

# Dr. Yahia M. Al-Smadi, PhD, PE, PMP, CSWP

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Dr. Yahia M. Al-Smadi has over 22 years of experience in engineering analysis, condition assessment, rehabilitation and construction design, and support services for a wide range of facilities, including heavy movable structures. With the combination of his mechanical and manufacturing engineering research, Dr. Al-smadi advances his career to embrace the design and management of projects with an emphasis on future capacity and growth. Several techniques such as DFMA, DOE, Lean Construction and Value Stream have been implemented in advancing the design of protective systems of major public authorities, including the Port Authority of NYNJ, Maryland Transit Administration (MTA) and NY Law Enforcement Division. Projects in which he participated as a finite element specialist range from cardiovascular biomechanics applications, geotechnical applications, reinforced concrete and masonry structures, and aerospace structures.

He has established Advanced Simulation and Automation Laboratory at TAMUK and served as a director of the Javelina Innovation Lab in 2014. He joined King Abdullah II Design and Development Bureau (KADDB) and served as Aerospace Systems' section head. Under his supervision, two reconnaissance drone projects have been launched; fixed-wing and multirotor. He joined Jordan University of Science and Technology (JUST) in 2018 and established the current lab, "Autonomous Platforms Lab", which produced several electrical platforms which can carry mid-size range loads and issued many patents accordingly.

## **EDUCATION:**

<b>Ph.D., Mechanical Engineering</b> , New Jersey Institute of Technology (NJIT), Newark, NJ	January, 2009
<b>M.Sc., Manufacturing Systems Engineering</b> , New Jersey Institute of Technology (NJIT), Newark, NJ	June, 2002
<b>B.Sc., Mechanical Engineering</b> , Jordan University of Science and Technology (JUST), Irbid, Jordan	June, 1999

Ph.D. Thesis (Mechanical Engineering, NJIT) "Kinematic Synthesis of Planar Four Bar and Geared Five Bar Mechanisms with Structural Constraints" (available at <http://archives.njit.edu/vol01/etd/2000s/2009/njit-etd2009-001/njit-etd2009-001.pdf>)

M.Sc. Thesis (Manufacturing systems Engineering, NJIT) "Flexible Manufacturing System Utilizing Computer Integrated Control and Modeling" (available at <http://archives.njit.edu/vol01/etd/2000s/2002/njit-etd2002-027/njit-etd2002-027.pdf>)

## **EMPLOYMENT HISTORY:**

March 2023 - Present	Associate Professor, (JUST), Irbid – Jordan
September 2019 – Sep. 2020	Technology Transfer Officer, Center of Excellence for Innovative Projects, JUST, Jordan
November 2017-March 2023	Assistant Professor, (JUST), Irbid – Jordan
November 2015-Nov. 2017	Principal Scientific Research. King Abdullah II for Design and Development Bureau, Amman, Jordan
September 2013-Oct. 2015	Assistant Professor, Texas A&M University-Kingsville, Kingsville, TX
March 2009-July 2013	Senior Mechanical Engineer, AECOM, New York, NY
September 2009-May 2013	Adjunct Professor, New Jersey Institute of Technology, Newark, NJ
October 2006-March 2009	Senior Mechanical Engineer, Parsons Transportation Group, New York, NY
July 2002-October 2006	Mechanical Engineer, Bergman Associates, Jersey City, NJ
January 2000-January 2001	AutoCAD Engineer, Hashemite University, Zarqa, Jordan

## **AREAS OF EXPERTISE:**

Specialized in high performance computing and computational mechanics based on finite element applications using software packages of ANSYS, FDS, COSMOS and LS-DYNA. Applications include the following:

- Crashworthiness analysis and design of protective systems of a major public authorities
- Blast analysis and design recommendations for station structures and aerial structures.
- Blast induced brain trauma and thorax compartment injuries
- Mechanical design, analysis and manufacturing of heavy movable structures.
- Synthesis and analysis of 2D and 3D mechanisms.

