



## CURRICULUM VITAE

### Jean-Jacques LESAGE, Full Professor

Department of Mechanical Engineering  
Automated Production Research Laboratory (LURPA)

Ecole Normale Supérieure de Cachan  
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### EDUCATION:

1981 Agregation	French “Agrégation” in Mechanical Engineering
1984 M.S.	ENS de Cachan
1989 Ph.D	Ecole Centrale de Paris
1994 Habilit.	French « Habilitation à Diriger les Recherches », Univ. of Nancy I

### PROFESSIONAL EXPERIENCE:

Sept. 1989 - July 1994	Associate Professor, Department of Mechanical Engineering, ENS de Cachan
Sept. 1994 - present	Full Professor of automatic control, Depart. of Mech. Engineering, ENS de Cachan
Jan. 1991 - Jan. 2001	Head of the “Automation Engineering” team of LURPA
Jan. 2001 – May 2009	Head, Automated Production Research Laboratory (LURPA)

### RESEARCH INTERESTS: Discrete Event Systems

- Formal analysis of models and control programs
- Algebraic synthesis
- Performance analysis of networked automation systems
- Model-Based Safety Analysis, diagnosis
- Identification by Finite Automata and Petri Nets
- DES approaches for Ambient Assisted Living

### TEACHING:

- Languages, Finite Automata and Supervisory Control Theory, 3 credits, S.M.-1
- Petri Nets and performance analysis of DES, 3 credits, S.M.-1
- Hybrid Systems modeling and analysis, 3 credits, S.M.-1
- Dependable control of DES, 3 credits, S.M.-2
- Good Practice in the Conduct of Research, 3 credits, S.M.-2

### **VISITING APPOINTMENTS:**

- Ecole Polytechnique Montreal - Canada(1987)
- School of Engineering, University of Minho - Portugal (2004 & 2006)
- Kaiserslautern Univ. of Technology, Institute of Automatic Control - Germany (2005, 2008 & 2010)
- Cinvestav, Dept. of Computer Science, Guadalajara - Mexico (2009, 2010, 2011 & 2013)
- Politecnico di Bari, Dept of Electrical and Electronic eng. - Italy (2015)

### **AFFILIATIONS:**

- Member of IEEE
- Member of IFAC (Co-Chair of the IFAC Technical Committees TC 1.3 on Discrete Event and Hybrid Systems 2011 – 2014)

### **SOME RECENT AND CURRENT PROFESSIONAL ACTIVITIES:**

- Member of the IPC of 20 international conferences since 2010 (most part IFAC or IEEE)
- Vice-Chair of the IFAC Technical Committee 1.3 “Discrete event and hybrid systems” (2011-2014 - Chair: A. Giua, Univ. di Cagliari – Italy)
- Associate Editor of IEEE Int. Conf. on Automation Science and Engineering (CASE’11), 25-27 August 2011, Trieste (Italy), for the track “Foundation of Automation”
- Associate Editor of « IEEE Transactions on Automation Science and Engineering » since January 2012
- Co-chair of the 11<sup>th</sup> IFAC Workshop on Discrete Event Systems – WODES’12, 3-5 October 2012, Guadalajara (Mexico)
- Associate Editor of the 12<sup>th</sup> European Control Conference (ECC’13), 17-19 July 2013, Zurich (Switzerland)
- Associate Editor of IEEE Int. Conf. on Automation Science and Engineering (CASE’13), 18-21 August 2013, Madison - Wisconsin (USA), for the track “Networked and Control Systems”
- Gest Editor, with E. Lopez Mellado, of "Nonlinear Analysis: Hybrid Systems", Volume 12, May 2014, Pages 2-65
- General Chair of 12<sup>th</sup> IFAC Workshop on Discrete Event Systems (WODES’14), 14-16 May 2014, Cachan (France)
- Associate Editor for TC 1.3 of 19<sup>th</sup> IFAC World Congress 2014, 24-29 August 2014, Cape Town (South Africa)
- Associate Editor of IFAC Journal « Annual Review in Control » since April 2015
- Vice Chair of the IPC of the IEEE Int. Conf. on Automation Science and Engineering (CASE’15), 18-21 August 2015, Göteborg (Sweden)
- Associate Editor of the 14<sup>th</sup> European Control Conference (ECC’15), 15-17 July 2015, Linz (Austria)
- Gest Editor, with J. Cury, of the special issue « New approaches for DES modeling, analysis and synthesis» of the Journal « Discrete Event Dynamic Systems », 26(1), March 2016
- Chair of the Best Student Paper Award, WODES’16, 30 May-01 June 2016, Xi’an (China)
- Member of the “Advisory panel” of IFAC World Congress 2017, 9-14 July 2017, Toulouse, France

