Professor Wisam Bukaita: Assistant Professor of Practice, Data Science Pioneer

Professor Wisam Bukaita is an Assistant Professor of Practice in the College of Arts and Sciences (CoAS) at Lawrence Technological University (LTU). With over 23 years of academic experience, his work bridges engineering, data science, and mathematical modeling, focusing on practical applications and innovative teaching methods. He is deeply committed to student success, research mentorship, and shaping the future of data science education.

Expertise and Research Focus

Prof. Bukaita's extensive background is rooted in engineering, specializing in:

- Data Science and Data Analysis: Leading research that addresses real-world healthcare and engineering problems through data mining and analysis.
- Engineering Simulations and Mathematical Modeling: Applying systems of differential equations and sophisticated data analysis to structural engineering challenges. His Ph.D. research focused on advancing engineering simulations using visualization techniques.
- Artificial Intelligence (AI): Utilizing AI and advanced tools to drive innovation in research projects.

His research efforts consistently involve mentoring undergraduate and graduate students, with many projects culminating in publications and presentations at academic conferences. His work strives to close the gap between theoretical knowledge and practical application.

Academic Background

Prof. Bukaita's diverse and advanced academic journey includes:

Degree	Field	Institution	Year	Focus
M.S.	Science (Data Analysis/Math Modeling)	Lawrence Tech University	2013	Systems of differential equations for structural engineering.
Ph.D.	Science	Baghdad University	2006	Advanced engineering simulations using data analysis and visualization.

Degree	Field	Institution	Year	Focus
M.S.	Science	Baghdad University	1999	Second-order differential equations for simulating non-prismatic members.
B.S.	Engineering	University of Technology	1993	Experimental work and data analysis techniques.

Prior to joining LTU in 2012, he held a faculty position at Baghdad University in the Water Resources Engineering Department, teaching Mathematics, Data Analysis, Structural Engineering.

Impact on Education and Curricular Development

Prof. Bukaita's primary role at LTU is teaching and research, marked by significant contributions to the curriculum:

- Data Science Program Development: He authored and developed the curriculum for a new major in Data Science, aligning it with industry demands. This involved creating courses, selecting materials, and establishing industry connections for internships.
- Innovative Course Creation:
    - Authored new data science courses to meet industry demands.
    - Developed the Coding Club series (R, Matlab, Python).
    - Authored a new one-credit robotics course incorporating computer vision and radar using an educational robotic dog for hands-on data collection experience.
- Diverse Teaching Portfolio: He has taught a wide spectrum of courses across multiple departments (Math, Physics, Civil Engineering, Architectural Engineering), ranging from foundational mathematics to advanced, research-focused topics:
    - Foundational: Basic Math, Intermediate Algebra, Precalculus.
    - Calculus: Calculus I, II, and III.
    - Advanced Math & CS: Discrete Math, Statistics, Probability and Statistics, Advanced Calculus, Linear Algebra, Advanced Engineering Mathematics, Differential Equations.
    - Engineering/Architecture: Structural courses that incorporate the 14 grant Engineering Challenges.

Innovative Teaching Philosophy

Prof. Bukaita is dedicated to a student-centric, active learning approach that transforms students from passive material takers into active problem solvers. His philosophy is defined by:

- Project-Based Learning (PBL): Integrating real-world applications and interdisciplinary concepts. Students' projects have led to presentations at LTU Research Day and publications in scientific journals as well as local and international conferences.
- Technology Integration: Infusing technology to create an interactive and personalized learning environment, including:
- Bridging Abstract and Tangible:
    - 3D Printing & Coding: Students use coding and 3D printing to create Lego bricks to visualize and solve integral equations and to construct a 3D Unit Circle to study trigonometry.
    - Interactive Gaming: Developed a video game in the Unity environment where students construct quadric surfaces (ellipses, parabolas, hyperbolas). This approach has led to a 22% improvement in quiz scores compared to traditional methods.

Publication research are listed below:

Research title, researchers, Journal or conference name, and DOI link	**Publication Year**
Vadde, Vinod, Takur Sai Karthik Chalamalasetty, Paka Shalini, and Wisam Bukaita. 2025. "Automated Detection and Classification of Underwater Species Using YOLOv8 for Real-time Marine Ecosystem Monitoring." *International Journal of Environmental Monitoring and Analysis* 13 (6): 314–27. https://doi.org/10.11648/j.ijema.20251306.13	2025
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Nedivi, N., Bukaita, W. (2026). Automated Drone Image Analysis for Real-Time Disaster Response and Emergency Situations. In: Arai, K. (eds) Proceedings of the Future Technologies Conference (FTC) 2025, Volume 3. FTC 2025. Lecture Notes in Networks and Systems, vol 1677. Springer, Cham. https://doi.org/10.1007/978-3-032-07995-4_2	2025
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García de Celis, Guillermo, and Wisam Bukaita. 2025. "Deep Learning-Based Lumbar Spinal Canal Stenosis Classification Using MRI Scans." *Medical Research Archives* 13, no. 7. https://doi.org/10.18103/mra.v13i7.6660	2025
Bukaita, Wisam, and Aaron Ghiurau. 2025. "The Impact of Climate Warming on Organism Populations in US." *International Journal of Environmental Monitoring and Analysis* 13 (4): 177-191. https://doi.org/10.11648/j.ijema.20251304.15	2025
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