



## CURRICULUM VITAE

**NIZAR TAYEM, Ph.D.**

Assistant Professor  
Electrical Engineering Program  
Department of Engineering and Technology  
Texas A&M University-Commerce  
Commerce, Texas 75429

### EDUCATION

**Ph.D., in Electrical Engineering**, Wichita State University, Wichita, KS-US, (2001- 2005)  
GPA: 3.95/4.0

**MS in Physics and Electronics**, Al-Najah National University, Palestine (1996- 1998)

**BS in Physics and Electronics**, Al-Najah National University, Palestine (1991-1995)

### ACADEMIC APPOINTMENTS

<b>Assistant Professor</b> Electrical Engineering program Department of Engineering and Technology Texas A&M University-Commerce, TX	<b>July 2018-Present</b>
<b>Chair of Electrical Engineering Department and Assistant Professor</b> Electrical Engineering department Prince Mohammed bin Fahd University Al-Khobar, Saudi Arabia	<b>Jan. 2010 – Jun 2018</b>
<b>Visiting Assistant Professor</b> Electrical and Computer Engineering Miami University, Ohio	<b>Aug. 2008 - Oct. 2009</b>
<b>Faculty of Communication and Electronics Engineering</b> ITT Technical Institute Electrical and Computer engineering Owings Mills, MD, USA	<b>Sep. 2007 - Aug. 2008</b>
<b>Postdoctoral Researcher Follow</b> Electrical and Computer Engineering department Louisiana State University Louisiana, USA	<b>July 2006 - Aug. 2007</b>

**Visiting Assistant Professor**

Electrical and Computer Engineering department  
West Virginia University Institute of Technology  
West Virginia, USA

**Oct. 2005 - May 2006****Senior RF Engineer**

Sprint Nextel Communication  
Ft. Lauderdale, Florida, USA

**April 2005 – Oct. 2005****Graduate Research Assistant**

Electrical and Computer Engineering Department  
Wichita State University, Wichita, KS  
Kansas, USA

**Aug. 2001 – Mar. 2005****ADMINISTRATIVE POSITION**

Chair of Electrical Engineering department, Prince Mohammad Bin Fahd University, KSA

**Jan. 2010 – Jun.2018****MAJOR INDUSTRIAL RESEARCH PROJECTS**

- Smart Antenna for Future US Army Frequency-Hopping Communications Systems,” US Army Research under State of Kansas Defense Experimental Program to Simulate Competitive Research (DEPSCoR)
- DOA Estimation scheme for wireless communication, US Army Research Laboratory, USA
- DOA Estimation and Downlink Beam Study for 3GPP,” Samsung Electronics Co., LTD, Information and Telecommunication R&D Center
- Developed algorithms for WCDMA TDD Mode for Samsung Electronics
- Proposed and implemented Unitary Root Music and Unitary Music with real valued Rank Revealing Triangular factorization algorithm for Wright-Patterson Air Force Base, USA
- Real time implementation for Direction of arrival estimation (DOA) Hardware implementation using FPGA for Direction of arrival estimation (DOA) proposed methods
- Developed an algorithm for Time of arrival estimation (TOA)
- Developed and proposed many algorithms in one dimensional and multidimensional array signal processing for parameter estimation

**TEACHING EXPERIENCE**

- Teaching The EE Curriculum that has been developed by Texas International Education Consortium (TIEC)
- More than ten years of teaching experience in universities
- Received excellent student evaluation (avg. 4.8/5)
- Taught courses and laboratories in different areas of electrical engineering

<b>Prince Mohammad bin Fahd University</b>	
EE Senior Design Project I & II	Advanced Applied Mathematics
Wireless Communication systems	Control Systems
Digital Communication Systems( <b>with Lab</b> )	Probability and Random Signal Analysis
Electromagnetic Field and Waves	Electric Circuits I ( <b>with Lab</b> )
Digital Signal Processing ( <b>with Lab</b> )	Electric Circuit II ( <b>with Lab</b> )
Communication System ( <b>with Lab</b> )	Electronics I & Electronics II ( <b>with Lab</b> )
Digital System ( <b>with Lab</b> )	LabVIEW and MATLAB Programming
Sensor and Instrumentation ( <b>with Lab</b> )	Signals and Systems
Electric Machinery	Microprocessor and Microcontroller ( <b>with Lab</b> )
<b>Miami University , OHIO, USA</b>	
Digital switching ( <b>with Lab</b> )	Circuit Analysis I ( <b>with Lab</b> )
Local Area Network ( <b>with Lab</b> )	Circuit II
<b>West Virginia University , WEST VIRGINIA, USA</b>	
Introduction to communication system ( <b>with Lab</b> )	Digital Signal Processing ( <b>with Lab</b> )
Electric Circuit 1 ( <b>with Lab</b> )	Circuit II ( <b>with Lab</b> )
<b>ITT Technical Institute , MARYLAND , USA</b>	
Network Standards and Protocols	Electronics I & II ( <b>with Lab</b> )
Network Management	Circuits I & II ( <b>with Lab</b> )
Electronics Communication system I ( <b>with Lab</b> )	Programmable logic control
Data and computer Communication ( <b>with Lab</b> )	Microprocessor ( <b>with Lab</b> )
Electronics Communication System II ( <b>with Lab</b> )	Digital Systems ( <b>with Lab</b> )