### **RECENT HONORS/AWARDS:**

- Best paper award of the track “Discrete Event System”, 13th IFAC Symposium on Information Control Problems in Manufacturing (INCOM’09), Moscow (Russia), June 2009
- Best Session Paper Presentation Award, American Control Conference (ACC’10), Baltimore (USA), July 2010
- Best paper award finalist, IEEE Int. Conf. on Automation Science and Engineering (CASE’11), Trieste (Italy), August 2011
- Best paper award of 16th IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA’11), Toulouse (France), September 2011
- Decoration (with the rank of “Knight”) for services to education (French “Academic Palms”), January 2012

## SELECTION OF RECENT PUBLICATION:

### Articles in Journals (since 2010)

- [A1] G. Merle, J.-M. Roussel, J.-J. Lesage, A. Bobbio, *Probabilistic algebraic analysis of Fault Trees with priority dynamic gates and repeated events*, IEEE Trans. on Reliability, **59(1)**, pp. 250-261, March 2010
- [A2] B. Addad, S. Amari, J.-J. Lesage, *Analytic calculus of response time in networked automation systems*, IEEE Trans. on Automation Science and Engineering, **7(4)**, pp. 858-869, October 2010
- [A3] A.-P. Estrada-Vargas, E. Lopez-Mellado, J.-J. Lesage, *A comparative analysis of recent identification approaches for discrete-event systems*, Mathematical Problems in Engineering, Vol. 2010, 21 pages, Article ID 453254
- [A4] G. Merle, J.-M. Roussel, J.-J. Lesage, *Algebraic determination of the structure function of Dynamic Fault Trees*, Reliability Engineering and System Safety, **96(2)**, pp. 267-277, February 2011
- [A5] B. Addad, S. Amari, J.-J. Lesage, *Genetic algorithms for delays evaluation in networked automation systems*, Engineering Applications of Artificial Intelligence, **24(3)**, pp. 485-490, April 2011
- [A6] B. Addad, S. Amari, J.-J. Lesage, *Client-Server networked automation systems reactivity: deterministic and probabilistic analysis*, IEEE Trans. on Automation Science and Engineering, **8(3)**, pp. 540-548, July 2011
- [A7] M. Roth, J.-J. Lesage, L. Litz, *The concept of residuals for fault localization in discrete event systems*, Control Engineering Practice, **19(9)**, pp. 978-988, September 2011
- [A8] B. Addad, S. Amari, J.-J. Lesage, *A virtual queuing based algorithm for delays evaluation in networked control systems*, IEEE Trans. on Industrial Electronics, **58(9)**, pp. 4471-4479, September 2011
- [A9] M. Roth, S. Schneider, J.-J. Lesage, L. Litz, *Fault detection and isolation in manufacturing systems with an identified discrete event model*, Int. Journal of Systems Science, **43(10)**, pp. 1826-1841, October 2012
- [A10] B. Addad, S. Amari, J.-J. Lesage, *Networked conflicting timed event graphs representation in (Max,+ ) algebra*, Discrete Event Dynamic Systems, **22(4)**, pp. 429-449, December 2012
- [A11] G. Merle, J.-M. Roussel, J.-J. Lesage, *Quantitative Analysis of Dynamic Fault Trees based on the Structure Function*, Quality and Reliability Engineering International, **30(1)**, pp. 143-156, February 2014
- [A12] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *Input-output identification of controlled discrete manufacturing systems*, Int. Journal of Systems Science, **45(3)**, pp. 456-471, March 2014
- [A13] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *A Stepwise Method for Identification of Controlled Discrete Manufacturing Systems*, International Journal of Computer Integrated Manufacturing, **28(2)**, pp. 187-199, published online 7 Nov. 2014
- [A14] J.-M. Roussel, J.-J. Lesage, *Design of logic controllers thanks to symbolic computation of simultaneously-asserted Boolean equations*, Mathematical Problems in Engineering, Vol. 2014, Article ID 726246, 15 pages, doi:10.1155/2014/726246, May 2014
- [A15] G. Merle, J.-M. Roussel, J.-J. Lesage, V. Perchet, N. Vayatis, *Quantitative analysis of Dynamic Fault Trees based on the coupling of structure functions and Monte Carlo simulation*, Quality and Reliability Engineering International, **32(1)**, pp. 7-18, Feb. 2016
- [A16] M. Danancher, J.-J. Lesage, L. Litz, *Model-Based Location Tracking of an a priori Unknown Number of Inhabitants in Smart Homes*, IEEE Trans. on Automation Science and Engineering, **13(2)**, pp. 1090-1101, April 2016
- [A17] R. Jacob, J.-J. Lesage, J.-M. Faure, *Overview of Discrete Event Systems Opacity: models, validation and quantification*, Annual Reviews in Control, **Vol. 41**, pp. 135–146, April 2016
- [A18] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *A Black-box Identification Method for Automated Discrete Event Systems*, IEEE Trans. on Automation Science and Engineering, accepted paper to be published 2016, available online IEEE Xplore
- [A19] M.P. Fanti, G. Faraut, J.-J. Lesage, M. Roccotelli, *An Integrated Framework for Binary Sensor Placement and Inhabitants Location Tracking*, IEEE Trans. on Systems, Man, and Cybernetics: Systems, accepted paper to be published 2016, available online IEEE Xplore

