

# MOHAMED SIALA

## PERSONAL INFORMATION

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## RESEARCH INTERESTS

Combinatorial Optimisation, Formal Reasoning, and Artificial Intelligence

## WORK EXPERIENCE

*2018 - present*            Associate professor in computer science  
LAAS-CNRS, INSA Toulouse, France

*2015 - 2018*                Post-doctoral researcher  
Insight, Centre for Data Analytics, UCC, Ireland  
Supervisor: Barry O'Sullivan

*2012 - 2014*                Teaching assistant, INSA, Toulouse, France

## EDUCATION

*2012 - 2015*                PhD in computer science, INSA Toulouse, LAAS-CNRS, France  
Title: *Search, propagation, and learning in sequencing and scheduling problems*  
Funding: CNRS, Google, and Midi-Pyrénées region  
Supervisors: Emmanuel Hebrard and Christian Artigues

*2010 - 2012*                Master's degree in *AI and Decision Making*, ENSI, Tunisia

*2007 - 2010*                Computer engineering diploma, ENSI Tunisia

*2005 - 2007*                Bachelor's degree in Mathematics and Physics, "Classes préparatoires", IPEIS, Tunisia

## AWARDS

*2016*                        **Honorable mention for the best Ph.D Thesis Award in AI**,  
European Association for Artificial Intelligence

*2012*                        **Best paper award, honorable mention** for the paper "An  
Optimal Arc Consistency Algorithm for a Chain of Atmost  
Constraints with Cardinality", CP 2012 Conference

*International  
Constraint  
Programming  
Competitions*                **Mistral-2.0, an open-source constraint programming library  
that won multiple awards in the XCSP competition (2017,  
2024) and the Minizinc Challenge (2020)**

## SUPERVISION

Ph.D 2020-2023 · **[Graduated]** Co-supervising the PhD of Julien Ferry with Marie José Huguet and Sébastien Gambis:

*Addressing Interpretability, Fairness & Privacy in Machine Learning Through Combinatorial Optimization Methods*

2019-2022 · **[Graduated]** Co-supervising the PhD of Hao Hu with Marie José Huguet:

*Interpretable Machine Learning Models via Maximum Boolean Satisfiability*

2016-2019 · **[Graduated]** Co-supervising the PhD of Begum Genc with Barry O’Sullivan:

*An Approach to Robustness in Stable Marriage and Stable Roommates Problems*

B.S. & M.S. 2024: Akshita Kumar  
2023: Alice Devilder  
2023: Brenda Tonleunguissi  
2023: Bryan Chen  
2023: Mohamed yassine Loulou  
2020: Sabine Muzellec  
2020: Maxence Bieres  
2020: Hao Hu  
2020: Hosseim Nahal  
2020: Julien Ferry

#### FUNDING AND INTERNATIONAL COLLABORATIONS

Project Funding 2024 · Trustworthy Machine Learning, Three months research visit to Prof. Joao Marques Silva at University of Lleida, 6K, INSA Toulouse

2022 - 2024 · Interactive Combinatorial Optimisation, PI, 20k, Funding: [CIMI Toulouse](#), PI

2019 - 2023 · Operational Research for Fairness, Privacy and Interpretability in Machine Learning, co-PI, 20k, Funding: [CIMI Toulouse](#), Co-PI

2019 - 2021 · LAAS-CNRS Starting Package, PI, 20k

2019 - 2020 · INSA Toulouse Starting Package, PI, 3k

Research Projects Participation 2020 - 2022 · Collaborator researcher in the *DEEP LEARNER EXPLANATION & VERIFICATION CHAIR* with Prof. Joao Marques Silva

2017 - 2018 · UTRC-UCC Cooperation Project, Cork, Ireland

2015 - 2018 · **Science Foundation Ireland**, Grants 12/RC/2289 and 16/RC/3918, co-funded under the European Regional Development Fund

Scientific Research Visits 10/2024 · Three months visit to University Of Lleida, Spain. Collaboration with João Marques Silva.

