

Ziad Ahmed El-Sahn

Personal Information

Marital status: Married
Nationality: Egyptian - Canadian
Date of Birth: November 22, 1979
Place of Birth: Alexandria, Egypt

Education

2005 - 2010, **Laval University**, Quebec City, QC, Canada

Ph.D. in Electrical Engineering, March 2010

Supervisor: Prof. Leslie A. Rusch

Courses: Processus Aléatoires: Méthodes d'Étude et Applications, Instrumentation de
Mesure Optique, Optoélectronique

Thesis Title: Smooth Upgrade of Existing FTTH Access Networks: SAC-OCDMA and
Dense SS-WDM Solutions

Main Contributions:

Proposed Next Generation SAC-OCDMA PON:

- Examining local sources versus centralized light sources architectures
- Experimental demonstration of the uplink of a 7x622 Mb/s SAC-OCDMA PON
- Studying the amplification requirements for each architecture and its relative merits
- Testing the burst-mode operation of the proposed PON

Proposed Next Generation Dense SS-WDM PON:

- Exploiting the noise cleaning capabilities of self-seeded RSOA transmitters
- Proposing a novel FBG-based self-seeded transmitter
- Combining self-seeding with balanced detection
- Experimental demonstration of a 1x1.25 Gb/s dense SS-WDM channel
- Examining the possibility of remote self-seeding and colorless ONU operation

2002 - 2005, **Alexandria University**, Alexandria, Egypt

M.Sc. in Electrical & Communication Engineering, July 2005

Supervisors: Prof. Hossam M. H. Shalaby, Prof. El-Sayed A. El-Badawy

Courses: Computer Networks, Digital Telephony, Teletraffic Engineering, Laser & Electro-
Optics, Spectral Estimation, Channel Coding

Thesis Title: Random Access Protocols for Future Optical CDMA Networks

Main Contributions:

- Performance limitations of the R^3T Protocol in noisy environment
- Queuing theory applied to Optical CDMA Protocols
- Design of a new optical CDMA random access protocol

1998 - 2002, **Alexandria University**, Alexandria, Egypt

B.Sc. in Electrical & Communication Engineering, June 2002

Cumulative Grade: Distinction with Degree of Honor (87.3347%)

Department Rank: Third over a class of 316 students

Graduation Project: 3G Multimedia Mobile Communications

1984 - 1997, **College Saint-Marc**, Alexandria, Egypt

Diplôme de Langue Française, 1997

Alliance Française, 1996

Professional and Work Experience

March 2010 - Present, **McGill University**, Montreal, QC, Canada

Postdoctoral Research Fellow, Full Time

Department of Electrical and Computer Engineering

Supervisor: Prof. David V. Plant

Research Project: High Bit Rate Optical Access Networks, Bell Canada and Nortel

September 2009 - February 2010, **McGill University**, Montreal, QC, Canada

Research Associate, Full Time

Department of Electrical and Computer Engineering

Supervisor: Prof. David V. Plant

Research Project: Access Network Technologies, Bell Canada

2005 - 2009, **Laval University**, Quebec City, QC, Canada

Research Assistant, Full Time

Teaching Assistant, Part Time

Department of Electrical and Computer Engineering

Research Project: Examining the use of CDMA for optical access networks, TELUS

Assisted in teaching courses on the following subjects:

- Analyze des signaux
- Réseaux de transmission de données

2003 - 2005, **Arab Academy for Science & Technology (AAST)**, Alexandria, Egypt

Teaching Assistant, Part Time

Department of Electrical Engineering

Assisted in teaching courses on the following subjects:

- Communication Systems (1): Analog communications
- Communications Systems (2): Random signals & noise analysis
- Communication Systems (3): Pulse modulation & source coding
- Communication Networks
- Solid State Devices
- Electronic Measurements

2002 - 2005, **Alexandria University**, Alexandria, Egypt

Research and Teaching Assistant, Full Time
Department of Electrical Engineering

Assisted in teaching courses on the following subjects:

- Communications Systems
- Optical Devices and Engineering
- Microwave & Optical Transmission Media
- Microprocessors Interfacing & Applications
- Electronic Measurements
- Semiconductor Devices
- Modern Physics
- Acoustics

