

# Curriculum Vitae

**Wessam Mahmoud Abdelaziz Mahmoud Hussein**  
**Professor**  
**Head of Mechatronic Engineering Dept.**



**Vice Dean for Society And Environment Affairs**

**Egyptian Academy For Engineering And Advanced  
Technology (EAE&AT)**

Mechatronic system design and applications, Robotics, Quality control and condition monitoring of Mechatronic systems, Statistical multivariate data analysis and applications, Statistical image analysis, Machine Learning and deep learning techniques, CAD/CAM, Thermodynamics.

## CONTENTS

1. Profile.....	2
2. Academic Education. . . . .	3
3. Teaching Experience . . . . .	4
4. Research Experience . . . . .	6
5. Industrial Experience and Training . . . . .	8
6. Publications . . . . .	9
7. Research Interest. . . . .	17



# 1. Profile

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## Profile

I am a research and teaching professional with a wide range of experience in conducting high-quality research, active teaching and course/program design, this is proved by numerous research papers and projects. I am interested in designing courses/programs that contribute to the graduation of engineers who have the required attributes from the professional and industrial bodies. I contribute to undergraduate and graduate teaching in the fields of Mechatronics engineering, microcontroller's technology, robotics, control engineering, PLC, smart sensor engineering, Multivariate latent methods, Deep learning and image analysis. I have experience in industry through 12 years of working as a production engineer.

I supervised 18 graduate programs (13 MSc - 5 PhD) and over 50 undergraduate projects. I am known among my peers to be a supportive man and contribute to administrative work alongside teaching / research activities.

# C.V.

Bachelor of Science/Mechanical Eng. "Military Technical College"	1987 – 1992
<b>Production/Manufacturer Engineer</b>	<b>1992 - 2004</b>
Master courses Mechanical Eng. "Ain Shams University"	1994 – 1995
Master of science Mechanical Eng. "Military Technical College"	1996 - 1999

Philosophy Doctor Mechanical Eng "McMaster University – Canada"	2004 - 2007
<b>Lecturer in Military Technical College</b> "Head of Mechatronic /Printing Department "	<b>2007 – 2014</b>

<b>Post Doctor Fellowship</b> "McMaster University"	<b>2014 – 2015</b>
Lecturer in Military Technical College "Head of Mechatronic /Printing Department "	2015 – 2019
<b>Lecturer in Canadian International College (CIC)</b> "Head of Mechatronic Eng. Department"	<b>2020- 2021</b>

<b>Professor in EAEAT</b> "Head of Mechatronic Eng. Department"	<b>2021- Present</b>
<i>"Vice Dean for Society And Environment Affairs"</i>	

## 2. Academic Education

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### Contact Information

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**Personal Data :** Birth date: July 17, 1969, Alexandria, Egypt.

**Home Address:** 46 Sakr Koraish ,Sheraton Elmatar, Elnozha, Cairo, Egypt

### Education

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**Professor In Mechanical Engineering: 22-8-2022 - Supreme Council of Universities**

**Associate Professor – Military Technical College – November 2015**

**Post Doctor Fellowship: McMaster University, Canada. 2015**  
Supervisor: Prof. WaelEldakkhany .

**Doctor of Philosophy: McMaster University, Canada.2007**

Major: Mechanical Engineering.

Thesis title: "Machining process condition monitoring using multivariate latent variable methods."

Supervisor: Prof. Mo Elbestawi.

**Master of Science: Military Technical College, Cairo, Egypt.1998.**

Major: Mechanical Engineering.

Thesis title: "Detection of engine faults using condition monitoring."

Supervisor: Prof. Imam Morgan.

**Master of Science Courses:, Ain Shams University, Faculty of engineering.1995**

Major: Mechanical Engineering.

**Bachelor of Science:** with Excellent, ***Military Technical College***, Cairo, Egypt.  
1992. Major: Mechanical Engineering.

### 3. Teaching Experience

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- I was the head of Printing/Mechatronic engineering department in Military Technical College for 11 years, and head of Mechatronic Eng. Department in CIC for one year with all the duties of establishing labs, program design , post graduate, researches, teaching and field training.
- Planned the delivery of course materials, assignments, and examination.
- Co-supervised a team of a great number of teaching assistantships in the daily course duties involving labs, sketching tutorials, and grading.
- Utilized collaborative E-learning tools to enhance accessibility to course materials.
- Supervised and guided students in course projects.
- Contribute in establishing of Mechatronics system engineering department.
- Contribute to curriculum design of the Mechatronics system engineering program.
- Establish a complete laboratory facilities for Mechatronics system engineering department.
- Regularly review and update course content and teaching materials, ensuring that they remain up-to-date and relevant, incorporating advances in the subject area and utilizing appropriate technology.
- Organize field trips for department students.
- Contributed in organizing 15 international conferences and attending seven international conferences.

