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Part I Conference Schedule

Time: January 5-7, 2019

**Location: International Asia-Pacific Convention Center Sanya
(三亚亚太国际会议中心暨三亚海航度假酒店), China**

Date	Time	Lobby	
Jan. 5	10:00-18:00	Registration	
Date	Time	TBD	TBD
Jan. 6	08:30-12:00	Mathematics: Invited Session Chair: Coffee Break:10:30-10:50	Medical Sciences: Invited Session Chair: Coffee Break:10:30-10:50
	12:00-13:30	Lunch [Pacific Cafe (太平洋咖啡厅)]	
Date	Time	TBD	TBD
Jan. 6	14:00-18:00	Mathematics & Computer Sciences: Invited Session Chair: Coffee Break:16:00-16:15	Medical Sciences: Invited & Oral Session Chair: Coffee Break:16:00-16:15
	18:00-19:30	Dinner [Pacific Cafe (太平洋咖啡厅)]	
Date	Time	TBD	TBD
Jan. 7	08:30-12:00	Mathematics & Computer Sciences: Invited & Oral Session Chair: Coffee Break:10:00-10:15	TBD
	12:00-13:30	Lunch [Pacific Cafe (太平洋咖啡厅)]	

Part II Invited Sessions

Mathematics: Plenary Speeches

Plenary Speech 1: Gronwall-Bellman-type Inequalities and Applications to Boundary Value Problems

Speaker: Prof. Wing-Sum Cheung, University of Hong Kong, China

Time: 08:30-09:10, Sunday Morning, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

It is well aware that integral inequalities provide a very handy and effective tool to the study of differential and integral equations. Among various types of integral inequalities, the Gronwall-Bellman type is particularly useful, as they provide explicit bounds for the unknown function. We will give some new Gronwall-Bellman type inequalities which on the one hand generalize the existing results in the literature and on the other hand provide qualitative as well as quantitative properties of the solutions to certain boundary value problems.

Plenary Speech 2: The unification of quantum-cloud-computing and MIMO wireless communication: fault tolerance and smart resource allocation

Speaker: Prof. Wanyang Dai, Nanjing University, China

Time: 09:10-09:50, Sunday Morning, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

A generic system is developed with the aim to unify the quantum cloud-computing and MIMO wireless communication into a single platform for resources-competing users. Inside the system, network hardware architecture and software structure are designed by high-performance cloud quantum-computers and quantum blockchain for the evolution of the current Internet to the future quantum IP based one. User's qubit based arrival data streams are described by big data flows whose random dynamics is accurately modeled by our recently refined triply stochastic renewal-reward processes. Fault tolerance with optimal error correction and service capacity via our latest mutual information formula are

presented. Intelligent BestGo resource allocation policies within quantum blockchain are dynamically proposed via Pareto optimal Nash equilibrium points to a game-theoretic scheduling problem. Numerical implementations are given to show the effectiveness of our studies.

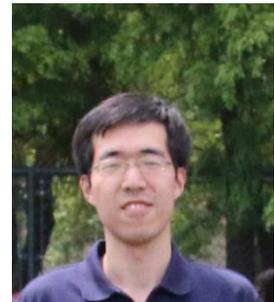
Mathematics: Keynote Speeches

Keynote Speech 1: New Bounds for Gaussian Estrada Index of Graphs

Speaker: Dr. Yilun Shang, Northumbria University, UK

Time: 09:50-10:20, Sunday Morning, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

In my talk, I will introduce integrable peakon and cuspon equations and present a basic approach how to get peakon solutions. Those equations include the well-known Camassa-Holm (CH), the Degasperis-Procesi (DP), and other new peakon equations with M/W-shape solutions. I take the CH case as a typical example to explain the details. My presentation is based on my previous work (Communications in Mathematical Physics 239, 309-341). I will show that the Camassa-Holm (CH) spectral problem yields two different integrable hierarchies of nonlinear evolution equations (NLEEs), one is of negative order CH hierarchy while the other one is of positive order CH hierarchy. The two CH hierarchies possess the zero curvature representations through solving a key matrix equation. We see that the well-known CH equation is included in the negative order CH hierarchy while the Dym type equation is included in the positive order CH hierarchy. In particular, the CH equation, constrained to a symplectic submanifold in \mathbb{R}^{2N} , has the parametric solutions. Moreover, solving the parametric representation of the solution on the symplectic submanifold gives a class of a new algebro-geometric solution of the CH equation. In the end of my talk, some open problems are also addressed for discussion.

Keynote Speech 2: Energy stable schemes for gradient flows

Speaker: Prof. Yang Jiang, Southern University of Science and Technology, China

Time: 10:40-11:10, Sunday Morning, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

We propose a new technique dealing with nonlinear terms in the numerical schemes of gradient flows. By introducing a scalar auxiliary variable, we construct second-order schemes unconditionally energy stable based on the

Crank--Nicolson (CN) or the BDF scheme for the linear part. The scheme is not restricted to specific forms of the nonlinear part of the free energy, and only requires to solve decoupled linear equations which are independent of the nonlinear terms. We use this technique to deal with several challenging applications which can not be easily handled by existing approaches, and present convincing numerical results to show that our schemes are not only much more efficient and easy to implement, but also can better capture the physical properties in these models.