## **SENIOR DESIGN PROJECTS**

- Supervised more than 30 senior design projects in the areas of Communication System, Electronics, Power System, and Control System
- Teaching senior design project course for more than 8 years

### **Samples of senior design projects I supervised:**

- ❖ Obstacle Avoidance & Navigational Autonomous Robot
- ❖ Remote weather station
- ❖ Peer to Peer Communication for Robotics System
- ❖ Performance Analysis and Implementation of Maximal Ratio Combining Using NI PXI System
- ❖ Off Grid On Demand Street Light System
- ❖ Smart Home Monitoring and control
- ❖ Smart Parking System
- ❖ Autonomous Quadcopter
- ❖ Remote Controlled Submarine
- ❖ Power Management System
- ❖ Motor Fault Detection
- ❖ Child Seat Safety System
- ❖ Lifeguard boat
- ❖ Wireless Charger

### **HARDWARE/SOFTWARE ELECTRICAL ENGINEERING LABRATORIES ESTABLISHMENT:**

Established the following Electrical Engineering laboratories at PMU:

<b>LAB NAME</b>	<b>LINKS</b>
General purpose Computer Lab	<a href="http://www.pmu.edu.sa/PDF/Viewer.aspx?ID=316">http://www.pmu.edu.sa/PDF/Viewer.aspx?ID=316</a>
Electronics Lab	<a href="http://www.pmu.edu.sa/PDF-HTML/Electronics%20Lab/Electronics_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Electronics%20Lab/Electronics_Lab-1.html</a>
Electric Circuits Lab	<a href="http://www.pmu.edu.sa/PDF-HTML/Electric%20Circuits%20Lab/Electric_Circuits_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Electric%20Circuits%20Lab/Electric_Circuits_Lab-1.html</a>
Process Control Lab	<a href="http://www.pmu.edu.sa/PDF-HTML/Process%20Control%20Lab/Process_Control_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Process%20Control%20Lab/Process_Control_Lab-1.html</a>
Data Acquisition Lab	<a href="http://www.pmu.edu.sa/PDF-HTML/DAQ%20Lab/DAQ_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/DAQ%20Lab/DAQ_Lab-1.html</a>
Automatic Controls Lab	<a href="http://www.pmu.edu.sa/PDF/Viewer.aspx?ID=314">http://www.pmu.edu.sa/PDF/Viewer.aspx?ID=314</a>
Sensors & Instrumentation Labs	<a href="http://www.pmu.edu.sa/PDF-HTML/Sensors%20and%20Instrumentation%20Lab/Sensors%20and%20Instrumentation%20Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Sensors%20and%20Instrumentation%20Lab/Sensors%20and%20Instrumentation%20Lab-1.html</a>
Robotics & Embedded Systems Labs	<a href="http://www.pmu.edu.sa/PDF-HTML/Embedded%20Systems%20and%20Robotics%20Lab/Embedded_Systems_and_Robotics_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Embedded%20Systems%20and%20Robotics%20Lab/Embedded_Systems_and_Robotics_Lab-1.html</a>
Digital Systems and Microprocessors Labs	<a href="http://www.pmu.edu.sa/PDF-HTML/Digital%20Systems%20Lab/Digital_Systems_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Digital%20Systems%20Lab/Digital_Systems_Lab-1.html</a>
Communications & Signal Processing Lab	<a href="http://www.pmu.edu.sa/PDF-HTML/Communications_Lab/Communications_Lab-1.html">http://www.pmu.edu.sa/PDF-HTML/Communications_Lab/Communications_Lab-1.html</a>

Electrical Machinery Lab

[http://www.pmu.edu.sa/PDF-HTML/Electric%20Machinery%20Lab/Electric\\_Machinery\\_Lab-1.html](http://www.pmu.edu.sa/PDF-HTML/Electric%20Machinery%20Lab/Electric_Machinery_Lab-1.html)

**Developed the Following Undergraduate Courses and Lab Manuals:**

- Digital Communication System
- Communication System
- Probability and Random Process
- EE Senior Design Project
- Lab Manual for Communication System
- Lab Manual for Sensor and Instrumentations
- Lab Manual for Digital Communication Systems
- Lab Manual for Circuit I

**Developed the following Graduate Courses:**

- EEEN5352 Digital Control Systems (MS)
- EEEN 5321 Digital Communication Systems (MS)
- EEEN 6322 Cellular Communication Networks (MS)
- EEEN 6323 Advance Wireless Communication (MS)
- EEEN 6332 Adaptive Signal Processing (MS)
- EEEE 6333 Information Theory and Coding (MS)

## **HARDWARE SKILLS**

- National Instruments (NI) compactDAQ
- NI myRIO
- NI CompactRIO Controller
- NI PXIe-5652, PXIe-5601, PXIe-5622, PXIe 7965, LabVIEW, LabVIEW FPGA Module
- Intel, Motorola, and Atmel Microcontrollers
- NI Universal Software Radio Peripheral (USRP)