**(1) *Lecturer at Military Technical College (Full time) 2007 – 2019:***

*Head of Printing/Mechatronic Engineering Dept. Military Technical College.*

- Contribute in establishing of Mechatronics system engineering department.

*Under-Graduate Courses:*

- a) Design of printing machines.
- b) Robotics
- c) Mechatronic Systems.
- d) Printing Control Systems.
- e) Engineering experimental design
- f) Theory and Design of Mech. Equip.
- g) Mech. System Design
- h) Mech. Equipment Logistic Eng.
- i) Engineering Drawing

**Graduate Courses:**

- 1- Advanced Topics in Mechatronics.
- 2- Process Analysis Diagnostic and Monitoring and Mechatronic Systems.
- 3-Advanced Topics in Robotic Systems
- 4-Mechatronic Systems
- 5-Mechatronic Control Systems.
- 6-Theory and Design of Mechanical Equipment.
- 7-Mechanical Equipment Logistic Engineering.

**(2) *Lecturer at Arab Academy for science and technology (Part time) 2007 – 2020:***

- a) Introduction to Mechatronics
- b) Mechatronic Systems
- c) Electro-Mechanical Systems

**(3) *Lecturer at Egyptian Russian University (Part time) 2010 – 2016:***

- a) Design of Smart Machines
- b) Robotic Design and Control
- c) SCADA systems
- d) Design of Mechatronic Systems
- e) Embedded System
- f) Sensor Technology
- g) Computer Controlled Experimentation

**(4) *Lecturer at Canadian International College (Part/Full time) 2015 – 2021:***

- a) Introduction to Mechatronic
- b) Design of Mechatronic Systems
- c) Motion Control and Servo Systems
- d) Robotic Engineering
- e) Statistical Process control.

**(5) *Lecturer at MSA Mechatronic Eng. Department (Full time) 2021- 2021:***

- a) Mechatronic System design.
- b) Special Topics in Mechatronic Systems.

**(6) *Lecturer at EAEAT Mechatronic Eng. Department (Full time) 2021- Present:***

- a) Thermodynamics
- b) SCADA systems.
- c) Principles of Mechatronic Systems
- d) Measurements and measuring devices

## **4. Research Experience**

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### **GRADUATE SUPERVISION (18)**

Ph.D. Programs: 5 students

M.Sc. Programs: 13 students

#### **Finished Master Programs (13)**

1- Condition Robot Monitoring Using Multivariate Analysis Techniques.	6- Satellite Health Data Monitoring and Analysis for Space Mission Operation.
2- Mechatronic Design of Pneumatic Control System for a Printing Machine.	7-Mechatronic Systems of Ground Equipment's.
3- Modeling and control of six legged robot.	8-Signal Processing of Mechatronic Systems.
4-Industrial Operation Control Using Statistical Methods.	9-Planning and Scheduling for the tasks of Constellation of LEO Earth Observation Satellite.
5-Investigation of Modern Control Systems in Mechanical Equipment.	10-Satellite Telemetry Data Analysis.
11- Modeling and Control of Search and Rescue Robot .	12-Design and Implementation of Unmanned Robotic Systems
13- Hydraulic control of Mechatronic systems.	

#### **Finished PhD Programs (5)**

1-Monitoring of Satellite Telemetry Data Using Multivariate Latent Methods.

2-Car Cabin Design Using Laser Shadowgraph and Robotics.

3- Application of Mechatronics Monitoring System Using Deep Learning and Network on A Gearbox.

4- Modeling, Design and Control of UAV.

5- Real time Trajectory Tracking Control and path planning of Autonomous Tracked Vehicle .