Keynote Speech 3: Residual and Past Lifetime Distributions: An Information Theoretic Approach

Speaker: Prof. H.C. Taneja, Delhi Technological University, India

Time: 11:10-11:50, Sunday Morning, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The ‘residual’ lifetime distribution means the lifetime distribution of a component which has already survived up to some unit of time and the ‘past’ lifetime distribution means the lifetime distribution from the state ‘zero’ to the state ‘t’ when the unit has been found to survive only up to time t. A conventional approach to characterize the life distribution of a component is by measures like hazard rate function and the aging of a system is usually described in terms of increasing hazard rate function. We consider the information-theoretic measure approach to study the concept of aging and derive measures of residual and past uncertainty and inaccuracy. From these we characterize some specific lifetime distributions. This has been done both for continuous and discrete parameters cases.

Keynote Speech 4: BicGO: a new biclustering algorithm based on global optimization

Speaker: Prof. Guojun Li, Shandong University, China

Time: 11:50-12:20, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Recognizing complicated biclusters submerged in large scale datasets (matrix) has been being a highly challenging problem. We introduce a Biclustering algorithm BicGO that is able to identify any complicated biclusters no matter narrow or broad. The BicGO consists of two separate strategies, i.e., column-based and row-based, that can be selectively used by users, which were developed based on Global Optimization. The

column-based can be implemented by iteratively answering if a given real number belongs to a given interval, and the row-based by iteratively finding a longest path in a directed acyclic graph. Tested on various simulated datasets in which most complicated and meaningful trend-preserved biclusters were submergingly implanted, BicGO always precisely extracted all the implanted biclusters, with accuracy 100% unless either too much noise or overlap involved. On real datasets, it also achieved an incredible superiority over all the salient tools compared in this article. It is the first tool capable of identifying any complicated biclusters of any shapes. In addition, it is also highly parsimonious in the usage of computing resources.

Keynote Speech 5: Stopped random Processes and Applications to Actuarial Science

Speaker: Prof. Hailiang Yang, The University of Hong Kong, China

Time: 14:00-14:30, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

We consider a random process stopped by a random variable and investigate the properties of the stopped process and its running maximum (or running minimum). A special case, exponential stopping of Brownian motion, is well known and many results are available. In some cases, such as Erlang stopping of Brownian motion, exponential stopping of jump diffusion and geometric stopping of random walk, we are able to obtain closed form expression for the joint distribution for the stopped process and its running maximum. The motivation of our study is from the problem of valuing Guaranteed Minimum Death Benefits in various deferred annuities. This talk is based on joint papers with Hans U. Gerber and Elias S.W. Shiu.

Keynote Speech 6: Exact and Approximate Solutions for Quadratic Constrained Quadratic Problems and Their Applications in Passive Source Localization

Speaker: Dr. Qu Xiaomei, Southwest Minzu University, China

Time: 14:30-15:00, Sunday Afternoon, January 6, 2019

Location: Beijing Room[北京厅], 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

In the past decades, QCQP has become an important class of optimization problems that arise in various science and engineering fields. For a general non-convex QCQP problem, even establishing (in)feasibility is NP-Hard. A popular polynomial-time approximation

strategy for obtaining a sub-optimal solution is the semidefinite relaxation (SDR) strategy. We found that QCQP with only one quadratic constraint possesses hidden convexity and exact solution could be obtained in polynomial time. For the QCQP with more than one quadratic constraint, we proposed an iterative approximate method which performs a linearization procedure on the quadratic constraints that can be analytically solved. Theoretical analysis reveals that the proposed method converges to the global optimal solution if it converges. Our methods can be applied in passive source localization with time difference of arrival (TDOA) measurements and frequency difference of arrival (FDOA) measurements, and the localization accuracy is significantly improved over the previous methods with much less computation time requirement.

Keynote Speech 7: Approximation results by certain genuine operators of integral type

Speaker: Dr. Vishnu Narayan Mishra, Indira Gandhi National Tribal University, India

Time: 15:00-15:30, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Approximation processes arise in a very natural way in many problems dealing with the constructive approximation of functions as well as solutions to (partial) differential equations and integral equations. The study of such subject falls into an intensive research area, developing in different directions by many mathematicians. Several investigations have been devoted to the approximation properties of new sequences of operators, which might generalize or modify well-known ones, in order to get better results. Issues related to these studies are, for instance, shape preserving properties of the approximating operators, estimates of the rate of convergence, asymptotic formulae, saturation problems, approximation of semigroups of operators, asymptotic behavior, direct, and converse results. Several approximation processes have been successfully applied for example in Computer Aided Geometric Design, in the theory of artificial neural networks, and in evolution problems arising in population genetics, financial mathematics, and other fields.

The goal of this talk is to attract researchers as well as scientists who are working in the recent advances in operator methods in approximation theory and related applications.

