

OPERATIONS RESEARCH
SOCIETY OF THE PHILIPPINES

OR and AI: Working Together to Power Better Decisions

17th National Conference

November 20, 2026
Eastwood Richmonde Hotel
Quezon City

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From the Conference Chair

Dear Colleagues, Friends, and Fellow Practitioners of Operations Research,

On behalf of the Operations Research Society of the Philippines (ORSP), it is my honor and privilege to welcome you to the 17th National Conference, *"OR and AI: Working Together to Power Better Decisions,"* on November 20, 2026 at the Eastwood Richmonde Hotel in Eastwood City, Quezon City.

Operations research has always been about helping people make better decisions, whether on the factory floor, in the supply chain, in government, or in the boardroom. Today, artificial intelligence is changing how we frame problems, analyze data, and arrive at solutions. This year's theme invites us to see AI not as a replacement for the rigor of OR, but as a powerful partner to it: where optimization, simulation, and analytics give AI structure and accountability, and where AI expands the reach, speed, and accessibility of what OR can do.

Our program reflects this spirit. We are honored to welcome Mr. Ian Frederick Ilagan of Bain & Company who will share his insights on "AI and Decision Making in OR: From Knowing How to Solve to Knowing What is Worth Solving." We are equally privileged to have Dr. Eugene Rex L. Jalao of the University of the Philippines - Diliman, whose talk on LLM-driven application evaluation and selection using sentiment analysis and the Analytical Hierarchy Process shows how AI and classical decision methods can work hand in hand. To our speakers, thank you for generously sharing your time and expertise.

This conference would not be possible without the dedication of the ORSP Board, the organizing committee, our volunteers, and our partners and supporters. I also thank every member, student, practitioner, and guest who has chosen to spend this day with us. Your presence and participation are what make this gathering a true community of learning.

I encourage you to listen closely, ask questions, share your experiences, and build new connections across industry, academe, and government. May the ideas we exchange today inspire better decisions and stronger solutions for our organizations and for our country.

Welcome to the ORSP 17th National Conference. Let us work together to power better decisions!

Respectfully yours,

Rex Aurelius C. Robielos, PhD
ORSP 2026 17th National Conference

From the President



Welcome to the 17th ORSP National Conference with the theme ***OR and AI: Working Together to Power Better Decisions!***

It is my great honor and privilege to welcome each one of you to this gathering of professionals, researchers, practitioners, and students who are committed to advancing the field of decision sciences. We come together at a time when organizations face increasingly complex challenges that require both analytical thoroughness and innovative thinking. Operations Research (OR) has long provided powerful tools for optimizing decisions, while Artificial Intelligence (AI) has opened new possibilities for uncovering insights and accelerating solutions. Together, these disciplines are transforming the way we solve problems, allocate resources, and create value across industries and organizations.

This conference highlights the wonderful opportunities that emerge when OR and AI work hand in hand. Throughout the event, you will have the opportunity to hear from experts, explore emerging trends, and discover practical applications that are making a real impact. I encourage you to actively engage in discussions, share your experiences, and connect with fellow participants.

May this conference inspire us to think more boldly, innovate more effectively, and make better decisions through the integration of OR and AI. The future of decision-making is not only data-driven but also collaboration-driven. Let us together unlock new possibilities and create solutions that benefit organizations, communities, and society as a whole.

Thank you for joining us, and I wish everyone a productive, insightful, and rewarding conference experience.

Marie Shella T. Mariscal
President

Program Schedule

730	Start of Registration	
0900 - 0910	Opening Ceremonies, Prayer and National Anthem	
0910 - 1015	Plenary Talk AI and Decision Making in Operations Research *From knowing how to solve to knowing what is worth solving* Ian Frederic Ilagan *Consultant, Bain & Company*	
1015 - 1035	Coffee Break	
1035 - 1140	Plenary Talk LLM-Driven Mobile Application Evaluation and Selection Using Sentiment Analysis and the Analytic Hierarchy Process Dr. Eugene Rex L. Jalao *Professor, University of the Philippines - Diliman*	
1140 - 1230	Annual Report by the President/Induction of New Members	
1230 - 1340	Lunch Break	
1340- 1440	1A AI and Intelligent Decision Systems	1B Healthcare and Public Health Analytics
1440 -1540	2A Industrial and Operations Analytics	2B Public Systems and Social Decision-making
1540 - 1610	Coffee Break	
1610 - 1650	3A Behavioral and Sports Analytics	3B Operations Management and Process Improvement
1650- 1700	Closing Ceremonies	

Plenary Talks

Plenary Speakers

AI and Decision Making in Operations Research

From knowing how to solve to knowing what is worth solving

0910 - 1015

A B S T R A C T

Artificial Intelligence is fundamentally changing how we approach complex problems. As AI makes sophisticated analytical and optimization tools faster and more accessible, it raises an important question: Is finding the mathematically optimal solution still the most valuable part of decision-making?

Drawing from real-world industry application of OR, this presentation explores how AI is reshaping the economics of problem-solving. It examines why effective decisions depend not only on solution quality, but also on execution speed, effort, and stakeholder adoption. Through practical demonstrations and examples of AI innovation at Bain & Company, the discussion highlights how AI is expanding the possibilities of Operations Research, and concludes by exploring what these developments mean for students, researchers, and industry practitioners, including how to harness AI's capabilities while preserving the depth of human thinking.



Ian Frederic Ilagan

Ian Ilagan is a management consultant at Bain & Company, with experience spanning OR, analytics, strategy, and organizational transformation. He earned his bachelor's and master's degrees in Industrial Engineering from De La Salle University, where his graduate research focused on optimization to airline crew scheduling and disruption management. He also served as a part-time lecturer at De La Salle University. Before joining management consulting, Ian worked in energy, leading analytics and strategy at ACEN. He subsequently earned his MBA from the University of Chicago Booth School of Business. At Bain, Ian has worked on several projects across $1B+ companies within Southeast Asia practicing in healthcare, banking, oil and gas, and agri industries. His interests lie at the intersection of AI, analytical decision-making, and business strategy, particularly how emerging technologies has changed modern problem solving and how AI impacts the modern workforce.

LLM-Driven Mobile Application Evaluation and Selection Using Sentiment Analysis and the Analytic Hierarchy Process

1035 - 1140

ABSTRACT

The rapid growth of mobile applications has made application selection increasingly challenging, particularly when users must evaluate numerous alternatives based on ratings, download statistics, and unstructured user reviews. While user reviews provide valuable insights into application performance and user satisfaction, their subjective and unstructured nature complicates systematic evaluation. This study proposes an integrated decision support framework combining Large Language Models (LLMs), aspect-based sentiment analysis, and the Analytic Hierarchy Process (AHP) to facilitate mobile application evaluation and selection. The proposed approach utilizes LLMs to extract relevant evaluation criteria, identify application features, classify aspect-specific sentiments, and transform user reviews into structured performance assessments.

These assessments are integrated into an AHP-based multi-criteria decision-making model, where expert-derived criteria weights are combined with LLM-generated performance scores to rank competing applications. The framework is designed to analyze large volumes of user reviews across multiple mobile application categories, including finance, communication, education, productivity, and entertainment. Its effectiveness is evaluated in terms of sentiment classification accuracy, consistency of extracted criteria, agreement with expert rankings, computational efficiency, and ranking stability. By leveraging the contextual understanding and semantic reasoning capabilities of LLMs, the proposed framework aims to overcome limitations of conventional text mining approaches while improving the transparency and consistency of application selection.

The study contributes an integrated artificial intelligence and operations research approach for transforming unstructured user feedback into actionable insights that support systematic, scalable, and evidence-based mobile application selection.

Keywords: Large Language Models, Aspect-Based Sentiment Analysis, Analytic Hierarchy Process, Multi-Criteria Decision-Making, Mobile Application Selection, Decision Support Systems.



Eugene Rex L. Jalao

Dr. Eugene Rex L. Jalao is a Professor of AI and Industrial Engineering at the University of the Philippines Diliman, Department of Industrial Engineering and Operations Research and AI Program of the College of Engineering. He specializes in Agentic AI Systems, Decision Support Systems, Business Analytics Solutions, Predictive Analytics, Optimization and Systems Simulation. He obtained his Ph.D. in Industrial Engineering from Arizona State University (ASU) in May 2013. Additionally, he obtained his Masters of Science in Industrial Engineering degree as well as his Bachelor of Science in Industrial Engineering from the University of the Philippines Diliman in 2009 and 2007 respectively. He also obtained AI and Machine Learning Professional Certificates from the Massachusetts Institute of Technology and University of California Irvine. His fifteen years of work and research experience are in the fields of business analytics both here in the Philippines and in the United States of America, specifically in the Banking, FMCG, Manufacturing, Real Estate, Healthcare, Telecommunications and Information Technology industries. He is also a certified SAP ERP Materials Management consultant, a Matlab computing associate, a Certified NVIDIA Deep Learning Instructor and an advocate of the R and Python Programming languages.

