

# CONFERENCE ABSTRACT



January 21-23, 2019  
Chulalongkorn University  
Bangkok, Thailand

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# Welcome Remarks

Distinguished Delegates and Guests,

It is our pleasure to introduce you 2019 9th International Conference on Applied Physics and Mathematics (ICAPM 2019) and 2019 10th International Conference on Mechatronics and Manufacturing (ICMM 2019), which held at Chulalongkorn University, Bangkok, Thailand during January 21-23, 2019.

We absolutely convict the conference topics are of great importance, with actual relevance: Materials Science and Engineering, Materials Properties, Measuring Methods and Applications, Methodology of Research and Analysis and Modelling, Materials Manufacturing and Processing, Mechatronics, Automation and Signal Processing, etc. In this edition, looking for the conference program, it will be presented very interesting works, creating a huge expectation for this event. We hope that this meeting may provide a great contribution for a bigger assertion of Applied Physics and Mathematics and Mechatronics and Manufacturing as a path for the future.

The expectation is that this conference is a significant contribution to this area and that the organization deserves your admiration.

We wish to express our sincere appreciation to all the individuals who have contributed to ICAPM 2019 and ICMM 2019 in various ways. Special thanks to colleagues of conference chairs, program committee, technical committees, authors and so on. Their high competence, their enthusiasm, their time and expertise knowledge, enabled us to prepare the high-quality final program and helped to contribute to a successful event.

Welcome and good work.

ICAPM 2019 and ICMM 2019  
Conference Committee

## Local Information

### Conference Venue

**Chamchhuri 10 Building, Chulalongkorn University**

**Website:** <http://www.chula.ac.th/en/>

**Address:** 254 Phayathai Rd, Wang Mai, Khet Pathum Wan, Krung The p Maha Nakhon 10330, Bangrak, Bangkok, Thailand

### Conference Rooms

**Keynote / Plenary Speeches:** Room 701 (7<sup>th</sup> floor)

**Parallel Sessions:** Room 701, 702, (7<sup>th</sup> floor); Room 802, 803 (8<sup>th</sup> floor)

**Lunch & Dinner:** Sasa Cuisine main dining room, Sasa International House

### Location:

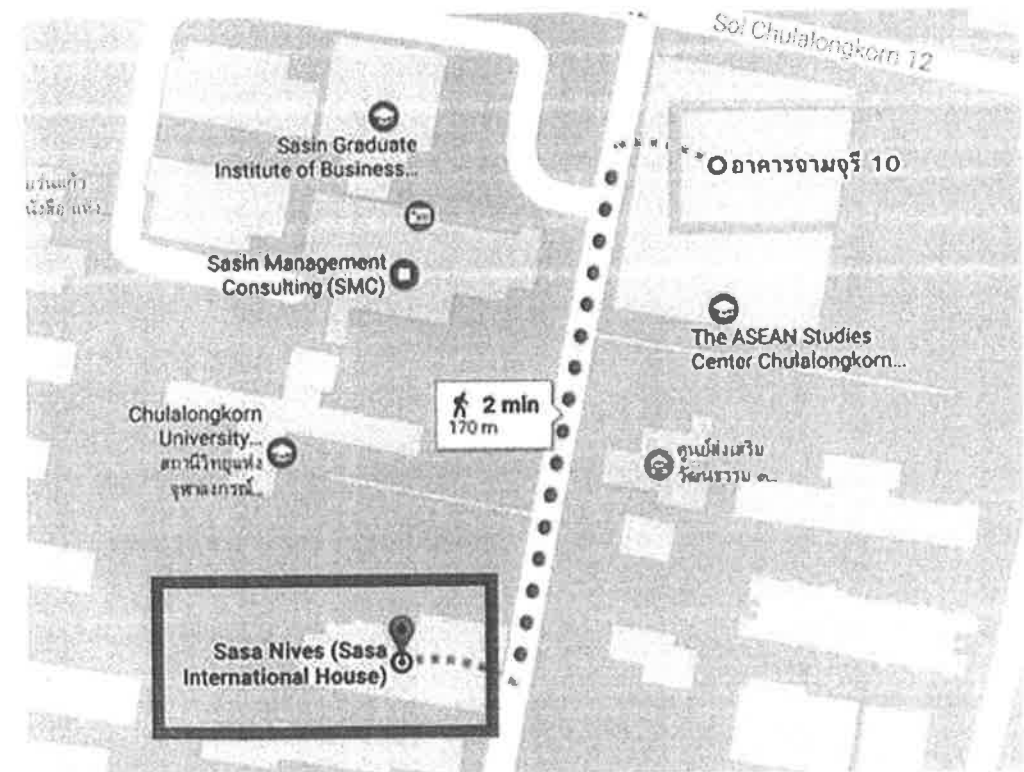
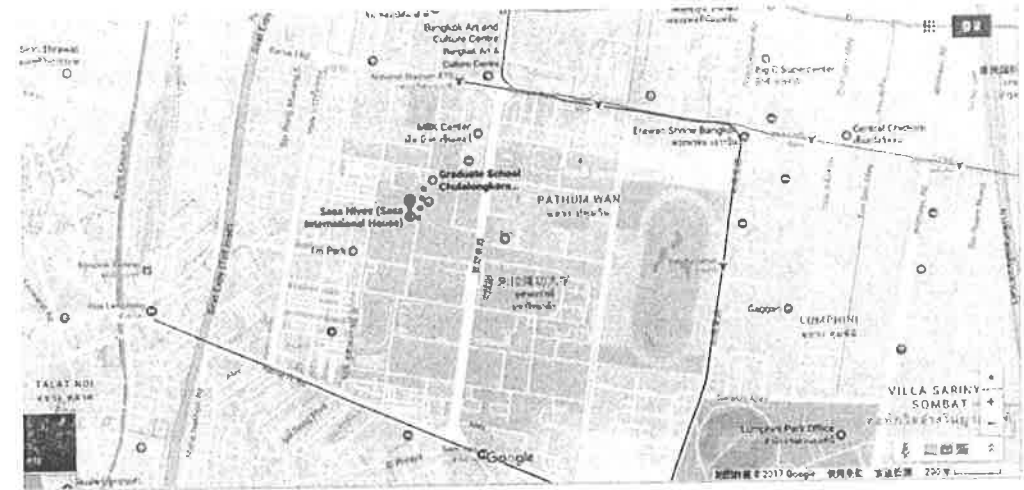


