

ARTHUR MAHÉO

I create tools to solve the hardest industrial problems using operations research. My interests are in decomposition methods and high-performance algorithms. I always aim to empower my users with new capabilities.

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Employment

Optifly, Remote Feb. 2024
Principal Scientist: Create new tools to optimise airline schedules.

- Develop local search operators for a metaheuristic framework.
- Use constraint programming (CP) to speed up search through domain reduction. Resulting in 2x speedup to first solution.

Amazon Transportation Services, Luxembourg Sep. 2021 – Jan. 2024
Research Scientist: Identify business opportunity, implement and deploy holistic solutions.

- Tech and research lead for a multiregion tool that creates daily operational truck schedules. Built using Mixed Integer Programming (MIP) techniques. Remove human intervention in publishing schedules.
- Lead researcher for large scale, stochastic network planning problems. Used for tactical planning and expansion. Enable same day results instead of week-long process.

Monash University, Melbourne, Australia Aug. 2019 – Aug. 2021
Research fellow: ARC grant with Daniel Harabor and Mark Wallace

- Develop a centralised, congestion-aware routing service for Melbourne.
- Distributed system based on sharding with a fan in/fan out pattern.

Selected publications

Mahéo, A., Belieres, S., Adulyasak, Y., & Cordeau, J.-F. (2024). Unified branch-and-Benders-cut for two-stage stochastic mixed-integer programs. *Computers & Operations Research*, 164, 106526. DOI: [10.1016/j.cor.2023.106526](https://doi.org/10.1016/j.cor.2023.106526)

Mahéo, A., Zhao, S., Hassan, A., Harabor, D., Stuckey, P., & Wallace, M. (2021). Customised shortest paths using a distributed reverse oracle. *The 14th Annual Symposium on Combinatorial Search (SoCS 2021)*.

Mahéo, A., Rossit, D., & Kilby, P. (2020). A Benders decomposition approach for an integrated bin allocation and vehicle routing problem in municipal waste management. *ICPR Americas 2020 [Best Paper Award]*.

Mahéo, A., Kilby, P., & Van Henteryck, P. (2019). Benders decomposition for the design of a hub and shuttle public transit system. *Transportation Science*, 53(1), 77–88.

DOI: [10.1287/trsc.2017.0756](https://doi.org/10.1287/trsc.2017.0756)

Relevant programming skills

Professional knowledge Python, Java, C++, Linear solver APIs (Gurobi, CPLEX)

- Optifly: schedule feasibility checker; schedule optimiser.
- Amazon: Truck schedule optimisation; stochastic network planning.

- **BRANDEC**¹: a framework for Benders with integer sub-problems.
- **Local TSP**²: local search heuristics for the TSP in Python, along with a **reader**.³
- **WARTHOG**⁴: high-performance pathfinding library.

Advanced knowledge, Haskell, C, Bash

Conversant in most programming paradigms.

Education

Australian National University, Canberra, Australia

PhD in Operations Research 2015–2019

Université de Nantes, Nantes, France

Université Libre de Bruxelles, Bruxelles, Belgium

Masters degree in Operations Research 2012–2014

Double degree in Maths and Computer Science 2009–2012

Supervision

Monash University, Faculty of IT

Eric Shi, Master, with Daniel Harabor 2020–2021

- Pathfinding with obstacle avoidance in a dynamic environment.

Jessica Tong, Master, with Mark Wallace 2020–2021

- Modelling and optimising user mode choice in Melbourne.

Nelson Frew, Honours, with Pierre Le Bodic 2018

- Thesis: “Implicit enumeration with dual bounds from approximation algorithms.”

Teaching experience

Head Tutor, manage course content and tutors

Declarative Programming (COMP90048), University of Melbourne 2019

Programming Paradigms (FIT2102), Monash 2017–2021

- Write tutorials and assignments in Haskell.
- Maintain the submission server.
- Mentor first-time tutors.

Tutor, deliver course content

Optimisation and Decision Making, Melbourne Business School 2019

Introduction to Programming and Algorithms (COMP1100), ANU 2015, 2016

Past work experience

Aziluth, France

2011–2014

Project leader **Battle Arenas**⁵

¹<https://gitlab.com/Soha/brandec>

²<https://gitlab.com/Soha/local-tsp>

³<https://gitlab.com/Soha/tsplib-reader>

⁴<https://bitbucket.org/dharabor/pathfinding/src/cpd-search/>

⁵<http://www.battle-arenas.net/>

- Browser-based strategy and management game with over 1,500 players daily. In-house engine written in PHP with over 90,000 LOC.

De la Plume à l'Écran, France

2008–2016

Webmaster

- Design and maintain a publishing [website](https://delaplumealecran.org/)⁶ for an NGO promoting Native American cinema.

Languages

French, mother tongue; English, fluent; Spanish, basic.

⁶<https://delaplumealecran.org/>