



NEO
NUMERICAL AND EVOLUTIONARY
OPTIMIZATION

Schedule

Day 1, September 23, 2025 (Research Experience Day)

"(V)" denotes virtual participation

08:00 — 08:30	Registration
08:30 — 09:00	Opening and group photo
09:00 — 10:00	<ul style="list-style-type: none"> • Jian-Quiao Sun, UC Merced, USA What machine learning can do for engineering
10:00 — 11:30	<ul style="list-style-type: none"> • Panel discussion: Strategic alliance between graduate programs and industry. Participants: Luis Ledezma (ITJ), Guillermo Sanchez (ThermoFisher Scientific), Leonardo Trujillo (TecNM/ITT)
11:30 — 11:50	Break
11:50 — 12:50	<ul style="list-style-type: none"> • Víctor Díaz Ramírez, CITEDI-IPN, Mexico Hybrid methods in multichannel vision, image processing, and pattern recognition.
12:50 — 13:50	<p>Finding your graduate program (ITT, IPN, CETYS)</p> <p>Dr. Ricardo Martínez Soto, Cetys Universidad, Coordinador de Maestría en Ingeniería e Innovación.</p> <p>Dr. Ricardo Cardenas, TecNM/ITT, Coordinador de Posgrado en Ciencias de la Ingeniería.</p> <p>M.A.E. Anaïd Berenice Álvarez Fuentes, Citedi, Coordinadora de Maestría en Ciencias en Sistemas Digitales.</p>
13:50 — 14:20	Closing
14:20 — 16:00	Break
16:00 — 17:30	<ul style="list-style-type: none"> • Workshop 01: Opening the Black Box — Neural Networks. Oliver Cuate, ESFM-IPN • Workshop 02: Intensive Course — Deploying Large Language Models in Colab. Adrian Rodriguez Aguiñaga, UABC • Workshop 03: Interactive Workshop — Data Visualization with Python. Noelia Torres and Rogelio Valdez, TecNM/ITT

Day 2, September 24, 2025

08:00 — 09:00	Registration
09:00 — 09:30	Opening
09:30 — 11:00	Session I (GPHS1, 4 talks, Room 1) and Session II (AML1, 4 talks, Main Room)
Session I:	Chair: Leonardo Trujillo <ul style="list-style-type: none"> • Quantifying the impact of genetic programming feature transformations: an analysis using the optimal transport dataset distance. Joel Nation • Integrating MLIR Infrastructure with MOEAs for FPGA Design Space Exploration. Joel Quevedo • Hardware description language based approach for GSGP design. Juan Flores-R • GSGP-CUDA for Supervised Classification. Cesar Lepe García
Session II:	Chair: Daniel Hernández <ul style="list-style-type: none"> • Embedded System for Vehicle Environment Perception and License Plate Recognition (LPR) Using Computer Vision and Deep Learning. Rogelio Leonardo Méndez Macías • Underwater Computer Vision for Tilapia Aquaculture: YOLACT-Based Trajectory Tracking and Group Behavior Analysis During Feeding. Osbaldo Aragón-Banderas • Optimizing Employee Attrition Prediction Models with TPOT AutoML. Daniel E Moreno • Comparative Analysis of Machine Learning Models for Congestive Heart Failure Detection from QRS Complex. Adriel Lozada Romero
11:00 — 11:20	Coffee break
11:20 — 12:20	Keynote I: Ryan J. Urbanowicz, Cedars-Sinai Medical Center, USA Learning to Evolve, Evolving to Learn: Interpretable AI for Unlocking Biomedical Complexity.
12:20 — 12:40	Group Photo
12:40 — 14:00	Poster session
13:00 — 14:00	Lunch Boxes (Lunch boxes will be provided)
14:00 — 15:00	Session III (EMO1, 3 talks, Main Room) and Session IV (OOG1, 3 talks, Room 1)
Session III:	Chair: Oliver Schütze <ul style="list-style-type: none"> • Multi-objective Particle Swarm Algorithm for Multi-objective Reinforcement Learning. Carlos Ignacio Hernández Castellanos • A Continuation Method for Parameter Dependent Multi-objective Optimization Problems. Francisco Vidal • Course Scheduling Optimization Using Genetic Algorithms: A Case Study in a Mathematics Department. Leonardo E. Rivera-Zacarias

Session IV: Chair: Rolando Menchaca-Méndez

- A Comparison of Heuristic Methods for the Identification of Regions of Interest in Wildfires.