**Special Research Projects** : Carried out several *governmental projects* using state of the art Mechatronic technologies, namely:

- 1- “Tooth carious detection using laser and Multivariate image analysis”.  
Conducting the tests and made the complete data analysis.
- 2- “Design and implementation of a jamming system on laser systems”  
Design the tests, complete data analysis and designing alarm system and electronic circuit.
- 3- “Design and implementation of a four-engine body”.  
Complete manufacturing of the main body, parameters setting and flying.
- 4- “Design and implementation of a wall painting robot”  
Complete mechanical/ Mechatronic design and implementation
- 5- “Design of chemical detection systems”.  
Made the Image analysis and conducting experimental tests.
- 6- “Laser system design to control flying objects”  
Servo-Control system implementation.
- 7- **Electric Vehicle**. Funded by Academy of Scientific Research and Technology (ASRT)
- 8- Robot Welder (Current project)

## **Under-Grad Activities:**

- 1- Graduation Projects : More than 50 Projects
- 2- Technical Supervisor of Radix team in EVER competition.  
“*Electric Vehicle Rally*”
- 3- Formula Student competition (UK) .



## 5. Industrial Experience

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- A) Manufacturing of automobile spare parts (Radiators, Silencers, engine Repair, batteries..). Production engineer.
- B) Head of quality control and assurance department in automobile spare parts factory.
- C ) Head of a calibration laboratory for automobile parts.
- Worked with project, service, and applications groups to install and support production automation solutions.
  - Carried out projects to launch new products for automotive maintenance and calibration.
  - Conducted cost analysis, and prepared bills of materials for machine tools manufacturing.
  - Developed programs for resource utilization analysis to automate product cost estimation.

## 6. Training

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### *Special Training Courses Attended*

- (1) Environmental management ISO-14000, The American University in Cairo, 1999.
- (2) Non destructive testing, The American University in Cairo, 2003.
- (3) Sensor and data fusion, SPIE course Orlando, Florida, USA 2010.
- (4) Robotic Training on NAO, Aldebaran Robotics, Boston, USA,2012.
- (5) Using Moodle in Teaching and Learning, AAST,2020.
- (6) Effective Teaching Skills, CIC, 2020.
- (7) SIMCA, MATLAB, Python, LabView.
- (8) University Exams and Digital questions banks, Helwan University, FLDC.
- (9) Reference management system & Science research formatting, Helwan University, FLDC.
- (10) MOOCs design and production, Helwan University, FLDC.
- (11) Effective teaching and learning strategies for higher education institutions, National Authority for Quality Assurance and Accreditation of Education.

## Publications

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- **2000**

- (1) W. M. Abdelaziz, H.M. Mahgoub, I.A. Elsherif, "Application of wavelet transform in detection of machine elements faults", Proceedings of the 9<sup>th</sup> Int. AMME Conference, May 2000.
- (2) I.A. Elsherif, H.M. Mahgoub, W. M. Abdelaziz, " Trending of rotary elements using time-scale analysis", Proceedings of the 6<sup>th</sup> Int. AEIC Conference, September 2000.
- (3) W. M. Abdelaziz, H.M. Mahgoub, I.A. Elsherif, E. I. Morgan, "Machine condition monitoring using pattern recognition techniques", Proceedings of the 9<sup>th</sup> Int. AMME Conference, May 2000.

- **2006**

- (4) W.M.Hussein, Veldhuis S.C., Elbestawi M.A., "Tool wear monitoring for next generation e-factory Using Multivariate Statistical Models", Proceeding of the CIRP 2nd International conference on high performance cutting, 2006, Vancouver.

- **2008**

- (5) Wessam Hussein, D. M. Mansour, M. Elbestawe and J.F. McGregor, "Machining Process Planning through Latent Variable Model Inversion", Proceedings of AMME Conference, May 2008.
- (6) E. M. Said, W.M. Hussein, A.M. Salem, Mohamed K.I., " Using Multivariate Latent Models to Monitor a Printing Machine and Predict Machine Failure", Proceedings of AMME Conference, May 2008.

- **2009**

- (7) W. M. Hussein, M. M. El-khatib, A. Y. Elruby and H. M. Haleem, " Quad Rotor Design, Simulation and Implementation", Proceedings of the 1<sup>st</sup> int. conference CSAA-2009.

- **2010**

- (8) A.F. Elsherif, W.M. Hussein and Y.H.Elsharkawy, "Laser-induced thermal imaging for tooth carious detection using multivariate image analysis"Proceedings of SPIE conference August 2010, SPIE Optics and Photonics in San Diego, California, USA.
- (9) Yasser H. Elsharkawy; W. M. Hussein; Mohamed Abbass,"Laser-induced photoacoustic imaging for breast cancer detection using multivariate image analysis", Article 62, Volume 14, 14th International Conference on Applied Mechanics and Mechanical Engineering., Spring 2010, Page 1-12.

