

# CURRICULUM VITAE

## Muhammad T. Anan, Ph.D.

PO Box 50927 Riyadh 11533 Saudi Arabia, Tel. +966 11 215 7744, Email: manan@alfaisal.edu

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### EDUCATION

- 2008 Ph.D., Electrical Engineering and Telecommunications Networking,  
University of Missouri-Kansas City, MO, USA  
Dissertation: A Slotted Wavelength Assignment Pipeline (SWAP) Scheduler for  
Next-Generation Optical Burst Switches (OBS)
- 2003 M.Sc., Computer Science, Software Engineering,  
University of Kansas, KS, USA  
Thesis: Evaluating Maintainability of Software Architectures
- 1999 M.Sc., Electrical and Computer Engineering,  
University of Missouri-Columbia, MO, USA  
Thesis: A New Fault Tolerant ATM Switching Architecture
- 1997 B.S., Computer Engineering,  
King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

### WORK EXPERIENCE

#### ACADEMIC APPOINTMENTS:

- Feb. '17 – Present Acting Dean, College of Engineering  
Chair of Software Engineering Department  
Associate Professor of Software Engineering  
Alfaisal University, Riyadh, Saudi Arabia
- Aug. '15 – Jan. '17 Vice Dean of Academic and Students Affairs, College of Engineering  
Associate Professor of Software Engineering  
Alfaisal University, Riyadh, Saudi Arabia
- Aug. '14 – Dec. '16 Chair of Software Engineering Department  
Associate Professor of Software Engineering  
Alfaisal University, Riyadh, Saudi Arabia
- May. '14 – Aug. '15 Associate Professor of Computer Engineering  
Electrical & Computer Engineering Department  
Purdue Northwest University (Purdue University Calumet), IN, USA
- Aug. '08 – May. '14 Assistant Professor of Computer Engineering  
Electrical & Computer Engineering Department  
Purdue Northwest University (Purdue University Calumet), IN, USA
- Dec. '10 – Dec. '14 Adjunct Visiting Professor  
Abu Dhabi University, UAE  
Master of Engineering Management Program
- Aug. '06 – Dec. '07 Graduate Teaching Assistant  
Electrical and Computer Engineering Department  
University of Missouri-Kansas City, MO, USA
- Aug. '97 – Dec. '98 Graduate Research Assistant  
Electrical and Computer Engineering Department  
University of Missouri-Columbia, MO, USA

### INDUSTRIAL APPOINTMENTS:

- Nov. '07 – Aug. '08 IT Consultant, IT Department, Kansas City Power & Light (KCPL)  
Midwest Consulting Group, Overland Park, KS, USA
- Feb. '06 – Apr. '07 Applications Developer,  
IT Network Services and Service Assurance Group,  
Sprint Nextel, Lenexa, KS, USA
- Sept. '04 – Feb. '06 IT Specialist, Integrated Service Assurance, Global Services,  
IBM, Overland Park, KS, USA
- Dec. '98 – Sept. '04 Software Engineer, Broadband Network Management Development  
and Service Establishment Technology Solutions Groups,  
Sprint, Overland Park, KS, USA
- Jul. '96 – Sept. '96 System Engineer Intern, Schlumberger-GeoQuest, Saudi Arabia and  
Oman

### **RESEARCH & TEACHING INTERESTS**

My main research and teaching interests are in the areas of computer networks, cloud computing, Internet of Things, software defined networking, future Internet architectures, wireless sensor networks, embedded systems, computer architecture, software engineering and visualization.