Potential topics of this talk include but are not limited to the following:

- Approximation by positive operators
- Approximation by linear/nonlinear operators
- Approximation by integral operators
- Rate of convergence and moduli of smoothness
- Simultaneous approximation
- Approximation problems for semigroups of operators and evolution equations
- Multidimensional problems

- Abstract approximation theory
- Quantum Calculus in Approximation Theory

The theory of summability arises from the process of summation of series and the significance of the concept of summability has been strikingly demonstrated in various contexts e. g. in Analytic Continuation, Quantum Mechanics, Probability Theory, Fourier Analysis, Approximation Theory and Fixed Point Theory. The methods of almost summability and statistical summability have become an active area of research in recent years. This short monograph is the first one to deal exclusively with the study of some summability methods and their interesting applications. We consider here some special regular matrix methods as well as non-matrix methods of summability. Broadly speaking, signals are treated as functions of one variable and images are represented by functions of two variables. Positive approximation processes play an important role in Approximation Theory and appear in a very natural way dealing with approximation of continuous functions, especially one, which requires further qualitative properties such as monotonicity, convexity and shape preservation and so on. Analysis of signals or time functions is of great importance, because it conveys information or attributes of some phenomenon. The engineers and scientists use properties of Fourier approximation for designing digital filters. In this talk, we discuss the basic tools of approximation theory & determine the error (degree) in approximation of a signal (function) by different types of positive linear operators in various Function spaces like as in L_p -spaces. During this talk, few applications of approximations of signals will also be highlighted. Approximation processes arise in a very natural way in many problems dealing with the constructive approximation of functions as well as solutions to (partial) differential equations and integral equations. The study of such subject falls into an intensive research area, developing in different directions by many mathematicians. Several investigations have been devoted to the approximation properties of new sequences of operators, which might generalize or modify well-known ones, in order to get better results. Issues related to these studies are, for instance, shape preserving properties of the approximating operators, estimates of the rate of convergence, asymptotic formulae, saturation problems, approximation of semigroups of operators, asymptotic behavior, direct, and converse results. Several approximation processes have been successfully applied for example in Computer Aided Geometric Design, in the theory of artificial neural networks, and in evolution problems arising in population genetics, financial mathematics, and other fields. The goal of this talk is to attract researchers, engineers as well as scientists who are working in the recent advances in operator methods in approximation theory and related applications.

Keynote Speech 8: Some Recent Progress in Hybrid Dynamical Systems and On Some Applications of Measures of Noncompactness

Speaker: Dr. Lakshmi Narayan Mishra, Vellore Institute of Technology (VIT) University, India

Time: 15:30-16:00, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

In this talk, we present a brief survey of theory and applications of measures of noncompactness. The classical measures of noncompactness are discussed and their properties are compared. The approaches for constructing measure of noncompactness in a general metric or linear space are described, along with the classical results for existence of fixed point for condensing operators. Also several generalization of classical results are mentioned and their applications in various problems of analysis such as linear equation, differential equations, integral equations and common solutions of equations are discussed. The most effective way in the characterization of compact operators between the Banach spaces is applying the Hausdorff measure of noncompactness. In this talk, we present some identities or estimates for the operator norms and the Hausdorff measures of noncompactness of certain operators given by infinite matrices that map an arbitrary BK-space into the sequence spaces c_0 , c , ℓ_∞ and ℓ_1 . Many linear compact operators may be represented as matrix operators in sequence spaces or integral operators in function spaces [J. Banas and M. Mursaleen, Sequence Spaces and Measures of Noncompactness with Applications to Differential and Integral Equations, Springer, 2014]. Recently the measures of noncompactness are applied in solving infinite system of integral equations [A. Das, B. Hazarika, R. Arab and M. Mursaleen, Solvability of the infinite system of integral equations in two variables in the sequence spaces c_0 and ℓ_1 , Jour. Comput. Appl. Math., 326 (2017) 183-192] and differential equations [M. Mursaleen and S.M.H. Rizvi, Solvability of infinite system of second order differential equations in c_0 and ℓ_1 by Meir-Keeler condensing operator, Proc. Amer. Math. Soc., 144(10) (2016) 4279-4289] in sequence spaces.

This talk originates from the investigation of nonlinear functional-integral equation with Erdlyi-Kober fractional operator. Existence results of solutions in Banach algebra are obtained under some relevant results of fixed point theorems such as Darbo's theorem concerning the mentioned goal in Banach algebra. Finally, some examples to illustrate the usefulness of our results.

Keywords: Sequence spaces; Erdlyi-Kober fractional integrals; functional-integral equation; compact operators, fixed point theorem; Banach algebra; measures of noncompactness, infinite system of differential equations.

Keynote Speech 9: Geometrical Nonlinear Dynamics and the Applications in Engineering Based upon the Proposed Type of ODEs with Irrational Nonlinearities

Speaker: Prof. Qingjie Cao, Harbin institute of Technology, China

Time: 16:15-16:45, Sunday Afternoon, January 14, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

In this talk, we present the geometrical nonlinear dynamics and the applications in engineering based upon a type of ordinary differential equations with irrational nonlinearities. Utilizing negative stiffness properties of these systems, we built up the corresponding vibration isolators with high order quasi-zero-stiffness properties to meet the requirements of engineering, which behave a high degenerated double-zero eigenvalue problems of high co-dimension bifurcations with multiple parameters. We demonstrate the chaos and the complicated bifurcations, the cups and the tangential saddles by showing the transition of the stabilities and also the distributions of the limit cycles for the geometrical systems. We will conclude the talk by giving several engineering applications in vibration isolations.

