

AHMAD TAWFIQ AL-HAMMOURI

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EDUCATION

- ◆ **Case Western Reserve University (CWRU)**—Cleveland, Ohio, USA
Ph.D. in Computer Engineering, January 2008
 - ◆ Dissertation Title: *Internet Congestion Control: Complete Stability Region for PI AQM and Bandwidth Allocation in Networked Control*
 - ◆ Advisor: Prof. Vincenzo Liberatore
- ◆ **Case Western Reserve University (CWRU)**—Cleveland, Ohio, USA
M.S. in Computer Engineering, January 2004
 - ◆ Thesis Title: *A Distributed Framework to Facilitate Human-Robot Remote Interaction*
 - ◆ Advisor: Prof. Vincenzo Liberatore
- ◆ **Jordan University of Science and Technology (JUST)**—Irbid, Jordan
B.S. in Electrical Engineering, June 2000
 - ◆ Majored in Computer Engineering

RESEARCH INTERESTS

- ◆ **Broad area of research:** Computer communication networks and distributed systems with emphasis on the intersection of networks and control theory
- ◆ **Particular subjects include**
 - ◆ Cyber-Physical Systems (also known as Networked Control Systems)
 - ◆ Smart power grid
 - ◆ Software Defined Networks
 - ◆ Congestion control
 - ◆ Middleware for real-time applications

PROFESSIONAL EXPERIENCE

- ◆ **Department of Network Engineering and Security, Jordan University of Science and Technology**—Irbid, Jordan
Assistant Professor: September 2009 –
 - ◆ Graduate and undergraduate teaching in computer and network engineering
- ◆ **Department of Industrial Information and Control Systems, KTH**—Royal Institute of Technology—Stockholm, Sweden
Visiting Research Associate: July 2013 – September 2013, January 2012, June 2011 – August 2011
 - ◆ Building simulation models for low voltage monitoring systems
 - ◆ Developed a software-based Synchrophasor Measurement Unit (PMU)
 - ◆ Implemented a C++ library for the IEEE C37.118 Protocol (the IEEE Standard for Synchrophasors for Power Systems)
 - ◆ Designed and developed an integrated simulation and emulation platform for power systems PMU-based applications

◆ **Department of Distributed Systems, Institute for Parallel and Distributed Systems, University of Stuttgart**—Stuttgart, Germany

Visiting Research Associate: June 2012 – September 2012

- ◆ Funded by Deutsche Forschungsgemeinschaft (DFG) [the German's Research Foundation]
- ◆ Devising an overlay approach for mitigating networks' lack of quality-of-service (QoS) for cyber-physical systems

◆ **Computer Engineering Department, Jordan University of Science and Technology**—Irbid, Jordan

Assistant Professor: February 2008 – September 2009

- ◆ Undergraduate teaching in computer engineering and science

◆ **Network Lab, Department of Electrical Engineering and Computer Science, Case Western Reserve University**—Cleveland, OH, USA

Research Assistant: September 2002 – December 2007

- ◆ Designed and developed a distributed, multi-agent framework to facilitate remote interaction with intelligent systems, e.g. robots
- ◆ Identified design foundations of a test-bed for networked control systems
- ◆ Proposed, designed, modeled, and evaluated a congestion control algorithm for cyber-physical systems (or networked control systems)
- ◆ Derived theoretical results for the Proportional-Integral (PI) Active Queue Management (AQM) with TCP
- ◆ Implemented a co-simulation platform for cyber-physical systems by integrating the Modelica framework and ns-2

◆ **Department of Electrical Engineering and Computer Science, Case Western Reserve University**—Cleveland, OH, USA

Teaching Assistant: September 2001 – December 2007

- ◆ Taught recitation sessions; covered classes; held office hours; and graded homeworks, quizzes and exams
- ◆ **Courses:**

• VLSI/CAD (EECS 318)	Fall 2001
• Computer Architecture (EECS 314)	Spring 2002
• VLSI Systems (EECS 485)	Fall 2003
• Digital Systems Design (EECS 315)	Spring 2004
• Logic Design and Computer Organization (EECS 281)	Fall 2004
• Computer Communication Networks II (EECS 428)	Spring 2006