## **COMPUTING SKILLS**

- C, MATLAB/ Simulink, Pspice,
- MULTISIM, TINA
- LabVIEW, FPGA
- Operating Systems: Windows
- Microsoft Word, Power Point, Excel, Visio

## **ABET TRAINING AND CERTIFICATES**

- Attended workshop organized by The institute for the Development of Excellence in Assessment Leadership (IDEAL) MD, USA
- Attended Program Assessment Workshop (Oregon, USA)

## **ACCREDITATION (ACHIEVEMENTS)**

- Led and achieved ABET accreditation for Electrical Engineering department for the first time for full six years till 2022.
- Led the department effort in achieving NCAAA institutional accreditation

## **EE PROGRAM ASSESSMENT (ABET ACCREDITATION)**

- Developed a number of assessment tools, rubrics, and surveys for direct and indirect assessment; defined the continuous improvement process for the EE department
- Developed Student Outcome Assessment Report (SOAR) and Continuous Program Improvement Report (CPIR) forms for ABET
- Developed Course Assessment Report (CAR) and LAB assessment report (LAR) forms
- Led the development of Senior Design Project Report Template and other assessment tools to cater to ABET assessment requirements
- Developed Student Outcome Assessment Report (SOAR) form for documenting the assessment of all student outcomes a – k.
- Developed a Continuous Program Improvement Report (CPIR) form for documenting the process of “closing the loop”.
- Led the EE department effort in defining the EE Dept. Goals, Mission, and Program Educational Objectives
- Guided Civil and Mechanical engineering departments in preparing for ABET accreditation

## **SCHOLARSHIPS and AWARDS**

- Outstanding Ph.D. Award in Electrical and Computer Engineering Wichita State University spring 2004.
- Certified LabVIEW Associate Developer (CLAD )

## **WORKSHOPS AND TRAINING COURSES**

- Advance OPNET Modular (OPNET Technology, Bethesda, MD, USA)
- Introduction to OPNET Modular (OPNET Technology, Bethesda, MD, USA)
- Introduction to ACE (OPNET Technology, Bethesda, MD, USA)
- NI myRIO (National Instruments, PMU , Al-Khobar, KSA)
- LabVIEW Core 1 (National Instruments, PMU , Al-Khobar, KSA)
- LabVIEW Core 2 (National Instruments, PMU , Al-Khobar, KSA)
- LabVIEW Core 3 (National Instruments, PMU , Al-Khobar, KSA)
- DATA Acquisition and Signal conditioning (National Instruments, PMU, Al-Khobar, KSA)
- NI ELVIS (National Instrument, PMU, Al-Khobar, KSA)
- NI Multisim (National Instrument, PMU, Al-Khobar, KSA)
- NI Test Stand (National Instrument, PMU, Al-Khobar, KSA)
- Radio Frequency (RF) fundamental (National Instrument, PMU, Al-Khobar, KSA)
- MIMO Systems (National Instrument, King Saudi University, Riyadh, KSA)
- Electrical Machinery Course (LD-didactic, Germany)
- Control Design and Robotics Hands-on training (NI Arabia Academic week 2011, Lebanon)
- LabVIEW FPGA Hands-on training (NI Arabia Academic week 2011, Lebanon)

- VeriStand Hands-on training (NI Arabia Academic week 2011, Lebanon)
- DIAdem Hands-on training (NI Arabia Academic week 2011, Lebanon)
- LabVIEW Hands-on training (NI Arabia Academic week 2011, Lebanon) Professional Activities