Keywords: SD Oscillator, nonlinear isolator, limit cycle, chaos, high codimension bifurcations with multiple parameters

Keynote Speech 10: Periodic Solutions of N-Body Problems

Speaker: Prof. Shiqing Zhang, Sichuan University, China

Time: 16:45-17:15, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The Newtonian N-body problem is a classical difficult problem which has long history, in this talk, I'll discuss how to use variational methods to study the periodic solutions.

Computer & Communications: Keynote Speeches

Keynote Speech 1: Designing accurate and universal quantum gates by Rydberg blockade of neutral atoms

Speaker: Dr. Xiaofeng Shi, Xidian University, China

Time: 17:15-18:00, Sunday Afternoon, January 6, 2019

Location: Beijing Room[北京厅], 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Ultracold atoms are promising for quantum computing due to the ability to trap atoms in arrays of optical dipole traps, to store quantum information in the hyperfine sublevels of the ground state, and to perform high-fidelity single-qubit gates with individual addressing. High-fidelity entangling gates based on Rydberg interactions are required for the development of large-scale quantum computing with ultracold neutral atoms. But their design is an outstanding challenge. Although there have been published methods for achieving high-fidelity Rydberg gates, they depend on difficult conditions like shaping laser pulses or exceedingly large van der Waals interactions of Rydberg atoms. In this talk, I will show that by using quantum interference in detuned Rabi cycles, entangling Rydberg gates of high fidelity can be easily obtained. The advantage of this interference method is that it does not require shaping the pulse of external control, and it can attain a high gate speed when the Rabi frequency used in the gate is similar to the blockade interaction. The rapidity and accuracy of such realizable entangling Rydberg quantum gates make neutral atoms promising for large-scale quantum computing. In this talk, I will also present study on the Deutsch gate, which distinguishes itself from other quantum gates by that one type of this Deutsch gate is enough to construct a universal quantum computer. But unfortunately a working Deutsch gate has remained out of reach, due to lack of a protocol. I will show that by using the excitation blockade of Rydberg atoms, one can realize the three-qubit Deutsch gate. This sheds new light on the study of quantum computation.

Keynote Speech 2: Several Algorithms for Optimization Problems

Speaker: Prof. Gonglin Yuan, Guangxi University, China

Time: 18:15-18:45, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

This report includes three main contents which are the algorithms for the unconstrained optimization problems, the nonlinear equations and nonsmooth optimization problems, respectively. (i) For content I, the quasi-Newton method with

new quasi-Newton equation is given, the conjugate gradient methods with some good properties are proposed; (ii) For the nonlinear equations problems, a new line search technique is presented to analyzed and the nonlinear conjugate gradient methods are used to solve large-scale nonlinear equations problems; (iii) The last point is the nonsmooth optimization problems, the two-point-gradient method is given for small-scale problems and the conjugate gradient method are successful for large-scale problems.

Keynote Speech 3: Quantum Key Distribution Networking and Applications

Speaker: Prof. Yongli Zhao, Beijing University of Posts and Telecommunications, China

Time: 18:45-19:15, Sunday Afternoon, January 6, 2019

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Network security is attracting increasing research interest. Data encryption is an effective way to secure communication networks. However, classical key distribution methods based on the mathematical complexity will suffer from increasing computational power and attack algorithms in the near future. Noticeably, quantum key distribution (QKD) is now being considered as a secure mechanism to provision information-theoretically secure symmetric quantum keys for data encryption, which is a potential technique to protect communications from security attacks in communication networks. Nevertheless, how to deploy and employ QKD over optical networks for security enhancements are emerging as two new challenges.

In this talk, a QKD-enabled optical network architecture will be described. Then, some topics in QKD-enabled optical networks will be discussed, such as resource allocation for different channels, survivability solutions for failures, construction schemes of quantum key pools, and last mile solution for quantum key provisioning.

Keynote Speech 4: Emerging 2D Xenes Transistors for IoTs

Speaker: Prof. Li Tao, Southeast University, China

Time: 08:30-09:00, Sunday Morning, January 7, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Two-dimensional (2D) atomic sheets yield collective properties of mechanical flexibility and tunable bandgap for innovative sensing devices and systems in internet-of-things (IoT). This talk will introduce our research progresses in novel silicene transistors and GHz flexible electronics enabled by graphene and

phosphorene. Our recent effort in a unique nanofabrication approach lets silicene transistor make its debut [*Nature Nanotechnology* 2015, 10, 227], corroborating theoretically predicted ambipolar transport with Dirac band structure. Electrostatic characterization on silicene transistors observed carrier mobility 100-200 cm²/V-s at residual carrier density $\sim 8 \times 10^9$ cm⁻². Similarly, we have demonstrated the first flexible phosphorene devices with carrier mobility 310-1500 cm²/Vs and gate modulation 10³-10⁵ on flexible polyimide. It features with an intrinsic $f_T=20$ GHz and sustains ex-situ tensile strain up to 1.5%. With new material and device integration techniques, our recent flexible electronics yield a high-speed record $f_T=95$ GHz. The research effort in exploring emerging semiconductor materials and devices could pave the way to develop new-generation high performance devices for IoT sensors.

