



**TNCHE Asia 2024 Conference**  
**" Decarbonization, AI and Digital Transformation**  
**for Sustainability in Process Industries "**  
**Presenter's Biodata & Abstract**



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**Title of Presentation** : **Innovative Synergies: Accelerating Development with Simulation and AI**

**Presentation Abstract :**

In today's fast-paced technological landscape, the synergy between simulation and artificial intelligence (AI) is leading the way in driving innovation. This presentation explores the transformative potential of integrating simulation-based optimization, digital twins, and simulation-based AI to expedite development processes and enhance decision-making. Simulation-Based Optimization uses computational models to refine designs, processes, and systems. By iteratively testing and adjusting variables within a simulation environment, organizations can identify optimal solutions that maximize performance. This approach accelerates the development cycle, enabling quicker iterations and more robust outcomes. The concept of the Digital Twin and Reduced Order Models (ROM) represents a paradigm shift in how real-world entities are monitored and managed. A digital twin is a dynamic, virtual representation of a physical object or system, continuously updated with real-time data. ROMs simplify these complex models, preserving essential behaviors while significantly reducing computational demands. Simulation-based AI integrates machine learning algorithms with simulation data, creating intelligent systems capable of predicting and responding to various scenarios. This fusion enhances the accuracy and efficiency of simulations, enabling the development of smarter, adaptive models. This presentation will explore practical applications, case studies, and the future outlook of these technologies, illustrating their critical role in shaping the next generation of innovative solutions.