### **PUBLICATIONS**

1. D. Benhaddou, F. Attia, M. Anan, L. Afugbuom, "Autonomous Living Building: Adapting to Occupant's Behavior," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, Morocco, 2019
2. N. Nasser, A. El Ouadrhiri, M. El Kamili, A. Ali, M. Anan, "Crowd Management Services in Hajj: A Mean-Field Game Theory Approach," *IEEE Wireless Communications and Networking Conference (WCNC)*, Morocco, 2019
3. O. Darwish, A. Alfuqaha, G. Ben Brahim, I. Jenhani, M. Anan, "Towards a Streaming Approach to the Mitigation of Covert Timing Channels," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, Cyprus, 2018
4. N. Nasser, L. Karim, A. Ali, M. Anan, N. Khelifi, "Routing in the Internet of Things," *IEEE GLOBECOM*, Singapore, 2017
5. N. Nasser, M. Anan, M. Chikh Awad, H. Bin-Abbas, L. Karim, "An Expert Crowd Monitoring and Management Framework for Hajj," *The International Conference on Wireless Networks and Mobile Communications (WinCom)*, Rabat, Morocco, 2017
6. M. Anan, A. Al-Fuqaha, N. Nasser, T. Mu, and H. Bustam, "Empowering Networking Research and Experimentation through Software Defined Networking," *Journal of Network and Computer Applications*, vol. 70, pp.140-155, 2016
7. A. Ahmad, N. Nasser and M. Anan, "A Secure Cloud Infrastructure through Power Consumption Statistics," *International conference on selected topics in Mobile and Wireless Networking (MoWNet)*, Cairo, Egypt, 2016
8. M. Anan, A. Ahmed, A. Alfuqaha, and N. Nasser, "Optimization of Power and Migration Cost in Virtualized Data Centers," *IEEE Wireless Communications and Networking Conference (WCNC)*, Doha, Qatar, 2016
9. M. Anan, and N. Nasser, "SLA-based Optimization of Energy Efficiency for Green Cloud Computing," *IEEE GLOBECOM*, San Diego, CA, USA, 2015
10. O. Darwish, A. Al-Fuqaha, M. Anan, N. Nasser, "The Role of Hierarchical Entropy Analysis in the Detection and Time-Scale Determination of Covert Timing Channels," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 153-159, Dubrovnik, Croatia, 2015

11. M. Guizani, M. Anan, "Smart Grid Opportunities and Challenges of Integrating Renewable Sources: A Survey," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 63-68, Nicosia, Cyprus, 2014
12. L. Ilyes, M. Anan, A. Alfuqaha, and M. Ayyash, "Cloud-based Autonomic Service Monitoring In The Future Internet," *IEEE International Wireless Communications and Mobile Computing conference (IWCMC)*, pp. 1098-1105, Nicosia, Cyprus, 2014
13. M. Elbes, A. Alfuqaha, and M. Anan, "A precise indoor localization approach based on particle filter and dynamic exclusion techniques," *International Journal of Network Protocols and Algorithms*, vol. 5, no. 2, pp. 50-71, 2013
14. M. Abdelhadi, M. Anan, and M. Ayyash, "Efficient artificial intelligence-based localization algorithm for wireless sensor networks," *Journal of Selected Areas in Telecommunications*, vol. 3, no. 5, pp. 10-18, 2013
15. M. Abdelhadi, and M. Anan, "A Three-Dimensional Localization Algorithm for Wireless Sensor Networks Using Artificial Neural Networks," *The International Workshop on Wireless Sensors, Actuator, and Robot Networks (WiSARN 2012)*, pp. 1-5, Las Vegas, 2012
16. M. Abdelhadi, and M. Anan, "A Fuzzy-based Collaborative Localization Algorithm for Wireless Sensor Networks," *International Conference on Collaboration Technologies and Systems (CTS 2012)*, pp. 152-156, Denver, 2012
17. M. Anan, C. Velazquez, D. Benhaddou, and M. Balakrishnan, "Energy Efficient Data Dissemination in Wireless Sensor Networks Based on Natural Selection," *IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)*, pp. 577-582, Istanbul, Turkey, 2011
18. M. Salahuddin, A. Alfuqaha, and M. Anan, "An Efficient Artificial Landmark-based System for Indoor and Outdoor Identification and Localization," *Invited Paper, IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)*, pp. 583-588, Istanbul, Turkey, 2011
19. Y. Wang, Y. Qin, L. Gao, and M. Anan, "Implementing an OpenFlow switch with QoS feature on the NetFPGA platform," *The 2011 NC-IL/IN ASEE*, Mt Pleasant, MI, 2011
20. L. Jin, C. Liu, and M. Anan, "Open-Source VLSI CAD Tools: A Comparative Study," *The 2010 IL/IN ASEE*, West Lafayette, 2010
21. M. Alzubi, and M. Anan, "User Zoning Handover: An Approach for 4G Mobility," *The International Wireless Communications and Mobile Computing Conference (IWCMC 2010)*, pp. 870-874, Caen, France, 2010
22. M. Alzubi, and M. Anan, "An Efficient Handover Technique for 4G Networks," *Next Generation Mobile Applications, Service and Technologies Conference (NGMAST 2010)*, pp. 79-83, Amman, Jordan, 2010
23. M. Anan, H. Saiedian, and J. Ryoo, "An architecture-centric software maintainability assessment using information theory," *Journal of Software Maintenance and Evolution: Research and Practice*, vol. 21, no. 1, pp.1-18, 2009
24. M. Anan and G. Chaudhry, "SWAP: A slotted wavelength assignment pipeline scheduler for next generation optical switches," *Journal of Optical Communications*, vol. 28, no. 2, pp. 103-111, 2007
25. M. Anan, and G. Chaudhry, "A real-time hardware-based scheduler for next-generation optical burst switches," *International Conference on Communications (ICC'07)*, pp. 2289-2293, Glasgow, UK, 2007
26. M. Anan, G. Chaudhry, and J. Qaddour, "Performance evaluation of an ultra-fast pipeline scheduler for next-generation networks," *International Conference on Computer Systems and Applications (AICCSA '07)*, pp. 650-654, Amman, Jordan, 2007
27. M. Anan, G. Chaudhry, and D. Benhaddou, "Architecture and performance of a next-generation optical burst switch (OBS)," *International Workshop on Optical*

