

# **15th International Multi-Conference on Complexity, Informatics and Cybernetics (IMCIC 2024)**

Online  
26-29 March 2024

## **Editors:**

**Nagib Callaos  
Shigehiro Hashimoto  
Natalja Lace**

**Belkis Sánchez  
Michael Savoie**

ISBN: 978-1-7138-9521-3

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2024) by International Institute of Informatics and Systemics (IIS)  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact International Institute of Informatics and Systemics (IIS)  
at the address below.

International Institute of Informatics and Systemics (IIS)  
13750 West Colonial Dr.  
Suite 350-408  
Winter Garden, Florida 34787  
USA

Contact-us@iis.org

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: curran@proceedings.com  
Web: www.proceedings.com

## **TABLE OF CONTENTS**

<b>Table of Contents</b>	i
<b>Biomedical Engineering - Invited Session</b>	
<b>Organizers:</b> Shigehiro Hashimoto and Hirotooshi Hishida (Japan)	
Haramura, Ten; Hashimoto, Shigehiro (Japan): "Device for Sorting of Biological Cells"	1
Inuma, Sota; Hashimoto, Shigehiro (Japan): "Measurement of Biological Cell Deformability"	5
Ono, Ryuya; Hashimoto, Shigehiro (Japan): "Microchannel Design for Cell Sorting by Dielectrophoresis"	9
Saito, Keisuke; Hashimoto, Shigehiro (Japan): "Control of Biological Cell Orientation on Scaffold"	14
Takabe, Yuuki; Hashimoto, Shigehiro (Japan): "Effect of Periodical Wall Shear Stress on Cultured Cell: Design of Couette Flow Device"	20
Yamamoto, Kota; Hashimoto, Shigehiro (Japan): "Cell Sorting Using Diagonal Bottom Grooves in Microchannel"	27
<b>Computer Science and Engineering</b>	
Alshikhe, Rania *; Jindal, Vinita **; Harland, James * (* Australia, ** India): "Analyzing Spatiotemporal Congestion Value on Urban Road Networks Based on Taxi GPS Data"	32
Bouchet, Pierre; Toinard, Christian; Jacquot, Sophie (France): "A Passive Assessment of Homecare Need with a Rasch Model"	40
Brandão Júnior, Paulo S.; Shigaki, Yukio (Brazil): "Advancements in Digital Twin Application in the Metalforming Industry: State of the Art and Challenges"	46
Bustos, Henry; Camogliano, Josealdo; Subauste, Daniel (Peru): "Mobile Augmented Reality Application for Digital Storytelling in High School Education"	54
Djambazoff, Phil (Bulgaria): "Serverless Approach in Continued Integration Testing"	61
Domb, Menachem; Zadok, Ayelet (Israel): "Face Authentication by Constructing a 3D Face Image from 2D Face Images, and Encoding a Unique Identification"	65

Nenov, Hristo; Djambazoff, Phil (Bulgaria): "Benefits of Effective Root Cause Analysis in Software Testing"	70
Nenov, Hristo; Djambazoff, Phil (Bulgaria): "Financially Effective Intellectual Property Defense Through Secured Remote Testing"	75
Ortega Ortega, Martín; Ortega Ortega, Josué (Ecuador): "An Assessment of Voice Quality and QoS in Real VoIP Calls Using Multiple Voice Codecs"	79
Roman Mancuello, Jesus Gabriel; Rios Alvarez, Luis Fernando; Paciello Coronel, Julio Manuel; Mendez Xavier, Ellen Lujan; Von Lucken Martinez, Christian Daniel (Paraguay): "Identifying the Features of Graduated Students of the Computer Science Degree of the National University of Asuncion"	89
Wu, Yung Gi; Chen, Jwu Jenq; Xie, Jia Ying (Taiwan): "Applying Intelligent System to Sandplay Psychological Status Detection – Transdisciplinary Collaboration"	95

