

2025 IEEE 7th International Conference on BioInspired Processing (BIP 2025)

**Pérez Zeledón, Costa Rica
3-5 December 2025**

IEEE Catalog Number:
ISBN:

CFP25AY0-POD
979-8-3315-7015-6



Copyright © 2025, IEEE

All Rights Reserved

Copyright and Reprint Permissions:

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number:	CFP25AY0-POD
ISBN (Print-On-Demand):	979-8-3315-7015-6
ISBN (Online):	979-8-3315-7014-9

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
E-mail:	curran@proceedings.com
Web:	www.proceedings.com

TABLE OF CONTENTS

Role of MicroRNAs in the Regulation of Gene Expression During Skeletal Muscle Adaptation to Exercise: A Multi-Omics Analysis	1
<i>Cinthyá Marín León, Rodrigo Mora Rodríguez</i>	
Role of miRNAs in the Restoration of Function of Severe Congenital Neutropenia Associated Genes	8
<i>Nicole Ramírez-Mata, Rodrigo Mora-Rodríguez</i>	
Classification of Tree Species Based on Canopy Using Satellite Images	14
<i>David De la Hoz Aguirre, Jason Leitón Jiménez, Luis Barboza Artavia, Luis Chavarría Zamora</i>	
A Framework for Hyperparameter Configuration in the Context of Software Defect Density Prediction Using Bio-Inspired Optimization Algorithms	21
<i>Juan Murillo-Morera, Rubén Fuentes-Fernández, Andrés Calvo Vargas, Alessandro Cambroner Delgado Janio Jadán-Guerrero, Susana Alexandra Arias</i>	
Synthetic Dataset Creation to Train a Cryo-EM Segmentation Model via Critical Points	27
<i>Jason Gerardo Gutierrez Quiros, Juan Esquivel-Rodríguez</i>	
Comparative Genomic Study of Candida Albicans Highlights its Pangenome as a Genomic Window into Eukaryotic Biodiversity	32
<i>Nicole Ramírez-Mata, Pablo Mora-Cubillo, José Arturo Molina-Mora</i>	
Preprocessing for Monocular or Stereo Computer Vision Systems, with Emphasis on SFM Algorithms	39
<i>Dylan Garbanzo Fallas, Luis Chavarria Zamora, Pablo Soto-Quiros</i>	
A Configurable Optimization Framework for Volcanic Seismo-Acoustic Event Detection	46
<i>Fabricio Quiros-Corella, Leonardo van der Laat-Muñoz, Henriette Bakkar-Hindeleh</i>	
Leveraging Large Language Models to Identify Chronic Overlapping Pain Conditions in the MIMIC Clinical Notes Dataset	52
<i>Saanvi Kotha</i>	
Weakly Supervised Anterior Lens Surface Segmentation for Cataract Detection	58
<i>Giulia Ibbá, Saúl Calderón-Ramírez, Miguel Abreu-Cárdenas, Marisse Masis-Solano, Maurizio Romano</i>	
Performance Evaluation of Deep Learning Formats: A Comparative Study of ONNX and Pytorch for Inference Efficiency and Portability	64
<i>Alfredo Mercado, Johansell Villalobos, Esteban Meneses</i>	
A Convolutional Speaker Recognition System for Modulated NBFM	70
<i>José-María Jimenez-Coronado, Emanuel Hernández-Cepeda, Roger-de-Jesús Morales-Monge Felipe Meza-Obando</i>	
Reference-Based Metric Analysis for Evaluating Spanish Text Simplification	76
<i>Nelson Pérez-Rojas, Santiago Castrillo Moncada, Ana Laura Mora Arias, Saúl Calderón-Ramírez Martín Solís, Monserrat Ramírez Castro</i>	
From Global to Local: Fine-Tuning of Earthquake AI Detection Methods with Costa Rican Seismic Data for Improved Phase Detection Performance	82
<i>Sebastián Gamboa-Chacón, Nahomy Campos Salas, Esteban J. Chaves, Esteban Meneses</i>	

A Parallel and Distributed Genetic Algorithm in Rust for the DNA Fragment Assembly Problem	88
<i>Christian Asch</i>	
Learning Compact Representations of Agricultural Fields: A Study of Variational Autoencoders	
Variants for Aerial Drone Imagery	94
<i>Danny Xie-Li, Manfred Gonzalez-Hernandez, Blaz Meden, Fabian Fallas-Moya</i>	
A Benchmark of Eye Anterior Image Semantic Segmentation in Scarcely Labeled Datasets	100
<i>Miguel Abreu-Cárdenas, Saúl Calderón-Ramírez, Giulia Ibba, Marisse Masis-Solano</i>	
<i>Samir Cabrera-Tabash</i>	
Evaluating VLM Reasoning and Localization for Floodwater Depth Estimation with Bounding Boxes	107
<i>Anthony José Arguedas Rodríguez, María José Angulo Campos, Nicole Prado Morales</i>	
<i>Kaleb Granados Acuña, Priscilla Gómez Vargas, Juan José Rojas Hernández</i>	
Uncertainty Quantification in Large Language Models Using Feature Space Density and Clustering	113
<i>María Mora-Cross, Saúl Calderón-Ramírez</i>	
Comparative Analysis of RNA-seq Pipelines Across Computing Environments for Generating	
Machine-Learning Outcomes	120
<i>Nicole Arias Espinoza, Alonso Segura Valverde, Susana Mesen-Porras</i>	
Multi-Agent Topology Optimization for Space Software Architectures Using Genetic Algorithms	126
<i>Johan Carvajal-Godinez</i>	
Feature Densities for Uncertainty Quantification for Complex Text Detection in Spanish	132
<i>Miguel Abreu-Cardenas, Saúl Calderón-Ramírez</i>	
Neural Network-Based Gunshot, Chainsaw, and Forest Sound Detection on Embedded Monitoring	
Platforms	138
<i>Carlos Salazar-García, Jeferson González-Gómez, Yeiner Arias-Esquivel</i>	
Deep Learning Pipelines for Biodiversity Monitoring: MegaDetector and Vision Transformer	
Approaches with Camera Traps in Costa Rica	144
<i>María Biarreta-Portillo, Pamela Morataya-Sandoval, Emilia Viquez-Mora, María Mora-Cross</i>	
<i>Adolfo Salinas-Acosta, María López-Venegas, William Gómez-Solís, Pável Bautista-Solís</i>	
Design of a Background Extraction Platform with Semantic Elements	150
<i>Justin Fernandez-Badilla, Luis Chavarria-Zamora, Luis Alonso Barboza-Artavia, Jason Leitón Jiménez</i>	
Regulation of MTHFR and ABCB1 Expression by miRNAs to Compensate for Genetic Variants	
Associated to Toxicity by Methotrexate	155
<i>Daniela González Corrales, Rodrigo Antonio Mora-Rodríguez</i>	
SLAM Parameters Optimization Using a Genetic Algorithm for Mapping Error Reduction	162
<i>Kevin Trejos Vargas, Leonardo Marín Paniagua, Edgar Casasola Murillo</i>	
B3P2: A Blood–Brain Barrier Permeability Predictor for Small Molecules	168
<i>Luis A. Zumbado Silva, Antonio Viayna Gaza, William J. Zamora Ramirez</i>	