- Burst/Packet Switching (WOBS'06)*, pp. 1-9, (In conjunction with *IEEE/CreateNet BROADNETS'06*), San Jose, CA, 2006
28. M. Anan, G. Chaudhry, and D. Benhaddou, "Promises and challenges of Optical Burst Switching (OBS) for next-generation optical networks," *The 7<sup>th</sup> International Workshop on Optical Networking Technologies: Examining the Case for Optical Burst Switching* (In conjunction with *IEEE GLOBECOM '06*), San Francisco, CA, 2006
  29. H. Saiedian, P. Kumarakulasingam and M. Anan, "Scenario-based requirements analysis techniques for real-time software systems: a comparative evaluation", *Journal of Requirements Engineering*, vol. 10, no. 1, pp. 22-33, 2005
  30. M. Anan and M. Guizani, "Fault-tolerant ATM switching architectures based on MINs: A survey," *Journal of Informatica*, vol. 25, no. 1, pp. 69-81, 2001
  31. M. Anan, and M. Guizani, "Modeling and Simulation of a new ATM switching Architecture", *Advanced Simulation Technologies Conference (ASTC '00)*, pp. 42-47, Washington DC, 2000
  32. M. Anan, and M. Guizani, "A Fault-tolerant ATM switching architecture", *19<sup>th</sup> IEEE International Performance, Computing and Communications Conference (IPCCC '00)*, pp. 295-301, Phoenix, Arizona, 2000

#### BOOK CONTRIBUTIONS:

1. Book chapter entitled: "Smart Grid Opportunities and Challenges in Integrating Renewable Sources" in the book "Renewable Energy Technologies for Water Desalination", Edited by: H Mahmoudi, N Ghaffour, M Goosen and J Bundschuh, CRC Press (Taylor Frances Group) (Balkema NDL), 2017 (in press)
2. Book chapter entitled: "Introduction to Mobile Ad-Hoc and Vehicular Networks" in the book "Wireless Sensor and Mobile Ad-Hoc Networks", D. Benhaddou and A. Alfuqaha, Springer, to be published in 2015
3. Book chapter entitled: "Fault Tolerant ATM Switching Architectures" in the book "Designing ATM Switching Networks", Mohsen Guizani and Ammar Rayes, McGraw Hill, 1998

#### TECHNICAL PRESENTATIONS & TALKS:

Presented all published papers in the corresponding conferences and workshops and was invited to give several technical presentations to universities and high-tech companies.

1. M. Anan, and A. Alfuqaha, "Empowering Future Internet Research and Experimentation through Software Defined Networking," Conference Tutorial, IEEE GLOBECOM 2015
2. M. Anan, and A. Alfuqaha, "The Internet of Things (IoT): Applications and Prospects," Conference Tutorial, IEEE International Wireless Communications and Mobile Computing conference (IWCMC), 2015
3. M. Anan, and A. Alfuqaha, "Empowering Future Internet Research and Experimentation through Software Defined Networking," Conference Tutorial, IEEE International Wireless Communications and Mobile Computing conference (IWCMC), 2014
4. M. Anan, "Service-based Internet Infrastructure for the Qatar World Cup 2022," Qatar Foundation Annual Research Conference ARC'13, Qatar, 2013
5. M. Anan, "Cloud-based Autonomic Video Streaming in GENI Networks," Invited Speaker for the Experimenter Roundtable Session, The 16<sup>th</sup> GENI Engineering Conference, Salt Lake City, 2013
6. M. Anan, "Empowering Future Internet Research and Experimentation through Active and Programmable Networks," Invited Speaker, Al-Faisal University, Saudi Arabia, 2012
7. M. Anan, "Implementation of an OpenFlow switch using NetFPGA platform," Research Day, Purdue University Calumet, 2011 (Winner of the 3<sup>rd</sup> place for the best paper award)
8. M. Anan, "User Zoning Handover: An Approach for 4G Mobility, " Research Day, Purdue University Calumet, 2010

