

# Arthur Delarue

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## EDUCATION

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**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

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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). Forthcoming in *Advances in Neural Information Processing Systems* (NeurIPS 2020).

## COMPLETED WORK

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5. Policy Analytics in Public School Operations (with D. Bertsimas). Submitted to *Operations Research*.
6. From Predictions to Prescriptions: A Data-Driven Response to COVID-19 (with D. Bertsimas et al.). Minor Revision in *Health Care Management Science* (2020).
  - Winner, William Pierskalla Best Paper (2020)
7. A Unified Model for Course Scheduling Under Sudden Scarcity: Applications to Pandemic Planning (with C. Barnhart, D. Bertsimas, J. Yan). Submitted to *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.

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## IN PREPARATION

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

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## 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

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## 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.

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## RESEARCH EXPERIENCE

<b>MIT Operations Research Center</b>	Cambridge, MA
<i>Research Assistant</i>	May 2015 - Present
<ul style="list-style-type: none"> <li>• Conducting research in optimization, machine learning, scheduling, and transportation.</li> </ul>	
<b>MIT Kavli Institute for Astrophysics</b>	Cambridge, MA
<i>Research Assistant</i>	Jan 2013 – Jan 2015
<ul style="list-style-type: none"> <li>• Analyzed satellite data to detect extrasolar planets and binary stars.</li> </ul>	

**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**

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**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

- 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**

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**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**

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**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

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### 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

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### 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

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**Languages:** French (native), German (intermediate), Spanish (intermediate), Greek (beginner).

**Software:** Julia, R, C++, Python, Bash, Mathematica, Matlab, SQL.

## REFERENCES

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Dimitris Bertsimas

MIT Sloan School of Management

[dbertsim@mit.edu](mailto:dbertsim@mit.edu)<sup>1</sup> - (617) 253-4223

Cynthia Barnhart

MIT Civil and Environmental Engineering

[cynthiabarnhart@mit.edu](mailto:cynthiabarnhart@mit.edu) - (617) 253-3815

John Hanlon

DI Routing (Formerly Boston Public Schools)

[jhanlon@dynideas.com](mailto:jhanlon@dynideas.com)

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MIT Sloan School of Management

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<sup>1</sup> Please also contact assistant Shalane Hutchins ([shalane@mit.edu](mailto:shalane@mit.edu)) for letter requests.