### **Health Sciences and Bio-Medical ICT**

Agustin, Antonni Mikela; Briones, Daryl John; Mallari, Miguel Alberto; Ong, Cristyanna Minda; Paboroquez, Annielov; Rufino, Neki Lora; Sanchez, Janna Mikaela; Adarlo, Genejane (Philippines): "Examining the Social Determinants of Seeking Help for Postpartum Mental Health"	100
Bautista, Karl Hendrick; Capillo, Jianna; Lopez, Mari Jazmin Ezekielle; Santos, Edgardo Javier; Severino, Ivan Matthew; Sio, Chloe Angela Mae; Tanchanco, Samantha Marie; Adarlo, Genejane; Eustaquio, Michelle Pia (Philippines): "The Influence of Needs Satisfaction and Support on the Well-Being of Physicians Deployed in Underserved Communities"	108
García-Gutiérrez, Fernando; Hernández-Lorenzo, Laura; Cabrera-Martín, María Nieves; Matias-Guiu, Jordi A.; Ayala, José L. (Spain): "Deep Learning for Predicting Cerebral Metabolism Changes Along the Alzheimer's Disease Continuum"	115
Soto Carrión, Carolina; Cervantes Carrión, Justina; Ccasani Contreras, Mariluz Roxana; De La Cruz Quispe, Fidel; Bravo Mendoza, Guido; Jimenez Mendoza, Wilber (Peru): "Iron Deficiency Anemia and Supplementation Practices with Polymaltosed Iron in Mothers with 4 - 5 Months Infants in a Rural Andean Health Center"	123
Tejada, Cledmir; Espinoza, Gustavo; Subauste, Daniel (Peru): "Use of Xception Architecture for the Classification of Skin Lesions"	129

### **ICT Applications in Education**

ElSayary, Areej (United Arab Emirates): "Integrating Generative AI in Active Learning Environments: Enhancing Metacognition and Technological Skills"	135
More Valencia, Rubén A.; Tume Ruíz, Juan M.; Rangel Vega, Antia; Puicon Zapata, Hoover A.; Saavedra Arango, Moises D. (Peru): "Exploring Programmatic Thinking: Efficient Code Generation in Programming Languages with Generative Artificial Intelligence for System Simulation"	139

## **ICT Applications in Social and Political Systems**

- Denchev, Stoyan; Peteva, Irena; Yordanova, Steliana (Bulgaria): "Information Literacy, Information Transparency and Information Accessibility – Distinctive Features of Cyber Security" 145
- Ebsen, Ty; Segall, Richard S.; Aboudja, Hyacinthe; Berleant, Daniel (USA): "A Customer Service Chatbot Using Python, Machine Learning, and Artificial Intelligence" 148
- Gutierrez, Bethania; Alfonzo, Ever; Paciello, Julio; von Lucken, Christian (Paraguay): "Paraguayan Sign Language Translation Using Machine Learning" 157
- Lee, Yen-Feng; Wang, Wei-Tsong (Taiwan): "The Model on Patent Investment Strategy of Technology Portfolio and Industrial Research" 159
- López San Martín, Matías; Núñez Benitez, David Ramon; Paciello Coronel, Julio Manuel; Pane Fernandez, Juan Ignacio (Paraguay): "Quantifying the Risk of Complaints in Public Procurement Tenders in Paraguay Using Machine Learning" 164

## **Towards Business Sophistication and Sustainability - Invited Session**

**Organizer:** Natalja Lace (Latvia)

- Babica, Viktorija; Sceulovs, Deniss (Latvia): "Business Processes in the Artificial Transformation of Industry 5.0" 170
- Bahmanova, Alona; Lace, Natalja (Latvia): "Cyber Risks: Systematic Literature Analysis" 177
- Bistrova, Julija; Lace, Natalja; Kasperovica, Ludmila (Latvia): "Start-up Support Efficiency Assessment" 185
- Kasperovica, Ludmila; Lace, Natalja; Ciemleja, Guna (Latvia): "Factors Influencing Positive Financial Performance: The Assessment Given by Latvian Companies" 192
- Mehmood, Khalid; Oganisjana, Karine; Lace, Natalja (Latvia): "How to Overcome the Challenges Faced to Enhance the Efficiency of Islamic Banking in the Asian Region" 200