- **2011**

- (10)M. M. El-khatib,W. M. Hussein,"Design, Modeling, implementation and Intelligent fuzzy control of a Hovercraft",Proceedings of SPIE conference April 2011,Orlando, Florida, USA.
- (11) M.Ola, W.M. Hussein, I.A. El-Sherif and I.S. Moustafa,"Electro-pneumatic system monitoring using multivariate latent methods", Proceedings of the 14<sup>th</sup> Int. ASAT Conference, May 2011, MTC, Cairo, Egypt.
- (12) K. A. Shaaban, W. M. Hussein, M hegazy and H M Mahgoub, "Buried Object Detection Based on Multivariate Latent Methods", Proceedings of the14<sup>th</sup> Int. ASAT Conference, May 2011, MTC, Cairo,Egypt.
- (13) EzzEldin F. Abdelkawy, Tarek A. Mahmoud, and W.M.Hussein," A new deblurring morphological filter for hyperspectral images ", Proceedings of SPIE conference April 2011,Orlando, Florida, USA.

- **2012**

- (14) M. Sobaih and W.M. Hussien,"Multivariate statistical analysis of fibre laser cutting of mild steel sheets", Proceedings of the15<sup>th</sup> Int. AMME Conference, May 2012, MTC, Cairo,Egypt.
- (15) K. A. Shaaban, W. M. Hussein, M Samir and H M Mahgoub, "Buried Object Detection Based on frequency analysis", Proceedings of the15<sup>th</sup> Int. AMME Conference, May 2012, MTC, Cairo, Egypt.

(16) Rami Shahin, W. M. Hussein, Ashraf Elsherif and H M Mahgoub, “Scoring Models For Process Monitoring in Industry a Mechatronic Application”, Proceedings of the 15<sup>th</sup> Int. AMME Conference, May 2012, MTC, Cairo, Egypt.

(17) Hesham Badr, M. M. El-khatib, W. M. Hussein and H M Mahgoub “Investigation Of Modern Control Algorithms in Mechatronic System”, Proceedings of the 15<sup>th</sup> Int. AMME Conference, May 2012, MTC, Cairo, Egypt.

- **2013**

(18) M.M. Elkhatib and Wessam Hussein, “Stabilization and Design of a Hovercraft Intelligent Fuzzy Controller”, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 2 Issue 12, December – 2013.

- **2014**

(19) W.M. Hussein, I.A. El-Sherif “Health Monitoring of Electro-pneumatic Controlled systems using multivariate latent methods: an experimental validation” SAE journal of Materials and Manufacturing, 2014.

(20) Bassem R. Nassar and W.M. Hussein “A Novel Approach of Health Monitoring and Anomaly Detection Applied to Spacecraft Telemetry Based on PLSDA Multivariate Latent Technique”, The 15<sup>th</sup> International workshop in Education and Mechatronics (REM), IEEE Xplore, 2014, El-Gounah, Egypt.

(21) Onsy Mohamed, Hussein Wessam and Elsherif, I “Development of an Advanced diagnostic system for automotive Mechanical Transmissions”, International Journal of Comadem , Volume 17, issue 2, April 2014.

- **2015**

(22) Bassem R. Nassar and W.M. Hussein “State-of-Health analysis applied to spacecraft Telemetry based on a new projection to latent structure Discriminant analysis algorithm” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA, March 2015, 978-1-4799-5380.

- (23) Bassem R. Nassar, W.M. Hussein and M. Mokhtar “Space Operations Monitoring Based on a new Statistical PCA Algorithm”, Proceedings of the 16<sup>th</sup> Int.ASAT Conference, May 2015, MTC, Cairo,Egypt.
- (24) B. Nassar, W. Hussein, M. Mokhtar “Space Telemetry Anomaly Detection Based on Statistical PCA Algorithm ”World Academy of Science, Engineering and Technology, International Journal of Environmental, Chemical, Ecological, Geological and Geophysical Engineering Vol:9, No:6, 2015.