## TECHNICAL PRESENTATIONS AND TALKS

- FPGA Hardware Implementation of DOA Estimation Algorithm Employing LU Decomposition, NI Week 2018 **Austin**, Texas, May 2018.
- Harmonic Estimation Employing QR factorization and Power Spectral Density for fault detection in Induction Motor," Machinery failure Prevention technology 2018, Virginia beach, Virginia
- Teaching Communications Engineering Using NI ELVIS and LabVIEW, NI Week 2016 **Austin**, Texas, August 2016
- Partial Data Matrix DOA Estimation without Eigenvalue Decomposition", International Conference on Digital Signal Processing Kuala Lumpur, Malaysia April 2017
- Real Time Implementation of Direction of Arrival Estimation Schemes using LabVIEW and NI PXI Platform" at King Fahd University for Petroleum and Minerals, March 2015
- Direction of Arrival Estimation Schemes using NI PXI Platform at Prince Sultan Advanced Technologies Research Institute (PSATRI) King Saud University, KSA, November 2014
- Direction of Arrival Estimation Schemes using NI PXI Platform at Advanced Sensors and Electronic Defence (ASED), KACST, KS A 2014
- QR-TLS ESPRIT for Source Localization and Frequency Estimations, IEEE Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2013
- Parallel TSQR-TLS and QR-TLS factorization for Joint Time Delay and Frequency Estimation, IEEE Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2013
- NI Graphical design in Developing RF Direction Finding Application, NI Arabia academic day 2013
- 2 D DOA estimations for multiple coherent sources using a new antenna array configuration," IEEE Military communication conference, Orlando, Florida, November. 2012
- QRC-ESPRIT for Wideband Signals, Second International Conference on Advances in Information and Communication Technologies, Amsterdam, Netherlands, Dec 2011
- Range and Bearing Estimation for Near-Field Sources," IEEE Vehicular Technology Conference Fall, Ottawa, Canada, September 2010
- Propagator Method for Joint Time Delay and Frequency Estimation," IEEE Conference on Signal, System & Computers, Pacific Grove, CA, Oct. 2008.
- Unitary MUSIC algorithm for Source bearing estimation," IEEE Vehicular Technology Conference, Baltimore, MD, October 2007
- Angle of Arrival Estimation for Non-Circular Signals" IEEE Sarnoff Symposium 2006, Princeton, New Jersey, March 2006.
- DOA Estimation for Coherent Sources with Spatial Smoothing without Eigen-decomposition under Unknown Noise Field," IEEE GLOBECOM Conference 2005, St Louis, MO, December 2005.
- 2-D Directional of Arrival Angle Estimation Non-Based on the Eigen Structure Approach, IEEE Vehicular Technology Conference, Los Angeles, CA, September 2004.

- CONJUGATE ESPRIT (C-SPRIT), IEEE Military Communications Conference, Boston, October 2003.

### COMMITTEE WORK (Department, College, University)

- Chair of EE department council
- Chair of College of Engineering ABET Committee
- Chair of EE senior design project committee.
- Chair of EE Teaching and accreditation committee
- Chair of EE Lab committee
- Member of faculty search committee
- Member of graduate research committee.
- Member of the college council
- Member of research and development committee
- Member of University IT committee

### REVIEWER FOR TECHNICAL PAPERS

Reviewer for international journals and conferences including:

- IEEE Transaction of Antenna and Propagation
- IEEE Vehicular Technology Conference
- IEEE Transaction on signal processing
- Signal Processing Journal
- IEEE signal processing Letter and Transactions
- IEEE Antenna and Wireless Propagation letter
- IEEE GLOBECOM Conference
- IEEE Transaction in Wireless Communication
- **General Co-Chair** of International Conference on Technology Innovation – ICTI 2016 at New York, USA

### MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Senior member of institute of Doctors Engineering and Scientists (IDES)
- IEEE member
- Member of World Academy of Science, Engineering, and Technology
- Member of the institute of Electronics, Information, and Communication Engineers
- Editor-in-Chief of International Journal on Electrical and Power Engineering (ACEEE, USA).



## RESEARCH PUBLICATIONS: JOURNALS

1. A. A. Hussain, **N. Tayem**, A. Soliman and R. M. Radaydeh, "FPGA-Based Hardware Implementation of Computationally Efficient Multi-Source DOA Estimation Algorithms," in *IEEE Access*, vol. 7, pp. 88845-88858, 2019. doi: 10.1109/ACCESS.2019.2926335
2. **Nizar Tayem**, K Majeed, AA Hussain, "Propagator Method using PARAFAC Model for Two Dimensional Source Localization" accepted for publication at Radioengineering Journal July 2018
3. A. A. Hussain, **N. Tayem**, M. O. Butt, A. Soliman, A. Alhamed and S. Alshebeili, "FPGA Hardware Implementation of DOA Estimation Algorithm Employing LU Decomposition," in *IEEE Access*, vol. 6, pp. 17666-17680, 2018.
4. **Nizar Tayem**, K Majeed, AA Hussain, "Parallel Factor-Based Model for Two-Dimensional Direction Estimation" International Journal of Antennas and Propagation, Volume 2017 (2017), Article ID 1813497, 12 pages
5. **Nizar Tayem** "Cholesky Factorization Based Parallel Factor for Azimuth and Elevation Angles Estimation" accepted at Arabian Journal for Science and Engineering, June 2017
6. A Alhamed, **Nizar Tayem**, T Alshawi, S Alshebeili, A Alsuwailem, A Hussain, "FPGA-based Real Time Implementation for Direction-of-Arrival Estimation," The Journal of Engineering [10.1049/joe.2017.0165](https://doi.org/10.1049/joe.2017.0165) , May 2017
7. **Nizar Tayem**, "Azimuth/Elevation Directional Finding with Automatic Pair Matching" International Journal of Antennas and Propagation, Volume 2016 (2016), Article ID 5063450, 9 pages
8. **Nizar Tayem**, Syed Raza, Mohammed Omer, Ahmed Abul Hussain, "Joint Frequency and Time Estimation Algorithms" Arabian Journal for Science and Engineering September 2016, Volume 41, Issue 9, pp 3511–3519
9. **Nizar Tayem**, Khaqan Majeed, and Ahmed A. Hussain, "Two Dimensional DOA Estimation using Cross-correlation Matrix with L-shaped Array," *IEEE Antennas and Wireless propagation letters* , October 2015
10. **N. Tayem**, "Real time implementation for DOA estimation methods on NI-PXI platform," *Progress In Electromagnetics Research B*, Vol. 59, 103-121, 2014.
11. M. Omer, **N. Tayem**, A Hussain," Two Uniform Linear Arrays for Non-Coherent and Coherent Sources for Two Dimensional Source Localization," Journal of Progress In Electromagnetics Research Letter , Vol. 47, 31-39, July 2014.
12. **N. Tayem**, M. Omer, M. El-Lakkis, S. A. Raza , J. Nayfeh," Hardware Implementation of a Proposed QR-TLS DOA Estimation Method and MUSIC, ESPRIT Algorithms on NI-PXI Platform, Journal of Progress In Electromagnetics Research C, Vol. 45, 203-221, November 2013.
13. **N. Tayem**, M. Omer, H. Gami, S. A. Raza, J. Nayfeh, M. Al-Lakkis," Joint Frequency and Angle Estimation Algorithms," Journal of Selected Areas in Telecommunications (JSAT), October 2013
14. M. M. Qasaymeh, **Tayem Nizar**, and Ahmed Musa, "An Efficient Channel Estimator for Frequency Hopping System via Propagator Method", The International Journal of Ubiquitous Systems and Pervasive Networks, Vol. 3, pp.23-27, May 2011.
15. **Nizar Tayem** and Gami Hiren, "Two Stages Time Delay and Frequency for multiple sinusoids," Journal of Selected areas in Telecommunication (JSAT), pp. 59-63, April 2011.
16. **Nizar Tayem**, "QRC-ESPRIT method for wideband signals" ACEEE International Journal on communication, Vol.2, No.03, pp.1-5. Nov 2011