Paper Presentations

Paper Sessions

Session	Time	Session Theme, Paper Title, Authors	
		Room A	Room B
1	13:30-14:30	*AI and Intelligent Decision Systems*	*Healthcare and Public Health Analytics*
		Developing an AI-enabled Decision Support System for Mang Kiko's Cacao *Jared Lawrenz Ty, Lincoln Gabriel Ang, Mary Antoinette Bacud, Jania Lyle Galang, and Jilliane Margaux Pedrosa*	Monte Carlo Simulation Analysis of Effects of Hospital and Insurance Operations on Waiting Times Among Filipino Hospitals *Diego Lorenzo Donato*
		An Agentic AI Framework for Adaptive Schema Standardization in ETL *Jarvy Larz San Juan, Adeb Rabelas, and Francis Miranda*	A Web-Based Nurse Assignment Recommendation System for Municipal Health Units Using Mixed-Integer Linear Programming *Angelo Ani and Miguel Darwin Lapitan*
		Integrating Neural Networks and Linear Programming for Agentic AI-Based Project Manager Allocation *Adeb Rabelas, Jarvy Larz San Juan and Francis Miranda*	Constrained Optimization of a Time-Varying Influenza Transmission Model for the Philippines *Nicolaitte Amor Alubog, Maria Czarina Lagura-Arreza, and Allen Nazareno*

Paper Sessions

Session	Time	Session Theme, Paper Title, Authors	
		Room A	Room B
2	14:30-15:30	*Industrial and Operations Analytics*	*Public Systems and Social Decision-making*
		Industrial Loss Decision Intelligence (ILDI): A Digital Twin-Enabled AI and Operations Research Framework for Repair, Restoration, and Replacement Decisions in Industrial Asset Recovery *Rachel Aurelio*	Network Optimization for Active Transport Infrastructure: A Dual-Factor Graph Theoretical Model for Bike Lane Planning in Iloilo City *RB Jann Jamindang, Jaypee Agregado, and Early Sol Gadong*
		An Integrated Approach to Demand Forecasting and Newsvendor Inventory Management for Artisanal Dumpling Operations *Carl Justin Lazaro, Loutch Faye Padilla, Louise Mari Paguia, and Ericka Vivien Rivera*	Decision-Making and Social Collateral in Cooperative Microlending *Diane Carmeliza Cuaresma, Edd Francis Felix, and Kimben Gonzales*
		Characterizing Paluto Market-Style Dining Operations through Value Stream Mapping: Evidence from the Iloilo Fish Port Complex *Yazmin Nievec Cristobal, Angela Liz Eroy, Leocarl Francis Montel, Nicole Ashley So, Emy Belle Joy Villanueva, Reisyl Villanueva, Mary Ann Sedero, Ramil Atando*	Optimizing Army Capability Investment Using A Constant Elasticity of Substitution Production Function *Don Stanley Dalisay*

Paper Sessions

		Session Theme, Paper Title, Authors	
		Room A	Room B
3	16:00-16:40	*Behavioral and Sports Analytics*	*Operations Management and Process Improvement*
		Achieving Target Vaccination Coverage Against Seasonal Infectious Diseases Using Evolutionary Game-Theoretic Model *Diane Carmeliza Cuaresma, Edd Francis Felix, Mark Allien Roble, Mark Jayson Cortez, and Allen Nazareno*	Reducing Waiting Time in University Admission Document Processing Using Discrete-Event Simulation *Erwin Arlan and Gabriel John De Leon*
		Optimizing Football Lineups from Recent Player Performance: An AHP–Integer Programming Framework *Juan Marco Antonio and Mark Lexter De Lara*	

Abstracts

1A AI and Intelligent Decision Support

13:30 - 14:30

Developing an AI-enabled Decision Support System for Mang Kiko's Cacao

Jared Lawrenz Ty, Lincoln Gabriel Ang, Mary Antoinette Bacud, Jania Lyle Galang, and Jilliane Margaux Pedrosa

Manufacturing micro, small, and medium enterprises (MSMEs) turn local resources into products that sustain their communities, yet many lack the consolidated data and analytical tools needed to price accurately, allocate resources, and scale. While decision-support applications often focus on larger manufacturers, this study examines how operations research (OR) concepts can be applied with Artificial Intelligence (AI) through an accessible, user-centered system that translates analytical outputs into actionable information for small, owner-managed enterprises.

The study analyzes Mang Kiko's Cacao (MKC), a family-owned tablea producer in Cagayan de Oro City, thriving in the Philippine cacao and chocolate industry. The analysis finds that MKC maintains sales, inventory, and production records, but these remain manually captured and fragmented, limiting visibility into costs, demand, and resource requirements. Owner-dependent decision-making and limited planning further constrain expansion.

To address these gaps, the study proposes an AI-enabled Integrated Operations Management and Decision-Support System. The system combines OR-based tools, including demand forecasting, inventory and production planning, resource requirement analysis, and what-if scenarios, with AI-enabled natural language interaction. This integration aims to make OR-based insights more accessible to more MSME managers so that they can make informed operational decisions.

An Agentic AI Framework for Adaptive Schema Standardization in ETL

Jarvy Larz San Juan, Adeb Rabelas and Francis Miranda

Structural variability, inconsistent data structures, and variable data quality remain persistent challenges in Extract, Transform, Load (ETL) workflows. These issues often require extensive manual interpretation and transformation before data can be standardized and utilized by downstream processes. We present an AI-assisted ETL framework that combines deterministic transformation logic with an agentic semantic interpretation layer to convert heterogeneous datasets into standardized formats. The framework detects and interprets unfamiliar schemas, identifies semantic column roles, recommends appropriate transformations, and applies normalization, reconciliation, and validation procedures with minimal user intervention.

Unlike traditional rule-based ETL pipelines, the proposed framework does not rely solely on predefined mappings. Instead, it adapts to structural variations across single-sheet and multi-sheet inputs through contextual metadata inference and guided decision-making. The process consists of multiple stages, including header interpretation, schema alignment, unpivoting, semantic standardization, quality assurance, and exception handling. The framework was evaluated using five heterogeneous datasets representing different schema structures, naming conventions, languages, and levels of data completeness. Evaluation demonstrated substantial reductions in manual preparation effort and improved consistency of standardized outputs. The results suggest that combining agentic AI with deterministic data-engineering methods can provide a scalable and adaptive approach to ETL, enabling more efficient management of schema variability while accelerating data preparation and standardization workflows.

Integrating Neural Networks and Linear Programming for Agentic AI-Based Project Manager Allocation

Adeb Rabelas, Jarvy Larz San Juan and Francis Miranda

Assigning Project Managers (PMs) to the right projects is harder than it should be. Capacity data is scattered, availability assessments rely on gut feel, and overload is often caught too late.

We present an agentic AI decision-support framework built on a two-stage engine. A neural network trained on historical delivery data forecasts when each PM's capacity will realistically open up, based on typical delivery delays. A linear programming model then evaluates candidate assignments against capacity, experience, and location to generate a portfolio-wide reallocation.

The agentic AI layer sits above this engine and performs three functions: understanding the intent of the query, translating plain-language questions into model parameters; constraint checking, validating any proposed reallocation against capacity, location, and experience limits before it is presented; and scenario generation, letting leaders explore alternative staffing options on demand without rerunning the workflow manually.

By combining predictive analytics, linear programming, and conversational AI, the solution transforms PM allocation from a largely reactive process into a proactive, data-driven decision framework. Rather than replacing managerial judgment, it augments human decision-making with forward-looking capacity forecasts and recommendations. This human-in-the-loop approach enables project leaders to identify capacity risks earlier, evaluate staffing options more consistently, and make faster, more informed allocation decisions.

Monte Carlo Simulation Analysis of Effects of Hospital and Insurance Operations on Waiting Times Among Filipino Hospitals

Diego Lorenzo Donato

Hospital visits in the Philippines are long and arduous tasks, with patients spending up to 300% more time in the hospital than intended due to waiting. To combat this, hospitals continually develop more advanced technology and more areas to accommodate patients; however, such development is costly both in terms of time and finances. Monte Carlo simulations provide a cheap and efficient method to interpret and analyze the efficacy of developmental decisions to minimize patient waiting times. An Excel-based simulation was created that utilized data, 2 weeks of waiting times, and the cumulative distribution function to simulate the operations in the Hospital. Insurance in Philippine hospitals remains inefficient. An alternative satellite method assigned to each department was proposed. Average waiting time and average service time were compared. The alternative method proved to be more efficient for both patients and the hospital. Since waiting times have been decreased, approximately 6 more patients are served daily. The profit generated by this significantly outweighs any administrative costs. Additionally, workers are reallocated rather than acquired, thus costs are lowered much more. Applying a robust and hospital wide simulation development network can allow decision makers to experiment and succinctly improve hospital operations for patients to an advanced degree.

A Web-Based Nurse Assignment Recommendation System for Municipal Health Units Using Mixed-Integer Linear Programming

Angelo Ani and Miguel Darwin Lapitan

Nurse scheduling in municipal health units involves coordinating regular duties at the main office with scheduled assignments to barangay health facilities. This study presents the development of a Nurse Assignment Recommendation System (NARS) using a mixed-integer linear programming (MILP) model. Users provide scheduling data, including activity schedules, staffing requirements, fixed nurse-to-barangay assignments, planned leaves, non-working days, and nurse availability. The model processes these inputs while enforcing activity-specific staffing requirements, limiting each nurse to one activity per day, and balancing assignments and workloads. The model was implemented in Python and integrated into a web-based Dash application, providing an interactive interface for entering scheduling requirements and generating recommended monthly nurse assignments. NARS is designed for monthly scheduling before the start of the next month. Based on the reported scheduling process, manual assignment takes approximately one to two days, depending on the availability of activity schedules and planned leave data, while NARS generates recommendations within minutes using available data. The resulting schedules are provided in editable files to allow personnel to revise assignments according to their requirements. The system also identifies practical scheduling limitations, including activities that cannot be removed or substituted within a day and unplanned absences not communicated before scheduling.