## Electric Platform Projects:

- **Rum Rover**  
The Rum Rover, a versatile six-wheel electric vehicle designed for challenging terrains, boasts remarkable features. Its jointed front wheels provide freedom for smooth driving and climbing. This adaptable robot can operate autonomously or remotely, featuring a strong robotic arm capable of lifting 5kg objects up to 1.5m. With a 360-degree rotating base, it excels in threat extraction and life-saving tasks. What sets it apart is its 300kg load capacity and 1-hour continuous operation on a single charge. Its unique front-wheel joint, combined with robust strength and endurance, makes it ideal for critical missions requiring reliability and top performance.
- **Electric ATV**  
The electric ATV is a purpose-built 4WD vehicle for farms, offering eco-friendly, quiet performance. It provides an exhilarating off-road experience with a high-capacity 4.2kW battery, making it perfect for nature exploration. With a towing capacity of 400-500kg, it's great for both adventure and practical tasks, reaching speeds of up to 40km/hr and covering 20km per charge. Its advanced suspension and regenerative braking system ensure a smooth and efficient ride on rough terrains.
- **eCarrier**  
The eCarrier effortlessly handles up to 350 kg loads, reaching speeds of 20 km/hr and scaling steep 45-degree ramps. Powered by a 2 kW battery, it covers 12 km per charge, rechargeable in just an hour. Split into two parts, it swiftly disconnects like train carts. Remote control capability makes it ideal for animal-friendly farms, airports, and warehouses, showcasing its versatility.
- **Crawler Robot.**  
This compact surveillance robot, weighing just 1.5 kg and measuring 67cm x 32cm x 13cm (or 23cm with the camera), is designed for confined spaces, tunnels, wreckage sites, and vehicle inspections. It provides remote access to tight areas, operating for 40 minutes on a 12V DC power supply. Controlled via GSM or handheld RC, its adaptability and efficient power use make it invaluable for various applications, offering vital data gathering in challenging environments.
- **Mobile Armored Shield**    **Version 1**    **Version 2**  
The meticulously crafted Shield is designed for SWAT teams, countering assaults and neutralizing threats effectively. Its foldable design allows easy deployment and efficient storage. Consisting of a shield and driver base, it offers flexibility in deployment, with remote or centralized control. Accommodating one soldier and protecting a crew of three, it features a 120cm opening capability and three-speed settings. With a total weight of 250kg, it operates on a reliable 24V DC power source.
- **eTransporter**  
The eTransporter utilizes six brushless DC motors, carrying up to 300 kg and running for an hour on a single charge with its 2 kW battery. Its additional 1 kW motors lift loads up to 1.5 meters, adaptable to various setups like scissor lifts. Ideal for cameras or robotic arms, it is RC operated within 1 km line of sight, extendable to 5 km with boosters. Industries like warehouses and hospitals find it advantageous.
- **Exoskeleton**  
Our groundbreaking upper extremity exoskeleton prototype revolutionizes stroke patient rehabilitation. It enhances mobility and functionality with new features, capable of carrying 50kg in each arm. Ideal for healthcare settings, it safely transports patients in hospitals' X-ray rooms, ensuring comfort and independence. This innovation reflects our dedication to advancing technology for stroke patients, improving their quality of life and rehabilitation journey.
- **BASHEQ Drone**    **Version 1 (stability test)**    **(Autonomous Mission)**    **Version 2**  
The BASHEQ drone is a cutting-edge drone with two configurations; quadcopter and hexacopter designed for combat and reconnaissance. Powered by four or six brushless DC motors and 32-inch propellers, it offers stable flight performance. Its innovative dual-platform design allows attachment of propelled rockets on the upper platform for enhanced strike capabilities, while the lower platform serves as landing gear. With a 55cm ground clearance and a 17kg payload capacity, it can mount machine guns, mortar shells, or cameras, providing precise ground support. With a 40-minute flight duration, cruising speed of 45km/hr, and 1km ceiling height.
- **5DOF Humanoid**  
This robotic hand is designed to mimic the human hand, featuring five fingers and an equal number of joints. Remarkably, it replicates the intricate movements of a human hand. What sets it apart is its innovative control system: it can be operated remotely using WiFi or SMS text messages. To further enhance its functionality, this humanoid hand can be manipulated by wearing an exoarm glove, allowing it to replicate human hand motions accurately.
- **eHandler**  
The eHandler employs six brushless DC motors as part of its electric vehicle framework. It boasts the capability to carry a 300 kg load. With a battery capacity of 1.5 kW, it offers convenient and rapid charging features. It can be conveniently operated with handheld remote control. Many industries, including warehouses, hospitals, and airports, can benefit from the capabilities of the eHandler.