2001 Summer Internship, **Schlumberger (Wireline)**, Shukeir, Egypt

2000 Summer Internship, **Federal Arab Maritime Company (FAMCO)**, Alexandria, Egypt

1999 Summer Internship, **Arabia Computer Systems (ACS)**, Alexandria, Egypt

Training Courses and Certificates

- Learning to Teach Day (LTT) Workshop, McGill University, March 2012
- Workplace Hazardous Materials Information System (WHMIS) Training, McGill University, September 2010
- High Speed Oscilloscope Training (LeCroy Corporation), McGill University, April 2010
- La Fibre Optique à la Maison (EXFO), Invited talk at Laval University, November 2008
- Attestation de Sécurité Laser, Laval University, February 2008
- Fiber to the Home (EXFO), SYTACom Workshop, Quebec City, April 2007
- Passive Optical Networks: Bringing Fiber to the Home (EXFO), Photonics North, Quebec City, June 2006
- FTTx Solutions and PONs (EXFO), SYTACom Workshop, Montreal, May 2006
- Formation SIMDUT (Système d'Information sur les Matières Dangereuses Utilisées au Travail), Laval University, September 2005

Journal Publications

- [1] J. M. Buset, **Z. A. El-Sahn**, and D. V. Plant, "Bandwidth efficient bidirectional 5 Gb/s overlapped-SCM WDM PON with electronic equalization and forward-error correction," accepted at *Opt. Express*, May 2012.
- [2] **Z. A. El-Sahn**, J. M. Buset, and D. V. Plant, "Overlapped-subcarrier multiplexing for WDM passive optical networks: experimental verification and mathematical analysis," *IEEE J. Lightwave Technol.*, vol. 30, no. 5, pp. 754-763, March 2012.
- [3] **Z. A. El-Sahn**, W. Mathlouthi, H. Fathallah, S. LaRochelle, and L. A. Rusch, "Dense SS-WDM PON over legacy PONs: Smooth upgrade of existing FTTH networks," *IEEE J. Lightwave Technol.*, vol. 28, no. 10, pp. 1485-1495, May 2010.

- [4] **Z. A. El-Sahn**, Y. M. Abdel-Malek, H. M. H. Shalaby, and El-S. A. El-Badawy, "Significance in adding a queuing subsystem to the R^3T optical CDMA protocol," *IEEE Trans. Commun.*, vol. 56, no. 10, pp. 1601-1605, October 2008.
- [5] **Z. A. El-Sahn**, B. J. Shastri, M. Zeng, N. Kheder, D. V. Plant, and L. A. Rusch, "Experimental demonstration of a SAC-OCDMA PON with burst-mode reception: local versus centralized sources," *IEEE J. Lightwave Technol.*, vol. 26, no. 10, pp. 1192-1203, June 2008.
- [6] B. J. Shastri, **Z. A. El-Sahn**, M. Zeng, N. Kheder, L. A. Rusch, and D. V. Plant, "A standalone burst-mode receiver with clock and data recovery, clock phase alignment, and RS(255, 239) codes for SAC-OCDMA applications," *IEEE Photonics Technol. Lett.*, vol. 20, no. 5, pp. 363-365, March 2008.
- [7] **Z. A. El-Sahn**, Y. M. Abdel-Malek, H. M. H. Shalaby, and El-S. A. El-Badawy, "Performance of the R^3T random access optical CDMA protocol in noisy environment," *IEEE J. Sel. Topics Quantum Electron.*, vol. 13, no. 5, part 2, pp. 1396-1402, September 2007.
- [8] Y. M. Abdel-Malek, **Z. A. El-Sahn**, H. M. H. Shalaby, and El-S. A. El-Badawy, "New optical random access code-division multiple-access protocol with stop-and-wait automatic repeat request," *SPIE J. Optical Engineering*, vol. 46, no. 6, pp. 065007(1-8), June 2007.
- [9] J. Penon, **Z. A. El-Sahn**, L. A. Rusch, and S. LaRochelle, "Spectral-amplitude-coded OCDMA optimized for a realistic FBG frequency response," *IEEE J. Lightwave Technol.*, vol. 25, no. 5, pp. 1256-1263, May 2007.
- [10] J. Faucher, S. Ayotte, **Z. A. El-Sahn**, M. Mukadam, L. A. Rusch, and D. V. Plant, "A standalone receiver with multiple access interference rejection, clock and data recovery, and FEC for 2-D λ -t OCDMA," *IEEE Photonics Technol. Lett.*, vol. 18, no. 20, pp. 2123-2125, October 2006.