◆ **USRA/NASA Glenn Research Center**—Cleveland, OH, USA

Student Research Assistant: June 2003 – July 2003

- ◆ Designed and developed a web site for the Polymer Molecular Devices Lab

◆ **Law School, Case Western Reserve University**—Cleveland, OH, USA

Computer Support Technician: May 2003 – August 2003

- ◆ Troubleshooted operating system, software, hardware and network problems for PC users
- ◆ Documented and logged help desk requests via Track-it@software

◆ **Department of Computer Engineering, JUST**—Irbid, Jordan

Teaching Assistant: July 2000 – August 2001

- ◆ Managed and supervised Labs; taught recitation sessions; held office hours; and graded homeworks and quizzes
- ◆ **Courses and Labs:**
 - Microprocessor and Interfacing
 - Digital Logic
 - Data Structure
 - Computer Architecture
 - Computer Organization and Design

GRANTS

- ◆ **Characterization and Detection of Fast Flux Networks—**
JUST Deanship of Research

December 2011 – December 2013

- ◆ JD14700 (\$20700)
- ◆ Co-PI with B. Al-Duwairi and M. Aldwairi

AWARDS AND HONORS

- ◆ Erasmus Mundus Action 2—DUNIA BEAM Scholarship June 2013
- ◆ Erasmus Mundus Partnership JOSYLEEN Scholarship June 2011 – August 2011
- ◆ USENIX Association Student Travel Stipend Award June 2005
- ◆ Full scholarship from JUST to pursue graduate studies August 2001 – August 2006
- ◆ Graduated at the top of class among 107 students, JUST June 2000
- ◆ Dean's Honor List eight of ten semesters, JUST September 1995 – June 2000

PROFESSIONAL SERVICE

◆ Program Committee Member:

- ◆ Fifth International Workshop on Self-Organizing Systems (IWSOS 11), Karlsruhe, Germany
(Shadow TPC) February 2011

◆ Conference Session Chair:

- ◆ Northeast Ohio Networking Workshop (NEONet 06), Cleveland, OH, USA March 2006

◆ Research Planning:

- ◆ Invited member, NSF United-States/Middle-East Workshop On Trustworthiness in Emerging Distributed Systems and Networks, Koc University, Istanbul, TURKEY. Distributed Systems and Cloud Computing Group. June 2012

◆ Peer Review:

◆ Journal Articles:

- Elsevier's Computer Communications
- IEEE Transactions on Smart Grid
- Engineering and Technology Reference
- IEEE Transactions on Industrial Informatics
- IEEE Transactions on Control Systems Technology
- International Journal of Systems Science

◆ Conference Articles:

- IEEE Industrial Electronics Society Conference (IECON)
- International Conference on Computer Communication Networks (ICCCN)
- IEEE EnergyTech
- IEEE/RSJ International Conference on Intelligent Robots and Systems
- IEEE International Conference on Mobile Data Management
- IASTED International Conference on Parallel and Distributed Computing and Systems
- IEEE Conference on Control Applications
- International Conference on Industrial Informatics
- International Workshop on Networked Sensing Systems
- IFAC World Congress

◆ Miscellaneous:

- ◆ Scribe at the International Conference on Mobile Systems, Applications, and Services (MobiSys 05)
[Summary appeared in ;login: *The USENIX Magazine*, 30(5), October 2005.] June 2005

PROFESSIONAL AFFILIATIONS

- ◆ Jordan Engineers Association

PUBLICATIONS

◆ Journal Papers:

1. Natheer Khasawneh, Rami A. Al-Hailat, and Ahmad T. Al-Hammouri. Employing physical distance in ranking image-search results. *International Journal of Intelligent Information and Database Systems*, 8(4):324–339, 2014.
2. Basheer N. Al-Duwairi and Ahmad T. Al-Hammouri. Fast flux watch: A mechanism for online detection of fast flux networks. *Journal of Advanced Research*, 5(4):473–479, 2014.
3. Ahmad T. Al-Hammouri. A comprehensive co-simulation platform for cyber-physical systems. *Computer Communications*, 36(1):8–19, 2012.
4. Natheer Khasawneh, Rami Al-Salman, Ahmad T. Al-Hammouri, and Stefan Conrad. A generic framework for collecting and mining client paradata for web applications. *Journal of Emerging Technologies in Web Intelligence*, 4(4):324–332, 2012.
5. Ahmad T. Al-Hammouri, Wenhui Zhang, Robert F. Buchheit, Vincenzo Liberatore, Panos K. Chrysanthis, and Kirk Pruhs. Network awareness and application adaptability. *Information Systems and E-Business Management*, 4(4):399–419, October 2006.
6. Ahmad T. Al-Hammouri, Vincenzo Liberatore, Michael S. Branicky, and Stephen M. Phillips. Complete stability region characterization for PI-AQM. *SIGBED Review*, 3(2), April 2006.
7. Nathan A. Wedge, Ahmad T. Al-Hammouri, Michael S. Branicky, and Vincenzo Liberatore. Discussion on: Development and experimental verification of a mobile client-centric networked controlled System. *European Journal of Control*, 11(2):243–246, 2005.

◆ Conference and Workshop Papers: [Presenter's name is in boldface]

1. Zaid Al-Ali, Basheer Al-Duwairi, and **Ahmad T. Al-Hammouri**. Handling system overload resulting from DDoS attacks and flash crowd events. In *IEEE International Conference on Cyber Security and Cloud Computing (CSCloud 2015)*, New York, New York, USA, November 2015.
2. **Basheer Al-Duwairi**, Ahmad Al-Hammouri, Monther Aldwairi, and Vern Paxson. GFlux: A google-based system for fast flux detection. In *IEEE Conference on Communications and Network Security (CNS 2015)*, Florence, ITALY, September 2015.
3. Mikel Armendariz, Moustafa Chenine, Ahmad Al-Hammouri, and Lars Nordström. A co-simulation platform for medium/low voltage monitoring and control applications. In *IEEE Conference on Innovative Smart Grid Technologies (ISGT 2014)*, Washington, D.C., USA, February 2014.
4. Isra' Al-Qasem, Sumaya Al-Qasem, and **Ahmad T. Al-Hammouri**. Leveraging online social networks for a real-time malware alerting system. In *IEEE Conference on Local Computer Networks (LCN 2013)*, Sydney, AUSTRALIA, October 2013.
5. Kun Zhu, Samarth Deo, Ahmad T. Al-Hammouri, Nicholas Honeth, Moustafa Chenine, Davood Babazadeh, and Lars Nordström. Test platform for synchrophasor based wide-area monitoring and control applications. In *IEEE Power and Energy Society General Meeting (PES GM 2013)*, Vancouver, British Columbia, CANADA, July 2013.
6. Davood Babazadeh, Moustafa Chenine, Kun Zhu, Lars Nordström, and Ahmad T. Al-Hammouri. A platform for wide area monitoring and control system ICT analysis and development. In *IEEE PowerTech Grenoble (PowerTech 2013)*, Grenoble, FRANCE, June 2013.
7. Kun Zhu, Ahmad T. Al-Hammouri, and Lars Nordström. Examination of data delay and packet loss for wide-area monitoring and control systems. In *IEEE International Energy Conference and Exhibition (EnergyCon 2012)*, Florence, ITALY, September 2012.
8. **Ahmad T. Al-Hammouri**, Lars Nordström, Moustafa Chenine, Luigi Vanfretti, Nicholas Honeth, and Rujiraj Leelaruij. Virtualization of synchronized phasor measurement units within real-time simulators for smart grid applications. In *IEEE Power and Energy Society General Meeting (PES GM 2012)*, San Diego, California, USA, July 2012.
9. **Kun Zhu**, Ahmad T. Al-Hammouri, and Lars Nordström. To concentrate or not to concentrate: Performance analysis of ICT system with data concentrations for wide-area monitoring and control systems. In *IEEE Power and Energy Society General Meeting (PES GM 2012)*, San Diego, California, USA, July 2012.