## **COMPUTATIONAL MECHANICS SELECTED PROJECTS:**

- **Pearl Harbor Memorial Bridge, Connecticut Department of Transportation (ConnDOT)**  
Performed blast analysis and simulations for demolition of marine piers using staged or sequenced blast charges. The simulations were performed using the commercially available software ANSYS and LS-DYNA; a steel jacket wall was modelled along the perimeter of the marine piers as a mean of environmental protection from the blast derbies. The blast charges and piers were simulated using an arbitrary Lagrangian-Eulerian computing method (ALE). \$500K
- **Maryland Transit Administration, Central Light Rail Line at Middle Branch**  
Performed an analytical simulation to study the response of the aerial structure subject to blast pressure. The simulation was performed using the commercially available software ANSYS and LS-DYNA. Three-dimension finite element models were generated for the investigated structure. The finite element model accounted for the material nonlinearities and the structural details that affect the blast response of the structure. \$300K
- **World Trade Center Campus Plan**  
Performed numerical crashworthiness analysis using ANSYS and LS-DYNA. This analysis included testing a proprietary retractable bollard to assess its feasibility of installing it at the entry and exit points of the WTC campus. Undertook an industry-wide survey of the state-of-the-art vehicle arrest devices to assess their potential installation on the WTC campus site. \$720K.
- **Vehicle Security Center and Tour Bus Parking Facility, Liberty Security Partners.** The Liberty Street VSC is a multi-story structure, predominantly below grade, which houses the primary vehicular security screening functions for the entire World Trade Center site and parking for tour buses. Performed finite element modelling and analyses for protective design verification of a number of structural components of the VSC. Also, evaluated different designs of hardened, composite steel-concrete columns in case of an explosive event at close proximity and that of CMU and RC walls using ANSYS and LS-DYNA finite element analysis software. Performed blast-soil-structure interaction analyses to evaluate the performance of a slurry wall in the case of an above-grade explosion event outside the VSC. \$340K.
- **Washington Avenue Bridge, Mississippi River, Minneapolis.**  
Performed finite element modelling using ANSYS for the bridge. Investigated this complex bridge's static and dynamic structural vibration characteristics and response. This investigation provided an understanding of the dynamic response of the existing un-retrofitted bridge and provided confidence in computer models of vibration that evolve from the existing bridge to the retrofitted bridge. Acceleration-time histories were measured using 28 accelerometers to record bridge response to two 40 kip dump trucks traveling at various prescribed speeds. Data were processed to derive natural frequencies and mode shapes, later used for calibrating computer models. \$1M
- **Williamsburg Bridge, Expansion Bearing, New York, New York.**  
Comprehensive design services for new expansion bearing assembly. The new design includes self-guided expansion bearing using gears, racks, heat-treated rollers, and plates. The design was performed according to AGMA and AASHTO code regulations. Services included fabrication shop testing of all components and supervising the field installation of the bearing assemblies. \$7M.
- **Bay Pines Veteran Affairs Medical Center, Bay Pines, Florida.**  
Computational Fluid Dynamics (CFD) modelling was undertaken to investigate the dispersion of exhaust products in the vicinity of the new buildings. Responsibilities included performing dispersion analysis modelling using permissible EPA NAAQS emission standards. Calculations of generators and truck exhaust emissions at loading docks were calculated. The predicted concentrations of regulated exhaust products (CO, NOx, and PM) were modelled and recorded at all intake vents in the existing and new buildings, and a detailed three-dimensional finite volume model was generated and analyzed using ANSYS CFX. \$150K
- **Denver Union Station, Denver Union Station Project Authority (DUSPA). Denver, Colorado**  
Participated in performing finite element modelling using ANSYS CFX for independent verification and QC process for the CFD models carried by Fire Dynamics Simulator (FDS). This verification involved modelling the station geometry and simulation of fire and smoke. Three-dimensional CFD models were set up to capture the physical parameters that affect smoke spread throughout the bus station roadway and investigate the ventilation of the bus station roadway under emergency conditions. \$430K
- **Murano @ Portofino" building, Miami-Dade Water and Sewer Department Miami Beach, Florida.**  
Performed an in-depth assessment of the global impact of the proposed 14ft diameter utility tunnel adjacent to the 36 story Murano Building on Miami Beach. Finite element modelling using ANSYS was used to analyze two-dimensional and three-dimensional models of the building piles and tunnel geometry. Nonlinear soil-structure interaction was investigated to study the building response to the excavation-induced settlement. \$830K

## **HEAVY MOVABLE STRUCTURES SELECTED PROJECTS:**

The design was performed in accordance with different codes and standards such as AASHTO, USACOE, AREMA, CMAA, OSHA, ASTM, ASCE, AWS, ANSI and SAE. The heavy movable structure includes; movable bridges, bridge travellers, taintor gates, and water navigational lock.

