ICBAI-2025 : Speakers

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1	**Dr. Arvind Kumar,** *Vice President (R&D), Optym, Bangalore*	**Demonstration of using AI in OR**
2	**Dr Amrutha, AA** Manager, Quantitative Advisory, EY UK	**Evolving Frameworks in Model Rosk Management**
3	***Shri Bhargav Vasudevarao*** *Value Advisor (SAP India Customer Advisory), SAP India Pvt. Ltd., Bangalore*	***Cutting through the hype: The future of business Process Management***
4	***Shri Chandrasekaran Vasudevan*** *CTO - Core Networks, Cloud Software & Services, Market Area South East Asia, Oceania & India, Ericsson*	***Data-Driven Intelligence: Transforming Managerial Decisions in Telecom***
5	**Prof. U Dinesh Kumar** Director In-charge, *Professor of Decision Sciences,* and *Chairperson Data Centre and Analytics Lab, IIM Bangalore*	**Inaugural Address: Impactful Use Cases from Indian Companies**
6	***Prof. Manoj Malhotra*** *Kevin L. and Lisa A. Clayton Dean, Professor in the Decision and Technology Analytics Department, College of Business, Lehigh University, USA*	***Optimization Strategies for Transportation of Charter School Students in South Carolina***
7	***Prof G Raghuram*** *Former Director of IIM Bangalore*	***Challenges for High Speed Rail Network in India: Implications for OR and Analytics***
8	***Prof. Ramaya Krishnan*** *Dean, Heinz College of Information Systems and Public Policy, W. W. Cooper & Ruth F. Cooper Prof. of Management Science and Information Systems, Dept. of Engineering & Public Policy, Heinz College, Carnegie Mellon University, Pittsburgh*	***Trustworthy AI: from policy to practice through AI measurement science and evaluation***
9	***Prof. Rema Padman*** *Trustees Professor of Management Science and Healthcare Informatics, The H. John Heinz III College of Information Systems & Public Policy, Carnegie Mellon University, Pittsburgh*	***Multimorbidity Analytics: Disease Progression and Treatment Pathways for Chronic Conditions***
10	***Prof. Ruppa K. Thulasiram*** *Department of Computer Science, Computational Financial Derivatives Lab, Cloud Computing Lab, Activities/Strategy Chair, IEEE CFETC, University of Manitoba, Canada*	***Agentic Portfolio Construction: A Multi-Agent Architecture for LLM-Driven Financial Asset Allocation***
11	***Dr. Suganya Srinivasan*** *Data Scientist, Rolls-Royce India Pvt. Ltd., Bangalore*	***Data Analytics: The Jet Fuel Powering the Future of Aviation***

12	**Dr. Umar Muhammad Modibbo** *President of ORS Nigeria,* *Department of Operations Research, Faculty of Computing, Modibbo Adama University, PMB 2076, Yola, Nigeria,*	**Harnessing the Power of Artificial Intelligence in Computational Sciences**
13	***Prof. Viswanathan Krishnan*** *Jacobs Family Chair in Management and Engineering Leadership, Technology and Operations, Rady School of Management, University of California, San Diego*	***Intelligent Management of Projects and Operations***
14	***Dr. Viswanath Kumar Ganesan*** *Principal Scientist, Tata Consultancy Services, Madras and Adjunct Faculty, Indian Institute of Technology Madras*	***The Next Frontier of Optimization: Adaptive, Accessible, and Human-Centric Solutions***

Demonstration of using AI in OR

Dr. Aravind Kumar
Vice President (R&D)
Optym, Bangalore

Abstract: In this session, I will demonstrate how AI can accelerate programming and analysis for mathematical models and optimization problems like Warehouse Location or Vehicle Routing Problem. We will explore practical tips and tricks on the Cursor platform, use AI to generate test cases for validating models, and create visualizations of solutions. Finally, we will compare this workflow with a Google Colab + Gemini setup to highlight differences in usability. We will also take few examples to learn how we can use this platform to teach these concepts in academic set up better.

