### **CONTACT INFORMATION**

University of Carthage, Engineering School of Communication of Tunis (Sup'Com), Green & Smart Communication Systems Laboratory (Gres'Com), Ghazela Technopark, 2083, Ariana, Tunisia. Phone : (+216) 22 612 796 e-mails : amor.gueddana@supcom.tn amor.gueddana@gmail.com

# EDUCATION

2008-2014	University of Carthage, Sup'Com, Gres'Com. PhD. Information and Communication Technologies (with Honours). PhD. Thesis: <i>Modeling of the Quantum CNOT Gate : Application to Quantum</i> <i>Cryptography and Information Encoding.</i>	
2006-2008	University of Carthage, Sup'Com, Cirta'Com. M.Sc. Circuits and Systems for Telecommunications Networks (with Honours). M.Sc. Thesis: Study of the Single Photon's Features Generated by Quantum Dots: Application to Quantum Logic Gates.	
2004-2007	University of Carthage, Sup'Com, Cirta'Com. Engineer Degree. Networks and Mobiles Services for Telecommunication Networks. Engineer project: Study of a Quantum Encryption channel: physical constraints and feasibility.	
2001-2004	Preparatory School. Mathematics and Physics.	

**2000-2001** Baccalaureate Diploma. Mathematics.

# **RESEARCH INTERESTS** -

I'm currently a member of TEEL Laboratory, School of Optometry and Vision Science, University of Waterloo, ON, Canada, I'm actually conducting researches on deterministic photonic Controlled-NOT (CNOT) gate based on quantum dot spin in a double sided optical microcavity. My most significant research contributions are related to the optimization of the all optical CNOT gates based on linear and nonlinear optical devices, I studied the algorithm of Grover and proposed a Quantum Query Language (QQL) for database search applications and I have been investigating all QKD systems as well as their optimization based on Quantum Dence Coding.

# MEMBERSHIPS

- Member, Quantum Communications & Information Technology Emerging Technical, Subcommittee, IEEE communications society (2017)
- Member, International Society for Optics and Photonics, SPIE (2009-2014, 2019).
- Member, Optical Society of America, OSA (2009-2014)
- President, Optics and Photonics Tunisia Student Chapter, OPTSC (2013-2014).
- Officer of the OPTSC (2009-2014).
- In charge of scientific activities, Optical Society of Tunisia, STO (2013-2014).

# **AWARDS AND PRICES**

- Awarded the best presentation prize sponsored by the International Society for Optics and Photonics (SPIE) in the ICO & IUTAP-C17 topical meeting OPTISUD and held in Tunisia (2019).
- Participant in the Winter College on Optics, organized by Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy. I received free accommodation, prepaid round trip ticket and fixed living allowance for two weeks (2017).
- Participant in the OSA Student Chapter Leadership meeting and Frontiers in Optics/Laser Science (FiO/LS) conference, Orlando, Florida, USA. OSA paid for my airfare, conference registration and two nights stay in a hotel (2013).
- Awarded the SPIE Travel Scholarship 2,000 US \$ (2014).
- Best poster award in first prize during the first African Summer School on Optics and Applications to Sustainable Development (ASOSD) meeting. The poster was entitled:" Non Deterministic quantum CNOT Gate with Double Encoding" (2013).
- Received the officer Travel grant and attended the SPIE leadership workshop meeting that took place in San Diego, CA, USA. 1,600 US \$ (2010)
- Best paper Award in the 4th International Symposium on Image/Video Communications and Mobile Networks (ISIVC2008) which took place in Bilbao, Spain (2008).
- Received a scholarship of 40 \$ monthly, total of 1.440 US \$ during my three years of engineering studies in Sup'Com (2004-2007).

### **TEACHING EXPERIENCE**

2015-Present	Assistant Professor (Tenure).
	University of Carthage, Engineering School of Computing of Carthage, Tunisia (EniCarthage).
	Taught courses: "Transmission techniques", "Computer Architecture" and "Optical Networks".
2012-2015	Assistant Professor. University of Jendouba, Higher Institute of Computing of Kef, Tunisia (ISIK). Taught courses: "Advanced Networks" and "interconnection and design of computer networks".
2008-2012	Contractual Assistant Teacher. University of Manouba, Higher Institute of Multimedia Arts of Mannouba, Tunisia (ISAMM). Taught courses: "Voice and Video over IP" and "JAVA programing". Supervisor of eight projects about Android applications, Web J2EE and PHP.
2007-2008	Research Student Teacher. University of Carthage, Higher Institute of Technological Studies in Telecommunication (Iset'Com). Taught courses: "JAVA programing", "C programing" and "Introduction to Optical Communications".

### **RECENT PUBLICATIONS**

A. Gueddana and V. Lakshminarayanan, <u>"Toward The Universal Quantum Cloner Limit For Designing</u> <u>Compact Photonic CNOT Gate</u> ", arXiv:1906.06547 (2019)

A. Gueddana, P. Gholami and V. Lakshminarayanan, "<u>Can a universal quantum cloner be used to</u> <u>design an experimentally feasible near-deterministic CNOT gate?</u>", Quantum Information Processing, 18, 221 (2019)

<u>A. Gueddana</u> and V. Lakshminarayanan, " <u>Comment on 'Deterministic CNOT Gate and Entanglement</u> <u>Swapping for Photonic Qubits Using a Quantum-Dot Spin in a Double-Sided Optical Microcavity' by</u> <u>H.F. Wang et al., Physics Letters A 377, 2870-2876 (2013)</u>", Physics Letters A, November 2018.