- **Williamsburg Bridge, Bridge Traveler, New York, New York.**  
Performed full review of the mechanical calculations prepared by the Contractor, which includes; power requirement, structural design, dynamic response, impact simulation, fatigue analysis and skew control. These calculations followed CMAA standards. Other responsibility includes mechanical inspection of the movable traveller as part of construction support services. An in-depth inspection of the traveller was performed, including all mechanical components. A report was presented to the Contractor outlining the identified deficiencies and recommendations for repairs.
- **145th Street Bridge, New York, New York, NYCDOT**  
Mechanical Engineer involved in rehabilitation design and control of mechanical system for swing span over Harlem River. The work includes the complete replacement of old machinery with up-to-date equipment. All designs were performed in accordance with the AASHTO. Performed the mechanical inspection during the construction phase and advised a better operation. This includes detecting and achieving bridge concentricity using multiple dial indicators and hydraulic jacks. Also performed an in-depth calculation to analyze the failure of lock arm mechanism; Engineer is working based on-call services to diagnose, correct or troubleshoot on-site problems.
- **Replacement of the Ingersoll Street and Washington Street Lift Bridges over the Erie Canal, Monroe County, New York, NYSDOT**  
Was responsible for the rehabilitation design of the operating machinery and counterweight machinery for this tower-less vertical lift bridges. This work included complete replacement of machinery components and structural repairs to the span, counterweight, and operating machinery pits. Construction support services, including shop and sight inspections of the new machinery were also part of the scope of work. All designs were performed in accordance with AASHTO standards.
- **Ward's Island Bridge Rehabilitation Design, New York, New York, NYCDOT**  
Performed a mechanical inspection of the tower-driven vertical lift pedestrian bridge as part of the rehabilitation design of the bridge machinery. Design work included select replacement and refurbishment of existing span drive machinery, span guides, live load shoes, and operator house mechanical facilities. In addition to this work, the engineer worked on the design of machinery and pier access walkway improvements. All designs were performed in accordance with the AASHTO.
- **Columbus Drive Bridge Rehabilitation Design, Hillsborough County, Florida, Hillsborough County Public Works**  
Involved in rehabilitation design of main and auxiliary drive system for swing span in FL. The work includes complete replacement of old gears and bearings, main drive motor and span reducer rehabilitation, replacement of solenoid actuated brake with thrust brake and upgrade auxiliary drive system with interlock system. All designs were performed in accordance with the AASHTO.
- **S-31 Manistee Bascule Bridge Rehabilitation, Manistee County, Michigan, MI DOT**  
Involved in rehabilitation design of main and auxiliary drive system for swing span in FL. The work includes complete replacement of old gears and bearings, main drive motor and span reducer rehabilitation, replacement of solenoid actuated brake with thrust brake and upgrade auxiliary drive system with interlock system. All designs were performed in accordance with the AASHTO.
- **West 3rd Street Vertical Lift Bridge, City of Cleveland, Ohio**  
Involved in the new design of the operating machinery and counterweight machinery for this span-driven vertical lift bridge. This work included complete replacement of structural span, counterweight, sheave design, span air buffers and span guide rollers. All designs were performed in accordance with the AASHTO.
- **Clyde Taintor Dam Gate At Lock E-26, Wayne County, New York, NYSDOT**  
Involved in design and control of the operating system for spillway taintor gate. Gate is connected to the counterweight and raised by means pinion and rack, which is mounted on the skin plate of the gate. The design was performed in accordance with the USACOE.
- **Inglis Lock - New Miter Gate Lock Inglis, Florida Florida Department of Environmental Protection**  
The existing Inglis Lock (on the Cross-Florida Barge Canal) is oversized for the historic vessel traffic and is currently out of service. Responsibilities included hydraulic and operating machinery design of new lock. All design was performed in accordance with the USACOE.

## **Patents:**

- 1- **Yahia M. Al-Smadi**, Ahmad Alramahi, Nedal Sumrein,  
WO2022064540 A1, Blood Vessels' Quality Testing Device  
<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2022064540>
- 2- **Yahia M. Al-Smadi**, Mohammed Atmeh, Nedal Sumrein,  
WO2022259284, An Articulating Internal Combustion Engine Assembly  
<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2022259284>
- 3- Taher Alomari , **Yahia M. Al-Smadi**,  
WO2023012848, A Dental Rubber Dam Clamp  
<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2023012848>
- 4- Hasib Aldary, **Yahia M. Al-Smadi**, Nedal Sumrein,  
WO2023062663, A Spring-Loaded Dental Mirror  
<https://patentscope.wipo.int/search/en/detail.jsf?docId=Wo2023062663>

## **Automation and Robotic Projects :**

- 1- eTransporter, 2022. The transporter platform can run off 36volt battery. The payload is about 250kgs and can lift the weight up to 1.2m. This is wirelessly controlled platform and can run for 40min.
- 2- Remotely controlled UGV, 2022, capable of carrying 300kg and running at a speed of 16km/hr. This platform is designed for exploratory missions and to go in very confided places
- 3- Articulated Armored Movable Shield (AAMS2) 2022, The shield is powered by **six** DC brushless motors capable of carrying 350kg and shielding a soldier from AK47 assault
- 4- eCarrier platform, 2021. This human-driven carrier can drive at 20km/hr with a payload of 350kg. The battery can last for one hour
- 5- Articulated Armored Movable Shield (AAMS1) 2019, The shield is powered by **four** DC geared motors capable of carrying 250kg and shielding a soldier from AK47 assault
- 6- Electric ATV which was fully designed and manufactured at Jordan Univeristy of Science and Technology. EATV is cabable of carrying 450kg, drive at speed of 25km/hr and has a charge suitable for 6km travel distance. 2019
- 7- Gas Powered Unmanned Air Vehicle (UAV), Hexacopter with single gas engine, Spring 2015. The designed hexacopter will participate in NASA's ICESat-2 2015 ICESat-2 Hexacopter Engineering Challenge
- 8- Autonomous Unmanned Air Vehecile (UAV), Hexacopter with VTOL Turbine UAV, Spring 2015
- 9- Unmanned Underwater Vehicle (UUV), Fall 2014. The designed submarine will Participate in 2015 MATEROV Regional Competition
- 10- Human Powered Vehicle Spring 2014. Participated in ASME 2014 Human Powered Vehicle Challenge
- 11- Quadrocopter UAV, Spring 2014. Participated in "Lighter than Air" ASME 2014 Student Professional Development Conference
- 12- SAE Aero Plane Design UAV, Spring 2014. Participated in 2014 SAE Aero Design East Competition