## **Trans- and Inter-Disciplinary Research, Education, and Communication**

- Aky, Nathan (France): "How to Link Educational Purposes and Immersive Video Games Development? An Ontological Approach Proposal" 208
- Baracho, Renata Maria Abrantes; Santiago, Luiz Gustavo da Silva; Silva, Antonio Tagore Assumpção Mendoza e; Porto, Marcelo Franco (Brazil): "Application of Building Information Modeling (BIM) in the Planning and Construction of a Building" 216
- Baracho, Renata Maria Abrantes; Vidigal, Mozart Joaquim Magalhães; Porto, Marcelo Franco; Couto, Beatriz (Brazil): "Interdisciplinarity in Smart Systems Applied to Rural School Transport in Brazil" 222

Barile, Paolo; Bassano, Clara; Piciocchi, Paolo (Italy): "Transfer Learning for Facial Emotion Recognition on Small Datasets"	230
Dokladalova, Eva; Hamouche, Rédha; Kocik, Rémy (France): "From Expert Computational Knowledge to Interdisciplinary Communication"	235
Franzago, Eleonora; Casarotto, Claudia; Trolese, Matteo; Toson, Marica; Ruzza, Mirko; Dalla Pozza, Manuela; Manca, Grazia; Arcangeli, Giuseppe; Ferrè, Nicola; Bille, Laura (Italy): "New Online Tools for the Data Visualization of Bivalve Molluscs' Production Areas of Veneto Region"	240
Grant, Lukas; Tennyson, Matthew F.; Owen, Jason (USA): "D-CIDE: An Interactive Code Learning Program"	245
Kopishynska, Olena; Utkin, Yurii; Sliusar, Ihor; Flehantov, Leonid; Somych, Mykola; Yakovlieva, Oksana; Scryl, Olena (Ukraine): "Geodata Processing Methodology on GIS Platforms When Creating Spatial Development Plans of Territorial Communities: Case of Ukraine"	251
Kopishynska, Olena; Utkin, Yurii; Sliusar, Ihor; Makhmudov, Khanlar; Kalashnyk, Olena; Moroz, Svitlana; Kyrychenko, Olena (Ukraine): "Peculiarities of the Realization of IT Projects for the Implementation of ERP Systems on the Path of Digitalization of Territorial Communities Activities"	259
Leka, Adrian; Haxhiu, Brunilda (Albania): "Navigating the Missteps: An In-Depth Critique of Albania's Sex Offender Registry"	267
Makhachashvili, Rusudan; Semenist, Ivan (Ukraine): "Transformative, Transdisciplinary, Transcendent Digital Education: Synergy, Sustainability and Calamity"	273
Makhachashvili, Rusudan; Semenist, Ivan; Prihodko, Ganna; Kolegaeva, Irina; Prykhodchenko, Olexandra; Tupakhina, Olena (Ukraine): "Interdisciplinary Digital Skills Development for Educational Communication: Emergency and Ai-Enhanced Digitization"	281
Makhachashvili, Rusudan; Semenist, Ivan (Ukraine): "Digital Humanities as a Transdisciplinary Communication Paradigm in the Age of AI"	286
Nalesso, Giacomo; Urbani, Rachele; Tassinato, Clara; Tregnaghi, Vittoria; Mazzucato, Matteo; Trolese, Matteo; Lorenzetto, Monica; Rizzo, Simone; Mulatti, Paolo; Di Martino, Guido; Manca, Grazia (Italy): "Business Intelligence (BI) and Geographic Information Systems (GIS) Tools in a Coordinated Strategy for Handling and Controlling Outbreaks of African Swine Fever"	294
Rokaj, Iv; Leka, Adrian (Albania): "Behind the Numbers: Decoding the Victimization Rate in Albania and Advocating for a Data Revolution"	297

### **Invited Paper(s) associated to Plenary Keynote Addresses**

Hashimoto, Shigehiro (Japan): "Utilization of Artificial Intelligence by Students in Interdisciplinary Field of Biomedical Engineering"	302
---	-----

<b>Authors Index</b>	305
----------------------	-----