<u>A. Gueddana</u> and V. Lakshminarayanan, "<u>Physical feasibility of QKD based on probabilistic quantum</u> <u>circuits</u>", IET Information Security, Institution of Engineering and Technology, Vol. 12, Issue 6, pp-521-526, November 2018.

M. Attia, A. Gueddana and R. Chatta, "Success Probability of Optical Quantum CNOT Gate Based on Probabilistic Single Photon Sources," Journal of Nanoelectronics and Optoelectronics, Vol. 11, Issue. 04, 441-449 (2016).

<u>A. Gueddana</u>, M. Attia and R. Chatta, "<u>Abstract probabilistic CNOT gate model based on double</u> <u>encoding: study of the errors and physical realizability</u>," SPIE Photonic West, Proc. SPIE, Vol. 9377, Advances in Photonics of Quantum Computing, Memory, and Communication VIII, 937712 (2015).

<u>A. Gueddana</u>, R. Chatta and M. Attia, "<u>CNOT-Based Design and Query Management in Quantum</u> <u>Relational Databases</u>," International Journal of Quantum Information, Vol. 12, Issue. 04, 1450023 (2014).

<u>A. Gueddana</u>, M. Attia and R. Chatta, "<u>Optimized QKD BB84 protocol using quantum dense coding</u> and <u>CNOT gates: Feasibility based on probabilistic optical devices</u>," SPIE Photonic Europe, Nonlinear Optics and Its Applications VIII, and Quantum Optics III, Proc. SPIE, Vol. 9136, 913627-913627-12, Brussels, Belgium (2014).

R. Cherif, A. Ben Salem, <u>A. Gueddana</u>, M. Zghal, D. Naidoo, A. Forbes, A. Heidt, E. Rohwer, "<u>Expansion</u> of student activities in Africa: from south to north," Proc. SPIE 9289. 12th Education and Training in Optics and Photonics Conference (2014).

<u>A. Gueddana</u>, M. Attia and R. Chatta, "<u>Benefits of using heralded single photon source for fiber-based</u> <u>Quantum Key Distribution BB84</u>," High Capacity Optical Networks and Enabling Technologies (HONET-CNS), 10<sup>th</sup> International Conference on, 32-36, Magosa, Cyprus (2013).

<u>A. Gueddana</u>, M. Attia and R. Chatta, "<u>Non-Deterministic Quantum CNOT Gate with Double Encoding</u>," SPIE Optics+Photonics, Quantum Communications and Quantum Imaging XI, Proc. SPIE, Vol. 8875, 88750V, San Diego, CA, USA (2013).

R. Chatta, M. Attia and <u>A. Gueddana</u>, "<u>Towards a Heralded Single Photon Source Model Based on</u> <u>Photonic Crystal: Constraints and Feasibility</u>," International Journal of Computer Science Issues, IJCSI, Vol. 10, Issue 2, No 1, 512-518. (2013).

M. Attia, <u>A. Gueddana</u>, R. Chatta and A. Morand, "<u>Modeling of the whispering gallery mode in</u> <u>microdisk and microgear resonators using a toeplitz matrix formalism for singlephoton source</u>," SPIE Optics+Photonics, Novel Optical Systems Design and Optimization XVI, Proc. SPIE, Vol. 8842, 88420U, San Diego, CA, USA (2013).

R. Chatta, <u>A. Gueddana</u> and M. Attia, "<u>Realizability Assessment of Probabilistic Quantum CNOT gates</u> <u>based on Experimental Implementation</u>," International Journal of Quantum Information, Vol. 11, No. 03, 1350032 (2013). <u>A. Gueddana</u>, R. Chatta and N. Boudriga, "<u>Success Probability Evaluation of Quantum Circuits Based</u> <u>on Probabilistic CNOT Gate,</u>" Optical Communication Systems OPTICS 2012, International Conference on, DCNET/ICE-B/OPTICS, 378-387, Rome, Italy (2012).

<u>A. Gueddana</u>, R. Chatta and N. Boudriga, "<u>Optimized Methods for Inserting and Deleting Records and</u> <u>Data Retrieving in Quantum Database</u>," Transparent Optical Networks (ICTON2010), The 12<sup>th</sup> International Conference on, Munich, Germany, 1-5 (2010).

<u>A. Gueddana</u>, M. Attia and R. Chatta, " **Génération de Photon Unique Par une Boite Quantique: Application Aux Portes Logiques Quantiques,**" TELECOM 2009 & 6ème JFMMA, Agadir, Morocco (2009).

<u>A. Gueddana</u>, R. Chatta and M. Attia, "**Study Of A Quantum Channel Encryption: Physical Constraints and Feasibility,**" The 4<sup>th</sup> International Symposium on Image/Video Communications and Mobile Networks (ISIVC2008), Bilbao, Spain (2008).

#### LANGUAGES -

Frensh	Spoken, read and written.
English	Spoken, read and written (TOEFL ITP and TOEIC)
German	Spoken, read and written.
Arabic	Mother tongue.