## **SPONSORED RESEARCH FUNDING AS PI AND CO-PI**

1. Co-PI: Scientific Research Fund, **A Novel Optimization-Based Design, Implementation, and Surgical Evaluation of an Active Robotic Capsule Endoscopy**, 2021. Amount **\$130000**
2. Co-PI Hashemite University, **New technologies to increase the endurance of firefighters**, 2020. Amount **\$54000**
3. Co-PI Yarmouk University, **New Exoskeleton of firefighters**, 2023. Amount **\$64000**
4. PI *Texas A&M-Kingsville*, **Investigation of Blast-induced Traumatic Brain Injury**, November 2013. Amount: \$ 15,000.
5. PI: *QEP- Student Engagement through teaching services at Texas A & M University-Kingsville*, **Automation Systems**, November 2013. Amount: \$ 9628.
6. PI: *Texas Higher Education Board, Engineering Rec. Summer Program*, **Ensuring Successful Engineers (ESF) ME camp 2014**, June 2014. Amount: \$ 12,500.  
[http://www.tamuk.edu/Engineering/engineering/student\\_resources/outreach/index.html](http://www.tamuk.edu/Engineering/engineering/student_resources/outreach/index.html)
7. PI: *QEP- Student Engagement through teaching services at Texas A & M University-Kingsville*, November 2013. Amount: \$5000. **Summer Course in Automated Unmanned Air Vehicle (UAV) Systems for South Texas High and Middle Schools**

## TECHNICAL PAPERS:

### Journal Publications

1. **Yahia M. Al-Smadi**; Nasser Al-Huthaifi, Ayah A. Alkhawaldeh, , "The Effect of Longitudinal Hole Shape and Size on the Flexural Behavior of RC Beams," *Results in Engineering*, 16, 100607, 2022
2. **Yahia M. Al-Smadi** , Ahmad M. Alshorman, Walaa Hassan, Razan Bader, Islam Abu Awad, Sajedah Alzghoul, Huda Bataineh, "Assessment and Perception of Renewable Energy Awareness and Potential in Jordan," *Jordan Journal of Mechanical and Industrial Engineering*, 16(4), 615-625, 2022
3. **Yahia M. Al-Smadi**; Rajai Z. Al-Rousan, Ameen A. Laradhi; and Onur Avci, "Vibration Serviceability Investigation of a Curved Footbridge," *ASCE, Practice Periodical on Structural Design and Construction*. 27(4), 2022
4. **Yahia M. Al-Smadi**, Y. Aburmaileh<sup>1</sup>, K. Russell and R. Sodhi, "Genetic Algorithm for Sensitivity Analysis of Automobile Hood Four-bar Mechanism Synthesis Using Motion Generation," *International Journal of Automotive and Mechanical Engineering*. Vol. 19, Issue 1 (2022), 9362 – 9378.
5. Wen-Tzong LEE, **Yahia M. Al-Smadi** and Kevin Russell, "A dual cam system for four-bar motion generation with adjustable length crank and follower links," *Journal of Advanced Mechanical Design, Systems, and Manufacturing*. Vol.15, No.6, 2021.
6. Wassel Al-Bodour, Yasmin Murad, Rana Imam & **Yahia M. Al-Smadi**, "Shear strength investigation of the carbon fiber reinforced polymer-wrapped concrete beams using gene expression programming and finite element analysis," *Journal of Structural Integrity and Maintenance*, Vol. 7, No. 1, (2022), 15-24.
7. Rajai Z. Al-Rousan, **Yahia M. Al-Smadi**, and Ameen A. Laradhi, "Operational Modal Analysis of the Curved JUST Footbridge Induced by Human," *Procedia Manufacturing* 44 (2020) 599-606.
8. **Yahia Al-Smadi**, " Dynamic response of RC bridge span subjected to blast wave shock," *Procedia Manufacturing* 44 (2020) 100–107 .
9. **Yahia Al-Smadi**, Herb Protin, "Imaginativeness beyond AASHTO," *Procedia Manufacturing* 44 (2020) 358–365
10. Bilal M Oraik, Nurnadiah Zamri, **Yahia M. Al-Smadi**, "Inverse Kinematic Synthesis of Motion Generation Four-bar Stamping Mechanism," *International Journal of Recent Technology and Engineering (IJRTE)* ISSN: 2277-3878, Volume-8, Issue-1, May 2019
11. Onur Avci, **Yahia Al-Smadi**, " Unreinforced Masonry Façade Assessment of a Historic Building for Excessive Displacements due to a Nearby Subway Construction," *ASCE's Practice Periodical on Structural Design and Construction*, 24(1): 2019.
12. Onur Avci, Ashish Bhargava, **Yahia Al-Smadi**, Jeremy Isenberg, "Vibrations Serviceability of a Medical Facility Floor for Sensitive Equipment Replacement: Evaluation with Sparse In-Situ Data," *ASCE's Practice Periodical on Structural Design and Construction*, 24(1), 2019
13. Valen-Sendstad K<sup>1</sup> , Bergersen AW<sup>1,2</sup> , Shimogonya Y<sup>3</sup> , Goubergrits L<sup>4</sup> , Bruening J<sup>4</sup> , Pallares J<sup>5</sup> , Cito S<sup>5</sup> , Piskin S<sup>6</sup> , Pekkan K<sup>7</sup> , Geers AJ<sup>8</sup> , Larrabide I<sup>9</sup> , Rapaka S<sup>10</sup> , Mihalef V<sup>10</sup> , Fu W<sup>11</sup> , Qiao A<sup>12</sup> , Jain K<sup>1,13,14</sup> , Roller S<sup>13</sup> , Mardal KA<sup>1,2</sup> , Kamakoti R<sup>15</sup> , Spirka T<sup>16</sup> , Ashton N<sup>17</sup> , Revell A<sup>18</sup> , Aristokleous N<sup>19</sup> , Houston JG<sup>20</sup> , Tsuji M<sup>21</sup> , Ishida F<sup>21</sup> , Menon PG<sup>22</sup> , Browne LD<sup>19</sup> , Broderick S<sup>19</sup> , Shojima M<sup>23</sup> , Koizumi S<sup>23</sup> , Barbour M<sup>24</sup> , Aliseda A<sup>24</sup> , Morales HG<sup>25</sup> , Lefèvre T<sup>25</sup> , Hodis S<sup>26</sup> , **Al-Smadi YM**<sup>27</sup> , Tran JS<sup>28</sup> , Marsden AL<sup>28</sup> , Vaippummadhom S<sup>29</sup> , Einstein GA<sup>29</sup> , Brown AG<sup>30</sup> , Debus K<sup>30</sup> , Niizuma K<sup>31</sup> , Rashad S<sup>31</sup> , Sugiyama SI<sup>32</sup> , Owais Khan M<sup>33</sup> , Updegrove AR<sup>34</sup> , Shadden SC<sup>34</sup> , Cornelissen BMW<sup>35</sup> , Majoie CBLM<sup>35</sup> , Berg P<sup>36</sup> , Saalfeld S<sup>36</sup> , Kono K<sup>37</sup> , Steinman DA<sup>38</sup> , "Real-World Variability in the Prediction of Intracranial Aneurysm Wall Shear Stress: The 2015 International Aneurysm CFD Challenge," *Cardiovascular Engineering and Technology*, 2018 Sep 10.
14. S. Mutawe, **Yahia M. Al-Smadi**, S., Sodhi, R.S., "Designing Four-bar Linkages for Path Generation with Worst Case Joint clearances," *Engineering Letters*, , Volume 20 Issue 2, Pages 143-147, (2012).
15. **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "On Traveler Braking Mechanism Design with Elastic Deflection and Buckling Considerations," *Journal of Mechanics Based Design of Structures and Machines*, ISSN 15397742, Vol 37, pp. 401–412, (2009).
16. **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "Geared Five-Bar Path Generators with Structural Constraints," *Journal of Inverse Problems in Science and Engineering*, ISSN:17415985, Vol 17:8, pp. 1059–1072, (2009).
17. **Yahia M. Al-Smadi**, Kevin Russell, Wen-Tzong Lee, Raj S. Sodhi "An Extension of An Algorithm for Planar Four-Bar Motion Generation with Optimization," *Journal of Canadian Society of Mechanical Engineers*, Vol. 33:3, pp. 443-458, (2009).