อาคารจามจรี 10  
Chamchuri 10 Building  
Chulalongkorn University



## Local Information

### Map of Conference Venue and Restaurant



## Local Information

### Weather

Average Temperature in January in Bangkok

**25°C - 33°C**

### Bank and Foreign Exchange

The Currency is **Thai Baht** here. You can exchange foreign currency at the airport, or exchange at the bank, Money exchanger.

### Attention Please

Please take care of your belongings in the public places. Don't stay too late in the city, don't be alone in the remote area. Be aware of the strangers who offer you service, signature of charity, etc., at many scenic spots. You can search more Tourist Information and Security tips online.

### Emergency

Police: 191

Ambulance: 1669

Fire: 199

## Instructions for Workshop

**Note:** The following time arrangement is for reference only. In case any absence or some presentations are less than 15 minutes, please come before your session starts.

\*A best presentation will be selected from each session which will be announced and awarded an excellent oral presentation certificate at the end of this session.

### Devices Provided by the Conference Organizer

Laptops (with MS-Office & Adobe Reader)

Projectors & Screen

Laser Sticks

### Materials Provided by the Presenters

**Oral Presentation:** PowerPoint or PDF files. Please copy your slide file to the desktop before session starts

**Poster Presentation:** A1 Size, Portrait Direction. During your poster session, the author should stay by your poster paper to explain and discuss your paper within visiting.

### Duration of Each Presentation

**Regular Oral Session:** about 15 Minutes of Presentation including Q&A

**Keynote Speech:** 40 Minutes of Presentation including Q&A

**Plenary Speech:** 30 Minutes of Presentation including Q&A

### About Dress Code

All participants are required to dress formally. Casual wear is unacceptable. National formal dress is acceptable.

## Conference Speakers

**Speech Title: Evolution of copulas in discrete and continuous processes**



**Prof. Naoyuki Ishimura**  
Chuo University, Japan

Prof. Naoyuki Ishimura was born in Tokushima, Japan in 1964. He obtained his bachelor's degree of Physics in 1986 and master's degree of Mathematics in 1989 both at University of Tokyo, Japan. He obtained his PhD from University of Tokyo in 1993 with the title "Analytic properties of mean curvature flows." He was Research Associate of Mathematics at University of Tokyo from 1989 to 1996. He moved to Hitotsubashi University, Japan as Associate Professor of Mathematical Sciences from 1996 and became full Professor from 2005. His interest gradually involves Mathematical Finance and he was a director of CFEE (Center for Financial Engineering Education) at Graduate School of Economics, Hitotsubashi University from 2011 to 2015. He now moves to Chuo University from 2015. Prof. Ishimura is a member of JSIAM (Japan Society for Industrial and Applied Mathematics) and a representative of Mathematical Finance study group. His area of research includes the applied analysis, the theory of nonlinear partial differential equations, and the mathematical finance.

