

# Er Raqabi El Mehdi

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## Education

### Polytechnique Montreal (Poly)

Montreal, Canada

*Doctor of Philosophy in Applied Mathematics*

2020 - Present

- Research Topic: Primal Large-scale Optimization - Application to a Global Supply Chain
- Advisors: Profs. El Hallaoui Issmaïl and Soumis François
- Relevant Coursework: Mathematical Programming (A\*), Integer Programming (A\*), Graph and Network Theory (A\*), Modeling in Operations Research (A\*), Decomposition Methods and Real-Time Optimization (A\*)
- Top 1% (**GPA: 4.0/4.0**)

### International University of Japan (IUJ)

Niigata, Japan

*Master of Business Administration*

2017 - 2019

- Research Topic: Design of Electric Vehicles Charging Station Network
- Advisor: Prof. Li Wenkai
- Relevant Coursework: Operations Management (A\*), Supply Chain Management (A\*), Applied Statistics (A\*), Computer-based Decision Modeling (A\*), Infrastructure Planning and Management (A\*)
- Valedictorian (**GPA: 3.9/4.0**)

### Ecole Mohammadia d'Ingénieurs (EMI)

Rabat, Morocco

*Master of Engineering in Industrial Engineering*

2013 - 2016

- Entry based on a competitive national exam following two years of intensive maths and physics courses.
- Relevant Coursework: Operations Research (A), Applied Mathematics (A\*), Probabilities and Statistics (A\*), Data Science (A), Lean Manufacturing (A\*)
- With Honors (**GPA: 3.8/4.0**)

## Honors & Awards

- **MITACS Accelerate Fellowship**, \$30,000, MITACS, 2023
- **IFORS Prize for OR in Development**, *Finalist*, IFORS, 2023
- **GERAD Competition for Doctoral Fellowships 'Conference Fees'**, \$1,750, GERAD, 2022
- **FRQNT Ph.D. Merit Scholarship**, \$84,000, FRQNT, 2021
- **IVADO Ph.D. Excellence Scholarship**, \$75,000, IVADO Institute, 2021
- **Vanier Canada Graduate Scholarship**, *Finalist*, Government of Canada, 2021
- **OCP Group Fellowship**, \$32,000, OCP Group, 2020
- **Increased Tuition Fees Exemption**, \$25,000, Polytechnique Montreal, 2020
- **James Brian Quinn Scholar**, *MBA Batch Valedictorian*, IUJ, 2019
- **Beta Gamma Sigma Academic Honor Society**, *Top 1% MBA Batch*, IUJ, 2019
- **Valedictorian Speech**, *IUJ Graduation Ceremony*, IUJ, 2019
- **Dean's List**, *Academic Terms Distinction* (×3), IUJ, 2017-2019
- **First Year Special Recognition**, *Top 1% MBA Batch*, IUJ, 2018
- **ABE Initiative Scholarship**, \$120,000, Japan International Cooperation Agency, 2017
- **Third Year Valedictorian**, *Distinction*, EMI, 2016
- **EMI Industrial Challenge**, \$2,000, EMI, 2015

## Papers

### Published & Accepted

- [1] **Er Raqabi El Mehdi**, Himmich Ilyas, El Hachemi Nizar, El Hallaoui Issmaïl and Soumis François (2023). Incremental LNS Framework for Integrated Production, Inventory, and Vessel Scheduling: Application to a Global Supply Chain. *Omega*, 116, 102821.
- [2] Himmich Ilyas, **Er Raqabi El Mehdi**, El Hachemi Nizar, El Hallaoui Issmaïl, Metrane Abdelmoutalib and Soumis François. MPILS: An Automatic Tuner for MILP Solvers. *Computers & Operations Research*, 159, 106344.

