

# Curriculum Vitae

Dr. Toufik Messaoud MAAROUK

Class A lecturer

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“Models, Calculation, Algorithms and Proof” Team

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## MARITAL STATUS

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**Name:** MAAROUK

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## TRAINING

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**September 19, 2019 Habilitation in computer science.**

University of Oum El Bouaghi.

**2006-2012 Doctorate in computer science.**

**Title:** Formal models for the design of real-time systems.

**Mention:** Very honorable.

**Supervisor:** Pr. Djamel Eddine Saidouni.

Mentouri University – Constantine-

**2004-2006 Magisterium in computer science, industrial computer science option.**

**Title:** Formal specification of real-time mobile systems.

**Supervisor:** Pr. Djamel Eddine Saidouni

University of Batna

**2001-2002 Diploma of advanced studies in computer science.**

**Title:** Tools for Model Checking of Java applications.

**Option:** programming, advanced compilation and parallelism.

**Mention:** GOOD.

**Supervisor:** Dr. Eric Madelaine

University of Orleans, France.

**1993-1998 computer engineer.**

**Title:** Recognition of handwritten Arabic characters.

**Option:** hardware and software.

**Mention:** GOOD.

**Supervisor:** Pr. Loubna Suidi.

Annaba University.

**1991-1993 Bachelor of Mathematics.**

**High school:** Chihani Bachir.

## **PROFESSIONAL EXPERIENCE**

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**Sept 2019 Lecturer A.**Department of Mathematics and Computer Science, Abbès Laghrour Khenchela University.

**July 2012- September 2019 Lecturer B.**Department of Mathematics and Computer Science, Abbès Laghrour Khenchela University.

**September 2009- June 2012 Assistant Professor A.**Department of Mathematics and Computer Science, Abbès Laghrour Khenchela University

**Sept 2008- Sep 2009 Assistant Professor A.**Department of Mathematics and Computer Science, Alarbi Tebessi University, Tebessa.

**Sept 2007- Sep 2008 Assistant Professor B.**Department of Mathematics and Computer Science, Alarbi Tebessi University, Tebessa.

**Oct 2004 – June 2007 Temporary teacher.**Department of Mathematics and Computer Science, Abbès Laghrour Khenchela University.

## **TEACHING AND ADMINISTRATIVE RESPONSIBILITIES**

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**October 2022-to date** Member of the scientific council of the faculty of science and technology, Abbès Laghrour Khenchela University

**August 2021 - to date** Director of the ICOSI laboratory.

**October 2019- September 2022** Elected member of the scientific committee of the Mathematics and Computer Science department, Abbès Laghrour Khenchela University.

**September 2014 – July 2015** Head of the Mathematics and Computer Science Department, Abbès Laghrour Khenchela University.

**March 2013- July 2013** Vice-dean in charge of teaching, faculty of science and technology, Abbès Laghrour Khenchela University.

**Jan 2011- March 2013** Head of the Mathematics and Computer Science Department, Abbès Laghrour Khenchela University.

## PUBLICATIONS AND COMMUNICATIONS

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### I. International publications

- 2024 Souidi, MEH, Ledmi, M.,**Maarouk, T.M.**, Siam, A., & Ledmi, A. (2024). Multi-Agent Dynamic Leader-Follower Path Planning Applied to the Multi-Pursuer Multi-Evader Game. COMPUTING AND INFORMATICS, 42(5), 1158–1183.[https://doi.org/10.31577/cai\\_2023\\_5\\_1158](https://doi.org/10.31577/cai_2023_5_1158).
- 2023 Messaoudi, N., Hicham, H.,**Messaoud, MT.**, Elkamel, HM (2023). Multi-layer consistency validation of IoT systems with UML inheritance dynamic diagrams via SPIN model checking. Information Systems Engineering, Vol. 28, No. 6, p. 1533-1547.<https://doi.org/10.18280/isi.280610>
- 2023**Maarouk, TM.**, El Habib Souidi, M., Ledmi, M. & Sabeg, S. (2023). Formalization of BPMN Gateways using the DD-LOTOS Formal Language. Journal of Communications Software and Systems, 19 (4), 254-263.<https://doi.org/10.24138/jcomss-2023-0138>
- 2023 Souidi, ME,**Maarouk, TM.**, Ledmi, M. et al. Multi-Pursuer Multi-Evader Games Based on Dynamic Elimination Priorities of the Dominated Strategies. J. Comput. Syst. Sci. Int. 62, 398–411 (2023).<https://doi.org/10.1134/S106423072302017X>
- 2023 Souidi, Mohammed El Habib, Haouassi, Hichem, Ledmi, Makhoulf,**Maarouk, Toufik Messaoud,** Ledmi, Abdeldjalil. 'A Discrete Particle Swarm Optimization Coalition Formation Algorithm for Multi-pursuer Multi-evader Game'. 1 Jan. 2023: 757 – 773.
- 2022 Haouassi Hichem, Merah Elkamel, Mehdaoui Rafik,**Maarouk Toufik Mesaaoud,** Chouhal Ouahiba. A new binary grasshopper optimization algorithm for feature selection problem, Journal of King Saud University - Computer and Information Sciences, Volume 34, Issue 2, 2022, Pages 316-328,<https://doi.org/10.1016/j.jksuci.2019.11.007>.
- 2021**Maarouk, T.M.**, Souidi, MEH, & Hoggas, N. (2021). Formalization and Model Checking of BPMN Collaboration Diagrams with DD-LOTOS. COMPUTING AND INFORMATICS, 40(5), 1080–1107.[https://doi.org/10.31577/cai\\_2021\\_5\\_1080](https://doi.org/10.31577/cai_2021_5_1080)
- 2019**Maarouk TM,** Merah E, Ghaoui S, Rahabi, N (2019) “FormalSemantics and Transformation of BPMN Models, International Journal of Business Process Integration and Management, Vol.9, No.3, pp 158-169.DOI:[10.1504/IJBPM.2019.100922](https://doi.org/10.1504/IJBPM.2019.100922)
- 2019 R.Mahdaoui, LH Mouss, A. Haboussi, O. Chouhal, H. Houassi,**TM Maarouk**“A Temporal Neuro-Fuzzy System For Estimating Remaining Useful Life In Preheater Cement Cyclones”, International Journal of Reliability, Quality and Safety Engineering World Scientific Publishing Company, DOI: 10.1142/S0218539319500128.

