TAMER ELBATT

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EDUCATION

1996-2000 **University of Maryland, College Park**
Ph.D., Electrical and Computer Engineering
Major: Communications**, Minor:** Computer
Dissertation Title: "On the Design of Satellite-Terrestrial Hybrid Wireless Systems"
Advisor: Prof. Anthony Ephremides

1993-1996 **Cairo University, Giza, Egypt**
M.Sc., Electronics and Communications Engineering
Major: Computer Networks
Thesis Title: "Jitter Analysis and Timing Recovery for Multimedia Traffic in ATM Networks"
Advisor: Prof. Samir Shaheen and Prof. Mustafa Mutwalli

1988-1993 **Cairo University, Giza, Egypt**
B.Sc., Electronics and Communications Engineering
Ranked 4th in a class of 250 students

RESEARCH INTERESTS

My domain of interest is university education with focus on teaching and research where I could have the opportunity to address challenging problems at the core of state-of-the-art technologies and innovations. In addition, I have strong commitment towards teaching in order to disseminate the fundamental principles underlying wireless networking and mobile computing and integrate the research findings into senior undergraduate projects and advanced elective and graduate courses. My research expertise lies within the broad areas of performance analysis, modeling, design, optimization, protocol design and novel applications of wireless and mobile networks. It spans the areas of Internet of things, 5G, green networks, queuing theory, cognitive radios and networks, cooperative networking, cross-layer optimization, MAC, sensor and vehicular networks, content delivery and emerging mobile applications. Other interests include RF energy harvesting networks, mobile healthcare, mesh networks, 802.15.4, LTE, and capacity of wireless networks.

PROFESSIONAL EXPERIENCE

- **The American University in Cairo, New Cairo, Egypt**

Dept. of Computer Science and Engineering
Associate Professor (July 2017 – present)

- **Cairo University, Faculty of Engineering, Giza, Egypt**

Dept. of Electronics & Communications Engineering

Associate Professor (on leave) (Sept. 2014 – Aug. 2017)
Assistant Professor (July 2009 – Sept. 2014)

- **Nile University, Giza, Egypt**

Wireless Intelligent Networks Center (WINC)
Director, WINC (Oct. 2012 – June 2017)
Adjunct Associate Professor (Sept. 2014 – June 2017)
Adjunct Assistant Professor (Oct. 2009 – Sept. 2014)

- **University of Padova, Italy**

Department of Information Engineering
Visiting Professor (Aug. 2015 – Sept. 2015)

- **Sabanci University, Istanbul, Turkey**

Faculty of Engineering and Natural Sciences (FENS)
Visiting Professor (Aug. 2013 – Sept. 2013)

- **Politecnico di Torino, Italy**

Electronics Department
Visiting Professor (Aug. 2010 – Sept. 2010)

- **Lockheed Martin**

Advanced Technology Center (ATC), Palo Alto, CA, USA
Senior Research Scientist (Jan. 2008 – July 2009)

Led the Communications and Networking R&D Group:
- Shaping group's vision and Internal R&D portfolio.
- Leading research on Network Utility Maximization (NUM) based wireless networking and mesh networking testbed.
- Leading Intra-LM projects and government proposal efforts.

- **San Diego Research Center, USA**

Networking and Systems Research
Senior Network Research Staff Member/Principal Investigator (Aug. 2006- Jan. 2008)

Led research and development projects in the following areas:
- MIMO Networking: cross-layer MIMO-MAC resource allocation to balance the multiple access throughput and reliability trade-offs under varying levels of interference.
- Multi-radio Multi-channel Topology Control for wireless mesh networks.

- **HRL Laboratories, LLC, Malibu, CA, USA**

Information and System Sciences Laboratory
Research Staff Member (Sept. 2000 – Nov. 2003)
Research Scientist/Principal Investigator (Dec. 2003 – Aug. 2006)

Initiated and led numerous wireless projects including:
- Cross-layer protocol design for wireless ad hoc networks with emphasis on the joint design of multiple access and routing protocols.

- DARPA Connectionless Networks (CN) program with emphasis on energy-efficient 802.11 MAC and integrated protocol stack development.
- Applications of short range wireless communications, with special emphasis on IEEE 802.15.4 (ZigBee), inside vehicles.
- Mobile ad hoc networking for inter-vehicle communications with emphasis on evaluating the emerging 802.11a-based dedicated short range communication (DSRC) standard for active safety and telematics applications.
- Active participation in the IEEE 802 standards with emphasis on Task Group P focused on Wireless Access for the Vehicular Environment (WAVE).
- DARPA Next Generation Internet (NGI) program with emphasis on developing a dynamic load switching algorithm for hybrid RF/Free space optical wireless links.
- DARPA Airborne Communications Node (ACN) program with emphasis on MAC design, dynamic frequency allocation, and mobility management.
- 802.11 MAC and neighbor discovery for ad hoc networks using switched-beam and beam forming antennas.
- Scalability study of cooperative data compression in dense sensor networks.

- **HRL Laboratories, LLC, Malibu, CA, USA**

Information Sciences Laboratory
Summer Intern (May 1999 – Aug. 1999)
Investigated the impact of transmission power adjustment on the end-to-end throughput of mobile ad hoc networks with the aid of a simulation study using OPNET simulation package.

- **University of Maryland, College Park, MD, USA**

Institute for Systems Research (ISR)
Graduate Research Assistant (Sept. 1996 – Aug. 2000)

- **Cairo University, Faculty of Engineering, Giza, Egypt**

Electronics and Communications Engineering Dept.
Teaching and Research Assistant (Sept. 1993 – Aug. 1996)
Teaching Responsibilities: preparing and grading homework problem sets and mid-term exams and holding regular office hours for the following undergraduate courses: Electrical Circuits Theory, Computer Engineering, and Computer Architecture.
Research Responsibilities: conducted a jitter analysis study for multimedia traffic in ATM networks. Two jitter levels were studied; jitter within a traffic flow, and jitter between different multimedia traffic components (inter-flows jitter). In addition, we investigated the necessity of employing a traffic recovery algorithm and its best location within the network.

SELECTED PUBLICATIONS

Book Chapters

1. Y. Khazbak, M. Ezz, T. ElBatt and M. Youssef, "Cost-Effective Networking for Mobile Healthcare," Book Chapter in Health Informatics: An Adaptive Communication Technology for future Healthcare, Edited by Naveen Chilamkurti, **Nova Publishers, Inc.**, 2013.

Journals

1. A. Elmahdy, A. El-Keyi, Y. Mohasseb, T. ElBatt, M. Nafie, K. Seddik, T. Khattab, "Degrees of Freedom of the Full-duplex Asymmetric MIMO 3-Way Channel with Unicast and Broadcast Messages," **IEEE Transactions on Communications**, accepted for publication, Jan. 2017.

2. A. Elmahdy, A. El-Keyi, T. ElBatt, K. Seddik, “Optimizing Cooperative Cognitive Radio Networks Performance with Primary QoS Provisioning,” **IEEE Transactions on Communications**, accepted for publication, Oct. 2016.
3. M. Ashour, M. Butt, A. Mohamed, T. ElBatt, M. Krunz, “Energy-Aware Cooperative Wireless Networks with Multiple Cognitive Users,” **IEEE Transactions on Communications**, accepted for publication, May 2016.
4. Y. Khazbak, M. Izz, T. ElBatt, A. Fahim, A. Guirguis, M. Youssef, "Cost-Effective Data Transfer for Mobile Healthcare," **IEEE Systems Journal**, accepted for publication, Feb. 2016.
5. A. Ibrahim, O. Ercetin, T. ElBatt, “Stability Analysis of Slotted Aloha with Opportunistic RF Energy Harvesting,” **IEEE Journal on Selected Areas in Communications**, Series on Green Communications and Networking, vol. 34, no. 5, pp. 1477-1490, May 2016.
6. A. Anwar, K. Seddik, T. ElBatt, A. Zahran, “Effective Capacity of Delay Constrained Cognitive Radio Links Exploiting Primary Feedback,” **IEEE Transactions on Vehicular Technology**, accepted for publication, Sept. 2015.
7. M. Ashour, A. El-Sherif, T. ElBatt, A. Mohamed, “Cognitive Radio Networks with Probabilistic Relaying: Stable Throughput and Delay Tradeoffs,” **IEEE Transactions on Communications**, vol. 63, no. 11, pp. 4002-4014, Nov. 2015.
8. H. Saad, A. Mohamed, T. ElBatt, “Cooperative Q-learning Techniques for Distributed Online Power Allocation in Femtocell Networks,” **Wiley Wireless Communications and Mobile Computing Journal**, vol. 15, pp. 1929-1944, Oct. 2015.
9. A. Arafa, K. Seddik, A. Sultan, T. ElBatt, A. El-Sherif, "A Feedback- Soft Sensing-Based Access Scheme for Cognitive Radio Networks," **IEEE Transactions on Wireless Communications**, vol. 12, no. 7, July 2013.
10. T. ElBatt, “On the Scheduling, Multiplexing and Diversity Trade-off in MIMO Ad hoc Networks: A Unified Framework,” **Elsevier Ad hoc Networks**, vol. 11, no. 2, March 2013.
11. F. Bai, H. Krishnan, T. ElBatt, G. Holland, "Towards Characterizing and Classifying Communication-based Automotive Applications from a Wireless Networking Perspective," **Inderscience International Journal of Vehicle Autonomous Systems (IJVAS)**, vol. 10, no. 3, 2012.
12. A. Attia, A. El-Moslimany, A. El-Keyi, T. ElBatt, F. Bai, and C. Saraydar, "MIMO Vehicular Networks: Research Challenges and Opportunities," **Academy Publisher Journal of Communications**, SI on Future Directions in Computing and Networking, Invited Paper, vol. 7 , no. 7, July 2012.
13. A. Nordio, C-F. Chiasserini, T. ElBatt, “Fair Traffic Relaying for Two-Source-One-Destination Wireless Networks,” **IEEE Wireless Communications Letters**, vol. 1, no. 1, Feb. 2012.
14. T. ElBatt, "On the Scheduling and Multiplexing Throughput Trade-off in MIMO Networks", **Springer LNICST**, vol. 66, part 2, pp. 178-197, Jan. 2012.
15. A. Fathy, T. ElBatt and M. Youssef, “A Source Authentication Scheme Using Network Coding,” **Inderscience International Journal of Security and Networks**, vol. 6, no. 2/3, Nov. 2011.
16. T. ElBatt and T. Andersen, “A Cross-layer Framework for Multiple Access and Routing Design in Wireless Multi-hop Networks,” **Wiley Wireless Communications and Mobile Computing Journal**, vol. 11, no. 8, Aug. 2011.
17. T. ElBatt, “On the Trade-offs of Cooperative Data Compression in Wireless Sensor Networks with Spatial Correlations,” **IEEE Transactions on Wireless Communications**, vol. 8, no.5, May 2009.
18. T. ElBatt and A. Ephremides, “Joint Scheduling and Power Control for Wireless Ad Hoc Networks,” **IEEE Transactions on Wireless Communications**, vol. 3, Jan. 2004.

19. H. Izadpanah, T. ElBatt, V. Kukshya, F. Dolezal and B. Ryu, "High-Availability Free Space Optical and RF Hybrid Wireless Networks," **IEEE Wireless Communications Magazine**, vol. 10, no. 2, April 2003.
20. T. ElBatt and A. Ephremides, "Design Aspects of Satellite Cellular Hybrid Wireless Systems," **Wiley International Journal of Satellite Communications**, vol. 20, March 2002.
21. T. ElBatt and A. Ephremides, "Optimization of Connection-oriented, Mobile, Hybrid Systems," **IEEE Journal on Selected Areas in Communications**, vol. 17, Feb. 1999.

Conferences

1. A. Girgis, O. Ercetin, M. Nafie, T. ElBatt, "Decentralized Coded Caching in Wireless Networks: Trade-off between Storage and Latency," accepted to IEEE **ISIT**, Aachen, Germany, June 2017.
2. R. Hassan, A. Mohamed, J. Tadrous, M. Nafie, T. ElBatt, F. Digham, "Dynamic Proactive Caching in Relay Networks," accepted to CCDWN Workshop, in conjunction with **WiOpt**, Paris, France, May 2017.
3. M. Abd El-magid, A. Biason, T. ElBatt, K. Seddik, M. Zorzi, "Non-orthogonal Multiple Access Schemes in Wireless Powered Communication Networks," accepted to IEEE **ICC**, Paris, France, May 2017.
4. M. Abd-Elmagid, T. ElBatt, K. Seddik, "On the Role of Finite Queues in Cooperative Cognitive Radio Networks with Energy Harvesting," IEEE **ICNC**, Silicon Valley, CA, USA, Jan. 2017.
5. D. Kiwan, A. El-Sherif, T. ElBatt, "Stability Analysis of a Cognitive Radio System with a Dedicated Relay," IEEE **ICNC** Workshop on Computing, Networks and Communications, Silicon Valley, CA, USA, Jan. 2017.
6. M. Zohdy, T. ElBatt, M. Nafie and O. Ercetin, "RF Energy Harvesting in Wireless Networks with HARQ," IEEE **Globecom** Workshop on Wireless Energy Harvesting Communication Networks, Washington D.C., USA, Dec. 2016.
7. A. Elmahdy, A. El-Keyi, Y. Mohassab, T. ElBatt, M. Nafie, K. Seddik, "Asymmetric Degrees of Freedom of the Full-Duplex MIMO 3-Way Channel," IEEE **ITW**, Cambridge, UK, Sept. 2016.
8. M. Mohamed, T. ElBatt, K. Seddik, "Sparse Spectrum Sensing in Infrastructure-less Cognitive Radio Networks via Binary Consensus Algorithms," IEEE **PIMRC**, Valencia, Spain, Sept. 2016.
9. M. K. Abdel-Aziz, A. Zahran, T. ElBatt, "A Novel Framework For Scalable Video Streaming Over Multi-Channel Multi-Radio Wireless Mesh Networks," ACM Multimedia Systems 2016 Conference (**MMSys**), Klagenfurt am Worthersee, Austria, May 2016.
10. M. Abd El-magid, A. Biason, T. ElBatt, K. Seddik, M. Zorzi, "On Optimal Policies in Full-Duplex Wireless Powered Communication Networks," **WiOpt**, Tempe, Arizona, USA, May 2016.
11. A. Fahim, T. ElBatt, "Multi-Reader RFID Tag Identification using Bit Tracking (MRTI-BT)," IEEE **RFID**, Orlando, Florida, USA, May 2016.
12. M. Said, O. Nasr, T. ElBatt, "Cell Outage Compensation Algorithm for Frequency Reuse One and ICIC LTE Networks," IEEE **WCNC**, Doha, Qatar, April 2016.
13. A. Elmahdy, A. El-Keyi, T. ElBatt, K. Seddik, "On Optimizing Cooperative Cognitive User Performance under Primary QoS Constraints," IEEE **WCNC**, Doha, Qatar, April 2016.
14. M. ElSherief, T. ElBatt, A. Zahran, A. Helmy, "An Information-theoretic Model for Knowledge Sharing in Opportunistic Social Networks," The 8th IEEE **SocialCom**, Chengdu, China, Dec. 2015.

15. A. Bedewy, A. El-Sherif, K. Seddik, T. ElBatt, "Cooperative MAC for Cognitive Radio Network with Energy Harvesting and Randomized Service Policy," SDRANCAN Workshop in conjunction with IEEE **Globecom**, Dec. 2015.
16. M. Abd-Elmagid, T. ElBatt, K. Seddik, "Optimization of Wireless Powered Communication Networks with Heterogeneous Nodes," IEEE **Globecom**, San Diego, CA, USA, Dec. 2015.
17. S. Elazzouni, O. Ercetin, A. El-Keyi, T. ElBatt, M. Nafie, "Full-duplex Cooperative Cognitive Radio Networks," **WiOpt**, Mumbai, India, May 2015.
18. M. Zohdy, T. ElBatt, M. Nafie, "Maximum Throughput Opportunistic Network Coding in Two-way Relay Networks," IEEE **ICC** 7th Workshop on Cooperative and Cognitive Networks, London, UK, June 2015.
19. A. Ibrahim, O. Ercetin, T. ElBatt, "Analytical Markov Model for Slotted Aloha with Opportunistic RF Energy Harvesting," IEEE **ICC** Workshop on Green Communications and Networks with Energy Harvesting, Smart Grids and Renewable Energies, London, UK, June 2015.
20. A. Anwar, K. Seddik, T. ElBatt, A. Zahran, "On the Effective Capacity of Delay Constrained Cognitive Radio Networks with Relaying Capability," EAI Cognitive Radios for 5G Networks Workshop in conjunction with **CrownCom** 2015, Doha, Qatar, April 2015.
21. M. Elkadi, K. Seddik, T. ElBatt, Y. Mohasseb, "Effective Capacity and Delay Optimization in Cognitive Radio Networks," EAI **Crowncom** 2015, Doha, Qatar, April 2015.
22. Y. Shabara, A. Zahran, T. ElBatt, "Efficient Spectrum Access Strategies for Cognitive Networks with General Idle Time Statistics," IEEE **ICC**, London, UK, June 2015.
23. I. Abdalla, T. ElBatt, M. Nafie, F. Digham, "Towards Optimal Power Control for Delay-Constrained Cognitive Radio Networks," IEEE **ICNC**, Feb. 2015.
24. A. Anwar, A. El Shafie, A. Mohamed, T. ElBatt, M. Guizani, "Interference-based Optimal Power-Efficient Access Scheme for Cognitive Radio Networks," IEEE **ICNC**, Feb. 2015.
25. A. Salama, A. Zahran, T. ElBatt, "Fractional Sequential Sensing for Energy Efficient Cooperative Cognitive Radio Networks," IEEE **GlobalSIP**, Dec. 2014.
26. H.Y. Lateef, C-F. Chiasserini, T. ElBatt, A. Mohamed and M. Guizani, "Towards Energy Efficient Relay Placement and Load Balancing in Future Wireless Networks," IEEE **PIMRC**, Sept. 2014.
27. A. El-Mahdy, A. El-Keyi, T. ElBatt and K. Seddik, "On the Stable Throughput of Cooperative Radio Networks with Finite Relaying Buffer," IEEE **PIMRC**, Sept. 2014.
28. I. Samy, A. Zahran and T. ElBatt, "Joint Relay Assignment and Adaptive Modulation for Energy-Efficient Cellular Networks," IEEE **PIMRC**, Sept. 2014.
29. M. Butt, A. Anwar, A. Mohamed and T. ElBatt, "Effective Capacity of Cognitive Radio Links: Accessing Primary Feedback Erroneously," **ISWCS**, Aug. 2014.
30. O. Shoukry, M. Abd ElMohsen, J. Tadrous, H. El Gamal, T. ElBatt, N. Wanas, Y. El-Nakieb and M. Khairy, "Proactive Scheduling for Content Pre-fetching in Mobile Networks," IEEE **ICC**, June 2014.
31. M. Ashour, A. El-Sherif, T. ElBatt and A. Mohamed, "Cooperative Access in Cognitive Radio Networks: Stable Throughput and Delay Trade-offs," WiOpt, **May** 2014.
32. M. El-Sherief, T. ElBatt, A. Zahran and A. Helmy, "The Quest for User Similarity in Mobile Societies," 2nd International Workshop on Social and Community Intelligence **(SCI-14)** in conjunction with **IEEE PerCom**, March 2014.
33. A. Arafa, K. Seddik, A. Sultan, T. ElBatt and A. El-Sherif, "A Feedback- Soft Sensing-Based Cognitive Access Scheme with Feedback Erasures," IEEE **WCNC**, April 2014.
34. H. Saad, A. Mohamed and T. ElBatt, "A Cooperative Q-learning Approach for Distributed Resource Allocation in Multi-user Femtocell Networks," IEEE **WCNC**, April 2014.
35. A. Ibrahim, T. ElBatt and A. El-Keyi, "Coverage Probability Analysis for Wireless Networks Using Repulsive Point Processes," IEEE **PIMRC**, Sept. 2013.

36. H. Saad, A. Mohamed and T. ElBatt, "A Cooperative Q-learning Approach for Online Power Allocation in Femtocell Networks," IEEE **VTC** Fall, Sept. 2013.
37. M. El-Sherif, T. ElBatt, A. Zahran and A. Helmy, "Demo: O'BTW- An Opportunistic, Similarity-based Mobile Recommendation System," ACM **Mobisys**, June 2013.
38. M. Assem, O. Shoukry, H. El Gamal, T. ElBatt, N. Wanas, M. Abdel Raouf, M. Zakaria, A. Abdelkader and H. Zaied, "Demo: *PAUL*- Proactive Automated mobile User-centric content deLivery," ACM **Mobisys**, June 2013.
39. A. Anwar, K. Seddik, T. ElBatt and A. Zahran, "Effective Capacity of Delay Constrained Cognitive Radio Links Exploiting Primary Feedback," IEEE/IFIP **WiOpt**, May 2013.
40. A. Fathy, T. ElBatt and M. Youssef, "On the Flow Anonymity Problem in Network Coding," **IWCMC**, July 2013. (Invited Paper)
41. A. Abdel-Hamid, A. Zahran and T. ElBatt, "Improved Spectrum Mobility Using Virtual Reservation in Collaborative Cognitive Radio Networks," IEEE **ISCC**, July 2013.
42. E. Naguib, T. ElBatt and M. Nafie, "Buffer Aware Power Control for Cognitive Radio Networks," **Asilomar** Conference on Signals, Systems and Computers, to appear, Nov. 2012.
43. A. Abotabl, A. El-Keyi, Y. Mohasseb, T. ElBatt, "Reduced-Complexity SFBC-OFDM for Vehicular Channels with High Mobility," IEEE **VTC Fall**, Quebec, Canada, Sept. 2012.
44. H. Saad, A. Mohamed and T. ElBatt, "Distributed Cooperative Q-learning for Power Allocation in Cognitive Femtocell Networks," IEEE **VTC Fall**, Sept. 2012.
45. M. Izz, Y. Khazbak, T. ElBatt and M. Youssef, "Demo: *CellChek:* Demonstrating a Cost effective Cell Phone-based Patient Monitoring and Advising System," ACM **Mobisys**, June 2012.
46. A. Arafa, K. Seddik, A. Sultan, T. ElBatt and A. El-Sherif, "A Soft Sensing-Based Cognitive Access Scheme Exploiting Primary Feedback," 10th International Symposium of Modeling and Optimization of Mobile, Ad Hoc, and Wireless Networks (**WiOpt**), May 2012.
47. M. Khafagy, A. El-Keyi, M. Nafie and T. ElBatt, "Degrees of Freedom for separated and non-separated Half-Duplex Cellular MIMO Two-way Relay Channels," IEEE **ICC,** June 2012.
48. N. Helal, K. Seddik, A. El-Keyi, and T. ElBatt, "A Feedback-based Access Scheme for Cognitive-Relaying Networks," IEEE **WCNC**, April, 2012.
49. O. Attia and T. ElBatt, "On the Role of Vehicular Mobility in Cooperative Content Caching," IEEE Workshop on Wireless Vehicular Communications and Networks (**WVCN**) in conjunction with WCNC, April 2012.
50. M. Khafagy, A. El-Keyi, T. ElBatt and M. Nafie, "Joint Power Allocation and Beamforming for Multi-user MIMO Two-way Relay Networks," IEEE **PIMRC,** Sept. 2011.
51. A. El-Keyi, T. ElBatt, F. Bai and C. Saraydar, "MIMO VANETs: Research Challenges and Opportunities," (**Invited Paper**) The International Conference on Computing, Networking and Communications **(ICNC)**, Jan. 2012.
52. A. Fathy, T. ElBatt and M. Youssef, "SANC: Source Authentication Using Network Coding," 1st IEEE Workshop on Security in Computers, Networking and Communications (**SCNC**) in conjunction with INFOCOM, April 2011.
53. A. Ewaisha, A. Sultan and T. ElBatt, "Optimization of Channel Sensing Time and Order for Cognitive Radios," IEEE **WCNC**, March 2011.
54. T. ElBatt, "On the Scheduling and Multiplexing Throughput Trade-off in MIMO Networks," ICST **BROADNETS**, Oct. 2010.
55. T. ElBatt, "Cross-layer Diversity and Scheduling Optimization for Interference-limited MIMO Ad hoc Networks," IEEE **GLOBECOM**, Dec. 2008.
56. P. Bose et al., "Network Utility Maximization-based Mobile Ad hoc Networking: A Reality Check," IEEE **MILCOM**, Nov. 2008.

57. J. Pandya et al., "Evaluation Framework for Theory Driven Mobile Ad hoc Networking Protocol Designs," **OPNETWORK**, Aug. 2008.
58. M. Ahmed et al., "Intra-vehicular Wireless Networks," 2nd IEEE Workshop on Automotive Networking and Applications (in conjunction with **GLOBECOM**), Nov. 2007.
59. T. ElBatt, "Towards Scheduling MIMO Links in Interference-limited Wireless Ad Hoc Networks," IEEE **MILCOM**, Oct. 2007.
60. F. Bai, T. ElBatt, G. Holland, H. Krishnan, V. Sadekar, "Towards Characterizing and Classifying Communication-based Automotive Applications from a Wireless Networking Perspective**,**" 1st IEEE Workshop on Automotive Networking and Applications (in conjunction with **GLOBECOM**), Dec. 2006.
61. J. Yin, G. Holland, T. ElBatt, F. Bai, and H. Krishnan, "DSRC Channel Fading Analysis from Empirical Measurement," The International Workshop on Vehicle Communications and Applications (**Vehiclecomm**) (in conjunction with Chinacom), Oct. 2006.
62. T. ElBatt, S. Goel, G. Holland, H. Krishnan and J. Parikh, "Cooperative Collision Warning Using Dedicated Short Range Wireless Communications," 3rd ACM workshop on Vehicular Ad Hoc Networks (**VANET**), Sept. 2006.
63. S. Goel, T. ElBatt and M. B. Srivastava, "Towards Balancing Medium Access Energy Trade-offs in Wireless Sensor Networks," 1st International Workshop on Advances in Sensor Networks (in conjunction with **MOBIQUITOUS**), July 2006.
64. T. ElBatt and T. Andersen, "Cross-layer Interference-aware Routing for Wireless Multi-hop Networks," IEEE/ACM International Wireless Communications and Mobile Computing Conference (**IWCMC**), July 2006.
65. T. ElBatt, C. Saraydar, M. Ames, and T. Talty, "Potential for Intra-vehicle Wireless Automotive Sensor Networks," 2006 IEEE **Sarnoff** Symposium, March 2006.
66. S. Goel, T. ElBatt and M. B. Srivastava, "Multi-modal MAC Design for Energy-efficient Wireless Networks," 2nd IEEE International Conference on Mobile Ad hoc and Sensor Systems (**MASS**), Nov. 2005.
67. J. Yin, T. ElBatt, G. Yeung, B. Ryu, S. Habermas, H. Krishnan and T. Talty, "Performance Evaluation of Safety Applications over DSRC Vehicular Ad Hoc Networks," First ACM workshop on Vehicular Ad Hoc Networks (**VANET**), Oct. 2004.
68. T. ElBatt, "On the Cooperation Strategies for Dense Sensor Networks," IEEE International Conference on Communications (**ICC**), June 2004.
69. T. ElBatt, "On the Scalability of Hierarchical Cooperation for Dense Sensor Networks," International Symposium on Information Processing in Sensor Networks (**IPSN**), April 2004.
70. B. Ryu, T. Andersen, and T. ElBatt, "Multi-tier Mobile Ad Hoc Routing," IEEE Vehicular Technology Conference (**VTC**), Oct. 2003.
71. B. Ryu, T. Andersen, T. ElBatt and Y. Zhang, "Multi-tier Mobile Ad Hoc Networks: Architecture, Protocols, and Performance," IEEE **MILCOM**, Oct. 2003.
72. T. ElBatt, T. Andersen and B. Ryu, "Performance Evaluation of Multiple Access Protocols for Ad hoc Networks Using Directional Antennas," IEEE Wireless Communications and Networking Conference (**WCNC**), March 2003.
73. T. ElBatt and B. Ryu, "On the Channel Reservation Schemes for Ad hoc Networks Utilizing Directional Antennas," 5th IEEE International Symposium on Wireless Personal Multimedia Communications (**WPMC**), Oct. 2002.
74. T. ElBatt and A. Ephremides, "Joint Scheduling and Power Control for Wireless Ad hoc Networks," IEEE Computer and Communications Conference (**INFOCOM**), June 2002.
75. B. Ryu, T. Andersen, M. Ahmed, T. ElBatt and A. Peterson, "Research Tools for 3-D Mobile Ad hoc Networking with Directional Antennas," 1st IEEE Symposium on Autonomous, Intelligent Networks and Systems (**AINS**), May 2002.

76. H. Izadpanah, T. ElBatt and G. Tangonan, "MM-Wave and Optical Hybrid Wireless Link Design and Implementation for All Weather and High Availability," The 4th Topical Symposium on Millimeter Waves (**TSMMW**), March 2002.
77. T. ElBatt and B. Ryu, "Priority-based Dynamic Packet Reservation for TDMA Wireless Networks," IEEE Military Communications Conference (**MILCOM**), Oct. 2001.
78. T. ElBatt and H. Izadpanah, "Design Aspects of Hybrid RF/Free Space Optical Wireless Networks," IEEE Emerging Technologies Symposium (**ETS**), September 2001.
79. T. ElBatt and A. Ephremides, "Optimal Call Re-Assignment in Hybrid Wireless Systems," 19th AIAA International Communication Satellite Systems Conference (**ICSSC**), April 2001.
80. T. ElBatt, S. Krishnamurthy, D. Connors and S. Dao, "Power Management for Throughput Enhancement in Wireless Ad hoc Networks," IEEE International Conference on Communications (**ICC**), June 2000.
81. T. ElBatt and A. Ephremides, "Frequency Reuse Impact on the Optimum Channel Partitioning for Hybrid Wireless Systems," International Mobile Satellite Conference (**IMSC**), June 1999.
82. T. ElBatt and A. Ephremides, "Cell Size in Hybrid Wireless Systems," IEEE Vehicular Technology Conference (**VTC**), May 1999.
83. T. ElBatt and A. Ephremides," Optimization of Connection-oriented, Mobile, Hybrid Systems," 17th AIAA International Communications Satellite Systems Conference (**ICSSC**), Feb. 1998.
84. T. ElBatt, S. El-Henaoui and S. Shaheen, "Jitter Recovery Strategies for Multimedia Traffic in ATM Networks," IEEE Global Communications Conference (**GLOBECOM**), Nov. 1996.

TEACHING EXPERIENCE

Dept. of Electronics & Communications Engineering, Faculty of Engineering, Cairo University, Giza, Egypt

1. Data Communications and Networks, Graduate Course, Spring 2010 through Spring 2017.
2. Wireless Networks, Senior Year, Spring 2011 through Spring 2017.
3. Computer Networks, Senior Year, Fall 2013 through Fall 2016.
4. Logic Design, Freshmen, Fall 2009 through Fall 2016.
5. Electronic and Digital Circuits, Sophomores, Fall 2009 through Fall 2012.
6. Logic Design, Sophomores, Spring 2010.

School of Communications and Information Technology, Nile University, Giza, Egypt

1. Advanced Networks, Graduate Course, Spring 2010 through Fall 2016.
2. Information Theory, Graduate Course, Spring 2012 through Spring 2017.
3. IoT Networking and Systems, Senior Year, Spring 2017.

Institute for Aviation Engineering and Technology, Giza, Egypt

1. Computer Networks, Senior Year, Spring 2014, 2015.

PATENTS

1. S. Krishnamurthy, T. ElBatt and D. Connors, Power Management for Throughput Enhancement in Wireless Ad-hoc Networks, **United States Patent 7,668,127**, Feb. 2010.
2. T. Rockwood, T. ElBatt and J. Yin, Jamming Malicious Nodes in Contention-based Wireless Networks, **United States Patent 7,656,801,** Feb. 2010**.**

3. T. ElBatt and T. Andersen, Interference-Resilient Joint MAC and Routing Design for Wireless Ad hoc Networks, **United States Patent 7,570,593**, Aug. 2009.
4. T. ElBatt and T. Andersen, Efficient Lightweight Information Dissemination Algorithm for Mobile Wireless Ad Hoc Networks, **United States Patent 7,420,954**, Sept. 2008.
5. T. ElBatt, Apparatus, Method, and Computer Program Product for Wireless Networking Using Directional Signaling, **United States Patent 7,075,902**, July 2006.
6. T. ElBatt and B. Ryu, Priority-based Dynamic Resource Allocation Method and Apparatus for Supply-Demand Systems, **United States Patent 7,054,936**, May 2006.
7. S. Krishnamurthy, T. ElBatt and D. Connors, Power Management for Throughput Enhancement in Wireless Ad-hoc Networks, **United States Patent 6,735,448**, May 2004.
8. T. ElBatt, H. Izadpanah, Method and apparatus for maintaining an optical wireless link, **WIPO WO/2004/012363**, Feb. 2004.
9. H. Izadpanah and T. ElBatt, Techniques and Methods for Load Switching in Hybrid RF/Free Space Optical Wireless Networks, **United States Patent Application 20040062551**, April 2004.

SELECTED PRESENTATIONS

1. "Internet of Things is Revolutionizing Healthcare," **EiTESAL IoT Day** – Connected Living Era!, Cairo, Egypt, Oct. 2016.
2. "Towards Exploiting Mobile Users Profiles: Proactive Caching and Opportunistic Networks," Dept. of Electronics, **Politecnico di Torino**, Italy, Jan. 2016.
3. "Towards Exploiting Mobile Users Profiles: Proactive Caching and Opportunistic Networks," Computer Science and Engineering Dept., **Qatar University**, Jan. 2016.
4. "An Information-theoretic Framework for Opportunistic Social Networks," Dept. of Information Engineering, **University of Padova**, Italy, Sept. 2015.
5. "An Information-theoretic Framework for Opportunistic Social Networks," The Dept. of Electronics, **The American University in Cairo**, Egypt, April 2014.
6. "An Information-theoretic Framework for Opportunistic Social Networks," Computer Science and Engineering Dept., **Qatar University**, Feb. 2014.
7. "Ubiquitous Wireless Access: From Cognitive Radios to Mobile Services," Computer Science and Engineering Dept., **Qatar University**, Feb. 2013.
8. "Recent Trends in Wireless Networks: Cognitive Radios & Mobile Apps" **UCSWSN** 2012 Workshop, Cairo, Egypt, Oct. 2012.
9. "*CellChek:* A Cost-effective Cell Phone-based Patient Monitoring and Advising System," Demo, **GSMA** Mobile Health Summit, June 2011.
10. "The Next Wave in Wireless Networking: Clean-Slate Design and Applications," **Politecnico di Torino**, Italy, Sept. 2010.
11. "The Connected Vehicle: A Key Enabler of Intelligent Transportation Systems," **Google EMEA Faculty Summit**, Feb. 2010.
12. "The Next Wave in Wireless Networking: Clean-Slate Design and Applications," Nile University (**NU**), July 2009.
13. "Cross-layer Diversity and Scheduling Optimization for Interference-limited MIMO Ad hoc Networks," **IEEE** GLOBECOM, Dec. 2008.
14. "Wireless Ad hoc Networks: Cross-layer Design and Applications," Nile University (**NU**), Dec. 2007.
15. "Vehicular Networks: Emerging Standards and Performance of Safety Applications," **IEEE** Communication Society, San Diego Section, March 2007.
16. "Wireless Ad hoc Networks: Cross-layer Design and Applications," **Samsung Information Systems America**, April 2006.

17. "Wireless Ad hoc Networks: Cross-layer Design and Applications," **Qualcomm** R&D, March 2006.
18. "Communications Performance Evaluation of Cooperative Collision Warning Applications," **IEEE** Plenary Session, Task Group P, San Francisco, July 2005.
19. "Wireless Ad hoc Networks: Cross-layer Design and Applications," University of California, Riverside (**UCR**), April 2005.
20. "Wireless Ad hoc Networks: Cross-layer Protocol Design and Applications," **Siemens Corporate Research**, Princeton, NJ, Nov. 2004.
21. "On the Scalability of Cooperative Data Compression for Wireless Sensor Networks," University of Southern California (**USC**), Los Angeles, Oct. 2004.
22. "Performance Evaluation of Safety Applications over DSRC Vehicular Ad Hoc Networks," First ACM workshop on Vehicular Ad hoc Networks (**VANET**), Philadelphia, Oct. 2004.
23. "On the Scalability of Hierarchical Cooperation for Dense Sensor Networks," 3rd International Symposium on Information Processing in Sensor Networks (**IPSN**), UC Berkeley, April 2004.

GRANTS

- Nile University Principal Investigator, European Union H2020 RISE Program, TACTILENet Project led by University of Sabanci, Istanbul, Turkey, 2016–2019.
- European Union Erasmus Mundus Alfihri Mobility Grant (visiting U. of Padova), Summer, 2015.
- Co-Principal Investigator, Interference Mitigation in Spectrally and Energy Efficient Wireless Networks, NTRA, 2015-2018.
- Principal Investigator, GAD: Green and Dense – Designing the New Wireless Access Network, Qatar National Research Fund (QNRF), 2012-2016.
- Principal Investigator, Proactive Content Delivery for Mobile Networks, NTRA/ITIDA, 2012-2013.
- Principal Investigator, PDAs: Proximity-based, Delay Tolerant Profile Relaying for Androids, Google, 2011-2013.
- Co-Principal Investigator, Optimal Sensing, Resource Allocation, and Protocol Design for Real-time Communications in Dynamic Spectrum Access Networks, Qatar National Research Fund (QNRF), 2012-2016.
- Nile University Principal Investigator, FP7 Marie Curie Research Staff Exchange Program, AgileNet Project led by University of Sabanci, Istanbul, Turkey, 2011 – 2014.
- Nile University Principal Investigator, FP7 Marie Curie Research Staff Exchange Program, CoopLab Project led by Centre for Research and Technology Hellas (CERTH), Greece, 2011 – 2014.
- European Union Erasmus Mundus Mobility Grant (visiting Politecnico di Torino), Aug.-Sept. 2010.
- Principal Investigator, Secure and Reliable VANET Broadcast, General Motors Corporation, 2010-2012.
- Principal Investigator, *CellChek:* A Cost-effective Cell phone-based Patient Monitoring and Advising System, Microsoft Research, 2010-2011.
- Technical Lead, DARPA STO Control-based Mobile Ad hoc Networking (CBMANET) Program, 2008.
- Co-Principal Investigator, DSRC-based Inter-vehicle Communications, General Motors Corporation, 2002-2006.
- Co-Principal Investigator, Applications of Short Range Wireless Technologies inside the Vehicle, General Motors Corporation, 2005-2006.
- Technical Lead, DARPA ATO Connectionless Networks (CN) Program, 2003-2004.

- Principal Investigator, Cross-layer Protocol Design for Wireless Ad Hoc Networks, HRL, 2001-2006.
- Principal Investigator, Scalability of Cooperative Data Compression for Wireless Sensor Networks, HRL, 2003-2004.
- Principal Investigator, MAC Protocols for Ad Hoc Networks Using Directional Antennas, Boeing Company, 2001-2004.
- Investigator, DARPA IPTO Next Generation Internet (NGI) Program, 2001.

HONORS AND AWARDS

- **VIRA Distinguished Scientist Award**, Venus International Foundation, India, 2016.
- Graduation Project Team "MazeIn", developing an Indoor localization system, ranked 6th among 35 teams in an international competition organized by Microsoft, jointly with IEEE/ACM IPSN 2016 Conference, in Vienna, Austria in April 2016. MazeIn team was the **only and first undergraduate team** to ever participate in this research-oriented competition.
- Graduation Project Team "Smart Access Systems" chosen among the top 15 Finalists in the MENA region to participate in Intel's ChallengeMe! Entrepreneurship training and mentorship workshop, Beirut, Lebanon, Nov. 2015.
- Graduation Project Team "Smart Access Systems" ranked 2nd in the TIEC IbTIECar competition – IoT Track, Dec. 19th, 2015.
- **Egypt State Incentive Award** in Engineering Sciences, 2014.
- **Cairo University Incentive Award** in Engineering Sciences, 2012.
- Dr. ElBatt is a recipient of the prestigious **Google Faculty Research Award,** 2011**.**
- Listed among **Top 50 Authors in Cairo University and Top 5 in Faculty of Engineering**, according to Scopus Number of Citations Index, since Oct. 2011.
- Dr. ElBatt research has thus far collected **more than 3200 citations and h-Index = 18 on the Google Scholar Index**.
- Listed in Cambridge Who's Who in America 2009-2010.
- Listed in Marquis Who's Who in the World 2011.
- Achievement Award, HRL Laboratories, 2002, 2004.
- Distinction with Honors Award, Cairo University, July 1993.

PRESS COVERAGE

- Nicolas Mokhoff, "Symposium Surveys the State of the Broadband Art," *EE Times* and *Information Week,* April 3, 2006. *[Citing research on in-vehicle wireless communications]* http://www.informationweek.com/news/showArticle.jhtml?articleID=184425942
- "California Inventor Develops Wireless Networking Method," *AllBusiness,* July 19, 2006. *[Citing US patent on CSMA-based MAC design using directional antennas]* http://www.allbusiness.com/government/3763284-1.html

PROFESSIONAL SERVICE

- **Editorial Advisory Board,** E-Healthcare Systems And Wireless Communications: Current And Future Challenges, Editor: Mohamed Watfa, IGI Global, 2010.

- **Panelist,** Misr Elkheir Graduate Applicants interview, Aug. 2012.

- **Panelist/Reviewer,** FulBright Scholarship selection for M.Sc., Ph.D. and visiting scholars, 2009, 2010, 2011, 2012, 2014, 2016.

- **Panelist,** NSF Cyber Physical Systems (CPS) Program proposal review, June 2009.

- **Member of the Editorial Board**
  - IEEE Transactions on Cognitive Communications and Networking, Feb. 2017-present.
  - IEEE Transactions on Mobile Computing, June 2010-2016.
  - Wiley International Journal of Satellite Comm. and Networking, Jan. 2004-present.

- **Steering Committee Member**
  - 2nd International Conference on Advances in Computing, Communications and Informatics (ICACCI-2013) August 22-25, 2013, Mysore, India.

- **Publications Co-Chair:**
  - EAI Mobiquitous, London, UK, Dec. 2014.
  - IEEE GLOBECOM, Anaheim, CA, USA, Dec. 2012.

- **Demos Co-Chair,** ACM Mobicom, Miami, FL, Sept. 2013.

- **Technical Program Committee Member**
  - World Forum -5G 2018.
  - WPMC 2017.
  - SmartCity Workshop – in conjunction with IEEE INFOCOM 2016, 2017.
  - 12th ACS/IEEE AICCSA 2015.
  - EAI CrownCom 2015.
  - IEEE BlackSeaCom 2013, 2014, 2015, 2016.
  - IEEE PIMRC 2008, 2011, 2013, 2014, 2015, 2016, 2017.
  - BWCCA 2013.
  - INFOS 2014.
  - IEEE International Workshop on Wireless Local Networks (WLN) 2011, 2012.
  - ITU Kaleidoscope 2011, 2012.
  - ICST ADHOCNETS 2011.
  - 11th IEEE WoWMoM 2010.
  - 17th International Conference on Telecommunications (ICT) 2010.
  - IEEE INFOCOM 2008, 2009, 2017, 2018.
  - ACM MOBIHOC 2003, 2009.
  - AccessNets 2010.
  - International Conf. on Wireless Information Networks and Systems (WINSYS) 2009.
  - IEEE VTC 2008, 2014.
  - ACM MOBICOM 2007.
  - IFIP NETWORKING 2007, 2008.
  - IEEE ICC 2007, 2008, 2009, 2010, 2017, 2018.
  - Mobiquitous 1st International Workshop on Advances in Sensor Networks, 2006.
  - IEEE GLOBECOM 2006, 2015, 2016, 2017.
  - IEEE MASS 2006.
  - IEEE/ACM IPSN 2005.
  - IEEE SECON 2005, 2006, 2008.
  - ACM Workshop on Vehicular Ad Hoc Networks (VANET) 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013.
  - 2005, 2006 IEEE Sarnoff Symposium.
  - IARIA International Conference on Systems and Networks Communications (ICSNC) 2006, 2007, 2008.

- **Session Chair,** IEEE SECON 2005, IEEE ICNC 2012, IWCMC 2013, IEEE PIMRC 2014, EAI CrownCom 2015, ICNC 2017.

- **Senior Member of the IEEE Communications Society:** member of technical committee on computer communications (TCCC).

UNIVERSITY COMMITTEE SERVICE

1. Member of EECE PhD Admissions Exam Committee, 2014 – present.
2. Coordinator, EECE Dept. IT Infrastructure Committee, 2014 - present.
3. Member of EECE Professional M.Sc. Program founding Committee, 2014.
4. Member of EECE Graduate Curriculum Committee, 2013.
5. Member of EECE Graduation projects Committee, 2012-2013.
6. Member of EECE Research Strategy Committee, 2010, 2012.
7. Organizing Committee Member, EECE Dept. Scientific Workshop Committee, 2012.
8. EECE Coordinator and Dept. Liasion for Itisalat-sponsored graduation projects, 2012.
9. Member of EECE Servers P.O. Technical Evaluation Committee, 2010-2011.
10. Member of EECE Dept. Schedules and Timetables Committee, 2009-2010.

M.Sc. SUPERVISION/Co-SUPERVISION (with Thesis)

A. Completed

1. Mohamed Abd El-magid (*PhD student, Virginia Tech*)
2. Ahmed Magdy Mohamed (*PhD student, Purdue University*)
3. Doaa Mahmoud
4. Abdel Rahman Fahim, 2016. (*PhD student, University of Alabama*)
5. Maha Zohdy, 2016. (*PhD student, Rensselaer Polytechnic Institute*)
6. Mohamed Khairy, 2016.
7. Yahia Shabara, 2015. (*PhD student, Ohio State University*)
8. Adel El-mahdy, 2015. (*PhD student, University of Minnesota*)
9. Mai El-kady, 2015. (*PhD student, Florida International University)*
10. Mai Osama Said, 2015.
11. Abdel Rahman Ibrahim, 2014. (*PhD student, Penn State University*)
12. Mohsen Awami, 2014.
13. Islam Samy, 2014. (*PhD student, University of Arizona*)
14. Ahmed Salama, 2014. (*PhD student, University of Arizona*)
15. Iman Abdalla, 2014.
16. Mai El-Sherief, 2014. (*PhD student, UCSB*)
17. Ahmed Anwar, 2013. (*PhD student, University of Central Florida*)
18. Mahmoud Abdel Aal, 2013.
19. Hussein Saad, 2013. (*PhD student, UT Dallas*)
20. Ayman Tharwat, 2013. (*PhD student, University of Pittsburgh*)
21. Ahmed Arafa, 2012. (*PhD student, UMD*)
22. Noha Helal, 2012. (*PhD student, UT Dallas*)
23. Osama Attia, 2012. (Intel), *PhD Candidate, Iowa State University*
24. Hanan Moharram, 2012.
25. Mohamed Abdel Wahab, 2012. (*PhD student, UT Dallas*)
26. Ahmed Ewaisha, 2011. (*PhD student, Arizona State University*)

27. Mohamed Khafagy, 2011. (*PhD student, KAUST*)
28. Ahmed Fathy, 2011. (Amazon), *PhD, UC, Riverside*

B. In Progress

1. Mohamed Hosaam Hegazy
2. Menna Mazen.
3. Mostafa Elemam.
4. Amr Nasr
5. Belal El-diwany.
6. Abdel moneim Ali.