# NUMAN SAEED

## Senior Analytics Specialist


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## EDUCATION

### Deep Learning Specialization

**Deeplearning.ai**

Nov. 2017 – Apr. 2018  Online

*Courses:*

- Neural Networks and Deep Learning
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
- Structuring Machine Learning Projects
- Convolutional Neural Network
- Sequence Models

### Master of Science (MSc) - MicroSystems Engineering

**Masdar Institute (In Collaboration with MIT), Khalifa University of Science and Technology**

Jan. 2015 – Dec. 2016  Abu Dhabi, UAE

- *Thesis Title:* **Characterization of Piezoelectric Micromachined Ultrasonic Transducers in Electrical, Mechanical and Acoustic Domains.**
- *Sponsors and Collaborators:* **Global Foundries, Mubadala.**
- *Awards:* **Full Scholarship for two years of MSc. degree program.**

### Bachelor of Science (B.Sc.) - Electrical Engineering

**National University of Computer and Emerging Sciences**

Aug. 2009 – June 2013  Islamabad, Pakistan

- *Thesis Title:* **Power Generation using Speed Breakers**
- *Accolade:* **Graduated among the top 5% of my class.**
- *Awards:* **Awarded Gold Medal, Silver Medal and Bronze Medal in semesters of Fall 2011, Spring 2012 and Fall 2012 respectively. Inscribed five time in Dean's list of Honors and once in Rector's list of Honors.**

## RESEARCH EXPERIENCE

### Research Assistant

**Electrical and Computer Engineering**
**New York University Abu Dhabi**

July 2019 - Sept. 2019

- Literature review on modeling human motor skills
- Investigated the theory behind reinforcement learning and its use in modeling motor skills.
- Explored dynamic programming in the context of reinforcement learning

## MY LIFE PHILOSOPHY

*"No two things have been combined better than knowledge and patience."*

## MOST PROUD OF

**Deep Learning Specialization**
Deeplearning.ai

**Python 3 Programming**
University of Michigan

**Founder of**
FAST Engineering society which organized tech-talks and workshops

**Book Reader**
History, Philosophy and Science are my favorite topics

## STRENGTHS

**Programming and Frameworks:** SQL, Tesnorflow, Keras, Python, PyTorch, C++, Matlab, Verilog, HTML, Java, JavaScript

**Design Tools:** Microsoft Power BI, Microsoft Office, Arduino, Comsol, Mems+, PZFlex, AIMMS, PSpice, Cadence Virtuoso, ModelSim, LabView, AutoCad

**Equipment:** Haptic Controller Device, 3d Printing, Dynamic Signal Analyzer, Digital Holographic Microscope, Scanning Electron Microscope (SEM), ABB Robotic Arm, Wire Bonder, Impedance and Network Analyzers

### Research Engineer

Microsystems Engineering
Khalifa University of Science and Technology

Feb. 2019 - Jun. 2019

- Detection of ultrasound-based hacking attacks on gyroscope devices using Machine Learning.
- Design MEMS devices (accelerometers and gyroscopes) for space-related applications
- Perform mechanical and electrical characterization on the fabricated accelerometers and gyroscopes.

### Research Engineer

Industrial and Systems Engineering
Masdar Institute, Khalifa University of Science and Technology

Jun. 2017 - Jan. 2019

- Carried out multidisciplinary research work on the problem of ***infrared based Non-Destructive Testing of composite structures***.
- Employed Convolutional Neural Networks (CNN) to automatically detect defects in composite structures through thermogram images.
- Used Deep Feed Forward (DFF) Neural Networks for estimating the defects depth in composites.
- Attained enhanced images for defect and porosity detection using PCA.
- Designed and printed 3D composite structures
- Collaborated with our industrial partner, ***Strata Manufacturing***
- Handled the project from planning to design and testing the final working prototype.
- Prepared and presented weekly and quarterly reports to the supervising committee.
- Supervised graduate students who are working on this project.

### Research Assistant/Engineer

Electrical and Computer Engineering
Masdar Institute, Khalifa University of Science and Technology

Jan. 2015 - May 2017

- Conducted simulation and characterization of a MEMS device called Piezoelectric Micromachined Ultrasonic Transducers (PMUTs)
- Worked on both low and high frequency PMUTs used in gesture recognition and fingerprint identification respectively.
- Developed the experimental characterization setup for the mechanical, electrical and acoustic domains.
- Collaborated with our industrial partners from ***Global Foundries and IME Singapore***.
- Assessed the quality of fabrication procedures.
- Studied the fabrication variation along different PMUT chips.
- Designed the driving circuitry for an array of low frequency PMUT devices.
- Prepared reports and summarized the findings of our measurements for the industrial collaborators.