17. **Nizar Tayem** and Gami Hiren, "Two Stages Time Delay and Frequency for multiple sinusoids," *Journal of Selected areas in Telecommunication (JSAT)*, pp. 59-63, April 2011.
18. Qasaymeh M.M, Gami Hiren, **Tayem Nizar**, Ravi Pendse, and M. E. Sawan "Joint Time Delay and Frequency Estimation with Propagator Method" *IEEE Signal Processing Letter March*. Vol. 16, No. 5, pp.422-425, May 2009.
19. **Nizar Tayem** and Hyuck M. Kwon, "Reply to Comment on "L-Shape 2-Dimensional Arrival Angle Estimation with Propagator Methods," *IEEE Transactions on Antennas & Propagation*, Vol. 56, No. 5, pp. 1503-1506, May 2008.
20. **Nizar Tayem** and Hyuck M. Kwon, "Reply to Comment on "Conjugate ESPRIT (C-SPRIT)," *IEEE Transactions on Antennas & Propagation*, Vol. 55, No. 2, pp. 512 - 513, February 2007.
21. **Nizar Tayem** and Hyuck M. Kwon, "Azimuth and Elevation Angle Estimation with No Failure and No Eigen Decomposition," *Elsevier Signal Processing Journal*, Volume 86, Issue 1, Pages 8-16, January 2006.
22. **Nizar Tayem** and Hyuck M. Kwon, "L-Shape 2-Dimensional Arrival Angle Estimation with Propagator Method," *IEEE Transactions on Antennas and Propagation*, Vol. 53, No. 5, pp. 1622-1630, May 2005.
23. **Nizar Tayem** and Hyuck M. Kwon, "Conjugate ESPRIT (C-SPRIT)," *IEEE Transactions on Antennas and Propagation*, Vol. 52, No. 10, pp. 2618-2624, October 2004.

## CONFERENCE PUBLICATIONS

1. **N. Tayem**, Nadar Sawalhi, Suri Ganriwala," Harmonic Estimation Employing QR factorization and Power Spectral Density for fault detection in Induction Motor," *Machinery failure Prevention technology 2018*, Virginia beach, Virginia
2. Ahmed A. Hussain, **N. Tayem**, Abdel-Hamid Soliman "LDL Decomposition-based Real-time FPGA Implementation of DOA Estimation." Accepted at *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2018.
3. **N. Tayem**, "Partial Data Matrix DOA Estimation without Eigenvalue Decomposition", *International Conference on Digital Signal Processing Kuala Lumpur*, Malaysia April 17-19, 2017
4. Nadar Sawalhi, **N. Tayem**, Suri Ganriwala,"Fault detection and health monitoring using motor current signature analysis Compared to Vibration Analysis ," *Machinery failure Prevention technology 2018*, Virginia beach, Virginia
5. **N. Tayem**, M. Omer, A. Abul Hussain , "DOA Estimation Method using R Matrix of the QR Factorized Data and its Prototype Implementation on NI-PXI Platform," *IEEE MILCOM 2014*, Baltimore, MD
6. **N. Tayem**, M. Omer, A. Abul Hussain , "Hardware Implementation of MUSIC and ESPRIT on NI-PXI Platform," *IEEE MILCOM 2014*, Baltimore, MD
7. Syed A. Raza and **Nizar Tayem**, "Direct and Parallel QR Based Subspace Decomposition Methods for System Identification", *International Conference on Industrial Automation, Information and Communications Technology*, Bali, 28-30th August 2014.
8. **N. Tayem**, M. Omer, H. Gami, Jamal Nayfeh "QR-TLS ESPRIT for Source Localization and Frequency Estimations." *IEEE Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, November 2013.

