COVER PAGE

2019 the 8th International Conference on

Engineering Mathematics and Physics
(ICEMP 2019)

2019 International Conference on

Intelligent Medicine and Health
(ICIMH 2019)

Ningbo, China | July 1-3, 2019

Co-supported by

جامعة أبوظبي
ABU DHABI UNIVERSITY

UNIVERSITI MALAYSIA TERENGGANU

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VENUE

Ningbo University Hotel

宁波大学宾馆

Add: No.818 Fenghua Road, Jiangbei District, Ningbo City, Zhejiang Province, China

地址：浙江省宁波市江北区风华路 818 号

ⓘ How to get to the **Ningbo University Hotel** from **Ningbo Lishe International Airport**?

- The fastest way: **Taxi**

Taxi------Around 43 minutes----Around 80 RMB

- The economic way:

Bus+ Walk ----- Around 1 hour and 20 minutes

Walk to the **Ningbo Li She International Airport Subway Station(Entrance B)** and take **the Rail Line 2**

步行至**宁波栎社机场地铁站（B 口）**并乘坐**轨道交通 2 号线**

↓

Get off at **Lu Lin Subway Station** (18 Stations) and walk out from **Entrance B**

在**路林地铁站**下车（18 个站）并从 **B 口**出

VENUE

↓

Walk to **Engineering College East Campus Bus Station**(149m) and get on **No. 391 Bus**
步行至**工程学院东校区站**并乘坐 **391 路**

↓

Get off at **Ningbo University South Gate Bus Station** (5 stations)
在**宁大南校门站**下车（5 个站）

↓

Walk to **Ningbo University Hotel**(201m)
步行至**宁波大学宾馆**

Other Hotels Nearby Recommendation

- **5 Star & Nearby**

Pan Pacific Ningbo (5.3km from Ningbo, Jiangbei, Fenghua Road)
宁波泛太平洋大酒店
Address: No.99 East Min'an Road, Yinzhou District, Yinzhou District, 315040 Ningbo, China
地址：宁波市鄞州区民安东路 99 号

- **4 Star & Nearby**

InterContinental Ningbo (3.2 km from Ningbo, Jiangbei, Fenghua Road)
宁波洲际酒店
Address: 777 Xin Hui Road, Yinzhou District, 315048 Ningbo, China
地址: 宁波市鄞州区新晖路 777 号

- **3 Star & Nearby**

1) Science Hall (1.12km from fenghua road 818)
宁波赛思学术会堂
Address: No.266 Siyuan Road Zhenhai District Ningbo China
地址：宁波市北镇海区思源路 266 号

2）Egreen Hotels & Resorts (Ningbo University Lulin Market) （2.93km from fenghua road | Near the subway)
四季青藤酒店
Address: 6-12F, No.266 Lane 3 Fenghua Road Jiangbei District Ningbo China
地址：宁波市江北区枫华路 3 弄 266 号

3) Casa Eve (Ningbo University Qingshuipu Metro Station) （ 2.51km from fenghua rode 818 ）
青藤艺宿酒店
Address: Building A2, Bei'ou Industrial Park, No.8 Jinchuan Road Zhenhai District Ningbo China
地址：宁波市镇海区金川路 8 号

VENUE

Useful Tips

Weather

High Temperature: 36℃ | Low Temperature: 22℃

Time Zone

GMT+8

Currency

Chinese RMB

Important Phone Numbers

Emergency Ambulance & Fire: 119

Emergency Ambulance: 120

Police Emergency: 110

AGENDA

July 1, 2019 (Monday)

10:00-17:00

Registration & Material Collecting

签到&领取会议资料

Lobby of Ningbo University Hotel

宁波大学宾馆大堂

 Give your **Paper ID** to the staff.

 **Sign your name** in the attendance list and check the paper information.

 Check your **conference kit**, which includes conference bag, name tag, lunch & dinner coupon, conference program, the receipt of the payment, the USB of paper collection and a pen.

Tips for Participants

- Your punctual arrival and active involvement in each session will be highly appreciated.
- The listeners are welcome to register at any working time during the conference.
- Get your presentation PPT or PDF files prepared.
- Regular oral presentation: 15 minutes (including Q&A).
- Laptop (with MS-Office & Adobe Reader), projector & screen, laser pointer will be provided by the conference organizer.

AGENDA

July 2, 2019 (Tuesday)

Morning

Bai Lu Hall（白鹭厅）

Keynote and Invited Speeches		
9:00-9:10	Opening Remarks	**Prof. Haydar Akca** Abu DhabiUniversity, UAE
9:10-9:50	Keynote Speech I	**Prof. Jimmy Liu** Southern University of Science and Technology, China
		Speech title- Intelligent Ocular Imaging Research and IMED Team latest research update 2019
9:50-10:30	**Coffee Break & Group Photo**	
	Poster Presentations- HP1-001, HP1-014, HP2-0007, HP1-023, HP1-019	
10:30-11:10	Keynote Speech II	**Prof. Haydar Akca** Abu DhabiUniversity, UAE
		Speech title- An Abstract Impulsive Second-Order Functional-Differential Cauchy Problem with Nonlocal Conditions
11:10-11:40	Invited Speech I	**Prof. Chiharu Ishii** Hosei University, Japan
		Speech title- Development of a Lightweight Power Assist Suit for Nursing Care
11:40-12:10	Invited Speech II	**Prof. Bimal Kumar Sarkar** Adamas University, India
		Speech title- Canonical Correlation Analysis in DNA pattern recognition

<12:10-13:30>

Lunch at 2nd Floor of Ningbo University Hotel

AGENDA

July 2, 2019 (Tuesday)

Afternoon

Peer-Reviewed Papers Presentations **Bai Lu Hall（白鹭厅）**	
13:30-16:00	**Session 1**-Physical science Chaired by **Prof. Hsueh-Chen** Lee Wenzao Ursuline University of Languages, Taiwan
	10 presentations- HP2-0011, HP1-005, HP1-010, HP1-016, HP1-022, HP1-2002, HP1-029, HP1-011, HP1-3003, HP1-1001
16:00 -16:15	**Coffee Break**
16:15-18:45	**Session 2**-Smart medical Chaired by **Lecturer Nunik Afriliana** Universitas Multimedia Nusantara, Indonesia
	10 presentations- HP2-0002, HP2-0004, HP2-0019, HP1-002-A, HP1-009, , HP2-0014, HP2-0018, HP2-0020, HP2-0017, HP2-0015

