CONFERENCE ABSTRACT

2024 14th International Conference on Biomedical Engineering and Technology (ICBET 2024)

June 14-17, 2024 | Seoul, South Korea

Global Center, College of Medicine, Seoul National University

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Welcome Letter

Dear distinguished participants,

Welcome to the 2024 14th International Conference on Biomedical Engineering and Technology (ICBET 2024)! We are thrilled to have you join us for this event, which will take place from June 14-17, 2024, in Seoul, South Korea.

The main objective is to create an effective platform for researchers and technical experts to share recent ideas, innovations and problem-solving techniques in the vast areas of Biomedical Engineering and Technology. Our conference offers an opportunity for you to engage in meaningful face-to-face discussions, foster new research and business relationships, and identify potential global partners for future collaborations.

With immense joy, the overwhelming response received from all over the world, with over 120 submissions showcasing the latest advancements in biomedical engineering and technology. This enthusiastic participation underscores the significance of our collective efforts in advancing research and innovation in this critical field.

Hopes that the outcomes of this conference will make a significant contribution to the advancement of knowledge in these dynamic and ever-evolving fields. We look forward to sharing idea and forging lasting connections. Together, we will drive progress and innovation.

Once again, welcome to the conference ICBET 2024, and we wish you a productive and memorable conference experience.

Conference Chair
Prof. Tae-Seong Kim
Kyung Hee University, South Korea

▪ Conference Venue

Global Center, College of Medicine, Seoul National University
Address: 71 Ewhajang-gil, Jongno-gu, Seoul
Website: https://medicine.snu.ac.kr/en/

Seoul National University's Yeongeon Campus is home to the College of Medicine and the College of Dentistry. The College of Medicine boasts over 520 professors who excel in international academic activities and are dedicated to student education. Combined with the undergraduate program and graduate students, there are over 2,000 outstanding students who are committed to their studies as medical professionals and scientists responsible for life sciences. Seoul National University College of Medicine (SNUCM) Global Center (71 Ewhajang-gil, Jongno-gu, Seoul) is located near the Yeongeon Campus, within the premises of Korea National Open University. It houses various event venues and conference rooms, including the Lee Jong-wook Global Education Center. The Yeongeon Campus and the Global Center are situated in Daehak-ro, a famous youthful street in Jongno, and are also close to Dongdaemun Tourism Complex. Additionally, there are nearby attractions such as Changgyeonggung Palace, Gyeongbokgung Palace, Insadong, and Ikseondong, which are popular destinations for domestic and international travelers.

Maps: https://maps.app.goo.gl/D9rxK1pyTsmkbF7s7

Recommended Hotels

- MayPlace Hotel
- Nine Tree Hotel Donddaemun
- Ramada By Wyndham Seoul Dongdaemun
- Orakai Daehakro Hotel

Note: The registration fee does not cover the accommodation. Please do not share your personal credit card information with unrelated persons.

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Assoc. Prof. Lam Kam Yiu, City University of Hong Kong, Hong Kong
Assoc. Prof. Khye Er Loh, Tunku Abdul Rahman University Management and Technology, Malaysia
Assoc. Prof. Guanghui (Richard) Wang, Toronto Metropolitan University, Canada
Assist. Prof. Pongphan Leelatien, Thammasat University, Thailand
Assoc. Prof. Marwan El Rich, Khalifa University, UAE
Prof. Wenqiao (Wayne) Yuan, North Carolina State University, USA

Presentation Guidelines

Presentation Requirement

- At least one author should present for each abstract/full paper during the session.

Tips for Presentation

- English is the official language.
- Get your presentation PPT/Slides prepared.
- Keynote Speech: about 40 minutes of presentation and 5 minutes of Q&A.
- Invited Speech: about 20 minutes of presentation and 5 minutes of Q&A.
- Oral Presentation: about 12 minutes of presentation and 3 minutes of Q&A.
- One Best Oral Presentation will be selected from each session and announced at the end of the session.

Onsite Presentation Instructions

- Devices Provided by the Conference Organizer
- Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader). (b) Digital Projectors and Screen. (c) Laser Pointer. (d) Materials Provided by the Presenters: PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)
- Instructions for Poster Presentation

  Materials Provided by the Conference Organizer: The place to put posters. Materials Provided by the Presenters: (a) Home-Made Posters: Submit the poster to the staff when signing in. (b) Maximum poster size is A1. (c) Load Capacity: Holds up to 0.5 kg.
- Conference Material

  All presented papers will be issued with hard copy of conference materials: Receipt/Invoice, Participation and presentation certificate, Conference program book, etc.
- Dress Code

  Please wear formal clothes or national representative of clothing.

Personal Insurance

- Along with your registration, you will receive your name badge, which must be worn when attending all conference sessions and activities. Participants without a badge will not be allowed to enter the conference venue.
- For your safety, please do not lend your name badge to the persons who are not involved in the conference and bring the unregistered persons into the conference venue.
- The conference organizers cannot accept liability for personal injuries, or for loss or damage of property spacing to conference participants, either during, or as a result of the conference. Please check the validity of your own insurance.

Online Presentation Instruction

- Equipment Needed:

  A computer with an internet connection (wired connection recommended). (b) USB plug-in headset with a microphone (recommended for optimal audio quality). (c) Webcam (optional): built-in or USB plug-in. (d) Please set up your laptop time in advance.

- Download the ZOOM:

  https://zoom.us/download;

  https://www.zoom.com.cn/download.

- Learn the ZOOM skills:

  https://support.zoom.us/hc/en-us/articles/201362033-Getting-Started-on-Windows-and-Mac

- How to use ZOOM:

  Set the language. (b) Test computer or device audio. (c) Join a meeting: Join the meeting with the "meeting ID" provided in the program, tap the name as "paper ID+name", eg.: "SE0001-XX", then click "Join". (d) Get familiar with the basic functions: Rename, Chat, Raise Hands, Start Video, Share Computer Sound and Share Screen, etc.

- Environment Requirement:

  Quiet Location. (b) Stable Internet Connection. (c) Proper Lighting.

- Test Session:

  On June 14, there is a test session for online presenters. On that day, all the above functions will be taught including how to use ZOOM. If you don't know how to use, please do not worry. However, please do download ZOOM and log in the meeting room in advance, then, you can join the conference.

- Voice Control Rules during the Presentation:

  The host will mute all participants while entering the meeting. (b) The host will unmute the speakers' microphone when it is turn for his or her presentation. (c) Q&A goes after each speaker, the participant can raise hand for questions, the host will unmute the questioner. (d) After Q&A, the host will mute all participants and welcome next speaker.

- Conference Material:

  All presented papers will be issued with soft copy of conference materials: Receipt/Invoice, Participation and presentation certificate, etc.

- Notes:

  Log in the meeting room 15 minutes ahead of the session. (b) Learn the zoom skills. (c) Your punctual arrival and active involvement in each session will be highly appreciated. (d) The conference will be recorded; we will appreciate your proper behavior.

Contact Us

- Contact us by email: icbet@cbees.org or WeChat for any inquiries.

Agenda Overview

Day 1, June 14, 2024, Friday (GMT+9)

Duration	Event	Venue
10:00-17:00	Arrival Registration & Conference Material Collection	Room 105 (1F)
Note: the arrival registration can be done on June 15, 2024.		
Duration	**Event**	**Venue**
10:00-12:00	**Online Test**: SE0073, SE0001, SE0078, SE0082, SE0083, SE1004, SE0081, SE2020, SE2003-A, SE0087, SE0084	**Meeting ID:** 889 8613 8982, **Link:** https:// zoom.us/j/88986138982

Day 2, June 15, 2024, Saturday (GMT+9)

Duration	Event	Venue
09:00-09:10	**Opening Remarks** Prof. Tae-Seong Kim, Kyung Hee University, South Korea	Room 101 (1F)
09:10-09:55	**Keynote Speaker I** Prof. Irene Yu-Hua Gu, Chalmers University of Technology, Sweden Speech Title: "Federated Deep Learning and its Application to Brain Cancer Molecular Subtype Prediction from MRIs "	
09:55-10:20	**Group Photo & Coffee Break**	
10:20-11:05	**Keynote Speaker II** Prof. Stephen Kwok-Wing Tsui, The Chinese University of Hong Kong, Hong Kong Speech Title: "Genomics Study Reveals Insights into the Divergent Evolution and Comprehensive Allergen Profiles of Astigmatic Mites"	Room 101 (1F)
11:05-11:30	**Invited Speaker I** Assoc. Prof. Md. Altaf-Ul-Amin, NARA Institute of Science and Technology, Japan Speech Title: "Computational Approaches to Predict Natural Antibiotics based on Traditional Herbal Medicines"	
11: 30-11:55	**Invited Speaker II** Assoc. Prof. Guanghui (Richard) Wang, Toronto Metropolitan University, Canada Speech Title: "Polyp Segmentation from Colonoscopy Images Using Enhanced Neural Networks"	

11:55-12:20	**Invited Speaker III** Prof. Dilek Çökeliler Serdaroğlu, Başkent University, Turkey Speech Title: "Glow Discharge Plasma Technology for Biomedical Applications and Integration Design of Experiment Model for In-Vitro and In-Vivo Test"	Room 101 (1F)
12:20-13:20	**Lunch---Venue: Room 101 (1F) &Room 105 (1F)**	

Duration	**Venue: Room 101 (1F)**	**Venue: Room 105 (1F)**
13:20-13:45	**Invited Speaker IV** Assoc. Prof. Giovanni Pappalettera, Polytechnic University of Bari, Italy Speech Title: "Effects of OUT (Onco-Ultrasound-Tripsy) in-vitro Treatment on Cancer and Healthy Cells: Application to U937 Human Histiocytic Lymphoma Cells"	**Invited Speaker V** Prof. Wenqiao (Wayne) Yuan, North Carolina State University, USA Speech Title: "Biochar and its Potential Biomedical Applications"
13:45-15:45	**Oral Session 1-Biomedical Signal Analysis and Processing** SE0002, SE0070, SE0079, SE0092, SE0080, SE0055, SE0042, SE0071	**Oral Session 2- Medical Imaging and Biomedical Image Processing** SE1003, SE0009, SE0014, SE0020, SE0066-A, SE0022, SE0023, SE0007
15:45-16:00	**Coffee Break**	
Duration	**Venue: Room 101 (1F)**	**Venue: Room 105 (1F)**
16:00-16:25	**Invited Speaker VI** Assoc. Prof. Anita Sukmawati, Universitas Muhammadiyah Surakarta, Indonesia Speech Title: "Formulation and Stability Evaluation of Gels Containing Chitosan Microparticle Loaded Beetroot (Beta Vulgaris, Linn) for Topical Skin Brightening"	**Invited Speaker VII** Assoc. Prof. Muhammad Ijaz, Qilu Institute of Technology, China Speech Title: "Screening of Active Ingredients from Wendan Decoction in Alleviating Palmitic Acid-Induced Endothelial Cell Injury"
16:25-18:10	**Oral Session 3- Medicinal Plants and Bioactivity of Natural Products** SE2004-A, SE2006-A, SE2011-A, SE2012-A, SE2029, SE2030, SE2021	**Oral Session 4- Biosensors and Virtual Simulation Technology in Healthcare** SE0004-A, SE0032, SE0094, SE1007, SE0024, SE0077, SE0067
18:20-20:30	**Dinner Banquet---Venue: Ashley Queens**	

Poster Session- Room 101 (1F) &Room 105 (1F)	
15:00-17:00	**Poster Session- Bioinformatics, Intelligent Medical Technology, and Pharmacy** SE0012-A, SE0089-A, SE0031-A, SE0034-A, SE0060-A, SE0028-A, SE2017-A, SE2005-A, SE2014, SE2008-A

Day 3, June 16, 2024, Sunday (GMT+9)

Duration	Event	Venue
09:00-09:45	**Keynote Speaker III** Prof. Nagendra Kaushik, Kwangwoon University, South Korea Speech Title: "Plasma-Generated Nitric Oxide Water for Bio-medical Applications"	Room 101 (1F)
09:45-10:00	**Coffee Break**	

Duration	Venue: Room 101	Venue: Room 105
10:00-11:45	**Oral Session 5- Bioinformatics and Prediction Models for Disease Dagnosis** SE0003, SE0019, SE0005, SE0018, SE0013, SE0017, SE0027-A	**Oral Session 6- Applied Pharmacy and Biomedical Research** SE3004-A, SE0065, SE0095-A, SE3002-A, SE2031, SE0006, SE2016

	Online Session **Meeting ID**: 889 8613 8982, **Link:** https:// zoom.us/j/88986138982
13:30-16:15	**Online Session- Computational Biology and Application of Intelligent Healthcare Technology** SE0073, SE0001, SE0078, SE0082, SE0083, SE1004, SE0081, SE2020, SE2003-A, SE0087, SE0084

Tips:

Please arrive at the Conference Room or log in the ZOOM Room 15 minutes ahead of the session. The duration for Keynote Speech: about 40 minutes of presentation and 5 minutes of Q&A. The duration for Invited Speech: about 20 minutes of presentation and 5 minutes of Q&A. The duration for Regular Presentation: about 12 minutes of presentation and 3 minutes of Q&A.

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Opening Remarks

09:00-09:10, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Prof. Tae-Seong Kim

Kyung Hee University, South Korea

Biography

Tae-Seong Kim received the B.S. degree in Biomedical Engineering from the University of Southern California (USC) in 1991, M.S. degrees in Biomedical and Electrical Engineering from USC in 1993 and 1998 respectively, and Ph.D. in Biomedical Engineering from USC in 1999. After his postdoctoral work in Cognitive Sciences at the University of California at Irvine in 2000, he joined the Alfred E. Mann Institute for Biomedical Engineering and Dept. of Biomedical Engineering at USC as Research Scientist and Research Assistant Professor. In 2004, he moved to Kyung Hee University in Republic of Korea where he is currently Professor in the Department of Biomedical Engineering. His research interests have spanned various areas of biomedical imaging, bioelectromagnetism, neural engineering, and assistive lifecare technologies. Dr. Kim has been developing novel methodologies in the fields of signal and image processing, machine learning, pattern classification, and artificial intelligence. Lately Dr. Kim has started novel projects in the developments of smart robotics and machine vision with deep learning methodologies. Dr. Kim has published more than 400 papers and twelve international book chapters. He holds ten international and domestic patents and has received numerous best paper awards.

Keynote Speaker I

09:10-09:55, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Prof. Irene Yu-Hua Gu

Chalmers University of Technology, Sweden

Speech Info.

Speech Title: Federated Deep Learning and its Application to Brain Cancer Molecular Subtype Prediction from MRIs

Abstract: One of the most common types of brain cancer is glioma. Identification of glioma subtypes is essential for clinicians to decide treatment strategies. If MRI brain scans show tumors, biopsies are usually followed. Previous studies show that deep learning-based classifiers are promising for predicting glioma subtypes from MRI scans of new patients without using biopsies. These classifiers are formed by deep networks trained by MRI datasets with tumor subtypes as annotations. Many challenges remain for such classifiers on achieving high performance useful to clinical applications. Apart from requiring large MRI training datasets or combining multiple small MRI datasets, data protection and privacy from different hospitals/regions/countries pose heavy constrains on sharing training datasets. Federated learning offers the possibility that each hospital can hold its own training dataset without sharing, while still obtain a local classifier with nearly the same performance as that of a centrally trained classifier by using all datasets. In this talk, we first review several federated deep learning approaches, followed by dedicated federated learning for glioma classification especially for glioma subtypes. We show results that federated learned classifiers may achieve almost similar performance as that of centrally learned classifiers. This is encouraging for further AI/DL research towards clinical applications.