Constrained Optimization of a Time-Varying Influenza Transmission Model for the Philippines

Nicolaitte Amor Alubog, Maria Czarina Lagura-Arreza, and Allen Nazareno

Influenza transmission in tropical countries exhibits irregular and multiple epidemic waves, complicating disease-control planning. This study formulates the calibration of a susceptible-vaccinated-exposed-infectious-recovered-susceptible model as a constrained nonlinear optimization problem using weekly influenza positivity data from the Philippines from 2023 to 2025. The time-varying transmission rate was represented by a baseline component and multiple Gaussian peaks. Model parameters were estimated using a multi-start L-BFGS-B algorithm with epidemiologically informed bounds. The objective function combined weighted linear and logarithmic fitting errors with penalties for excessive variation in transmission, implausibly high positivity, and unrealistic incidence. Candidate models with three, four, and five peaks were compared using the Akaike and Bayesian information criteria. The optimized model captured the major epidemic surges in 2024 and 2025. Transmission peaks preceded increases in modeled incidence by approximately four weeks, providing a model-based lead time that could inform preparedness planning. Sensitivity analysis identified the transmission and recovery rates as the strongest drivers of epidemic magnitude, while combined intervention scenarios generally produced greater incidence reductions than individual strategies. The framework demonstrates how constrained optimization can integrate surveillance data, disease dynamics, and epidemiological feasibility to support influenza preparedness and intervention planning.

14:30 - 15:30

Industrial Loss Decision Intelligence (ILDI): A Digital Twin-Enabled AI and Operations Research Framework for Repair, Restoration, and Replacement Decisions in Industrial Asset Recovery

Rachel Aurelio

Industrial assets are increasingly exposed to loss events arising from natural hazards, fire, electrical failures, transportation incidents, lifting accidents, and operational disruptions. Following such events, determining whether a damaged asset should be repaired, restored, replaced, or subjected to further technical assessment requires balancing technical feasibility, economic viability, operational continuity, safety, and sustainability considerations. This paper proposes the Industrial Loss Decision Intelligence (ILDI) Framework, a Digital Twin-enabled decision-support approach that integrates Artificial Intelligence (AI) and Operations Research (OR) to improve post-loss asset recovery decisions. AI functions as an information-processing layer that extracts and structures evidence from inspection reports, photographs, maintenance records, equipment specifications, quotations, and historical loss information. A digital twin representation of the affected asset is utilized to model damage conditions, simulate recovery alternatives, and estimate future performance under different recovery pathways. The OR component applies multi-criteria decision analysis and optimization techniques to evaluate repair, restoration, replacement, and further-assessment options based on damage severity, recovery cost, downtime, lead time, asset criticality, remaining useful life, safety risk, salvage value, and environmental impact. A Philippine industrial asset-loss scenario is presented to demonstrate the framework's capability to generate transparent, defensible, and data-driven recommendations. The proposed framework contributes a novel methodology for resilient, sustainable, and evidence-based industrial asset management.

An Integrated Approach to Demand Forecasting and Newsvendor Inventory Management for Artisanal Dumpling Operations

Carl Justin Lazaro, Loutch Faye Padilla, Louise Mari Paguia, and Ericka Vivien Rivera

Small food businesses producing perishable, made-to-order goods often plan production manually, causing spoilage and stockouts. A Philippine artisanal dumpling restaurant incurred daily losses of 15 to 27 spoiled and 3 to 4 unfulfilled orders, equivalent to ₱2,700 to ₱4,300, with top sellers having excess rates up to 41.42% while low-volume items stocked out 4% to 13% of days. A newsvendor model was paired with product-specific forecasting because dumplings keep only two days, have no salvage value, and show weekday-dependent demand. Six forecasting techniques (naive, single exponential smoothing, linear trend equation, and simple, weighted, and central moving averages) were shortlisted for simplicity, short-term accuracy, and spreadsheet implementation, then compared by mean absolute percentage error. Thirty-one weeks of sales and production records, yielding roughly 27 observations per weekday, were used to fit demand distributions for 10 products. Quantities from service levels and these distributions were validated through hindcasting, applying the model retrospectively to historical data and comparing outputs against observed outcomes. Spoilage for top sellers fell to near zero on most days, low-volume stockouts occurred on at most 6.67% of days, and daily losses fell about 56%. Excess and shortages persisted, reflecting a spoilage-stockout trade-off. A spreadsheet workbook was developed for continuous improvement.

Characterizing Paluto Market-Style Dining Operations through Value Stream Mapping: Evidence from the Iloilo Fish Port Complex

Yazmin Nievec Cristobal, Angela Liz Eroy, Leocarl Francis Montel, Nicole Ashley So, Emy Belle Joy Villanueva, Reisyl Villanueva, Mary Ann Sedero, and Ramil Atando

Paluto restaurants operate through a distinctive food-service model where customers purchase fresh seafood from the market and have it cooked by nearby stalls, connecting them with the seafood supply chain while providing livelihood for the locals. However, service delivery is constrained by variable waiting times and operational constraints. This study characterized paluto operations at the Iloilo Fish Port Complex and identified initial process data requirements for future operational improvement. A qualitative multiple-case design used structured interviews with stall owners and personnel recruited through convenience sampling, representing 25 stalls. Value stream mapping and process activity mapping were used to document and classify operational activities, while thematic analysis was employed to organize interview responses. The findings identified value-adding, necessary non-value-adding, and non-value-adding activities across order receipt, preparation, cooking, and service delivery. Operational constraints included variable customer demand, waiting and service delays, unnecessary movement, limited kitchen and dining space, informal task allocation, inconsistent order-handling practices, unequal customer traffic, and inadequate shared facilities. The findings informed proposed data requirements and stage timestamps for waiting-time prediction, resource scheduling, and capacity planning. The qualitative map provides a framework for locating future data-capture points and linking operational problems to potential AI-assisted decision support.

Network Optimization for Active Transport Infrastructure: A Dual-Factor Graph Theoretical Model for Bike Lane Planning in Iloilo City

RB Jann Jamindang, Jaypee Agregado, and Early Sol Gadong

Surges in local cycling demand highlight the need for data-driven transport planning in Iloilo City Proper. This paper presents a graph-based decision-support framework to design an efficient municipal bike lane network under real-world budget and traffic constraints. Major commercial, educational, and transit hubs are modeled as graph vertices, with connecting roads serving as weighted edges. To balance different urban planning goals through distinct objective functions, two optimization models were constructed. The distance-induced model minimizes total route length to lower construction expenditure, operating under the assumption that infrastructure expenses scale with distance. For the traffic-induced model, a scoring method was developed that translates color-coded Google Maps heatmaps into numerical traffic density weights across peak hours, prioritizing heavily congested roads to ease vehicular bottlenecks. Findings reveal an optimal distance-induced tree spanning 10.99 km for cost minimization and a traffic-induced tree accumulating 14.86 weighted density units for congestion relief. Both networks consistently integrate General Luna, Ledesma, and Delgado Streets as essential arterial corridors. Comparative analysis demonstrates how graph optimization provides local governments with a flexible tool to evaluate trade-offs between capital investment and traffic relief objectives.

Decision-Making and Social Collateral in Cooperative Microlending

Diane Carmeliza N. Cuaresma, Edd Francis O. Felix, and Kimben M. Gonzales

Microlending provides small loans to individuals with limited access to traditional credit, often relying on social collateral to support repayment. This study examines how individual decisions and social dynamics influence the sustainability of cooperative microlending, defined in terms of successful loan repayment and eligibility for loan renewal.

The model considers (N) individuals who borrow equal amounts (L), repayable with interest, and allocate their funds between a risky microfinance project and savings. At the end of each loan cycle, members with surplus funds may assist those unable to meet their repayment obligations. Social collateral is represented through a reputation-based donor-recipient game involving three strategies: unconditional cooperation, unconditional defection, and the leading-eight strategy, a conditional cooperation strategy in which donation decisions depend on recipients' reputations. Reputations are updated based on observed donor-recipient interactions, influencing subsequent donation decisions. The game continues until repayment is completed or no willing donors remain.

Using agent-based simulation, the study investigates how repayment requirements and cooperative behavior affect repayment success and loan renewal. The model provides a decision-support framework for examining the role of social collateral in sustaining cooperative microlending systems.

Optimizing Army Capability Investment Using A Constant Elasticity of Substitution Production Function

Don Stanley Dalisay

Philippine Army modernization decisions depend on capability assessments that identify gaps between required tasks and the force's ability to perform them. Translating these gaps into investment priorities requires understanding how capability components jointly produce task performance.

This study will develop a two-stage framework that models this relationship from demonstrated unit performance. First, a constant-elasticity-of-substitution (CES) production function will link the DOTMLPF-P capability components (doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy) to unit proficiency in capabilities such as firepower and command and control, observed in training rotations. Its elasticity of substitution will show whether components are substitutes or complements. Second, the function will be embedded in a constrained optimization model that selects the affordable investment package maximizing capability proficiency, given each option's cost, implementation requirements, and expected effect on component levels.

A proof of concept using synthetic data tests whether the model favors balanced spending when components depend on each other, and which uncertainty most shifts its recommendations. The study then outlines a pathway to empirical application using training-rotation records and provides a data-driven basis for capability assessment that will support more defensible investment decisions under resource constraints.