05/2022 · Six weeks visit to UQAM, Montréal, Canada.  
Collaboration with Sébastien Gambs and Ulrich Aïvodji.

02/2020 · Two weeks visit to the Department of Philosophy,  
University College Cork, Ireland.

01/2013 · One month visit to NICTA, UNSW, Sydney, Australia.  
Cooperation with : Nina Narodytska and Toby Walsh

## SERVICE

### *Administrative Roles*

2020-2023 · Academic advisor and coordinator for the  
Distributed Systems and Big Data major at INSA Toulouse

2019 - 2021 · In charge of organising the ROC Seminar Series

2016 - 2018 · In charge of organising the Insight Seminar Series

2012 - 2014 · Ph.D students coordinator, LAAS-CNRS

### *Program Committee*

**IJCAI**, International Joint Conferences on Artificial Intelligence:  
since 2019

**Awarded Distinguished Program Committee in 2019**

**AAAI**, AAAI Conference on Artificial Intelligence : PC since 2020

**CP**, International Conference on Principles and Practice of  
Constraint Programming: since 2017

**ECAI**, European Conference on Artificial Intelligence: 2016, 2018

**CPAIOR**, International Conference on the Integration of  
Constraint Programming, Artificial Intelligence, and Operations  
Research, 2014, 2016, 2021, 2022, 2023, 2024

### *Journals*

Artificial Intelligence, Computing Surveys, Constraints, JAIR

### *Organisation Committee*

2020 · **Co-organising & co-chairing the Master Class of the  
CPAIOR'20 Conference**, Vienna, Austria

2019 · Member of the organisation committee of JFPC'19 (the  
French constraint programming conference), Albi, France

### *Science Outreach*

10/2013 · The art of "decision making", Science Festival in  
Toulouse

## MISCELLANEOUS

2024 · Awarded a six months sabbatical research period from  
INSA Toulouse (CRCT)

2014 · Finalist for the ROADEF Young Researcher Award

2012 · International Conference on Principles and Practice of  
Constraint Programming doctoral program grants, 2012, Quebec,  
Canada

### *Additional Skills and Experiences*

2005-2024 · Violin player in various French, Irish, and Tunisian

bands

2016 · Hike leader, UCC Mountaineering Club, Ireland

2007 - 2010 · Manager of the ENSI-Music association, Tunisia

## PUBLICATIONS

### Preprint

2024 Julien Ferry, Ulrich Aïvodji, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Sok: Taming the triangle - on the interplays between fairness, interpretability and privacy in machine learning. *CoRR*, abs/2312.16191, 2023

### 2024

SATML 2024 Julien Ferry, Ulrich Aïvodji, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Probabilistic dataset reconstruction from interpretable models. *CoRR*, abs/2308.15099, 2023

### 2023

MACHINE LEARNING Julien Ferry, Ulrich Aïvodji, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Improving fairness generalization through a sample-robust optimization method. *Mach. Learn.*, 112(6):2131–2192, 2023

SATML 2023 Ulrich Aïvodji, Julien Ferry, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Exploiting fairness to enhance sensitive attributes reconstruction. In *First IEEE Conference on Secure and Trustworthy Machine Learning, SATML'23, Raleigh, North Carolina, USA, 2023*

### 2022

AAAI 2022 Hao Hu, Marie-José Huguet, and Mohamed Siala. Optimizing binary decision diagrams with maxsat for classification. In *Thirty-Sixth AAAI Conference on Artificial Intelligence, AAAI'22 2022, 22 February 2022, Vancouver BC, Canada, 2022*

CPAIOR 2022 Ulrich Aïvodji, Julien Ferry, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Leveraging integer linear programming to learn optimal fair rule lists. In *9th International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research, CPAIOR'22, Los Angeles, California USA, 2022*