## LANGUAGES

**English** ●●●●●

**Urdu** ●●●●●

**Pashto** ●●●●●

**Arabic** ●●○○○

## TEST SCORES

**GRE (*General*)**
***Quantitative:*** 162
***Verbal:*** 152
***Analytical:*** 3.5

**IELTS (*Academic*)**
***Overall Band:*** 7.5

## PROJECTS

**Defect Detection and Depth Estimation**
Utilized CNN to detect and locate defects in thermograms of a composite structure. Used DFF Networks to estimate the depth of the located defects.

**Jazz music using LSTM Network**
Trained an LSTM network model with Jazz music pieces to make it capable of producing and generating its own jazz music with deep learning.

**Object Detection and Identification**
Used CNN to detect objects and identify them during a live mode video taping in Tensorflow.

**Reinforcement Learning in a video game**
Trained agent (player) to play and win a video game using reinforcement learning algorithms.

**Car detection with YOLO**
Use object detection algorithms and CNN on a car detection dataset to locate possible bounding boxes around car objects in the given images.

**Screen-printed electronics**
Screen-printed passive circuit elements. Electrical characterization of the elements. Incorporating spiral printed inductors in wireless power transfer application.

### Research Assistant

**Electrical and Computer Engineering**
**Comsats Institute of Information Technology**

Oct. 2013 - April 2014

- Assessed the reliability of RFID tags by using MIMO techniques in a unique way.
- Planned to increase the range of passive RFID tag by allowing multiple RFID tags to respond at the same time.
- Explored to beam-form using multiple RF antenna's and send narrow beams in a controlled direction.
- Prepared a research proposal to secure funds for this project.

## PROFESSIONAL EXPERIENCE

### Senior Analytics Specialist

**Etihad Airways**

Oct. 2019 - Present

- Time Series based forecasting for Passenger bookings and Ancillary Revenue using Classical methods, CNN and LSTM
- Targeted Excess Baggage advertising using Machine learning.
- Leveraging advanced analytical skills to analyze and visualize Etihad's enterprise data resources.
- Identify opportunities for automation and improvements in each analysis performed
- Working with the Team Leader Analytics and/or Business Translator to analyze requirements and design solutions
- Execute complex, ad-hoc analyses utilizing Etihad's wider analytical toolkit proactively looking for further insights and root cause
- Develop and maintain proficiency with advanced analytic and database tools, in-house data sets, and other resources
- Summarize and visualize results and highlight likely insights for the business translator
- Maintain documentation repository of solutions, to include methodology

## TEACHING EXPERIENCE

- Teaching assistant for "Programming for Engineers I" course at FAST-NUCES, in 2009
- Teaching assistant for "Object Oriented Programming" course at FAST-NUCES, in 2010
- Teaching assistant for "FPGA" course at NUCES, in 2013
- Teaching assistant for "Circuit Analysis-II" course at COMSATS, in 2014
- Founded a YouTube channel to teach programming related topics in local language (Urdu).

**Daily Operation of Wind-Hydro Plant**
Optimization the performance of the power plant. Maximize the profit of wind Generation Company by Combined wind-hydro (W-H) facility. Stochastic programing and Robust Optimization techniques were used.

**3D Printed Carbon Composite Structure**
Printed composites with defects using 3D printer. Evaluated with pulsed and lock-in thermography.

## REFEREES

**Prof. Dr. Mohammed A. Omar**
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**Prof. Dr. Ibrahim Elfadel**
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**Dr. Naveed Aman**
@ National University of Singapore
dcsmnam@nus.edu.sg

**Prof. Dr. Mahmoud Rasras**
@ New York University
mrasras@nyu.edu

# PUBLICATIONS

## Journal Articles

[1] A.O. Chulkov, S. Sfarra, **Numan Saeed**, J. Peeters, Ibarra-Castanedo C., G. Gargiulo, G. Steenackers, X.P.V. Maldague, M.A. Omar, and V. Vavilov. "Evaluating quality of marquetries by applying active IR thermography and advanced signal processing". In: *Journal of Thermal Analysis and Calorimetry* (2020), pp. 1–14.