- [3] **Er Raqabi El Mehdi** and Li Wenkai (2023). An Electric Vehicle Migration Framework for Public Fleet Planning. *Transportation Research Part D: Transport and Environment*, 118, 103732.
- [4] **Er Raqabi El Mehdi** (2019). Design of Electric Vehicles Charging Station Network. *Master's Thesis*, International University of Japan.

## Under Review

- [5] **Er Raqabi El Mehdi**, El Hallaoui Issmaïl and Soumis François. The Primal Benders Decomposition. *Under Review*.
- [6] **Er Raqabi El Mehdi**, Yong Wu, El Hallaoui Issmaïl and Soumis François. Towards Resilience: Primal Large-scale Re-optimization. *Under Review*.
- [7] **Er Raqabi El Mehdi**, Beljadid Ahmed, Mohammed Ali Bennouna, Rania Bennouna, Latifa Boussaadi, Nizar El Hachemi, Issmaïl El Hallaoui, Michel Fender, Anouar Jamali, Nabil Si Hammou and Francois Soumis (2023). OCP Optimizes its Supply Chain for Africa. *Major Revision. INFORMS Journal on Applied Analytics*.
  - Finalist at the IFORS Prize for OR in Development 2023
  - Selected for Presentation at the *23rd Conference of the International Federation of Operational Research Societies, Santiago, Chile, on 10-14 July 2023*

## Working

- [8] Bani Abderrahman, **Er Raqabi El Mehdi** and El Hallaoui Issmaïl. Combining Benders Decomposition and Column Generation for a Petrol Replenishment Problem with Inventory Management. *Soon to be Submitted*.
- [9] Bani Abderrahman, **Er Raqabi El Mehdi** and El Hallaoui Issmaïl. The Petrol Station Replenishment Problem: Case Study from West Africa. *Working Paper*.
- [10] **Er Raqabi El Mehdi**, Bani Abderrahman, Morabit Mouad, Blondin Alexandre, Besner Alexandre and El Hallaoui Issmaïl. An Efficient Decomposition Matheuristic for the Unit Commitment Problem with Power Stability Constraints. *Working Paper*.
- [11] El Fassi Mohamed, **Er Raqabi El Mehdi** and El Hallaoui Issmaïl. A New Benders Decomposition. *Working Paper*.

## Research Experience

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|---|------------------------|
| <b>Katholieke Universiteit Leuven (KU Leuven)</b> | <b>Leuven, Belgium</b> |
| <i>Visiting Scholar</i>                           | <i>2024</i>            |

- Advisor: Prof. Roel Leus
- Research Areas: Operations Research, Benders Decomposition, Improved Primal Simplex, Large-Scale Optimization
- Applications: Transportation, Mining, Operations and Supply Chain Management
- Collaborations with OCP and UM6P

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|------------------------------------|------------------------------|
| <b>Griffith University (Griff)</b> | <b>Queensland, Australia</b> |
| <i>Visiting Scholar</i>            | <i>2023</i>                  |

- Advisor: Prof. Yong Wu
- Research Areas: Operations Research, Re-optimization, Resilience, Supply Chain Management, Machine Learning for Operations Research
- Applications: Mining, Operations and Supply Chain Management
- Collaborations with OCP and UM6P

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|---|-------------------------|
| <b>Groupe d'études et de recherche en analyse des décisions (Gerad)</b> | <b>Montreal, Canada</b> |
| <i>Research Assistant</i>   | <i>2020 - Present</i>   |

- Advisors: Profs. El Hallaoui Issmaïl and Soumis François
- Research Areas: Operations Research, Large-Scale Optimization, Decompositions, Metaheuristics, Solvers, Data Science, Machine Learning for Operations Research
- Applications: Airline, Mining, Transportation, Operations and Supply Chain Management
- Collaborations with OCP, UM6P, Laminaar, Hydro-Québec, and IVADO

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|--|-----------------------|
| <b>International University of Japan (IUJ)</b> | <b>Niigata, Japan</b> |
| <i>Research Project</i>                        | <i>2018 - 2019</i>    |

- Advisor: Prof. Li Wenkai
- Developed an Electric Vehicles Migration Framework for Developing Countries
- Collaboration with Fostergy Technologies Inc.