9. **N. Tayem**, M. Omer , S. A. Raza, J. Nayfeh, Mohamed El-Lakkis, “ Parallel TSQR-TLS and QR-TLS factorization for Joint Time Delay and Frequency Estimation.” IEEE Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, November 2013
10. **Nizar Tayem**, “2 D DOA estimation for multiple coherent sources using a new antenna array configuration,” IEEE Military communication conference, Orlando, Florida, November. 2012
11. **Nizar Tayem**, “ QRC-ESPRIT for Wideband Signals, Second International Conference on Advances in Information and Communication Technologies, Amsterdam, Netherlands, Dec 2011.
12. **Nizar Tayem** ,Champike attanaayake, and Ayodele Abatan, “ Range and Bearing Estimation for Near-Field Sources,” IEEE Vehicular Technology Conference Fall, Ottawa , Canada, September 2010.
13. Gami H., Qasaymeh M., **Tayem N.**, R. Pendse, M. Sawan, “Efficient Structure-Based Carrier Offset Estimator for OFDM System,” IEEE Vehicular Tech. Conf., Barcelona, Spain, Apr 26-29, 2009.
14. Qasaymeh M., Gami H., **Tayem N.**, R. Pendse, M. Sawan, “Time Delay Estimator for Frequency Hopping System without Eigen Decomposition,” IEEE Vehicular Tech Conf, Barcelona, Spain, Apr 26-29, 2009.
15. Qasaymeh M., Gami H., **Tayem N.**, R. Pendse, M. Sawan, “Rank Revealing QR Factorization for Jointly Time Delay and Frequency Estimation,” IEEE Vehicular Tech Conf, Barcelona, Spain, Apr 26-29, 2009.
16. Gami H., Qasaymeh M., **Tayem N.**, R. Pendse, M. Sawan, “Subspace-Based Blind CFO Estimation for OFDM by Exploiting Used Carriers,” IEEE Sarnoff Sym., Princeton, NJ, Mar 30-Apr 1, 2009.
17. Shatnawi H., Gami H., Qasaymeh M., **Tayem N.**, M. Sawan, R. Pendse, “High Resolution Joint Time Delay and Frequency Estimation,” IEEE Sarnoff Sym., Princeton, NJ, Mar 30-Apr 1, 2009.
18. Gami H., Qasaymeh M., **Tayem N.**, R. Pendse, M. Sawan, “Semiblind Multiuser MIMO Channel Estimators using PM and RRQR methods,” IEEE Conf on Comm. Network & Services Research, New Brunswick, Canada, May 11-15, 2009.
19. Gami H., Qasaymeh M., **Tayem N.**, R. Pendse, M. Sawan, “Carrier Frequency Offset Estimator for Multicarrier Systems using Matrix Pencil Method”, IEEE International conf. on Telecommunications, Marrakech, Morocco, May 25-27, 2009.
20. Qasaymeh M.M, Gami Hiren, **Tayem Nizar**, Ravi Pendse, and M. E. Sawan “Joint Time Delay and Frequency Estimation without Eigen-Decomposition” accepted in 42nd Annual Asilomar Conf. Signals, Systems Computers, Pacific Grove, CA Oct. 2008
21. Kareem Al Jabr, Hyuck M. Kwon, and **Nizar Tayem**, “Modified UCA-ESPRIT for Estimating DOA of Coherent Signals Using One Snapshot,” IEEE Vehicular Technology Conference, , Marina Bay, Singapore, 11–14 May 2008
22. Qasaymeh M., Gami H., **Tayem N.**, M. Sawan, R. Pendse, “Propagator Method for Joint Time Delay and Frequency Estimation,” IEEE Conference on Signal, System & Computers, Pacific Grove, CA, Oct. 2008.
23. **N. Tayem** and M. Naraghi-Pour, “ Unitary MUSIC algorithm for Source bearing estimation,” IEEE Vehicular Technology Conference, Baltimore, MD, 30 September 3 October 2007
24. **N. Tayem** and M. Naraghi-Pour, “ Unitary MUSIC algorithm for Source bearing estimation,” IEEE Vehicular Technology Conference, Baltimore, MD, 30 September 3 October 2007
25. **N. Tayem** and M. Naraghi-Pour, “Propagator Method and Triangular Factorization for Source Bearing Estimation,” IEEE Military Communications Conference, Orlando, Florida, October 29-31 2007.