### 2021

CIKM 2021 Ulrich Aïvodji, Julien Ferry, Sébastien Gambs, Marie-José Huguet, and Mohamed Siala. Faircorels, an open-source library for learning fair rule lists. In *30th ACM International Conference on Information and Knowledge Management, CIKM 2021, 1-5 November 2021, Gold Coast, Queensland, Australia, 2021*

### 2020

IJCAI 2020 Hao Hu, Mohamed Siala, Emmanuel Hebrard, and Marie-José Huguet. Learning optimal decision trees with maxsat and its integration in adaboost. In *Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence, IJCAI 2020, pages 1170–1176, 2020*

- CP 2020 Alexey Ignatiev, Martin C. Cooper, Mohamed Siala, Emmanuel Hebrard, and João Marques-Silva. Towards formal fairness in machine learning. In *Principles and Practice of Constraint Programming - 26th International Conference, CP 2020, Louvain-la-Neuve, Belgium, September 7-11, 2020, Proceedings*, pages 846–867, 2020
- INTERNATIONAL JOURNAL ON ARTIFICIAL INTELLIGENCE TOOLS Mark Antunes, Vincent Armant, Kenneth N. Brown, Daniel A. Desmond, Guillaume Escamocher, Anne-Marie George, Diarmuid Grimes, Mike O’Keeffe, Yiqing Lin, Barry O’Sullivan, Cemalettin Ozturk, Luis Quesada, Mohamed Siala, Helmut Simonis, and Nic Wilson. Assigning and scheduling service visits in a mixed urban/rural setting. *International Journal on Artificial Intelligence Tools*, 29, 2020
- 2019**
- CPAIOR 2019 Begum Genc, Mohamed Siala, Gilles Simonin, and Barry O’Sullivan. An approach to robustness in the stable roommates problem and its comparison with the stable marriage problem. In *Integration of Constraint Programming, Artificial Intelligence, and Operations Research - 16th International Conference, CPAIOR 2019, Thessaloniki, Greece, June 4-7, 2019, Proceedings*, pages 320–336, 2019
- INFORMATION PROCESSING LETTERS Mohamed Siala and Barry O’Sullivan. Combinatorial search from an energy perspective. *Information Processing Letters*, 148:23–27, 2019
- THEORETICAL COMPUTER SCIENCE Begum Genc, Mohamed Siala, Gilles Simonin, and Barry O’Sullivan. Complexity study for the robust stable marriage problem. *Theoretical Computer Science*, 775:76–92, 2019
- 2018**
- CPAIOR 2018 Guillaume Escamocher, Mohamed Siala, and Barry O’Sullivan. From backdoor key to backdoor completeness: Improving a known measure of hardness for the satisfiable CSP. In *Integration of Constraint Programming, Artificial Intelligence, and Operations Research - 15th International Conference, CPAIOR 2018, Delft, The Netherlands, June 26-29, 2018, Proceedings*, pages 198–214, 2018
- ICTAI 2018 Mark Antunes, Vincent Armant, Kenneth N. Brown, Daniel A. Desmond, Guillaume Escamocher, Anne-Marie George, Diarmuid Grimes, Mike O’Keeffe, Yiqing Lin, Barry O’Sullivan, Cemalettin Ozturk, Luis Quesada, Mohamed Siala, Helmut Simonis, and Nic Wilson. Assigning and scheduling service visits in a mixed urban/rural setting. In *IEEE 30th International Conference on Tools with Artificial Intelligence, ICTAI 2018, 5-7 November 2018, Volos, Greece*, pages 114–121, 2018
- 2017**
- IJCAI 2017 Begum Genc, Mohamed Siala, Barry O’Sullivan, and Gilles Simonin. Finding robust solutions to stable marriage. In *Proceedings of the Twenty-Sixth International Joint Conference on Artificial Intelligence, IJCAI 2017, Melbourne, Australia, August 19-25, 2017*, pages 631–637, 2017
- CP 2017 Mohamed Siala and Barry O’Sullivan. Rotation-based

formulation for stable matching. In *Principles and Practice of Constraint Programming - 23rd International Conference, CP 2017, Melbourne, VIC, Australia, August 28 - September 1, 2017, Proceedings*, pages 262–277, 2017