Biography

Dr. Irene Yu-Hua Gu received Ph.D. degree in electrical engineering from Eindhoven University of Technology, Eindhoven, The Netherlands, in 1992. From 1992 to 1996, she was Research Fellow at Philips Research Institute IPO, Eindhoven, The Netherlands, post dr. at Staffordshire University, Staffordshire, U.K., and Lecturer at the University of Birmingham, Birmingham, U.K. Since 1996, she has been with the Department of Electrical Engineering (previous name: Department of Signals and Systems), Chalmers University of Technology, Gothenburg, Sweden, where she has been a Professor since 2004. Her research interests include statistical image and video processing, video object tracking and recognition, machine learning and deep learning, and signal processing with applications. During the last several years her main research has been focused on biomedical image analysis and deep learning. Dr. Gu was an Associate Editor for IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans, and Part B: Cybernetics from 2000 to 2005, and Associate Editor for EURASIP Journal on Advances in Signal Processing from 2005 to 2016, Editorial Board of the Journal of Ambient Intelligence and Smart Environments from 2011 to 2019. She is a Senior Area Editor for IEEE Signal Processing Letters since 2021. She was elected as the Chair of the IEEE Swedish Signal Processing Chapter from 2001 to 2004. She is a senior member of IEEE. She has coauthored over 200 papers, and has been ranked as the top 50 scientists in the field of Computer Science and Electronics in Sweden in the 6th Edition of 2020 ranking by Guide2Research team.

Keynote Speaker II

10:20-11:05, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Prof. Stephen Kwok-Wing Tsui

The Chinese University of Hong Kong, Hong Kong

Speech Info.

Speech Title: Genomics Study Reveals Insights into the Divergent Evolution and Comprehensive Allergen Profiles of Astigmatic Mites

Abstract: Highly diversified astigmatic mites comprise many medically important human household pests such as house dust mites causing ~ 1-2% of all allergic diseases globally. However, their evolutionary origin and diverse lifestyles have not been illustrated at the genomic level, which hampers allergy prevention and our exploration of these household pests. Using six high-quality assembled and annotated genomes, this study thoroughly explored the divergence of Acariformes and the diversification of astigmatic mites. Within astigmatic mites, a wide range of gene families rapidly expanded via tandem gene duplications. Gene diversification after tandem duplications provides many genetic resources for adaptation to sensing environmental signals, digestion, and detoxification in rapidly changing household environments. Throughout the evolution of Acariformes, massive horizontal gene transfer events occurred in gene families enable detoxification and digestive functions and provide perfect drug targets for pest control. This genomics study sheds light on the divergent evolution and quick adaptation to human household environments of astigmatic mites and provides insights into the genetic adaptations and even control of human household pests. Moreover, in this talk an innovative and efficient way to unveil the comprehensive allergen profiles of astigmatic mites will be described.

Biography

Stephen Kwok-Wing Tsui is currently a Professor and the Associate Director (Research) in the School of Biomedical Sciences. He is also the Director of Hong Kong Bioinformatics Centre in the Chinese University of Hong Kong (CUHK). In 1995, he received his PhD degree in Biochemistry at CUHK. He was then appointed as an Assistant Professor in the Biochemistry Department in 1997 and promoted to the professorship in 2004. He was also a former member of the International HapMap Consortium and worked on the single nucleotide polymorphisms of human chromosome 3p. During the SARS outbreak in 2003, his team was one of the earliest teams that cracked the complete genome of the SARS-coronavirus and facilitated the emergence of real-time PCR assay for the virus. Totally, he has published more than 240 scientific papers in international journals, including Nature, Nature Machine Intelligence, New England Journal of Medicine, Lancet, PNAS, Nucleic Acids Research, Genome Biology and Bioinformatics. His h-index is 58 and the citations of his publications are over 20,000. His major research interests are next generation sequencing, bioinformatics and metagenomics in human diseases.

Keynote Speaker III

09:00-09:45, June 16, 2024, Sunday (GMT+9)

Venue: Room 101 (1F)

Prof. Nagendra Kaushik

Kwangwoon University, South Korea

Speech Info.

Speech Title: Plasma-Generated Nitric Oxide Water for Bio-medical Applications

Abstract: This presentation elucidates the research behind nonthermal gas plasma techniques for decontamination, microbial inactivation, viral sterilization, and environmental protection. Aimed at creating a pathogen-free world, the focus is on industrial interventions to neutralize contaminants in soil, water, and air. Our laboratory investigates plasma-generated nitric oxide water and eco-friendly plasma-based nanomaterial synthesis, examining their biomedical applications. We introduce an innovative method using plasma-generated nitric oxide water for inactivating pathogens, including viruses and bacteria. This technique promotes sustainable agriculture and eco-friendly metal nanoparticle synthesis. Additionally, we explore its use in cosmetics and aesthetics, such as anti-aging treatments. These methods are cost-effective, environmentally responsible, and sustainable, making them viable for biological, environmental, and nanobiotechnological applications, with potential therapeutic and industrial uses. In summary, research into plasma-based, environmentally friendly methods shows promise for advancements in agriculture, bioscience, nanotechnology, and environmental sciences, highlighting their potential as sustainable and effective solutions for various applications.

Biography

Prof. Nagendra Kaushik is working at the Department of Electrical and Biological Physics & Plasma Bioscience Research Center at Kwangwoon University, Seoul (South Korea) since 2011. His research work is primarily focused on plasma bioscience & medicine, plasma agriculture, plasma environment, cancer biology & immuno-modulations, plasma chemistry, nanobiotechnology, and biomaterials. He has published more than 150 high impact publications, including many in top-ranked journals such as Biomaterials (impact factor 15.6), Cancer Research (impact factor13.3), Journal of Advanced Research (impact factor 12.4), Green Chemistry (impact factor 11.3), Materials Today Bio (impact factor 10.7), Science of The Total Environment (impact factor 10.75) and Journal of Nanobiotechnology (impact factor 11.5) and Bioactive Materials (impact factor 17.3) and applied several product and process patents. His H-index is 34 and the I10 index is 74 with a total citation of around 5000. Prof. Nagendra is serving as the editor of more than 20 journals including Scientific Report, PloS One, IEEE Journals, Frontiers journals, and many others. He is also listed in World's Top 2% Scientists by Stanford University and Elsevier continuously since 2020.

Invited Speaker I

11:05-11:30, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Assoc. Prof. Md. Altaf-Ul-Amin

NARA Institute of Science and Technology, Japan

Speech Info.

Speech Title: Computational Approaches to Predict Natural Antibiotics based on Traditional Herbal Medicines

Abstract: Antibiotic resistance is a major public health threat and there is an urgent need for new antibiotics. Traditional herbal medicine systems, such as Jamu, Unani, and Traditional Chinese Medicine, have been used for centuries to treat bacterial infections. Machine learning methods have been shown to be effective for predicting potential natural antibiotic candidates based on traditional herbal medicine systems. In this study, we used machine learning methods to predict potential natural antibiotic candidates at plant and metabolite levels. We evaluated different machine learning algorithms and preprocessing techniques to obtain the best prediction accuracy. For Jamu, we achieved an accuracy of 91.10% using the Random Forest model. For Unani, we achieved an accuracy of 83% using a multilayer perceptron model with SMOTE preprocessing. In total, we predicted 42 potential plant candidates and 201 candidate metabolites as potential natural antibiotics. Many of these candidates have been validated based on published literature mentioning their antibacterial properties. Some others are structurally similar to known antibiotics. Our findings suggest that machine learning methods can be used to effectively predict potential natural antibiotic candidates utilizing traditional herbal medicines. This approach has the potential to accelerate the development of new antibiotics to combat antibiotic-resistant pathogens.

Biography

Md. Altaf-Ul-Amin received B.Sc. degree in Electrical and Electronic Engineering from Bangladesh University of Engineering and Technology (BUET), Dhaka, M.Sc. degree in Electrical, Electronic and Systems Engineering from Universiti Kebangsaan Malaysia (UKM) and PhD degree from Nara Institute of Science and Technology (NAIST), Japan. He received the best student paper award in the IEEE 10th Asian Test Symposium. Also, he received two other best paper awards as a co-author of journal articles. He previously worked in several universities in Bangladesh, Malaysia and Japan. Currently he is working as an associate professor in Computational Systems Biology Lab of NAIST. He is conducting research on Network Biology, Systems Biology, Cheminformatics and Biological Databases. He published around 90 peer reviewed papers in international journals and conference proceedings. Current google scholar citation index of his publications is more than 7900.

Invited Speaker II

11:30-11:55, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Assoc. Prof. Guanghui (Richard) Wang

Toronto Metropolitan University, Canada

Speech Info.

Speech Title: Polyp Segmentation from Colonoscopy Images Using Enhanced Neural Networks

Abstract: Colonoscopy is a crucial procedure for detecting colorectal polyps, which stand as the primary precursors to colorectal cancer. However, accurately segmenting polyps presents a significant challenge due to their diverse shapes, sizes, colors, and texture variations. To address these challenges and enhance polyp segmentation performance, we propose two enhanced neural network structures. The first network enhances semantic information through a novel Semantic Feature Enhancement Module (SFEM) and an Adaptive Global Context Module (AGCM). By integrating these modules, we progressively refine feature quality across layers, thereby enhancing the final feature representation. The second network introduces a novel Fuzzy Attention module, designed to prioritize difficult pixels, particularly those near the boundaries that pose a greater challenge for prediction. This attention module can be seamlessly incorporated into any backbone network. We evaluated its efficacy with three backbone networks: Res2Net, ConvNext, and Pyramid Vision Transformer. Our proposed approaches are rigorously evaluated across five colonoscopy datasets, showcasing superior performance compared to other state-of-the-art models.

Biography

Guanghui (Richard) Wang received the Ph.D. degree in engineering from the University of Waterloo, Waterloo, ON, Canada, in 2014. He is currently an Associate Professor with the Department of Computer Science, Toronto Metropolitan University (TMU), Toronto, ON. He is also the director of the Computer Vision and Intelligent Systems Laboratory at TMU. From 2014 to 2020, he was an Assistant Professor and then an Associate Professor in the Department of Electrical Engineering and Computer Science at the University of Kansas (KU), Lawrence, KS, USA. He has authored one book “Guide to Three Dimensional Structure and Motion Factorization”, published by Springer-Verlag. He has authored or co-authored more than 180 papers in peer-reviewed journals and conferences. His research interests include computer vision, image analysis, machine learning, and intelligent systems.

Invited Speaker III

11:55-12:20, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Prof. Dilek Çökeliler Serdaroğlu

Başkent University, Turkey

Speech Info.

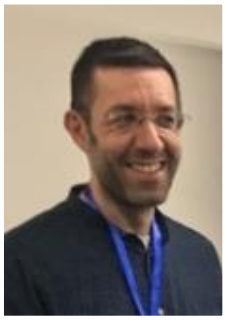
Speech Title: Glow Discharge Plasma Technology for Biomedical Applications and Integration Design of Experiment Model for In-Vitro and In-Vivo Test

Abstract: This presentation evaluates the performance of a focused plasma-based surgical prototype device for use in spine discectomy surgery, including identifying active device operating conditions through engineering models and in-vitro tests. It also discusses experiences related to antibacterial efficacy, creating an appropriate in-vivo wound model, and evaluating the healing process to demonstrate the effect of plasma irradiation on anastomosis. Plasma is a partially ionized gas mixture with highly reactive ions and electrons, neutral atoms, electric fields, reactive molecules, induced species, and UV radiation resulting from exposing a substance to solid energy in the gas direct plasma discharge application to living cells, bacteria, or tissues, studied for its potential in disinfection, healing, and cancer treatment. The design of the experiment analysis is crucial in engineering, improving production processes and optimization, and revealing changes in output due to input variable changes. Experimental design methods are used to understand factors like plasma charge neutralization, observe optimal factor combinations, show statistical significance, and determine successful factor levels. This presentation includes in-vitro and in-vivo experiences, using a complete factorial experimental design in plasma-based device development.

Biography

Dilek Çökeliler Serdaroğlu is a professor and chair in the Department of Biomedical Engineering at Baskent University, Ankara, Turkey (Accredited by MUDEK). Dr. Çökeliler received his Ph.D. from Hacettepe University, Ankara, Turkey including one year international doctoral training experience study entitled “plasma aided immunosensor fabrication” in Charles University, Macromolecular Physics Department in Czech Republic. Moreover, she won “Post Gradual Study Support” Funded by The Ministry of Education of Czech Republic, at the Department of Physics, J.E. Purkyne University. She was post doctoral researcher in the Biological Systems Engineering Department, University of Wisconsin Madison, USA. Now, her research and teaching activities at Başkent University have emphasized on both various aspects of plasma surface modifications of biomaterials and nanofiber production with electrospinning technique / nanomaterial-based mass sensitive sensors. She is the recipient of several international patent awards (number: +8) including the L’ORÉAL Awards for Women in Science in 2009 In addition, she is a regular lecturer in the Intensive Summer Course: Biomedical Engineering in an International Perspective in Jade Hochschule Wilhelmshaven, Applied Engineering Science Department, Germany for 15 years.

Invited Speaker IV



13:20-13:45, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Assoc. Prof. Giovanni Pappalettera

Polytechnic University of Bari, Italy

Speech Info.

Speech Title: Effects of OUT (Onco-Ultrasound-Tripsy) in-vitro Treatment on Cancer and Healthy Cells: Application to U937 Human Histiocytic Lymphoma Cells

Abstract: In recent years, research has made many progresses in understanding and treating cancer. Different types of tumours can now be treated successfully, allowing a long-life expectancy after the disease. However, the interest towards alternative clinical approaches is alive and one of the current challenges consists in identifying treatments able to act selectively on tumour, without harming the surrounding environment. Several studies have highlighted the ability of low-intensity ultrasound to selectively damage tumour cells, based on the different mechanical properties that they present compared to healthy cells. In this study, we analyzed the ability of ultrasound to damage U937 Human Histiocytic Lymphoma cells, without altering the viability of the corresponding healthy Human CD14+ Monocytes cells, used as control. Different sonication parameters were tested, to identify the conditions that allow the best results in terms of selective death of U937 cancer cells to be achieved. Informativa Privacy - Ai sensi del Regolamento (UE) 2016/679 si precisa che le informazioni contenute in questo messaggio sono riservate e ad uso esclusivo del destinatario. Qualora il messaggio in parola Le fosse pervenuto per errore, La preghiamo di eliminarlo senza copiarlo e di non inoltrarlo a terzi, dandocene gentilmente comunicazione. Grazie. Privacy Information - This message, for the Regulation (UE) 2016/679, may contain confidential and/or privileged information. If you are not the addressee or authorized to receive this for the addressee, you must not use, copy, disclose or take any action based on this message or any information herein. If you have received this message in error, please advise the sender immediately by reply e-mail and delete this message. Thank you for your cooperation.

Biography

Giovanni Pappalettera is an Associate Professor at Polytechnic University of Bari, where he also lectures in the Bachelor Degree in Industrial Design and the Master Degree of Mechanical Engineering. He earned his PhD in Mechanical and Biomechanical Design at Politecnico di Bari and in Biomechanics and Bioengineering at Scuola Interpolitecnica di Dottorato di Torino. His primary research interests include material characterization and experimental mechanics, encompassing optical methods, acoustic emission, and residual stress analysis. He is actively involved in biomechanics research including ultrasound-induced fatigue effects on cells, mechanical characterization of dental devices, and 3D dental element reconstruction. In 2007 and 2008, he was a visiting researcher at Politechnika Warsawska – Warszawa, and in 2009, he was a visiting researcher at the Northern Illinois University - DeKalb. Giovanni serves on the PhD committee in Mechanical and Management Engineering at Politecnico di Bari. He has authored over a hundred papers in international journals and conference proceedings and is a co-inventor of three Italian patents. He is also a co-author of three books and a member of international associations, including the Society of Experimental Mechanics, the European Society of Experimental Mechanics, and the Italian Association of Stress Analysis. Since 2003, he has been a research associate at the National Institute of Nuclear Physics (INFN).

Invited Speaker V

13:20-13:45, June 15, 2024, Saturday (GMT+9)

Venue: Room 105 (1F)

Prof. Wenqiao (Wayne) Yuan

North Carolina State University, USA

Speech Info.

