

# Dr. Hussein Al-Zubaidy

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## Work experience

Feb. 2011 ECE, University of Toronto Toronto, Canada

### **Research Associate (Post-Doctoral Fellow)**

References: Prof. J. Liebeherr ([jorg@comm.utoronto.ca](mailto:jorg@comm.utoronto.ca))

- 1) Conducting Research:
  - Stochastic Network Calculus.
  - Stochastic modeling and optimization.
- 2) Preparing publications and technical reports.

2010-2011 SCE, Carleton University Ottawa, Canada

### **Research Associate (Post-Doctoral Fellow)**

References: Prof. C.C. Huang ([huang@sce.carleton.ca](mailto:huang@sce.carleton.ca)), Prof. Jim Yan ([jim.yan@sympatico.ca](mailto:jim.yan@sympatico.ca))

- 1) Conducting Research:
  - Cooperative communications and Wireless Relay Networks (WRN).
  - Security in wireless Ad-Hoc networks.
  - Optimal control of queuing systems.
- 2) Preparing and publishing papers and technical reports.

Summer 2009 HSNB, National Chung Cheng University (CCU) Chiya-Yi, Taiwan

### **Research Associate**

References: Prof. Ren-Hung Hwang ([rhhwang@cs.ccu.edu.tw](mailto:rhhwang@cs.ccu.edu.tw)).

- 1) Conducting Research:
  - Security in wireless Ad-Hoc networks.
  - Optimal node selection in distributed public key generation in wireless Ad-Hoc networks.
- 2) Giving talks in several universities and research labs in Taiwan, e.g., National Taiwan University (NTU), Institute of Information Science, Academia Sinica, National Cheng Kung University (NCKU), and National Sun Yat-Sen University (NSYSU).

2004–2010 Broadband Networks Lab., Carleton University Ottawa, Canada

### **Research Assistant**

References: Prof. I. Lambadaris ([ioannis@sce.carleton.ca](mailto:ioannis@sce.carleton.ca)), Prof. I. Viniotis ([candice@ncsu.edu](mailto:candice@ncsu.edu)).

- 1) Conducting Research:
  - Applied Stochastic Processes and Probability.
  - Optimal control of queuing systems using coupling method and stochastic dominance.
  - Modeling, analysis and optimization of packet scheduler in wireless systems using DP.
  - Scheduling algorithm design in emerging wireless networks.
  - Mesh networks planning, analysis and optimization.
  - Third and fourth Generation mobile networks LTE, HSPA, EVDO-EVDV.
- 2) Supervising students research work and mentoring them.
- 3) Preparing and publishing papers and technical reports to report research results.
- 4) Presenting research findings in scholarly meetings and gatherings (e.g., conferences).
- 5) Chairing technical sessions in international conferences and contributing to the reviewing and selection process of the accepted papers.
- 6) Writing proposals for the sake of securing research funding from governmental and industrial organizations.

2004–2010            System and Computer Eng., Carleton University            Ottawa, Canada

**Teaching Assistant**

References: Prof. I. Lambadaris, Prof. J. Talim, Prof. C.C. Huang and Prof. C.H. Lung.

- Supervised labs and presented tutorial sessions in OPNET, assembly programming and distributed systems programming.
- Assisted in many courses including: Computer Networks, Distributed Systems, Networks Programming, Microprocessor Systems, Digital Communications, Communication systems lab, and Communication Systems Analysis and Design.
- Mentoring, Counseling and supervising undergraduate students.

2006–2007            Carleton University Foundry Program            Ottawa, Canada

**Consultant (Innovation management)**

Reference: Mr. Luc Lalande ([luc\\_lalande@carleton.ca](mailto:luc_lalande@carleton.ca))

- Provide consultation to faculty members and students of Carleton University to help them commercialize their innovative ideas and inventions.
- Evaluate the potential of these projects and recommend funding options if deemed promising (The foundry grants funds to innovative ideas and spin-off companies).
- Provide the required professional advice and exposure by utilizing the Foundry resources and network of professionals from the surrounding community.

1997–2001            Faculty of Engineering at Hoon/ Tahaddi university            Hoon, Libya

**Faculty Member (Electrical and Computer Engineering Department)**

- Instructed the following courses: Digital Systems Design, Microprocessor Systems, Computer Networks, Computer Architecture, and Assembly Programming.
- Conducted research in the area of Wireless Communication and Networks.
- Supervised the computer systems, the Electronic Engineering, and the Communication Engineering laboratories.
- Supervised several graduation projects.
- Chaired several thesis defense committees and took part in many others.