Keynote Speech 5: Innovative Time-Domain Smart Temperature Sensor Design

Speaker: Prof. Poki Chen, National Taiwan University of Science and Technology, Chinese Taipei

Time: 09:00-09:30, Sunday Morning, January 7, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

According to the evolution of IoT and Industry 4.0, we need to connect and monitor almost everything. Sensors get a big say and a tremendous market in not only the academic research but also the commercial market. Among them, the temperature sensor plays a dominate role for environment, safety, health and manufacturing monitoring. With the operational definition, it's not impossible but really hard to measure the temperature directly. Traditionally, the test temperature is converted to voltage or current and then digitized by ADC (analog-to-digital converter) to compose the so-called smart temperature sensor. However, the design of an accurate enough ADC is still major challenge for not only newbies but also experienced engineers. To reduce the heavy burden of ADC design, the power consumption and chip size, the test temperature can be converted to a time-domain signal and then digitized by a much simpler time-to-digital converter (TDC). It opens a door for miniature temperature sensor with extremely low power and cost to fit the booming market of IoT and Industry 4.0. To make matters better, the time-domain signal can be fully processed by digital circuit and even possible to be realized with FPGA chips. It makes the fully digital temperature sensor another main stream research with performance competitive to its traditional analog counterparts. More and more researchers simply turn their heads away from voltage- to time-domain since after for sensor design.

Keynote Speech 6: Blockchain Economics and Marketing

Speaker: Prof. Frank Lorne, New York Institute of Technology, UK

Time: 09:30-10:00, Sunday Morning, January 7, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Blockchain as a supporting platform for various cryptocurrencies is a technology that will not sell by itself, meaning that its success could not be built on technical efficiency of an algorithm alone. Understanding the real economic problems that the technology should aim at solving is a first step towards identifying the marketing beachheads for the technology. The branding of any blockchain can be categorized under an economic framework pointing to the types that have the potentials of being sustainable and disruptive. Selection of appropriate beachheads, verticals, services etc. should aim to promote the exchange of real goods and services, and/or the utilization the accounting/data advantage of the technology.

Keynote Speech 7: TBD

Speaker: Dr. Xiangning Lu, Jiangsu Normal University, China

Time: 10:15-10:45, Sunday Morning, January 7, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

TBD

Medical Sciences: Plenary Speeches

Plenary Speech 1: CMOS biomedical IoT design for tissue engineering and regenerative medicine

Speaker: Dr. Kiichi Niitsu, Nagoya University, Japan

Time: 08:30-09:15, Sunday Morning, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

CMOS Biosensor is promising enabler for next-generation biomedical

IoTs for personalized health care systems. This tutorial introduces CMOS biomedical IoT design from fundamental to state-of-the-art.

First, the tutorial introduces the fundamental of CMOS biosensors. Operational mechanism and applications of each types of CMOS biosensors such as potentiometric, amperometric, impedimetric, and ISFET are summarized.

Latter part introduces development of energy-autonomous biomedical IoTs. Ensuring stable energy is one of the most important current challenges in wearable and implantable biomedical systems. For addressing this issue, many developments with respect to batteries, wireless power delivery, and energy harvesting have been reported. One of the promising candidates is bio fuel cell. In this tutorial, the fundamental and forecast of the bio-fuel-cell-operated biosensing systems. Firstly, I will summary the fundamental basics of bio fuel cell including operation mechanism, its performance, and its advantages/disadvantages. Secondary, I will introduce the examples of the bio-fuel-cell-operated biosensing systems. Thirdly, I will introduce the supply-sensing architecture presented in BioCAS 2015/2016 from our group. The supply-sensing architecture uses bio-fuel cells as both power source and sensing converter. In addition, I will plan to present the latest result on the work on Glucose-fuel-cell-operated Glucose sensing system which can be applied to self-powered continuous Glucose monitoring system (CGMS). The tutorial will conclude with a discussion of recent work and future applications on the bio-fuel-cell-operated biosensing systems.

Medical Sciences: Keynote Speeches

Keynote Speech 1: Advances in regenerative medicine: From stem cells to organoids

Speaker: Prof. Jeanne Adiwinata Pawitan, The Department of Histology FMUI, Indonesia

Time: 09:15-09:55, Sunday Morning, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Stem cells have moved from lab to bedside, and many initial studies showed promising results. Therefore big companies are entering the business. However, most initial studies did not used controls to make sure of the efficacy of stem cells. Many phase-1 studies showed safety of stem cell therapies, when precaution measures were adapted. However, efficacy needs to be proven by randomized controlled trials (RCT) to exclude placebo effects. Recently, various RCTs for various conditions have been done with various contradictory results. Therefore, a meta-analysis is very useful to know whether a stem cell therapy really work for a certain condition. As various centres used various type of stem cells, various dose, and route of application, as well as different outcome measures with various results for one certain condition, sometimes it is difficult to conduct a meta-analysis when there is high heterogeneity, which is like

pooling ‘apples’ with ‘oranges’ and ‘avocado’ that will lead to a misleading conclusion. In many cases, where the studies are highly heterogeneous, and the heterogeneity can’t be identified, then a descriptive systematic review is the best solution to take a conclusion which protocol is the best and valuable to be standardized.