Speech Title: Biochar and its Potential Biomedical Applications

Abstract: Biochar is a carbon-rich material resulted from the thermal conversion of biomass. It can improve environmental quality when used for pollutant removal in liquid or gas media, soil conditioning, or as a long-term storage of carbon. It has been found to have at least 50 different uses. In this presentation, a non-traditional use of biochar in biomedical engineering is discussed. Mesoporous carbon particles (MCP) were generated from activated biochar. Then Glucose oxidase (GOx) and catalase (CAT) were self-assembled on the MCPs to form a GOx/CAT/MCP composite, which was then dispersed in Nafion solution and layered on carbon cloth to fabricate a flexible 3-D bio-anode possessing extremely high electron transfer rate. Such bio-anode designed via the simple, bio-compatible, and multi-enzyme self-assembly approach displayed exceptional electrochemical performance for the fabrication of glucose-based bio-fuel cells or biosensors, which has high potential to be a self-sustained bio-battery for implantable biomedical devices or for human health monitoring, especially for diabetic patients.

Biography

Dr. Wenqiao (Wayne) Yuan is currently a professor at the Department of Biological and Agricultural Engineering, North Carolina State University (NCSU), Raleigh, NC, USA. He received a Ph.D. degree in Biological and Agricultural Engineering from the University of Illinois at Urbana-Champaign, Urbana, IL, USA. He has been the chair and vice chair of several technical committees of American Society of Agricultural and Biological Engineers (ASABE), and is an associate editor of Journal of the ASABE, International Journal of Agricultural and Biological Engineering, and Applied Engineering in Agriculture. Dr. Yuan's research is mainly focused on bioenergy and bioproducts, such as microalgae culture and bioprocessing, green agriculture development, biomass thermochemical and biochemical conversion, and microbial ad bio-fuel cells. Dr. Yuan has published more than 200 papers and 4 book chapters, with numerous invited speeches worldwide. He received the "CAREER Award" in 2010 from US National Science Foundation, the "New Holland Young Researcher Award" in 2012, the "Engineering Concept of the Year Award" in 2016 from ASABE, and the "Research Fellowship for Experienced Researchers" from Alexander von Humboldt Foundation (Germany) in 2017. He has also received nearly a dozen other prestigious international and national awards and honor.

Invited Speaker VI

16:00-16:25, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Assoc. Prof. Anita Sukmawati

Universitas Muhammadiyah Surakarta, Indonesia

Speech Info.

Speech Title: Formulation and Stability Evaluation of Gels Containing Chitosan Microparticle Loaded Beetroot (Beta Vulgaris, Linn) for Topical Skin Brightening

Abstract: The objective of this research is to investigate the effect of hydroxypropyl methylcellulose (HPMC) concentration as a gel base for chitosan microparticle containing beetroot (Beta vulgaris, Linn) toward gels stability and skin brightening effect. Ionic gelation was used to make microparticle (MP) using chitosan 1% solution and beetroot dry extract as active component. Scanning electron microscope (SEM) and active substance loading were used for physical characterisation. The MP then was added to HPMC-based gels at 0.5, 1.0, and 1.5% w/w. Gels were tested for viscosity, pH, and active component stability. Gels were tested for skin lightening on humans. Results reveal beetroot extract may be loaded into chitosan MP with a drug loading (DL) of 23.27 ± 0.057% w/w. HPMC gels had a pH of 5-5.4 and increased viscosity related with HPMC content. Gels showed colour instability after 6 cooling-heating cycles and decreased betanin levels on day 7 at 40 ± 2 °C and RH 75 ± 5%. HPMC 0.5% gel brightened human skin more than other HPMC gels. The 0.5% HPMC gel base had the smallest betanin reduction during the accelerated stability test, compared to the 1.0 and 1.5% HPMC gels. The formulation of chitosan microparticle gel loading beetroot extract with 0.5% HPMC gel base had brightened skin better than the other two formulae.

Biography

Anita Sukmawati is an associate professor in Faculty of Pharmacy, Universitas Muhammadiyah Surakarta, Indonesia. She gained her Ph.D degree from School of Pharmacy, University of Nottingham, UK, under Islamic Development Bank (IDB) Merit Scholarship. Currently, she teaches several subjects for undergraduate and postgraduate programs at her institution. She had published a number of research articles on drug delivery systems and dosage formulations for pharmaceutical and cosmetic preparations that use the most recent technologies. The ongoing research focuses on the utilization of beetroot (Beta vulgaris, Linn) components in microparticle formulations for cosmetic applications.

Invited Speaker VII

16:00-16:25, June 15, 2024, Saturday (GMT+9)

Venue: Room 105 (1F)

Assoc. Prof. Muhammad Ijaz

Qilu Institute of Technology, China

Speech Info.

Speech Title: Screening of Active Ingredients from Wendan Decoction in Alleviating Palmitic Acid-Induced Endothelial Cell Injury

Abstract: (1) Objective: Traditional Chinese medicine (TCM) plays an important role in the treatment of numerous illnesses. As a classic Chinese medicine, Wendan Decoction (WDD) encompasses a marvelous impact on the remedy of hyperlipidemia. It is known that hyperlipidemia leads to cardiovascular injury, therefore anti-vascular endothelial cell injury (AVECI) may be an underlying molecular mechanism of WDD in the cure of hyperlipidemia. However, there is no relevant research on the effect of WDD on vascular endothelial cells and its pharmacodynamic substances. Therefore, the purpose of this study was to investigate the protective effect of WDD on vascular endothelial cells. (2) Methods: The chemical constituents of WDD were determined by LC-MS/MS technology. The protective effects of 16 batches of WDD on samples from human umbilical vein endothelial cells (HUVECs) were evaluated. Finally, gray relation analysis (GRA) and partial least squares regression (PLSR) were used to analyze the potential correlation between chemical ingredients and AVECI. (3) Results: The results indicated that WDD had apparent protective effect on endothelial cells, and pharmacological properties in 16 batches of WDD tests were apparently discrepant. The GRA and PLSR showed that trigonelline, liquiritin, hesperidin, hesperetin, scopoletin, morin, quercetin, isoliquiritigenin, liquiritigenin and formononetin may be the active ingredients of AVECI in WDD. (4) Conclusion: WDD has a protective effect on endothelial cell injury induced by palmitic acid, which may be related to its component content. This method was suitable for the search of active components in classical TCM.

Biography

Dr. Muhammad Ijaz, from Pakistan, graduated from Shandong University with a Ph.D. in Pharmacology. Currently, he is working as an associate Professor of Pharmacology at Qilu Institute of Technology. His main research interests include anti-cancer study and antihyperlipidemic study. He has published 12 Sci research papers and review articles in different well renowned international core Journals with high impact factors. In 2020, he was appointed as the Principal at the Apex college of Pharmacy, Pakistan. Shandong University awarded him the 'Outstanding Graduate 2017 Shandong University International Student', and '2019-2020 Winner of Shandong University Distinguished International Graduate Student Scholarship'. Moreover, He has published several articles on the vital 'the belt and road' initiative in China Daily and other print media forums. He has published an article on 'Life in China'and got third prize in 'My journey in SDU' writing/photo contest held by the International School, Shandong University. While being active in research, he has actively participated in the co-curricular activities. He enthusiastically participated in International Sports Gala and won the title of 'Champions' in the game of cricket.

Oral Session 1

Biomedical Signal Analysis and Processing

13:45-15:45, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Session Chair: Assoc. Prof. Giovanni Pappalettera, Polytechnic University of Bari, Italy

S1-1	13:45-14:00 SE0002	Speech Emotion Recognition using Selected Full-Speech Fast Fourier Transform Derived Narrowband Frequency Intensity **Kai Sze Hong** Tunku Abdul Rahman University of Management and Technology, Malaysia Abstract: Speech Emotion Recognition has been an important research topic recently due to the emergence of Big Data and Artificial Intelligence applications. The system contains two parts, which are extraction part and pattern recognition part. Speech emotion recognition research is considered a sub-field of speech recognition research. Mel-Frequency Cepstral Coefficient (MFCC) had dominated in Speech Emotion Recognition as front-end feature extraction techniques due to its dominance in Speech Recognition research filed. This research study aims to evaluate the accuracy of speech emotion recognition system using full-speech frequency intensities as front-end feature extraction techniques. The major difficulty is due to the lengthy features to be fed into pattern recognition part. Thus, only selected frequency intensities will be used. The results were compared with the accuracy of the dominant MFCC feature extraction techniques. The system modified the Sequential Deep Learning Neural Networks so that the initial input entries were raised to 512 inputs. Kaggle website which provides Big Data research services had been used to run the experiments and the time required had been recorded. The proposed system can produce the highest accuracy of 57.33% when every 5 frequency intensities of narrow band frequency range were used. The 10-order MFCC on the other hand produces the accuracy of 51.59% when running on the same database.
S1-2	14:00-14:15 SE0070	Prediction of Gripping Force of Robot-Assisted Minimally Invasive Surgery System Based on Sparrow Search Algorithm **Yong-Li Yan**, Teng Ren, Tiansheng Sun, and Li Ding Beihang University, China Abstract: In response to the insufficient force feedback mechanism in current robot-assisted minimally invasive surgical systems, this study proposes a novel non-sensor indirect clamping force detection method. The relationship between force and compression depth, compression speed, and contact area of the Leaf of a clamp was systematically analyzed through a series of compression experiments conducted on isolated pig stomach tissues. Subsequently, a comprehensive force prediction model is developed by considering multiple influential factors. This model incorporates parameters such as the velocity, displacement,

		and contact area of the forceps as inputs and employs a backpropagation neural network optimized by Sparrow Search Algorithm (SSA) for precise clamping force prediction, thereby achieving accurate estimation of forces during surgical procedures. The SSA-BP model outperforms both traditional BP models and GA-optimized BP models in terms of prediction accuracy and other performance indicators, showcasing its superior performance. After optimization and improvement through SSA, the determination coefficient between this model and experimental clamping force reaches 0.9954, representing an increase of 0.83% and 1.41% compared to the GA-optimized BP model and traditional BP neural network model, respectively. The SSA-BP model proposed in this study demonstrates superior predictive ability and a higher degree of fitting, thereby offering a dependable clamping force control scheme for robot-assisted minimally invasive surgery systems.
S1-3	14:15-14:30 SE0079	A Hybrid Neonatal Sleep Staging Method based on Convolutional Neural Networks and Graph Neural Networks **Ligang Zhou**, Xia Hu, Zheng Zeng, Laishuan Wang, Yan Xu, Chen Chen, and Wei Chen Fudan University, China Abstract: Currently, deep learning-based methods for automatic sleep staging are thriving and gaining significant traction due to the advanced pattern recognition and feature extraction inherent as compared to machine learning-based methods. However, most of the existing approaches only consider the informative features of raw signals, while neglecting the connectivity characteristics among multichannel electroencephalogram (EEG) data. In this study, a hybrid framework for neonatal sleep staging by combining Convolutional Neural Network (CNN) and Graph Neural Network (GNN) is proposed. It not only considers brain connections among multi-channel EEG through various perspectives (such as linear temporal correlation, information-theoretic, and phase-dynamics information, etc.) but also involves the high-order structural features that originate from graphs. The method potentially enhances the feature representation, thus significantly improving neonatal sleep staging performance. The proposed method is validated on a clinical neonatal sleep dataset, demonstrating superior performance, especially with CNN+Graph Attention Network (GAT) achieving an accuracy of 74.8% and an f1-score of 0.747. The results highlight the potential of leveraging both CNN for feature learning on connectivity matrices and GNN for attention between nodes to enhance neonatal sleep staging.
S1-4	14:30-14:45 SE0092	An EEG-based Automatic Classification Model for Epilepsy with Explainable Artificial Intelligence **Lan Wei** and Catherine Mooney University College Dublin, Ireland Abstract: Effective monitoring of patients' conditions is crucial in medical practice. Machine learning methods hold promise for automating disease detection, including epilepsy. However, the opacity of these black-box models presents significant challenges. In this study, we propose a LightGBM-based automatic classification model for epilepsy trained using TUH EEG data. Ten channels were employed, and 22 features from both the time and frequency domains were estimated from each channel. The model can distinguish between normal EEG, focal epilepsy, and generalised epilepsy. We trained the model on a dataset

		comprising 600 adult EEG records. Five-fold cross-validation yielded a mean accuracy of 89.46% and a mean F1 score of 0.8907 on the training set. To assess the model's generalization performance, we independently tested it on 456 EEGs, achieving an accuracy of 71.49% and a weighted F1-score of 0.7386. Furthermore, we employed permutation feature importance, SHAP and LIME, to provide explanations for the model's decisions. This model has the potential to gain the trust of clinicians and facilitate its adoption in clinical settings.
S1-5	14:45-15:00 SE0080	Feature Pyramid Network and Gated Recurrent Unit-based Obstructive Events Detection from Nighttime Audio **Xia Hu, HuiPing Luo,** Ligang Zhou, Rui Fang, Zheng Zeng, Jingchun Luo, Chen Chen, and Wei Chen Fudan University, China Abstract: Accurate localization of obstructive sites in the upper airway during sleep is of great importance for the guidance of OSA surgery. Nighttime audio signals, which gain the advantages of low-cost, non-invasiveness, and real-time monitoring, have been extensively applied in obstructive sites recognition. However, most of the existing research has only focused on obstructive sites classification, overlooking the events-related information (such as the start time, end time, duration, etc.), thereby diminishing the clinical applicability. In this paper, a Feature Pyramid Network (FPN) and Gated Recurrent Unit (GRU)-based framework to detect the occurrence and duration time of obstructive events is proposed. Using the FPN Backbone to extract multi-level feature representations can effectively handle large-scale changes in the duration of detection event. GRU is used to capture relationships among frequency variables over different time points. The proposed method achieved optimal event-based results with F1-score of 79% at an IoU of 0.3 and 64% at an IoU of 0.5. Experimental results have demonstrated the effectiveness of the proposed method in the field of obstructive events detection, which is expected to pave the way for more in-depth sleep-related breathing events analysis and detection.
S1-6	15:00-15:15 SE0055	Patient Information System for Dental Clinics with Integrated Facial Recognition **Maribelle Dequilla Pabiania**, Charles Edward S. Relucio, and Mark Samuel P. Santos Mapua University, Philippines Abstract: This output of this study was a web application for a patient information system using facial recognition intended for security log in, enabling dental clinics to lessen and avoid using pen and paper during the pandemic, eliminate queues, and take out the risk of contact tracing. The objective of the study aimed for a faster service for dental patients through facial recognition technology using Python as the programming language and its deep learning feature. The web application implemented a more secure system through logins, and Python deep learning. Moreover, the goal for dental clinics was to go digital, where they could all focus on procedures rather than data. This web application would also lessen their storage and spread health awareness regarding teeth. The researchers also added a feature on their web application where you can see services available, dentist appointments or schedule, and the ease of tracking one's dental health with just a few taps on a personal computer or mobile devices. Existing applications are also shown in this study

		to compare its features and show exclusive benefits. Furthermore, the researchers provided a way to expand machine learning and integrate it by using facial recognition in the dental industry. Facial testing was made to ensure consistency and accuracy of the algorithms used to recognize a user. The study shows multiple alternatives, recommendations, and related studies similar to the project to show significance.
S1-7	15:15-15:30 SE0042	Impact of Upper Body Mass Scaling on Musculoskeletal Model Predictions during Gait **Abdul Aziz Hulleck,** Muhammad Abdullah, Abdelsalam Alkhalaileh, Tao Liu, Dhanya Mohan, and Rateb Katmah Khalifa University, UAE Abstract: Utilizing musculoskeletal modeling through an inverse dynamics approach for gait assessment offers a non-invasive method to compute internal joint kinetics and ground reaction forces and moments solely from kinematic data, reducing reliance on cumbersome equipment. The effectiveness of these models relies on the scaling approach adopted to tailor the model to individual subject data. While constant percentage-based, also called uniform scaling-based, has traditionally been used, recently developed upper body shape-based mass distribution approach which accounts for inter-subject inherent mass distribution variation within the same body mass index category, has demonstrated sensitivity of muscle forces and joint kinetics during static posture to segmental masses and centers of mass variation. This study investigates the influence of upper body mass distribution on internal and external kinetics computed using a full body musculoskeletal model during level walking in normal-weight healthy individuals. The findings reveal that variations in segmental masses and centers of mass resulting from different mass scaling approaches significantly alters ground reaction force prediction, especially the vertical component, followed by the medio-lateral and antero-posterior components. Joint reaction forces also show sensitivity to variations in personalized mass distribution, particularly the vertical component at the hip, knee, and ankle joints, followed by the medio-lateral and antero-posterior components. These results emphasize the importance of caution when employing subject-specific upper body musculoskeletal models with uniform mass scaling for gait kinetics assessment.
S1-8	15:30-15:45 SE0071	A Fuzzy Logic Based Motion Recognition Sensors for Determination of Cerebral Palsy Sophia Alexandra Unabia, Ghezzna Maria Rotoni, **Jocelyn Flores Villaverde**, Roben A. Juanatas, and Irish C. Juanatas Mapua University, Philippines Abstract: Cerebral palsy (CP) is a group of disorders that affect a person's ability to move and maintain balance and posture. It is the most common motor disability in childhood. It is a permanent disorder that causes motor impairments. One of the earliest signs of CP is the abnormal limb and gait movements called Cramped Synchronized General Movements (CSGMs) of a baby. CSGMs are involuntary, jerky movements involving all limbs and the trunk that occur simultaneously. This paper implements a fuzzy logic algorithm to measure and analyze CSGMs that may link to the occurrence of CP. This research study aims to determine the occurrence of Cerebral Palsy in babies at an early age with the use of lightweight non-invasive devices with the integration of fuzzy logic. Since there is no definite

		value of limb acceleration that confirms the presence of CP, training was performed on normal babies as a comparison for the babies diagnosed with cerebral palsy. Based on the data gathered from the prototype testing, the overall performance of the device showed a device accuracy rate of 75%.

