2026 Workshop on Engineering Applications (WEA)

Final Program

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

Fundación Universitaria del Área Andina – October 21-23, 2026

Bogotá, Colombia

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Final Program

FINAL PROGRAM

Wednesday 21 Oct. - Área Andina Main Campus	Thursday 22 Oct. - Área Andina Main Campus	Friday 23 Oct. - Área Andina Main Campus
Registration: 7:30-8:30am	**Registration:** 8:30-9:00am	
Opening Ceremony: 8:30-9:00am Prof. Emilio Carrizosa Ph.D. - University of Sevilla, SP Sala Auxiliar - Área Andina 9:00-10:30am	Special Sessions Room (see detailed schedule) 9:00-10:30 am	Invited Talk: Prof. Juan Pablo Trujillo Lemus, Andrés Felipe Calvo Salcedo - Universidad Tecnológica de Pereira, Colombia Pannel: Agentic AI in Education Sala Auxiliar - Área Andina 9:00-10:30am
Coffee Break: 10:30-11:00am	**Coffee Break:** 10:30-11:00am	**Coffee Break:** 10:30-11:00am
Gilson Augusto Helfer Ph.D. - Universidade de Santa Cruz do Sul (UNISC), BR Sala Auxiliar - Área Andina 11:00-12:30m	Special Sessions Room (see detailed schedule) 11:00-12:30 m	Closing Ceremony - Prizes/Certificates Sala Auxiliar - Área Andina 11:00am-12:00m
Lunch: 12:30-2:00pm	**Lunch:** 12:30-2:00pm	
Special Sessions Room (see detailed schedule) 2:00-3:30 pm	Prof. Oscar Castillo Ph.D. - Instituto Tecnológico de Tijuana, MEX Sala Auxiliar - Área Andina 2:00-3:30pm	
Coffee Break: 3:30-4:00pm	**Coffee Break:** 3:30-4:00pm	
Special Sessions Room (see detailed schedule) 4:00-5:30pm	Janosch Ortmann Ph.D. - Université du Québec à Montréal, CAN Sala Auxiliar - Área Andina 4:00-5:30pm	
	Conference Dinner (Bistecca e Vino Da Trattoria de la Plaza Cl. 69a #5 - 75, Chapinero, Bogotá) 7:00pm onwards	

Wednesday 21 Oct. – 2026, Venue: Sala Auxiliar, Área Andina

Registration: 07:30 – 08:30

Opening Ceremony: 08:30 – 09:00

Plenary Speaker: Prof. Emilio Carrizosa Ph.D. - University of Sevilla, Spain – Talk: *"Machine Learning made (more) explainable and robust with Multiobjective Optimization"*. 09:00 – 10:30

Coffee Break: 10:30 – 11:00

Plenary Speaker: Gilson Augusto Helfer Ph.D. - Universidade de Santa Cruz do Sul (UNISC), Brasil – Talk: "*From Analytical Signals to Intelligent Solutions: Machine Learning Applied to Chemistry, Agriculture, and Health*". 11:00 – 12:30

Lunch: 12:30 – 14:00

Special Sessions: Detailed below

Thursday 22 Oct. – 2026, Venue: Sala Auxiliar, Área Andina

Registration: 08:30 – 09:00

Special Sessions: Detailed below

Lunch: 12:30 – 14:00

Plenary Speaker: Prof. Oscar Castillo Ph.D. - Instituto Tecnológico de Tijuana, Mexico – Talk: "*Optimization of Type-2 and Higher Type of Fuzzy Systems for Applications*". 14:00 - 15:30

Coffee Break: 15:30 – 16:00

Plenary Speaker: Janosch Ortmann Ph.D. - Université du Québec à Montréal, Canada (Chile) Talk: "*Decision-based clustering for stochastic optimisation models*". 16:00 – 17:30

Conference Dinner: Bistecca e Vino Da Trattoria de la Plaza - 7:00pm onwards

Friday 23 Oct. – 2026, Venue: Sala Auxiliar, Área Andina

Open Panel Agentic AI in Education - Prof. Juan Pablo Trujillo Lemus, Prof. Andres Felipe Calvo – Universidad Tecnológica de Pereira, Colombia – Talk: "*Educación superior ante la IA: futuro y desafíos*". 09:00 - 10:30

Coffee Break: 10:30 – 11:00

Closing Ceremony - Prizes/Certificates: 11:00 - 12:00

Plenary Speakers

Prof. Emilio Carrizosa Ph.D. - University of Sevilla, Spain

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Talk: Machine Learning made (more) explainable and robust with Multiobjective Optimization

Abstract: There is a need to explain and interpret AI models, a need that has given rise to increasingly sophisticated techniques for the local and global interpretability of model outputs; the standardization and convergence of certain techniques (e.g., PDP, LIME, or SHAP) necessitate an understanding of their application and scope. LIME (Local Interpretable Model-agnostic Explanations) enables the explanation of results at a local level—that is, explaining the output for a specific instance based on information from other similar cases. We will cover the definition and application of LIME using examples of AI models, alongside an analysis of the results and the model's explanatory and interpretability capabilities.