**Abstract:** The relation between each risk factors is an important subject for researches. A typical assumption of the independence does not lead to a true estimate of potential risk. Copulas, in this respect, are known to provide a flexible tool for analyzing nonlinear relations among random variables. However, the usual definition of copulas does not involve the time variable, although real world events proceed with the time.

In this presentation, we review on our recent investigations for the time evolution of copulas. In particular, we deal with the convergence from discrete to continuous setting. It is shown that the discrete evolution converges to the corresponding continuous evolution under suitable assumptions. Applications of these time evolution of copulas are also discussed.

## Conference Speakers

**Speech Title: Can two weak competitors wipe out a strong competitor in a 3-species competition system?**



**Prof. Jong-Shenq Guo**  
Tamkang University, Taiwan

Professor Jong-Shenq Guo is currently a Chair Professor of the Department of Mathematics, Tamkang University, Taiwan. He received his B.S. degree in mathematics from National Taiwan Normal University in 1980, Master degree in mathematics from Purdue University in 1987, and Ph.D. degree in mathematics from the University of Minnesota in 1989. He was an Associate Professor during 1989-1994 and a Full Professor during 1994-1995 in National Tsing Hua University. After serving as a Full Professor in National Taiwan Normal University during 1995-2010, he moved to Tamkang University as a Full Professor in August, 2010. Professor Guo has received the Outstanding Research Award of the National Science Council, Taiwan, in 2010, and the Outstanding Research Award of the Ministry of Science and Technology, Taiwan, in 2016. His major research interests are partial differential equations, applied mathematics, mathematical biology and wave propagation. He is now the President of the Mathematical Society of R.O.C. (Taiwan) for the term 2018-2019

**Abstract:** We are concerned with which species wins the competition in the multi-species competition models in one dimension habitat. We shall tackle this question by determining the wave speed sign of the corresponding traveling wave. In this talk, we are interested in the case of 3-species competition system in which there are 2 weak competitors and one strong competitor. It seems that the strong competitor should always win the competition. However, it turns out that this is not always true. Our aim is to provide a rigorous proof of these facts.

# Conference Speakers

**Speech Title: Improving the mechatronic system for automatic control of the reversing stands of mill 5000**



**Assoc. Prof. Vadim Rashitovich Gasiyarov**  
**Head of Department of Mechatronics, South Ural State University**  
**(National Research University), Russia**


Vadim Rashitovich Gasiyarov graduated from the Magnitogorsk State Technical University named after G.I. Nosov in "electrical engineer" (specialization electric drive and automation of industrial plants and technological complexes") in 2007. After his graduation he started working as electronics engineer of service department of automated control systems in OJSC Magnitogorsk Iron & Steel Works. He has been promoted to lead Engineer of Service of automated control systems and automated electric drive on Hot plate mill 5000 in OJSC Magnitogorsk Iron & Steel Works in a year. And the same time he began working as an Assistant Professor of department of automated electric drive and mechatronics on a part-time in Magnitogorsk State Technical University named after G.I. Nosov. In 2012 he successfully defended his PhD thesis "Development of the plan view pattern automatic control system of drives of hot plate mill", which deals with contemporary problems of industrial engineering. Then he quitted the industrial plant and started working in Magnitogorsk State Technical University on a full time as Associate Professor of department of automated electric drive and mechatronics. Thanks to the professionalism and personal achievement, he was invited to South Ural State University (National Research University) as an Associate Professor of department of Theoretical Foundations of Electrical Engineering in 2013. In a year he founded new Department of Mechatronics in this university and became the head of it. He has an experience of Guest Professor, The National University of Science and Technology MISiS, Moscow invited him to do lecturing of special courses of electrical and industrial engineering. He is an author of 40 scientific publications, including 3 books and 18 scientific and research-and-production reports. He takes part in Organizing Committee of International Conference of Industrial Engineering 2015 and Editorial board of Russian Internet Journal of Electrical Engineering.