Oral Session 2

Medical Imaging and Biomedical Image Processing

13:45-15:45, June 15, 2024, Saturday (GMT+9)

Venue: Room 105 (1F)

Session Chair: Prof. Wenqiao (Wayne) Yuan, North Carolina State University, USA

S2-1	13:45-14:00 SE1003	Classification of Histological Types of Primary Lung Cancer from CT Images Using Clinical Information Naoya Honda, **Tohru Kamiya**, and Shoji Kido Kyushu Institute of Technology, Japan Abstract: Identification of primary lung cancer is very important because it influences the course of treatment, especially for small cell carcinomas, which metastasize rapidly and have to be detected at an early stage. In addition to imaging, clinical information is often used in CAD (computer aided diagnosis) systems. Especially, clinical information such as smoking history, which is considered to be important in the diagnosis of lung cancer. In this paper, we propose a method to identify primary lung cancer by adding clinical information from medical records in addition to images to improve the accuracy of diagnosis. We use tumor images surrounded by rectangular regions from CT images in an open dataset as input images and train the method based on deep learning technique. We evaluate the proposed method by discriminating tumors from unknown data. In our experiments, we found that the accuracy was improved about 6% when clinical information was added to 604 images, which included four classes of cancer; adenocarcinoma, small cell carcinoma, squamous cell carcinoma, and large cell carcinoma.
S2-2	14:00-14:15 SE0009	Assistive Method for the Detection of Dental Caries using Blob Spot Detection Algorithm **Jose Bernardo Lazaro**, Lwmorc James Fortuno Bitangcor, Joseph Marxlen Dumapit, and Jayvee Navarro Mapote Mapua Institute of Technology at Laguna, Philippines Abstract: An assistive method for dental caries detection allows dental doctors and practitioners to have a deliberate and visual perspective on the tooth surface area. It is an important procedure where dental doctor decides on what particular remedies or action must have to do to the tooth under observation. The Blob Spot Detection Algorithm (BSDA) is alternative method for caries detection that didn't rely on using any machine learning models which are resource intensive. This approach uses a prevalent method that focused the detection on the exploited teeth since caries can easily be spotted. The use of the designed algorithm which aid in processing X-ray images provide mean for correctly identifies caries, including the filter minimum and maximum value range to correctly identify caries over the structuring elements required in each process. While the image information is being extracted the blob analysis correctly identify carries and provide good starting point on the region of extraction. Finally, the correct used of an structuring elements provides threshold values "2" to

		"80" for each processing done over x-ray images and must be correlated to the image filter min value "1" and max value "5000" which also states the severity of dental damage to the tooth region and left with filtered blob spot which is the caries.
S2-3	14:15-14:30 SE0014	Multi-Layer Dense Attention Decoder for Polyp Segmentation Krushi Patel, Fenjun Li, and **Guanghui Wang** Toronto Metropolitan University, Canada Abstract: Detecting and segmenting polyps is crucial for expediting the diagnosis of colon cancer. This is a challenging task due to the large variations of polyps in color, texture, and lighting conditions, along with subtle differences between the polyp and its surrounding area. Recently, vision Transformers have shown robust abilities in modeling global context for polyp segmentation. However, they face two major limitations: the inability to learn local relations among multi-level layers and inadequate feature aggregation in the decoder. To address these issues, we propose a novel decoder architecture aimed at hierarchically aggregating locally enhanced multi-level dense features. Specifically, we introduce a novel module named Dense Attention Gate (DAG), which adaptively fuses all previous layers' features to establish local feature relations among all layers. Furthermore, we propose a novel nested decoder architecture that hierarchically aggregates decoder features, thereby enhancing semantic features. We incorporate our novel dense decoder with the PVT backbone network and conduct evaluations on five polyp segmentation datasets: Kvasir, CVC-300, CVC-ColonDB, CVCClinicDB, and ETIS. Our experiments and comparisons with nine competing segmentation models demonstrate that the proposed architecture achieves state-of-the-art performance and outperforms the previous models on four datasets. The source code is available at: https://github.com/krushi1992/Dense-Decoder.
S2-4	14:30-14:45 SE0020	Warfarin Anti-Coagulant Dosage Measurement using Image Processing and Two-step Dosing Algorithm Based on Clotting Time **Rosemarie V Pellegrino**, Jumelyn L. Torres, Alexandra C Gamboa, Jesika Leslie E. Moreno, and Eileen Angela L. Repollo Mapua University, Philippines Abstract: This study focuses on the automation of the Clotting Time coagulation test through the use of image processing. Image to be processed will be taken from the Arduino Yun which serves as a frame grabber of the system. Through the obtained Clotting Time, dosage measurement of Warfarin will be given. Dosage measurement was done by using the Two-Step Dosing Algorithm which monitors patients undergoing Warfarin therapy. The algorithm makes use of the patient's computed INR to give off the corresponding dosage. INR is the quotient of the abnormal Clotting Time and mean of normal Clotting time. Error percentage was conducted to prove the system's ability to accurately determine a patient's Clotting Time.
S2-5	14:45-15:00 SE0066-A	Substantia Nigra and Nigrosome1 Identification in Parkinson's Disease and Healthy Controls: Comparison of Manual and Automated Approach **Ilaria Chimento**, Andrea Quattrone, Maria Eugenia Caligiuri, Emanuele Tinelli, Umberto Sabatini, and Aldo Quattrone University of Catanzaro, Italy

		Abstract: In this study, we evaluated the distribution of Quantitative Susceptibility Mapping (QSM) values in Substantia Nigra (SN) and Nigrosome1 (N1) in healthy controls (HC) and Parkinson's Disease (PD) patients using two different approaches. Sixteen PD and 16 HC underwent 3T brain MRI. The protocol comprised i) 3D-T1-weightedsequence ii) T2-FLAIR iii) susceptibility weighted imaging (SWI). Bilateral SN and N1 were manually segmented on SWI images. SN masks were delineated on all subjects, whereas N1 was visible bilaterally in all HC, on the left side in 7 PD and in 4PD on the right side. QSM was estimated using ROMEO. Histogram of regional χ values were extracted from manually-segmented masks, as well as from symmetric templates of SNpars-compacta (SNpc) and N1. In PD, nigral χ distributions were shifted towards higher values compared to HC with both methods. On the other hand, smaller differences were observed in N1 χ values between PD and HC when using automated segmentations compared to manual. These results support the feasibility of using an atlas-based approach to identify SNpc and its subdivisions, in HCand PD using a hybrid 3T PET/MR scanner.
S2-6	15:00-15:15 SE0022	Identification of Axial Triradius on the Palm Print using Image Processing Bernard Benedict Mendoza, Jerome Santiago, and **Jocelyn Flores Villaverde** Mapua University, Philippines Abstract: Hypertension is common among the aging population. It is commonly known as high blood pressure and may lead to heart and cerebrovascular diseases if untreated. Researchers have used dermatoglyphics in diagnosing some diseases with the use of the traditional black ink method. The hand will be covered in black ink and will be pressed on the plain white paper. Hypertension's relationship to dermatoglyphics is through the angle of axial triradius. A high axial triradius indicates that the person has hypertension. The group developed a prototype for measuring the angle of axial triradius with the use of Template Matching Algorithm. The person's hand will be placed above the camera instead of using black ink. The result yielded an 80% accuracy, which means that the system can be a possible alternative to predict hypertension.
S2-7	15:15-15:30 SE0007	Elucidating White Matter Changes of Association Fibres and Cerebellum in Noise-Induced Hearing Loss: A Diffusion Tensor Imaging Study **Mohd Khairul Izamil Zolkefley**, Norhidayah Abdull, Rajeev Shamsuddin Perisamy, Muzaimi Mustapha, Daud Adam, and Muhamad Ariff Muhamad Noordin National Institute of Occupational Safety and Health, Malaysia Abstract: This study investigates the impact of Noise-Induced Hearing Loss (NIHL) on the structural integrity of white matter pathways in the brain, specifically focusing on association fibers and the cerebellum. Utilising Diffusion Tensor Imaging (DTI) technique, this study examines changes in white matter integrity that may underlie cognitive and perceptual deficits associated with NIHL. Findings suggest alterations in the association fibers and cerebellum, indicating potential disruptions and neuroplasticity changes in auditory processing and cognitive functions. This research contributes to understanding the neurobiological effects of NIHL, offering insights for therapeutic strategies targeting auditory rehabilitation and cognitive impairment.
S2-8	15:30-15:45	CNN-Based Anemia Detection in Blood Smear Images

	SE0023	**Maribelle Dequilla Pabiania**, Kristine Joyce P. Ortiz, Daniel Ehsan W. Abdel Bari, Princess Czarina A. Marilag, and Patrick Aren A. Nisperos Mapua Institute of Technology at Laguna, Philippines Abstract: Millions of people die from cardiovascular diseases each year, highlighting the need for accurate cardiac models. We present an atomistic electro-strain entropy theory and equation for heart cells that characterizes electrocardiograms (ECGs) and predicts heart function. Using time-dependent mechanical loading forces and tensile testing data of human cardiac tissue, we establish and validate a dynamic action potential-loading forces relationship expressed as a single variable equation. Our findings challenge current ECG principles and interpretations, suggesting new techniques for assessing heart function and opening new directions for cardiac medications. Furthermore, this method allows for the revelation of biological insights of human and rate hearts.

Oral Session 3

Medicinal Plants and Bioactivity of Natural Products

16:25-18:10, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F)

Session Chair: Assoc. Prof. Md. Altaf-Ul-Amin, NARA Institute of Science and Technology, Japan

S3-1	16:25-16:40 SE2004-A	Postbiotic Metabolites of Natural Products: A Novel Key to Understanding Bioactivity of Biogenic Medicines **Jakub P. Piwowarski,** Maciej Korczak, Weronika Skowronska, Marcin Równicki, Inna Vlasova, Yuliia Kostenko, Natalia Melnyk, Dominik Popowski, and Sebastian Granica Medical University of Warsaw, Poland Abstract: Knowledge about the role of gut microbiota in maintaining the homeostasis of the human body has been rapidly developing in recent years. Its activity is considered to be crucial for health, particularly through its influence on the digestive, immune, and nervous systems, as well as metabolism of nutrients and xenobiotics. While determining the microbiota composition is now a standard procedure in its research, studies related to its metabolome are still limited to a narrow group of metabolites. The changes occurring in the structure of orally administered compounds under the influence of gut microbiota require that the assessment of the impact on the human body of substances present in food and drugs must currently take into account the biological activity of postbiotic metabolites formed in the intestine. As shown in our studies, various natural products contained in traditionally applied plant materials can be transformed by human gut microbiota to postbiotic metabolites of completely different structure and pharmacological properties. This offers a new perspective on understanding mechanisms of medicinal plants' biological activity and great potential of discovery of novel pharmacologically active substances resulting from gut microbiota metabolism
S3-2	16:40-16:55 SE2006-A	A Network-Based Pharmacological Investigation to Identify the Mechanistic Regulatory Pathway of Siegesbeckia orientalis Against Gouty Arthritis **Dang-Khoa Nguyen** and Ching-Kuo Lee Taipei Medical University, Taiwan Abstract: Purpose. Investigating the active compounds and the underlying pharmacological mechanisms of Siegesbeckia orientalis L (S. orientalis) in the treatment of gouty arthritis. Methods. Utilizing a network pharmacology approach, we identified active compounds of S. orientalis, predicted potential targets, and elucidated the signaling pathways that contribute to its therapeutic effects. Subsequently, a molecular docking strategy was utilized to forecast the affinity between the active compounds and key targets. Results. A total of eight active components and 20962 targets were identified, of which 460 targets were common targets for the drugs and diseases. 15,16-di-O-acetyldarutoside, hythiemoside B, pubeside C, stigmasterol, β-sitosterol, 3,7-O-dimethylquercetin, quercetin and ursolic acid, were

		identified as key active compounds. In PPI analysis, ATK1, HIF1A, IL1B, IL6, MAPK1, MAPK3, PTGS2, STAT3, TNF and VEGFA were screened out. GO enrichment analysis indicated that S. orientalis was likely to interfere with inflammatory response (GO:0006954) in the treatment of gouty arthritis. KEGG enrichment analysis indicated multiple inflammation-related signaling pathways, namely TNF, HIF-1, and PI3K-Akt. The molecular docking indicated that the active compounds had good binding properties to their key targets. Conclusions. In this study, we propose that S. orientalis possesses multi-component, multi-target, and multi-pathway. Additionally, we identify the key ingredients of S. orientalis and elucidate the interaction between these ingredients and their corresponding targets through relevant pathways. The potential ability of S. orientalis to alleviate gouty arthritis may be attributed to its ability to inhibit inflammation.
S3-3	16:55-17:10 SE2011-A	Chemical Constituents from the Rhizomes of Geodorum Attenuatum Griff **Phirapon Setsuwan** and Oue-artorn Limtragool Mahasarakham University, Thailand Abstract: Geodorum attenuatum Griff. belongs to the family Orchidaceae. It is a terrestrial orchid plant of medium size, widely found in Northern and Northeastern parts of Thailand. This plant has been used in traditional medicine to treat insect bites. The crude EtOAc extract of the rhizomes of G. attenuatum was purified by chromatographic techniques to yield seven known compounds including, 2-methoxy-9,10-dihydrophenanthrene-4,5-diol (1),confusarin (2),9,10-dihydro-2,5-dimethoxyphenanthrene-1,7-diol(3),4,7-dihydroxy-2,3 dimethoxyphen anthrene 2,3dimethoxyphenanthrene (4), 2,4,8-trimethoxyphenanthrene-3,7-diol (5), 3,4'-dihydroxy-5,3',5'-trimethoxybibenzyl (6), and flavanthridin (7). The structures of the isolated compounds were elucidated by spectroscopic data (IR, 1D, and 2D NMR). All isolated compounds will be tested for acetylcholinesterase and butyrylcholinesterase inhibitory activities.
S3-4	17:10-17:25 SE2029	Synthesis of Black Turmeric Extract Nanoparticles (Curcuma Caesia) and Its Cytotoxic Activity on T47d Cells Muhammad Da'i, Nur Azizah, Andrea Yovva Rahmana, and **Erindyah Retno Wikantyasning** Universitas Muhammadiyah Surakarta, Indonesia Abstract: This study aims to formulate black turmeric into nanoparticle preparations with various concentrations of chitosan and determine its cytotoxic effect on T47D breast cancer cells. Methods: Extraction was carried out by the maceration method. Black turmeric condensed extract is formulated into nanoparticles using the ionic gelation method, which is a method that relies on the cross-linking agent NaTPP. The cytotoxic activity of black turmeric extract was tested using the MTT assay method. Results: The results showed that black turmeric extract nanoparticles have a size range of 266-558 nm and are positively charged with zeta potential values ranging from 3.3 to 9.7 mV. The encapsulation efficiency of black turmeric extract nanoparticles is in the range of 63.42% so that the preparation of black turmeric extract nanoparticles is less stable. The results of the cytotoxic test showed that both black turmeric extract and black turmeric extract nanoparticles showed moderate cytotoxic activity because they had values in the range of 50 - 100, respectively the IC50 values of the two preparations were 162.95 µg/mL and 78.60 µg/mL. From the statistical test, the IC50