Bio: Dr. Arvind Kumar is a seasoned Operations Research (OR) practitioner with over 20 years of experience in enabling large logistics, transportation and e-mobility companies to leverage power of analytics for better planning and execution. Besides his previous leadership role of VP - Research and Development at Optym, he has also advised several startups and small businesses in converting business problems to mathematical formulation, and mature the process of applying OR techniques to solve these problems in real-life environment. He holds a BTech from IIT Chennai, and a PhD from University of Florida. He is also recipient of best paper awards in the field of medical and military applications at INFORMS.

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Cutting through the hype: The future of business Process Management

Shri Bhargav Vasudevarao
Value Advisor (SAP India Customer Advisory)
SAP India Pvt. Ltd., Bangalore

Abstract: AI and agentic AI promise value generation, but real impact only comes from transformation done right. Go beyond the hype to focus on the conditions that enable AI-driven value creation and how Business Process Management and Mining tools provides the foundation for making it real.

Bio: Following his MBA at the Indian Institute of Science Bangalore's Department of Management Studies, Bhargav focused his career in Operations Management, primarily at Shell and SAP, utilizing Business Process Management and Lean techniques to enhance both their internal processes and diverse clients across industries like Oil and Gas, Manufacturing, Supply Chain, Insurance, and Finance. He is currently a Presales Solution Expert at SAP Signavio, a leading Business Process Management and Mining software company, helping his customers achieve operational process improvements through data-driven process mining techniques.

Data-Driven Intelligence: Transforming Managerial Decisions in Telecom

Shri Chandrasekaran Vasudevan
CTO - Core Networks,
Cloud Software & Services
Market Area South East Asia, Oceania & India
Ericsson

Abstract: The telecom industry is witnessing an unprecedented surge in data volumes generated from networks, customers, and digital platforms. In this complex and fast-evolving environment, managerial decisions can no longer rely solely on experience or intuition—they must be powered by data-driven intelligence. This keynote explores how data analytic models are transforming decision-making across the telecom sector by integrating AI into core management processes. It highlights how telecom leaders can leverage machine learning, statistical modeling, and real-time data analytics to optimize network performance, improve customer experience, anticipate churn, and guide strategic investments. Beyond technical sophistication, the focus is on translating analytical insights into actionable managerial decisions that align with business objectives. Drawing from real-world telecom applications, the session demonstrates how analytics can move from being a support function to a strategic enabler of innovation and competitive differentiation.

Bio: Chandra is currently the CTO for Core Networks in Ericsson's Cloud Software and Services segment, across India, Southeast Asia, and Australia. With over 25 years of experience in the telecommunications industry, he has played a significant role in Ericsson's 5G engagements with leading regional and global operators, including SingTel, Telstra, Softbank, Bharti-Airtel, Jio, Vodafone-Idea, Axiata, Viettel, and Maxis. His tenure at Ericsson spans multiple countries, and he has been an integral part of Ericsson Research and its Global Principal Architect group.

Before joining Ericsson, Chandra served as an R&D Manager at the Institute for Infocomm Research in Singapore. In this role, he led pre-competitive research projects in collaboration with various industry partners and global academic institutions. His contributions to EU research projects have resulted in several research publications and patent filings.

Chandra holds a Master’s degree in Communication and Network Systems Engineering from Nanyang Technological University (NTU), Singapore.

Optimization Strategies for Transportation of Charter School Students in South Carolina

Prof. Manoj Malhotra
Kevin L. and Lisa A. Clayton Dean,
Professor in the Decision and Technology Analytics Department,
College of Business,Lehigh University, USA

Abstract: Maximizing overall system outcomes when demand comes from two or more different sources is a problem that can occur in many resource constrained operating environments. In this study, we focus on examining such a problem within the context of transporting both public school and charter school students by the South Carolina Department of Education (SCDE) in USA. Given a set of students with their individual addresses and the addresses of public and charter schools they attend, we develop optimization strategies for clustering, selecting and assigning students to specific bus routes. An integer programming (IP) model that pools public and charter school students on the same bus is formulated, and then embedded within a usable Arc-GIS and Excel tool to develop routes that match the greatest number of students with their respective charter or public schools subject to time and capacity constraints. Results from our study provide insights and modeling based empirical understanding to SCDE about the potential strategies for transporting charter school students on public school buses.