16:00 - 16:40

Achieving Target Vaccination Coverage Against Seasonal Infectious Diseases Using Evolutionary Game-Theoretic Model

Diane Carmeliza Cuaresma, Edd Francis Felix, Mark Allien Roble, Mark Jayson Cortez, and Allen Nazareno

Effective vaccination planning for seasonal infectious diseases requires understanding both disease transmission and individual vaccination decisions. Since vaccination is a voluntary decision influenced by its costs, benefits, and perceived infection risks, an epidemic model must incorporate a behavioral framework to capture how individuals choose and adapt their vaccination strategies. This study integrates evolutionary game theory into an epidemic model to examine how vaccination costs, vaccine efficacy, disease transmission, previous infection, and others' vaccination decisions influence vaccination uptake across successive epidemic seasons. Through payoff comparisons, individuals adapt their strategies based on the relative benefits of vaccination and non-vaccination. The model evaluates whether voluntary vaccination can achieve a target coverage of 80% under varying epidemiological and economic conditions.

Simulation results show that under moderate transmission (β=0.3) and high vaccine efficacy (e=0.8), the target is achieved when vaccination costs are below 25% of infection costs. However, it is not reached when vaccine efficacy decreases to 50%. Under low transmission (β=0.15), the target is achieved at vaccination costs below 40% and 25% for high and low vaccine efficacy, respectively. Under high transmission (β=0.6), the target is not achieved regardless of vaccine efficacy. These findings demonstrate the importance of incorporating behavioral decision-making into epidemic models to inform vaccination strategies and public health planning.

Optimizing Football Lineups from Recent Player Performance: An AHP–Integer Programming Framework

Juan Marco Antonio and Mark Lexter De Lara

Selecting a football lineup requires balancing recent performance, positional demands, formation, and player eligibility. Mathematical optimization makes these trade-offs explicit. Unlike lineup models for sports with different roster structures, our model represents football's 11-player squad, formation-specific positional quotas, and one-position-per-player assignment. We combine the Analytic Hierarchy Process (AHP) and binary integer programming in a transparent framework, examining Atlético Madrid across three 2024–2025 La Liga matches. A football statistics expert ranked criteria by position; AHP converts these judgments into transparent position-specific weights. The criteria included goals, assists, goal- creating actions, and expected goals for attacking roles; passing and ball involvement; tackles, interceptions, clearances, and blocks for defensive roles; goalkeeper save and pass-completion rates; and yellow and red cards. We applied the weights to min-max normalized statistics averaged across the three prior matchweeks, then optimized suitability subject to squad-size, formation, and unique-assignment constraints. Lineups overlapped with actual selections by 8/11 (72.7%) and 9/11 (81.8%) in the first two scenarios (mean 77.3%), and 4/11 (36.4%) in the third. The lower third-scenario overlap was partly associated with injuries that excluded players from the lookback data, as well as tactical and other non-statistical considerations. The model lacked positional eligibility restrictions and sometimes assigned players outside conventional positions, highlighting the need to include such constraints for realistic recommendations. The framework lets coaches inspect and adjust the criteria and weights that drive lineup recommendations.

Reducing Waiting Time in University Admission Document Processing Using Discrete-Event Simulation

Erwin Arlan and Gabriel John De Leon

University admission periods often experience congestion due to clustered student arrivals, variable service times, and limited service capacity. This study applies discrete-event simulation to analyze and improve the admission document processing system of Caraga State University in Butuan City, Philippines. The model represents student arrivals, form distribution and completion, and document verification across multiple service counters. Thirty independent replications were conducted for the baseline system and three alternative configurations: staggered staff breaks, dynamic queue selection, and an integrated strategy combining both interventions. The baseline system produced a mean waiting time of 34.6 minutes. Staggered staff breaks reduced mean waiting time by 13.56%, while dynamic queue selection achieved a 27.50% reduction. The integrated strategy reduced mean waiting time to 21.3 minutes, representing a 38.45% reduction from the baseline without increasing staffing levels. Statistical tests indicated significant differences among the evaluated configurations. The results demonstrate how simulation-based decision support can identify operational bottlenecks and evaluate low-cost process improvements before implementation. The study provides a practical framework for improving queue management, staff scheduling, and service efficiency in university admission operations.

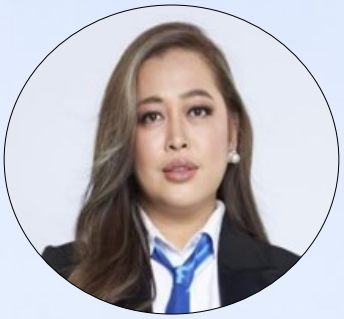
Paper Presenters



Erwin N. Arlan is a PhD student in Applied Mathematics at the University of the Philippines Los Baños. He is a Licensed Professional Teacher and Civil Engineer, and currently an Associate Professor in the Mathematics Department at Caraga State University. His research interests include Number Theory, Combinatorics, and Operations Research.

Erwin Arlan

Rachel G. Aurelio, PIE, ASEAN Eng., CrFA, CEM, CEA, is a Professional Industrial Engineer whose work spans industrial asset recovery, disaster restoration, insurance-supported loss assessment, heavy-lift logistics, and operational risk management. Her experience includes post-loss restoration projects, business interruption recovery support, and industrial asset relocation within manufacturing environments. Her research focuses on the application of Operations Research, Artificial Intelligence, and Digital Twin technologies to improve decision-making for industrial asset management and recovery.



Rachel Aurelio



Diane Carmeliza Cuaresma

Diane Carmeliza N. Cuaresma is an Associate Professor and the current Quality Assurance Officer at the Institute of Mathematical Sciences, College of Arts and Sciences, University of the Philippines Los Baños (UPLB). She earned her Bachelor of Science in Applied Mathematics (2011) and Master of Science in Mathematics (2017) from UPLB, and her Doctor of Science in Environment and Energy Systems (2024) from Shizuoka University, Japan. Her research interests include mathematical modeling, game theory, and the application of mathematical approaches to environmental and social systems. In recognition of her contributions to teaching, she received the Outstanding Mathematics Instructor Award from the Mathematics Division, Institute of Mathematical Sciences and Physics, in 2016, and the Outstanding Junior Faculty Award from the College of Arts and Sciences in 2018.

DS Dalisay is a Scout Ranger captain in the Philippine Army, currently working in Capability Development and Force Modernization. He received his Operations Research and Economics training from West Point, where he conducted research on deep neural networks and their applications to urban vulnerability modelling and prediction under the supervision of William Pulleyblank. As an active-duty soldier, he has deployed in combat with the Army Scout Rangers in Western Mindanao and Eastern Mindanao. Prior to his military service, he did research and analytics work with the World Bank and RAND Corporation on public policy and defense-related issues. He is currently interested in applying mathematical modelling to Army systems and processes to guide better decision-making.



Don Stanley Dalisay



Mark Lester De Lara

Mark Lexter David De Lara is an Associate Professor of Mathematics at the University of the Philippines Los Baños (UPLB), where he currently serves as Program Leader of the Topological Data Analysis for Complex Systems (TDACS), a funded collective mentorship program. He earned his Ph.D. in Mathematics and M.S. in Applied Mathematics from the University of the Philippines Diliman and his B.S. in Applied Mathematics (cum laude) from UPLB. His research interests include topological data analysis, optimization, and mathematical modeling, with particular emphasis on developing homology-based classification algorithms and exploring their applications in data science and the natural sciences.

Dr. De Lara has led and participated in several research projects spanning supply chain optimization, mathematical modeling of infectious diseases, and persistent homology-based approaches to data classification. His research has been published in peer-reviewed journals, including PeerJ Computer Science and the Philippine Journal of Science, and presented at national and international conferences. Beyond research, he is committed to teaching and mentoring the next generation of mathematicians and data scientists. He has supervised nu-

merous undergraduate theses and special problem projects in applied mathematics and data analytics. His contributions to teaching and research have been recognized through several distinctions, including the 2023 IMS Outstanding Teacher Award (Senior Category), 2026 IMS Outstanding Researcher Award (Senior Category), 2024 and 2026 UPLB Professorial Chair Lecture Awards, and a 2024 Research Grant from the UP Diliman Institute of Mathematics. He is an active member of several professional organizations, including the Mathematical Society of the Philippines, the Southeast Asian Mathematical Society, the Philippine Society for the Study of Nature, and the Philippine-American Academy of Science and Engineering (PAASE).

Diego "Ren" Donato is an emerging researcher from the Management Engineering course of Ateneo, passionate about leveraging mathematical modeling and operations research to transform healthcare. His research interests focus on applying mathematical and quantitative methods, optimization techniques, and data-driven decision-making to address complex healthcare challenges, improve operational efficiency, and enhance patient outcomes. He is particularly driven by the intersection of mathematics and public health, where analytical solutions can translate into more accessible, equitable, and effective healthcare systems. Guided by the belief that mathematics extends beyond numbers and equations, Ren aspires to use research and innovation to develop solutions that make a meaningful difference in people's lives.



Diego Lorenzo Donato



Edd Francis Felix

Edd Francis Obiña Felix is an Assistant Professor at the Institute of Mathematical Sciences (formerly IMSP), University of the Philippines Los Baños (UPLB). He earned his Bachelor of Science in Applied Mathematics (Actuarial Science Option) in 2013 and Master of Science in Mathematics in 2021, both from UPLB. His research interests include actuarial modeling, mortality forecasting, financial risk analysis, and mathematics education. He received the IMSP Outstanding Teacher Award (Junior Category) in 2023.