Bio – Emilio Carrizosa is Full Professor of Statistics and Operations Research in the University of Seville, Spain, since May 18 2005. His research interests include: Industrial and Applied Mathematics; Data Science (Explainable and Fair Machine Learning, Supervised Classification and Regression), Mathematical Optimization and Operations Research (Mixed Integer Nonlinear Programming, Global Optimization, Vector Optimization). He is President of math-in, the Spanish Network of Industrial Mathematics, member of the Council of ECMI (European Consortium for Mathematics in Industry) and EU-MATHS-IN, member of the international advisory board of the Danish Academy of Data Science, and of CITMAGa (Centro de Investigación y Tecnología Matemática de Galicia).

He has served as Director of IMUS, the Mathematical Institute of the University of Seville, as President of SEIO, the Spanish Statistics and OR Society, and as Editor-in-Chief of TOP- Transactions in Operations Research. He has (Scopus: May 18h 2025) 155 publications with 2,286 citations (1,032 in the period 2021-

2025), yielding an h-index of 27. He has papers in top journals in the area Operations Research and Management Science: Operations Research (2), Mathematical Programming (6), Management Science (1), Mathematics of Operations Research (4), Omega (4), European Journal of Operational Research (26), Computers & OR (21). Due to his interdisciplinary research, he has also published in disciplines beyond OR: Statistics and Probability (Biostatistics, ADAC, Bayesian Analysis, CSDA, J Multi- variate Analysis, J of Applied Probability), Energy (Applied Energy, Solar Energy, International Journal of Energy Research), Chemical Engineering (Computers & Chemical Engineering, Industrial & Engineering Chemistry Research), Hydrology (J of Hydrology). The Spanish Research Agency has acknowledged 5 research periods (5 sexenios de investigación): 1990-95, 1996-01, 2002-07, 2008-13, 2014-19.

He has supervised 17 PhD Theses (plus 3 ongoing in the University of Seville), 6 of them awarded with various national and international prizes: Jasone Ramírez-Ayerbe (Prize SEIO-FBBVA 2024), Vanesa Guerrero (L'Oréal- Unesco Prize for Women in Science 2024, Premio Extraordinario de Doctorado Universidad de Sevilla, Research Award Vicent Caselles RSME-FBBVA, Research Award Ramiro Melendreras SEIO 2018), Sandra Benítez-Peña, M. Asunción Jiménez-Cordero, Remedios Sillero-Denamiel (Premio Extraordinario de Doctorado Universidad de Sevilla), Cristina Molero-Río (Classification Society Distinguished Dissertation Award 2022).

He has received awards such as the SEIO Medal 2024 (Operations Research), the SEIO-FBBVA Award 2024 to the best paper in Statistics and Operations Research applied to Big Data and Data Science, the Excellence FAMA Award 2020 (branch: Sciences) in the University of Seville, the Award Academia Sevillana de Ciencias for young researchers (1998) and the Doctoral Award in the PhD in Mathematics in the University of Seville (1993).

He is involved in Transfer of Knowledge activities. He has been leading researcher in industrial projects and contracts in applications of OR to different sectors: Energy (Repsol, Abengoa, TSK Flagsol), Health (UDX), Logistics (Azur Global Business SL), Information Technologies (Junta de Andalucía), and also participating in contracts on Environment (Junta de Andalucía), Smart cities (IMESAPI), Logistics (Portel). Since 2022 he is Scientific Advisor of the OR-IA company OGA. The Spanish Research Agency has acknowledged 1 transfer of knowledge period (1 sexenio de transferencia) - 2013.

He has an intense activity of outreach, participating in debates and interviews in TV, radio and newspapers on industrial mathematics and teaching mathematics.

Prof. Oscar Castillo Ph.D. - Instituto Tecnológico de Tijuana, Mexico

Webpage: http://www.hafsamx.org/castillo/
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Talk: "*Optimization of Type-2 and Higher Type of Fuzzy Systems for Applications*"

Abstract: Type-2 fuzzy systems are powerful intelligent models based on the theory of fuzzy sets, originally proposed by Prof. Zadeh. Most real-world applications up to now are based on type-1 fuzzy systems, which are built based on the original (type-1) fuzzy sets that extend the concept of classical sets. Type-2 fuzzy sets extend type-1 fuzzy sets by allowing the membership to be fuzzy, in this way allowing a higher level of uncertainty management. Even with the current successful applications of type-1 fuzzy systems, now several papers have shown that type-2 is able to outperform type-1 in control, pattern recognition, manufacturing and other areas. More recently, type-3 fuzzy systems have also emerged as an even more powerful tool to deal with uncertainty and there have also been some recent applications of this new concept. The key challenge in dealing with type-2 fuzzy models is that their design has a higher level of complexity, and in this regard the use of bio-inspired optimization techniques is of great help in finding the optimal structure and parameters of the type-2 fuzzy systems for particular applications, like in control, robotics, manufacturing and others. Methodologies for designing type-2 fuzzy systems using bio-inspired optimization in different areas of application are presented in this talk as illustration. Finally, the prospects for the future trends in theory and applications of type-3 fuzzy logic will be discussed.

Bio: Oscar Castillo holds the Doctor in Science degree (Doctor Habilitatus) in Computer Science from the Polish Academy of Sciences (with the Dissertation “Soft Computing and Fractal Theory for Intelligent Manufacturing”). He is a Professor of Computer Science in the Graduate Division, Tijuana Institute of Technology, Tijuana, Mexico. In addition, he is serving as Research Director of Computer Science and head of the research group on Hybrid Fuzzy Intelligent Systems. Currently, he is President of HAFSA (Hispanic American Fuzzy Systems Association) and Past President of IFSA (International Fuzzy Systems Association). Prof. Castillo is also Chair of the Mexican Chapter of the Computational Intelligence Society (IEEE). He also belongs to the Technical Committee on Fuzzy Systems of IEEE and to the Task Force on “Extensions to Type-1 Fuzzy Systems”.

