MECHANICAL & MATERIAL COLLOQUIUM

A procedural framework to accelerate the adoption of AI practices to establish a replicable blueprint for future innovations in the field of engineering

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The integration of Artificial Intelligence (AI) into engineering applications is a transformative shift in how systems are designed, maintained, and optimized. The framework is organized into several clear stages that guide the transition from traditional engineering practices to AI-enhanced systems. In the first stage, existing engineering systems are thoroughly assessed to identify both opportunities for improvement and potential limitations, establishing a solid foundation for a feasibility study. This study matches the unique requirements of engineering processes with suitable AI technologies, where the process of learning and understanding AI plays a critical role in ensuring that the chosen approaches are both relevant and effective. The next stage focuses on practical implementation, involving essential steps for data preparation, algorithm selection, model training, and iterative validation—each designed to ensure that the developed AI solutions are robust, scalable, and seamlessly integrated with current practices. Finally, the framework emphasizes operational integration, where AI solutions are tested and refined in real-world conditions to continuously enhance system performance. Overall, this procedural framework offers a clear pathway for future innovations, promising improved efficiency and sustained advancement in the field of engineering.

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Dr. Nidal Alif is a distinguished mechanical engineer with over two decades of experience spanning academia, research, and entrepreneurship. He earned his Ph.D. in Mechanical Engineering from Florida Atlantic University—specializing in solid mechanics and composite materials—complemented by a Master's in Industrial & Manufacturing Systems Engineering and a B.S. in Mechanical Engineering from Yarmouk University. He has held academic positions at Florida International University and the University of Miami, contributing to engineering education, and integrates traditional engineering with emerging AI solutions. A prolific innovator and inventor with a US patent, Dr. Alif has led over 400 engineering projects in the fields of automation, and custom product design. As an entrepreneur, he created innovative ideas in new product design and prototype development across diverse engineering disciplines.

Place:
EC 1113

Time:
3:30-4:30 PM
March 11, 2025

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For questions, comments and suggestions, contact Colloquium Organizers Dr. Benjamin Boesl (bboesl@fiu.edu) or Dr. Jiuhua Chen (chenj@fiu.edu)