• **2016**

- (25) A.S. Zaghoul, W.M. Hussein and A. Badawy “DYNAMICS AND MEASURING OF FEET FORCE DISTRIBUTIONS OF SIX-LEGGED ROBOT”, *Proceedings of the 17<sup>th</sup> Int. AMME Conference, 19-21 April, 2016.*
- (26) AymanO.Raslan ,Wessam. M. Hussein and Yasser I. ElShaer”Smart Diagnostic System for Automotive Multistage Mechanical TransmissionsUsing Multi-class Support Vector Machine”, *Proceedings of the 17<sup>th</sup> Int. AMME Conference, 19-21 April, 2016.*
- (27)AymanO.Raslan , Wessam. M. Hussein and Yasser I. ElShaer “Scoring Models for Automotive Multistage Mechanical Transmission Using Principal Component Analysis”,*Proceedings of the 17<sup>th</sup> Int. AMME Conference, 19-21 April, 2016.*
- (28) M.NazeehTawfeek, H.S.Ayoub, Wessam M.Hussein and Yehia H.Hossam“Evaluating in-car design using a novel upgradeable test: The normalized three weight (NTW) index”, *Proceedings of the 17<sup>th</sup> Int. AMME Conference, 19-21 April, 2016.*
- (29) M.NazeehTawfeek, H.S.Ayoub, Wessam M.Hussein and YehiaH.Hossam, “Role of Chromo-Photometry of the vehicle interior lighting in modern automotiveErgonomy”, *Proceedings of the 8<sup>th</sup> Int. ICMEP-7 Conference, 19-21 April, 2016.*
- (30) Bassem R. Nassar and W.M. Hussein “Statistical Learning Approach for Space SystemsHealth Monitoring” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA, March 5-12-2016, 16107486.

(31) A.S. Siam, W.M. Hussein and W.W. El-Dakhakhni “Proposed Multivariate Predictive Approach of Masonry Wall Seismic Performance” Brick and Block Masonry, Proceedings of the 16th International Brick and Block Masonry Conference, Padova, Italy, 26-30 June 2016.

• **2017**

(32) Bassem R. Nassar, W.M. Hussein and M. Mokhtar “Supervised Learning Algorithms for Spacecraft Attitude Determination and Control System Health Monitoring”, IEEE Aerospace and Electronic Systems Magazine, Volume 32, Issue 4, 26-39, 2017.

(33) Ahmad Al-Zaidy, Wessam M. Hussein and Ibrahim Elsherif, “Novel Approach of Satellite Health Monitoring, Diagnosis and Prediction via PLS Batch Modeling” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA,,MARCH 4-11, 2017.

(34) Bassem R. Nassar ,W.M. Hussein and Mahmoud Sayed “Classification of Multi-failure Mechanisms in Space Operations Using Novel PLS-DA Approach” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA, March 4-11-2017.

(35) A.S. Siam, W.M. Hussein and W.W. El-Dakhakhni “Scoring Models for Reinforced Concrete Block Shear Wall Maximum Displacement Prediction Under Seismic Loads”. Journal Elsevier, engineering Structures, 2017.

(36) Wessam M.Hussein, M.NazeehTawfeek and Mahmoud Sayed“Investigation of Drivers FOV and related Ergonomics using laser shadowgraphy from automotive interior”, *Journal of Ergonomics,doi: 10.4172/2165-7556.1000207* 2017.

(37) Mahmoud Sayed and Wessam M.Hussein,”Monitoring of automotive multistage mechanical transmissions using multi-class support vector machine”, Journal of Engineering Science and Military Technologies, Volume 1, Issue 1, January 2017, 38-43.

• **2018**

(38) Ahmad Al-Zaidy, Wessam M. Hussein and Mahmoud Sayed, “Data Driven Models for Satellite State-of-Health Monitoring and Evaluation” International Journal of Robotics and Mechatronics, 2018.

(39) Hany S. Ayoub, M. Nazeeh, Wessam M. Hussein, Ashraf F. El-Sherif,”Equi- radial Vehicular Laser Shadowgraphy”, Proceeding of the 9<sup>th</sup> International Conference on Mathematics and Engineering Physics. 3-5 April 2018, Cairo,Egypt.