26. **N. Tayem** and M. Naraghi-Pour, "Fast algorithm for source localization in multipath environments," SPIE (The International Society for Optical Engineering) April 2007.
27. **Nizar Tayem** and M. Naraghi-Pour, "Unitary Root MUSIC and Unitary MUSIC with Real-Valued Rank Revealing Triangular Factorization," accepted at IEEE Military Communications Conference, Orlando, Florida, October 29-31 2007
28. A. Salameh and **N. Tayem**, "Conjugate MUSIC for non-circular signals" IEEE International Conference on Acoustics, Speech and Signal Processing 2006, Toulouse, France 14-19 May 2006.
29. **Nizar Tayem**, A. Salameh, and Hyuck M. Kwon, "Toeplitz based matrix Pencil for Non-Circular Signals" IEEE Vehicular Technology Conference 2006, Montréal, Canada, 25 – 28 September 2006.
30. **Nizar Tayem** and Hyuck M. Kwon, "Covariance Matrix Differencing for Coherent Sources DOA Estimation under Unknown Noise Field " IEEE Vehicular Technology Conference 2006, Montréal, Canada, 25 – 28 September 2006.
31. **N. Tayem** and A. Salameh, "DOA Estimation for non-circular sources under correlated noise field," ICT 13th International Conference on Telecommunications 2006, Funchal, Madeira Island, Portugal, 9-12 May 2006.
32. A. Salameh and **N. Tayem**, "Angle of Arrival Estimation for Non-Circular Signals" IEEE Sarnoff Symposium 2006, Princeton, New Jersey, 27-28 March 2006.
33. **Nizar Tayem** and Hyuck M. Kwon, Seunghyun Min and Donghee Kang, "Root MUSIC Transform Covariance Differencing for Correlated Sources under Unknown Symmetric Toeplitz Noise," International ITG - IEEE Workshop on Smart Antennas 2006, Reims near Ulm, 13-14 March 2006.
34. A. Salameh, **Nizar Tayem**, and Hyuck M. Kwon, "Improved 2-D Root MUSIC for Non-Circular Signals" Fourth IEEE Workshop on sensor array and multi-channel processing 2006, Waltham, Massachusetts, 12-14 July 2006.
35. **Nizar Tayem** and Hyuck M. Kwon, and Yong H. Lee, "DOA Estimation for Coherent Sources with Spatial Smoothing without Eigendecomposition under Unknown Noise Field," IEEE GLOBECOM Conference 2005, St Louis, MO, November 28-December 2, 2005.
36. **Nizar Tayem** and Hyuck M. Kwon, "Transform Covariance Differencing Method for Correlated Sources under Unknown Symmetric Toeplitz Noise," IEEE Military Communications Conference, Atlantic City, New Jersey, October 17-20, 2005.
37. **Nizar Tayem**, Hyuck M. Kwon, and Yong H. Lee, "2-D DOA Estimation with No Failure," IEEE Vehicular Technology Conference 2005 Fall, Dallas, TX, September 25-28, 2005.
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39. **Nizar Tayem**, Hyuck M. Kwon, "Arrival Angle Estimation of Correlated Sources with Unknown, Spatially Uncorrelated and Nonstationary Noise," IEEE AP-S International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, paper number 2583, Washington, DC, USA on July 3-8, 2005.
40. **Nizar Tayem**, Hyuck M. Kwon, "Arrival Angle Estimation of Correlated Sources under Unknown Noise of Hermitian Covariance Matrix," IEEE AP-S International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, paper number 2905, Washington, DC, USA on July 3-8, 2005.
41. **Nizar Tayem** and Hyuck M. Kwon, "Angle Estimation with Propagator Method for Correlated Sources under Unknown Symmetric Toeplitz Noise," The 18th Annual Canadian Conference on

Electrical and Computer Engineering (CCECE05), Session TM22 Digital Signal Processing 3, Saskatoon Inn Saskatoon, Saskatchewan, Canada, May 1-4, 2005.

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43. **Nizar Tayem** and Hyuck M. Kwon, "L-Shape 2-Dimensional Arrival Angle Estimation with Propagator Method," IEEE Vehicular Technology Conference 2005-Spring, Stockholm, Sweden, May 30 - June 2, 2005.
44. **Nizar Tayem** and Hyuck M. Kwon, "2-D Directional of Arrival Angle Estimation Non-Based on the Eigen Structure Approach," IEEE Vehicular Technology Conference 2004-Fall, Los Angeles, CA, September 26-29, 2004.
45. **Nizar Tayem** and Hyuck M. Kwon, "CONJUGATE ESPRIT (C-SPRIT)," IEEE Military Communications Conference, Boston, MA, pp. 1155 - 1160, Vol. 2, October 13-16, 2003.