He is also a member of NAFIPS, IFSA and IEEE. He belongs to the Mexican Research System (SNI Level 3). His research interests are in Type-2 Fuzzy Logic, Fuzzy Control, Neuro-Fuzzy and Genetic-Fuzzy hybrid approaches. He has published over 300 journal papers, 10 authored books, 40 edited books, 200 papers in conference proceedings, and more than

300 chapters in edited books, in total 910 publications according to Scopus (H index=63, and more than 1050 publications according to Research Gate (H index=74 in Google Scholar).

He has been Guest Editor of several successful Special Issues in the past, like in the following journals: Applied Soft Computing, Intelligent Systems, Information Sciences, Non-Linear Studies, Fuzzy Sets and Systems, JAMRIS and Engineering Letters. He is currently Associate Editor of the Information Sciences Journal, Applied Soft Computing Journal, Engineering Applications of Artificial Intelligence, Granular Computing Journal and the International Journal on Fuzzy Systems. Finally, he has been elected IFSA Fellow in 2015 and MICAI Fellow member in 2017. He has been recognized as Highly Cited Researcher in 2017 and 2018 by Clarivate Analytics because of having multiple highly cited papers in Web of Science.

Janosch Ortmann Ph.D. - Université du Québec à Montréal, Canada

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Google Scholar: https://scholar.google.com/citations?user=iji4xj4AAAAJ&hl=en
LinkedIn: https://ca.linkedin.com/in/janosch-ortmann-32447338



Talk: "*Decision-based clustering for stochastic optimisation models*"

Abstract: Many engineering decisions have to be taken before key quantities such as demand are known. This talk concerns stochastic optimisation models, where some quantity is to be maximised or minimised subject to constraints whose parameters are only partially known in advance. One way to model this is to look for the optimal value of the expectation of the random quantity. However, it is typically not possible to find closed-form expressions for the expected value, leading to the need for numerical methods. The sample average approximation (SAA) approach uses samples (called scenarios) from the underlying probability distribution and replaces the expectation by the empirical mean over these samples, turning the stochastic problem into a deterministic one of much larger size.

In this talk I will give an overview of decision-based clustering, which extracts information about the stochastic problem from the solutions obtained for each scenario separately. In particular, I will discuss distances on the set of scenarios that encode the opportunity cost of predicting the wrong scenario. Clustering the scenarios with respect to these distances leads to approximate feasible solutions as well as performance guarantees in the form of upper and lower bounds. It also reveals new structures on the scenario set, for example which of the uncertain parameters has a particularly large influence on the optimal decision.

This set of ideas turns out to be useful in a second, less studied situation: ambiguity, where the probability distribution itself is not known. In practice, several data sources may give conflicting estimates of the uncertain quantities, with no way of telling which one is right. Generating scenarios from each source and clustering them together shows whether the sources disagree only on the numbers or also on the decisions. A cluster that mixes scenarios from different sources indicates agreement on what to do, while clusters drawn from a single source indicate that the disagreement matters. Reweighting the scenarios according to this analysis yields a consensus solution that performs well under every source's view of the uncertainty. I will illustrate this with the location of shelters for displaced people in Idleb, Syria,

based on two humanitarian needs assessments whose estimates barely overlap in some districts. There the consensus solution accommodates more people under both assessments than the classical approaches.

The talk is based on collaborations with Samah Abdalrhaman, Burcu Balcik, Shubhajit Dey, Emilia GraÃŸ, Yuchen Ge, Olivia Harrison, Michael Hewitt, Julien Keutchayan and Walter Rei

Bio: Janosh Ortmann is a full professor of business analytics and data science at the University of Quebec-Montréal (UQAM, Canada), where he has held a post since 2017. He holds a PhD in Mathematics from the University of Warwick (UK), obtained under the supervision of Neil O'Connell, and a Master in Mathematics (MMath) from Oxford University (UK). He has held postdoctoral positions at Warwick, at the Universities of Toronto and Montreal and at Concordia University (Canada).

His research interests lie at the intersection of probabilistic modelling, optimisation and machine learning. In practice, this means translating real-world situations into mathematical models and developing solution approaches that support decision-making, in applications from logistics to personalised medicine and healthcare operations.

For his work on discrete random processes and their scaling behaviour he has been awarded two prizes, jointly with his co-authors Duncan Dauvergne and Bálint Vireag : the 2026 George Polya prize in mathematics and the 2025 Frontiers of Science award. His work is supported by grants from the Quebec Ministry of the Economy as well as Canada's Natural Sciences and Engineering Research Council (NSERC) and Mitacs.

He currently serves as director of the Interdisciplinary Centre for Intelligent Management of Complex Systems (CRI2GS) at UQAM and is a member of the Mathematics Research Centre (CRM) and Group for Research in Decision Analysis (GERAD) in Montreal.