Conference Publications

- [11] Q. Zhuge, M. E. Mousa-Pasandi, M. Morsy-Osman, X. Xu, M. Chagnon, **Z. A. El-Sahn**, and D. V. Plant, "High performance, low overhead CO-OFDM for next generation fiber transmission systems (invited)," accepted at *Signal Processing in Photonic Communications (SPPCom)*, Colorado Springs, Colorado, USA, June 2012.
- [12] **Z. A. El-Sahn**, B. J. Shastri, J. M. Buset, and D. V. Plant, "A robust overlapped-SCM WDM PON with a standalone burst-mode OLT receiver," in *Proc. IEEE Photonics Conference*, Paper TuE6, pp. 226-227, Arlington, Virginia, USA, October 2011.
- [13] J. M. Buset, **Z. A. El-Sahn**, and D. V. Plant, "Symmetric 2.5 Gb/s RSOA-based WDM-PON with electronic equalization and overlapped-subcarrier multiplexing," in *Proc. IEEE Photonics Conference*, Paper TuE1, pp. 216-217, Arlington, Virginia, USA, October 2011.
- [14] D. V. Plant, **Z. A. El-Sahn**, J. M. Buset, and B. J. Shastri, "Overlapped subcarrier multiplexed WDM PONs enabled by burst-mode receivers (invited)," in *Proc. Access Networks and In-House Communications (ANIC)*, Paper ATuA3, Toronto, Ontario, Canada, June 2011.
- [15] **Z. A. El-Sahn**, J. M. Buset, and D. V. Plant, "Bidirectional WDM PON enabled by reflective ONUs and a novel overlapped-subcarrier multiplexing technique," in *Proc. Optical Fiber Communication (OFC)*, Los Angeles, California, USA, Paper OMP7, March 2011.
- [16] **Z. A. El-Sahn**, W. Mathlouthi, H. Fathallah, S. LaRochelle, and L. A. Rusch, "A novel FBG-based self-seeded RSOA transmitter with noise mitigation for dense SS-WDM PONs," in *Proc. IEEE Photonics Society Annual Meeting*, Paper WA4, pp. 349-350, Denver, Colorado, USA, November 2010.