RB Jann G. Jamindang is an Instructor and a Master of Science in Mathematics student at the Institute of Mathematical Sciences (IMS), College of Arts and Sciences, University of the Philippines Los Baños. He holds a B.S. in Applied Mathematics (Summa Cum Laude) from the University of the Philippines Visayas. His research includes graph-theoretic models, mathematical programming, and application of decision-support optimization to active transport and urban infrastructure planning.



RB Jann Jamindang



Miguel Darwin Lapitan

Miguel Darwin DC. Lapitan is an Instructor at the Department of Industrial Engineering, University of the Philippines Los Baños. He earned his BS in Industrial Engineering from the same university and graduated magna cum laude. He is currently pursuing his Master of Science in Industrial Engineering, majoring in Operations Management Engineering, at the same university. His research interests include mathematical modeling, systems simulation, and multi-objective and stochastic optimization.

Allen L. Nazareno is an Associate Professor at the Institute of Mathematical Sciences, University of the Philippines Los Baños (UPLB), with expertise in mathematical epidemiology, vaccine health economics, and disease-burden modeling. He earned his PhD in Population Health from the University of New South Wales, Sydney, where his doctoral research focused on the cost-effectiveness of maternal RSV vaccination in Australia. His research applies mathematical, epidemiological, and economic modeling to infectious diseases, with work on RSV, influenza, TB, and pertussis, including the evaluation of vaccination strategies and disease burden.



Allen Nazareno



Louise Mari Paguia

Louise Mari M. Paguia is an undergraduate student of Industrial Engineering at the University of the Philippines Diliman. Her research interests include Operations Research and Management and Data-driven Decision Making. She is a co-author of *"An Integrated Approach to Demand Forecasting and Newsvendor Inventory Management for Artisanal Dumpling Operations,"* which explores the application of forecasting techniques and inventory optimization to reduce food waste and improve production planning in small food businesses. Through this research, she aims to contribute to practical and sustainable solutions for operational challenges in the food industry.

Adeb Byron Rabelas is a Senior Operations Client Partner for Indonesia at NielsenIQ, where he focuses on client operations, business process transformation, and strategic stakeholder management. He holds a BS in Industrial Engineering from the University of Santo Tomas and a Postgraduate Diploma in General Management from the Asian Institute of Management. With experience spanning operations leadership, web crawling solutions, and process automation across APAC, his work centers on leveraging data, technology, and continuous improvement methodologies to drive operational excellence and client value.



Adeb Byron Rabelas



Ericka Vivien Rivera

Ericka Vivien F. Rivera is a Bachelor of Science in Industrial Engineering student at the University of the Philippines Diliman, with research interests in demand forecasting, inventory management, and decision-support systems. Within the food industry, she co-authored a study that integrated product-specific forecasting with a newsvendor model to reduce spoilage and stockouts in an artisanal dumpling operation and developed a spreadsheet workbook to support continuous improvement. This focus on data-driven planning is further reflected in her experience as a Demand and Supply Planning Intern at Gentle Supreme Philippines, Inc., a fast-moving consumer goods company, where she designed forecasting models and allocation tools that strengthen inventory and order fulfillment decisions.



Jarvy Larz San Juan

Jarvy Larz San Juan recently joined NielsenIQ (NIQ) as an Associate Client Operations Partner, where he focuses on data analysis and streamlining analysis processes. He holds a BS-MS in Industrial Engineering from De La Salle University, where his academic research centered on optimization under uncertainty. His current work brings an AI and operations research perspective to practical data challenges, including the use of agentic AI to make ETL workflows more adaptive and efficient.



Nicole Ashley So

Nicole Ashley So graduated with a degree of Bachelor of Science in Management at the College of Management, University of the Philippines Visayas (UPV). She previously interned at the Filipina CEO Circle and the UP Resilience Institute's Education Division. During her undergraduate studies, she also served as a student research assistant for the UPV Action Research Project in Teaching, where she facilitated discussions on the development of a localized voter education module for high school students. She is currently a Management Trainee at the Philippine Bank of Communications (PBCOM), where she continues to develop her knowledge and practical understanding of organizational and operational processes.



Jared Lawrenz Ty

Jared Lawrenz P. Ty is a fourth-year BS Management Engineering student at Ateneo de Manila University, specializing in International Business. He combines analytical thinking, strategic problem-solving, and leadership experience with a passion for entrepreneurship, business development, and innovation. Through his involvement in entrepreneurial ventures, corporate strategy initiatives, and growth-oriented projects, he applies data-driven insights and creativity to solve real-world business challenges. A former student-athlete and experienced organizational leader, Jared values his Christian faith, teamwork, empowerment, and building meaningful relationships. He is driven by a desire to create lasting impact by developing businesses and solutions that create value for people and communities. Through his academic training and hands-on experience in strategy, artificial intelligence, and entrepreneurship, he aspires to bridge business, technology, and human-centered leadership in building innovative and sustainable enterprises.

Board of Directors



Marie Shella T. Mariscal
PRESIDENT

Shella is the Data Analytics & Operations Research Manager of the Data and Analytics Group at San Miguel Corporation. She has a BS degree in Industrial Engineering (minor in Mechanical Engineering) from De La Salle University. She has completed the Leadership and Management Development Program in Ateneo de Manila University with Academic Citation, completed the Basic Management Program in the Asian Institute of Management with Superior Performance, and taught at the De La Salle University. She is also an Adviser of the UP Diliman IE-OR Department Industry-Alumni Advisory Council.

Rex R. Robielos
VICE-PRESIDENT



Rex Aurelius Robielos is currently a Senior Manager, Project Management Office-Business Intelligence and Analytics at Analog Devices General Trias (ADGT). Before he transferred to ADGT, he was the Dean of the School of Industrial Engineering and Engineering Management at Mapua University. He has a BS in Applied Mathematics from the University of the Philippines Los Banos, and a Diploma and MS in Industrial Engineering from the University of the Philippines Diliman. He received his PhD in Industrial Management from the National Taiwan University of Science and Technology in Taiwan. Currently, he is the Vice President of the Operations Research Society of the Philippines, Director of the Human Factors and Ergonomics Society of the Philippines, and a member of the Board of Trustees of the Industrial Engineering Certification Board.



Iris Ann G. Martinez
SECRETARY

Iris is a professor of the UP Department of Industrial Engineering and Operations Research. She is the holder of the Cesar E.A. Virata Professorial Chair for Industrial Engineering, leads the Production Systems Culture of Manufacturing & Operations Management Research Group, and co-heads the Supply Chain Analytics Research Laboratory. For more than 25 years, she has been helping the academe, government agencies, and industries of food, personal care, healthcare, and utilities improve their production and service operations and supply chain management.



Juanito S. Chan

TREASURER

Jacky is a workplace-based professor at the Ateneo Graduate School of Business, teaching courses such as Business Statistics, Operations Management, and Lean Six Sigma. He also teaches part-time at De La Salle University and works as a freelance consultant in process improvement, Six Sigma, ISO 9001, and data analytics. He previously served as Chair of UST's Industrial Engineering Department and held teaching and consultancy roles with Mapua, Letran, DOST-MPEX, and Kaizen Management Systems. Mr. Chan holds a BS in Chemical Engineering (Mapua), MS in Industrial Engineering, MBA, and is pursuing a PhD at DLSU. He is a certified PIE, Six Sigma Green Belt, and ASEAN Engineer. Recently, he served as a guest professor at TU Delft (Netherlands). He currently sits on the Board of Directors of ORSP.



Dennis Cruz

DIRECTOR

Dennis is an Associate Professor in the Department of Industrial and Systems Engineering of De La Salle University. He is a former Associate Dean of DLSU Gokongwei College of Engineering. He is currently the DOST-SEI Undergraduate Scholarships Project Director for De La Salle University. He completed his Doctor of Philosophy degree in Industrial Engineering in De La Salle University last December 2023. He also finished his Master of Science in Industrial Engineering and Bachelor of Science in Industrial Engineering Minor in Chemical Engineering in the same University. His areas of interest include Supply Chain Management, Circular Economy, Water Footprint, Sustainability, Facilities Planning, Mathematical Modelling, and Optimization.



Alexander Hipolito

DIRECTOR

Alex is a Senior Staff Engineer, TSG AI/ML Engineering within Bain & Company's Technology Solutions Group in Manila specializing in the use of mathematical optimization and AI / machine learning / data science techniques to improve Bain's internal operations. He was previously an Expert Senior Manager, Data Science with Bain's Advanced Analytics Group in Singapore. Prior to Bain, Alex worked as a Solution Architect for Supply Chain as well as Data Science solutions for Hewlett Packard in Singapore. Alex has a Ph.D. in Industrial & Systems Engineering (Operations Research) from the University of Florida and holds industry certifications from ASCM (APICS Certified Supply Chain Professional) and INFORMS (Certified Analytics Professional-Expert)



Francis C. Miranda
DIRECTOR

Francis is the Client Operations Lead for Singapore, Malaysia, Thailand, Japan and Indonesia at NielsenIQ. He has over 28 years of experience leading local, regional, and global analytics, data science, and operations research teams in various companies, including Coca-Cola Philippines and Zuellig Pharma. He has a BS degree in Industrial Engineering from De La Salle University-Manila, and an MS degree in Industrial Engineering from Purdue University. He completed his Advanced Management and Leadership Programme (OAMLP) at Oxford University. He is currently pursuing his Doctorate in Business Administration (DBA) at Business School Lausanne (BSL). He was past VP for Asia of the International Federation of Operational Research Societies (IFORS), the past President of the Association of Asia Pacific Operational Research Societies (APORS), and the past President of the Operations Research Society of the Philippines (ORSP). He is currently the Committee Head on Business Analytics at JA Philippines and the chair of the Program Advisory Board of the UPLB-IE Department.