Gilson Augusto Helfer Ph.D. - Universidade de Santa Cruz do Sul (UNISC), Brasil

Webpage: http://lattes.cnpq.br/2543196269709403
Google Scholar: https://scholar.google.com/citations?user=ofkUaG0AAAAJ
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Talk: "*From Analytical Signals to Intelligent Solutions: Machine Learning Applied to Chemistry, Agriculture, and Health*"

Bio: Gilson Augusto Helfer holds a PhD in Applied Computing from the University of Vale do Rio dos Sinos (2022), an MSc in Industrial Systems and Processes from UNISC (2014), and undergraduate degrees in Systems Analysis and Development from ULBRA/RS (2015) and Industrial Chemistry from UNISC (1998). He is a professor and researcher at the University of Santa Cruz do Sul (UNISC), serving in the Department of Engineering, Architecture, and Computing and as a permanent faculty member of the Graduate Program in Industrial Systems and Processes.

His work focuses on mobile computing and the Internet of Things (IoT) applied to chemistry, chemometrics, agriculture, and healthcare. He conducts projects involving Machine Learning, the Semantic Web, and Natural Language Processing across various fields of knowledge. He is the developer of the ChemoStat software and the Pho

Juan Pablo Trujillo Lemus Ph.D. - Universidad Tecnológica de Pereira

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Google Scholar: https://scholar.google.com/citations?user=kSlgGyMAAAAJ&hl=es
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Andres Felipe Calvo Ph.D. - Universidad Tecnológica de Pereira

Webpage: https://media2.utp.edu.co/oficinas/55/PERFIL-ANDRES-FELIPE-CALVO-DECANO-FACULTAD-INGENIERIAS.pdf
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Talk: "*Educación superior ante la IA: futuro y desafíos*"

Abstract: La inteligencia artificial está transformando la producción y circulación del conocimiento, planteando interrogantes sobre el futuro de la educación superior. Esta conferencia analiza escenarios posibles de transformación universitaria y los desafíos que estos representan para la formación profesional, la enseñanza, la evaluación y la gestión institucional.

Desde una perspectiva prospectiva, se examina cómo la integración de sistemas inteligentes podría modificar los roles de docentes y estudiantes, la organización de los currículos y las capacidades que deberán desarrollar los futuros profesionales. Se discuten las oportunidades de personalización y acompañamiento del aprendizaje, junto con los riesgos de dependencia cognitiva, desigualdad de acceso y pérdida de autonomía académica.

La reflexión propone criterios para orientar decisiones pedagógicas, éticas e institucionales frente a estas transformaciones. Se plantea la necesidad de fortalecer el pensamiento crítico, el juicio profesional y el aprendizaje autónomo, y de construir respuestas universitarias que articulen innovación tecnológica, responsabilidad social y calidad educativa.

Bio: Juan Pablo Trujillo Lemus actualmente es el Decano de la Facultad de Ciencias Básicas de la Universidad Tecnológica de Pereira - Colombia, Ingeniero Físico, PhD(c) Doctorado en Ciencia de Datos e Inteligencia Artificial Avanzada, Magíster en Instrumentación Física, Magíster en Enseñanza de la Física, tesis laureada de pregrado. Docente investigador con más de 18 años de experiencia, director del Grupo de Investigación Ingeniería Biomédica y Ciencias Forenses BIOIF, trabaja en las líneas de ingeniería biomédica, instrumentación biomédica, análisis de señales e imágenes médicas, inteligencia artificial, ciberseguridad, biomateriales y nuevos materiales, física forense, neurociencias y enseñanza de las ciencias.

Bio: Andres Felipe Calvo es Doctor en Ingeniería de la Universidad Tecnológica de Pereira, Ingeniero Electrónico de la Universidad Tecnológica de Pereira y posee un Magister en Ingeniería Eléctrica, Universidad Tecnológica de Pereira.

Actualmente es Decano Facultad de Ingenierías Universidad Tecnológica de Pereira, Docente Programa Ingeniería Electrónica, Maestría en Ingeniería Eléctrica y Especialización en Tecnologías de la Información y las Comunicaciones de la Universidad Tecnológica de Pereira. Miembro del Consejo de Facultad de Ingenierías y Director del Grupo de Investigación en Ingeniería Electrónica de la UTP.

Se especializa en Docencia en investigación y gestión académica, con énfasis en diseño electrónico, inteligencia artificial, diseño fotónico y computación cuántica.

WEA 2026 - Special Sessions schedule



Wednesday 21 Oct.	Thursday 22 Oct.	Friday 23 Oct.
	Computational Methods in Finance I Room: 101A-405 9:00-10:30am	**Pannel: Agentic AI in Education** Sala Auxiliar 9:00-10:30am
	Energy and Power Applications I Room: 101A-406 9:00-10:30am	
	Health Applications II Room: 101A-407 9:00-10:30am	
	Applications I - Online Online 9:00-10:30am	
	Coffee Break: 10:30-11:00am	**Coffee Break:** 10:30-11:00am
	Computational Methods in Finance II Room: 101A-405 11:00am-12:30m	**Closing Ceremony** Sala Auxiliar 11:00am-12:00m
	Energy and Power Applications II Room: 101A-406 11:00am-12:30m	
	Applications II - Online Online 11:00am-12:30m	
Lunch: 12:30m-2:00pm		
Optimization Room: 101A-405 2:00-3:30pm		
Artificial Intelligence Foundations Room: 101A-406 2:00-3:30pm		
Miscelaneous I Room: 101A-407 2:00-3:30pm		
Optimization I - Online Online 2:00-3:30pm		
Artificial Intelligence I - Online Online 2:00-3:30pm		
Break: 3:30-4:00pm		
Simulation Room: 101A-405 4:00-5:30pm		
Miscelaneous II Room: 101A-406 4:00-5:30pm		
Health Applications I Room: 101A-407 4:00-5:30pm		
Optimization II - Online Online 4:00-5:30pm		
Artificial Intelligence II - Online Online 4:00-5:30pm		

