Quantum and Classic Intelligent Distributed Control Systems

Contact details

Name	**Quantum and Classic Intelligent Distributed Control Systems**
Acronym	**Q&CIDCS**
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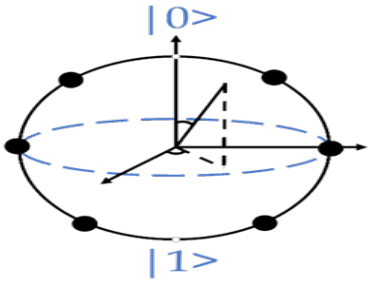

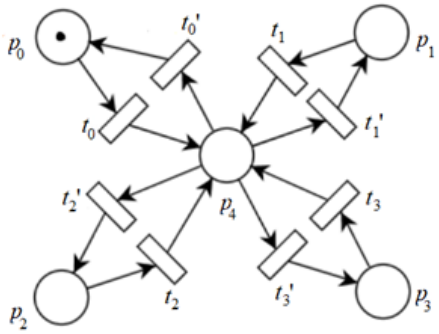

Areas of expertise

Quantum computing, quantum and classic intelligent systems, quantum and classic distributed control systems, hybrid real-time applications etc.

Team

Prof. Dr. Eng. Tiberiu S. Letia, Lect. Dr. Octavian Cuibus, Assist. Dr. Magdalena Santa, Assist. Dr. Dahlia Al-Janabi.

Representative projects

Development of Quantum Artificial Intelligent Applications
Development of Quantum and Classic Applications using Petri Nets.
Development of Distributed Control Application using Object Enhanced Time Petri Nets.
Development of sustainable house heating applications.
“Intelligent control system of road traffic”, research topic in the Postdoctoral project: Development and support of multidisciplinary postdoctoral programs in major technical areas of national strategy of Research - Development - Innovation" 4D-POSTDOC, contract no. POSDRU/89/1.5/S/52603, project co-funded by the European Social Fund through Sectorial Operational Program Human Resources Development 2007-2013, (2010-2013).
I3E, “Promoting Innovation in the Industrial Informatics and Embedded Systems Sectors through Networking”, Contract EU: SEE/A/219/1.1/X, http://www.i3e.eu/ (2009-2012)
“Identification system based on digital fingerprint with mobile terminals”, PNII-PDP (Joint Applied Research Project) 11038/2007, (2007-2010)
“Real-Time intelligent system for management, control and information of railway traffic”, Grant Cod CNCSIS: 1537/2007, (2007-2009)

Significant results

The most representative publications of the past 10 years:

1. Tiberiu Stefan Letia, Camelia Avram, Dahlia Al-Janabi, Ionel Miu and Octavian Cuibus. Development of Dynamic System Applications Using Distributed Quantum-Centric Computing, Mathematics 2025, 13, 3159. https://doi.org/10.3390/math13193159.
2. Claudiu Rafa, Maria M. Santa, Dahlia Al-Janabi, Octavian P. Cuibus, Tiberiu S. Letia. Procedure for Modelling, Identification and Control of a Sustainable House Heating, Proceedings of the 2025 29th International Conference on System Theory, Control and Computing (ICSTCC), DOI: 10.1109/ICSTCC66753.2025.11240429
3. Claudiu Rafa, Maria M. Santa, Dahlia Al-Janabi, Octavian P. Cuibus, Tiberiu S. Letia. , Air Preheating Identification for Heat Pump for Performance Improvement, IEEE Conf. AQTR 2024, DOI: 10.1109/AQTR61889.2024.10554242.
4. Letia, T.S.; Durla-Pasca, E.M.; Al-Janabi, D.; Cuibus, O.P. Development of Evolutionary Systems Based on Quantum Petri Nets. Mathematics **2022**, 10, 4404. https://doi.org/10.3390/math10234404Academic
5. O. Cuibus, T. Letia. Approaching Problems with Different Kinds of Petri Net Mode, AQTR 2022,
6. T. Letia, E. Durla, D. Al-Janabi. Quantum Petri Nets, IEEE conf. ICSTCC, 2021. DOI: 10.1109/ICSTCC52150.2021.9607302
7. D. Al-Janabi, M. Enache, T.S. Letia. Assessment methods for quality of programs conceived by Object Enhanced Time Petri Nets. IEEE Conf. ICCP, Cluj-Napoca, 2020
8. T.S. Letia, D. Al-Janabi, M.F. Enache. Hindsight of the Order to Chaos Edges for Traffic Systems, IEEE Conf. AQTR, Cluj-Napoca, 2020
9. M.F. Enache, D. Al-Janabi, T.S. Letia. Conceiving of Resilient Railway Systems, IEEE Conf. AQTR, Cluj-Napoca, 2020
10. M.M. Santa, O.P. Cuibus, D. Al-Janabi Relations of UML and OETPN models, IEEE Conf. AQTR, Cluj-Napoca, 2020
11. O. Cuibus, D. Al-Janabi, T.S. Letia. Object Enhanced Real-Time Petri Net Models in Multi-processing Environments, IEEE Conf. ICSTCC, Sinaia, 2020
12. D. Al-Janabi, T.S. Letia. Analysis of Applications Conceived by Object Enhanced Time Petri Nets. IEEE Conf. ICSTCC, Sinaia, 2019.
13. M. F. Enache, T.S. Letia. Approaching the Railway Traffic Resilience with Object Enhanced Time Petri Nets, . IEEE Conf. ICSTCC, Sinaia, 2019
14. Kilyen, Attila O.; Letia, Tiberiu S., Interactive development of cyber physical systems using UETPN model, Federated Conference on Computer Science and Information Systems (FedCSIS) Location: Poznan, POLAND Date: SEP 09-12, 2018, Book Series: Federated Conference on Computer Science and Information Systems Pages: 1035-1042, 2018
15. Enache, Mihai F.; Al-Janabi, Dahlia; Letia, Tiberiu S., Railway Modeling with Object Enhanced Time Petri Nets, Conference: 21st IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR THETA) Location: Cluj-Napoca, ROMANIA Date: MAY 24-26, 2018
16. Letia, T. S.; Kilyen, A. O., Using Unified Enhanced Time Petri Net Models for Cyber-Physical System Development Conference: 9th Vienna International Conference on Mathematical Modelling (MATHMOD) Location: Vienna, AUSTRIA IFAC PAPERSONLINE Volume: 51 Issue: 2 Pages: 248-253 Published: 2018
17. Letia, Tiberiu S.; Kilyen, Attila O., Unified Enhanced Time Petri Net Models for Development of the Reactive Applications Conference: 3rd International Conference on Event-Based Control, Communication and Signal Processing (EBCCSP) Location: Funchal, Portugal Date: MAY 24-26, 2017

Significant solutions:

Development of quantum computing applications and verification environments
Control and monitoring system for urban vehicle traffic
Control and monitoring system for railway traffic
Control systems for Flexible Manufacturing Systems

Distributed control for hybrid processes. Design, verification and implementation real-time (embedded) applications. Person identification based on digital fingerprint.

The offer addressed to the economic environment

Research & development	Quantum artificial intelligence based on Quantum Fuzzy Logic Petri Nets Development of Quantum and Classic applications. Automatic synthesis of control and monitoring systems for discrete event or hybrid, concentrated or distributed processes. Verification of real-time applications.
Consulting	Quantum and classic rule-based systems. Embedded systems, real-time applications design, implementation and verification. Distributed control systems for urban vehicle traffic, railway traffic, power systems.
Training	Development of quantum and classic applications. Design and implementation of real-time applications, Design and implementation of distributed control applications Distributed control of Transportation systems.

Last updated: January 2026