9. M. Anan, "Dynamic CDMA Ad-Hoc Network with Token Ring Topology for Vehicular Communication," Research Day, Purdue University Calumet, 2010
10. M. Anan, "A Real-Time Hardware-Based Scheduler for Next-Generation Metro Optical Networks," Research Day, Purdue University Calumet, 2009
11. M. Anan, "Optical Burst Switching Model using OPNET," Research Day, Purdue University Calumet, 2009
12. M. Anan, "Performance evaluation of multimedia protocols over Gigabit Ethernet based campus network," Research Day, Purdue University Calumet, 2009
13. M. Anan, "Computer Engineering Career," Futurama 2009 Conference, Lowell High School, Indiana 2009
14. M. Anan, "Engineering at Purdue University Calumet", Academic Learning College Conference at IVY Tech, Valparaiso, Indiana 2008

## **COURSES TAUGHT**

### ALFAISAL UNIVERSITY

- SE 416: Mobile Application Development
- EE 210/SE223: Digital Logic Design
- SE 327: Embedded Systems
- SE 410: Software Architecture
- SE 443: Cloud Computing for Software Engineers
- SE 444: Artificial Intelligence
- SE 490/491: Capstone Projects

### ABU DHABI UNIVERSITY:

- MEM 509: Information Technology Management

### PURDUE UNIVERSITY CALUMET:

- ECE 595: Digital Logic using VHDL
- ECE 495: Microcomputers in Engineering (Embedded Systems)
- ENGR 151: Software Tools for Engineers using MATLAB
- ENGR 190: Elementary Engineering Design (Robotics)
- ECE 464: Computer Architecture and Organization
- ECE 375: Digital Integrated Circuits
- ECE 595: VLSI Design
- ECE 547: Computer Networks
- ECE 595: Client Server Programming and Applications
- ECE 505: Network Programming
- ECE 354: Software Engineering
- ECE 493: Senior Engineering Design

### UNIVERSITY OF MISSOURI-KANSAS CITY:

- ECE 535: HDL-Based Digital Systems Design and Modeling
- ECE 426: Microcomputer Architecture and Interfacing

## SERVICE ACTIVITIES

### SERVICE AT ALFAISAL UNIVERSITY:

2017-pres. Acting Dean for the College of Engineering  
2017-pres. Member, Council of Deans, Alfaisal University  
2016-pres. Member, University Council, Alfaisal University  
2014-2016 Chair, Software Engineering Department  
2015-2017 Vice Dean of Academic and Students Affairs, College of Engineering  
2016-2017 Chair, College of Engineering Curriculum Committee  
2015-2017 Advisor, ClickIT Students Club  
2015-2016 Advisor, Robogals Students Club  
2015-2016 Chair, Software Engineering Search Committee  
2014-2015 Member, College of Engineering Curriculum Committee  
2014-2016 Member, Research and Graduate Studies Committee  
2014-2015 Member, Students Recruitment Committee  
2014-2016 Member, Students Affairs Committee

### SERVICE AT PURDUE UNIVERSITY CALUMET:

2013 Judge, Science Olympiad, Purdue University Calumet  
2012 Member, Electrical and Computer Engineering search committee  
2012 Campus representative, ASEE IL/IN 2012 conference  
2010-2014 Chair, Computer Engineering program committee  
2010 Session Chair, Faculty/Student research day  
2010 Member, First-Year-Seminar Committee  
2009 Judge, Science Olympiad, Purdue University Calumet  
2009 Member, Computer Education Day planning committee  
2009 Member, Electrical and Computer Engineering search committee  
2009-2014 Advisor, Muslim Student Association  
2008-2014 Member, Engineering graduate program committee  
2008-2014 Member, Engineering undergraduate curriculum committee  
2008-2014 Advisor, Graduate Student Association

