Arthur Delarue

Massachusetts Institute of Technology		Phone	(617) 467-8954
Operations Research Center		Email	adelarue@mit.edu
77 Massachusetts Ave, Bldg E40-103		Website	adelarue.github.io
Cambridge, MA 02139		Citizenship	USA, France

EDUCATION

Massachusetts Institute of Technology June 2016 – June 2021
Candidate for PhD in Operations Research. GPA: 5.0/5.0
Thesis title: Optimizing School Operations.
Advisor: Dimitris Bertsimas.

Massachusetts Institute of Technology Sept 2012 – June 2016
S.B. in Physics and Mathematics. GPA: 5.0/5.0
Honors and activities: Phi Beta Kappa, Sigma Pi Sigma. President of MacGregor Hall (2015).

PUBLICATIONS

1. Optimizing Schools' Start Time and Bus Routes (with D. Bertsimas, S. Martin). *Proceedings of the National Academy of Sciences* 116(13): 5943-5948 (2019).
    - Finalist, Franz Edelman Award (2019)
    - Runner-up, INFORMS Doing Good with Good OR Best Student Paper (2018)
    - Winner, MIT ORC Best Student Paper (2018)
2. Travel Time Estimation in the Age of Big Data (with D. Bertsimas, P. Jaillet, S. Martin). *Operations Research* 67(2): 498-515 (2019).
3. Bus Routing Optimization Helps Boston Public Schools Design Better Policies (with D. Bertsimas, W. Eger, J. Hanlon, S. Martin). *INFORMS Journal of Applied Analytics* 50(1): 39-47 (2020).
4. Reinforcement Learning with Combinatorial Actions: Application to Vehicle Routing (with R. Anderson, C. Tjandraatmadja). In *Advances in Neural Information Processing Systems* (NeurIPS 2020).
5. From Predictions to Prescriptions: A Data-Driven Response to COVID-19 (with D. Bertsimas et al.). Forthcoming in *Health Care Management Science* (2021).
    - Winner, William Pierskalla Best Paper (2020)

COMPLETED WORK

6. Policy Analytics in Public School Operations (with D. Bertsimas). Submitted to *Operations Research*.
7. A Unified Model for Course Scheduling Under Sudden Scarcity: Applications to Pandemic Planning (with C. Barnhart, D. Bertsimas, J. Yan). Minor revision in *Manufacturing & Service Operations Management* (2020).

8. The Price of Interpretability (with D. Bertsimas, P. Jaillet, S. Martin). Preprint available on arXiv: 1907.03419.
    - Finalist, INFORMS Data Mining Section Best Student Paper (2019)
9. Optimal Explanations of Linear Models (with D. Bertsimas, P. Jaillet, S. Martin). Preprint available on arXiv:1907.04669.

IN PREPARATION

10. Prediction with Missing Data (with D. Bertsimas, J. Pauphilet). Targeted at *Operations Research*.
    - Preliminary version accepted to 2020 INFORMS Data Mining Workshop

AWARDS AND HONORS

William Pierskalla Best Paper	2020
MIT William L Stewart Jr. Award	2020
INFORMS Data Mining Section Best Student Paper, Finalist	2019
INFORMS Franz Edelman Laureate	2019
MIT LIDS Student Conference Best Presentation, Second Place	2019
INFORMS Doing Good With Good OR Competition, Second Place	2018
MIT ORC Best Student Paper	2018
Boston Public Schools Transportation Challenge, First Place	2017
William Asbjornsen Albert Memorial Fellowship	2016
Zeno Karl Schindler Foundation Research Grant	2014
Third prize in Latin from "Concours général des lycées" (French national contest)	2011

SELECTED MEDIA COVERAGE

How an Algorithm Made the Buses in Boston Better. *Popular Mechanics*, August 2019.

Building a Smarter (and Cheaper) School Bus System. *The 74 Million*, August 2019.

What the Boston School Bus Schedule Can Teach Us About AI. *Wired*, November 2018.

The Equity Machine. Special report in *The Boston Globe*, September 2018.

How Do You Fix a School Bus Problem? Call MIT. *The Wall Street Journal*, August 2017.

2 MIT Engineers Use Math To Plot A Path For Boston's School Buses. *WBUR*, July 2017.

RESEARCH EXPERIENCE

MIT Operations Research Center Cambridge, MA
Research Assistant May 2015 - Present
- Conducting research in optimization, machine learning, scheduling, and transportation.

MIT Kavli Institute for Astrophysics Cambridge, MA
Research Assistant Jan 2013 – Jan 2015
- Analyzed satellite data to detect extrasolar planets and binary stars.

ETHZ Institute for Particle Physics Zurich, Switzerland
Summer Intern Jun 2014 – Aug 2014
- Designed machine learning techniques to identify boosted top quarks at the Large Hadron Collider.