## Teaching Experience

### Polytechnique Montreal (Poly)

Montreal, Canada

Teaching Assistant

2021 - Present

- MTH6406 - Modeling in Operations Research, 4 hours/week for 13 weeks, Masters and Ph.D. (Winter 2021, Winter 2022, Winter 2023)
- Stats: Winter 2021 Average Class GPA: 3.70/4, Winter 2022 Average Class GPA: 3.73/4, Winter 2023 Average Class GPA: 3.81/4
- Feedback: *'The corrections of homework were very clear, and I am honestly impressed with Mehdi's responsiveness given he was in Australia during the course', 'I think Mehdi was great! He was quick to respond and always available to answer questions.', 'Mehdi introduced me to a classmate I can work with. It was quite helpful and enjoyable. It was good of him to introduce us.'*

### Griffith University (Griff)

Queensland, Australia

Teaching Assistant

2023

- 7108IBA - Supply Chain Modelling, Postgraduate (Trimester 1 2023)
- 7102IBA - Strategic Supply Chain Management, Postgraduate (Trimester 1 2023)

### International University of Japan (IUJ)

Niigata, Japan

Teaching Assistant

2018 - 2019

- OPR1010 - Operations Management, 3 hours/week for 12 weeks, Average Class GPA: 3.72/4, Masters (Winter 2019)
- QIS1070 - Computer-based Decision Modeling, 3 hours/week for 12 weeks, Average Class GPA: 3.65/4, Masters (Fall 2019)
- QIS1020 - Applied Statistics, 3 hours/week for 12 weeks, Average Class GPA: 3.68/4, Masters (Fall 2019)
- Feedback: *'I could obtain B<sup>+</sup> for statistics because of Mehdi's TA sessions', 'Too sad that we do not have any other TA session. I really enjoyed every session', 'Thank you very much Mehdi. You are a good instructor, a good teacher'*

JDS Tutor

2017 - 2018

- Tutor for MBA students under the Graduate School of International Management. Topics: QIS1020 - Applied Statistics, QIS1070 - Computer Based Decision Making, ACT1010 - Financial Accounting, FIN1010 - Corporate Finance, ECN1010 - Managerial Economics, 2 hours/week for 48 weeks
- Stats: 6 out of 7 tutored students reached the lowest GPA level required for continuing studies and graduation
- Feedback: *'As for Mehdi, it is above all the way he delivers the message with all the energy he exudes, but also the relevance of his advice. If today I am comfortable in the MBA program, it is partly thanks to his support, advice, and guidance'*

## Work Experience

### Hydro-Québec

Varenes, Canada

MITACS Accelerate Intern (Part-Time)

2023 - 2024

- Tackling Hydro-Québec's specific Unit Commitment Problem (UCP) using efficient large-scale optimization algorithms
- Collaborating closely with researchers from the Hydro-Québec Research Institute (IREQ)

### Fostergy Technologies Inc.

Niigata, Japan

Operational Researcher & Data Scientist (Part-Time)

2017 - 2019

- Designing an efficient and effective selection of the appropriate electric vehicle components and prediction of its behavior over different kinds of routes/duty cycles and over a huge number of parameters' choices
- Enhancing user's simulation capability and reducing development time many folds

### ProQuest

Yokohama, Japan

Systems Engineering Intern (Part-Time)

2018

- Promoting the online ProQuest's product training
- Planning, Designing, and Implementing the use of databases and the conduct of research within IUJ Library

### Induproj

El Jadida, Morocco

Quality & Safety Manager (Full-Time)

2016 - 2017

- Leading quality management through the international standard ISO 9001, quality control of the work done on the construction sites, and quality assurance into which I was dealing with customers' requirements and seeking their satisfaction