Peer-Reviewed Papers Presentations **Hui Jian Hall（会见厅）**	
13:30-15:45	**Session 3**-Mathematical science Chaired by TBA
	9 presentations- HP1-017, HP1-015, HP1-1003, HP1-3001, HP1-012, HP1-013, HP1-021, HP1-030-A, HP1-3002
16:00-16:15	**Coffee Break**

<18:45-20:00>

Dinner at 2nd Floor of Ningbo University Hotel

AGENDA

July 3, 2019 (Wednesday)

One-day Tour

Ningbo-Ci Cheng

Qing Dao Guan-清道观

Jiao Shi Guan-校士馆

Ci Cheng Xian Ya-慈城县衙

Ci Cheng Kong Miao-慈城孔庙

- 9:00-10:00 Gather at Ningbo University Hotel and take the Bus to Ci Cheng
- 10:00-12:00 Visit **Qing Dao Guan** and **Jiao Shi Guan**
- 12:00-13:30 Lunch
- 13:30-15:30 Visit **Ci Cheng Xian Ya** and **Ci Cheng Kong Miao**
- 15:30-17:00 Free visit
- 17:00-18:00 Take bus back to Ningbo University Hotel

Notice: 1. The tour is with English guidance and bus service; 2. Lunch is included; 3. Please sign up before **June 20th, 2019** if you are interest in this tour;4. If less than 10 people signed up the tour will be cancelled

WELCOME

Dear Professors and distinguished delegates,

It is our great pleasure to welcome you to the 2019 the 8th International Conference on Engineering Mathematics and Physics and 2019 International Conference on Intelligent Medicine and Health which will be hosted in Ningbo, China on July 1-3, 2019.

The main concern for the conference is to provide a platform for people from universities, labs, and industries to communicate and share, also to teach each other and learn. It also creates opportunity to see the research level of certain area out of one's own country or district.

That is also creates an opportunities and for finding potential domestic as well as international cooperation for the researchers, which is not only referring to business, but also further educational and friendship making.

Now the platform is ready, what we need is for you all to come up here to seize this opportunity and present your thoughts, results and opinion confidently. Maybe your idea is still an idea which is not been proved, accepted or practically not exercised, no matter the new ideas and innovation will be 100 percent respected in our conference, and you are welcome no matter you are esteemed experts, or dreaming students, here is your stage.

When you are making presentation, you are making progress and someone else going to be enlightened by your demonstration and explanation. Therefore let us make progress together, and wish you a good job today and happy stay in Ningbo.

Last but not at least, we'd like to express our heartfelt appreciation to our conference chairs, program chairs, technical program committee members, organizing committee members, authors and delegates, who made a lot of efforts and contributions year by year.

Wish you will enjoy this conference, and have a wonderful time.

Yours sincerely,

Conference Organizing Committee

KEYNOTE SPEAKER

Prof. Jimmy Liu

Southern University of Science and Technology, China

Jimmy Liu graduated from the Department of Computer Science of the University of Science and Technology of China in 1988. He further obtained his master and doctoral degrees in Computer Science from the National University of Singapore. In 2004, he started the Intelligent Medical Imaging Research Team (iMED Singapore, A*STAR) and grew it to become one of the world's largest ophthalmic medical image processing team, focusing on ophthalmic Artificial Intelligence research. Jimmy was the chairman of the IEEE Singapore Biomedical Engineering Society in Singapore.

In March 2016, Jimmy returned to China and founded the iMED China (Ningbo) team. He was the founding director and senior professor of the Cixi Institute of Biomedical Engineering (CIBE) of the Chinese Academy of Sciences.

In February 2019, he joined the Department of Computer Science and Engineering of the Southern University of Science and Technology to establish iMED China（Shenzhen）. .He will devote his time to more fundamental eye-brain, Artificial Intelligence, precision medicine, surgical robotics research.

Title- Intelligent Ocular Imaging Research and IMED Team latest research update 2019

Abstract-In the talk, Jimmy will update the ocular imaging research work in the past years. He will share his AI-based eye image processing work on various ocular imaging modalities. He will cover the following 4 areas conducted in IMED Team (Singapore, Ningbo and Shenzhen): ocular disease screening, robot assisted eye micro-surgery, ocular biometrics, as well as ocular medical informatics using genome study. He will introduce the current issues, technologies and approaches in this inter-disciplinary research area, and introduce his latest research work in 2018/2019 in details.

KEYNOTE SPEAKER

Prof. Haydar Akca

Abu DhabiUniversity, UAE

Haydar Akca graduated in Mathematics and Astronomy from Ege University, Faculty of Science, Izmir, Turkey in 1970. Dr. Akca received Ph. D. in Applied Mathematics from Inonu University, Malatya with collaboration Helsinki University of Technology in 1983. Since then, he has been teaching in various universities. He becomes Professor in Applied Mathematics at Akdeniz University, Antalya in 1996. He has around 100 technical publications including monographs. His research interest area primarily functional differential equations, neural networks, mathematical modelling, control theory, and wavelet neural networks. He has been organizing the serial International Conference on Dynamical Systems and Applications. Dr. Akca is a member of a number of professional mathematical associations. He is the Editor – in-Chief and Editorial Board Member of number of International Mathematical Journals. At present he is Professor of Applied Mathematics at Abu Dhabi University, College of Arts and Science Department of Applied Sciences and Mathematics, Abu Dhabi, United Arab Emirates.

Title- An Abstract Impulsive Second-Order Functional-Differential Cauchy Problem with Nonlocal Conditions

Abstract- The main concern of the paper is to prove the existence, uniqueness and continuous dependence of mild and classical solutions of a semi linear impulsive second-order functional-differential equation with nonlocal initial conditions. We consider the Cauchy problem in general Banach spaces, and apply the theory of strongly continuous cosine families of linear operators and the Banach fixed-point theorem.