Formerly it was believed that stem cells that are given to patients work by differentiating into the needed cells, and thus replacing damaged cell. However, recent evidence showed that only a few stem cells homed to the desired area, while a large amount went to various areas that were remote from the damaged area. Even though they were trapped in remote areas, the stem cells still exerted beneficial effects by remote signalling and secretion of various beneficial factors. Therefore, there are attempts to produce substitute tissue/organs ‘ex vivo’ to be transplanted to replace a damaged organ. There are various means to produce a tissue/an organ/organoid ‘ex vivo’ (tissue engineering) by using various stem cells, scaffold, and soluble factors, in various vessels from static vessel to bioreactors, and ‘on chips’. Though these attempts are in the initial stage, but some translational animal studies have been done. A more usual use of these ‘ex vivo’ developed tissues/organs/ organoids is for drug testing, such as toxicity testing, and for studying the mechanism of certain diseases that is directed toward the development of a cure of the diseases.

In conclusion, many stem cell therapies have entered RCTs, but no standardized and approved protocol has been established, while organoids are usually used for drug testing and studying the mechanism of certain diseases.

Keynote Speech 2: Therapeutic effect of Mesenchymal Stem Cells and their exosomes in smoke inhalation injury

Speaker: Dr. Qi Lv, Tianjin University, China

Time: 09:55-10:35, Sunday Morning, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Smoke inhalation injury (SII) is caused by smoke-induced damage of the respiratory tract and lung parenchyma, with or without additional heat-induced damage. SII is a major cause of morbidity and mortality in victims of fire tragedies. Multiple preclinical evidences have supported the potential value of mesenchymal stem cells (MSCs) for treatment of acute lung injury (ALI). Our recent studies evaluate the therapeutic effect of Bone marrow-derived Mesenchymal Stem Cells (BMSCs) and their exosomes in smoke inhalation injury, and the dynamic tropism of MSCs in animals with acute lung injury. BMSCs significantly attenuated lung injury, elevated the levels of KGF, decreased the levels of TNF- α in BALF, and inhibited inflammatory cell infiltration in the rats with SII. We track systemically transplanted BMSCs in rats with smoke inhalation injury (SII) through bioluminescence imaging (BLI). Compared with the uninjured control group treated with BMSCs, higher numbers of

BMSCs were found in the lungs of the SII rats. The BLI signals in the lungs steadily decreased over time and disappeared by 5 days after treatment. We also investigated the protective role and underlying mechanisms of bone marrow mesenchymal stem cell-derived exosomes (BMSC-DEs) on smoke inhalation injury (SII) in rats. The results showed that BMSC-DEs treatment could significantly alleviate the pathological damage, reduce lung water content and total protein content in BALF, inhibit the expression of IL-6, TNF- α and MPO, reduce the degree of fibrosis, compared with SII group. In conclusion, our study demonstrated that systemically administered BMSCs mainly localized to the lungs of rats with SII. The effects of MSCs with regard to lung tissue repair are not attributable to the differentiation capacity of these cells but rather to their secretion function. BMSCs-Ex showed the similar therapeutic effect as BMSCs on smoke inhalation injury.

Keynote Speech 3: Children with premature ventricular complexes induced cardiomyopathy -----assessment, diagnosis and treatment

Speaker: Dr. Pengjun Zhao, Shanghai Jiaotong University Medical School, China

Time: 10:50-11:30, Sunday Morning, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Cardiomyopathy can be combined with ventricular arrhythmia; however, premature ventricular complexes can also induce cardiomyopathy. Sometimes it is difficult to draw an accurate clinical diagnosis. This time, we will elaborate on the characteristics of premature ventricular beats, such as premature ventricular contractions load, QRS duration, the interval between two beats and the origin of premature ventricular contractions, and so on. And try to explain how these facts may influence the cardiac function? And summarize some diagnostic criteria and treatment of premature ventricular complexes induced cardiomyopathy, so that pediatricians can better assess the risk of premature ventricular beats and give right treatment.

Keynote Speech 4: Is there fibrosis in PCOS ovary?

Speaker: Prof. Yong Wang, Nanjing University, China

Time: 11:30-12:10, Sunday Morning, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

TBD Androgen excess is generally considered as one of the major characteristics of polycystic ovarian syndrome (PCOS). Our recent research showed that androgen induced PCOS rat existed over fibrosis, which may have influence on ovary function. But there is no direct clinical report. Is there fibrosis in PCOS ovary?

Keynote Speech 5: The Associations of Sleep with Maternal and Child Health: A Sleep Series Study in China

Speaker: Prof. Shenghui Li, Shanghai Jiaotong University, China

Time: 14:00-14:40, Sunday Afternoon, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

Background: For a variety of reasons, either by societal changes or due to lifestyle choice, chronic sleep loss and sleep disturbance are increasingly common among both adults and children. Studies among adults have revealed that disrupted sleep is implicated in the pathogenesis of numerous co-morbidities, including type 2 diabetes, hypertension, coronary heart disease, dyslipidemia, endothelial dysfunction, and metabolic syndrome. However, compared to adults, little is known about sleep and its health effects among special population, such as children, adolescents, and pregnant women.