1995–1997            Mansour College University            Baghdad, Iraq

**Faculty Member (Computer Science Dept.)**

- Instructed the following courses: Microprocessor Systems, Computer Programming (C/C++, Pascal, and BASIC), Computer Architecture, and Computer Networks.
- Supervised the Electronics lab and the Microprocessor systems lab.
- Supervised several graduation projects and was a member of many defense committees.

**Interests**

**Research fields of interest:**

- Stochastic network calculus.
- Performance analysis and optimization using queuing theory, stochastic modeling, Fluid-Based Analysis, Coupling argument and Stochastic Dominance.
- Optimal scheduling and resource allocation in wireless relay networks.
- 3G/4G mobile systems; HSDPA, HSPA, CDMA2000/EVDO/EVDV, WIMAX, LTE.
- Mesh networks analysis, planning and optimization.
- Wireless Ad Hoc and sensor networks architecture.

**Personal interests:**

Sport, music and reading. I was the captain of the soccer team of the Electrical Eng. dept.-Tahaddi University in 2001. I also play volleyball. I and my team won first place in Tahaddi University volleyball competition at Hoon, summer 2000.

## Skills

### Research skills:

I have accumulated a significant research experience from my past work such as:

- The ability for critical thinking and analysis
- The ability to identify research problems and provide intuition for the expected outcome of tackling such problems.
- Knowledge of basic and advanced research protocols and procedures
- Drafting and completing research papers and technical reports and meeting deadlines
- Presenting research findings at scholarly and professional society meetings
- Team work in collaboration with research team members and other researchers in academia and in the industry.

I also acquired many interesting analytic skills and techniques such as:

- Dynamic programming, Markov Decision Process (MDP) and POMDP.
- Stochastic Modeling, Stochastic Dominance, Dynamic coupling and sample path arguments.
- Fluid Based Analysis (FBA) approximations for queuing systems
- Queuing theory
- Network calculus.

### Simulation tools and programming languages:

I mastered several simulations and modeling software and programming languages such as; OPNET, NS-2, MathCAD, MATLAB, C/C++, VB, MPI and OpenMP parallel programming, Assembly programming (SDK86, Motorola 68020).

### Other software tools:

MiKTeX, MS-Word, MS-PowerPoint, MS-FrontPage, Excel, Adobe Acrobat Professional, and utility software, such as; NAV, Sophos anti-virus, NSW, ... etc.

## Education

2005-2010 Carleton University Ottawa, Canada

**Ph.D. Systems and Computer Engineering.** **GPA: 11.5 / 12**

- Thesis: "*Optimal Packet Scheduling in Emerging Wireless Networks.*"
- Supervisor: Prof. Ioannis Lambadaris.

2004-2005 Carleton University Ottawa, Canada

**M.A.Sc. Systems and Computer Engineering.** (*Upgraded to the PhD program in summer 2005*)

- Thesis: "*Quality of Service Provision in Third Generation HSDPA system.*"
- Supervisor: Prof. Ioannis Lambadaris.

1992-1994 University of Technology Baghdad, Iraq

**M.Sc. Communication Engineering.** **GPA: 85 / 100**

- Thesis: "*Search Strategies for Serial Search DS/Spread Spectrum Acquisition Schemes.*"
- Supervisor: Prof. Waseem W. Jibrail.

1987-1991 University of Technology Baghdad, Iraq

**B.Sc. Electronic and Communication Engineering.** **Rank: 2 out of 73**

- Graduation Project entitled: "*Micro-computer Based Micro-processor Tester Design.*"

## Honors and awards

- **NSERC Post-Doctoral Fellowship (PDF) for 2 years**, Canada, 2010.
- **NSERC Visiting Fellowship in Canadian Government Laboratories**, Canada, 2009.
- **NSERC Summer program in Taiwan**, held at CCU, Chiya Yi, Taiwan, 2009
- **Ontario Graduate Scholarship (OGS)**, held at Carleton University, 2008-2009.
- **Ontario Graduate Scholarship for Science and Technology (OGSST)** for 2 years, held at Carleton University, Ottawa, Canada, 2004-2006.
- **Dr. Roger Kaye Memorial Award**, 2007 and 2008, Carleton University, Ottawa, Canada.
- **The Minister of Higher Education prize**, for ranking the 2nd of 73 graduates in a 4 years B.Sc. program, University of Technology, Baghdad, 1991.
- Scholarship Departmental – SCE, Carleton University, for 4 years (2005 -2009).
- Domestic Tuition Scholarship-Carleton University, for 4 years (2005 -2009).
- **Best industry oriented project award**, Almansour College University, Baghdad, 1996.