Many evolutionary processes in nature are characterized by the fact that at certain instants of time they experience a rapid change of their states. The theory of the impulsive differential equations is one of the attractive branches of differential equations which have extensive realistic mathematical modeling applications in physics, chemistry, engineering, and biological and medical sciences. The nonlocal condition generalizes the classical initial condition. In our previous papers we found sufficient conditions for the existence, uniqueness and continuous dependence of a mild solution of a first-order impulsive functional-differential evolution nonlocal Cauchy problem such that the linear part of the right-hand side of the differential equation is given by the infinitesimal generator of a strongly continuous semi group of bounded linear operators.

INVITED SPEAKER

Prof. Chiharu Ishii

Hosei University, Japan

Chiharu Ishii received Bachelor of Engineering degree in Mechanical Engineering from Sophia University in 1992, Master of Engineering degree in Mechanical Engineering from Sophia University in 1994 and Doctor of Engineering degree in Mechanical Engineering from Sophia University in 1997.

He worked at Ashikaga Institute of Technology between 1997 and 2002, at Kogakuin University between 2002 and 2009, and at Shibaura Institute of Technology between 2009 and 2010. He has been working at Hosei University since 2010, and currently working as a Professor with the Department of Mechanical Engineering, Faculty of Science and Engineering at Hosei University.

Dr. Chiharu Ishii has received several awards such as The Best Paper Award in the area of Tactile and Haptic Interfaces at the 4th International Conference on Human System Interaction (HSI2011); Best Paper Award at the 1st International Conference on Computer Science, Electronics and Instrumentation (ICCSE2012); Best Presentation Award at the International Conference on Intelligent Mechatronics and Automation (ICIMA2013). He is currently a member of IEEE, SICE, JSME, RSJ, IEEJ and JSCAS. His research interests are in medical robotics, assistive technology and robust control.

Title- Development of a Lightweight Power Assist Suit for Nursing Care

Abstract- In recent years, the aging of the world is advancing rapidly. Therefore, needs of nursing care for elderly people are increasing. In practice, however, 80% of caregivers have lower back pain due to the nursing care. To help caregivers, many kinds of power assist suits have been developed, so far. However, conventional power assist suits have the following problems. Those are heavy, expensive and hard to put on the suit.

Therefore, by following advices from caregivers who are working in nursing home, we developed a vest type power assist suit for the purpose of practical use in nursing care. The newly developed assist suit was termed "Cool Vest", which has characteristic that is lightweight, low cost and easy to put on and take off. In order to demonstrate effectiveness of the Cool Vest, verification experiments were carried out. By wearing the developed assist suit, the muscular load decreased 46% at the maximum in the case of lifting and taking down the 30kg object and decreased 43% at the maximum in the case of transferring the 20kg object by turning around.

INVITED SPEAKER

Prof. Bimal Kumar Sarkar

Adamas University, India

Bimal Kumar Sarkar graduated in physics at Jadavpur University, India and Electrical Engineering at Institute of Engineers (India). He did his Ph.D. form Indian Association for the Cultivation of Science, India. He pursued postdoctoral fellowship at the Department of Chemistry, National Sun Yat-sen University, Taiwan. Afterward he visited in research positions at NSYSU, Taiwan, UCLA, USA, Max Planck Institute, Germany, Czech Technical University, Slovak Technical University. At present, he is Professor in Physics and Dean at Adamas University, Kolkata, West Bengal, India with activity in research and teaching. He is involved in the field of Computational Physics. In October 2018, he had 113 articles published in international peer reviewed journals and conference proceedings.

Title- Canonical Correlation Analysis in DNA pattern recognition

Abstract- We performed canonical correlation analysis (CCA) as an unsupervised statistical tool to describe related views of the same semantic object for identifying patterns. CCA is a mathematical procedure to describe the relations between two related views of the same semantic object. The analysis focuses on the correlation between a linear combination of the variables in one set and another linear combination of the variables in the other set. CCA determines the linear combinations of x and y, called canonical variables, in such a way that the correlation between the canonical variables becomes utmost among all such linear combinations. A pattern recognition technique based on canonical correlation analysis (CCA) was proposed for finding required genetic code in the DNA sequence. Two related but different objects were considered: one was a particular pattern, and other was test DNA sequence. CCA found correlations between two observations of the same semantic pattern and test sequence. It is concluded that the relationship possesses maximum value in the position where the pattern exists. As a case study, the potential of CCA was demonstrated on the sequence found from HIV-1 preferred integration sites. The subsequences on the left and right flanking from the integration site were considered as the two views, and statistically significant relationships were established between these two views to elucidate the viral preference as an important factor for the correlation.

SESSION I

July 2, 2019

Session 1

[Physical science]

13:30-16:00

Bai Lu Hall（白鹭厅）

Chaired by Prof. Hsueh-Chen

Wenzao Ursuline University of Languages, Taiwan

10 presentations—

HP2-0011, HP1-005, HP1-010, HP1-016, HP1-022, HP1-2002, HP1-029, HP1-011, HP1-3003, HP1-1001

***Note**:

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- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