### Invited Talks (since 2010)

- [Cinv. 1] J.-M. Faure & J.-J. Lesage, *Improving dependability of controlled systems: a challenge for automation science and engineering*, Keynote paper, 8<sup>th</sup> Int. Conf. on Informatics in Control Automation and Robotics (ICINCO'11), Noordwijkerhout (The Netherlands), July 2011
- [Cinv. 2] J.-J. Lesage, *Tailor-made vs. formal languages: how to reconcile effectiveness and rigor of modelling for automation engineering*, Keynote paper, 5<sup>th</sup> Int. Workshop on Verification and Evaluation of Computer and Communication Systems (VECOS'11), Tunis (Tunisia), September 2011
- [Cinv. 3] J.-J. Lesage, *Equipment of tailor-made languages with formal framework: the case of two industrial tools for Safety Analysis*, Invited talk, Annual Research Seminary of the Faculty of Informatics, Univ. Magdeburg (Germany), September 2011
- [Cinv. 4] J.-J. Lesage, *Fault diagnosis of DES based on a fault-free identified model*, Plenary talk, Colloquium on Discrete Event and Hybrid Systems, Cinvestav-Guadalajara (Mexico), 19 February 2013
- [Cinv. 5] J.-J. Lesage, *Identification of DES for diagnosis purposes*, Plenary talk, Annual Research Seminary of the Faculty of Electrical Eng. And Control, Kaiserslautern (Germany), 21 November 2014
- [Cinv. 6] J.-J. Lesage, *Fault diagnosis of DES based on a fault-free identified model*, Invited talk, Research Seminary of the Dep. of Electrical Eng. And Information, Politecnico bari (Italy), 29 April 2015

### Refereed Conference Proceedings (since 2010)

- [CI 1] M. Roth, L. Litz, J.-J. Lesage, *Identification of discrete event systems: Implementation issues and model completeness*, 7<sup>th</sup> Int. Conf. on Informatics in Control Automation and Robotics (ICINCO'10), Funchal (Portugal), pp. 73-80, June 2010
- [CI 2] M. Roth, J.-J. Lesage, L. Litz, *Black-box identification of discrete event systems with optimal partitioning of concurrent subsystems*, American Control Conference (ACC'10), Baltimore (USA), pp. 2601-2606, July 2010, **Best paper Award of the track "Discrete Event Systems"**
- [CI 3] G. Merle, J.-M. Roussel, J.-J. Lesage, *Improving the Efficiency of Dynamic Fault Tree Analysis by Considering Gates FDEP as Static*, 19<sup>th</sup> European Safety & Reliability Conf. (ESREL'10), Rhodes (Greece), pp. 845-851, September 2010
- [CI 4] G. Merle, J.-M. Roussel, J.-J. Lesage, N. Vayatis, *Analytical Calculation of Failure Probabilities in Dynamic Fault Trees including Spare Gates*, 19<sup>th</sup> European Safety & Reliability Conf. (ESREL'10), Rhodes (Greece), pp. 794-801, September 2010
- [CI 5] B. Addad, S. Amari, J.-J. Lesage, *Linear time-varying (max,+) representation of conflicting timed event graphs*, 10<sup>th</sup> Int. Workshop on Discrete Event Systems (WODES'10), Berlin (Germany), pp. 310-315, September 2010
- [CI 6] A.-P. Estrada-Vargas, E. Lopez-Mellado, J.-J. Lesage, *An identification method for PLC-based automated discrete event systems*, 49<sup>th</sup> IEEE Conf. on Decision and Control (CDC'10), Atlanta-Georgia (USA), pp. 6740-6746, December 2010
- [CI 7] G. Merle, J.-M. Roussel, J.-J. Lesage, *Dynamic Fault Tree analysis based on the structure function*, Annual Reliability and Maintainability Symposium 2011 (RAMS'11), Lake Buena Vista - FL (USA), pp. 462-467, January 2011
- [CI 8] M. Danancher, M. Roth, J.-J. Lesage, L. Litz, *A comparative study of three model-based FDI approaches for Discrete Event Systems*, 3<sup>rd</sup> IFAC Int. Workshop on Dependable Control of Discrete Systems (DCDS'11), Saarbrücken (Germany), pp 31-36, June 2011
- [CI 9] B. Addad, S. Amari, J.-J. Lesage, B. Denis, *Measures vs. Analytic Evaluation of Response Time of Networked Automation Systems*, IEEE Int. Conf. on Automation Science and Engineering (CASE'11), pp. 576-581, Trieste (Italy), August 2011, **Best paper Award finalist**
- [CI 10] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *Stepwise Identification of Automated Discrete Manufacturing Systems*, 16<sup>th</sup> IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA'11), Toulouse (France), paper N°4-6, 8 pages, September 2011, **Best paper Award of the conference**
- [CI 11] P.-Y. Chaux, J.-M. Roussel, J.-J. Lesage, G. Deleuze, M. Bouissou, *Qualitative analysis of a BDMP by finite automata*, 20<sup>th</sup> European Safety & Reliability Conf. (ESREL'11), Troyes (France), in "Advances in Safety Reliability and risk management", Taylor & Francis Ed., pp. 2055-2057, September 2011