- [17] **Z. A. El-Sahn**, M. Zeng, B. J. Shastri, N. Kheder, D. V. Plant, and L. A. Rusch, "Dual architecture uplink demonstration of a 7x622 Mbps SAC-OCDMA PON using a burst-mode receiver," in *Proc. Optical Fiber Communication (OFC)*, Paper OMR3, San Diego, California, USA, February 2008.
- [18] N. Kheder, **Z. A. El-Sahn**, B. J. Shastri, M. Zeng, L. A. Rusch, and D. V. Plant, "Performance of incoherent SAC-OCDMA using a burst-mode receiver with CDR and FEC," in *Proc. IEEE LEOS Annual Meeting*, Paper WX2, pp. 610-611, Orlando, Florida, USA, October 2007.
- [19] A. G. Mahgoub, **Z. A. El-Sahn**, H. M. Abdel-Baky, and El-S. A. El-Badawy "Enhancement of X-ray images for cargo and pallet search using FPCNN," in *Proc. 11th World Multi-Conference on Systemics, Cybernetics and Informatics, (WMSCI)*, Orlando, Florida, USA, July 2007.
- [20] **Z. A. El-Sahn**, Y. M. Abdel-Malek, H. M. H. Shalaby, and El-S. A. El-Badawy, "Immunity of the R^3T random access optical CDMA protocol against receiver noise," in *Proc. 24th National Radio Science Conference (NRSC)*, Cairo, Egypt, March 2007.
- [21] **Z. A. El-Sahn**, J. Penon, and L. A. Rusch, "Simulation of real SAC-OCDMA under both S-ALOHA and R^3T random access protocols," in *Proc. IEEE LEOS Annual Meeting*, Paper ThW3, pp. 907-908, Montreal, Quebec, Canada, October 2006.
- [22] J. Faucher, S. Ayotte, **Z. A. El-Sahn**, M. Mukadam, L. A. Rusch, and D. V. Plant, "Receiver for 2D λ -t OCDMA with quantizer, CDR and FEC," in *Proc. European Conference on Optical Communication (ECOC)*, Paper Th3.6.3, Cannes, France, September 2006.
- [23] **Z. A. El-Sahn**, Y. M. Abdel-Malek, H. M. H. Shalaby, and El-S. A. El-Badawy, "The R^3T optical random access CDMA protocol with queuing subsystem," in *Proc. 10th World Multi-Conference on Systemics, Cybernetics and Informatics, (WMSCI)*, Paper S123OF, Orlando, Florida, USA, July 2006.
- [24] Y. M. Abdel-Malek, **Z. A. El-Sahn**, H. M. H. Shalaby, and El-S. A. El-Badawy, "Proposal of an optical CDMA random access protocol," in *Proc. 10th World Multi-Conference on Systemics, Cybernetics and Informatics, (WMSCI)*, Paper S276AZ, Orlando, Florida, USA, July 2006.
- [25] Y. M. Abdel-Malek, **Z. A. El-Sahn**, H. M. H. Shalaby, and El-S. A. El-Badawy, "Proposed optical random access CDMA protocol with stop & wait ARQ," in *Proc. 5th Workshop on Photonics and its Application*, pp. 62-78, Cairo, Egypt, May 2005.
- [26] **Z. A. El-Sahn**, Y. M. Abdel-Malek, H. M. H. Shalaby, and El-S. A. El-Badawy, "Performance limitations in the R^3T optical random access CDMA protocol," presented in part at *IEEE Egyptian Student Branch Contest 2004*, AAST, Cairo, Egypt, January 2005.

Patents

- [1] W. Mathlouthi, L. A. Rusch, P. Lemieux, **Z. A. El-Sahn**, and H. Fathallah, "Transmitter and receiver for optical communication systems," *International Patent Application (pending)*, Ref: 6013-225PCT, May 2008.

Awards Received

- Egyptian Award of Scientific Publication in Highly Ranked Journals. This award was received for papers [4], [7] and [8], November 2009
- Bourse d'exemption de droits de scolarité supplémentaires pour les étudiants étrangers, Laval University, September 2005 - September 2009

- Best Paper Award for paper [26], IEEE Egyptian Student Branch Contest, AAST, Cairo, Egypt, January 2005
- Degree of Honor of Cumulative Academic Distinction, Faculty of Engineering, Alexandria University, June 2002
- Academic Distinction Award, Faculty of Engineering, Alexandria University, 1998 - 2002

Professional Memberships

IEEE Organization (Valued IEEE member since 1998)

Member of the Egyptian Engineering Syndicate since 2002

Reviewer for IEEE, OSA and IET Journals:

- IEEE Journal of Lightwave Technology (JLT)
- IEEE Photonics Technology Letters (PTL)
- IEEE/OSA Journal of Optical Communications and Networking (JOCN)
- OSA Optics Express (OE)
- IET Communications
- IET Electronics Letters

Reviewer for Conferences:

- IEEE Lasers and Electro-Optics Society (LEOS)
- IEEE International Conference on Telecommunications (ICT)
- IEEE International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunications Systems (MASCOTS)

Technical Committee Memberships:

- Member of the organization committee of the Healthcare Support through Information Technology Enhancements (hSITE) Annual Research Review, Montreal, QC, Canada, June 2010
- Member of the program committee of the 11th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI), Orlando, Florida, USA, July 8-11, 2007

Language and Computer Skills

Languages: Arabic (native), French (very good), and English (very good)

Computer: Programming (Matlab), Microsoft Office, Windows

Interests and Activities

Communication & Electronics, Computer Hardware, Reading, Sports: tennis, basketball, volleyball and swimming, Scout, Traveling and social relationships

References

Available upon request