Braulio Leonardo Santa Fe-García (V)

- Socio-Environmental Regionalization Based on Clustering and Geospatial Analysis.

Erick Estrada Patiño(V)

- Computing Regulatory Control Policies in Facility Location Games Using Reinforcement Learning.

Rolando Menchaca-Méndez

15:00 — 15:20

Coffee break

15:20 — 17:20

Session V (DO1, 3 talks, Room 1), Session VII (LSEO1, 3 talks, Room 1) and Tutorial (Main Room)

Session V: Chair: Guadalupe Carmona Arroyo

- Optimal Hyperspectral Band Selection Using Metaheuristics for the Detection of *Aspergillus flavus* in Figs with Convolutional Neural Networks.

Israel Calderon Aguilar (V)

- A Belief Model for BDI Agents Derived from Roles and Personality Traits.

Eduardo David Martínez-Hernández (V)

- Knowledge-Based Design Methodology for Human Resources Information Management.

Sofia Morales Zaleta(V)

Session VII: Chair: Guadalupe Carmona Arroyo

- Study of Performance from Hierarchical Decision Modeling in IVAs within a Greedy Context.

Francisco Federico Meza Barrón (V)

- Study on the impact of machine learning techniques to support CO2 capture process via Ionic liquids.

Rodolfo Ortega (V)

- A methodology for Information Retrieval from Industrial Systems based on Artificial Intelligence Methods.

Jesús Carballo Ruelas (V)

Tutorial:

- Evolutionary Artificial Intelligence: An Industrial Case Study.

Dr. Octavio Ramos-Figueroa and Marcela Quiroz-Castellanos

Day 3, September 25, 2025

09:00 — 09:30	Registration
09:30 — 11:00	Session VIII (GPHS2, 4 talks, Main Room) and Session IX (EMO2, 4 talks, Room 1)
Session VIII:	Chair: Yazmín Maldonado <ul style="list-style-type: none"> • Estimation of total body fat using Genetic Programming. José Manuel Muñoz Contreras • Machine Learning Algorithms for Translating Inductive Band Signals into Spirometric Volume Estimates. José Rosario Ortega Ramírez • Implementation of a CNN in FPGA for Pulmonary Volume Estimation. Fidel Alejandro Ortega Ramírez • Exploration of FPGAs as a Platform for the Development of Adaptive Logic Circuit Design Using ANN. Teodoro Alvarez-Sanchez
Session IX:	Chair: Oliver Cuate <ul style="list-style-type: none"> • Scenario Optimization in Fuzzy Cognitive Maps by Means of Multi-objective Evolutionary Algorithms. Carlos Ignacio Hernández Castellanos • RSG, a Method for Pareto Front Approximation and Reference Set Generation. Angel Rodriguez-Fernandez • An Evolutionary Approach for the Computation of ε-Locally Optimal Solutions for Multi-Objective Multimodal Optimization. Carlos Ignacio Hernández Castellanos • Smooth Path Planning for Multi-robot Systems in Warehouses. America Morales-Díaz
11:00 — 11:20	Coffee break
11:20 — 12:20	Keynote 2: Pierrick Legrand, Bordeaux INP and IMS, France Artificial Evolution and Illustrative Applications
12:20 — 12:40	Coffee break
12:40 — 13:20	Session X (AML2, 2 talks, Room 1) and Session XI (LSEO2, 2 talks, Main Room)
Session X:	Chair: Daniel Hernández <ul style="list-style-type: none"> • Analysis of Mexican pandemic COVID-19 mobility data through an NP-hard propagation model. José Alejandro Cornejo-Acosta (V) • Neural Architecture Search with CMA-ES for Facial Emotion Recognition. Ricardo Santiago (V)
Session XI:	Chair: Marcela Quiroz <ul style="list-style-type: none"> • Comparative Analysis of Optimization Techniques Applied to Automotive Assembly Using Big Data. Jose Peinado • Experimental Data-Driven Gaussian Process Regression Model for Thermal Conductivity Prediction in Aluminum Alloys. Jaime Guillen

13:20 — 15:00	Lunch (on your own)
15:00 — 15:20	Coffee break
15:20 — 17:20	WNEO Chair: Yazmín Maldonado
19:00 — 23:00	Gala dinner - Food is served at 20:00

Day 4, September 26, 2025

09:00 — 10:00 Session XII (OOG2, 3 talks, Main Room) and Session XIII (EMO3, 3 talks, Room 1)

Session XII: Chair: Rolando Menchaca-Méndez

- Graph-Based Strategies for Grouping Variables in Multiobjective Optimization With Overlap.