**Abstract:** It is noted that when extending the range of products made by plate rolling mills, it becomes relevant to improve the algorithms of the automatic parameters control systems. We hereby present a structure that explains the SMS Demag AG concept of automatic control over stand roll gauge and gaps. This concept is implemented in the automatic gauge control system (AGCS) of Mill 5000, Magnitogorsk Iron and Steel Works. We describe the drawbacks of the AGCS that manifest when rolling <10 mm plates. The most serious drawback is the tear of metal pieces from the trailing edge, which is caused by the inappropriate functioning of the gauge assignment and adjustment system. We present the structural diagram of the gauge calculation system. We also describe the functions of a system for dynamic compensation of disturbances. We provide rationale for excluding the roll counter-bending and deformation correction signals. The paper proposes a method to control hydraulic screwdowns, which is essentially about a quick increase in the inter-roll gap at the workpiece "trailing edge" during the last pass, which must be done when rolling thin plates. We analyze the oscillograms of signals describing the gauge interference when the

# Conference Schedule

Day 1, Monday, January 21, 2019		
10:00-16:00	Arrival Registration at the Hall on the ground floor Venue: Chamchhuri 10 Building, Chulalongkorn University	
Day 2, Tuesday, January 22, 2019 Keynote Speeches & Authors' Presentations Host: Prof. Po-Liang Liu, National Chung-Hsing University, Taiwan		
09:00-09:05 <Room 701>		<b>Welcome Remarks</b> Assoc. Prof. Ratchatin Chanchaoren, Chulalongkorn University, Thailand
09:05-09:10 <Room 701>		<b>Opening Remarks</b> Prof. Naoyuki Ishimura, Chuo University, Japan
09:10-09:50 <Room 701>		<b>Keynote Speech</b> <i>Speech Title: Fatigue properties of severely-deformed light weight alloys</i> Prof. Yoshihiko Uematsu, Gifu University, Japan
09:50-10:30 <Room 701>		<b>Keynote Speech</b> <i>Speech Title: A Digital Discrete Fabrication and Digital Fabrication Ecosystem at Chulalongkorn university.</i> Assoc. Prof. Ratchatin Chanchaoren, Chulalongkorn University, Thailand
10:30-10:50	<b>Group Photo and Coffee Break</b>	
10:50-11:30 <Room 701>		<b>Keynote Speech</b> <i>Speech Title: Evolution of copulas in discrete and continuous processes</i>

## Conference Schedule

11:30-12:10 <Room 701>		<p><b>Keynote Speech</b></p> <p><i>Speech Title: Can two weak competitors wipe out a strong competitor in a 3-species competition system?</i></p> <p>Prof. Jong-Shenq Guo, Tamkang University, Taiwan</p>
12:10-13:30	<p><b>Lunch</b></p> <p>Venue: Sasa Cuisine main dining room, Sasa International House</p>	
13:30-14:00 <Room 701>		<p><b>Plenary Speech</b></p> <p><i>Speech Title: Improving the mechatronic system for automatic control of the reversing stands of mill 5000</i></p> <p>Assoc. Prof. Vadim Rashitovich Gasiyarov, South Ural State University (National Research University), Russia</p>
<b>Afternoon Parallel Sessions</b>		
14:00-16:00 <Room 701>	<p><b>Parallel Session 1 [ Material analysis and preparation ]</b></p> <p>Presentation Papers: M0040, M0026, M1017, M1041, M1043, M2006-A, M0705, M1034</p>	
14:00-16:00 <Room 702>	<p><b>Parallel Session 2 [ Machinery and manufacturing engineering ]</b></p> <p>Presentation Papers: M1038, M1012, M1044, M1007-A, M1047, M1029, M1013-A, M1048</p>	
14:00-16:00 <Room 802>	<p><b>Parallel Session 3 [ Fluorescent materials and biological materials ]</b></p> <p>Presentation Papers: M1025, M0063-A, M1021, M0055-A, M1009, M0056-A, M1019, M1020</p>	
14:00-16:00 <Room 803>	<p><b>Parallel Session 4 [ Mechatronics and Control Engineering ]</b></p> <p>Presentation Papers: M1053, M0095, M1011, M1016, M1031, M0075, M0092, M0905-A</p>	
16:00-16:15	<p><b>Coffee Break (Outside Room 701)</b></p>	
16:15-18:30	<p><b>Parallel Session 5 [ Metal materials and alloys ]</b></p> <p>Presentation Papers: M1026, M1027, M1018, M1015, M1014, M1010, M1008, M1004, M1003, M1001, M0904, M0903, M0902, M0901, M0802, M0801, M0800, M0704, M0702, M0701, M0603, M0601, M0503, M0502, M0501, M0404, M0403, M0402, M0401, M0303, M0302, M0301, M0203, M0202, M0201, M0103, M0102, M0101, M0007, M0006, M0005, M0004, M0003, M0002, M0001</p>	