18. **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "Four-Bar Motion Generation with Elasticity Constraints and Optimization," *Journal of Multi-Body Dynamics*, Vol. 223:3, pp. 245-253, (2009).
19. **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "Planar Four-Bar Path Generation with Static Structural Conditions," *JSME – Journal of Advanced Mechanical Design, Systems, and Manufacturing*, ISSN:18813054, Vol 2:5, pp. 926-936, (2008).
20. **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "Planar Four-bar Motion Generation with Static Structural Conditions," *ASME – Journal of Mechanisms and Robotics*, Vol1, (2009).
21. Qiong Shen, **Yahia M. Al-Smadi**, Peter J. Martin, Kevin Russell, Raj S. Sodhi, "An Extension of Mechanism Design Optimization for Motion Generation," *Journal of Mechanism and Machine Theory*, 44, pp.1759–1767, (2009).
22. **Yahia M. Al-Smadi**, Qiong Shen, Kevin Russell, Raj S. Sodhi, "Planar Four-Bar Motion Generation with Prescribed Static Torque and Rigid-Body Reaction Force," *Journal of Mechanics Based Design of Structures and Machines*, 37: 73–85, (2009).
23. Qiong Shen, **Yahia M. Al-Smadi**, Kevin Russell, Raj S. Sodhi, "On Planar Five-Bar Motion Generation with a Driver Torque Constraint," *JSME – Journal of Advanced Mechanical Design, Systems, and Manufacturing*, 2:3, pp. 408-416, (2008).