Charlon Adrian C. Ruiz
DIRECTOR



Charlon Adrian C. Ruiz is an Adjunct Faculty member of the Department of Industrial Engineering at the University of Santo Tomas (UST), where he serves as Academic Program Adviser and Faculty Adviser of the Operations Research Society of the Philippines (ORSP)-UST Chapter. He earned his Bachelor of Science in Industrial Engineering from the Polytechnic University of the Philippines (PUP) as a DOST-SEI Scholar and is currently pursuing his Master of Science in Industrial Engineering at De La Salle University (DLSU) Manila. He also serves as the Quality, Safety, and Risk Management Head and Data Protection Officer of Manila Doctors Hospital.



Nestley I. Sore
DIRECTOR

Nestley is the Director of Programs and Standards at Adamson University since 2018. A licensed Professional Industrial Engineer (PIE), she was conferred the title ASEAN Engineer in 2012. She previously chaired Adamson's Industrial Engineering Department and continues to teach at both the undergraduate and graduate levels. She holds a BS in Industrial Engineering from Adamson and an MS in Industrial Engineering, major in Operations Research, from UP Diliman. As Director, she led accreditation efforts and spearheaded the shift to outcome-based education, designing and implementing the university's OBE framework. She also served as ISO Lead Internal Auditor and chaired various accreditation committees. ASEAN Engr. Sore previously served as Chair the PAASCU Commission on Engineering and Architecture, serves on the ORSP Board of Directors, and is a CHED Assessor for Regions IV-A and NCR.



Froilan Q. Tejada

DIRECTOR

Froilan Tejada graduated with Bachelor of Science in Management Engineering Degree in year 1994 as Honourable Mention in Ateneo De Manila University and in 2002 he finished his Masters in Business Administration at Murdoch University in Australia. Froilan has been in the Finance field since 1994, starting with the Manufacturing Industry, to Fast food and 2002 in Real Estate Development. He first joined Ramcar Group of Companies as Manager and was primarily involved with the successful acquisition and turnaround of KFC and Mister Donut franchises in the Philippines. In year 2002 he has successfully stint Bonifacio Development Corporation and moved to Philippine Real Estate Developer as Chief Financial Officer of Philippine Real Estate Developer in 2008. He rejoined Ramcar Group of Companies, positioned as the Vice President for Finance / CFO of Philippine Batteries, Inc. on March 2012. Currently, he is the Group CFO for Ramcar Group of Companies both Food and Battery Group.



Maria Lourdes de Guzman U

DIRECTOR

Malu is a lecturer of operations research at the John Gokongwei School of Management, Ateneo de Manila. She has also taught OR and applied math at the University of Asia & the Pacific, and mathematics at UP Diliman. Her previous work in Dallas as a supply chain analyst, software implementor, and trainer has brought her to different cities in the U.S. and Asia Pacific. Malu obtained her Ph.D. in Industrial Engineering, specializing in optimization, from Purdue University. Her dissertation entitled "Experiments with Nonlinear Discriminants in the Analysis of Fine Needle Aspirates" won First Place, 1999 Pritsker Doctoral Dissertation Award, given by the Institute of Industrial Engineers (IIE) of the U.S. which recognizes the best dissertations in the field of IE across U.S. universities. She finished MS Applied Mathematics major in Operations Research at UP Diliman, and BS Mathematics at the Ateneo de Manila. Her research interests are nonlinear optimization for breast cancer diagnosis, pattern recognition, combinatorial and heuristic optimization, and complexity. She joined ORSP in 2005.



Elise A. del Rosario

EXECUTIVE DIRECTOR

Elise is Past President of the International Federation of Operational Research Societies (IFORS) and a founding member of the ORSP. Upon retirement from San Miguel Corporation as Vice President in charge of Operations Research, Elise went into consulting – mostly pro-bono work with the Philippine government – through the ORSP Committee on OR for Public Service. Currently, she is the CFO of her family's One Small Step Forward Foundation, dedicated to uplifting Philippine public elementary school education. On the OR side, she still actively speaks at local and international conferences and acts as editor for various scientific publications. She obtained her BS degree in IE from UP, her Master's degree in IE & Mgt from Asian Institute of Technology, Bangkok and was an International Research Fellow at the Stanford Research Institute, USA. She is an IFORS Fellow and actively involved in the Global Leadership in OR for Women.

Newsletter

ORSP NEWSLETTER
www.orsp.org.ph
September 2026

Logistics, Freight, and Aviation Forum Focuses on Analytics that Move People, Goods, and Aircraft

The Operations Research Society of the Philippines, in cooperation with Ateneo de Manila University, convened its 2026 Technical Forum Series on Saturday, 12 September 2026. Nearly 300 participants gathered at Leong Hall for an afternoon devoted to the use of Operations Research in logistics, freight and aviation.

The audience reflected the forum's broad academic and professional reach. Participants came from the University of the Philippines Diliman, the University of the Philippines Los Baños, De La Salle University Dasmariñas, Ateneo de Manila University, Cavite State University, Holy Angel University, University of Perpetual Help System and other institutions, together with ORSP members and non-member professionals. Their presence created a productive meeting point for students, educators, researchers and decision makers confronting real operational challenges.



Participants were well accommodated in the spacious Leong Hall venue.

Three perspectives on connected decisions. Across the three presentations for the afternoon, one message recurred: decisions in transportation systems cannot be optimized in isolation. Maintenance choices ripple through an airline; stakeholders value different outcomes for air transportation; and logistics promises must be translated into capacity, routing and allocation decisions. Each speaker showed the importance of OR in providing the structure needed to make those tradeoffs visible, measurable and actionable.

From equations to safer and more reliable flights. ***Katherine L. Rivera***, Assistant Vice President for Aircraft Engineering at Philippine Airlines, brought the discussion into the safety critical environment of airline engineering and maintenance. She described an airline as an interconnected OR ecosystem in which flight operations, maintenance and engineering, ground operations, airport operations, training, supply chain and logistics continually affect one another.

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K. Rivera presents the connected model chain of Optimization, Analytics and Systems Improvement.

Mathematical models support maintenance program development, reliability management, work packaging, materials positioning, scheduling and the anticipation of technical disruptions. Rivera emphasized that the goal is not optimization for its own sake. Quantitative methods help protect continuing airworthiness while improving aircraft availability, on time performance, resource use and customer outcomes.

She ended by citing the model chain of supply chain optimization, predictive analytics and systems improvement that is important in airline engineering and maintenance, where each on-time departure is supported by decisions on when to perform maintenance, how to package work within limited ground time, where to position critical materials, and how to anticipate technical disruptions before they effect flight operations.

Balancing conflicting stakeholder interests. ***Dr. Miriam F. Bongo***, Associate Professor in the Industrial and Systems Engineering Department of De La Salle University Manila, opened her presentation by asking whether the diverse and sometimes conflicting interests of multiple stakeholders can be balanced.



M. Bongo shows how MS TORO works by considering the conflicting goals of air traffic control (expeditious flow of traffic), airline management (airline revenue) and airport management (efficiency of air resources).

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She then introduced a multiple stakeholder-based target oriented robust optimization model, or MS TORO. The model brings stakeholder interests into a single framework while accounting for uncertainty and seeking a satisficing solution against agreed performance targets. A hypothetical post-departure aircraft rerouting problem illustrated the approach. In such a setting, delay, cost, profit and reputation may point decision makers toward different routes; a defensible solution must recognize all of them instead of allowing one objective to dominate by default.

The talk demonstrated why optimization is also a governance tool. By making targets, uncertainty and tradeoffs explicit, a model can clarify why a course of action was selected and test whether the interests of multiple parties have been treated fairly.

Moving logistics beyond gut feel. ***Enrique "Ike" C. Castillo***, President and CEO of PTC Logistics, AP Cargo Logistics Network Corporation and Safexpress Logistics, Inc., closed the technical program with a value driven account of OR in the logistics business. Using AP Cargo as a practical case, he traced a decision chain from customer value proposition to operating model, decision problems, OR applications, operational outcomes and, ultimately, customer and enterprise value.



E. Castillo presents AP Cargo's nationwide network and the complex logistics decisions that it necessitates.

Citing how logistics decisions carry competing demands for cost, speed, reliability, reach, revenue and customer priority, he explained how OR helps at several levels: Network design and long-term capacity support strategic choices; Forecasting, capacity planning and resource allocation strengthen tactical planning; and Vehicle routing, scheduling, assignment, queuing and capacity allocation improve day to day execution.

He mentioned three cases they are working on and to which he challenged researchers in the audience. The first involves investment decisions on fixed and "rolling" warehouses. The second is a choice of optimal vehicle routing that must contend with different drop offs, lead times, distances, costs, revenue profiles and capacity requirements. For the third airfreight case, he cited the decision for an optimal dispatching of cargo that is way above flight capacity, while considering weight, volume, commodity, urgency, commitment, destination, customer priority, possible connections, revenue and contribution across all air and Roll-on-Roll-off (RORO) options.