- 2018 H. Houassi, R. Mahdaoui, **TM Maarouk** “PSO with crossover operator applied to feature selection problem in classification”, *Informatica.* , flight. 42 no. 2, pp. 189-192. 2018.
- 2016 H. Houassi, **TM Maarouk**, R. Mahdaoui “IP Address Lookup in an IP Router Based On a Reorganized Binary Prefixes Value Tree (RBPVT)”, *International Journal of Computer Networks and Applications.* Volume 3, Issue 1, January – February.
- 2012 **TM Maarouk** and DE Saidouni. Towards a calculus for distributed, real-time and mobile systems. *Journal of Software (JSW, ISSN 1796-217X).* Vol 7(3), pages 564-574. 2012.

## II. International communications

- 2023 Mr. Belkebir, **TM Maarouk**, B. Nini and D. Belkebir, "Semantic-Layer: A High-Level Semantic Ontology For Data-Driven Approaches," 2023 International Conference on Decision Aid Sciences and Applications (DASA), Annaba, Algeria, 2023, pp. 213-217, doi: 10.1109/DASA59624.2023.10286750.
- 2022 S. Sabeg, **TM Maarouk** and M. El Habib Souidi, "Formal Specification and Verification for Organization-based systems: A Survey," 2022 4th International Conference on Pattern Analysis and Intelligent Systems (PAIS), Oum El Bouaghi, Algeria, 2022, pp. 1-6, doi: 10.1109/PAIS56586.2022.9946660.
- 2022 Belkebir, M., **Maarouk, TM.**, Nini, B. (2023). Integrating Ontology with Imaging and Artificial Vision for a High-Level Semantic: A Review. In: Al-Sharafi, MA, Al-Emran, M., Al-Kabi, MN, Shaalan, K. (eds) Proceedings of the 2nd International Conference on Emerging Technologies and Intelligent Systems. ICETIS 2022. Lecture Notes in Networks and Systems, vol 573. Springer, Cham. [https://doi.org/10.1007/978-3-031-20429-6\\_4](https://doi.org/10.1007/978-3-031-20429-6_4)
- 2021 Mohammed El Habib Souidi, **Toufik Messaoud Maarouk** and Abdeldjalil Ledmi, “Multi-agent Ludo game collaborative path planning based on Markov decision process”. In: International Conference on Inventive Systems and Control ICISC 2021.
- 2020 Bezza Assma, Elkamel Merah, Ameer-Boulifa Rabéa, Benaboud Rohallah and **Toufik Messaoud Maarouk**; “Formalization and Renement Proof for Embedded Systems”. Fourth International Symposium on Informatics and its Applications (ISIA'20 Symp pp (I) Mohamed Boudiaf University of M'sila, Algeria, December 15th-16th, 2020).
- 2015 **TM Maarouk**, DE Saidouni, R. Mahdaoui, H. Houassi “Interpretation of DD-LOTOS Specification by C-DATA\*”. In: Morzy T., Valduriez P., Bellatreche L. (eds) New Trends in Databases and Information Systems. ADBIS 2015. Communications in Computer and Information Science, vol 539. Springer, Cham.
- 2015 Houassi, R. Mahdaoui, **TM Maarouk** “Consultation of IP addresses in an IP router based on a reorganized binary tree” Conference on Optimization and Information Systems COSI'2015, June 1-3, 2015, Oran, Algeria.

2015 Mahdaoui, O. Chouhal, **TM Maarouk**, H. Houassi, LH Mouss “Temporal neurofuzzy system for fault prognostic in manufacturing system” The 1st International Conference on Applied Automation and Industrial Diagnostics (ICAAID 2015) Djelfa on 29-30 March 2015, Algeria.