Miguel Angel Hernández Servín

- Fitting and validation of a Monod–logistic model for *Stigeoclonium nanum* in a thin-layer photobioreactor.

Jesus Leonel Arce Valdez

- The Moving Firefighter Problem with Heterogeneous Propagation Times.

Rolando Menchaca-Méndez

Session XIII: Chair: Oliver Cuate

- Bailando++: An Approximation from Computational Creativity.

Fernando Rodrigo Valenzuela

- The Pareto Tracer for the Numerical Treatment of High-dimensional Multi-objective Optimization Problems.

Pablo Uriel Benítez Ramírez

- Optimizing Solar Panel Allocation in Smart-City Buildings Using Genetic Algorithms.

Ponciano Escamilla-Ambrosio

10:00 — 11:00 Session XIV (DO2, 3 talks, Main Room) and Session XV (LSEO3, 3 talks, Room 1)

Session XIV: Chair: Marcela Quiroz

- Analysis of Tumor Growth Under Oncological Treatment Using Mathematical Modeling and Artificial Intelligence.

Uriel Solís Procopio

- Toward a Data Science Pipeline for the Design of Hyper-Heuristic Grouping Genetic Algorithms.

Octavio Ramos-Figueroa

- Task Scheduling Optimization in Cloud Computing: A Bin Packing and Machine Learning Perspective.

Jessica Gonzalez San Martin(V)

Session XV: Chair: Guadalupe Carmona Arroyo

- Dynamic Multi-objective Evolutionary Algorithm Based on Decomposition with Adaptive Response Change Environment Method (DMOEA/D-ARCEM).

Miguel Garcia(V)

- A Hybrid Ensemble Model for Financial Time Series Forecasting Integrating Statistical, Machine Learning and Deep Learning Methods.

José Olvera (V)

- Efficient Selection of Low Level Heuristics in Hyperheuristics Using Combinatorial Testing for the Master Bay Planning Problem.

Norberto Castillo-García (V)

11:00 — 11:20	Coffee break
11:20 — 12:40	Session XVI (AML3, 4 talks, Main Room) and Session XVII (DO3, 4 talks, Room 1)
Session XVI:	<p>Chair: Paul Valle</p> <ul style="list-style-type: none">• A Machine Learning Approach to Gender Classification via Operating System GUI Interaction Pattern. Eduardo Navarro Bautista (V)• Preprocessing of EEG signals to measure the impact of psychological interventions through Artificial Intelligence. David Octavio Roa-Rico• Evolutionary NAS Models and Pre-Trained CNNs for Tattoo and Face Recognition. Benjamin Fajardo Hernandez• Beyond Hyperscalers: How MLOps Unlocks AI in Latin America. Adrian Rodriguez Aguiñaga
Session XVII:	<p>Chair: Octavio Ramos-Figueroa</p> <ul style="list-style-type: none">• EV-STSP on Directed Urban Networks: Construction, Energy Enrichment, and Evaluation. Juan Hernandez-Marin(V)• SA and TA algorithms applied to alternative assets in mexican stock exchange. José Purata Aldaz(V)• Ensemble Deep Learning and Metaheuristic Strategies for Stock Forecasting and Investment Portfolio Optimization. José Purata Aldaz (V)• Query Optimization in RAG: Retrieval and Context Construction. Fabricio Chia (V)
12:40 — 13:00	Closing

Poster session, September 24, 2025

- Predictive glucose monitoring and telemedicine-enhanced diabetes management.

Jose Ricardo Cardenas Valdez

- Statistical and Machine-Learning Framework for Climate–Socioeconomic Interactions in Mexico and Developed and Emerging Economies.

Guadalupe Valdez

- Design and Development of an Optimized Control System for a Solar Tracking System.

Andres Calvillo-Tellez

- Fuzzy Decision Trees and Genetic Algorithms for the Automated Construction of Fuzzy Predicates.

Jose Padron Tristan

- Particle Swarm Optimization for Hydro-Thermal Power Scheduling Problem with a Type-1 Fuzzy Controller for Dynamic Parameter Adjustment.

Norberto Castillo-García