Methods: A sleep series epidemiological study was designed to obtain insight into sleep health among special population, including children, adolescents and pregnant women. **Part I** Study among Children and adolescents: 1) sleep patterns and their distribution in a large national cross-sectional survey; 2) a longitudinal associations of sleep with school performance, metabolic status, and neurobehavioral development in a prospective cohort study; 3) the effectiveness of a school-based sleep intervention scheme using a comparative cross-sectional analysis of pre- and post-intervention surveys. **Part II** Study among pregnant women: 1) the trajectories of sleep quality and their associations with maternal BMI gain speed during pregnancy based on a maternal sleep cohort study; 2) the association between periconceptional poor sleep and the risk of congenital heart disease, and to examine if daytime napping could to some extent change the association.

Results and conclusions: The prevalence of daytime sleepiness was 64.4% in school-aged children

and approximate 80% in adolescents. Sleep problems, daytime sleepiness, and in some cases, short sleep duration were significantly associated with impaired academic achievement, mental health problems, and childhood obesity. School schedule could be considered as a target for sleep intervention.

Poor sleep quality during pregnancy was associated with advanced BMI gain speed in pregnant women. Poor maternal sleep around periconceptional period seems to be an independent risk factor for congenital heart disease. The concurrence with daytime nap could to some extent reverse the effect.

Keynote Speech 6: Complex regulation of DC-mediated T cell responses in tolerance and immunity

Speaker: Dr. Gonghua Huang, Shanghai Jiao Tong University School of Medicine, China

Time: 14:40-15:20, Sunday Afternoon, January 6, 2018

Location: TBD, 3rd Floor, Conference Building, International Asia-Pacific Convention Center Sanya



Abstract

The dysregulation of T cell responses is the cause of many autoimmune disorders. Although the involvement of T cell–intrinsic pathways in regulating T cell differentiation and function has been well described, how T cell development is triggered by extrinsic pathways and physiological and pathological stimuli remains poorly understood. Dendritic cells (DCs) are the most important antigen-presenting cells (APCs) that bridge innate and adaptive immunity by triggering the activation and differentiation of naive T cells. By using a combination of approaches including mouse genetics, cellular immunology and biochemistry, as well as models of autoimmune inflammatory and infectious diseases, our findings demonstrate that DCs employ intracellular MAPK pathway to program multiple T cell lineage choices and functions, thus orchestrating tolerance and immunity. Significant insight into the physiological roles of signaling pathways could impact our understanding of fundamental mechanisms of immune regulation and manifest legitimate therapeutic opportunities.

Part III Oral Sessions

Mathematics & Computer Sciences: Oral Session

Session Chair: TBD

TBD, 3rd Floor

11:15-12:00, Monday Morning, January 7, 2019

ID	Paper Title	Author	Affiliation
1-1 Oral	On the scale mixture of multivariate skew slash distribution	Weizhong Tian	Eastern New Mexico University
1-2 Oral	SOME TIME-CHANGED FRACTIONAL POISSON PROCESSES	Aditya Maheshwari	Indian Institute of Management Indore
1-3 Oral	Singular dividend optimization for a linear diffusion model with time-inconsistent preferences	Jinxia Zhu	The University of New South Wales
1-4 Oral	Vacuum Adapted Quantum Stochastic Integrals on Interacting Fock Space	Yuanbao Kang	Chongqing Normal University
1-5 Oral	Centers of simplices on spaces and linear algebra	Kenzi SATO	Tamagawa University
1-6 Oral	On Local Spectral Properties of Hamilton Operators	Chaihu Wuri	Inner Mongolia Normal University
1-7 Oral	Extremal Problems Related to Dual Gauss-John Position	Tongyi Ma	Hexi University
1-8 Oral	Mathematical Modeling of Porous Medium for Sound Absorption Simulations: Application of Multi-Scales and Homogenization Techniques	Allen Teagle-Hernandez	California State University, Long Beach
1-9 Oral	A Mathematical Study to Gout Symptoms	Baojun Song	Montclair State University
1-10 Oral	Non-Markovian effects on the dynamics of entanglement in real environment	Huang Jiang	Guangdong ocean university

Keep Updating

Medical Sciences: Oral Session

Session Chair: TBD

TBD, 3rd Floor

16:00-18:00, Sunday Afternoon, January 6, 2019

ID	Paper Title	Author	Affiliation
2-1 Oral	The effect of a high-frequency-hearing-threshold weighted value on the diagnosis of occupational-noise-induced deafness	Xue Lajun	Qing Yuan Municipal Hospital for Occupational Disease Prevention and Treatment
2-2 Oral	Implementing the First-Aid Education into the College Curriculum in China: The Efficacy Study of the First-Aid Workshop at Wenzhou-Kean University	Bowen Cao	Wenzhou-Kean University
2-3 Oral	Bioinformatics analysis reveals important gene and pathway in macrophages during carotid atherosclerotic plaque rupture	Tie Guo	Haikou Hospital affiliated to Xiangya School of Medicine of Central South University
2-4 Oral	The Growing Evidence for Photobiomodulation as a Promising Treatment for Alzheimer's Disease	Lew Lim	Vielight Inc

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Part V Instructions for Presentations

Oral Presentation

Devices Provided by the Conference Organizing Committee:

- Laptops (with MS-office & Adobe Reader)
- Projectors & Screen
- Laser Sticks

Materials Provided by the Presenters:

- PowerPoint or PDF files

Duration of each Presentation:

- Regular Oral Session: 10-15 Minutes of Presentation
- Invited Speech: 30-45 Minutes of Presentation