## Conference Schedule

16:15-18:30 <Room 702>	<p><b>Parallel Session 6 [ Applied Mathematics and Computational Modeling ]</b></p> <p>Presentation Papers: M0038, M0008-A, M0071, M0073-A, M0066, M0042, M0025, M0081, M0053</p>
16:15-18:30 <Room 802>	<p><b>Parallel Session 7 [ Quantum Physics and Astrophysics ]</b></p> <p>Presentation Papers: M0041, M0033, M0707-A, M0078, M0019, M0024-A, M0034, M0039-A, M0010</p>
16:15-18:30 <Room 803>	<p><b>Parallel Session 8 [ Computer and information technology ]</b></p> <p>Presentation Papers: M0018, M0043, M0060, M0052, M0046, M0069, M0098-A, M0011, M1046</p>
From 19:00	<p><b>Dinner</b></p> <p>Venue: Sasa Cuisine main dining room, Sasa International House</p>
<p><b>Day 3, Wednesday, January 23, 2019</b></p> <p><b>One Day Tour</b></p> <p>Gather at the Chamchhuri 10 Building by 6:50 AM</p>	

Abstract: Sunspot number, solar radio flux and solar wind involve in interpreting the movements of CMEs and solar flare. Rotating sunspots are an extremely efficient way to inject energy into the magnetic field of the sun's atmosphere. A solar flare is essentially a blast on the surface of the sun going from minutes to hours long. Therefore, the objective of this study is to state that the active region sunspot waves as a trigger solar flare. Equally important, the energy efficiency associated with solar flares may take several hours or even days to build up, but most flares take only a matter of minutes to release their energy. Detailed analyzed of solar flare event on 2016 and 2017 based on e-CALLISTO, the higher the number of active region sunspots, the higher the class of flares produced and released. Four classes of solar are observed in categories of frequency, interplanetary magnetic field and sunspot number emitted by the solar. By using the interplanetary magnetic field data, the magnetic energy contained in the active region sunspots has been calculated which this magnetic energy triggered the emission of solar flare. This study exposed us to analyze the active region waves as a trigger of solar flares and also the factor influenced by it. The physical element that triggers the solar flare by measuring the magnetic energy in the flaring site.

**Topic: Computer and information technology**

**Session Chair: Prof. SAMIR B. HADID, Ajman University, UAE**

**Time: 16:15-18:30**

**[Room: 803]**

<p><b>M0018</b> <b>16:15-16:30</b></p>	<p>Title: NEW METHOD OF HUMAN BRAIN SEGMENTATION UTILIZING A CLASS OF POWER SERIES SOLUTIONS OF FRACTIONAL DIFFERENTIAL Authors: SAMIR B. HADID, RABHA W. IBRAHIM &amp; NORSHALIZA KAMARUDDIN Presenter: SAMIR B. HADID, Ajman University, UAE</p> <p>Abstract: A biological dynamic system is very useful in engineering possessions such as control systems, signal processing, and bio-molecular communication networks. On the other hand, fractional differential equations are one of the main subjects that are used to solve problems in biological dynamic systems. In the current paper, we investigate a new class of fractional dynamical systems of brain segmentation. The application shows the improvement of segmentation of a class of brain images.</p>
<p><b>M0043</b> <b>16:30-16:45</b></p>	<p>Title: Image Feature Extraction Method to Analyze Soft-Mode Turbulence Fluctuation in Nematic Liquid Crystal Authors: Risti Suryantari, Yusril Yusuf, and Flaviana Presenter: Risti Suryantari, Department of Physics, Parahyangan Catholic University, Indonesia</p> <p>Abstract: An electroconvective pattern called soft-mode turbulence (SMT) of homeotropic alignment in MBBA (4'-Methoxy-benzylidene-4-butyl-aniline) nematic liquid crystal appears when an external electric field with a certain frequency applied on the nematic liquid crystal sample at a threshold voltage (VSMT). The threshold voltage will increase with increasing of frequency. SMT fluctuation occurs when VSMT continues to increase at the same frequency. This phenomenon can be analyzed by applying an image processing technique. Based on image feature extraction method, inhomogeneous of SMT patterns can be observed through contrast, correlation, energy, homogeneity, and entropy parameters. Those parameters represent a result in accordance with the image visualization. Significant changes in the value of contrast, energy, homogeneity, and entropy parameters occur at <math>V &gt; VSMT</math> which fluctuation begin. In this experiment the fluctuation begin at <math>V = 27.3</math> V.</p>
<p><b>M0060</b> <b>16:45-17:00</b></p>	<p>Title: Optimization of pathology diagnosis by applying chaos theory and fractal analysis to EEG-signal processing Authors: Vasily Kornilov, Maxim Ostroukhov and Andrey Dmitriev Presenter: Vasily Kornilov, National Research University Higher School of</p>