- (40) Sameh Ibrahim ,W.M. Hussein and M. Atef “Dynamic Modeling and Control of the Hexapod Robot Using MATLAB SIM-Mechanics”  
Proceedings of ASME 2018 International Mechanical Engineering Congress and Exposition, IMECE2018, November 9-15, 2018, Pittsburgh, PA, USA

• **2019**

- (41) Mohamed A Galal, Wessam M Hussein, Ezz El-din Abdelkawy, “Satellite battery sensor values prediction using Bayesian ridge regression models”  
ASAT-Aerospace conference, Cairo, Egypt, April 2019. IOP Conference Series: Materials Science and Engineering
- (42) M Galal ,W.M. Hussein and Mahmoud Sayed “Satellite Battery Health Monitoring Using Naïve Bayesian Classifier” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA, March 2019.
- (43) Ahmed Hassan ,W.M. Hussein and Ehab Abouobaia “A Deep Learning Framework for Automatic Airplane Detection in Remote Sensing Satellite Images” IEEE-Aerospace conference, Yellowstone conference center, big sky, Montana, USA, March 2019.
- (44) Ahmad Mansour, Ahmed Hassan, Wessam M Hussein, Ehab Said “Automated vehicle detection in satellite images using deep learning”  
ASAT- Aerospace conference, Cairo, Egypt, April 2019. IOP Conference Series: Materials Science and Engineering.
- (45) HS Ayoub, M NAzeeH, WM Hussein, A el-SHerif, YH ELBASHAR, “A Brief Study of Equiradial Automotive Visual Vehicular Using Laser Shadowgraphic System”, Nonlinear Optics, Quantum Optics: Concepts in Modern Optics,vol.51, 2019
- (46) Mahmoud M.A. Sayed<sup>1</sup>, Marwa S. Shalaby<sup>2</sup>, Wafa Rady<sup>1</sup>, Wessam Hussien<sup>3</sup>, Mohamed Magdy<sup>1</sup>, K. El-Sabagh<sup>1</sup>, A. Mohamed<sup>1</sup>, A. Nour Eldin<sup>1</sup>, F. Maher<sup>1</sup> and M. Osama<sup>1</sup> , “Design of HHO Cell as Energy Source for Electric Vehicles”, IOP Conference Series: Materials Science and Engineering, Volume 610, conference 1, 2019.
- (47) Ahmed Hamed, Ahmed Badawy, Adel A Omer, Mahmoud Ashry, Wessam M Hussein Multiple Debris Orbital Collision Avoidance 2019 IEEE Aerospace Conference, 2019

- (48) Hossam Saudi, Wessam M Hussein, Ehab Said, Ahmad M Al-Zaidy, "Novel Approach of Satellite Health Evaluation via Convolutional Neural Network", IEEE International Conference of Vehicular Electronics and Safety (ICVES), 2019.
- (49) Ahmad Mansour, Wessam Hussein and Ehab Said," Small Objects Detection in Satellite Images Using Deep Learning", Ninth International Conference on Intelligent Computing and Information Systems (ICICIS), 2019.

- **2020**

- (50) Ahmed Sabiha, Mohamed Atef. Kamel, Wessam Mahmoud. Hussein, "Trajectory Generation and Tracking Control of an Autonomous Vehicle Based on Artificial Potential Field and Optimized Backstepping Controller", 12th International Conference on Electrical Engineering (ICEENG), 2020.
- (51) HS Ayoub, WM Hussein, A el-SHerif and YH ELBASHAR," Design and Test of High Efficiency Dual Element Laser Diffuser for Large Field Automotive Shadowgraphy". Journal of Optics. 2020

- **2021**

- (52) HS Ayoub, WM Hussein, "Investigation of Automotive Digital Mirrors Ergonomics Through Laser Shadowgraphy and Driver's Real Road Test Questionnaire, Journal of Optics, Volume 50, Issue1, Pages 95-108, Publisher Springer India, 2021.
- (53) Mohamed Sh., Sameh Beaber, Ehab Said, Wael Elmayyah and Wessam Hussein, "Indoor path-planning for a tracked mobile robot using Dijkstra's algorithm and Ros". Proceedings-of-spie on 17 Jun 2021.
- (54) Sameh Beaber, Abdelrahman Zagloul, Mohamed Kamel, and Wessam Hussein, "Dynamic modeling and real-time evaluation of reaction forces and torques of hexapod robot". Unmanned Systems Technology XXIII, Volume 11758, Pages 1175808. Proceedings-of-spie on 17 Jun 2021.
- (55) ) Ahmed Sabihaa, Mohamed Kamel, Ehab Said and Wessam Hussein "Dynamic modeling and optimized trajectory tracking control of an autonomous tracked vehicle via backstepping and sliding mode control", Journal of Systems and Control Engineering, 2021.
- (56) Waleed M.Taha, Wessam Hussein, Abdulaziz Morgan, "Hydraulic Control For Mechatronics Systems: An Experimental validation". International Journal of