10. **Isra' Al-Qasem, Sumaya Al-Qasem,** and Ahmad T. Al-Hammouri. Leveraging online social networks for a real-time malware alerting system. In *Undergraduate Research Conference on Applied Computing (URC 2012)*, Dubai, UAE, April 2012. Short Abstract.
11. **Vincenzo Liberatore** and Ahmad T. Al-Hammouri. Smart grid communication and co-simulation. In *IEEE EnergyTech 2011*, Cleveland, OH, USA, May 2011.
12. **Amro J. Awad,** Hatem S. Mashaqi, Abdirahman S. Alasow, and Ahmad T. Al-Hammouri. Undoing sending an E-mail. In *Undergraduate Research Conference on Applied Computing (URC 2011)*, Dubai, UAE, May 2011. Short Abstract.
13. **Vincenzo Liberatore** and Ahmad T. Al-Hammouri. Networked control of the smart grid. In *NITRD Workshop on New Research Directions for Future Cyber-Physical Energy Systems*, Baltimore, Maryland, USA, June 2009. Available at <http://www.ece.cmu.edu/~nsf-cps/file.php?id=54>.
14. **Natheer Khasawneh,** Eyad Taqieddin, and Ahmad Al-Hammouri. Collaborative arabic morphological service. In Khalid Choukri and Bente Maegaard, editors, *International Conference on Arabic Language Resources and Tools*, Cairo, EGYPT, April 2009. The MEDAR Consortium.
15. Ahmad T. Al-Hammouri, **Michael S. Branicky,** and Vincenzo Liberatore. Co-simulation tools for networked control systems. In *International Conference on Hybrid Systems: Computation and Control (HSCC 08)*, St. Louis, MO, USA, April 2008.
16. Ahmad T. Al-Hammouri, **Vincenzo Liberatore,** Huthaifa Al-Omari, Zakaria Al-Qudah, Michael S. Branicky, and Deepak Agrawal. A co-simulation platform for actuator networks. In *ACM Conference on Embedded Networked Sensor Systems (SenSys 07)*, Sydney, AUSTRALIA, November 2007. Demonstration.
17. **Ahmad T. Al-Hammouri** and Vincenzo Liberatore. Analytic derivation of the PI-AQM stability region. In *Northeast Ohio Networking Workshop (NEONet 07)*, Baldwin Wallace College, Cleveland, OH, USA, April 2007. Short Abstract.
18. **Ahmad T. Al-Hammouri,** Michael S. Branicky, Vincenzo Liberatore, and Stephen M. Phillips. Decentralized and dynamic bandwidth allocation in networked control systems. In *International Workshop on Parallel and Distributed Real-Time Systems (WPDRTS 06)*, Island of Rhodes, GREECE, April 2006.
19. **Ahmad T. Al-Hammouri,** Vincenzo Liberatore, Michael S. Branicky, and Stephen M. Phillips. Parameterizing PI congestion controllers. In *International Workshop on Feedback Control Implementation and Design in Computing Systems and Networks (FeBID 06)*, Vancouver, CANADA, April 2006.
20. **Ahmad T. Al-Hammouri,** Vincenzo Liberatore, Huthaifa A. Al-Omari, and Stephen M. Phillips. Transversal issues in real-time sense-and-respond systems. In *ACM Workshop on End-to-End, Sense-and-Respond Systems, Applications, and Services (EESR 05)*, Seattle, WA, USA, June 2005.
21. **Ahmad T. Al-Hammouri** and Vincenzo Liberatore. Optimization congestion control for networked control systems. In *IEEE INFOCOM Student Workshop*, Miami, FL, USA, March 2005. Abstract.
22. **Ahmad T. Al-Hammouri,** Vincenzo Liberatore, and Michael S. Branicky. A testbed for networked control systems. In *Research ShowCase*, Case Western Reserve University, Cleveland, OH, USA, April 2004. Poster.
23. Ahmad T. Al-Hammouri, Adam Covitch, David Rosas, Murat Kose, Wyatt S. Newman, and **Vincenzo Liberatore.** Compliant control and software agents for Internet robotics. In *IEEE International Workshop on Object-oriented Real-time Dependable Systems (WORDS 03)*, Guadalajara, MEXICO, January 2003.
24. **Vincenzo Liberatore,** Wyatt Newman, Ahmad T. Al-Hammouri, Adam Covitch, David Rosas, and Murat Kose. Remote interaction with machines. In *Wireless Communications and Networking Workshop*, Case Western Reserve University, Cleveland, OH, USA, November 2002. Poster and live demonstration.