## **Publications:**

### **a. Articles published or accepted in refereed journals**

1. **Al-Zubaidy, H.**, Lambadaris, I., and Talim, J. (2009) Optimal Scheduling in High Speed Downlink Packet Access Networks. ACM Transaction on Modeling and Computer Simulation (TOMACS). (25 pages + 12 pages online appendix). Sub. /Accepted: April 2009/ October 2009.
2. **Al-Zubaidy, H.**, Jibrail, W. (1998) Search Strategies for Acquisition of DS Spread Spectrum Signals. International Journal of Electronics. 84: 83-104 (22 pages).

### **b. Articles under preparation:**

3. **Al-Zubaidy, H.**, Huang C.C., Yan J., Dynamic Packet Scheduler Optimization in Wireless Relay Networks. Submitted to JSAC. Feb.1, 2011 (30 pages).
4. **Al-Zubaidy, H.**, Lambadaris, I. and Viniotis, I. Optimal Scheduling Policies in a Multi-server Homogeneous Queuing System with Random Connectivity. To be submitted to IEEE Transactions on Information Theory. (17 pages).
5. **Al-Zubaidy, H.**, Huang C.C., Yan J., Throughput Optimization for Packet Scheduling in Wireless Relay Networks. (20 pages).
6. **Al-Zubaidy, H.**, Lambadaris, I., Viniotis, I., Scheduler Optimization in A Multi-Server System of Parallel Queues With Random Connectivity and Packet Retransmission. (12 pages).
7. **Al-Zubaidy, H.**, Huang C.C., Lambadaris, I., Viniotis, I., Yan J., Optimal Key Generation Policies for Threshold Security Scheme in Mobile Ad-Hoc Networks. (10 pages).

### **c. Other refereed contributions (Conferences)**

1. **Al-Zubaidy, H.**, Huang C.C., Yan J., Most Balancing Algorithms for Optimal Packet Scheduling in Multi-Server Wireless Systems. Accepted in WCNC'2011, Mexico.
2. **Al-Zubaidy, H.**, I. Lambadaris, I. Viniotis, C. C. Huang, R. H. Hwang, (2010) Optimal Key Generation Policies for MANET Security. Globecom'10, Miami, USA.
3. **Al-Zubaidy, H.**, Lambadaris, I., Viniotis, I., Yu, R. (2010) Optimal Multi-server Allocation to parallel queues with random connectivity and retransmissions. ICC'10, South Africa.
4. **Al-Zubaidy, H.**, Lambadaris, I., Viniotis, I. (2009) Optimal Resource Scheduling in Wireless Multi-service Systems with Random Channel Connectivity. IEEE Globecom'09, USA.
5. **Al-Zubaidy, H.**, Lambadaris, I., and Talim, J. (2008) Code Allocation Policy Optimization in HSDPA Networks Using FSMC Channel Model. IEEE WCNC'08, USA.
6. **Al-Zubaidy, H.**, Lambadaris, I., and Talim, J. (2008) Analytic Evaluation of Achievable Downlink Service Rate and Server Sharing in 3G Wireless Networks. ICTTA'08, Syria.
7. Abou El Saoud, M., **Al-Zubaidy, H.**, and Mahmoud, S. (2008) Connectivity Model for Wireless Mesh Networks. ICC'08, Beijing, China.
8. Abou El Saoud, M., Mahmoud, S., **Al-Zubaidy, H.** (2008) Effect of Inter-Link Dependencies on the Connectivity of Wireless Mesh Networks. IEEE WCNC'08, USA.
9. **Al-Zubaidy, H.**, Talim, J., and Lambadaris, I. (2007) Dynamic Scheduling in High Speed Downlink Packet Access Networks: Heuristic Approach. MILCOM07, USA.
10. **Al-Zubaidy, H.**, Lambadaris, I., Talim, J. (2007) Determination of Optimal Policy for Code Allocation in High Speed Downlink Packet Access with Multi-State Channel Model. ACM/IEEE MSWiM'07, Greece.
11. **Al-Zubaidy, H.** (2007) Downlink Scheduler Optimization in HSDPA Networks. Communication, 2nd Canadian Summer School on Comm. and Info. Theory, Banff, Canada.

12. **Al-Zubaidy, H.**, Lambadaris, I., Talim, J. (2007) Service Rate Determination for Group of Users with Random Connectivity Sharing a Single Wireless Link. IASTED WOC 2007 Montreal, Canada.
13. **Al-Zubaidy, H.**, Talim, J., Lambadaris, I. (2007) Optimal Scheduling Policy Determination for High Speed Downlink Packet Access. IEEE ICC'07, Scotland.
14. **Al-Zubaidy, H.**, Lambadaris, I., Talim, J. (2007) Downlink Scheduler Optimization in High-Speed Downlink Packet Access Networks. 26th IEEE INFOCOM'07, USA.
15. **Al-Zubaidy, H.**, Talim, J., Lambadaris, I. (2007) Heuristic Approach of Optimal Code Allocation in High Speed Downlink Packet Access Networks. ICN'07, French Caribbean.
16. **Al-Zubaidy, H.**, and Omari, T. (2006) RED Performance Evaluation Using Stochastic Modeling and Fluid-Based Analysis. CCECE06, Canada.
17. Omari, T., and **Al-Zubaidy, H.** (2005) Call Center Performance Evaluation. CCECE05, Canada.

#### **d. Non-refereed contributions**

##### **Technical reports (TR):**

1. **Al-Zubaidy, H.** (2009) Optimal Node Selection for Distributed Security Management in Wireless Systems. TR # SCE-09-12, SCE, Carleton University (Collaboration with DRDC).
2. **Al-Zubaidy, H.** (2009) Optimal Control of Parallel Queues Served by Two Homogeneous Randomly Connected Servers with Retransmission. TR # SCE-09-11, SCE, Carleton Univ.
3. **Al-Zubaidy, H.** (2009) Optimal Channel Resource Allocation in Emerging Wireless Networks. TR# SCE-09-02, SCE, Carleton University.
4. **Al-Zubaidy, H.**, Talim, J., and Lambadaris, I. (2006) Optimal Scheduling in High Speed Downlink Packet Access Systems. TR # SCE-06-16, SCE, Carleton University.
5. **Al-Zubaidy, H.** (2006) Dynamic Frequency Hopping (DFH) in Mobile Communication. TR # SCE-06-17, SCE, Carleton University.
6. **Al-Zubaidy, H.** (1994) Search Strategies for Serial Search Direct-Sequence Spread Spectrum Acquisition Schemes. M.Sc. Thesis, University of Technology.

##### **Conference presentations (most recent):**

1. IEEE Globecom'09. Honolulu, HI, USA. Dec. 2009.
2. IEEE International Wireless Comm. and Networking Conference WCNC. USA. Mar. 2008.
3. IEEE International Conference on Information & Comm. Technologies ICTTA. Syria 2008.
4. Two presentations. International Military Comm. Conference MILCOM. Orlando, USA. Oct 2007.
5. Three presentations. IEEE International Conference on Communications ICC. Scotland. June 2007.
6. International IASTED Wireless and Optical Communications. Montreal, Canada. May 2007.
7. Canadian CCECE'06, Ottawa, May 2006; and CCECE'05, Saskatchewan, May 2005, Canada.

##### **Invited talks (most recent):**

1. Optimal Allocation of Multiple Servers to Parallel Queues with Independent Random Connectivity. Comm. Group seminar series, U. of T., Toronto. Dec. 2010.
2. Optimal Packet Scheduling in Wireless Networks. BCWS Seminar Series, Carleton Univ. 2009.
3. Invited talks at National Taiwan Univ. and at Institute of Information Science, Taipei, Taiwan 2009.
4. Two invited talks at National Cheng Kung University (NCKU) in Kaohsiung and National Sun Yat-Sen University (NSYSU) in Tainan, Taiwan. July 2009.
5. Downlink Scheduler Optimization in HSDPA Networks. Canadian Summer School on Communications and Information Theory, Banff, August 2007.
6. Optimal Scheduling in HSDPA: Dynamic Programming Approach, Carleton University Fall 2006.