### CO-ADVISOR PH.D. DISSERTATIONS

- Hiren Gami Ph.D., employed at Miami University Middletown, Ohio
- Mahmoud M. Qasaymeh Ph.D., employed at Tafila Technical University, Jordan
- Ahmed Abul Hussain, currently Ph.D. student at Staffordshire University

### RESEARCH CITATIONS

My publications have been **cited 691 times**, according to information on the Google scholar website: <https://scholar.google.com/citations?user=R9Z-glQAAAAJ&hl=en>

### INDUSTRIAL CASE STUDIES

National Instruments published my case studies on their website:

- **Nizar Tayem** , Ahmed Abul Hussain, "Real-time Implementation for DOA Estimation Methods on NI-PXI Platform, July 2015, <http://sine.ni.com/cs/app/doc/p/id/cs-17309?nisrc=RSS-pxi-en>
- **Nizar Tayem**, Ahmed Abul Hussain ,Abdel-Hamid Soliman" FPGA Hardware Implementation and Experimental Verification of Direction-of-Arrival Estimation Algorithm Using LU Decomposition, July 2018, <http://sine.ni.com/cs/app/doc/p/id/cs-17700>
- **Nizar Tayem**, "FPGA-Based Real-Time Implementation for Direction of Arrival Estimation Algorithm Using QR Decomposition, October 2017 <http://sine.ni.com/cs/app/doc/p/id/cs-17614#>

### INTERNATIONAL PATENTS

1. **Nizar Tayem**, Kwon Hyuck, Min Seung Hyun, Kang Dong Hee,: Antenna apparatus for estimating direction of arrival and frequency of arrival and estimating method thereof, using three array antennas. Samsung Electronics July 2007: KR 1020060000682
2. Kwon Hyuck Moon,**Nizar Tayem**, Min Seung Hyun, Kang Dong Hee,: Method and an apparatus for estimating a DOA of a coherent source, to obtain a difference between forward/backward spatial smoothing and backward spatial smoothing covariance matrixes. Samsung Electronics September 2008: KR 1020070028560.

## TECHNICAL REPORTS

- **Nizar Tayem**, Raja Balakrishnan, and Hyuck M. Kwon, "Smart Antenna for Future US Army Frequency-Hopping Communications Systems," US Army – DEPSCoR Final Progress Report, June 7, 2005, 263 pages
- **Nizar Tayem** and Mort Naraghi-Pour, "Unitary Root Music and Unitary Music with real valued Rank Revealing Triangular factorization," Wright-Patterson Air Force Base, OH 45433-7320, AFRL-RY-WP-TP-2010-1213, June 2010

## RESEARCH FUND:

- **Nizar Tayem (PI)**, 56,750 (SAR).’ Real Time implementation of proposed QR decomposition DOA estimation method on NI-PXI platform and FPGA. Prince Mohammed bin Fahd University.
- **Nizar Tayem (PI)**, 70,000 (SAR).’ Hardware Implementation of Two-Dimensional Azimuth and Elevation Angles Using Dual Polarized Antennas. Prince Mohammed bin Fahd University.
- **Nizar Tayem (PI)**, 70,000 (SAR).’ Wind Turbine Electricity Power System Analysis for Power Quality and Harmonics Estimation Using Signal-Processing Methods. Prince Mohammed bin Fahd University.

## SIGNAL PROCESSING AND COMMUNICATION SYSTEMS RESEARCH LAB

This Lab covers a wide range of topics in Communications such as analog communication systems, digital communication systems, and Wireless and RF communications

Lab Link:

<http://www.pmu.edu.sa/profiles/ntayem/Wireless-Communication-Signal-Processing-Research-Lab.html>

### Projects completed:

- Implemented Proposed Direction of Arrival Estimation (DOA) using NI PXI Platform hardware and LabVIEW software
- FPGA LabVIEW implementation for proposed Novel DOA Algorithms for Mobile communications, radar, and sonar applications
- Simulate and prototype advance wireless and RF communication systems

### Publications:

- **Nizar Tayem**, "Real-time Implementation for DOA Estimation Methods on NI-PXI Platform," <http://sine.ni.com/cs/app/doc/p/id/cs-17309?nisrc=RSS-pxi-en>
- A. A. Hussain, **N. Tayem**, M. O. Butt, A. Soliman, A. Alhamed and S. Alshebeili, "FPGA Hardware Implementation of DOA Estimation Algorithm Employing LU Decomposition," in *IEEE Access*, vol. 6, pp. 17666-17680, 2018.
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- A Alhamed, **Nizar Tayem**, T Alshawi, S Alshebeili, A Alsuwailem, A Hussain, “FPGA-based Real Time Implementation for Direction-of-Arrival Estimation,” *The Journal of Engineering* 10.1049/joe.2017.0165 , May 2017
- **N. Tayem**, “Real time implemenation for DOA estimation methods on NI-PXI platform,” *Progress In Electromagnetics Research B*, Vol. 59, 103-121, 2014
- **N. Tayem**, M. Omer, A. Abul Hussain , “DOA Estimation Method using R Matrix of the QR Factorized Data and its Prototype Implementation on NI-PXI Platform,” *IEEE MILCOM 2014*, Baltimore, MD
- **N. Tayem**, M. Omer, A. Abul Hussain , “Hardware Implementation of MUSIC and ESPRIT on NI-PXI Platform,” *IEEE MILCOM 2014*, Baltimore, MD
- **N. Tayem**, M. Omer, M. El-Lakki, S. A. Raza , J. Nayfeh,” Hardware Implementation of a Proposed QR-TLS DOA Estimation Method and Music, Esprit Algorithms on NI-PXI Platform, *Journal of Progress In Electromagnetics Research C*, Vol. 45, 203-221, November 2013.

#### Pictures from the Lab:



