



Part A. PERSONAL INFORMATION		CV date	25.05.2025	
First and Family name	Cristian-Florentin Mahulea I	Poleuca		
ID number	73293557D		Age	47
Researcher codes	Open R. and Contributor ID	(ORCID**)	0000-0003-0056-2225	
	SCOPUS Author ID (*)			
	WoS Researcher ID (*)		F-7433-2	012

A.1. Current position

Name of University	University of Zaragoza				
Department	Computer Science and Systems Engineering				
Address and Country	c/ Maria de Luna 1, 50018 Zaragoza				
Phone number	976 762517	E-mail	cmahulea@unizar.es		
Current position	Full Professor			From	25/03/2024
Key words	Discrete event systems, planning, multirobot systems				

A.2. Education

PhD, Licensed, Graduate	University	Year
Laurea in Automatic Control and Industrial Informatics	"Gh. Asachi" Technical University of lasi	2001
Master in Systems Engineering	"Gh. Asachi" Technical University of Iasi	2002
PhD in Systems Engineering	University of Zaragoza	2007

A.3. General indicators of quality of scientific production

- 3 research CNEAI periods: 2003-2008, 2009-2014, 2015-2020.
- Web of Science Clarivate Analytics: 894 cites, h index:17.
- Google Scholar: 2184 cites, h index: 25.
- 1 research book; 29 journals and more than 90 conference publications.

Part B. CV SUMMARY

Cristian Mahulea is a Professor of Automatic Control at the University of Zaragoza, being head of the Computer Science and Systems Engineering Department between July 2020 to July 2024. His research interest is related to discrete event systems, with practical applications in path planning of mobile agents and hospital management. His contributions to the field have garnered significant recognition and impact on the global academic community, with 2184 citations and an h-index of 25 (Google scholar), along with three six-year research periods and extensive international collaborations.

Cristian is co-author of two books, 29 papers in indexed journal, six book chapters, and over 90 conference papers. Moreover, more than half of his journal papers involve collaborations with external experts, underscoring his ability to foster productive partnerships with national and international experts. He completed two research stays, one at Sheffield University (3 months) and another one at the University of Cagliari (3 months) during his doctoral studies. Post-thesis, he did seven-month research stays at Boston University (3) and ENS Paris-Saclay (4). Additionally, Cristian served as a visiting professor at the University of Cagliari for nine months (in 2008, 2010 and 2024) and received invitations from various other prestigious institutions for lectures, seminars, and short-term collaborations.

Beyond his research publications, Cristian has demonstrated leadership in scientific investigations. He has acted as the Principal Investigator for both national projects (DPI2014-57252-R and TED2021-130449B-I00) and an international project (NSFC China). Furthermore, he has co-supervised four doctoral theses and is currently overseeing another one. His academic leadership extends to conference organization, where he has served as the General Chair for the IEEE ETFA 2019 conference and as the PC Co-Chair for the same conference in 2017, 2018 and 2023. With over eight years of editorial board experience, he has held positions as an Associate Editor for IEEE Transactions on Automation Science and Engineering (TASE) and IEEE Control Systems Letters (CSS-L) and currently serves as an Associate Editor for IEEE Transactions on Automatic Journal of



Robotics Research (IJRR), Journal of Discrete Event Dynamic Systems: Theory and Applications (JDES) and IEEE Robotics and Automation Letters (RA-L).

Cristian's research contributions span three distinct fields:

<u>Analysis and design of discrete event systems</u>: In this area, considering fluid Petri nets he has delved into techniques used in the control theory and Petri net theory. His publications include a 70-page monograph in the Journal of Discrete Event Systems, which has received 121 citations. He also developed a software called SimHPN toolbox and co-supervised two doctoral thesis in this topic. *Fault diagnosis* in discrete event systems has also been considered publishing three journal papers in this field, one of which received recognition as the best paper published in 2012 in the IEEE Transactions on Systems, Man and Cybernetics journal.

<u>Planning and Control of Mobile Robot Teams</u>: In this area, he has published seven papers in JCR-indexed journals and led an international project in collaboration with Xidian University. His contributions focus on using Petri net models and mathematical programming to develop scalable algorithms for multi-robot path planning. Notable achievements include the development of the RMTool toolbox and the ongoing supervision of a PhD thesis in this field. Additionally, he authored a book published by IEEE Wiley, which provides an in-depth exploration of this research line.

<u>Hospital Management</u>: Collaborating with medical professionals, Cristian applies formal models to healthcare system management and optimization techniques to improve surgical waiting list management. His work has been published in important journals and conferences, earning recognition such as the Best Paper Award at the ICSTCC 2018 conference. Additionally, he contributed to the development of a Java-based software tool for surgery planning, which was awarded the Best Software Application for Digital Hospitals by eSalud Spain. Over the past years, he has been involved in projects leveraging clinical data to develop new clinical pathways for hospitals.

Part C. RELEVANT MERITS

C.1. Journal Publications (maximum 10 in the last 10 years)

- S. Hustiu, C. Mahulea, M. Kloetzer, J.J. Lesage, "On Multi-Robot Path Planning based on Petri Net Models and LTL Specifications," IEEE Transactions on Automatic Control, vol. 69(9), pp. 6373 - 6380, September 2024.
- 2. D. Clavel, **C. Mahulea** and M. Silva, "On Liveness Enforcement of Distributed Petri Net Systems," IEEE Transactions on Automatic Control, vol. 68(6), pp. 3776-3782, June 2023.
- 3. S. Hustiu, I. Hustiu, M. Kloetzer and **C. Mahulea**, "LTL Task Decomposition for 3D High-Level Path Planning," J. of Control Eng. and Applied Inform., vol. 24(3), pp. 76-87, 2021.
- 4. **C. Mahulea**, R. González, E. Montijano and M. Silva, "Path planning of multirobot systems using Petri net models. Results and open problems." Revista Iberoamericana de Automática e Informática industrial, vol. 18(1): January 2021.
- 5. M. Kloetzer and **C. Mahulea**, "Path planning for robotic teams based on LTL specifications and Petri net models," Discrete Event Dynamic Systems, 30(1):55-79, March 2020.
- 6. **C. Mahulea**, M. Kloetzer, R. Gonzalez, "Path Planning of Cooperative Mobile Robots Using Discrete Event Models", Wiley-IEEE Press, January 2020.
- 7. **C. Mahulea** and M. Kloetzer, "Robot Planning based on Boolean Specifications using Petri Net Models," *IEEE Transactions on Automatic Control*, 63(7): 2218-2225, July 2018.
- 8. M. Kloetzer and **C. Mahulea**, "LTL-based Planning in Environments with Probabilistic Observations," IEEE Trans. on Autom. Science and Eng., 12(4): 1407 1420, 2015.
- 9. X. Wang, **C. Mahulea** and M. Silva, "Diagnosis of Time Petri Nets using Fault Diagnosis Graph," IEEE Transactions on Automatic Control, 60(9): 2321 2335, September 2015.
- 10. M. Kloetzer and **C. Mahulea**, "A Petri net based approach for multi-robot path planning," Discrete Event Dynamic Systems: Theory and Appl., 24(4): 417-445, December 2014.

C.2. Research projects

C.2.1. As principal investigator

• **Reference**: 6155011023. **Title**: Discrete Event Systems tools for planning and control of teams of mobile robots. **Financial entity**: National Nat. Science Found. of China (NSFC)



- **Reference**: DPI2014-57252-R. **Title:** Formal models and methods for healthcare systems management. **Duration:** 01.01.2015-28.02.2018. **Funded**: 90.508 €
- **Reference**: UZ2018-TEC-06. **Duration**: Healthcare System Management Using Discrete Event Systems. **Duration**: 08.06.2018 31.12.2018. **Funded**: 1.250€.
- **Reference**: TED2021-130449B-I00. **Title**: "VALIDATOR: Evaluation and optimization of clinical pathways using formal methods", **Duration**: 01.12.2022 30.11.2024. **co-PI**: J. Albareda. **Funded**: 114.885,00€.
- C.2.2. As part of the research team
- Reference: CICYT DPI2006-15390. Title: Formal techniques for the analysis and design of discrete and hybrid event systems. Application to logistics and real-time systems. Principal investigator: Manuel Silva Suárez. Duration: 2006-2009. Funded: 206.100 €
- Reference: DISC INFSO-ICT-224498. Title: Distributed Supervisory Control of Complex Plants. Principal investigator: Manuel Silva. Financing entity: European Union. Duration: 01/09/2008 30/08/2011. Funded: 192.000€
- Title: Modeling and verification of critical software systems. Principal investigator: Jorge Júlvez. Financing entity: Fundación Aragón I+D. Duration: 01/10/2010 30/09/2012. Funded: 18.000€
- Reference: DPI2010-20413. Title: Analysis and control of large distributed discrete event systems. Principal investigator: Manuel Silva Suárez. Duration: 01/01/2011-31/12/2013. Funded: 106.480 €
- **Reference**: JIUZ-2018-TEC-10. **Title**: Distributed perception in dynamic environments with teams of mobile robots. **Principal investigator**: Eduardo Montijano. **Duration**: 01/01/2019-31/12/2019. **Funded**: 2.000 €
- **Reference**: I-2019/013. **Title**: DISCERNERS: Distributed high-level scene reasoning with teams of heterogeneous robots. **Principal investigator**: E. Montijano. **Duration**: 25.01.2019 10.02.2023. **Funded**: 449.942\$.
- Reference: PID2021-125514NB-I00. Title: Mejoras en comprensión automática de escenas mediante modalidades múltiples de sensores y percepción activa. Principal investigador: A. Murillo and E. Montijano. Duration: 01.09.2022 31.08.2025. Funded: 113.135,00 €.

C.3. Contracts, technological or transfer merits

- Authors: Jorge Júlvez, Cristian Mahulea. Title: SimHPN. Type of work: computer program. Registry seat number: 10/2010/464. Country: Spain (2010). Owner entity: University of Zaragoza.
- Authors: Cristian Mahulea, Jorge Albareda, Diana Botez, Daniel Clavel. Title: CIPLAN. Scheduling of surgical waiting lists. Type of work: computer program. Code: PII-2019-0028. Owner entity: University of Zaragoza.
- Authors: Cristian Mahulea, M. Kloetzer, R. Gonzalez. Title: RMTool Robot motion Toolbox under MATLAB. Type of work: computer program. Code: PII-2019-0018. Owner entity: University of Zaragoza.

C.4. Editorial activity

- Associate editor of the IEEE Trans. on Automation Science and Engineering (2014-2017)
- Associate editor of the IEEE Control Systems Letters, (2017-2021, two terms).
- Associate editor of the IEEE Transactions on Automatic Control, (Since 2020).
- Associate Editor of the International Journal of Robotics Research (IJRR) (Since 2023)
- Associate Editor of Journal of Discrete Event Dynamic Systems: Theory and Applications (JDES) (Since 2023)
- Associate Editor of the IEEE Robotics and Automation Letters (RA-L) (Since August 2024)
- A. Giua, C. Mahulea, M. Silva and J. Zaytoon (eds.): Proc. of 3rd IFAC Int. Conference on Analysis and Design of Hybrid Systems (ADHS'09), IFAC Proceedings Volumes, Vol. 42(17), Pages 1–420 (2009).

C.5. Conference committees

- General Co-Chair of ETFA'2019: IEEE Int. Conf. on Emerging Technologies and Factory Automation, Zaragoza, Spain, September 10-13, 2019.
- Program Committee Co-Chair of ETFA'2017, ETFA'2018 and ETFA'2023.