Wednesday 21 Oct. – 2026, Special Sessions Schedule

Venue: Área Andina Main Campus

Special Session in Optimization – Chair: Prof. José Gerardo Cuta
14:00 -15:30. Room: 101A-405

- ID 15 - Carolina Suárez Roldán, Germán Andrés Méndez. *Optimization Models in the Selection of Economic Activities with a Focus on Sustainable Rural Development*
- ID 56 - Juan Zambrano Alvarez, Gustavo Velasquez Parra, Ricardo Hincapie Isaza. *A MILP Formulation for the Optimal Siting and Sizing of DGs and Operational Dispatch of BESS in Monopolar DC Distribution Networks*
- ID 81 - Alejandro Marquez, Sandra X Carvajal-Quintero, Dahiana López-García. *Optimization of Hosting Capacity in Isolated Areas: A Techno-Economic Analysis of Hybrid Self-Management in Inírida, Colombia*
- ID 121 - Milena Rojas, Eduyn Lopez-Santana. *Aplicación de Análisis Envolvente de Datos para medir la Eficiencia Técnica de Unidades Catastrales en Colombia*
- ID 133 - Juan Camilo Olarte, David Torres, Juan Carlos Figueroa-García, Carlos Franco. *Capacity Planning for Vaccination Centers Under Uncertainty: A Fuzzy Queueing Approach*
- ID 77 - Jaime Restrepo, David Cardona, Angelia Liceth Perez, Andres Arismendi. *Optimization of the Staffing Logistics Process in a Service Company: Integration of Design Thinking and the EOQ Model*

Special Session on Artificial Intelligence Foundations – Chair: Prof. Omar Bustos
14:00 -15:30. Room: 101A-406

- ID 25 - Adalto Farias, Emeldo Brochado. *Interval Fuzzy-Rough Sets for Surface Roughness Classification in Turning Operations*
- ID 28 - David Maldonado, Andres Jutinico. *Physics-Informed Neural Networks for Eigenvalue Problems: Spectral Stability and Training Collapse*
- ID 35 - Cristian Moreno, Cesar Rodríguez-Garavito, Elsa Fonseca, Fernando Guerra, Bernay Cifuentes. *Computer Vision for Coffee Roast Degree Classification at the Individual Bean Level Using a Detector-Classifier Pipeline*
- ID 57 - Juan Martinez, Jhon Diaz, Carlos Gomez. *Robust Inverse Quantum Potential Reconstruction Using Physics-Informed Neural Networks under Noisy Data*
- ID 91 - Jawy Romero, Elvis Gaona. TokenShield: *A Selective Homomorphic Encryption Framework for Privacy-Preserving Token Protection in LLM Inference*

Special Session on Miscellaneous Applications I – Chair: Prof. Claudia Ramirez
14:00 -15:30. Room: 101A-407

- ID 48 - Raul Gutierrez, Angel Alberto Varon, Andrés Alfonso Cardenas Rojas. *Prediction for IPv6 Adoption in South America based on Machine Learning Models*
- ID 54 - Juan Martinez, Carlos Gomez, Jhon Diaz. *Efficient Neural Surrogates for Acoustic Transmission Loss in the SOFAR Channel: MLP, PINN, and SIREN under Geographic Extrapolation*
- ID 94 - Elvis Gaona-García. *QoS Affectation Model for Smart City Telecommunications in Wi-Fi Networks Coexisting with LTE in Unlicensed Band*
- ID 105 - Julian Gutierrez Espinosa, Cesar Rojas. *A GeoAI Framework for Intelligent Property Valuation Integrating Spatial Econometrics, Machine Learning and Urban Sentiment Analysis*
- ID 106 - Juan Pablo Ramírez Rojas. *Caracterización multidimensional de las ZNI de Colombia: Herramientas analíticas para decisiones de electrificación rural*
- ID 139 - Edwin Mauricio Arias López, Diego Alonso Peña. *Salud urbana, bienestar y calidad de vida en el Distrito Calles Vivas: línea base sociourbana del centro de Pereira y su reconfiguración tras el sismo del 10 de agosto de 2026*

Online Session in Optimization I – Chair: Mauricio Morales
14:00 -15:30. Room: https://meet.google.com/xtt-qnoa-jwf

- ID 5 - Gean Mendoza, Angelica Torregroza Espinoza, Jose Figueroa-Contreras, Yenifer Villanueva-Salas. *Supplier Selection in Food Supply Chains: A Structured Multi-Criteria Decision Approach*
- ID 8 - Gean Mendoza, Blanca Paola Hernández-Benítez, Adriana Jaraba-Amaya, Rolando López-Martínez, José Daniel Franco-Avila. *An Integrated Optimization–Simulation Approach for Strategic Agro-Food Supply Chain Design*
- ID 9 - Julian Ramirez, Patricia Cano, Joan Moreno. *Optimization of Multi-Compartment Routing with Flexible Assignment in Fuel Distribution*
- ID 80 - Jeysser Johan Otero-Díaz. *Evaluating Supply Chain Resilience to Minimize Food Waste: A Multi-Agent Simulation of the Mango Network*
- ID 86 - Kenneth Marín Silva, Oscar Gomez, Victor Vélez. *Reactive Power Compensation in Large Distribution Systems: A Genetic Algorithm Integrated into DIgSILENT PowerFactory*