- Leading safety management through the standard OHSAS 18001 and safety control of all the work done on the construction sites. Achieved the main safety KPI of 0 accident

## **Bombardier**

**Casablanca, Morocco**

*Operations Management Intern (Full-Time)*

*2016*

- Designing and implementing an Automated Production System (APS) for assembly lines monitoring
- Introducing Data mining for knowledge extraction

## **Managem Group**

**Tinghir, Morocco**

*Industrial Challenge (Full-Time)*

*2015*

- Modeling and Simulating the Silver Treatment Plant at SMI
- Mapping of Ag rocks flows at SMI

## **Selected Talks**

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### **An Efficient Decomposition Matheuristic for the Unit Commitment Problem with Power Stability Constraints**

- 38th Annual Conference of the Belgian Operational Research Society, Antwerp, Belgium, 2024

### **OCP Optimizes its Supply Chain for Africa**

- IFORS Prize for OR in Development, Santiago, Chile, 2023
- Seminar 'Meet a GERAD Researcher!', Montreal, Canada, 2023

### **An Electric Vehicle Migration Framework for Public Fleet Planning**

- International University of Japan, Niigata, Japan, 2023

### **Modeling for Strategic Supply Chain Management**

- Griffith University Business School, Queensland, Australia, 2023

### **MPILS: An Automatic Tuner for MILP Solvers**

- CORS/INFORMS International Conference, Vancouver, Canada, 2022
- JOPT, Montreal, Canada, 2022

### **Design of Electric Vehicle Charging Stations**

- SLACJ 6th International Conference on Indo-Pacific Studies, Niigata, Japan, 2019

### **Achieving Traceability within Supply Chains through Data Science**

- International Conference On Advances In Cloud Computing, Data Science And Big Data Analytics, Tokyo, Japan, 2019

## **Service & Engagement Activities**

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### **Leadership & Organizing**

- *Science Popularization*: Bringing science to the general public, to disseminate scientific knowledge, foster experience sharing, and introducing research topics to students via Medium & LinkedIn, 2018-Present
- *Better Research Better Life*: Leading the organization and execution of the first Library Day in IUJ history. The initiative is still going on within more Japanese universities, 2019
- *Head of Houses*: Leading the social interaction among international students from around 70 countries through the House System. Our motto is: "Honoring Our Unique Social Environment". The initiative is still going on, 2018

### **Outreach & Volunteering**

- *OR@AFRICA Initiative*: Founding Member of OR@AFRICA, 2023
- *IVADO Student Intersectoral Committee*: Member of the IVADO Student Intersectoral Committee, 2023
- *Canadian Operations Research Society*: Volunteer in the Montreal Operations Research Student Chapter (MORSC), 2022
- *Industrial Seminars*: Speaker at several seminars within the Industrial Engineering Departement of EMI, 2019-Present
- *Tutor*: Academic orientation and schooling for Moroccan undergraduate and graduate students, 2017-Present
- *Snow Shoveling*: Volunteer in snow shoveling activities to help and support elderly citizens of Minamiuonuma City, 2018

## Skills

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- **Programming & Software:** C++, CPLEX, L<sup>A</sup>T<sub>E</sub>X, Excel, PowerPoint (Proficient), Python, R, Git, VBA, SQL (Familiar)
- **Languages:** Arabic (Native), French, English (Bilingual)
- **Interests:** Football, Snowboarding, Swimming

## Selected Media Coverage

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- **A GERAD Team Finalist for the IFORS Prize for OR in Development 2023**, GERAD, 2023
- **Six Finalists for the IFORS Prize for OR in Development 2023**, IFORS, 2023
- **IVADO Student Portraits - Er Raqabi El Mehdi**, IVADO Institute, 2022
- **IUJ held its 2019 Graduation Ceremony**, International University of Japan, 2019
- **GSIM's first batch of BGS lifetime members**, International University of Japan, 2019
- **La coopération japonaise élargit son spectre**, Laformation News, 2017

## References

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