#### Conference Publications (Refereed)

1. Aviktha Reddy, **Yahia M. Al-Smadi**, "Inverse Dynamic Analysis of Shoulder Muscle Activity During Archery Draw back," Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition, IMECE 2015, Houston, Texas, USA, November 13-19, (2015).
2. Rajan Borse, **Yahia M. Al-Smadi**, "Non-linear Dynamic Response of Thorax to Impulsive Loading of Cardiopulmonary Resuscitation (CPR)," Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition, IMECE 2015, Houston, Texas, USA, November 13-19, (2015).
3. Oruba Rabie, **Yahia M. Al-Smadi**, " Numerical Simulation of Blast Wave Mitigations on RC Buildings via Improved Structural Configuration and Column Cross-Section Properties," Proceedings of the 2013 Structures Congress, Pittsburgh, PA, May 2-4, (2013).
4. Oruba Rabie, **Yahia M. Al-Smadi**, Eric Wolf, " Numerical Simulation on the Performance of Passive Mitigations Under Blast Wave Loading," Proceedings of the 31<sup>st</sup> IMAC, A Conference on Structural Dynamics, 2013, Conference Proceedings of the Society for Experimental Mechanics, (2013).
5. Onur Avci, Ashish Bhargava, Jeremy Isenberg, Peter Feenstra, **Yahia M. Al-Smadi**, "Vibrations Assessment of a Hospital Floor for a Magnetic Resonance Imaging (MRI) Unit Replacement," Proceedings of the 2013 Structures Congress, Pittsburgh, PA, May 2-4, (2013).
6. Omar Awad, Mohamed Harfoush, **Yahia M. Al-Smadi**, "Nonlinear FEA Simulation of Thorax Considering Transient CPR and Sternotomy," Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition, IMECE 2012, Houston, Texas, USA, November 9-15, (2012).
7. Omar Awad, **Yahia M. Al-Smadi**, "Nonlinear FEA Simulation of Thorax Considering Transient CPR and Lateral Forces," Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition, IMECE 2012, Houston, Texas, USA, November 9-15, (2012).
8. **Yahia M. Al-Smadi**, Nedal Sumrien, Omar Awad, Oruba Rabie, "Nonlinear FEA Simulation of Thorax Dynamic Response Under Blast Load," Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition, IMECE 2012, Houston, Texas, USA, November 9-15, (2012).
9. Oruba Rabie, **Yahia M. Al-Smadi**, "Dynamic Response of RC Structures Subjected to Blast Wave Shock Loading," Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition, IMECE 2012, Houston, Texas, USA, November 9-15, (2012).
10. **Yahia M. Al-Smadi**, Omar Awad "Spatial Four-bar Motion Generation With Static Control Condition," Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition, IMECE 2012, Houston, Texas, USA, November 9-15, (2012).
11. **Yahia M. Al-Smadi**, Bhargava, A., Avci, O., Elmorsi, M., "Design of Experiments Study to Obtain a Robust 3D Computational Bridge Model," IMAC XXX A Conference and Exposition on Structural Dynamics , Society for Experimental Mechanics, Inc. Jacksonville, Florida USA, January 30 – February 2, (2012).
12. Mutawe, S., Sodhi, R.S., **Yahia M. Al-Smadi**, "Planar Four-bar Path Generation Considering Worst Case Joint Tolerances," Proceedings of the International Conference on Intelligent Automation and Robotics, San Francisco, USA, October 19-21, (2011).

13. Mutawe, S., Sodhi, R.S., **Yahia M. Al-Smadi**, Bhargava, A., "Planar Four-bar Motion Generation Considering Worst Case Joint Tolerances," Proceedings of the International Conference on Industrial and Mechanical Engineering, Amsterdam, Netherlands, July 13-15, (2011).
14. Mutawe, S., Sodhi, R.S., **Yahia M. Al-Smadi**, Bhargava, A., and Mahgoub M., "Synthesis of Five-bar Motion Generation with Gear Train Fabrication Tolerances," Proceedings of the 13th World Congress in Mechanism and Machine Science, Guanajuato, MÉXICO, June 19–25, (2011).

#### Conference Publications (Non-refereed):

1. **Yahia M. Al-smadi**, Yousef Alostaz, Adib Hamid "ANSYS Non-Linear Multi-staging Technique for Shrink Fit Analysis," Heavy Movable Structures Symposium, Orlando, Florida, October 25-28, (2010).
2. **Yahia M. Al-smadi**, "Computer-Aided Design/Engineering of Trunnion Girder for Water Street Bridge," Heavy Movable Structures Symposium, Orlando, Florida, November 3-6, (2008).
3. **Yahia M. Al-smadi**, Herbert Protin, "The Use of Small-Diameter Sheaves to Bend Wire Rope," Heavy Movable Structures Symposium, Orlando, Florida, November 6-9, (2006).
4. David Thurnherr, Herbert Protin, **Yahia M. Al-smadi**, "Erie Canal Lift Bridges – Historic Towerless Lift Bridges and How They Work," Heavy Movable Structures Symposium, Orlando, Florida, November 6-9, (2006).