- (57) S. Salah , K. El Telbany ,B. Samy , A. Khalil ,K. El-Ganzoury , Wessam Hussien and Mostafa Yacoub, “ Design of Light Weight-Low Cost Remotely Operated Underwater Vehicle” , IDETC/CIE ASME , AVT-08-03 Advances in Intelligent Vehicles, virtual conference , 2021.
- (58) Wessam Hussein, Shaimaa M Maged, Sherif Sabry, Omar Ali Abobakr, Mazen Amr Mustafa, Ahmed Essam Dakroury, Essam Morsy, “Modelling, Simulation, and Implementing ROS for Autonomous Navigation of Tracked Robot”, International Journal of Advances in Scientific Research and Engineering (ijasre). Volume 7, Issue 6, Pages 1-13. 2021.

- **2022**

- (59) Ahmed Sabihaa, Mohamed Kamel, Ehab Said and Wessam Hussein " Path Planning Algorithm Based on Teaching-Learning-Based-Optimization for an Autonomous Vehicle ", Journal of Communications - Scientific Letters of the University of Zilina, issue 2, 2022.
- (60) Mohamed Sh. Khadr, Ehab Said, Wael M. Elmayyah, Wessam Hussein, “Risk-informed path planning on uneven multi-terrain environments”. Proceedings-of-SPIE on 5 April 2022.**
- (61) Ahmed Sabihaa, Mohamed Kamel, Ehab Said and Wessam Hussein, “A Comprehensive Modeling, Simulation, and ROS-Implementation for Trajectory Tracking Control with a Comparative Study”, Journal of Robotics and Autonomous Systems, Elsevier. 2022**
- (62) Ahmed Sabihaa, Mohamed Kamel, Ehab Said and Wessam Hussein, “Real time Path Planning for autonomous tracked vehicle Based on Teaching-Learning-Based-Optimization”, journal of intelligent service robotics, springer. 2022**

- **2023**

- (63) Sameh Beaber, Abdelrahman Zagloul, Mohamed Kamel, and Wessam Hussein “Trajectory Generation of Hexapod Robots Based on Genetic Algorithm”, In the 1st Intelligent Methods, Systems, and Applications (IMSA 2023) International Conference, 15-16 Jul. 2023, Giza, Egypt2023.**

**Books:**

- (1)** Wessam M.Hussein, M.NazeehTawfeek and Hany Ayoub, “Car Cabin Design using Robotics and Laser Shadowgraphy”, LAP LAMBERT Academic Publishing, Omni Scriptum Group, ISBN: 978-620-2-05274-0, 2017.

**RESEARCH INTERESTS**

The subject of my doctoral research is condition monitoring of machining processes. In particular, I have investigated the issues of automation, and measurement data analysis. I have presented a new approach to the lean manufacturing. This approach utilizes the multivariate latent methods for data analysis and decision making about the state of different manufacturing machines. I based my work on the theoretical understanding of the manufacturing processes and measurement processes and related data driven approaches. I demonstrated the application of this work using different milling machines.

My doctoral research work lends itself to a wide variety of areas which includes, but is not limited to, biomedical, aerospace, and automotive applications. I intend to extend the work which I developed in my Ph.D. research, as well as pursue research work in the broad areas of Mechatronic field. I published many papers in the field of satellite telemetry data analysis.

I have been exposed, throughout academic and professional career, to several problems in the Mechatronic systems design and implementation and big data analysis.

**Future Research Pursuits**

The major factors necessary for the success of research in engineering are: theoretical fundamentals, focus, application, and continuation. In addition to extending my doctorate research, I am interested in pursuing research in the following areas:

***Mechatronic system design and applications, Robotics, Quality control and condition monitoring of Mechatronic systems, Statistical multivariate data analysis and applications, Statistical image analysis, Machine Learning and deep learning techniques.***

**Approach to Research**

I believe that research in engineering has to satisfy, and balance three major goals: 1) expand the fundamental knowledge, 2) solve practical problems, and 3) help researchers develop valuable skill set. I will bear these goals in mind when planning my future research pursuits, especially these which involve graduate students. I will work hard to ensure the continuation, and focus of the research projects. Furthermore, I will ensure that the researchers will develop a valuable skill set. Last, but not least, published research is an essential component in the life of a faculty member, and a graduate student. I will plan my research work such that it has potential for publication, both in journals and conferences.