- [CI 12] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *Identification of Industrial Automation Systems: Building Compact and Expressive Petri Net Models from Observable Behavior*, American Control Conference (ACC'12), Montreal (Canada), pp. 6095-6101, June 2012
- [CI 13] P.-Y. Chau, J.-M. Roussel, J.-J. Lesage, G. Deleuze, M. Bouissou, *Systematic extraction of Minimal Cut Sequences from a BDMP model*, 21<sup>th</sup> European Safety & Reliability Conf. (ESREL'12), Helsinki (Finland), paper 16B-We4-3, 8 pages, June 2012
- [CI 14] M. Danancher, J.-J. Lesage, L. Litz, *Indoor Location Tracking based on a Discrete Event Model*, 10th Int. Conf. On Smart homes and health Telematics (ICOST'12), Artimino (Italy), Lecture Notes in Computer Science 7251, pp. 262-265, June 2012
- [CI 14] J.-M. Roussel, J.-J. Lesage, *Algebraic synthesis of logical controllers despite inconsistencies in specifications*, 11<sup>th</sup> Int. Workshop on Discrete Event Systems (WODES'12), Guadalajara (Mexico), pp. 307-314, October 2012
- [CI 15] Schneider, L. Litz, J.-J. Lesage, *Determination of Timed Transitions in Identified Discrete-Event Models for Fault Detection*, 51<sup>st</sup> IEEE Annual Conference on Decision and Control (CDC'12), Grand Wailea, Maui, HI (USA), pp. 5816-5821, December 2012
- [CI 16] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *Automated Modeling of Reactive Discrete Event Systems from External Behavioral Data*, 23<sup>rd</sup> Int. Conf. on Electronics, Communications and Computing (CONIELECOMP 2013), Cholula Puebla (Mexico), pp. 120-125, March 2013
- [CI 17] M. Danancher, J.-J. Lesage, L. Litz, G. Faraut, *A Discrete Event Model for Multiple Inhabitants Location Tracking*, 9th IEEE Int. Conf. on Automation Science and Engineering (CASE'13), pp. 922-927, Madison-Wisconsin (USA), August 2013
- [CI 18] A.-P. Estrada-Vargas, E. Lopez-Mellado, J.-J. Lesage, *Identification of Partially Observable Discrete Event Manufacturing Systems*, 18th IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA'13), Cagliari (Italy), paper 83, 7 pages, September 2013
- [CI 19] M. Danancher, G. Faraut, J.-J. Lesage, L. Litz, *A DES Simulator for Location Tracking of Inhabitants in Smart Home*, 8th EUROSIM Congress on Modelling and Simulation (EUROSIM'13), pp. 330-335, Cardiff-Wales (United Kingdom), September 2013
- [CI 20] P.-Y. Chau, J.-M. Roussel, J.-J. Lesage, G. Deleuze, M. Bouissou, *Towards a unified definition of Minimal Cut Sequences*, 4th IFAC Workshop on Dependable Control of Discrete Systems (DCDS'13), York (United Kingdom), 6 pages, September 2013
- [CI 21] M. Danancher, J.-J. Lesage, L. Litz, G. Faraut, *Online Location Tracking of a Single Inhabitant based on a State Estimator*, IEEE Int. Conf. on Systems, Man, and Cybernetics (SMC'13), Manchester (United Kingdom), 6 pages, 13-16 October 2013
- [CI 22] M.P. Fanti, A.M. Mangini, W. Ukovich, K. Viard, J.-J. Lesage, *An Integrated System Model for the Management of Health Care at Home*, 11<sup>th</sup> IEEE Int. Conf. on Automation Science and Engineering (CASE'14), Taipei (Taiwan), pp. 582-587, August 18-22, 2014
- [CI 23] P.-Y. Piriou, J.-M. Faure, J.-J. Lesage, *Control-in-the-loop Model Based Safety Analysis*, 23<sup>th</sup> European Safety & Reliability Conf. (ESREL'14), Wroclaw (Poland), pp.655-662, September 11-14, 2014
- [CI 24] T. Tapia-Flores, E. Lopez-Mellado, A.-P. Estrada-Vargas, J.-J. Lesage, *Petri Net Discovery of Discrete Event Processes by Computing T-invariants*, 19<sup>th</sup> IEEE Int. Conf. on Emerging Technologies and Factory Automation (ETFA'14), Barcelona (Spain), paper 345, 8 pages, September 16-19, 2014
- [CI 25] R. Jacob, J.-J. Lesage, J.-M. Faure, *Opacity of Discrete Event Systems: models, validation and quantification*, 5<sup>th</sup> IFAC Workshop on Dependable Control of Discrete Systems (DCDS 2015), Cancun (Mexico), 8 pages
- [CI 26] P.Y. Piriou, J.M. Faure, J.J. Lesage, *Modeling standby redundancies in repairable systems as guarded preemption mechanisms*, 5<sup>th</sup> IFAC Workshop on Dependable Control of Discrete Systems (DCDS 2015) , pp. 147-153, Cancun (Mexico), May 2015
- [CI 27] J. Saives, G. Faraut, J.-J. Lesage, *Identification of Discrete Event Systems Unobservable Behaviour by Petri nets using Language Projections*, European Control Conference 2015 (ECC'15), Linz, Austria, Paper WeB2.1, 8 pages, 15-17 July 2015