Online Session in Artificial Intelligence I – Chair: Camilo Cardona
14:00 -15:30. Room: https://meet.google.com/szu-dnjj-mqh

- ID 13 - Ricardo Calderón-Pérez, José Rodríguez-Sánchez, Jairo Coronado-Hernández, Alexander Troncoso-Palacio. *Artificial Intelligence Adoption in Colombian SMEs: Barriers, Impacts, and Regional Strategies*
- ID 14 - Julio Rodríguez Rincon. *Artificial Intelligence Applied to Dry Eye Diagnosis*
- ID 18 - Luisa Villa Montoya, Yarlin Andrea Ortiz Toro, Melissa Alejandra Acosta Velez, Christian Andrés Diaz León. *Intelligent Model for Estimating Kinematic and Dynamic Parameters of the Upper Limp*

- ID 23 - Miguel Angel Fernandez Marin, Chavelys Fernández Quintero, Christian David Castellanos Isern, Daniela Fuentes Morales, Daniel Alejandro Alfonso Bermúdez, Reydel Fanjul Evora, Alejandro Cespon Ferriol, Daliana Cabrera Grau, Guillermin Agüero-Chapin, Deborah Galpert Cañizares, María del Camen Chávez Cárdenas. *A Comparative Study of ProtFlash and ProtT5 Embeddings for Antimicrobial Peptide Classification with Explainable AI*
- ID 34 - Christian Erazo, Cristian Gil, Leonel Paredes, Fabian Leon. *Glucometer Readout Extraction from Smartphone Images: Classical OCR vs Multimodal API*
- ID 112 - Nestor Rodriguez, Manuel Ceballos, Diego Canales. *A Three-Axis Taxonomy of Machine Learning Applications in Dengue Epidemiology*

Coffee Break: 15:30 – 16:00

Special Session in Simulation – Chair: Prof. José Gerardo Cuta
16:00 -17:30. Room: 101A-405

- ID 116 - José Orjuela. *Modelo de simulación de eventos discretos basado en datos reales para el procesamiento de muestras diagnósticas en un servicio hospitalario de urgencias*
- ID 117 - Brayant Salgado, Feizar Rueda, Harold Ávila. *Simulating decentralized logistics scenarios in agri-food supply chains: An agent-based modeling approach for regional food systems*
- ID 131 - Mariluz Osorio, German Vargas, Juanita Diaz, Cristitan López, Juan Orozco. *Uso de la simulación de Montecarlo para la evaluación de las rutas de atención a estudiantes de la Facultad de Ingenieria de la Universidad El Bosque - Bogotá, Colombia*
- ID 132 - Ray Bello, Mariluz Osorio, Laura Palencia, Sara Roa. *Simulación de la atención al usuario en un centro de medicina laboral usando FlexSim Healthcare*
- ID 134 - Jhon Castañeda, Eduyn Lopez, Carlos Franco. *Modelamiento del Sector Deportivo Colombiano desde la Dinámica de Sistemas según su Impacto en el Ámbito Social*
- ID 137 - Diana Guzman, Juan Felipe Vargas-González, Charity Juliana Avella, Gabriel Ricardo Ballén-Gamba. *Ciclo Boom-Bust en la Cadena de Suministro de Papa Pastusa Suprema en Colombia*
- ID 76 - David Cardona García, Jaime Restrepo Mesa, Angela Liceth Peréz Rendón, Andrés Arismendi Ramírez . *General Cubing Model for Space Utilization Optimization in Logistics Systems: Validation in a Manufacturing Company*

Special Session in Miscellaneous II – Chair: Prof. Omar Bustos
16:00 -17:30. Room: 101A-406

- ID 24 - René Lobo Quintero, Julio Baron, Sebastian Vanegas. *Leia 2.0: A Configurable AI-Powered Pedagogical Assistant for Reducing Programming Barriers in Engineering Education*
- ID 45 - Yesid Díaz, Magda Fernández. *Automatic Curriculum Alignment Using Sentence Transformers A Natural Language Processing Approach for Higher Education*
- ID 49 - Edgardo Barraza Verdesoto. *Systematic review of complaint management approaches influenced by artificial intelligence*

- ID 63 - Camilo Silva Real, Jose Ignacio Rodriguez, Beatriz Rodriguez. *Knowledge Management Methodology: KPI design and control in low tech organizations using office tools*
- ID 107 - Juan Cogollo, Daniela Alzate. *Modelado de Product Recall Management: tendencias y retos*
- ID 124 - Carolina Sarmiento González. *Interoperabilidad del Ecosistema Educativo Digital: Análisis de la Interoperabilidad Semántica y la Situación de Colombia frente a Referentes Internacionales*

Special Session in Health Applications I – Chair: Prof. Claudia Ramirez
16:00 -17:30. Room: 101A-407