SESSION I

HP2-0011 **13:30-13:45**	Enhancing engagement during robot-assisted rehabilitation integrated with motor imagery task Tianyu Jia, Xinyu Guan, **Chong Li,** Linhong Ji Tsinghua University, China **Abstract-**Stroke remains the most common cause of motor deficits for adults. Enhancing engagement has become the focus of recent research with the aim of improving the efficiency of robot-assisted rehabilitation. Since motor imagery (MI) has the potential to engage the subject, the objective of this study is to explore the influence of complementing robot-assisted rehabilitation with MI during training exercises. An experiment was designed and conducted in which 10 healthy subjects were recruited to participate in two separate sessions. An acoustic-cue-based experimental paradigm was applied in both sessions. In the first session, each patient was required to imagine moving arm after the cue, then the robot device drove the arm during the MI process; while in the second session, the robotic device drove the user to move without requiring the MI tasks. Each session consisted of 20 trails, in which electroencephalogram (EEG) was recorded to analyze the activated brain regions. Analyses showed that the activation of sensorimotor cortex (SM1) was the strongest during passive movement (PM) integrated with MI than either PM or MI alone. The results indicated that robot-assisted training integrated with MI task can enhance the subject's engagement as shown by a stronger event related desynchronization (ERD), which can lead to a stronger stimulation on SM1. This indication can explain why only passive movement driven by robotic device has a low rehabilitation efficiency during clinical practice. The result can also contribute to the understanding of the mechanism underlying the brain computer interface (BCI) supported rehabilitation therapy, which can improve rehabilitation efficiency by closing the loop between the motor intention and sensorimotor feedback.
HP1-005 **13:45-14:00**	A Multiwavelength Study of The Sunspot of Active Region Which Leads to X 17 Solar Flare Nur Amira Mohd Norsham and **Zety Sharizat Hamidi** Universiti Teknologi MARA, Malaysia **Abstract-**This paper focuses on the study of active region (AR) 486 from the 171 Å wavelength in conjunction with solar radio burst data from the e-CALLISTO. This active region produced quite a strong solar flare with the X 17 class on 28th October 2003. The intense solar flare was detected by the CALLISTO system as the type III solar burst. Another data for this study were collected from the online database of Solar Monitor and Space Weather Live website where they provided the data from NOAA and SDO/AIA publicly. The study of the solar flare event was done by observing the sunspot for the past six days to see the changes in the magnetic field of the active region 486 and compared it to the solar radio data for the nature of the solar flares. The active region 486 alone had a sunspot number of 74 which is quite high, hence it produced a flare with the solar wind speed of 800 km/s and a solar radio burst type III with the storm type. The frequency drift rate for the solar burst was 2.15 MHz/s which proved that this type III is a fast drift burst. It was also recorded that the coronal mass ejection followed this solar flare event with the speed of nearly 2000 km/s and directed toward the Earth which then produced intense geomagnetic storm on the Earth the next day.
HP1-010 **14:00-14:15**	Integrating Math, Physics and Microcontroller Technology into a Temperature Control System **Jie Sheng**

SESSION I

	University of Washington, USA **Abstract-**Control engineering is an interdisciplinary field requiring knowledges on math, physics, circuits, sensors, actuator, and microcontrollers (for digital control implementation). It also provides users experiences in testing, simulation and real-time implementation. This paper presents a course demonstration project illustrating the essence of control engineering. The objective is to design and apply a PID controller to maintain the temperature of a power resistor by using Arduino Mega 2560. After device modelling and testing by applying math and physics knowledges, the open-loop system dynamics can be determined and controllers can be designed. By comparing the simulation and experimental closed-loop system performances, the difference caused by plant-model mismatch is discussed. The importance of integrating math, physics, and circuits with Arduino programming in embedded control systems is also highlighted.
HP1-016 **14:15-14:30**	An Automated System in Detecting Solar Radio Burst Type II and IV Associated to Multiple Coronal Mass Ejections **Nurain Mohamad Ansor**, Zety Sharizat Hamidi and Nur Nafhatun Md Shariff Universiti Teknologi MARA, Malaysia **Abstract-**This paper presents an automated system named as CALLISTO which is implemented to record solar radio burst emissions associated to solar activity. CALLISTO is a spectrometer used in solar activity observations in order to monitor the Sun's activity and behaviour and also as an indicator of upcoming solar events. Solar radio burst type II is known as slow drift going from high to low frequency at a range of 20 MHz- 150 MHz. It is found to be associated to Earth-directed Coronal Mass Ejections (CMEs) travelling at a very high speed. On 4th November 2015, type II and IV bursts were detected by Almaty and Bir station respectively along with multiple formation of CMEs throughout the day. Due to the shock wave from CMEs, a minor G1 storm was triggered on 7th November 2015 leaving an aurora scenery over the skies of several states in USA. However, no damages on power systems were reported. Comprehensive discussions on this event are discussed in this paper.
HP1-022 **14:30-14:45**	Multi-objective Optimal Operation of Renewable Energy hybrid CCHP System Using SSO Wei-Chang Yeh, Chyh-Ming Lai and **Yi-Fan Peng** National Tsing Hua University, Taiwan **Abstract-**In recent years, the amalgamation of renewable energies into combined cooling, heating and power system (CCHP) become a popular research in energy field. In order to improve the energy utilization of renewable energies integrated the CCHP (RECCHP) system, it is necessary to optimize the operation and component capacity in the RECCHP system. A multi-objective optimization model characterizing the system daily operation cost, daily carbon dioxide emission, and primary energy saving rate is established. Considering each objective function, Simplified Swarm Optimization (SSO) is applied as a single objective optimization problem to find the best capacity of components and operation of the system. Further, normalize three objective respectively and use Analytic Hierarchy Process to get weight for each objective. Transform the multi-objective optimization problem into a single objective optimization problem. Finally, taking a historical weather data in winter of Kinmen Island, Taiwan, as a case study, solve

	the problem with SSO, and the experiment results are compared with traditional energy systems. The results show that the RECCHP system is better than traditional energy systems among economic, environmental and energy aspect.
HP1-2002 **14:45-15:00**	Stress Analysis of Orthotropic Plate Based on Complex Variable Method **Purong Jia**, Gang Wang, Long Zhang, Cheng Jia and Yongyong Suo Northwestern Polytechnical University, China **Abstract-**Typical stress boundary problem for a wedge with orthotropic materials is considered. The complex variable functions including a material parameter are fully analyzed for solving the partial derivation equation. By constructing new stress function, the mechanic analysis of the wedge subjected to a concentrated force is carried out. The stress boundary problem and the governing equation are resolved. The formulae of stress fields in rectangular and polar coordinates are derived for the wedge.
HP1-029 **15:00-15:15**	Solitary waves propagation in Three-Level Atomic Media **Sofiane Grira** and Hichem Eleuch Abu Dhabi University, United Arab Emirates **Abstract-**In this paper analytical solutions of a non-linear differential equations describing solitary wave-pair propagation are derived as well as the existence conditions in absorbing optical dense media.
HP1-011 **15:15-15:30**	The analytic law of held water evaporation in contact drying process of paper **Zheng Mingliang**, Feng Xian and Deng Bin Taihu University of Wuxi, China **Abstract-**In order to reveal the change law of water content in drying technology of cylinder, guide the design of drying structure and reduce energy consumption. Based on the principle of conservation of mass, this paper only establishes a mathematical model of the evaporation of held water at dry end during the contact drying process of paper; The analytical formula of the change law of water content was obtained by combining the fixed conditions; The effects of the initial moisture content (initial dry degree) and the air velocity on the rate of water content of the drying process were simulated. The results show that the size of the parameters do not change the overall exponential decay trend of the evaporation law, but they change the slope of attenuation in the decline stage of drying process. The initial dry degree is smaller, the absolute value of the curve descending slope is greater, but the time needed for drying is longer; The air flow velocity is larger, the absolute value of the curve descending slope is greater, and the drying time is shorter, so, the initial dry degree is larger and the air flow is faster, the drying time is shorter, the theoretical analysis fully conforms to the actual production process.
HP1-3003 **15:30-15:45**	DESIGN AND DEVELOPMENT OF A PARALLEL ALGORITHM FOR SOLVING A THREE-DIMENSIONAL PROBLEM OF OIL RECOVERY BY POLYMER/SURFACTANT INJECTION **Mukhambetzhanov S.T.**, Akhmed-Zaki D.Zh., Matkerim B., Imankulov T.S. Atyrau State University named after Dosmukhamedov, Kazakhstan **Abstract-**This article discusses the use of MDA technology for the design and development of a