#### SEMINARS

- Jordan Armed Forces, "Drones and Electronic Ambush," IQ Defence Countering Drones Middle East, Amman, Jordan, May 2018
- National Agricultural Research Center, " Using Applied Technology to Perform Innovation," Baq'aa-Jordan, September 2018
- Jordan Armed Forces, " High End Analysis Techniques in Studying the Response of Armoured Plates to Mine Blast and High Impulsive Loading," IQ Defence Armoured Vehicle Middle East, April 2017
- First Armour Co., "Ballistic impact and blast wave Effects on Structures," Dulail-Jordan, January 9, 2017
- King Abdullah II Design and Development Bureau, "Investigation of high impulsive loading on Traumatic Brain Injury," Amman-Jordan, January 8, 2017
- King Abdullah II Design and Development Bureau, "High Impulsive Loading Simulations to Solve Complex Structure Design," Dulail-Jordan, January 23rd, 2016
- SPIE Conference, "Modeling and simulation of infrastructure resiliency against man-made hazards," Baltimore, Maryland, USA, 20–24 April 2015
- SPIE Conference, "Understanding the impact of blasts from explosions on MEMS," Baltimore, Maryland, USA, 20– 24 April 2015
- Texas A&M University, "Blast induced Brain Traumatic Injury," Kingsville, TX. April 2015.
- Texas A&M International University, "Best Practices in FEA Simulations," Laredo, TX. November 2014
- Iowa State University, "Mechanism Synthesis with Structural and Tolerance Constraints", Ames, IA. March 2013.
- Texas A&M University – Kingsville, "Special Topics in Computational Mechanics", Kingsville, TX. March 2013.
- The Petroleum Institute, "Fire Dynamics and Survivability", Abu Dhabi, UAE February 2013.
- Binghamton University, "ANSYS and LSDYNA for Nonlinear Structure Response under Ambient and Extreme Impulsive Loading", Binghamton, NY February 2013. Presented in Engineering Week
- Columbia University, "FEA Applications at AECOM and Advances in Mechanism Synthesis", New York, NY December 2012.
- AAAEA-TriState, "Heavy Movable Structures Synthesis Considering Motion and Torque", Newark, NJ, July 2011.
- New Jersey Institute of Technology, "Planar Four-bar Path Generation with Static Structural Conditions", Newark, NJ, October 2008.

#### Honours and Awards

- Professor of the Year, Texas A&M University- Kingsville, May, 2014
- Tau Alpha Pi, National Honor Society, NJIT April 2011
- Tau Beta Pi, Graduate Student Honor Society, NJIT June 2004
- Alpha Epsilon Lambda Chapter, Graduate Student Honor Society, NJIT June 2002
- Dean of College of Engineering Honor List: Fall 1998, and Spring 1999, Jordan University of Science and Technology, Irbid, Jordan.



## **PROFESSIONAL AFFILIATIONS**

1. SAE – Society of Automotive Engineers, February 2014
2. BMES – Biomedical Engineering Society, February 2014
3. ASME – American Society of Mechanical Engineering, February 2006
4. SME – Society of Manufacturing Engineers, April 2006
5. HMS - Heavy Movable Structures, June 2003
6. JEA - Jordan Engineers Association, 1999

## **COURSES TAUGHT**

1. CE906: Computational Mechanics (F20)
2. HSS119A: Entrepreneurship and Innovation (F20,S21)
3. ME305: Applied Math for Engineers (S19-S20)
4. ME211B: Statics(S18,F18)
5. ME433: Machine Design (F17,S18)
6. ESEN 6329: Multiphysics Modeling (F2015)
7. MEEN5318: Advanced Dynamics (S14, Summer15)
8. MEEN5313: Numerical Methods in Mechanical Engineering (F14)
9. MEEN5303: Automation Systems (Sm14, Sm15)
10. MEEN4345: Engineering Vibrations (S14,S15)
11. MEEN4351: Machine Design (F13,15)
12. MEEN3360: Engineering Design and Simulation (S15)
13. MEEN3350: Design of Machine Elements (Fall, Spring, &Summer, 13,14,15)
14. ME433: Vibration Analysis (F10, Summer11)
15. MET415: Automatic Control Systems (S10,11,12,13)
16. MET407: Structural Analysis (F09,10,11)
17. MET303: Applied Thermodynamics (S12)
18. MET302: Design of Machine Elements (S11,12)
19. MECH320: Statics and Mechanics of Materials (F11, S12,13 )
20. MECH236: Dynamics (S10, F10,12)
21. MECH234: Statics (F10)

## **Service Activities (within and outside of the institution)**

Director of Autonomous Platforms Lab (APL), JUST

Youtube: [https://www.youtube.com/channel/UC\\_vUorA2qY1DbAxVraszQwQ](https://www.youtube.com/channel/UC_vUorA2qY1DbAxVraszQwQ)

Facebook: [https://www.facebook.com/APL.Tech/?modal=admin\\_todo\\_tour](https://www.facebook.com/APL.Tech/?modal=admin_todo_tour)

Linkedin: <https://www.linkedin.com/company/autonomous-platforms-lab/?viewAsMember=true>