C.6. Student supervision

- **PhD thesis**: four defended (Liewei Wang, defended: 08/07/2013; Xu Wang, defended: 19/01/2017; Daniel Clavel, defended: 29/11/2019; Cesar Arzola, defended: 19/03/2024), one ongoing (Sofia Hustiu, expected defense date: June 2025).
- Final degree projects: 25 from 2016.
- **Master projects**: 11 from 2016, 4 at University of Zaragoza, 3 at University of Salerno (italy), 2 at "Gh. Asachi" Technical University of Iasi (Romania) and 2 at University Paris-Saclay (France).

C7. Participation in evaluation tasks

- Referee for national projects of the Ministry of Education of Greece in 2011.
- Referee for national research projects of the Romanian Ministry of Education in 2012, 2016, 2019, 2024 and 2025.
- Referee for research proj. of the Nat. Agency for Scientific and Technical Promotion in 2014.
- Referee for research projects and FPI scholarships of the Ministry of Science and Universities of Spain in 2018, 2019, 2023 and 2024.

C8. Participation in international committees

- Chair of IEEE RAS TC on Automation in Logistics (TCAL) since 2024.
- Co-chair (with Carla Seatzu) of the Subcommittee on Industrial Automated Systems and Control of the TC on Factory Autom. of the IEEE Industrial Electronics Society (since 2016).
- Member of the IFAC T.C. 1.3. on Discrete Event and Hybrid Systems (since 2011).
- Member of the IEEE T.C. on Discrete Event Syst. of the Control Syst. Society (since 2011).
- Member of the IEEE TC on Automation in Health Care Management of the Robotics and Automation Society (since 2013).

C9. Research stages and short stays

- February 2002 to April 2002 (3 months): research stay with the Department of Automatic Control and Systems Engineering, University of Sheffield, UK.
- January 2007 to April 2007 (3 months): research stay with the Department of Electrical and Electronic Engineering, University of Cagliari, Italy.
- October 2007 to December 2007 (3 months): research stay with the Department of Manufacturing Engineering, Boston University, Brookline, USA.
- May 2008 to August 2008 and from September 2010 to November 2010 (5 months in total): visiting professor with Dep. of Electrical and Electronic Engineering, Univ. of Cagliari, Italy.
- November 2014 (one week): ERASMUS teaching mobility Università di Salerno, Italy.
- October 2015 (one week): visiting researcher Xidian University, China.
- June 2016 (one week): visiting researcher Xidian University, China.
- October 2019 to January 2020 (4 months) research stay «SALVADOR DE MADARIAGA» with École Normale Supérieure París-Saclay, France.
- September 2024 to December 2024 (4 months): visiting professor with Dep. of Electrical and Electronic Engineering, Univ. of Cagliari, Italy.

C10. Awards

- Best 2012-2013 journal paper of the IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans awarded by IEEE Systems, Man, and Cybernetics Society Italian Chapter for the paper "Fault Diagnosis of Discrete-Event Systems using Continuous Petri Nets, published in Issue 42 (4): 970-984, July 2012."
- Best conf. paper at 22nd Int. Conf. on System Theory, Control and Computing, Sinaia, Romania, October 2018 for the paper "D. Clavel, D. Botez, C. Mahulea and J. Albareda, Software Tool for Operating Room Scheduling in a Spanish Hospital Department ".
- Outstanding reviewer for Journal on Discrete Event Dynamic Systems: Theory and Applications (J-DEDS) for the period July 2017 to July 2018.
- Best software application for digital hospitals with the tool called CIPLAN: Java application for planning operations for elective patients, awarded by eSalud Spain, November 2018.

C11. Administrative tasks

• Head of the Computer Science and Systems Engineering Department of the University of Zaragoza from July 2020 to July 2024.