	parallel application to solve the three-dimensional problem of displacing oil by pumping polymer and surfactant into an oil reservoir. We calculated the main parameters: pressure distribution, concentration, temperature, phase saturation, efficiency and acceleration of the parallel algorithm. The application of the model-based approach of MDA gave many significant advantages, which prove the promise of using this technology in the design and development of applications for scientific computing.
HP1-1001 **15:45-16:00**	Tunable structure and electronic properties of multilayer PtSe2 **Zhiming Hong** Chongqing Foreign Language school, China **Abstract-**Two dimensional (2D) materials such as graphene and transition metal dichalcogenide (TMDC) like MoS2, WTe2 have brought widespread attention as their novel 2D confined properties and applications in nano devices. Among them, the up to date multilayer PtSe2 has been reported to be high mobility, air stable and possess novel phenomenon like Dirac fermions but to date have little study as the tunable electronic properties via structural control. Here we use the first principle calculations based on density functional theory (DFT) to study the tunable structure and electronic properties of monolayer and multilayer PtSe2 by the method of strain. We find that when apply compress strain on monolayer PtSe2 at -3% or more, the photoluminescence will enhance due to a larger density of states at conductance band minimum (CBM). With the increase of layer number, the band gap become small rapidly. The band gap change from 1.3 eV for monolayer to 0.4 eV for bilayer. With three layers, the band gap becomes 0.1 eV. Begin at four layer, the PtSe2 multilayer become a negative band gap semimetal. The DOS under VBM is small for multilayers due to the large splitting between the first valence band with the second valence band. This indicate the possible low photoluminescence strength for these multilayers. Our results can pave a way for the experiment electronic and optical properties tuning in multilayer PtSe2 and possible in the similar TMDCs.

SESSION II

July 2, 2019

Session 2

[Smart medical]

16:15-18:45

Bai Lu Hall（白鹭厅）

Chaired by Lecturer Nunik Afriliana

Universitas Multimedia Nusantara, Indonesia

10 presentations—

HP2-0002, HP2-0004, HP2-0019, HP1-002-A, HP1-009, , HP2-0014, HP2-0018, HP2-0020, HP2-0017, HP2-0015

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SESSION II

HP2-0002 **16:15-16:30**	Investigation and Research of the Hidden Dangers of Drug Misused in Elderly People **Yang Yang** and Yan-jie Zhao Bohai University, China **Abstract-**Population aging has become a global phenomenon. The aging population is in grim situation, and chronic disease prevalence rate is very high in China. In addition, the demand growth for medical service results in more home medication treatment. Therefore, drug undeserved risk for elderly patients also increases, which need more attention. In this paper, the problem of improper use of drugs for elderly people was investigated and analyzed, which could provide a reference for regulating the elderly family medication and reducing the risk of drug use. The questionnaire survey was conducted among 120 elderly people, and 83 of them were followed up. The elderly population in the family is not with standardized medication, over 60% of the elderly have strong randomness, inappropriate medication and safety hazards. Statistic difference existed between drug with long and short time for safety evaluation and $P < 0.05$. Irrational drug use can increase the adverse effects of drugs, which can cause some damage to the elderly health, and even increase the risk of death.
HP2-0004 **16:30-16:45**	The Development of Standardized and Sharable Computer Interpretable Guidelines for Diabetic Retinopathy Lei Wang, Yujuan Shang, Xia Weng, Xifan Yang, Aimin Sang, Jiancheng Dong, Kui Jiang and **Huiqun Wu** Nantong University, China **Abstract-**The deployment of computer-interpretable guidelines (CIGs) is of significance for diabetic retinopathy (DR) clinical decision making (CDS) since the traditional management relied on amount of trained health care professionals. The propriety-based CDS models are not interoperable among different EHR vendors, limiting the implementation efficiency of such CDS models. This study aims to develop standardized and sharable CIGs for DR prevention. In this study, DR specific virtual medical record (vMR) was designed and data mapping was conducted from patient's continual care document (CCD). Several published guidelines on DR screening, diagnosis and treatment have been referred for DR CIG modeling via Gello, GLIF, OpenCDS editors. The CIGs were developed and testified in each editor and the results were compared. In conclusion, the developed CIG for DR is actionable and shareable, which is favorable to the management and prevention of DR.
HP2-0019 **16:45-17:00**	Data Augmentation Is More Important Than Model Architectures For Retinal Vessel Segmentation **Zhaolei Wang,** Junbin Lin, Ruixuan Wang, Weishi Zheng Sun Yat-sen University, China **Abstract-** While various deep learning models have recently been proposed or applied to improve the segmentation of vessels in retinal images, the performance gap between different models are often quite small. Such small difference may come from their limited generalization capabilities due to small training data. By simply augmenting data with oriented image patches extracted from the limited training images, we are surprised to observe that even a very simple U-Net with these augmented training patches can outperform the state-of-the-art models with much more complicated architectures or training schemes, and initial gaps between models have become negligible or disappeared. This suggests that it might be more crucial to explore effective data augmentations to extract richer visual information from limited training data, rather than solely focusing on developing