- CPAIOR 2017 Emmanuel Hebrard and Mohamed Siala. Explanation-based weighted degree. In *Integration of AI and OR Techniques in Constraint Programming - 14th International Conference, CPAIOR 2017, Padua, Italy, June 5-8, 2017, Proceedings*, pages 167–175, 2017
- COCOA 2017 Begum Genc, Mohamed Siala, Gilles Simonin, and Barry O’Sullivan. On the complexity of robust stable marriage. In *Combinatorial Optimization and Applications - 11th International Conference, COCOA 2017, Shanghai, China, December 16-18, 2017, Proceedings, Part II*, pages 441–448, 2017
- ICTAI 2017 Danuta Sorina Chisca, Mohamed Siala, Gilles Simonin, and Barry O’Sullivan. New models for two variants of popular matching. In *29th IEEE International Conference on Tools with Artificial Intelligence, ICTAI 2017, Boston, MA, USA, November 6-8, 2017, Proceedings*, pages 752–759, 2017

#### 2016

- CONSTRAINTS Nina Narodytska, Thierry Petit, Mohamed Siala, and Toby Walsh. Three generalizations of the FOCUS constraint. *Constraints An International Journal*, 21(4):495–532, 2016
- CPAIOR 2016 Mohamed Siala and Barry O’Sullivan. Revisiting two-sided stability constraints. In *Integration of AI and OR Techniques in Constraint Programming - 13th International Conference, CPAIOR 2016, Banff, AB, Canada, May 29 - June 1, 2016, Proceedings*, pages 342–357, 2016

#### 2015

- ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE Mohamed Siala, Emmanuel Hebrard, and Marie-José Huguet. A study of constraint programming heuristics for the car-sequencing problem. *Engineering Applications of Artificial Intelligence*, 38:34–44, 2015
- CP 2015 Mohamed Siala, Christian Artigues, and Emmanuel Hebrard. Two clause learning approaches for disjunctive scheduling. In *Principles and Practice of Constraint Programming - 21st International Conference, CP 2015, Cork, Ireland, August 31 - September 4, 2015, Proceedings*, pages 393–402, 2015

#### 2014

- CONSTRAINTS Mohamed Siala, Emmanuel Hebrard, and Marie-José Huguet. An optimal arc consistency algorithm for a particular case of sequence constraint. *Constraints An International Journal*, 19(1):30–56, 2014
- CPAIOR 2014 Christian Artigues, Emmanuel Hebrard, Valentin Mayer-Eichberger, Mohamed Siala, and Toby Walsh. SAT and hybrid models of the car sequencing problem. In *Integration of AI and OR Techniques in Constraint Programming - 11th International Conference, CPAIOR 2014, Cork, Ireland, May 19-23, 2014, Proceedings*, pages 268–283, 2014

**2013**

IJCAI 2013

Nina Narodytska, Thierry Petit, Mohamed Siala, and Toby Walsh. Three generalizations of the FOCUS constraint. In *IJCAI 2013, Proceedings of the 23rd International Joint Conference on Artificial Intelligence, Beijing, China, August 3-9, 2013*, pages 630–636, 2013

**2012**

CP 2012  
[HONOURABLE  
MENTION]

Mohamed Siala, Emmanuel Hebrard, and Marie-José Huguet. An optimal arc consistency algorithm for a chain of atmost constraints with cardinality. In *Principles and Practice of Constraint Programming - 18th International Conference, CP 2012, Québec City, QC, Canada, October 8-12, 2012. Proceedings*, pages 55–69, 2012