### SERVICE AT PROFESSIONAL SOCIETIES:

2013 Organizer and chair, Workshop on Collaborative Mobile Systems and Sensors Networks (CMSSN), San Diego, California  
2013 Technical Program Committee (TPC) member. International Conference on High Performance Computing & Simulation, Helsinki, Finland  
2013 Technical Program Committee (TPC) member, Workshop on Wireless Sensor, Actuator, and Robot Networks (WiSARN), Cambridge, MA  
2012 Technical Program Committee (TPC) member, Workshop on Wireless Sensor, Actuator, and Robot Networks (WiSARN), Las Vegas  
2011-2016 Associate Editor, Wiley Journal of Wireless Communications & Mobile Computing  
2011-2014 Associate Editor, International Journal of Quality of Service Issues in Networking  
2011 Publication co-chair, International Wireless Communications and Mobile Computing Conference (IWCMC), Istanbul, Turkey  
2011 Session chair, International wireless communications and mobile computing Conference (IWCMC), Istanbul, Turkey  
2010 Technical Program Committee (TPC) member, International Congress on Engineering Education (ICEED), Kuala Lumpur, Malaysia  
2010 Technical Program Committee (TPC) member, International Workshop on Concurrent Communications (ConCom), Seoul, Korea

### REFEREEING:

Regular referee for the following journals and conferences:

- Wiley Journal of Wireless Communications and Mobile Computing (WCMC)
- Journal of Security and Communication Networks (JSAC)

- Journal of Optical Network (JON)
- International Journal of Distributed Sensor Networks
- International Journal of Quality of Service Issues in Networking
- International Journal of Communication Systems
- Journal of Security and Communication Networks
- International Conference on Communications (ICC)
- IEEE Globecom Conference (GLOBECOM)
- IEEE International Conference on Communications and Information Technology
- International Workshop in Concurrent Communication
- IASTED Parallel and Distributed Computing Systems Conference
- IEEE Region 5 Conference
- IEEE International Conference on Mobile Ad-hoc and Sensor Systems

## CERTIFICATION

2011 Digital Learning and Distance Education Certificate, Purdue University Calumet

## HONORS, AWARDS & GRANTS

2019 KACST, SAR 1M, Optical Tags Alternative to RFID tags, Principal Investigator

2017 Annual Research Award, Alfaisal University

2016 RFID-based Multimodal Wireless Framework for Crowd Monitoring and Control in Hajj, GDRG-KACST, Saudi Arabia, SAR 1,260,000, 2014-2016, Co-Principal Investigator

2015 Internal Research Grant (IRG), Alfaisal University, SAR 44,000, 2015-2016, A hybrid Web/Standalone internet of things framework with natural user interface and robot-enabled immersive telepresence for home automation, Co-Principal Investigator

2015 Internal Research Grant (IRG), Alfaisal University, SAR 50,000, 2015-2016, Design Energy Efficient Computing Framework for Cloud Datacenters, Principal Investigator

2015 NSF-REU, \$323,846, 2015-2017, Sustained Wireless Communication in Challenging Environments, Senior Personnel

2014 Summer Faculty Research Grant, Purdue Research Foundation (PRF)

2013 International Travel Grant, Purdue Research Foundation (PRF)

2012 Outstanding Leadership Award, Purdue University Calumet

2012 NSF-TCPP Curriculum Initiative Grant on Parallel and Distributed Computing

2012 Driver Distraction Mitigation System, Industry Project Grant, iQ-Telematic Inc., Principal Investigator

2011 International Travel Grant, Purdue Research Foundation (PRF)

2010 Faculty Summer Research Grant, Purdue Research Foundation (PRF)

2009 Faculty Summer Research Grant, Purdue University Calumet

2009-2015 NSF-GENI Travel Grants

2008 Faculty Research Time Release Award, Purdue University Calumet

2003 Sprint Values Excellence Award, Sprint Nextel

2002 Sprint Values Excellence Award, Sprint Nextel

2001 Sprint Values Excellence Award, Sprint Nextel

2003 Sprint Values Excellence Team Award, Sprint Nextel

1999 Electrical Eng. Outstanding Graduate Student Award, Univ. of Missouri-Columbia

1997-1999 Graduate Research Assistantship, University of Missouri

## **MEMBERSHIPS & AFFILIATIONS**

2011-2016 Associate Editor, Wiley Journal of Wireless Communications & Mobile Computing  
2011-2014 Associate Editor, International Journal of Quality of Service Issues in Networking  
1999-pres. Senior Member, Institute of Electrical and Electronic Engineers  
1997-pres. Member, Jordan Engineers Association

## **REFERENCES**

Available upon request