		value of nanoparticle preparations of black turmeric extract and black turmeric extract without nanoparticles had a significant difference in value. Conclusion: The results obtained in this research work indicated a promising potential of nanoparticles of black turmeric extract as cytotoxic agent for the treatment of breast cancer.
S3-5	17:25-17:40 SE2012-A	Chemical Constituents from the Roots of Croton Krabas and Cholinesterase Inhibitory Activities **Sunita Uk-at** and Oue-artorn Limtragool Mahasarakham University, Thailand Abstract: Croton krabas belong to the family Euphorbiaceae, widespread in tropical regions of the world. C. krabas has been traditionally used for treatment of high blood pressure, inflammation, dysmenorrhoea, dyspepsia, and dysentery. The crude EtOAc extract of the roots of this plant was purified by chromatographic techniques to give seven known compounds, crotonkrabas A (1), crotonkrabas B (2), 12-oxohardwickiic acid (3), isoteucvin (4), mixture of crotoeurin C (5) and 6-epi-crotoeurin C (6), and taraxerol (7). The structures of the isolated compounds were elucidated by spectroscopic methods (IR, 1D, and 2D NMR). All isolated compounds will be evaluated for cholinesterase inhibitory activity.
S3-6	17:40-17:55 SE2030	Formulations and Characterizations of Telang Flower Extract (Clitoria ternatea L.) Gel Using Hpmc as Gelling Agent and its Antioxidant Activity **Setyo Nurwaini**, Aruniyal Alimatus Sadiah, Riza Maulana, and Teguh Imanto Universitas Muhammadiyah Surakarta, Indonesia Abstract: Objective: Telang flowers (Clitoria ternatea L.) are plants that contain a natural source of antioxidants that can be formulated in gel preparation with a variation of concentration of gelling agent HPMC. The purpose of this research was to know the difference in the levels of HPMC as a gelling agent against the physical properties and antioxidant activity of preparation of telang flower extract gel. Methods: The extraction of telang flowers is done by a maceration method with a 96% ethanol solvent. The gel was formulated with HPMC concentration variations of 2%, 2.5% and 3% respectively. The physical properties of the gel that were determined were organoleptic, pH, stickiness, spreadability, viscosity, and homogeneity. Antioxidant activity was determined using DPPH method (2,2-diphenyl-1-picrylhydrazyl). Data was analyzed statistically using a one-way ANOVA test with a 95% confidence level. Results: The results of the research showed that the best formula was formula II with a concentration of HPMC of 2.5%. The gel of extract telang flower has characteristics with a typical scent of the telang flower, the blue-purple colour, homogeneous, pH was 6.393±0.01, stickiness was 1.203±07 s, spreadability was 4.17±0.1 cm, and viscosity was 3000±100 cP. The antioxidant activity (IC50) the gel was 101.442 ppm belongs to the category of moderate antioxidants. Conclusion: Gel extract of telang flowers with concentration gelling agent HPMC concentration of 2.5% had the best physical properties.
S3-7	17:55-18:10 SE2021	Safety Assessment of Kerra Formula Capsules by Oral Administration in Healty Volunteers: A Phase I Clinical Trial Chaiwat Rerkswattavorn Wandee Chanprasertpinyo, Manit Nuinoon, Rangsan Butcha, Phayong Thepaksorn, Piyachat Evelyn Denbaes, Muhammad Junaidh, Katanchalee Thabsrii Suwannee Sroisong, Pussadee Srathong, and **Suriyan Sukati**

		Walailak University, Thailand Abstract: Objective: Kerra Formula, derived from Tak-Ka-Si-La, a Thai herbal tradition, contains nine key medicinal plants approved by the Thai FDA for fever reduction. Despite its use by some during COVID-19 infections, its safety for human consumption requires thorough examination. This phase I trial aimed to evaluate the safety and short-term side effects of Kerra Formula capsules on healthy volunteers.Methods: Eleven healthy volunteers received orally administered Kerra Formula capsules at a dosage of 500 mg/cap, four times daily for 14 days. Safety assessments included symptom observation, medical history review, physical examination, and various laboratory tests assessing blood cells, platelets, urine, coagulation profiles, liver and kidney function, inflammation markers, fasting blood sugar, and lipid profiles. Results: Comparison of baseline and post-oral administration results at 1, 7, and 14 days, as well as after a 14-day washout period, revealed no abnormalities in physical examination. Additionally, no adverse reactions or statistically significant differences were observed in laboratory results. Conclusion: The study suggests that a daily dose of 4,000 mg (1,000 mg four times per day) of Kerra capsules for 14 consecutive days appears to be safe for healthy volunteers. However, further research is essential to assess the long-term effects of this traditional herbal remedy. Trial registration: The trials were registered at The Thai Clinical Trials Registry (TCTR) with the identification number TCTR20230320009. (https://www.thaiclinicaltrials.org/show/TCTR20230320009).

Oral Session 4

Biosensors and Virtual Simulation Technology in Healthcare

16:25-18:10, June 15, 2024, Saturday (GMT+9)

Venue: Room 105 (1F)

Session Chair: Prof. Dilek Çökeliler Serdaroğlu, Başkent University, Turkey

S4-1	16:25-16:40 SE0004-A	Development of a Wearable Biosensor to Monitor Placental Oxygenation **Thien Nguyen**, Soongho Park, and Amir Gandjbakhche National Institutes of Health, USA Abstract: This study developed a wearable biosensor to measure placental oxygenation using near-infrared spectroscopy. A pilot clinical study was conducted to test the device on 36 pregnant women in their second and third trimesters. Among these participants, four had an uncomplicated pregnancy, 18 had maternal preexisting conditions/complications, 22 had placental pathological issues, and 9 had neonatal complications. Our preliminary finding indicated a close relationship between placental oxygenation and pregnancy complication where the placental oxygenation levels in uncomplicated pregnancy (68.0 ± 5.1 %) were statistically significantly higher than those in participants with maternal preexisting conditions/complications (69.0 ± 5.1 %), placental pathologies (69.4 ± 4.9 %) and/or neonatal complications (68.0 ± 5.1 %). This finding shows the feasibility of the developed wearable biosensor in monitoring pregnancy health remotely.
S4-2	16:40-16:55 SE0032	Electromyography Data Collector with Real-Time Monitoring of Muscle Improvement Through Android Technology for Patients Experiencing Muscle Pain **Maria Carmela Factoriza Capul** Mapua Malayan Colleges Laguna, Philippines Abstract: Electromyography provides a wide range of purposes when it comes to biomedical applications. Doctors and nurses often use these devices on patients with muscle problems, those who suffered a stroke, and even people who experienced an accident. Real-time monitoring of EMG is required for some patients to gather the information that could help inform doctors and patients as to whether the medication has helped improve the patient's condition. Some EMG machines used in hospitals and rehabilitation are heavy and sizeable equipment for testing and monitoring. These machines are unmovable. Therefore, it does not have a wireless transmission to make it portable. This study proposes using Arduino with a Myo Ware module connected to an Android device. An Android device application was developed where the data collected can be viewed in real-time and monitored if there is an improvement in the patient's muscle problem
S4-3	16:55-17:10 SE0094	Generating Age-Dependent Radial Artery Pulses with a Pneumatic Pulse Simulator: A Feasibility Study Simon A. Debruin, **Hoang N. Nguyen**, Jeong-Hoi Koo, Tae-Heon Yang, and Young-Min Kim Miami University, USA

		Abstract: Radial pulse simulators can play an important role in the advancement of wearable healthcare devices and the modernization of pulse diagnosis methods, which are widely used in Oriental Medicine. They can be used to calibrate wrist-worn sensors and train medical professionals for pulse palpations. This study proposes a new, simple, and cost-effective pulse simulator capable of producing a wide range of blood pressure waveforms. It designed and constructed a prototype pulse simulator, consisting of two precision solenoid valves, an air compressor, a pneumatic pressure sensor, and control electronics. By controlling the opening and closing of the solenoid valves, the simulator regulates the pneumatic pressure to generate desired pulse waveforms. To assess the performance of the prototype, age-related radial pulses were considered, and the pulse waveforms generated by the prototype for representative three age groups (10, 50, and 90-year-olds), which show distinctly different pulse waveforms, are compared with pre-existing in-vivo data for the same age groups. The results show that the Root-Mean-Squared-Error (RMSE) between the experimentally obtained pulses and in-vivo pulses of approximately 6% for all groups, indicating the feasibility of the proposed pulse simulator for creating a range of pulse waveforms.
S4-4	17:10-17:25 SE1007	The Investigation of A Suitable EX Vivo Model Design to Test Plasma Glow Discharge-Assisted Adhesive Anastomosis Zeynep Büşra Ayhan, Ayberk Kaya, Ariyan Teimoori, **Dilek Çökeliler Serdaroğlu**, Şaban Remzi Erdem, and İsmail Cengiz Koçum Başkent University, Turkey Abstract: In this study, we investigated the potential of using plasma irradiation to increase the adhesion strength between tissue and a cyanoacrylate-based adhesive to reduce the adverse effects of stitches in anastomotic surgeries. We hypothesized that plasma treatment would increase the surface energy of the tissue and, therefore, the adhesive's adhesion affinity. Our findings suggest that plasma therapy may offer a promising approach to improving the outcomes of anastomotic surgeries.
S4-5	17:25-17:40 SE0024	Hands-Free Electrolarynx with Pitch Control **Maribelle Dequilla Pabiania**, Catherine S. Salvador, Carl Sherwin P. Palupit, Benjimel Niño d. Barba, and Abel Simon D. Yu Mapua Malayan Colleges Laguna, Philippines Abstract: The electronic larynx, or electrolarynx for short, is used mostly by patients with difficulties making vocal speech. This device is used by patients who have undergone total laryngectomy or those who have throat-related health conditions that make speaking difficult. Previous studies had implemented pitch and loudness variation controls to the electrolarynx to take out the monotonous voice and make it more comprehensible and more recognizable to a human voice. The goal of this study is to implement an easy-to-use, hands-free, controlled pitch electrolarynx that can erase some of the negatives of its use. A design where the electrolarynx is mounted on a neck brace-like case where it can be mounted on the neck without having to be held by hand, and for the activation of the electrolarynx, we used EMG electrode sensors that detect muscle contractions of the neck muscles. The researchers conclude that it is possible to use sEMG (Surface Electromyography) to control an

		electrolarynx's pitch. The subjects have a statistically significant effect on the prototype electrolarynx and its ability to vocalize after taking the NFMRT test. They have a subject p-value of 0.0033 and a test p-value of 0.057 from an alpha level of 0.05. Although the study used thresholds to have a set frequency at specific thresholds, it is possible to use the raw processed value of the sEMG sensors, provided they are free of noise to prevent a "shaky" voice due to the sensitivity of the nature of sEMG.
S4-6	17:40-17:55 SE0077	MyoVR: A Virtual Reality Platform for Musculoskeletal Simulation and Interaction **Ruoyu Feng**, Ying Chen, Qianhui Cheng, Moli Zhao, and Shaowei Wang Shandong University, China Abstract: Musculoskeletal modeling and simulation have shown diverse applications in fields like biomedical engineering, sport science, and education. In this paper, we propose a software platform called MyoVR, which can visualize forward dynamics simulation and conduct interaction in virtual reality (VR). The simulation is in real-time, and the interaction movements are trained through deep reinforcement learning (DRL). With the fast simulation merit of MuJoCo engine, MyoSim musculoskeletal models are found to be competent for the requirements of VR rendering and DRL training. In a case study, we adopt the elbow model from MyoSim, and train its reaching interaction with the motion controller, to form a "holding hands" gesture. This setup allows the users, such as rehabilitation clinicians, to monitor and interact with the simulation in the stereoscopic VR environment. This work demonstrates feasibility of the platform's framework, and paves the way for more complex models, and other interactive biomedical applications.
S4-7	17:55-18:10 SE0067	Design of Real-time Vital Signs Monitoring System for Ambulance using Dijkstra Algorithm **Kristine Joyce Ponce Ortiz**, Dave Salamida Alde, Gian Dominic Arciaga Dela Cruz, and Paulojet Velasco Ramirez Mapua Malayan Colleges Laguna, Philippines Abstract: The study is focused on the time efficiency of relaying information from the incoming patient to the respective hospital that the patient will be attended. The objective of the study was to develop a device and a mobile application that can obtain a patient's important vital signs for pre-assessment advanced information before arriving at the nearest hospital using Dijkstra algorithm. The Arduino microcontroller, Bluetooth module, blood pressure, temperature, pulse rate sensors, and Global Positioning System (GPS) were used to build the prototype. Visual Basic was used to build the Windows application in the Hospital and Android Studio to build the mobile application in the ambulance. ThingSpeak was used as a server to record and view the vital signs from the mobile application. The digital device and analog device were compared to determine the accuracy of the sensors, as well as the time difference in sending data using the prototype compared with manual sending. The comparison results for pulse rate, blood pressure, and body temperature showed that the device had an average percent error of 0.7682%, 3.7634% and 1.7808%, respectively. Based on the device testing and statistical analysis, the system produced accurate and reliable data. Therefore, the system can monitor the patient efficiently and effectively.

Oral Session 5

Bioinformatics and Prediction Models for Disease Dagnosis

10:00-11:45, June 16, 2024, Sunday (GMT+9)

Venue: Room 101 (1F)

Session Chair: Assoc. Prof. Jin-Ku Lee, Seoul National University, South Korea

S5-1	10:00-10:15 SE0003	Enhanced Detection and Localization of Zinc Finger Proteins Using Advanced Neural Network Techniques **Mohammad Fayez Al Bataineh** United Arab Emirates University, UAE Abstract: Zinc Finger proteins play a crucial role in DNA recognition and binding, representing a significant area of study in molecular biology and genetics. Leveraging the advancements in neural network technologies, this paper introduces a groundbreaking approach to detect and localfize Zinc Finger protein sequences more effectively. We propose a deep learning-based framework that enhances detection accuracy and operational speed, overcoming the limitations of conventional methods. Our experimental results demonstrate the method's effectiveness, highlighting its potential to transform protein sequence analysis. This research not only furthers our understanding of Zinc Finger proteins but also exemplifies the application of neural networks in complex biological data analysis.
S5-2	10:15-10:30 SE0019	Nail Abnormality Identification Using Roboflow and Yolov8 **Rosemarie Pellegrino,** Jethro Hoyt T. Lacuesta**,** and Carl Ferione L. Dela Cuesta Mapua University, Philippines Abstract: This research aims to develop a nail abnormality detection device for Splinter Haemorrhage, Spoon nail and Terry's nail using Raspberry Pi. It utilized the YOLOv8n-segmentation model and explores three dataset versions with different augmentation techniques: image-level, bounding box-level, and color-level transformations using Roboflow. Training involves Ultralytics, PyTorch, and CUDA on an NVIDIA GTX 1070 GPU with a Ryzen 5 5600x CPU. The model is implemented on a Raspberry Pi 4 Model B for practical use. After training, model evaluation includes Mean Average Precision (mAP), normalized confusion matrices, precision-recall curves, and F1-confidence curves, focusing on balancing precision and recall. Findings reveals that different augmentation techniques influence the model's performance across various nail abnormality classes. Among the three dataset versions, Version 3, which incorporated image-level, bounding box-level, and color-level augmentations, achieved the highest mean Average Precision (mAP) at 50. Consequently, it was selected as the optimal model for nail abnormality detection. This research contributes to the field of dermatology and computer vision, offering potential advancements in nail abnormality detection systems.
S5-3	10:30-10:45 SE0005	Classifying Brain Tumours: A Deep Learning Approach with Explainable AI **Lih Poh Lin** and Zhi Hung Seow Tunku Abdul Rahman University of Management and Technology, Malaysia