Bio: Manoj K. Malhotra was appointed the Kevin L. and Lisa A. Clayton Dean of the College of Business in July 2024. He is also a professor in the department of Decision and Technology Analytics in the College of Business.

Dean Malhotra is an accomplished university leader who combines the business acumen of a higher education executive with a clear understanding of today's academic landscape through multi-year experiences at both at an elite private university (Dean at Case Western Reserve University) and at a flagship public university (multiple positions at University of South Carolina). With a strong footing in strategic planning, he has demonstrated the ability to improve enrollments, increase revenue and resources, build strategic partnerships, and enhance student success with a strong focus on access and inclusive excellence. He has extensive international experience as well as a strong record of working with corporate partners.

Dean Malhotra is a distinguished scholar who has been recognized for his pedagogical and scholarly contributions through several teaching and discipline-wide research awards. He is a co-author of a leading text book in operations and supply chain management, and has published widely in leading journals of the field. He has been the program chair for two major international conferences, and served as the President of the Production and Operations Management Society in 2017. He is a Fellow of the Decision Sciences Institute (DSI) and a Fellow of the Production and Operations Management Society (POMS).

Read more about Dean Malhotra's appointment to Lehigh University College of Business.

Challenges for High Speed Rail Network in India: Implications for OR and Analytics

Prof G Raghuram
Former Director
IIM Bangalore

Abstract: Indian Railways are building a 508 km dedicated high speed rail (HSR) corridor between Ahmedabad and Mumbai. The first section of 50 km between Surat and Bilimora is expected to be open in early 2027, with the entire project now targeted to be completed by end 2029. The project, which officially started in 2017, was earlier scheduled for completion in 2022, at a cost of Rs 1 trillion. The anticipated cost now is Rs 2 trillion.

The project is expected to be a game changer in terms of connectivity and with positive externalities in technology. It is now time for deciding on the next segments of HSR, based on the lessons of the first segment. The key decision questions would be:

a. What should be a HSR network vision, with a prioritization of the segments?
b. Who would be the technology partner and what would be the level of indigenisation?
c. What should be the standards, especially in terms of gauge?
d. In terms of stations, what would be the choice of city and location with respect to the city?
e. In general, HSR alignments are grade separated. Where should it be elevated and where underground?
f. How should the project be planned, scheduled and executed with no time and cost over runs?
g. What market segments should be targeted? What should be the service frequency, train consist and pricing?
h. What should be the sources of financing?

The talk will focus on the implication for OR and Analytics to support quality decision making in the above context.

Bio: Raghuram is a Professor (Emeritus) of Chanakya University and the Gujarat Maritime University. He is visiting faculty at IIM Ahmedabad, IIM Bangalore, Gati Shakti Vishwavidyalaya and Adani University. He is associated with the Akshaya Patra Foundation and the Infrastructure Vision Foundation.

He has been Director, IIM Bangalore, from February 2017 to July 2020. Prior to that, he was Professor and Chairperson of the Public Systems Group at IIMA. He has been Dean (Faculty), IIMA; Vice-Chancellor of the Indian Maritime University and Indian Railways Chair Professor at IIMA.

He specializes in infrastructure and transport systems, and logistics and supply chain management. He conducts research on the railway, port, shipping, aviation, and road sectors. He has been part of various government policy making and advisory committees, and Boards of companies, higher educational and social institutions and continues to be on some.

Raghuram has a BTech from IIT, Madras; a Post Graduate Diploma in Management from IIM, Ahmedabad; and a PhD from Northwestern University, USA.