	other novel deep learning techniques for retinal vessel segmentation.
HP1-002-A **17:00-17:15**	Adaptive finite element method using an a posterior error estimator for viscoelastic fluid flow problems **Hsueh-Chen Lee** Wenzao Ursuline University of Languages, Taiwan **Abstract-**The work concerns adaptive least-squares (LS) finite element solutions of the viscoelastic fluid flows; in contrast to the Newtonian flows, the problems are associated with fluid viscosity, elasticity, and memory. The LS method uses the L2-norm of the residuals of the continuity equation multiplied by appropriately adjusted weights. An a posteriori error estimator of the LS functional is used for an adaptive weight iteration approach and adaptive mesh refinements. Model problems considered are the flow past a slot channel problem. Numerical results indicate that the viscoelastic polymer solution flow characteristics are described by the adaptive approach. The results demonstrate that mass conservation of the LS method can be significantly improved by appropriately adjusting weights, and that this can be accomplished using low-order basis functions. Numerical results indicate that we can apply the LS method to viscoelastic flow problems and discuss the parameter effects. The developed method is effective for viscoelastic fluid flows.
HP1-009 **17:15-17:30**	The q-Derivative and Di¤erential Equation **Haydar Akça**, Jamal Benbourenane and Hichem Eleuch Abu Dhabi University, UAE **Abstract-**The q-calculus appeared as a connection between mathematics and physics. It has several applications in different mathematical areas such as number theory, combinatorics, orthogonal polynomials, basic hypergeometric functions, quantum theory, and electronics. Recently, a great interest to its applications in differential transform methods, in order to get analytical approximate solutions to the ordinary as well as partial differential equations. In this paper, we present some of the interesting denitions of q-calculus and q-derivatives. By using q-calculus, solutions of some differential equations could be generated.
HP2-0014 **17:30-17:45**	Deep Learning Algorithm for Brain Tumor Detection and Analysis Using MR Brain Images **Abd El Kader Isselmou**, Guizhi Xu, Shuai Zhang, Sani Saminu, Imran Javaid Hebei University of Technology, China **Abstract**-Medical image processing paly a good role in helping the radiologists and facility patients diagnosis, the aims of this paper is created deep learning algorithm to detect brain tumor using magnetic resonance brain images and analysis the performance of algorithm based on different values, accuracy, sensitivity, specificity, ndice, nJaccard coeff and recall values. The significance of convolution neural network (CNN) it's the ability to detect brain clearly with high performance. We propose framework is successfully tested on data source on magnetic resonance brain images of the patients suffering from different brain tumor types reaching a Dice similarity 86,785% and high accuracy 98, 33%.
HP2-0018 **17:45-18:00**	Asynchronous Multivariate Time Series Early Prediction for ICU Transfer **Lei Zhao,** Huiying Liang, Daming Yu, Xinming Wang, Gansen Zhao

SESSION II

	South China Normal University, China **Abstract-** The forecasting of whether a patient should be transferred into intensive care units (ICU) is a matter of life and death since it will raise survival rate for patients if they get treated properly and carefully in time. However, we found that recent research on ICU early prediction could not get an acceptable result on the time series that are asynchronous and multivariate. We propose Multivariate Early Shapelet (MEShapelet) which could get an accurate prediction on asynchronous multivariate time series beside interpretability. Our experiments show that MEShapelet can get 9% improvement on F1-score over the best of the previous methods on our real ICU data set. In summary, we prove that our method can effectively carry out asynchronous multivariate time series early predict problem.
HP2-0020 **18:00-18:15**	Methodology to determine important-points location for automated Lumbar Spine Stenosis diagnosis procedure Friska Natalia, Hira Meidia, **Nunik Afriliana**,Ala Al-Kafri, Sud Sudirman Universitas Multimedia Nusantara, Indonesia **Abstract-**Chronic Lower Back Pain (CLBP) is one of the major types of pain that is affecting many people around the world. Lumbar Spine Stenosis (LSS), a major cause of CLBP, requires experienced neuroradiologists to detect and diagnose. It has been reported that the number of MRI examinations around the world is increasing but the number of specialist neuroradiologists to examine and analyse them has not. This paper presents a continuation of our methodology to automatically detect the presence of LSS by analyzing lumbar spine MRI images. It details important points location-determination algorithm that can be further processed in the LSS diagnosis procedure. We use the results of our, previously developed, boundary delineation method to supply boundary points to the algorithm. The algorithm is applied to the best cut axial-view images of the intervertebral discs of 515 patients contained in the Lumbar Spine MRI dataset. The results of the important points locations are presented.
HP2-0017 **18:15-18:30**	Cost-Effective Cancer Screening: Bayesian Model Averaging with Two Sources of Variation **Paul J. Darwen** James Cook University Brisbane, Australia **Abstract-** For medical testing, a popular measure of accuracy is the sensitivity or true positive rate TP/(TP+FN) to reduce the number of false negatives, which result in people who have the disease not receiving treatment. In contrast, there is a need for cost-effective tools that can achieve high precision, TP/(TP+FP), to identify a small fraction of the population with a high probability of having a disease, and thus avoid the cost of testing a large population. This paper explores how Bayesian model averaging can achieve better precision in a novel way. The task is predicting who has mesothelioma, a lung cancer linked with asbestos.
HP2-0015 **18:30-18:45**	Qualitative assessment methods of adaptation reserves in the evolution of patient's follow-up with endocrine diseases Irina Kurnikova, **Ramchandra Sargar**, Svetlana Kislaya, Sofia Buturlina, Artyem Yurovskiy. RUDN University, Russian Federation

SESSION II

Abstract-This study aims to evaluate the effectiveness of qualitative indicators in assessing the state of functional reserves of the body in patients with type 2 diabetes mellitus (DM 2) and metabolic syndrome (MS) for the development of individual programs at the stages of medical rehabilitation and monitoring the adequacy and quality of therapy.

The study comprised 124 individuals, 92 of them were diagnosed diabetes mellitus type 2 and 32 patients with metabolic syndrome. The two important aspects of problems has been envisaged in this investigation; 1- the effect of the preserved functional reserves of the body on the course and progression of systemic diseases (Diabetes mellitus); 2- the effectiveness of using the method of qualitative assessment of the state of functional reserves of the body (an indicator of adaptive compliance) to predict the effectiveness and current monitoring of therapy.

The assessment of the state of functional reserves with adaptation consistency criteria (ACC) in examined diabetic patients illustrated high and satisfactory rehabilitation potential. At the second stage of the study, the criteria for patient's distribution into groups was the preserved functional reserves of the body according to ACC with the development of personalized rehabilitation programs at the outpatient stage.

The method allows carrying out as control of treatment and making a forecast.

SESSION III

July 2, 2019

Session 3

[Mathematical science]

13:30-15:45

Hui Jian Hall（会见厅）

Chaired by TBA

9 presentations—

HP1-017, HP1-015, HP1-1003, HP1-3001, HP1-012, HP1-013, HP1-021, HP1-030-A, HP1-3002

***Note**:

- Please arrive 30 minutes ahead of the sessions to prepare and test your PowerPoint.
- Certificate of Presentation will be awarded to each presenter by the session chair when the session is over.
- One Best Presentation will be selected from each parallel session and the author of best presentation will be announced and awarded when the session is over.

SESSION III

HP1-017 **13:30-13:45**	Simplified Swarm Optimization for Optimal Deployment of Fog Computing System of Industry 4.0 Smart Factory Wei-Chang Yeh, Chyh-Ming Lai and **Jr-Yu Tsai** National Tsing Hua University, Taiwan **Abstract-**Fog computing is an emerging technology that can reduce the load on cloud system and decentralize computing resource, thus increasing response speed and reducing time delay. More and More environments in order to achieve intelligence, collect massive amounts of data though IOT devices. Considering deploying fog computing system in these environments can make system faster and more robust. This work creates a simulated factory consisting of a cloud center, gateways, fog devices, edge devices, and different types of sensors. We build an integer programming model and apply metaheuristic method for determining the layout of above devices except of cloud center and all sensors so that can find the cost minimization deployment of the smart factory.
HP1-015 **13:45-14:00**	Automatic Code Parallelization for Data-Intensive Computing in Multicore Systems Ranjini Subramanian and **Hui Zhang** University of Louisville, USA **Abstract-**A major driving force behind the increasing popularity of data science is the increasing need for data-driven analytics fuelled by massive amounts of complex data. Increasingly, parallel processing has become a cost-effective method for computationally large and data-intensive problems. Many existing applications are sequential in nature and if such applications are ported to multi-processor systems for execution, they would make use of only one core and the optimal usage of all cores is not guaranteed. Knowledge of parallel programming is necessary to ensure the use of processing power offered by multi-processor systems in order to achieve better performance. However, many users do not possess the skills and knowledge required to convert existing sequential code to parallel code to achieve speedups and scalability. In this paper, we introduce a framework that automatically transforms existing sequential code to parallel code while ensuring functional correctness using divide-and-conquer paradigm, so that the benefits offered by multi-core systems can be maximized. The paper will outline the implementation of the framework and demonstrate its usage with practical use cases.
HP1-1003 **14:00-14:15**	The alternate iterative Gauss-Seidel method for linear systems **Bingyuan Pu** and Xun Yuan Chengdu Textile College, China **Abstract-**In this paper, we present an alternate iterative Gauss-Seidel method for linear systems. The spectral radius of the iteration matrix and the convergence of the proposed method are discussed. Finally, the numerical examples are provided to confirm our theoretical analysis and demonstrate the efficiency of the new method.
HP1-3001 **14:15-14:30**	Solution of Triangle **Peter Chew** Engineering Maths, Malaysia

SESSION III

	Abstract-Objectives Peter Chew rule: is to let upcoming generation solve same problem can solve directly, more easy, more accuracy compare what`s now solution. With sine rule, cosine rule and Peter Chew rule, all problem at solution of triangle can solve directly more easy, more accuracy. Peter Chew rule are complement rule of topic solution of triangle.
HP1-012 **14:30-14:45**	Using a novel grey model to forecast the unconventional water sources supply volume in China **Lin Chen**, Zhibin Liu and Nannan Ma Southwest Petroleum University, China **Abstract-**Unconventional water resources are an important part of fresh water resources, which can help relieve pressure of water supply and further a sustainable development could be achieved, especially in China. In this paper, a novel optimize fractional order polynomial grey model is proposed, which is abbreviated as OFOPGM(1,1). The novel grey model is validated and calibrated and forecast the unconventional water sources supply volume in China. The forecast results prove the validity and practicability of the novel model.
HP1-013 **14:45-15:00**	Dynamic Task Assignment Method Based on NSGA-II Algorithm in Command and Control Field **Yichao He**, Xun Wang, Zhiqiang Jiao and Jieyong Zhang Air Force Engineering University, China **Abstract-**In order to improve the adaptability of command and control organizations to complex operational environments and effectively solve the unexpected events that may be encountered in the operation of C2 organizations, this paper studies the dynamic task assignment of C2 organizations and proposes multi-objective tasks assignment method based on NSGA-II algorithm. Firstly, two kinds of emergencies such as platform damage and task increase in the course of combat are analyzed, and the mathematical expression method is given. Secondly, a multi-objective optimization model aiming at maximizing task completion quality and minimizing plan adjustment cost is constructed. And the adaptive NSGA-II algorithm is designed to solve the model. Finally, the simulation experiment shows that the constructed model can effectively deal with the above-mentioned emergencies, and the designed algorithm can obtain the better Pareto frontier and realize the dynamic task assignment.
HP1-021 **15:00-15:15**	Nurse Scheduling Problem Using Simplified Swarm Optimization Wei-Chang Yeh, Chyh-Ming Lai and **Meng-Hang Tsai** National Tsing Hua University, Taiwan **Abstract-**In the past, many researchers tried to find a high-quality nurse scheduling by using mathematical programming approach. However, mathematical programming approach is hard to solve the highly complex problem in the real world, because there are so many constraints. In this paper we present Simplified Swarm Optimization (SSO), which is the stochastic optimization method proposed by Yeh [1], to solve the real world problem of Nurse Scheduling Problem (NSP). SSO designs the new update mechanism and aim to overcome the disadvantage of Particle Swarm Optimization (PSO) in discrete problem. The objective function is to maximize the fairness within all nurse's scheduling.
HP1-030-A **15:15-15:30**	Compactifications of based-free G-spaces **N. Antonyan**