		Abstract: Brain tumours stand out as one of the deadliest cancers, urging the need for early detection and intervention. However, the diverse characteristics of these tumours, ranging from variations in shape, location, type, to size, alongside the inherent variations in intensity across magnetic resonance imaging (MRI) images, contribute to the complexity of MRI analysis. To tackle these difficulties, this study proposes the development of a deep learning model for autonomous brain tumour classification, leveraging Convolutional Neural Networks (CNNs) specifically, VGG16, ResNet50, and MobileNetV2. This study fine-tuned hyperparameters, including learning rate, optimizer, number of epochs, and dropout rate, to enhance model performances. All three CNN models exhibited good performance for brain tumour classification, with the VGG16 model, configured with the Adam optimizer, 150 epochs training time, a 0.3 dropout rate, and a learning rate of 0.0001, demonstrating superior accuracy (98%) in predicting brain tumours. The study recognizes the challenge of interpretability in deep neural models, addressing it by employing Local Interpretable Model-agnostic Explanations (LIME). LIME's explanation, employing superpixels and coloured indicators, reveals crucial regions considered by the CNN for brain tumour class prediction, offering insights into the decision-making process.
S5-4	10:45-11:00 SE0018	Prediction of Chronic Kidney Disease Using Ammonia Gas Sensor with Supports of Other Non-Invasive Attributes **Mae Medroso Garcillanosa,** Jherome P. Arroyo, Patricia Anne Gonzales, and Hamina A. Villanueva Mapua Malayan Colleges Laguna, Philippines Abstract: Chronic kidney disease (CKD) is a condition characterized by gradual loss of kidney function over time and it has become a major public concern with its rising prevalence. Diagnosing CKD is generally invasive, costly, time-consuming, and often risky. To address the disadvantages of CKD detection, we proposed a prediction model using non-invasive predictive parameters (blood pressure, appetite, diabetes, coronary, hyper-tension, pedal edema, and anemia) and the measurement of ammonia concentration in breath to classify patients with chronic kidney disease. The mean breath ammonia levels of CKD patients were significantly higher with a value of 3.868 ppm versus those of healthy participants with a mean ppm value of 0.678 ppm. Decision tree classifier is applied to the extracted features for classification. By using bootstrap aggregating (bagging) machine learning applied to decision trees in MATLAB, the accuracy of the model in the training datasets showed 99.02% of success rate in classifying the patients, while an accuracy of 100% was acquired in predicting the five samples of test data. The overall aim of this study is to construct a model designed to detect chronic kidney disease. The system is focused mainly on the breath samples for both classes of participants, with and without chronic kidney disease, with the aid of non-invasive attributes in improving machine learning accuracy. Using machine learning classification, particularly decision tree method, the system allows to build a model based on the breath samples and non-invasive attributes collected from the participants.
S5-5	11:00-11:15 SE0013	Hybrid Feature Selection Approach Combining Filters and Feature Importance on the PPMI Dataset **Camilla Calomino**, Maria Giovanna Bianco, and Andrea Quattrone

		Magna Graecia University of Catanzaro, Italy Abstract: Artificial intelligence (AI) has revolutionized the field of neurodegenerative disease management, particularly in radiology and medical imaging, by enabling the identification of biomarkers crucial for prediction and classification. However, the small dataset size for rare disorders poses significant challenges, particularly due to the high dimensionality of the feature space and limited cohort size. In this scenario, feature selection becomes critically important. Here, we use a dataset sourced from the Parkinson's Progression Markers Initiative (PPMI), comprising data from 100 Parkinson's disease (PD) patients and 73 healthy controls (HC), encompassing 160 features of both imaging and cognitive data. The dataset is partitioned into training (80%) and test sets (20%), with nested cross-validation employed for unbiased performance estimation on the training data. Our study introduces a novel hybrid approach to feature selection, combining correlation analysis with two distinct techniques: SHAP (SHapley Additive exPlanations) and Permutation Feature Importance (PFI). These methods are applied to MRI data, aiming to enhance the selection of relevant features. Subsequently, XGBoost models is deployed for the classification of patients from healthy subjects. Our findings demonstrate the superiority of correlation-SHAP over correlation-PFI in validating an independent test set, supported by its robustness and adherence to key properties. Furthermore, our study highlights the importance of identifying informative features, such as differences in brain regions, to enhance model robustness and accuracy.
S5-6	11:15-11:30 SE0017	Knee Osteoarthritis Grade Severity Classification Using Ensemble Learning Jimwell G. Maglayao, Emmanuel P. Hayahay, Jason Ray M. Moslares, Julian Marc B. Surars, **Jocelyn Flores Villaverde**, and Dionis A. Padilla Mapua University, Philippines Abstract: Background: Cardiac resynchronization therapy (CRT) does not improve heart failure in approx. 30 % of recipients. One of the reasons is suboptimal programming of CRT device. Device automatic algorithms predominantly use the measurement of the most delayed activation and generate optimal leads to pace from and optimal atrioventricular (AV) and interventricular (VV) delay. Ultra-high-frequency ECG (UHF-ECG) visualizes ventricular activation and can help optimize the location and timing of pacing. Purpose: To compare automatic algorithm SMART (Boston Scientific) and UHF-ECG approach in CRT optimizing. Methods: This prospective study included consecutive CRT recipients with sinus rhythm and implanted device equipped with the SMART algorithm. The ultra-high frequency 25-kHz ECG data were collected during 2 minutes in the resting supine position with a standard 12-lead electrode setup. The amplitude envelopes of QRS were computed in a frequency band of 500–1000 Hz and were averaged. Normalized V leads maps were compiled and numerical descriptors identifying ventricular dyssynchrony were detected. e-DYS parameter was computed as the difference between the earliest and the latest activation in the left ventricle. Three settings were analyzed: 1) before implant, 2) with SMART optimized parameters, 3) in optimal UHF-ECG guided programming acquired by consequent testing of different AV and VV delay and manual preexcitation of the region with delayed activation. For these three programs, e-DYS parameter (UHF-ECG) as a marker of electrical dyssynchrony, and IVD (interventricular delay, echocardiography-derived difference between preejection times of

		left and right ventricles) as a marker of mechanical dyssynchrony, were acquired and statistically evaluated. Results: e-DYS was evaluated in 128 patients (90 males). e-DYS before implant was 55 ± 37 ms, with SMART parameters 24 ± 27 ms (p <0.001), with UHF-ECG guided program 8 ± 19 (versus before and smart p<0.001). IVD was available in 93 patients, IVD before implant was 39 ± 30 ms, with SMART parameters 21 ± 26 ms (p<0.001), with UHF-ECG guided program 19 ± 30 ms (versus before implant p<0.001, versus SMART p=0.036). Conclusion: The UHF-ECG offers a new method to access electrical activation patterns in ventricular synchrony. CRT optimization using UHF-ECG leads to extra benefit when compared with implemented device algorithms.
S5-7	11:30-11:45 SE0027-A	Development of an Artificial Intelligence - Assisted Spectral Analysis Method for Evaluation of Early Osteoarthritis Ruei-Fong Chen, **Ying-Chun Chen**, and Chao-Ching Ho National Taipei University of Technology, Taiwan Abstract: Osteoarthritis (OA) is a cartilage degenerative disease, traditionally assessed through arthroscopic evaluation in clinical practice. However, this method is subjective, relying heavily on clinicians' experience. With the shift towards precision medicine, there is an increasing demand for objective and quantitative data to enhance treatment accuracy. Despite the development of several techniques, their clinical adoption has been limited due to high costs and extensive training requirements. This research proposes a novel approach using an arthroscope-like optical system to collect spectra and an artificial intelligence model for classifying the disease stage of the cartilage. We utilized 271 spectra to evaluate the potential of two methods, Support Vector Machine (SVM) and Convolutional Neural Network (CNN), in spectral analysis. Results show that CNN outperforms SVM with a classification accuracy of 70%, indicating that CNN has significant potential for classifying disease stages through spectral data. This innovative method has the potential to transform arthroscopy into a quantitative tool, providing a more accurate and efficient means of assessing cartilage health and guiding therapeutic interventions, thereby bringing substantial improvements to clinical practice.

Oral Session 6

Applied Pharmacy and Biomedical Research

10:00-11:45, June 16, 2024, Sunday (GMT+9)

Venue: Room 105 (1F)

Session Chair: Assist. Prof. Pongphan Leelatien, Thammasat University, Thailand

S6-1	10:00-10:15 SE3004-A	Real-time Mass Spectrometry Analysis Technology for Detecting Drugs in Food Feng Zhang and **Tong Liu** Chinese Academy of Inspection and Quarantine, China Abstract: The variety of food types, lengthy supply chains, and regulatory challenges make ensuring food safety a complex issue. Detection technology serves as a crucial tools to ensure food safety. However, existing detection technologies face limitations, including long sample pre-treatment times, complex operations, and slow detection speeds. Facing these challenges, we have developed a series of novel, highly selective electrospray mass spectrometry (MS) ionization sources by integrated separation materials such as molecularly imprinted polymers (MIP), covalent organic framework (COF), graphene oxide (GO), and immunoaffinity materials with solid substrate materials. These ionization sources are designed to purify complex food sample matrices before ionizing target substances. Based on the novel ionization sources, real-time MS detection methods have been established for the analysis of various drug residues in food, such as sulfonamide antibiotics, zearalenone mycotoxins, and carbamate insecticides. These methods significantly reduce detection time from several hours to a few seconds, and increase sensitivity by more than tenfold, thereby overcoming the key challenges of accuracy and speed in on-site food safety detection technology. This research provides a powerful and portable tool for both rapid analysis and reliable on-site detection of drug residues in food.
S6-2	10:15-10:30 SE0065	A Compact T-arc-shaped Implantable Antenna for Biomedical Devices **Pongphan Leelatien** Thammasat University, Thailand Abstract: This paper reports on a single-fed compact slotted implantable patch antenna for biomedical applications. The proposed antenna operates at 915 MHz in the industrial, scientific, and medical (ISM) band. The antenna design features a single T-arc-shaped slot loading on the patch. The antenna is developed using Rogers 3010 as both the substrate and the superstrate. The reported antenna occupies a small volume of π×4^2×1.27 mm3. It covers the broad bandwidth from 860 to 968 MHz (108 MHz) and exhibits the return loss value of -30.6 dB at the resonant frequency. To address patient safety concerns, the specific absorption rate (SAR) calculation was performed within muscle tissue. The biocompatibility issue for actual implementations was also addressed by means of two commonly utilized methods. These findings suggest the potential of the proposed antenna for implant biomedical applications.
S6-3	10:30-10:45	The Annotation of Protein-protein Interactions and Functional Terms for Breast Cancer

	SE0095-A	Candidate Genes **Chloe Yu** Union County Academy for Allied Health Sciences, USA Abstract: The identification of clusters of significant miRNA–mRNA interaction networks is important in characterizing their functional relationships in tumor and normal samples of the cancer types to help with diagnostic and therapeutic purposes. Our previous research study has reported lists of significant miRNA–mRNA pairs, which were used to further employ bioinformatics tools to analyze TCGA Breast Cancer (BRCA) for interaction patterns between the clusters. We evaluated protein-protein interaction (PPI) patterns and tested the functional enrichment of biological terms among the eight important clusters found previously. The protein-protein interaction cut off score was greater than 0.7 and for the Database for Annotation, Visualization and Integrated Discovery (DAVID) functional annotation enrichment cut off false discover rate (FDR) was less than 0.1. The average Interaction Prevalance (IP) is 0.71, the greatest is 1.53, and the smallest is 0.309 among significant interaction clusters. Terms like Zinc-finger and Transcription were found to be shared by three clusters. These results indicate that the proteins tend to interact together to play certain biological roles in tumorigenesis of BRCA. Our research provided the guidance for scientists to further evaluate the clinical relevance of the candidate biomarkers in the context of miRNA post-transcriptional regulation.
S6-4	10:45-11:00 SE3002-A	Mechanism of Antioxidant Activity from Active Pharmaceutical Ingredients in Amorphous Solid Dispersion **Arif Budiman**, Gloria Mahayarni Lastiar Sitinjak, Zulfa Tavira Al Fath, Arina Ghaida Faza Rahmani, Ai Syipa Ulfah Paujiah, Bilqisti Kanzabila Karim, Priskila Margaretha, Laila Subra, and Diah Lia Aulifa Universitas Padjadjaran, Indonesia Abstract: Poor bioavailability is one of the major problems in drug delivery associated with oral routes. Approximately 80% of active pharmaceutical ingredients (API), including antioxidant compounds (ACs), are poorly water-soluble. Thus, antioxidant activity should be inefficient in preventing disease when orally administered. Amorphous solid dispersion (ASD) is one of the promising strategies to enhance the aqueous solubility, bioavailability, and antioxidant activity of poorly water-soluble API. The presence of a polymer can stabilize amorphous API in the formulations and maintain a high supersaturation in bulk medium. Even though several studies reported ASD systems in the solubility improvement of ACs, there is limited research fully discussing the topic. Therefore, this study aimed to summarize the mechanisms of ASD system, particularly the impact on antioxidant activity of poorly water-soluble API. The study provided an overview with a detailed discussion of improvement in the solubility and antioxidant activity of poorly water-soluble API based on molecular pharmaceutics. A thorough understanding antioxidant activity of poorly water-soluble API was important for the rational design of the products, specifically for oral dosage forms.
S6-5	11:00-11:15 SE2031	Exploration of Ethnoveterinary Medicine for Cattle's Lumpy Skin Disease in Indonesia: Narrative Review **Zakky Cholisoh**, Ahda M. U. Nurinnafi'a, Suranto Suranto, and Erindyah R. Wikantyasning

		Universitas Muhammadiyah Surakarta, Indonesia Abstract: Objective: Lumpy Skin Disease (LSD) is a condition characterized by the development of nodules on the skin of affected cattle. Typically, it impacts bovine animals such as cattle and buffalo. Ethnoveterinary medicine focuses on the application of traditional medicine to animals. The efficacy of traditional medicine in addressing the symptoms of lumpy skin condition was established through empirical research. Farmers can utilize medicinal plants from traditional medicine to treat bovine LSD. The primary objective of LSD treatment in cattle is to address the clinical symptoms. The objective of this study was to examine the use of LSD treatment in indigenous medicine in Indonesia. Methods: A review was conducted primarily targeting traditional medicines that have gained interest as potential treatments for cattle infected with LSDV. Government authorities have specifically advised some precautions, while national mass media has raised awareness about further measures. Results: The screening result indicates that there are 9 plant species that can be used in the traditional treatment of cattle to cure LSD e.g. Nicotiana tabacum, Acorus calamus, Allium sativum, Annona muricata, Piper betle, Zingiber officinale, Curcuma xanthorrhiza, Kaempferia galanga, and Curcuma domestica, which have antimicrobial, anti-inflammatory, antioxidant, analgesic, immunostimulant, antidepressant, wound healing, and insect/larvae repellant. This research aims to contribute to the advancement of LSD treatment using conventional herbal remedies. Conclusion: Evidence from the study revealed the significance of said plants against LSDV especially in Indonesia.
S6-6	11:15-11:30 SE0006	Recovery and Care after Coronary Artery Bypass Graft Surgery under On-pump and Off-pump Circulation for Coronary Atherosclerotic Heart Disease **Chunling Guo**, Jing Hu, and Fangfei Liu Northwest Institute of Mechanical & Electrical Engineering, China Abstract: Coronary atherosclerotic heart disease (CAD), also known as ischemic cardiomyopathy, is the leading cause of death worldwide. There are two types of treatment: extracorporeal coronary artery bypass grafting (CABG) and off-extracorporeal coronary artery bypass grafting (OPCAB). However, these two types of surgery have their own advantages and disadvantages, and it is necessary to choose the treatment method reasonably according to the condition. This paper summarizes the influence of two kinds of treatment on the postoperative recovery of patients, and summarizes the points of attention of patients' postoperative nursing and life, aiming at providing theoretical guidance and help for the postoperative recovery and nursing of CAD patients.
S6-7	11:30-11:45 SE2016	Evaluation of the Determination and Implementation of Beyond-Use Date (Bud) to Non-Sterile Extemporaneous Compounded Medicines by Pharmacists in Sukoharjo Indonesia **Hidayah Karuniawati** and Marsilia Rosa Sinensis Hi Universitas Muhammadiyah Surakarta, Indonesia Abstract: Objective: This research aims to evaluate the determination and implementation of beyond-use date (BUD) for extemporaneously compounded medicines from non-sterile drugs by pharmacists and the factors that influence it. Methods: This research is a non-experimental cross-sectional study that used a validated questionnaire with the cluster sampling method

		applied to select pharmacists. The data were analyzed statistically using the Mann-Whitney, Kruskal Wallis tests and Spearman Correlation. Results: Of the 127 pharmacists who participated, 107 (84.3%) were aged 26–45 years, 113 (89%) were women, 93 (73.2%) were married, and 125 (98.4%) had a bachelor's degree with a profession. Around 75%–77% of respondents calculate BUD on the extemporaneous compounded and mark BUD on the drug label or medicine packaging. Around 80% of pharmacists inform patients about BUD, but only 65% ensure that patients understand it. Age, education level, length of work experience, income, and marital status significantly influence the determination and implementation of BUD ($P<0.05$). Knowledge has a significant relationship with pharmacists' attitudes ($r = 0.836$) and behavior ($r = 0.646$) towards BUD. Conclusions: The role of pharmacists in determining and implementing BUD in extemporaneously compounded medicines needs to be improved to ensure maximum drug quality and safety, as well as optimal therapy.