Trustworthy AI: from policy to practice through AI measurement science and evaluation

Prof. Ramaya Krishnan
Dean, Heinz College of Information Systems and Public Policy,
W. W. Cooper & Ruth F. Cooper Prof. of Management
Science and Information Systems, Dept. of Engineering &
Public Policy, Heinz College,
Carnegie Mellon University,Pittsburgh

Abstract: Large Language Models (LLMs) have shown remarkable capabilities across various tasks, but their deployment in high-stake domains such as health care relies on sound evaluation. Evaluation requires a "systems" approach and is ripe with opportunity for harnessing synergies between OR/MS and AI. In this talk, I will present work on evaluating one aspect of the robustness of LLM models – their consistent and coherent behavior across multiple rounds of user interaction. This work introduces a comprehensive framework for evaluating and improving LLM response consistency, making three key contributions. First, we introduce Position-Weighted Consistency (PWC), a metric designed to capture both the importance of early-stage stability and recovery patterns in multi-turn interactions. Second, we present MT-Consistency, a carefully curated benchmark dataset spanning diverse domains and difficulty levels, specifically designed to evaluate LLM consistency under various challenging follow-up scenarios. Third, we introduce Confidence-Aware Response Generation (CARG), a framework that significantly improves response stability by explicitly integrating internal model confidence scores during the generation process. Focusing on the case when models switch from correct answers to incorrect answers in the face of adversarial prompting, we statistically analyze the behavior of the models using ideas drawn from survival analysis to develop actionable insights for societally consequential applications. More information is available in https://arxiv.org/abs/2510.02712.

This research was supported in part by the AI Measurement Science and Engineering Center (https://www.cmu.edu/aimsec/) at Carnegie Mellon University.

Bio: Ramayya Krishnan is the Dean Emeritus and W. W. Cooper and Ruth F. Cooper Professor of Management Science and Information Systems at the Heinz College Information Systems and Public Policy at Carnegie Mellon University. He is an expert in data and decision analytics and digital transformation. He served as President of INFORMS in 2019 and helped lead the creation of its AI strategy.

He is an AAAS Fellow (section T), an INFORMS Fellow, and an elected member of the National Academy of Public Administration. He chaired the AI futures Committee of the National AI Advisory Committee to the President and the White House office of AI Initiatives office and is chair of the DOD's RAI academic council. He directs the CMU-NIST cooperative research center on AI measurement science and engineering. Please see https://tinyurl.com/k8kbej25 for additional information.

Multimorbidity Analytics: Disease Progression and Treatment Pathways for Chronic Conditions

Prof. Rema Padman
Trustees Professor of Management Science and Healthcare Informatics,
The H. John Heinz III College of Information Systems & Public Policy,
Carnegie Mellon University, Pittsburgh

Abstract: An ever increasing number of people worldwide are affected by multiple chronic conditions. The increasing deployment and usage of clinical information systems and the resulting availability of vast amounts of detailed patient data in electronic databases are challenging our ability to utilize them effectively at the point of decision-making. Tracking the progression of disease and identifying high-risk patients with multi-morbid conditions offer new opportunities for applying innovative data-driven approaches for risk stratification and outcomes prediction with improved prediction accuracy, interpretability, and bias mitigation. We leverage the availability of a rich and unique multi-year clinical dataset to investigate how multimorbid conditions such as Chronic Kidney Disease evolve over time from the onset of a particular stage for an identified patient population into distinct trajectories of disease development using group-based multi-trajectory modeling. We further predict serious adverse outcomes such as End Stage Renal Disease using both machine learning and deep learning methods applied to integrated clinical and claims data with varying observation windows. Despite the outstanding performance of deep learning models in clinical prediction tasks, explainability remains a significant challenge. Inspired by transformer architectures, we introduce the Temporal-Feature Cross Attention Mechanism, a novel deep learning framework designed to capture dynamic interactions among clinical features across time, enhancing both predictive accuracy and interpretability, and providing multi-level explainability by identifying critical temporal periods, ranking feature importance, and quantifying how features influence each other across time before affecting predictions. These studies present a robust framework for multimorbidity analytics to improve clinical decision-making and patient health outcomes.