- [CI 28] P.-Y. Piriou, J.-M. Faure, J.-J. Lesage, *A formal definition of Minimal Cut Sequences for dynamic, repairable and reconfigurable systems*, 25th European Safety & Reliability Conf. (ESREL'16), Glasgow (Scotland), September 2016
- [CI 29] M.P. Fanti, M. Roccotelli, J.-J. Lesage, G. Faraut, *Motion Detector Placement Optimization in Smart Homes for Inhabitant Location Tracking*, 21th IEEE int. Conf. on Emerging Technologies and Factory Automation (ETFA'16), Berlin (Germany), 6-9 September 2016
- [CI 30] P.-Y. Piriou, J.-M. Faure, J.-J. Lesage, *From Safety Analysis of Reconfigurable Systems to Design of Fault-Tolerant Control Strategies*, 3rd Int. Conf. on Control and Fault-Tolerant Systems (SysTol'16), Barcelona (Spain), pp. 609-614, 7-9 September, 2016
- [CI 31] K. Viard, M.P. Fanti, G. Faraut, J.-J. Lesage, *An Event-Based Approach for Discovering Activities of Daily Living by Hidden Markov Models*, The 15th IEEE Int. Conf. on Ubiquitous Computing and Communications, (IUCC 2016), Granada (Spain), 14-16 December 2016

### **Refereed Conference Proceedings in French (since 2010)**

- [CN 2] B. Addad, S. Amari, J.-J. Lesage, *Modélisation de réseaux de graphes d'événements temporisés avec conflits dans l'algèbre (Max,+)*, Sixième IEEE Conférence Internationale Francophone d'Automatique (CIFA'10), papier N°22, 6p., Nancy (France), Juin 2010
- [CN 3] P.-Y. Chauv, J.-M. Roussel, J.-J. Lesage, *Formalisation des scénarios de défaillance d'un BDMP par automate fini*, Journées Doctorales du GDR MACS 2011, papier N° JD14-5, 6 pages, Marseille (France), Juin 2011
- [CN 4] M. Danancher, M. Roth, J.-J. Lesage, L. Litz, *Diagnostic des SED basé sur un modèle : trois approches évaluées sur une même étude de cas*, Journées Doctorales du GDR MACS 2011, papier N° JD6-1, 6 pages, Marseille (France), Juin 2011
- [CN 5] A.-P. Estrada-Vargas, J.-J. Lesage, E. Lopez-Mellado, *Identification de SED au moyen de réseaux de Petri : une approche pour la représentation structurelle des comportements observés*, Septième IEEE Conférence Internationale Francophone d'Automatique (CIFA'12), pp. 919-924, Grenoble (France), Juillet 2012
- [CN 6] G. Faraut, M. Danancher, J. Saives, J.-J. Lesage, *E-santé et maison intelligente : Une approche à travers le prisme des Systèmes à Événements Discrets*, Journées d'étude sur la Télésanté (JETSAN'14), Université de technologie de Troyes (UTT), Juin 2014
- [CN 7] J. Saives, G. Faraut, J.-J. Lesage, *Identification par réseau de Petri du comportement non observable d'un système séquentiel réactif*, 6èmes Journées doctorales du GDR MACS, JDMACS'15, Papier 9-2, 6 pages, 18-19 juin 2015

### **Participation to PhD examinations (since 2010)**

14 PhD examination in France and 7 out of France:

<b>University</b>	<b>Date</b>	<b>PhD student</b>	<b>Supervisor</b>
Univ. Magdeburg (Germany)	09/2011	M. Güdeman	F. Ortmeier
Univ. Bochum (Germany)	03/2013	Y. Nke	J. Lunze
Univ. Cagliari (Italy)	09/2013	M. Pocci	A. Giua
TU Berlin (Germany)	01/2014	T. Brunsch	J. Raisch
Univ. Kaiserslautern (Germany)	12/2014	S. Schneider	L. Litz
Univ. Hull (UK)	01/2016	S. Kabir	Y. Papadopoulos
Univ. Bochum (Germany)	10/2016	M. Schuh	J. Lunze