- ID 53 - Andy Dominguez-Monterroza, Alfonso Mateos-Caballero, Antonio Jiménez-Martín. *Ricci Curvature and Topological Descriptors of Heart Rate Dynamics Reveal Developmental Transitions in Early Childhood*
- ID 11 - Derlly Alfonso, Juan Camilo Cuesta, Ana Isabel Tenjo, Juan Sebastian Abril, Cesar Rodriguez. *Macular segmentation using an automatic deep learning and graph cut strategy*
- ID 84 - Raul Gutierrez, Raul Bareño. *Biomechanical Analysis Using Emerging Technologies and AI in Sports: A Data Science-Based Reflection*
- ID 103 - Victor Quintero. *Bio-Computational Architecture and Multimodal AI in Visible Light for Correlating Ocular Phenotypes with Cloninger's TCI Psychobiological Model*
- ID 129 - Edwin Arias López. *Representaciones sociales de la diabetes tipo 2 en mujeres, desde la perspectiva de los determinantes sociales de la salud*

Online Session in Optimization II – Chair: Mauricio Morales
16:00 -17:30. Room: https://meet.google.com/rdg-wqkc-gsv

- ID 6 - Gean Mendoza, Luz Stela Meza Martínez, María José Villadiego Castillo. *Multi-Criteria Supplier Selection for Supply Chain Decision-Making Using TOPSIS*
- ID 7 - Gean Mendoza, Blanca Paola Hernández Benítez, Paula Andrea Vergara Peralta, María Victoria Villadiego García. *Impact of facility layout redesign on operational efficiency in small manufacturing enterprises*
- ID 10 - Jonathan Gallego, José López. *Robust Localization of Animal Vocalizations with Synchronized Recorder Arrays*
- ID 69 - Martín Gómez Navarro, Gustavo Gatica, Rodrigo Linfati, Juan Carlos Figueroa-García, Carlos Alberto Franco Franco, Daniel Morillo-Torres. *GSPH-FC: A Geometric Space Partitioning Heuristic with Frontier Connectivity for the Euclidean TSP*

Online Session in Artificial Intelligence II – Chair: Andres Arismendi
16:00 -17:30. Room: https://meet.google.com/njb-gcco-yrt

- ID 20 - Maria Beatriz Bernábe, Angel Hernandez Francisco, Fernando Perez, Javier Romani. *Gender Wage Gap in Spain: A Multivariate Analysis Based on Education and Age*
- ID 29 - Jairo Powell Gonzalez, Maya Carrillo, Rogelio González, Pedro García. *Fight classification in video clips using image enhancement, pose estimation and Bi-LSTM*

- ID 78 - Jose Barrera-García, Broderick Crawford, José Manuel Gómez Pulido, Felipe Cisternas-Caneo, Yoslandy Lazo, Ricardo Soto, Giovanni Giachetti. *Mamdani Fuzzy Rule Base Design for Adaptive Inertia Weight in Particle Swarm Optimization*
- ID 90 - Julio Cesar De Dios Garcia, Nantai Nava Nolazco, Ernesto Monroy Cruz, Carolina Reta, Jesús Emmanuel Vidal Cuevas, Luis Alberto Cruz Salazar, Juan Sebastián Sánchez-Gómez. *Deep Learning-Based Smart Drone Face Recognition System: A Case Study on Educational Environment*
- ID 109 - Alexander Parody. *Influencia de la Calidad de Vida y la Dinámica Económica sobre la Concentración de PM2.5 a Nivel Continental: Desde la Estadística Multivariada y las Redes Neuronales*
- ID 110 - Alexander Parody. *Concentración de PM2.5 y su Interacción con la Calidad de Vida y el Comportamiento Económico en Países de Suramérica*

Thursday 22 Oct. – 2026, Special Sessions Schedule

Venue: Área Andina Main Campus

Special Session in Computational Methods in Finance I – Chair: Prof. Pedro Pablo Uribe
09:00 -10:30. Room: 101A-405

- ID 43 - Andy Dominguez-Monterroza, Alfonso Mateos-Caballero, Antonio Jiménez-Martín. *Spectral Concentration and Effective Dimensionality in the S&P 500: A Network Perspective on Market Stress*
- ID 50 - Jhon Moreno. *Deep Hedging under Model Uncertainty via Neural Stochastic Differential Equations*
- ID 82 - Fabián Castiblanco, Yuly Andrea Franco. *Determinants of Insolvency in Colombian SMEs: Approach Based on Gradient Boosting Algorithms and Reporting Behavior*

Special Session in Energy and Power Applications I – Chair: Prof. Luis Francisco Lopez
09:00 -10:30. Room: 101A-406

- ID 16 - Fabian Salazar. *Solar Fraction Modeling for Rural Broiler Farms via Synthetic Demand, K-Means Clustering, and Harmonic Approximation*
- ID 27 - Alejandro Marquez, Sandra Carvajal, Dahiana Lopez. Resilient *Optimization Framework for Power Systems: PV Siting via Graph Learning and Probabilistic Stability Validation using MATPOWER*
- ID 39 - Christian Erazo, Diego Guevara, Eduard Mallama. *Percentage-Error Reward and Penalty Design for DDPG-Based Control: Validation in Liquid-Level Regulation and Double Boost Voltage Control*
- ID 65 - Jose Villa, Marcela Arrieta. *Integrated Modeling of Electric Marine Vessel Dynamics, Propulsion, and Battery Systems*
- ID 104 - Francisco Moya, José Alvarez, José L. Torres M. *Iluminación Pública con Tecnologías Convencionales y Fotovoltaicas*