Bio: Rema Padman is Trustees Professor of Management Science and Healthcare Informatics in the Heinz College of Information Systems and Public Policy at Carnegie Mellon University and Adjunct Professor in the Department of Biomedical Informatics at the University of Pittsburgh School of Medicine. Her research, funded by the National Institutes of Health, the Centers for Disease Control and Prevention, Veterans Affairs, and several foundations, investigates predictive, prescriptive and generative analytics, informatics and operations for data-driven decision support in the context of clinical and consumer-facing IT interventions in healthcare delivery and management. More recently, she has also been focusing on AI-ML-OR approaches for investigating patient safety issues and for addressing health literacy challenges. She is a Distinguished Alumnus of IIT/Kanpur, an elected Fellow of the American Medical Informatics Association, and the Inaugural Recipient of the Bufalini Prize in Italy for applications of AI in Medicine. More information is available at https://www.heinz.cmu.edu/faculty-research/profiles/padman-rema

Agentic Portfolio Construction: A Multi-Agent Architecture for LLM-Driven Financial Asset Allocation

Prof. Ruppa K. Thulasiram
Department of Computer Science,
Computational Financial Derivatives Lab,
Cloud Computing Lab,
Activities/Strategy Chair, IEEE CFETC,
University of Manitoba, Canada

Abstract: Accurately curating portfolios and managing asset allocation is an essential and complex task in financial risk management. The emergence of large language models (LLMs) could be utilized for this task to a good extent. Prior approaches predominantly relied on LLMs operating in isolation or supported by retrieval-augmented generation (RAG) pipelines, depending solely on pretrained knowledge or external static datasets. In other words, LLMs alone remain insufficient. In contrast, our proposed architecture embeds LLMs within a structured multi-agent system capable of executing complex decision-making workflows through coordinated interaction among agents and with external tools such as APIs, functions, and other models.

Each agent within this system is tailored to perform a specific role and equipped with a defined objective and specialized functionality. These agents collaborate by sharing intermediate outputs, validating information, and routing tasks based on their expertise, thereby enabling a more structured and adaptive computational process. The portfolio generation system architecture is centered on a state-driven execution graph, which regulates both data flow and decision-making processes among agents and functional nodes. LangGraph is used to coordinate this modular workflow, allowing for conditional routing that adapts based on runtime state evaluations, thus ensuring robust processing from initial user input to the final output.

The workflow begins with a natural language investment request, which is parsed by an LLM-based Agent. The output, which is a structured user profile and a list of relevant assets, triggers subsequent steps in the pipeline. The system then invokes an external agent to retrieve recent financial news using the Tavily API, followed by another node that collects historical financial data via the Yahoo! Finance API. Once this data is retrieved, the Quantitative Analyst Node computes essential financial metrics, including CAPM-based expected returns, volatility, Sharpe ratios, and momentum indicators. Utilizing this data, a Portfolio Manager Agent powered by GPT-4o suggests an optimized portfolio, which the validation node subsequently verifies. The portfolio must meet all structural and metric-based criteria, and afterward, a Reporting Agent provides a commentary in natural language outlining the outcomes, culminating in a formatted report. The architecture demonstrates how multi-agent LLM systems can perform complex, high-stakes financial tasks with adaptability, transparency, and robustness, marking a promising direction for AI-driven portfolio management.

Bio: Dr. Ruppa K. Thulasiram (Tulsi) is a Professor with the Dept. of Computer Science, Univ. of Manitoba, Canada. He received his PhD (Aerospace Engineering) from Indian Institute of Science and spent years at Concordia Univ., Canada, Georgia Institute of Technology, Atlanta, USA and Univ. of Delaware, Newark, USA before taking up a position at Univ. of Manitoba (UM) in 2000. His current research interests include Computational Finance (CF), Computational Intelligence in Finance, Data Science Applications in Finance, DeFi: Cryptocurrency, Smart Contracts, and Cloud Computing (CC). With his initial training in Mathematics, Physics and Applied Science, he has written many papers in the areas of High Temperature Physics, CF, CC, Computational Intelligence and Blockchain Applications research areas. He has trained and graduated many MSc and PhD students and has received best paper awards in reputed conferences. His research has been funded continuously by the Natural Sciences and Engineering Research Council (NSERC) Canada. Tulsi has developed curriculum for Computational Finance and Cloud Computing for both graduate and undergraduate level and has been teaching these courses for the past several years. Tulsi has been the Chair of the Computational Finance