2012 **TMMaarouk**, DE Saidouni and A.Bezza. Environment of specification of real-time systems. 2nd International Conference on Information Systems and Technologies, pages 99-103, Sousse, 2012.

2011 **TM Maarouk**, DE Saidouni, and M. Khergag. DD-LOTOS: A distributed real time language. In Proceedings 2nd Annual International Conference on Advances in Distributed and Parallel Computing (ADPC 2011) Special Track on: Real Time & Embedded Systems (RTES 2011), pages 45-50, Singapore, 2011.

2011 **TM Maarouk** and DE Saidouni. Formal verification of real-time systems using a true concurrency semantics. International Conference on Information and Multimedia Technology (ICIMT 2011), Dubai, UAE.

2009 TM Maarouk and DE Saidouni. Supporting mobility in real-time process algebras. In Proceedings of International Conference on Applied Informatics ICAI2009, pages 10-15, Bordj Bouarréridj, Algeria, 2009.

### **III. National communications**

2008 DE Saidouni and TM Maarouk. MD-LOTOS: a formal specification model for real-time and mobile systems. National computer science seminar in Biskra (SNIB 08).

## **SUPERVISION ACTIVITIES**

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### **I. Master and engineering**

2008-2009 Design & implementation of real-time specifications. Engineering dissertation.

2009-2010 Development of a real-time systems specification environment in D-LOTOS. Engineering dissertation.

2016-2017 A formal semantics for BPMN business processes using process algebras.

2018-2019 Interpretation of BPMN conversation diagrams in DD-LOTOS.

### **II. Doctoral theses**

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**March 2023 to date**Contribution to mining association rules for energy optimization in buildings. Co-supervision of the LMD doctoral thesis of candidate Necibi Khaoula, University of Khenchela.

**2022 to date**Formal methods for exploring architectures and designing reliable systems. Co-supervision of the doctoral thesis in sciences of candidate Bezza Assma- University of Oum El Bouaghi.

**2021 to date**Proposal of semantic models for improving standard image processing methods based on inductive inference. LMD doctoral thesis director of candidate Belkebir Malak, University of Oum El Bouaghi.

**April 2021 to date**Formal approach to the design of coordination mechanisms. LMD doctoral thesis supervisor of candidate Youcef Foughali, University of Khenchela.

**Nov 2019 to date**Formal models for the design of Multi-Agent Systems. LMD doctoral thesis supervisor of candidate Sabeg Samra, University of Khenchela.

### III. Master

2019-2020 Verification of BPMN business processes: logical approach.

2019-2020 Design and development of a mobile application.

2020-2021 Transformation of BPMN collaboration diagrams into Promela language.

2020-2021 Model-checking of BPMN collaboration diagrams.

2021-2022 An operational semantics for BPMN collaboration diagrams.

2022-2023 Integration of Algebra of Communicating Processes in the Design of Fog Systems.

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### **POST-GRADUATION TEACHING ACTIVITIES**

**2022-2023**Information and communication technologies. Trainer as part of initial postgraduate training (taught online via the Doctoral Student Support Platform <https://padoc.univ-ouargla.dz/>).

**2020-2021**Formal Methods for Software Specification and Verification. Course intended for first year doctoral students, IT specialty. University of Oum El Bouaghi.

**2020-2021**Information and communication technologies. Course intended for first year doctoral students, specializing in literary studies. University of Khenchela.

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### **RESEARCH ACTIVITIES**

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## I. Attached laboratory

**August 2021** to date Director of the ICOSI Knowledge Engineering and Computer Security laboratory.

**2013– 2021** Member of the ICOSI laboratory. “Models, Computation, Algorithms and Proof” Team

**2006-2013** Member of the Modeling and Implementation of Complex Systems (MISC) laboratory, University of Constantine. “Distributed verification of critical systems” team

## II. Organization of scientific events

**December 18-19, 2023** President of the doctoral days on computer science and mathematics, University of Khenchela.

**April 17-18, 2023** Member of the organizing committee for the scientific week on artificial intelligence.

**March 14-15, 2023** Member of the organizing committee of the week on pi-day.

**2022** Chairman of the scientific committee of the 1st doctoral days on “Artificial Intelligence & its Applications” AIA'22, University of Khenchela. December 18, 19 and 20, 2022.

**2022** Participation in the creation of the thematic research network in artificial intelligence, Algiers, December 10, 2022.

**2022** Member of the Scientific Committee of the 4th international conference on pattern analysis and intelligent system, University of Oum El Bouaghi, Algeria, October 12-13, 2022.

**2021** Member of the Organizing Committee of the 1st international visio conference on materials science and engineering ICMSE2021, University of Khenchela, Algeria, November 17-18, 2021.

**2021** Member of the Scientific Committee of the IEEE international conference on recent advances in mathematics and informatics (ICRAMI'2021), University of Tebessa, Algeria, September 21-22, 2021.

**2021** Member of the Scientific Committee of the 2nd international conference on complex systems and their application (ICCSA'21), University of Oum El Bouaghi, Algeria, May 25-26, 2021.