Poster Presentation

Materials Provided by the Conference Organizing Committee:

- X Racks & Base Fabric Canvases (60cm×160cm, see the figure below)
- Adhesive Tapes or Clamps

Materials Provided by the Presenters:

- Home-made Posters

Requirement for the Posters:

- Material: not limited, can be posted on the Canvases
- Size: smaller than 60cm×160cm
- Content: for demonstration of the presenter's paper



Part VI Hotel Information

About Hotel

International Asia-Pacific Convention Center Sanya is a five star standard luxury hotel, which locates beside the seashore, and is the ideal place for vacation and conference. The hotel has 254 luxury and comfortable rooms, and 16 conference rooms in different sizes. The conference rooms can accommodate people from 20-1000 and totally square 5400m2. Housing, dining, recreation facilities... everything needed is ready, Even National initiative seawater swimming pool, sea recreational centre and so on, which make you a pleasant vacation. High-speed net connectors are equipped in the houses and service of renting laptops is provided, all these give you a convenient office atmosphere while you are on vacation.

Address: No.17, Haipo tourism and economic zone, Sanya Bay, Sanya city, China

三亚市三亚湾海坡旅游经济开发区17横路

URL: www.iapccsanya.com

Tel: (86 898) 88332666

Fax: (86 898) 88332266

How to Get to the Hotel

Downtown of Sanya: 30 minutes ride

Sanya Phoenix Airport: 15 minutes ride

Sanya International Golf Club: 20 minutes ride

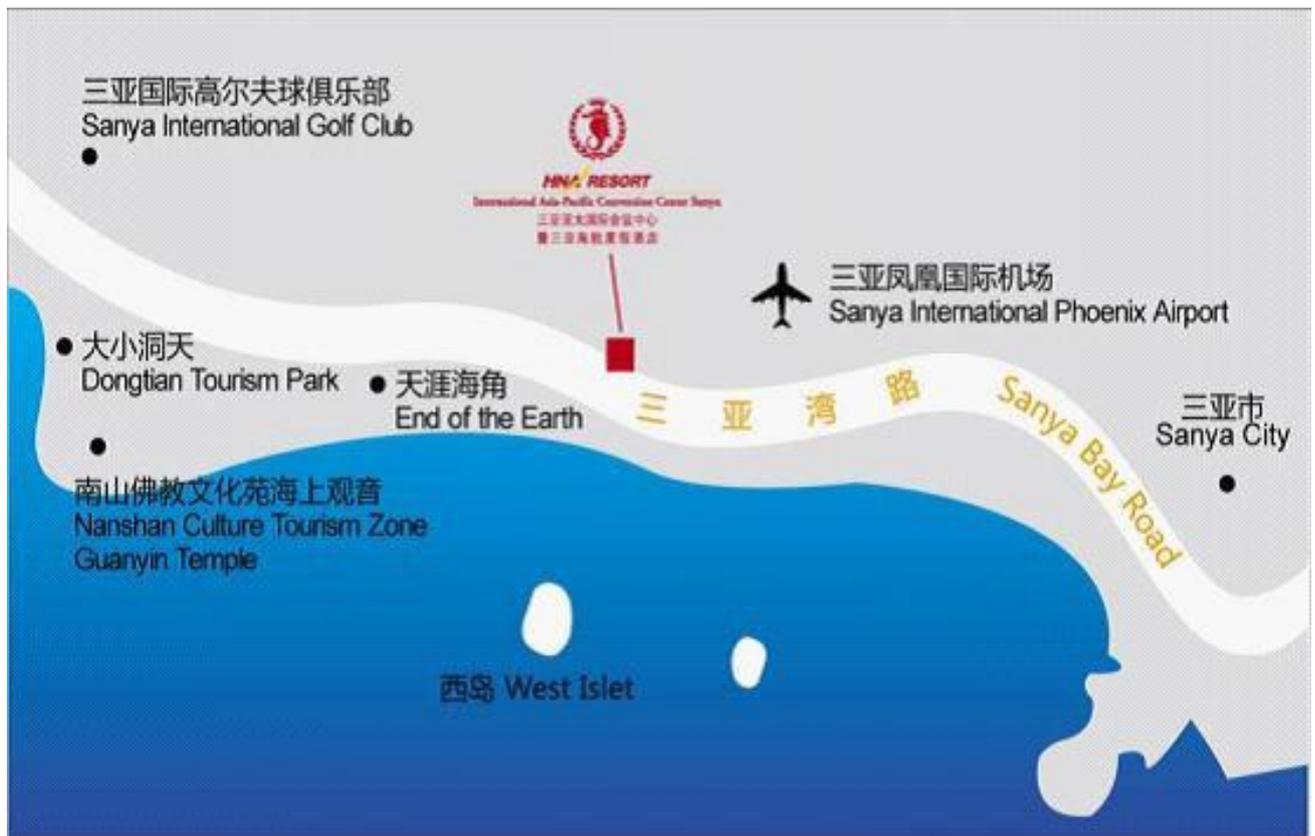
End of the Earth: 10 minutes ride

For non-Chinese author, please show the following info to the driver if you

take a taxi:

请送我到： 三亚市三亚湾海坡旅游经济开发区17横路

亚太国际会议中心暨三亚海航度假酒店



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