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A forum bridging classrooms and operations. Taken together, the sessions presented OR as more than a collection of mathematical techniques. It is a decision architecture for connecting objectives, constraints, data and consequences across complex systems. The forum also gave students a concrete view of career pathways in aviation, logistics, industrial engineering, analytics and systems improvement, while giving practitioners a common language for decisions that are often made across organizational boundaries.

The proceedings were managed by ORSP Board members **Malu de Guzman U**, **Dennis Cruz** and **Elise del Rosario**, with the participation of **Kerish Villegas** who welcomed participants to the ADMU. At the conclusion of the forum, del Rosario summarized the key points from the three talks before drawing the names of the raffle winners. KFC sponsored the tokens presented to the speakers as well as the gift certificates awarded during the raffle.



E. del Rosario goes over the learning for the day and gives out the raffle prizes.

The afternoon ended on an especially cheerful note. Participants were pleased with their prizes, and the sunshine was a welcome sight after four consecutive days had been lost to heavy rain. More importantly, those gathered acknowledged the valuable learning they had gained from the speakers and from seeing how Operations Research can guide difficult decisions in aviation, freight and logistics.

The strong attendance and enthusiastic response underscored continuing interest in practical, socially relevant applications of Operations Research. By bringing academic research and industry experience onto one stage, the 2026 Technical Forum advanced ORSP's role in building a community capable of moving from intuition to transparent, evidence based and continuously improving decisions.◆

Advancing Operations Research Tools Competence for Data-Driven Decision Making Through the Simulation and Optimization Software Training



Participants take time to pose in front of the UPDIEOR Wall with their certificates from the day-long hands on workshop.

The Operations Research Society of the Philippines (ORSP) organized its annual technical workshop on 19 June 2026 at the Kaizen Laboratory, IE-ME Building, University of the Philippines Diliman (UPD). Faculty members of the Circle of Operations Research Enthusiasts (CORE) from the Department of Industrial Engineering, University of the Philippines, Los Baños (UPLB), conducted the "Simulation and Optimization Software (SOS) Training: A Hands-on Workshop on Operations Research Tools for Data-Driven Decision Making". The event is hosted in partnership with the UPD Department of Industrial Engineering and Operations Research (IEORD). Prof. Iris Ann G. Martinez, ORSP Board of Directors Secretary, welcomed the participants on behalf of ORSP.

Asst. Prof. Angelo C. Ani, started the workshop by having a review of the basics of operations research and an overview of the common OR tools used in both deterministic and stochastic OR. Sample applications from previous projects utilizing these tools were also presented. Before moving on to the use of the specialized optimization software, a guided exercise using Excel Solver on simple linear programming models, such as the product-mix model and bank portfolio optimization, was also facilitated.

The first hands-on exercise using the specialized software was facilitated by **Engr. Miguel Darwin DC. Lapitan**. This exercise modeled a production inventory model. The basic modeling elements of the software were employed. Accordingly, LP formulations in their set-based form were also discussed to facilitate easier implementation in the software. Asst. Prof. Ani continued the morning session by facilitating the next exercise, which focused on a transshipment problem. This exercise also introduced the use of an interactive web-based interface, which aids users in visualizing data inputs and optimization results.

During the afternoon, **Asst. Prof. Gabriel John L. De Leon** had a discussion on systems simulation, presenting previous simulation projects. Asst. Prof. De Leon facilitated the two simulation sessions covering a production and a service system. The first exercise familiarized the participants with the simulation software's basic modeling elements and interface. The primary goal is to develop initial comfort with navigation, object libraries, and property settings, while building a simple but complete simulation model of a production system. The following exercise emphasizes modeling decision rules, time-dependent arrivals, service-time differentiation by transaction type, and structured data collection in a multi-service bank system.

The workshop was attended by professors and professionals from Mapua Malayan Colleges Laguna, Analog Devices Inc, P.J. Lhullier Inc., and San Miguel Corporation.

Participants rated the Workshop as Excellent and look forward to other offerings from the ORSP. ◆

ORSP Student Congress Quiz Bee 2026: Showcasing the Nation's Brightest Minds in Operations Research

The Operations Research Society of the Philippines (ORSP), through the ORSP Student Federation, successfully held the ORSP Student Congress Quiz Bee 2026 on March 21, 2026, at the Industrial Engineering–Mechanical Engineering Building, College of Engineering, University of the Philippines Diliman. The event gathered some of the country's top universities in a dynamic and intellectually stimulating competition.

Each university fielded a team of highly skilled and competitive students who demonstrated strong proficiency in operations research and problem-solving. The quiz bee followed a three-round format: easy, medium, and difficult, with ten questions per round. The competition covered a wide range of topics, from programming fundamentals to advanced Markovian processes, challenging participants to apply both theoretical knowledge and analytical thinking under pressure. The early rounds showcased strong performances across all teams, with participants demonstrating speed and accuracy in answering foundational questions. As the competition progressed to the medium and difficult rounds, the level of intensity heightened, and distinctions between the teams became more apparent.

In the end, **Ateneo de Manila University**, composed of Lincoln Gabriel K. Ang, Zachary Ashton L. Go, Walden Merrick T. Kuo, Jaden Christian L. Lim, and Marvin Josh S. Tan, emerged as the champion, delivering a consistent and outstanding performance throughout the competition. The **University of the Philippines Diliman**, manned by Vanessa Ryanne G. Julio, Shawn Garrett O. Yuen, Hugh Ruzle E. Mejos, Jerd Mark M. Carlos, and Jucille Kate B. Delos Santos, secured the first runner-up position. Meanwhile, **De La Salle University–Manila**, represented by Gabriel Cheo M. Carambas, Jared Earl C. Leyson, Chun Yang H. Shi, Cassidy Kyler L. Tan, and Megan Daryl L. Sio, claimed second runner-up. All participating teams exhibited remarkable skill, resilience, and sportsmanship, contributing to the success and excitement of the event.

The competition was adjudicated by a distinguished panel of judges, namely **Mr. Rommel Dela Cruz**, **Ms. Christine Co**, and **Ms. Marlene Gutierrez**, whose expertise ensured a fair and credible evaluation of all responses.



Quiz Bee Champion Ateneo de Manila University contestants show off their cash prize and certificate.

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First and 2nd runner ups, UP Diliman (top) and De La Salle University—Manila (bottom) pose proudly with their certificates and cash prizes.

The event was made possible through the generous support of **Philippine Batteries, Inc**., the major sponsor, whose contributions helped enhance the overall experience for both participants and attendees. Behind the event's success was the ORSP Student Federation leadership: *Harold Anjelo Espeleta* (University of Santo Tomas), President; *Juztine Brigette Bunda* (De La Salle University), Vice President; *Lia Esclamado* (Holy Angel University), Secretary; *Sebastian Bugayong* (Mapúa University), Treasurer; *Cristian Obida* (Asia Pacific College), Auditor; *Raechelle Go* (University of the Philippines Diliman), Social Communications Officer; and *Sofia Paige Tang* (Ateneo de Manila University), Membership Officer. The organizers also extend their sincere gratitude to the ORSP Mother Chapter advisers and Board for their invaluable guidance and support in making the event possible, as well as to the ORSP Secretariat for their valuable administrative support and coordination throughout the preparations.

More than just a competition, the ORSP Student Congress Quiz Bee 2026 served as a celebration of academic excellence, collaboration, and the growing impact of operations research in addressing real-world challenges. It continues to inspire students across institutions to pursue innovation, critical thinking, and excellence in the field.◆

2025 National Conference Highlights Real-World OR and Analytics

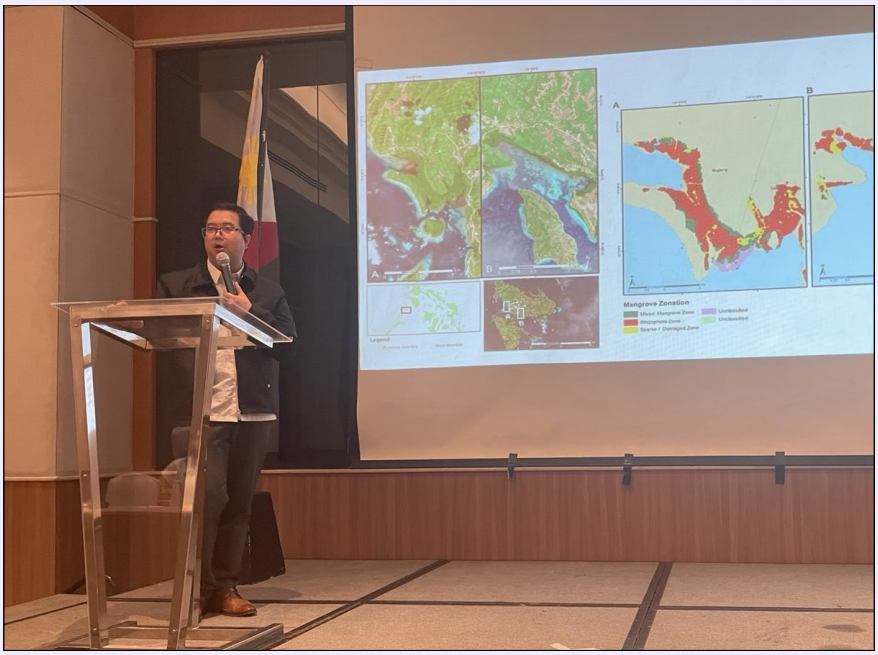
The Operations Research Society of the Philippines (ORSP) successfully held its 16th National Conference on November 14, 2025 at the Eastwood Richmonde Hotel in Quezon City. With the theme **OR/Analytics in Practice,** the event gathered **159 participants** from leading universities, government agencies, and major industry partners, highlighting the rapidly expanding role of operations research, analytics, and artificial intelligence in solving real-world problems.