[2] **Numan Saeed**, Nelson King, Zafar Said, and Mohammed A Omar. "Automatic Defects Detection in CFRP Thermograms, using Convolutional Neural Networks and Transfer Learning". In: *Infrared Physics & Technology* (2019), p. 103048.

[3] AO Chulkov, DA Nesteruk, VP Vavilov, AI Moskovchenko, **Numan Saeed**, and M Omar. "Optimizing input data for training an artificial neural network used for evaluating defect depth in infrared thermographic nondestructive testing". In: *Infrared Physics & Technology* (2019), p. 103047.

[4] **Numan Saeed**, Houda Al Zarkani, and Mohammed A Omar. "Sensitivity and Robustness of Neural Networks for Defect-Depth Estimation in CFRP Composites". In: *Journal of Nondestructive Evaluation* 38.3 (2019), p. 74.

[5] Wajih U Syed, Boo Hyun An, Waqas Gill, **Numan Saeed**, Muneera S Al-Shaibah, Sultan Al Dahmani, Daniel S Choi, and Ibrahim M Elfadel. "Sensor Design Migration: The Case of a Vibrating Ring Gyroscope". In: *IEEE Sensors Journal* (2019).

[6] **Numan Saeed**, Yusra Abdulrahman, Saed Amer, and Mohammed A Omar. "Experimentally validated defect depth estimation using artificial neural network in pulsed thermography". In: *Infrared Physics & Technology* 98 (2019), pp. 192–200.

[7] **Numan Saeed**, Mohammed A Omar, and Yusra Abdulrahman. "A Neural Network Approach for Quantifying Defects Depth, for Nondestructive Testing Thermograms". In: *Infrared Physics & Technology* (2018).

[8] **Numan Saeed**, Mohammed A Omar, Yusra Abdulrahman, Sultan Salem, and Ahmad Mayyas. "IR Thermographic Analysis of 3D Printed CFRP Reference Samples with Back-Drilled and Embedded Defects". In: *Journal of Nondestructive Evaluation* 37.3 (2018), p. 59.

[9] "MEMS Multi-Vibrating Ring Gyroscope for Space Applications". In: *Microsystem Technologies* (2020 (Accepted)).

## Conference Proceedings

[10] Alabi Bojesomo, **Numan Saeed**, and Ibrahim M Elfadel. "A multiband RF MEMS switch with low insertion loss and CMOS-compatible pull-in voltage". In: *2018 Symposium on Design, Test, Integration & Packaging of MEMS and MOEMS (DTIP)*. IEEE. 2018, pp. 1–4.

[11] Shadi Khazaaleh, **Numan Saeed**, Inas Taha, Mateusz T Madzik, and Jaime Viegas. "Piezoelectric micromachined ultrasonic transducers and micropumps: from design to optomicrofluidic applications". In: *Microfluidics, BioMEMS, and Medical Microsystems XV*. vol. 10061. International Society for Optics and Photonics. 2017, 100610S.

[12] J Tillak, **Numan Saeed**, S Khazaaleh, and J Viegas. "pMUT+ ASIC integrated platform for wide range ultrasonic imaging". In: *Photons Plus Ultrasound: Imaging and Sensing 2017*. Vol. 10064. International Society for Optics and Photonics. 2017, 100644W.

[13] MS Javaid, **Numan Saeed**, AT Al-Awami, and Zorays Khalid. "Stochastic versus Robust Optimization of wind-hydro power plant's operational strategy". In: *Multi-Topic Conference (INMIC), 2016 19th International*. IEEE. 2016, pp. 1–5.

[14] Shahzad Muzaffar, **Numan Saeed**, and Ibrahim M Elfadel. "Automatic protocol configuration in single-channel low-power dynamic signaling for IoT devices". In: *Very Large Scale Integration (VLSI-SoC), 2016 IFIP/IEEE International Conference on*. IEEE. 2016, pp. 1–6.

[15] M Behzad, Nadeem Javaid, A Sana, Mahmood Ashraf Khan, **Numan Saeed**, Zahoor Ali Khan, and Umar Qasim. "Tsddr: Threshold sensitive density controlled divide and rule routing protocol for wireless sensor networks". In: *Broadband and Wireless Computing, Communication and Applications (BWCCA), 2014 Ninth International Conference on*. IEEE. 2014, pp. 78–83.