Online Session

Computational Biology and Application of Intelligent

13:30-16:15, June 16, 2024, Sunday (GMT+9)

Meeting ID: 889 8613 8982, Link: https://zoom.us/j/88986138982

Session Chair: Assoc. Prof. Marwan El Rich, Khalifa University, UAE

Online-1	13:30-13:45 SE0073	DHCR24 is Upregulated in Cervical Cancer and Correlates with Immune Infiltration and Tumor Stemness **Dewang Wu**, Jun Zhou, Mei Tian, Haoyu Tian, Fengchen Liu, Jiale Xiong, and Yue Xu Wuhan University of Science and Technology, China Abstract: Cervical cancer is a condition that arises from the abnormal growth of cervical tissue into a malignant tumor. The primary cause of cervical cancer is infection with high-risk human papillomavirus (HPV), particularly HPV types 16 and 18. Cholesterol is a crucial element of cell membranes and a significant substance for cell signaling. DHCR24, also known as 24-dehydrocholesterol reductase, is a gene that encodes a flavin adenine dinucleotide (FAD)-dependent oxidoreductase. DHCR24 plays a role in cholesterol synthesis through the enzymes it encodes, which in turn affects lipid metabolism and various pathophysiological processes [1]. Studies have shown that variants in the DHCR24 gene can cause the rare syndrome of multiple tissue congenital anomalies [1]. In this study, we analyzed the role of DHCR24 in the development and prognosis of cervical cancer through informatics analysis. We used the online website TIMER to evaluate the transcriptional profiles of DHCR24 in pan-cancer and cervical cancer, respectively. DHCR24 mRNA overexpression was evaluated in cervical cancer and 18 other types of cancer. GSEA analysis revealed that DHCR24 was associated with cell cycle and tumor cell adhesion molecules, and its expression might be related to the proliferation and migration of cervical cancer cells, as well as the stem cell capacity of tumor cells. Additionally, the relationship between DHCR24 expression level and immune cell infiltration was analyzed using XIANTAO and TIMER tools. The study found a negative correlation between most immune infiltrating cells and the upregulation of DHCR24. These results suggest that DHCR24 may be a marker for the diagnosis of cervical cancer and may be associated with its progression.
Online-2	13:45-14:00 SE0001	To Explore the MECHANISM OF ICARIIN on Depression based on GEO Differential Gene Chip Data and Network Pharmacology **Heming Xue** and Hui Shen Shandong University of Traditional Chinese Medicine, China Abstract: To analyze the molecular mechanism of Icariin in the treatment of depression based on network pharmacology and bioinformatics technology. The targets of the Icariin were predicted by Swiss Target Prediction. At the same time,the GEO database was searched for data sets related to depression. The drug targets and disease targets were imported into Cytoscape to construct a protein-protein interaction (PPI) network to obtain key genes. The key genes were imported into the Metascape platform for GO enrichment analysis and KEGG

		signaling pathway analysis. Results: A total of 108 drug targets were obtained. 13823 depression-related targets were retrieved.A total of 91 drug-disease intersection genes were obtained.A total of 1667 GO entries were selected, including 1434 biological processes (BP), 85 cellular components (CC) and 148 molecular functions (MF).KEGG Pathway Analysis of 111 possible pathways for the treatment of depression.The molecular docking results indicate that all the small molecules can enter the active center of the target protein. Icariin in the treatment of depression has the characteristics of multiple components, multiple pathways and multiple targets. Among them, the key genes are TNF、HSP90AA1、BDNF、HIF1A、TLR4. Important pathways are Neurotrophin signaling pathway, The HIF-1 signaling pathway, The c-type lectin receptor signaling pathway, Adipocytokine signaling pathway, and Thyroid hormone signaling pathway. They may play a combined role in the treatment of depression.
Online-3	14:00-14:15 SE0078	Effect of COMP on Colorectal Cancer Cell Migration **Haoyu Tian**, Meitong Zhou, Dongcheng Qin, Dewang Wu, Fengchen Liu, Dandan Zhang, Xiaoshuai Ren, and Jun Zhou Wuhan University of Science and Technology, China Abstract: A publicly accessible online database was utilized in this study to investigate COMP, which is aberrantly expressed in a range of malignancies. It was discovered that colorectal cancer had significant levels of COMP expression. This finding was corroborated by Western Blot and RT-qPCR analysis tests on colorectal cancer cell lines. In order to study the effect of COMP on colorectal cancer migration, we investigated the expression of mRNA and protein levels in colorectal cancer cell lines knocked down by COMP, and the effect of COMP on the migration of SW480 cell line was studied using Transwell, wound healing assay. The findings demonstrated that the migration of colorectal cancer cell lines was suppressed by COMP expression knockdown. These findings offer a theoretical foundation for the use of COMP as a novel clinical treatment target and possible marker for the identification of colorectal cancer metastases.
Online-4	14:15-14:30 SE0082	Diffusion Abnormalities in Mesial Temporal Lobe Epilepsy **Maria Celeste Bonacci**, Maria Eugenia Caligiuri, Ilaria Sammarra, and Antonio Gambardella Magna Graecia University, Italy Abstract: Diffusion Tensor Imaging (DTI) is a non-invasive method to study integrity of fibers in white matter and could help detect microstructural alterations in MRI data not necessarily associated with volumetric or structural variations. In this study, we used DTI to identify changes in fractional anisotropy (FA) and mean diffusivity (MD) in temporal and extratemporal white matter in patients with mild MTLE (mMTLE) and drug-resistant MTLE (rMTLE) compared to Healthy Controls (HC). In this study we enrolled 21 mMTLE, 17 rMTLE and 31 age and sex matched HC. For each subject, FA and MD were extracted from the following regions of interest (ROI): right and left hippocampi, right and left white matter and gray matter of temporal lobe. In all MTLE patients we classified right and left ROI such as ipsilateral and contralateral zone according to epileptogenic activity on EEG. We investigated group-wise differences using ANOVA followed by Tukey's test setting threshold to < 0.05. In all tests, we found decreased FA in both mMTLE and rMTLE compared to HC, paralleled increased MD in all temporal white matter regions. These results were also confirmed

		classifying all ROIs as ipsilateral or contralateral to EEG side. These alterations support the idea that DTI measurements could help to individuate drug-resistant in patients with MTLE.
Online-5	14:30-14:45 SE0083	gSlider RF Encoded MR Fingerprinting with Thin Slice Thickness, High Accuracy and Reproducibility **Dakun Hu**, Huihui Ye, and Huafeng Liu Zhejiang University, China Abstract: As one of the most promising multi-parameter quantitative MRI techniques, MRF also suffers from the problem of insufficient imaging resolution. To this end, we introduced the radio frequency encoding idea of gSlider, which has been successful in the field of dMRI, into MRF and proposed MRF-gSlider, which improves the slice resolution of imaging results while maintaining high SNR based on the original advantages of MRF. In order to verify the effectiveness of this method, we designed a series of phantom and in vivo experiments, and conducted comprehensive evaluation and analysis. Experimental results show that the proposed method performs well in multiple dimensions such as quantitative accuracy, consistency, and repeatability, showing its practical significance for clinical application and scientific research.
Online-6	14:45-15:00 SE1004	Research on Optical Properties of Skin Phantom Based on Lambert-Beer's Law **Rui Hou**, Zhihui Zhao, Ling Fu, Zhiqiang Hou, and Lingkai Gong Shanghai Institute of Measurement and Testing Technology, China Abstract: In this paper, based on Lambert-Beer's law and the optical properties of human skin tissue, black, purple and yellow silica gel optical phantoms for simulating melanin, hemoglobin and bilirubin were designed for the calibration of percutaneous jaundice meters. In order to characterize the optical properties of the phantom, melanin, hemoglobin and bilirubin solutions were prepared. The absorbance spectra of the solution and the phantom were measured and compared.The absorbance and concentration of bilirubin were fitted by least square method. The test results show that the developed phantom has good consistency with the absorbance spectrum of the solution, and has good stability, which can be used as a standard for calibrating the percutaneous jaundice meters.
Online-7	15:00-15:15 SE0081	Enhancing the Mental Health of College Students: An Emotional Robot Design Based on CNNs and Smart Wearable Devices Xitian Tan, Liying Zhu, Yaowen Liang, Michun Wang, and **Sha Ma** Guangdong Medical University, China Abstract: As modern life speeds up, mental health issues increasingly affect people's well-being. Current mental health apps often offer basic features, relying on questionnaires. This paper introduces a WeChat applet "Emotion Bot" leveraging CNN and wearable devices for comprehensive mental health analysis. Gathering data enables a thorough evaluation of mental health status, aiding in better understanding and management. The applet aims to address the limitations of existing mobile-based psychological intervention systems. The "Emotion Bot" WeChat applet integrates data visualization, facial recognition, and mental health questionnaires for convenient and personalized mental health management. It offers enhanced convenience and inclusivity in approaching mental health, emphasizing holistic

		well-being for individuals.
Online-8	15:15-15:30 SE2020	Research on Mechanism of Shenling Baizhu San on Diabetic Obesity Based on Meta-Analysis and Network Pharmacology Xiaoling Zhou, Liping Tang, **Diyao Wu**, and Xinyou Zhang Jiangxi University of Chinese Medicine, China Abstract: Objective To evaluate the therapeutic effects of Shenling Baizhu San on diabetic obesity by literature meta-analysis, and analyze the mechanism of Shenling Baizhu San on diabetic obesity by combining network pharmacology and animal experiment methods. Methods 1.Relevant literatures at home and abroad were included. The BMI, glycosylated hemoglobin (HbA1c), 2h postprandial blood glucose (2hPG), fasting blood glucose (FBG), Homa-IR, waist-to-hip ratio were used as outcome indicators to evaluate the effects of Shenling Baizhu San on diabetic obesity. 2.The related genes of diabetes obesity in GEO chip were downloaded, and the targets of Shenling Baizhu San were downloaded in TCMSP, TCMID and BATMAN-TCM. Protein interaction analysis was carried out on the intersection targets of the two, and then the core target protein was screened out based on topological analysis. 3.The model of diabetic obese mice was established, and the mice were treated with Shenling Baizhu San after grouping. After two weeks, the body mass, blood sugar and Lee's index of mice in each group were measured. The volume changes of adipocytes in each group were analyzed by Hematoxylin-Eosin method, and the concentrations of cholesterol, triglyceride and core target protein in mice serum were measured. Results 1.A total of 9 literatures were included, the data were complete, no publication bias was found, and the evaluation was low risk. After administration of Shenling Baizhu San, the BMI, HbA1c, 2hPG, FBG, Homa-IR and waist-hip ratio of the patients were significantly improved. 2. There were 337 genes related to diabetes obesity, 2067 targets of Shenling Baizhu San and 59 intersecting targets. There were 7 signal pathways related to the effect of Shenling Baizhu San on diabetes obesity, including Biosynthesis of unsaved fatty acids, Fatty acid metabolism and so on. 3. The results of animal experiment showed that the blood glucose of mice treated with Shenling Baizhu San was not significantly changed, the body weight and Lee's index showed a significant downward trend, the fat cells were significantly reduced, and the contents of cholesterol and triglyceride, the concentration of APO-E, IGF-1 and PAI-1 protein showed a downward trend. Conclusion Based on the results of meta-analysis and animal experiments, Shenling Baizhu San had obvious therapeutic effect on diabetic obesity, and its mechanism may be related to influencing the synthesis of unsaturated fatty acids and fatty acids, reducing the transformation of glucose and fat, correcting the imbalance of energy metabolism in the body, and promoting the decomposition of adipose tissue by up-regulating autophagy.
Online-9	15:30-15:45 SE2003-A	Anti-Biofilm and Bacteriostatic Effects of Three Flavonoid Compounds on Streptococcus Mutans **Li Yan** Xinjiang Medical University, China Abstract: Streptococcus mutans (S. mutans) is the main cariogenic pathogen associated with dental caries. Orientin-2''-O- β -L-galactoside, orientin and vitexin are natural flavonoids compound. In this study, the antibacterial ability of these flavonoids and their mechanisms in

		inhibiting S. mutans biofilm formation were investigated. Inhibition zone and 2-fold-dilution tests showed that these flavonoids exerted inhibitory effects on S. mutans. Phenol sulfuric acid method and lactate dehydrogenase (LDH) test revealed that they could reduce EPS formation and stimulate S. mutans to release LDH. Moreover, crystal violet and live/dead bacterial staining test showed that they inhibited biofilm formation. Finally, qRT-PCR test indicated that the down-regulated the transcription levels of spaP, srtA, brpA, gtfB and luxS genes of S. mutans. In conclusion, orientin- 2''-O- β -L-galactoside, orientin and vitexin had antibacterial and anti-biofilm activities.
Online-10	15:45-16:00 SE0087	A Finite Element Study of the Universality and Scalability of an Optimized Universal Talus Implant **Ahmed Hassan Hafez**, Kinda Khalaf, Herbert Franz Jelinek, Tao Liu, Nadr Jomha, Andreas Schiffer, and Marwan El-Rich Khalifa University, UAE Abstract: Total talus replacement is an alternative treatment to ankle fusion for talus fractures resulting from avascular necrosis and collapse. It involves the complete replacement of the human talus bone with an artificial implant that allows for maintaining ankle joint functionality. Universal talus implants have been proposed and proved feasible as a replacement for custom-made ones, reducing costs and implant development times. Nevertheless, the universal implants remain heavy given their solid nature and materials used, leading to an unnatural feel and potentially further complications for the patient. Consequently, the implants have been redesigned using topology optimization, resulting in significantly lighter implants with high safety factors when simulated under three common foot postures, namely neutral, dorsi- and plantar-flexion, for a single human subject's ankle joint geometry. Therefore, in order to evaluate the universality and scalability of the optimized universal implant, it was scaled to different sizes, for three different bone geometries, under the aforementioned postures. Its performance in terms of stress distributions in the implant in addition to the contact characteristics with the surrounding bone cartilages was studied using finite element analysis. When scaled to smaller or larger sizes, depending on the subject, the resulting safety factors for subjects 1-3 were 4.65, 3.19, and 4.33, respectively, for maximum von Mises stresses (in MPa) of 236.4, 344.6, and 254.1, respectively, deeming the optimized implant scalable. Similarly, in addition to the obtained stresses, the contact characteristics were in agreement with the expected implant behavior on the surrounding bone cartilages. Thus, 2 the implant was also deemed universal after behaving as intended under different sizes for different bone geometries. Ultimately, while mechanical testing is required to determine clinical feasibility, it is currently not necessitated that the previously-developed universal implant be re-optimized.
Online-11	16:00-16:15 SE0084	Molecular Docking of Bioactive Components of Tawa-Tawa (Euphorbia hirta L.) Leaves as Inhibitor Against Galactofuranosyltransferase 2 (4FIX) of Mycobacterium Tuberculosis **Conrado Pineda Monterola**, Angela Amor Balagon, Jasper Allen Juanillo Gonzales, and Patrick Zen Aerol Tongson Zabala Mapua Malayan Colleges Laguna, Philippines Abstract: Tuberculosis (TB) continues to pose a significant global health challenge,

		necessitating innovative therapeutic approaches. This study delves into the potential of Tawa-Tawa (Euphorbia hirta L.) leaf constituents as inhibitors against Galactofuranosyltransferase 2 (4FIX) of Mycobacterium tuberculosis (Mtb). Through molecular docking simulations utilizing AutoDock Vina, we determine the binding affinity between bioactive compounds and the target enzyme. The historical medicinal use of Tawa-Tawa, alongside its well-documented antioxidant and antimicrobial properties, underscores the importance of this investigation. Our analysis, including ligand-protein interactions and pharmacokinetic properties gleaned from ADMETox analysis, aids in the identification of promising anti-TB drug candidates. Notably, among the eighteen potential drugs from Tawa-Tawa, ten exhibit superior binding affinity compared to the natural substrate UDP-Galf. Of these, Corilagin emerges with the highest binding affinity score of -11.7 kcal/mol, a significant improvement over UDP-Galf's -8.7 kcal/mol. Furthermore, Corilagin demonstrates favorable results in ADMETox toxicity tests, enhancing its potential as a viable anti-TB therapeutic candidate. These findings underscore the potential of Tawa-Tawa derived compounds as compelling candidates for further development as anti-TB therapeutics.

