40-21:10	Dr. Petr Velmisov, Dr. Andrey V. Ankilov (Russia)	Investigation of dynamics and stability of elastic elements of wing profiles	
21:10-21:40	Prof. Guanrong Chen (Hong Kong, China) Prof. Alexander Fradkov (Russia) Prof. Wei Lin (China)	Closing Ceremony & Group Photo	Dr. Bo-Wei Qin (Fudan University)

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Congratulations to the Success of
The 10th PhysCon Conference

4-8 October 2021, Fudan University, Shanghai, China

International Physics and Control Society (IPACS):



founded by Alexander Fradkov (President 2005-2014)
Jürgen Kurths (President 2014 – 2019)
Eckehard Schöll (President 2019 -)



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Centre for Chaos and Complex Networks, City University of Hong Kong, has been one of the Co-organizers and Co-sponsors since the 1st PhysCon



Photo from **1st PhysCon 2003, St Petersburg, Russia**

Congratulations Again !



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Thanks, again, to Local Organizing Committee, Conference Chairs, and All Participants