◆ **Talks and Presentations:** [in addition to conference/workshop presentations listed above]

1. Co-simulation and emulation platforms for the smart grid. Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, Urbana, IL, USA, August 2012. Invited Talk.
2. Cyber-physical systems: Bandwidth allocation and co-simulation. Department of Distributed Systems, Institute for Parallel and Distributed Systems, University of Stuttgart, Stuttgart, GERMANY, June 2012.

3. Cyber-physical systems security. In *NSF United-States/Middle-East Workshop On Trustworthiness in Emerging Distributed Systems and Networks*, Koc University, Istanbul, TURKEY, June 2012. Invited Talk.
4. A real-time CORBA middleware for networked surgical simulations. In *Ohio ICE Technical Conference*, University of Akron, Akron, OH, USA, October 2006.
5. Several presentations on various topics related to Networks. In *Network Chat course*, Electrical Engineering and Computer Science Department, Case Western Reserve University, Cleveland, OH, USA, 2004 – 2007.

TEACHING

◆ Courses Taught:

◆ CPE 412: Modeling and Simulation	Spring 2008
◆ CS 115: C++ Programming Language	Spring 2008
◆ CPE 412: Modeling and Simulation	Summer 2008
◆ CPE 255: Digital Logic Design Laboratory	Summer 2008
◆ CPE 412: Modeling and Simulation	Fall 2008
◆ CS 213: Advanced Data Structures	Fall 2008
◆ CS 112: Object Oriented Programming	Fall 2008
◆ CPE 255: Digital Logic Design Laboratory	Fall 2008
◆ CPE 412: Modeling and Simulation	Spring 2009
◆ CPE 254: Digital Logic Design and Computer Architecture	Spring 2009
◆ CPE 341: Applied Probability and Queuing Theory	Fall 2009
◆ CPE 254: Digital Logic Design and Computer Architecture	Fall 2009
◆ CPE 253: Digital Logic Design Laboratory	Fall 2009
◆ CPE 341: Applied Probability and Queuing Theory	Spring 2010
◆ CPE 441: Data Communications	Spring 2010
◆ CPE 253: Digital Logic Design Laboratory	Spring 2010
◆ CPE 341: Applied Probability and Queuing Theory	Fall 2010
◆ CPE 252: Computer Organization and Design	Fall 2010
◆ CPE 341: Applied Probability and Queuing Theory	Spring 2011
◆ CPE 412: Modeling and Simulation	Spring 2011
◆ CPE 253: Digital Logic Design Laboratory	Spring 2011
◆ NES 301: Probability and Queuing Theory	Fall 2011
◆ NES 201: Communication Skills	Fall 2011
◆ CPE 780: Seminar in Computer Engineering	Fall 2011
◆ NES 301: Probability and Queuing Theory	Spring 2012
◆ NES 201: Communication Skills	Spring 2012
◆ NES 301: Probability and Queuing Theory	Fall 2012
◆ NES 201: Communication Skills	Fall 2012
◆ NES 412: Network Modeling and Simulation	Spring 2013
◆ NES 201: Communication Skills	Spring 2013
◆ NES 301: Probability and Queuing Theory	Fall 2013
◆ NES 413: Computer Networks Laboratory	Fall 2013
◆ NES 595: Distributed Systems	Fall 2013
◆ NES 412: Network Modeling and Simulation	Spring 2014
◆ NES 301: Probability and Queuing Theory	Spring 2014
◆ NES 413: Computer Networks Laboratory	Spring 2014
◆ NES 595: Distributed Systems	Fall 2014
◆ NES 411: Network Programming	Fall 2014

♦ NES 413: Computer Networks Laboratory	Fall 2014
♦ NES 412: Network Modeling and Simulation	Spring 2015
♦ NES 301: Probability and Queuing Theory	Spring 2015
♦ NES 553: Networks Security Laboratory	Spring 2015
♦ NES 595: Distributed Systems	Fall 2015
♦ NES 411: Network Programming	Fall 2015
♦ NES 553: Networks Security Laboratory	Fall 2015
♦ NES 580: Software-Defined Networks	Spring 2016
♦ NES 301: Probability and Queuing Theory	Spring 2016
♦ NES 413: Computer Networks Laboratory	Spring 2016