Center for Free-Electron Laser Science Hamburg, Germany
Summer Intern Jun 2013 – Aug 2013
- Engineered software to test micrometer-scale imaging devices.

TEACHING EXPERIENCE

The Analytics Edge (15.071)
Teaching Assistant Jan 2018 – May 2018
- Prepared recitations, conducted office hours, developed and graded homework assignments, and supervised final projects for course aiming to introduce data analytics to Sloan MBA students.

Computing in Optimization and Statistics (15.S60)
Course Coordinator Jan 2019, Jan 2020, Jan 2021
- Defined course expectations, prepared course outline and overview, coordinated a team of 11 teaching assistants, assigned session leaders.
- Responsible for developing assignments, managing enrollment, and course feedback.

Computing in Optimization and Statistics (15.S60)
Session Instructor Jan 2018, Jan 2019, Jan 2020, Jan 2021
- Taught sessions to Sloan graduate students on using tools including the Julia language, the JuMP package for mathematical programming, and distributed computing resources.

Software Tools for Business Analytics (15.S41)
Session Instructor Jan 2018, Jan 2020
- Taught 3-hour sessions to Sloan undergraduate students on using the Julia language and its JuMP extension for basic mathematical programming.

GUEST LECTURES

Data, Models and Decisions (15.060)
Optimization in Practice: Pandemic Course Scheduling Fall 2020

Optimization Methods in Business Analytics (15.053)
Optimization for Public Schools Spring 2020
From School Buses to Start Times: Driving Policy with Optimization Spring 2019

The Analytics Edge (15.071)
Bus Routes and Start Times for Public Schools: Introduction to Multi-Objective Optimization Fall 2019
From School Buses to Start Times: Driving Policy with Optimization Spring 2018, Spring 2019

LEADERSHIP AND SERVICE

MIT Residential Education
Graduate Resident Advisor Aug 2018 - Present
- Live-in mentor and support resource for 40 undergraduates. Organize weekly study breaks and monthly hall events. Completed 10-module community development training.

MIT Operations Research Center
REFS Member May 2017 - Present

- Member of ORC REFS team (Resources for Easing Friction and Stress). Support students with issues related to research, communication, and personal matters. Completed semester-long conflict management training.

MIT Office of the Chancellor
Consultant Jun 2019 – Aug 2019

- Developed and implemented mixed-integer optimization algorithm to assign all incoming first-year MIT students (Class of 2023) to dorms based on their preferences.
- Assisted student leaders to develop algorithmic in-residence rooming assignment procedures for incoming first-year students.

INDUSTRY EXPERIENCE

Google Cambridge, MA
Research Intern Jun 2019 – Aug 2019

- Developed a mixed-integer optimization framework to solve combinatorial optimization problems (e.g. vehicle routing) using reinforcement learning. Paper accepted to NeurIPS 2020.

Jane Street Capital New York, NY
Trading Intern Jan 2015

- Analyzed arbitrage and risk hedging strategies and searched for new opportunities.
- Developed predictive models to capitalize on trends in historical data.

SELECTED TALKS

Optimizing School Operations
- INFORMS Annual Meeting 2020
- Kellogg-Wharton OM Workshop 2020

The Price of Interpretability
- MIT LIDS Annual Student Conference, Cambridge, MA 2020
- INFORMS Annual Meeting, Seattle, WA 2019

Driving Policy with Optimization: Optimizing Schools' Start Time and Bus Routes
- INFORMS Annual Meeting, Seattle, WA 2019
- CSBA Data as a Resource Workshop, Washington, DC 2019
- Google Research, Cambridge, MA 2019
- AI100 Prediction in Practice Workshop, New York City, NY 2019
- MIT LIDS Annual Student Conference, Cambridge, MA 2019
- INFORMS Annual Meeting, Phoenix, AZ 2018
- MIT ORC Fall Seminar Series, Cambridge, MA 2018
- MIT ORC Special Seminar on Operations Research for Social Good 2018

Travel Time Estimation in the Age of Big Data
- ISMP Triennial Meeting, Bordeaux, France 2018
- INFORMS Annual Meeting, Houston, TX 2017

SKILLS AND INTERESTS

Languages: French (native), German (intermediate), Spanish (intermediate), Greek (beginner).
Software: Julia, R, C++, Python, Bash, Mathematica, Matlab, SQL.

REFERENCES

Dimitris Bertsimas
MIT Sloan School of Management
dbertsim@mit.edu[1] - (617) 253-4223

Cynthia Barnhart
MIT Civil and Environmental Engineering
cynthiabarnhart@mit.edu – (617) 253-3815

John Hanlon
DI Routing (Formerly Boston Public Schools)
jhanlon@dynideas.com

Alexandre Jacquillat
MIT Sloan School of Management
alexjacq@mit.edu – (412) 715-4848

[1] Please also contact assistant Shalane Hutchins (shalane@mit.edu) for letter requests.