and Economics Technical Committee (CFETC) of IEEE Computational Intelligence Society (CIS) and is currently the strategy liaison for Computational Intelligence in Financial Engineering and Economics Conference. He has been an expert reviewer for research funding proposals from Canada, USA, and Europe. He has been serving on many administrative committees at UM and outside. He is associated with many professional societies such as IEEE, ACM, etc. and has organized many conferences and has been editor and guest editor with many journals. Tulsi has been honored as a Distinguished Contributor with IEEE Computer Society. For further details please visit www.cs.umanitoba.ca/~tulsi or google-scholar

Data Analytics: The Jet Fuel Powering the Future of Aviation

Dr. Suganya Srinivasan
Data Scientist,
Rolls-Royce India Pvt. Ltd., Bangalore

Abstract: The aviation industry is rapidly evolving with the integration of data analytics and artificial intelligence. Modern aircraft generate large volumes of data from engines, avionics, and operations, offering new opportunities to enhance safety, efficiency, and sustainability. Effective use of this data is helping airlines and manufacturers make smarter, faster, and more reliable decisions.

This keynote highlights how analytics is transforming aviation through predictive maintenance, fuel optimization, and improved passenger experience. It also explores emerging technologies such as digital twins, IoT, and machine learning that are reshaping operational strategies. By connecting technology with business value, the session shares insights on how data-driven intelligence is redefining aviation and creating lessons for leaders across industries.

Bio: Dr. Suganya leads the Engine Health Monitoring (EHM) Analytics team at Rolls-Royce Data Labs, India. She holds a Ph.D. in Electrical Engineering. Her work focuses on applying data analytics, machine learning, and system modeling to enhance engine reliability, predictive maintenance, and operational efficiency. With strong expertise in both engineering and analytics, she plays a key role in advancing digital transformation and data-driven decision-making within the aviation sector.

Harnessing the Power of Artificial Intelligence in Computational Sciences

Dr. Umar Muhammad Modibbo, FORI
Department of Operations Research
Faculty of Computing
Modibbo Adama University, PMB 2076, Yola, Nigeria

Abstract: The integration of Artificial Intelligence (AI) in computational sciences has revolutionized the field, enabling researchers to tackle complex problems with unprecedented efficiency and accuracy. This synergy has opened up new avenues for scientific discovery, from simulating intricate systems to optimizing computational models. By leveraging AI's capabilities, computational scientists can now analyze vast datasets, identify patterns, and make predictions with remarkable precision. This research explores the transformative role of AI in computational sciences, highlighting its applications, challenges, and future directions. As AI continues to evolve, its impact on computational sciences will likely be profound, driving innovation and breakthroughs in various fields. However, several challenges need to be addressed, including ensuring the interpretability of AI models, maintaining data quality, and mitigating potential biases. Despite these challenges, the potential benefits of AI in computational sciences are substantial, and ongoing research is poised to unlock new opportunities for scientific discovery and innovation. In conclusion, the role of AI in computational sciences is multifaceted and rapidly evolving. As researchers continue to explore the potential of AI, it is likely to have a lasting impact on the field, driving advancements and breakthroughs that will shape the future of computational sciences.