Poster Session

Bioinformatics, Intelligent Medical Technology, and Pharmacy

15:00-17:00, June 15, 2024, Saturday (GMT+9)

Venue: Room 101 (1F) &Room 105 (1F)

P-1	SE0012-A	Exploring Vital Genes and their Interactions: A Logic Tree-based Ensemble Algorithm **Yu-Chung Wei** National Changhua University of Education, Taiwan Abstract: Single Nucleotide Polymorphisms (SNPs) and their interactions are pivotal in Genome-Wide Association Studies (GWAS) for disease research. While statistical methods struggle to pinpoint precise interactions amidst a plethora of features, machine-learning approaches offer enhanced prediction accuracy but lack interpretability, hindering their application in biomedical fields. Logic regression, despite its interpretability, may falter in reliably detecting interactions due to the abundance of features in GWAS, resulting in decreased prediction accuracy. To bridge this gap, we propose the iterative weighted Logic Forest (iwLF) algorithm, amalgamating statistical and machine-learning concepts. By employing ensemble learning and logic trees as base learners with two weight settings, iwLF surpasses logic tree models in predictive accuracy and stability, efficiently identifying significant features and interactions in both simulated and real data sets.
P-2	SE0089-A	Quantitative Assessment of Prodromal Parkinson's Disease Based on Temporal and Spatial Characteristics of Rapid Automatic Movement of the Fingers **Wei-Chun Wang**, Chuang-Chien Chien Chiu, and Shoou-Jeng Yeh Feng Chia University, Taiwan Abstract: Parkinson's disease (PD) is a chronic neurodegenerative disorder for which there is currently no effective cure. Due to the time-consuming and cumbersome nature of existing clinical assessments, as well as the lack of a simple, low-cost, and effective quantitative evaluation system, prodromal symptoms often go unnoticed or cannot be continuously monitored in a timely manner. This study aims to quantitatively assess hand function impairment in patients with prodromal Parkinson's disease (PPD) using the rapid automatic movement (RAM) of the fingers. The RAM involves the sequential tapping of the thumb with all four fingers of both hands in five cycles, a procedure distinct from the finger tapping test used in the unified Parkinson's disease rating scale (UPDRS). Twenty-two subjects with PPD, eight Parkinson's disease (PD) patients, and eight healthy control subjects (HCs) were recruited from the Taichung Cheng-Ching General Hospital, Taiwan. Motion signals were acquired using visual imaging and hand pose estimation techniques. The results revealed that the RAM tapping time of both PPD and PD patients takes longer than that of HCs with statistically significant differences. On the other hand, an enslavement index was calculated to quantify the degree of finger enslavement in the subjects. The finding indicated that patients with both PPD and PD exhibited a greater enslaving effect

		during finger tapping compared to HCs. This research concludes that the proposed quantitative assessment is helpful for early detection of hand function deterioration in PPD subjects, and validates the use of RAM as a convenient method for the assessment of PD.
P-3	SE0031-A	Unraveling EEG Dynamics: Novel Methods for Subject Grouping and Pattern Identification **ShengLi Tzeng** and Terence Huang National Sun Yat-sen University, Taiwan Abstract: This study aims to utilize two-mode clustering and constrained spatio-temporal division methods to identify valuable features for grouping subjects based on their multi-channel electroencephalography (EEG) profiles. The topographic map of EEG signals from scalp electrodes can consist of multiple simpler sub-topographic maps, each representing an electrical source with distinct spatial or temporal characteristics. By pinpointing dominant spatio-temporal patterns with localized traits, interpretation becomes more manageable, facilitating intuitive reconstruction in neuroimaging. Unlike most studies in the literature, our framework accommodates individual topological differences of each subject. To achieve this, we initially segment subjects' data across different times and spaces into locally connected units using constrained partition approaches, and subsequently regard the entire topological structure as composed of these units. Additionally, we employ an expectation-maximization algorithm, originally designed for data-fusion techniques in geoscience, to automatically determine spatio-temporal features and subject groups. The entire analysis workflow described above was applied to a publicly available EEG database, demonstrating the effectiveness of our method in revealing meaningful patterns in EEG data and providing insights into underlying neural processes and complex brain dynamics.
P-4	SE0034-A	The Study of Non-Invasive Blood Information Measurement and Monitoring Method via Wearable AWPPG Device **Chi Fu Chung**, Shu Kai Chang, Po Wen Lu, and Cheng Chun Chang National Taipei University of Technology, Taiwan Abstract: In recent years, with the proliferation of wearable devices, wearable watches and wristbands capable of measuring physiological information have become indispensable tools for many in modern society. These wearable devices allow individuals to monitor real-time physiological data, such as heart rate, blood pressure, and blood oxygen concentration, to maintain their health. However, there is currently no non-invasive method available on the market for measuring blood-related information within the human body. Therefore, this study aims to investigate whether wearable devices can provide a non-invasive means of acquiring blood-related information through related signal processing algorithms and neural network models, utilizing an All-Wavelength Photoplethysmography (AWPPG) approach combined with neural network models for accurate measurement of blood information. The research is divided into three main components: the development of a non-invasive wearable device, the collection of blood information in a clinical setting, and the exploration of onedimensional signal algorithm models. Currently, we have collected blood-related data at the hospital using our selfdeveloped AWPPG measurement device. We have also trained artificial intelligence models for various blood parameters. The accuracy rate for blood glucose is seventy percent, while for hemoglobin, platelet count,

		sodium ion concentration, calcium ion concentration, and total protein content, the accuracy rate is approximately sixty to seventy percent.
P-5	SE0028-A	Bayesian Gene Selection Methods for Population Genetic Data **Miao-Yu Tsai** National Changhua University of Education, Taiwan Abstract: The stochastic search variable selection (SSVS) method is a Bayesian procedure used to identify “promising” subsets of explanatory variables by using a Gibbs sampling algorithm and specifying hierarchical mixture priors. However, SSVS is computationally intensive when the number of explanatory variables and/or subjects is large. Therefore, to reduce the computational load, we used a special form of the reversible jump Markov chain Monte Carlo (RJMCMC) method, the Holmes and Held algorithm (HH algorithm), to perform variable selection. In this research, we compared the computational efficiency, accuracy, and sensitivity to prior specifications of the SSVS and HH methods for gene selection in generalized linear mixed models (GLMMs). Applying the methods using two population genetic datasets, the HapMap and bipolar disorder (BD) datasets, provided evidence that the HH algorithm is a computationally efficient and reliable selection method that can be used to identify true candidate genes and gene–gene associations after adjusting for complex structures among clusters.
P-6	SE0060-A	On the Development of Anemia Measurement Using Smartphone **Cheng-Chun Chang**, Shun-Ya Chang, Shu-Kai Chang, Jian-Cheng Lin, and Po-Wen Lu National Taipei University of Technology, Taiwan Abstract: Anemia is a global health issue. There are around 2 billion patients in the world. Traditionally, diagnosing anemia requires invasive blood tests. However, in recent years, the emergence of the big health industry, the proliferation of big data technologies, and the widespread adoption of artificial intelligence have sparked discussions on utilizing non-invasive methods for accurate detection of anemia. While there have been related studies conducted abroad, it is lacking suitable datasets tailored to Taiwanese patients for corresponding neural network models. This project aims to develop a mobile application that integrates neural network models for non-invasive anemia detection. After capturing the images of eyelids, the mobile application performs a series of steps processing the image in order to detect anemia. This includes environmental light correction algorithms, image correction algorithms, automatic photo detection, and an anemia prediction model. This enables users to quickly understand the status of anemia through an efficient and user-friendly interface. Utilizing non-invasive methods allows early detection of anemia before it gets worse, alerting patients to seek further treatment. It also enables real-time monitoring through photo capture at home, thus being a step toward telemedicine.
P-7	SE2017-A	Development Of Polymeric Buccoadhesive Famotidine Hydrogel **Mohammad H. Alyami** and Mohammad F Bayan Philadelphia University, Jordan Abstract— Objectives: Famotidine works by blocking histamine H2-receptors. It's frequently employed to treat stomach ulcers, Zollinger-Ellison syndrome, duodenal ulcers, and

		gastroesophageal reflux disease. Mucoadhesive hydrogels were created with a low concentration to avoid presystemic purging of Famotidine in the gastrointestinal tract and to improve the residence period in the oral cavity. Methods: An Orifice ionotropic gelation process was used to create the Famotidine buccoadhesive hydrogel beads, which are ideally suited to subsequent formulations. The polymers and solvent used produced a higher percentage yield of hydrogels (HPMC K100, sodium alginate, carbopol, and SCMC). Results: The selected polymers do not significantly interact with the famotidine, as demonstrated by FTIR, DSC, and physical observation. The physicochemical features such as swelling index, gel fraction, and water uptake tests were determined. In-vitro release experiments were done on all formulations, and the results revealed a regulated release profile of the famotidine for up to 11 hours. Surface characteristics analysis (SEM images) revealed a acceptable spherical shape and external structural characteristics. The in vitro release rate was compared to the commercial formulation. All formulations yielded satisfactory results, and F13 performed the finest when related to the others. In-vitro, in-vivo, and ex-vivo experiments demonstrated a good correlation and the formulation's capacity to recreate the in-vitro release studies. The stability studies revealed that the formulations were stable for a longer duration. Conclusion: Famotidine mucoadhesive oral hydrogel beads minimize pre-systemic elimination, increase oral cavity residence time, maximise bioavailability, reduce side effects, and improve patient adherence.
P-8	SE2005-A	Synthesis and Anti-Inflammatory Properties in Vitro of Urolithin A Derivatives Conjugated with Neurotransmitters **Maciej Korczak**, Sheyda Bahiraii, Piotr Roszkowski, Sebastian Granica, Elke Heiss, Jakub Piwowarski Medical University of Warsaw, Poland Abstract: Urolithin A (UA) is a postbiotic metabolite with potent biological activity, including anti-inflammatory and anti-aging properties. In vivo, UA rapidly conjugates with glucuronic acid, rendering its biologically inactive metabolites. To overcome the limitations of UA, we synthesized a series of new UA derivatives (UADs) conjugated with nonsteroidal anti-inflammatory drugs and assessed their identity, stability, anti-inflammatory properties, and intestinal bioavailability. Recently, we proposed the synthesis of novel UADs linked with neurotransmitters – serotonin (UASer) and dopamine (UADop). The purity of the obtained compounds was confirmed using HPLC-MS/MS and NMR techniques. Subsequently, we measured the cytotoxicity and anti-inflammatory properties of novel UADs using immortalized bone marrow-derived macrophages. qPCR experiments revealed that both UASer and UADop reduced levels of inflammatory markers, including IL-1β, IL-6, iNOS, and TNF-α. Additionally, we investigated the impact of UASer and UADop on NF- κB and Nrf2 signaling using reporter cell lines: NF-kB LUC – HEK and HepG2 ARE LUC cells. In conclusion, our results present a promising approach in the structural modification of gut-microbiota-derived compounds and serve as a starting point for further studies focused on an application of UADs in the neuroinflammation. Project financially supported by Polish National Science Centre research grant Preludium Bis No. UMO-2019/35/O/NZ7/00619
P-9	SE2014	Electrochemical Determination of Kasugamycin based on Metal-ion Assisted Molecularly Imprinted Polymers

		Ali Omar Alqarni, Ashraf Mohamed Mohamed Mahmoud, Mohamed Mahmoud Elwakeel, and Samer Sami Aburub Najran University, Saudi Arabia Abstract: A novel electrochemical sensing approach was developed for the detection of the agricultural antibiotic drug kasugamycin. The method involves the construction of an electrochemical sensor comprising molecularly-imprinted polymers (MIPs) embedded within a carbon paste (CP) matrix. The MIPs are designed to have imprinted sites that match the size and geometry of the Cu(II)-kasugamycin coordinated complex. Upon removal of kasugamycin, cavities suitable for the drug's entrance are formed within the MIPs. The presence of Cu(II) facilitates the detection of the drug by generating a redox signal of Cu(II)-Cu(I), which can be easily detected using differential pulse voltammetry (DPV). The signal response of Cu(II)-Cu(I) increases in the presence of the drug, promoting the accumulation of Cu(II) ions within the imprinted cavities. Under optimized conditions, the anodic peak (Ipa) signal of Cu(II)-Cu(I) exhibits an increase proportional to the concentration of kasugamycin within the range of 0.15-140 µM. The detection limit (LOD, S/N=3) achieved is 0.046 µM. The proposed sensor demonstrates several characteristic features including good stability, reliable performance, a low detection limit, and excellent selectivity. The Cu(II)-MIP@CP sensor was successfully used to detect kasugamycin in complex samples such as meat, milk, and cucumber, and the findings were satisfactory.
P-10	SE2008-A	Trimethoxychalcone-Based DHPMs: Design, Synthesis and Evalua-tion as Potent Broad-Spectrum Anticancer Agents with Potential VEGFR-2 Inhibitory Activity **Mater Mahnashi** and Mahrous A. Abou-Salim Najran University, Saudi Arabia Abstract: Cancer is an enormous burden for all worldwide. Herein, a novel series of 3,4,5-trimethoxychalcone-based multi-functional 1,4-dihydropyrimidines (CDHPM) was designed and synthesized as VEGFR-2 inhibitors. The designed analogs CDHPM-6a-g were evaluated for their anticancer activities towards a full panel of NCI-60 tumor cell lines with mean %inhi-bitions ranging from 76.40 to 147.69%. Among them, CDHPM-6e and CDHPM-6f demonstrated the highest MGI% of 147.69% and 140.24%, respectively. Compounds CDHPM-6a,b,d-f showed higher mean %inhibitory activity than the reference drug sorafenib (MGI% = 105.46%). Superiorly, the hybrid CDHPM -6e displayed the highest potencies towards all the herein tested subpanels of nine types of cancer with MGI50 of 1.83 µM. Also, it revealed potent cytostatic single-digit micromolar activity towards 58 cancer cell lines. The designed compounds CDHPM-6a-g were exposed as potent non-selective broad-spectrum anticancer agents over all NCI subpanels with an SI range: 0.66 – 1.97. In addition, the target analog CDHPM-6e revealed potency towards VEGFR-2 kinase comparable to sorafenib with a sub-micromolar IC50 value of 0.11 µM. Also, CDHPM-6e could effectively induce Sub-G1-phase arrest and prompt apoptosis via caspase and p53-dependent mechanisms. Compound CDHPM-6e revealed significant anti-metastatic activity as detected by wound healing assay. The modeling study implies that CDHPM-6e overlaid well with sorafenib and formed a strong H-bond in the DFG binding domain. The ADMETLab study hinted out that CDHPM-6e met Pfizer`s drug-likeness criteria. The presented novel

		potent anticancer agent merits further devotion as a new lead product in developing more chalcone-based VEGFR-2 inhibitors.

Note