ORSP President S. Mariscal presents speaker Camille Reyes Castro with Certificate after the Q & A.

The conference opened with two keynote addresses that set the tone for a day of advanced technical discussions and applied analytics. ***Camille Reyes-Castro*** of NielsenIQ Philippines delivered an engaging talk on Sales Force Activation, emphasizing how predictive models, segmentation analytics, and real-time dashboards are transforming the way organizations plan, motivate, and guide their sales teams. She underscored the importance of integrating behavioral analytics with operational insights to create agile, high-performing sales organizations.

This was followed by an equally compelling presentation from ***Dr. Ariel C. Blanco*** of UP Diliman and the Philippine Space Agency. His talk highlighted how remote sensing, geospatial analytics, and operations research are being used to map, monitor, and protect mangrove ecosystems across the Philippines. Dr. Blanco showcased how tools such as satellite imagery, the Mangrove Vegetation Index, artificial intelligence, and conservation planning models support restoration prioritization, early warning systems, and nationwide mangrove rehabilitation efforts.



Dr. Ariel Blanco shows how OR tools, among others, help support mangrove rehabilitation efforts.

One of the major conference events was the panel discussion, **From Problem to Profit: A 360º View of Real-World OR/Analytics Cases** was moderated by former Accenture Philippines Managing Director *Jaime "Bing" del Rosario*, The panel featured *Anthony Chan* of Bain & Co., *Myk Ogbinar* of San Miguel Corporation, and *Alyson Yap* of Ateneo and Ramcar, who discussed their backgrounds, the role of math and critical thinking in OR and analytics, and their experiences working on diverse projects across

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Moderator Jaime "Bing" del Rosario draws out practical insights, case studies and career timelines in the OR journeys of panelists (left to right): Anthony Chan (Bain & Co.), Myk Ogbinar (San Miguel Corp) and Alyson Yap (ADMU and Ramcar).

conglomerates. They shared high-impact work—from supply chain diagnostics and vehicle routing to EV fleet planning and enterprise-wide data initiatives—highlighting the value of strong fundamentals, Python skills, business understanding, and interpersonal abilities. They advised students to focus on modeling problems clearly and building broad technical and communication skills. On applying OR and analytics to government, they pointed to Metro Manila mobility, AI-driven budget transparency, and analytics for agriculture, social services, and education.

The featured paper session presented one of the day's most forward-looking topics. *Dr. Alexander Hipolito* of Bain & Company shared a pioneering optimization and AI-driven approach to staffing consulting teams across multiple projects. His presentation illustrated how multi-objective mixed-integer optimization models, when combined with generative and agentic AI, can streamline planning cycles, improve fairness and transparency, and align consultant skills with project demands.

Throughout the parallel sessions, presenters showcased a wide range of applied OR research spanning education, transportation, supply chain, environmental management, MSME optimization, and public service delivery. Papers included UPLB's development of AskOR, a generative AI-powered knowledge assistant capable of retrieving and summarizing operations research concepts with high accuracy; De La Salle Lipa's Transerve system, which optimized vehicle reservations and significantly reduced costs and processing times; and UPLB's mixed-integer model for ready-mix concrete dispatching, which minimized delivery costs while accounting for customer priorities and admixture use.

Other studies focused on improving MSME operations, such as Ateneo's mall optimization model, a Lean Six Sigma audit addressing inventory inaccuracies in an ecostore, and UP Diliman's newsboy-model-based framework



Professionals from the academe and industry, along with students, gather for the opening ceremonies.

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for bakery inventory management, which achieved a notable reduction in waste. Public service and community-focused papers also drew strong interest, including PUP's paper on flood response strategies in Biñan City and UPLB's linear programming model for optimizing dog rabies vaccine allocation in Calamba City. Behavioral and sectoral modeling studies rounded out the program, featuring research on running event participation in the Philippines and multiple linear regression models for forecasting residential real estate prices with more than 90 percent predictive accuracy.

During the Business meeting, ORSP President Mariscal presented ORSP activities for the year, and inducted new members as follows: *Angelo Paulo Atienza, Gilbert Calosa, Klariza Marie Leander, Nazka Leosala, and Benito Joseph Ngo.* The conference concluded with recognition of its sponsors—San Miguel Corporation, Ramcar Group of Companies, Asia Pacific College, and Adamson University—whose support helped make the event possible. Chaired by President *Shella Mariscal*, this 16th national conference of ORSP reaffirmed the essential role of operations research and analytics in addressing complex economic, environmental, and societal challenges. The event strengthened collaboration across academia, industry, and government, and underscored ORSP's continuing commitment to developing future-ready analytical talent for the Philippines.◆



S. Mariscal inducts new ORSP members (left to right): Klariza Marie Leander, Gilbert Calosa, Angelo Paulo Atienza, Nazka Leosala, and Benito Joseph Ngo.



At conference end, participants show off raffle prizes they won, compliments of sponsor, Ramcar.

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ORSP Presence Shines at IFORS 2026 in Vienna

The 23rd IFORS Triennial Conference, held from **12–16 July 2026** at the University of Vienna, brought together the global Operations Research community for five days of scientific exchange, collaboration, and celebration of OR's impact worldwide. The conference welcomed **over 1,500 delegates** from **more than 70 countries**, underscoring the international reach of the discipline. For ORSP members, IFORS 2026 was especially significant as the Philippines was prominently represented through the leadership and contributions of ORSP Founder and past IFORS President **Elise del Rosario**.

The scientific program featured plenary and keynote speakers who addressed the evolving role of OR in solving societal challenges—from sustainability and mobility to digital transformation and public policy. Delegates also enjoyed the traditional **mid-week outings**, which offered curated cultural and historical tours around Vienna, providing opportunities for informal networking and deeper engagement among participants.

Within the **Magic of OR** practice area, E. del Rosario organized the stream on **OR in Practice**, a well-attended track that highlighted real-world applications of OR across industries and public sectors. Speakers shared case studies demonstrating how OR models are implemented in complex, data-rich environments, and how practitioners navigate challenges such as stakeholder alignment, uncertainty, and resource constraints. The strong attendance and lively discussions reflected the growing global interest in applied OR and the importance of bridging analytical rigor with implementation realities.

Beyond the technical program, E. del Rosario exercised a major role in the activities of the **Global Leadership on OR for Women (GLOW), which aims t**o **increase visibility for women in OR**, **strengthen professional networks**, **promote mentorship**, and **support leadership pathways** for women across the global OR community. During IFORS 2026, E.del Rosario led two major GLOW events: the **GLOW Circles** and the **GLOW Reception**, both of which became standout moments of community building.

The **GLOW Circles** offered small-group conversations where women in OR could share experiences, discuss career challenges, and build supportive connections. Participants appreciated the intimate, structured format, which encouraged honest dialogue and practical mentorship. The conference also featured a **GLOW Panel Discussion**, which brought together women leaders in OR to discuss visibility, leadership journeys, and the im-



▲ Some *invited speakers* of the *Practice of OR* stream (from left to right, top) - *A. Weintraub, E. Del Rosario, J. Cochran, K. Hoffman*; (from left to right, bottom) - *A. Banaszewska* and *F. Gotzinger, E. Arruda, A. Cohn* and *S. Nickel*.



▲ *Elise del Rosario (GLOW Founding Steering Committee member), Hector Cancela (IFORS President), and Grazia Speranza (GLOW Founder) are launching the GLOW reception.*

portance of inclusive professional environments. Panelists shared insights on navigating career transitions, advocating for representation, and building confidence in technical and leadership roles. The session resonated strongly with attendees and reinforced GLOW's mission of empowering women in the field.

The **GLOW Reception** gathered delegates from around the world, focused on connection and collaboration. The event encouraged participants to make "one meaningful introduction" to support mentorship, sponsorship, and future partnerships.

For ORSP members, IFORS 2026 demonstrated how Philippine OR continues to contribute to the global community. Through her roles as stream organizer, GLOW leader, and long-standing IFORS volunteer, Elise showcased the depth of ORSP's engagement in international initiatives and amplified the visibility of Filipino OR professionals.◆

(Readers are asked to refer to the IFORS News, September 2026 issue, pp.8-9, pp. 15-17 and pp.18-19. Above pictures are reproduced from September issue of IFORS News.)

Welcome New Members!

This newsletter issue welcomes new members who have joined the ORSP Family.

From the ***Academe*** are: **Maria Lourdes P. Jusa**, Program Chair, BSIE, School of Engineering and Information Technology, UST Gensan; **Don Stanley C. Dalisay,** Section Chief, Scout Ranger Capability Development Office of thePhilippine Army; and **Charlon Adrian C. Ruiz**, Instructor, IE Department, University of Santo Tomas.

From the ***Industry*** are: **Gabriel P. Bayani,** Data Analytics & OR Analysts at San Miguel Corporation; **Harold Chavenia**, Data Analytics & OR Analyst at San Miguel Corporation; and **John Robert Ureta**, Data Architect at San Miguel Corporation.



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Don Stanley C. Dalisay



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Gabriel P. Bayani



Harold Chavenia



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