Bio: Umar Muhammad Modibbo received the Bachelor of Technology (B.Tech.) and Master of Technology (M.Tech.) degrees in Operations Research from the Federal University of Technology, Yola, Nigeria (Now Modibbo Adama University), in 2010 and 2016, respectively, and the Ph.D. degree in Operations Research from Aligarh Muslim University, Aligarh, India, specializing in applied mathematical programming and computing. He is currently a Lecturer with Modibbo Adama University. He has nine years of experience in teaching, research, and community services. He has published more than 40 research articles in journals of national and international repute and attended many conferences and workshops in his domain area. His research interests include mathematical programming and its applications, reliability optimization, fuzzy programming, multi-objective optimization, inventory and supply chain management, soft computing, and sustainable development goals. Dr. Modibbo is a fellow and the President of the Operations Research Institute for Decision Sciences and Analytics of Nigeria (ORIDSAN), a Lifetime Member of African Federation of Operations Research Societies (AFROS) and the International Federation of Operational Research Societies (IFORS), and a member of the International Group on Reliability (Gnedenko e-Forum). He is an Editorial Board Member of several journals and a Reviewer of many journals, including IEEE Access. He was a recipient of the University Grant to study M.Sc. Operations Research, in 2014; Nigerian Tertiary Education Trust Fund (TETFund) to study Ph.D. Operations Research, in 2018; and the Young Researcher Award and Research Excellence Award from the Institute of Scholars (InSc), India, in 2020.

Intelligent Management of Projects and Operations

Prof. Viswanathan Krishnan
Jacobs Family Chair in Management and Engineering Leadership,
Technology and Operations, Rady School of Management
University of California, San Diego

Bio: Vish Krishnan holds the Jacobs Chair in Engineering and Management at the University of California. Dr. Krishnan holds a PhD from the top-ranked Engineering program at the Massachusetts Institute of Technology (MIT) on top of a B.Tech from IIT Madras, and a Masters from CMU; he has co-authored some of the most cited articles on the topics of program management, product innovation and growth strategy. He is a 5-time winner of the Most Valuable Professor (MVP) award at the University of California, and developed as well as taught the Product and Program Management Course at MIT. His HarvardX course on Technology Innovation and Entrepreneurship has benefited hundreds of thousands of students. Professor Krishnan is a partner to a number of technology companies large and small, working shoulder to shoulder with them to advance and de-risk their strategic planning and execution. His work with Dell Computer has been documented as a Harvard Business School case study taught at a number of top Universities, and he has been invited to the Wall Street Journal and Cisco CIO forums. His work on solutions-driven growth has been a best-seller article in the MIT Sloan Management Review, and applied in numerous multinational companies including Zeiss, Caterpillar, and Sony. His work with 3M was featured on the front page of the Wall Street Journal. Vish Krishnan also serves in editorial positions at the top journals such as Management Science.

The Next Frontier of Optimization: Adaptive, Accessible, and Human-Centric Solutions

Dr. Viswanath Kumar Ganesan [a,b]
[a]*Principal Scientist. Tata Consultancy Services, Madras*
[b]*Adjunct Faculty, Indian Institute of Technology Madras*

Abstract: Generative AI is poised to transform optimization by bridging the gap between complex mathematical modeling and intuitive decision-making. Over the next few years, expect a shift toward **natural language-driven optimization**, where business users describe problems conversationally, and GenAI systems translate these into validated mathematical models. Large Language Models (LLMs) will act as co-pilots, assisting in formulating decision variables, constraints, and objectives, democratizing access to optimization for non-experts.

Hybrid approaches—combining GenAI's creative generation with traditional solvers—will dominate. These "generative optimization" frameworks will enable rapid scenario generation, adaptive re-optimization, and integration with digital twins for real-time decision support. Meta-controllers powered by machine learning will intelligently select algorithmic pipelines (exact solvers, heuristics, metaheuristics) based on user priorities like speed, cost, and accuracy.

Explainability and governance will become critical, with GenAI providing plain-language rationales and interactive "what-if" analysis to build trust. Domain-specific GenAI models will proliferate, reducing hallucination risks and improving performance in sectors like supply chain, energy, and finance. Ultimately, GenAI will not replace optimization but augment it—making solutions more accessible, adaptive, and human-centric while ensuring rigorous adherence to constraints and ethical standards.

Bio: Dr. Viswanath Kumar Ganesan is a Principal Scientist at Tata Consultancy Services with over 20 years of service, specializing in operations research, optimization, and decision sciences. Holding a Ph.D. from IIT Madras, he has published extensively in journals and conferences, earned multiple awards and patents, and serves as adjunct faculty at IIT Madra