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	Tecnologico de Monterrey, Mexico **Abstract-**By a G-space we mean a triple (G, X, α), where G is a topological group, Xa topological space, and α : G ×X→X a continuous action of G on X. In 1960 R. Palais proved that every Tychonoff G-space can equivariantly be embedded into a com-pact Hausdorff G-space provided Gis a compact Lie group. This result was extended by JandeVries to the case of arbitrary locally compact Hausdorff groups. The local compactness is es-sential here; it was M.Megrelishvili who constructed in a continuous action αof a separable, complete metrizable group G on a separable, metrizable space Xsuch that (G, X, α) does not admit an equivariant embedding into a compact G-space. In this paper we are mostly interested in based-free G-spaces. Recall that a G-space X is called free (or the action of Gon X is called free), if for every x ∈ X the equality gx =x implies g=e, the unity of G. For a compact Lie group G we characterize those based-free G-spaces which admit based-free G-compactifications. For such G-spaces a universal based-free compact G-space of a given infinite weight is constructed. Besides, we show that the maximal G-compactification βGX is based-free whenever X is a finitistic (in particular, finite-dimensional and paracompact) based-free G-space. We also give new charaterizations of βGX for such G-spaces.
HP1-3002 **15:30-15:45**	Quadratic Equation **Peter Chew** Engineering Maths, Malaysia **Abstract-**Peter Chew Method is easy and suitable for higher order function. what`s now solution not suitable for higher order function. Peter Chew Method not suitable for quadratic equation contain unknown. Peter Chew method similar with Remainder Theorem, Remainder Theorem is easy and suitable for higher order, but Remainder Theorem not suitable for polynomial function divisor.

POSTERS

HP1-001	Simultaneously identify right-hand side and lowest coefficient in a parabolic equation Ling De Su, V. I. Vasilev and Tong Song Jiang North-Eastern Federal University, Russia **Abstract-**The theory and practice of inverse problem of partial differential equations play an important role in science and engineering applications. This paper deals with the numerical solutions of the inverse problem to simultaneously identify the right-hand and lowest coefficient that dependent on time only in a two dimensional parabolic equation. Backward difference in time and finite element procedure in space are constructed for solving this kind of inverse problem. Based on a special decomposition, the algorithm transforms the original problem into three standard elliptic problems at the new time level. Numerical examples are given to demonstrate the ability of the proposed computational algorithm for solving such coefficient inverse problem.
HP1-014	Bifurcation analysis for a functionally graded materials plate: two pairs of pure imaginary eigenvalues Weiqin Yu, Na Li, and Shouwei Zhao Shanghai University of Engineering Science, China **Abstract-**In this paper, the dynamics in the vicinity of a compound critical point which is characterized by two pairs of pure imaginary eigenvalues are studied for a simply supported functionally graded materials rectangular plate. The solutions for equilibria and quasi-periodic motions are obtained and stability conditions of these solutions are presented. The numerical simulations confirm the analytical predictions.
HP2-0007	Design of intelligent defecation monitoring system for newborns Meng-Ru Zhu* and Jun Guo The First Hospital of Jilin University, China **Abstract-**In this paper, a new design of intelligent defecation monitoring system for use in maternity wards is introduced. By monitoring the newborns' defecation situation intelligently in real time, and send a warning signal to the background management system through wireless communication right after the occurrence of defecation, the system can prompt the nursing staff to change the diaper for the baby just in time. The successful implementation of the system can promptly remind the nursing staff right after the newborn finished the defecation, avoid the symptoms such as red buttocks, eczema and other symptoms, thus minimize the accordance damages to the newborns, improve the satisfaction of the family, and greatly reduce the difficulty of newborns' care.
HP1-023	Aeroacoustic noise calculation of noncompact bodies with time-domain scattered Green's function Fang Wang, Qiuhong Liu North Minzu University, China **Abstract-**In view of the scattering effect induced by non-compact bodies, and the growing time cost of the noise calculation with high-order methods, tailored Green's function methods gradually become effective means to study acoustic noise of noncompact bodies. With the help of free-space Green's function and convective wave equation, time-domain integral method is presented to calculate scattered Green's function under arbitrary boundary condition. In order to

	verify the present method, the cylinder noise under solid wall condition is firstly calculated with stationary point source. The scattered Green's functions are in good agreement with Gloerfelt's analytical solution and Takaishi's frequency method. The pressure distribution demonstrates that the pressure appears as circle shape at low frequency but petal-like pattern at high frequency. Furthermore, point sources in parabolic moving form is chosen to study the influence of scattering effect to far field noise. Numerical results illustrate that the scattering effect is closely related to cylinder radius and the location of sound sources, large body size and sound sources adjacent closely to body surface could lead to serious scattered noise. Besides, time-domain method overcomes the limit that noise calculations have to be performed in relative coordinate system, and it can calculate scattered noise accurately and instantaneous.
HP1-019	The D-N Alternating Algorithm Based on the Curved-FEM and Moving Mesh for the Exterior Harmonic Problem Quan Zheng and Sheng Wang North China University of Technology, China **Abstract-**In this paper, we study the numerical solution of the exterior harmonic problem with the Dirichlet boundary value condition. Owing to the difficulties of solving directly in the unbounded domain, we decompose the exterior problem into a mixed boundary value problem on a bounded annular subdomain and a Dirichlet boundary value problem on an unbounded subdomain by constructing an artificial boundary. Then, the Dirichlet-Neumann (D-N) alternating algorithm is proposed to solve two sub-problems alternately, where the former is solved by the curved-FEM, while the latter is solved by the principle of natural boundary reduction (NBR). Rather than the standard FEM, the curved-FEM is conforming and gives better discrete approximate variational formulation of the algorithm. The geometrical convergence of the discrete algorithm is also obtained. Finally, the D-N alternating algorithm based on the curved-FEM and the moving mesh method is shown to achieve higher precision in the numerical example.

MEMOS