Special Session in Health Applications II – Chair: TBA
09:00 -10:30. Room: 101A-407

- ID 64 - Gabriela Leon. *Analysis of high-frequency electromyographic signals captured with needle electrodes*
- ID 87 - Diego Martinez Florez, Andres Leonardo Jutinico. *Impact of Differential Privacy on Synthetic Data Generation with CTGAN for Heart Failure Risk Prediction*
- ID 100 - NILSON Herazo, Jhonathan Barrios, Bienvenu Bongue. *Machine Learning-Based Chronic Disease Risk Models for Health Prevention Programs*
- ID 101 - Valentina Holguin, Estefania Perez, Juan Pablo Restrepo. *Análisis de descriptores de sEMG y su relación con el puntaje EAT-10 en pacientes con disfagia*

Online Session in Applications I – Chair: Carlos Valencia
09:00 -10:30. Room: https://meet.google.com/igz-gzpn-xmt

- ID 32 - Daniel Aragon, Carlos Zapata, Oscar Reyes. *Regime-Robust Sparse Index Tracking via Multi-Objective Genetic Optimization with Hurst Exponent Regularization*
- ID 26 - Oscar Acevedo, Yamil Ballestas, Javier Carrillo, Camila Lozano, Nicolas Molina, Santiago Bertel, Aisner Marrugo, Raul Vargas. *An Intelligent Neonatal Incubator Prototype for Active Control and Remote Monitoring*
- ID 41 - Santiago Romero Solana. *Machine Learning-Based IoT Infrastructure for Energy Systems: Signal Smoothing Optimization in High-Noise Environments*
- ID 68 - Diego Castrillon Diaz. *Automated Photovoltaic Irrigation System for Crops in the Colombian Caribbean Region*
- ID 73 - Edgar Tibaduiza, Walter Villa, Jesus Lopez. *A Discrete to Continuous Strategy for AC Optimal Reactive Power Dispatch Using Pyomo and IPOPT*

Coffee Break: 10:30 – 11:00

Special Session in Computational Methods in Finance II – Chair: Prof. Pedro Pablo Uribe
11:00 -12:30. Room: 101A-405

- ID 22 - Carlos Zapata Quimbayo, Daniel Aragon Urrego, Oscar Eduardo Reyes Nieto. *PhysRisk-ADMM: A Scalable Consensus Architecture for Dynamic Physical Climate Risk Integration in Portfolio Optimization*
- ID 60 - Andres Suarez Mantilla, Diego León, Ricardo Delgadillo. *Black–Litterman for Fixed-Income Engineering Applications: A Structured Survey of Machine Learning, Deep Learning, and Dynamic Probabilistic Extensions*
- ID 138 - Oscar Javier López Alfonso. *Finite-Time Ruin in the Jump-Telegraph Risk Model: Exact Simulation and Transform Inversion*

Special Session in Energy and Power Applications II – Chair: Prof. Luis Francisco Lopez
11:00 -12:30. Room: 101A-406

- ID 17 - Maximiliano Bueno, Carlos Vidal, Jose-Fabian Salazar. *Demand Management Model for a Microgrid within an Open Market Framework*
- ID 21 - Harrynson Ramirez Murillo, Duvan Tellez Castro, Carlos Andrés Torres Pinzón. *Static and Dynamic Data-Driven Modeling of Colombian Average Redispatch Marginal Cost*
- ID 31 - Daniel Arias, Jorge Duque, Jose Villa. *Design and Implementation of a Two-Coupled Tank Control System*
- ID 51 - Luis Alejandro Arias. *UML-Based Modeling of a Management System for Distribution Network Sectioning under Blackouts and Sudden Supply Interruptions*
- ID 123 - Vladimir Silva Leal, Diego J. Rodríguez Patarroyo, Edwin A. García Chavarría, Frank A. Ruiz Holguín, John R. Agudelo Santamaría. *Marco metodológico de inteligencia computacional basado en el algoritmo LAMDA para la clasificación multivariante de variables de desempeño y emisiones en la microturbina GTM-300 alimentada con biojet HEFA-SPK*

Online Session in Applications II – Chair: Carlos Valencia
11:00 -12:30. Room: https://meet.google.com/gfw-hwpw-zyx

- ID 2 - Gean Mendoza, Angelica Torregroza, Cristina Isabel Beltrán Sotomayor, Jhon Jairo Gonzalez Yerena, Rolando López Martínez. *Improving Production Flow in a Manufacturing System Through Discrete Event Simulation*
- ID 3 - Juan Contreras, Isabella Ceballos, Juan Jose Restrepo, Maria Constanza Pabon. *Enhancing Manufacturing Systems: Evaluating Graph Databases for Process Control and Information Management*
- ID 75 - Roger Mauricio Pérez Cruz. *Dinámica de Sistemas y Ciencia de Redes aplicadas al estudio de la corrupción pública: un análisis bibliométrico*
- ID 88 - Roger Mauricio Pérez Cruz. *Methodological Fragmentation in Public Corruption Re-search: Between Network Science and System Dynamics*
- ID 115 - Igor Pedro, Graziela Guarda, Maise Silva. *FlowMap: a web platform using graphs and CPM to support academic planning*