# MINAKSHI PUNAM MANDAL

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### EDUCATION

Ph.D. in Operations Research ESSEC Business School, France	2020 - 2024
MsBAR in Operations and Data Analytics ESSEC Business School, France	2018 - 2020
M.Sc. in Mathematics Indian Institute of Technology Delhi, India	2015 - 2017
<b>B.Sc. (Hons.) in Mathematics</b> St. Xavier's College (Autonomous) Kolkata, India	2012 - 2015

### AREAS OF INTEREST

- Mixed-Integer Linear Programming Robust Optimization Matheuristics Last Mile Logistics
- Humanitarian Operations Disaster Management

### **Research Experience**

### PICKUP AND DELIVERY PROBLEM WITH ELECTRIC VEHICLES

Collaborators: Manuel Trotta, Claudia Archetti, Dominique Feillet, and Alain Quilliot

• Developing heuristic methodologies for energy management for a pickup and delivery problem with time windows using electric vehicles.

#### **ROBUST FACILITY LOCATION IN DISASTER PREPARATION**

Supervisor: Laurent Alfandari and Ivana Ljubić

- Developed a strategic **facility location model** for earthquake preparedness with aftershocks.
- Proposed four models using a novel uncertainty set and studied branch-and-cut based solution approaches.
- Provided a case study on the **2023 earthquake in Turkey**, identifying four key locations for setting up facilities.

#### TACTICAL WORKFORCE SIZING AND SCHEDULING DECISIONS Jan'22 - Jan'24 Supervisor: Claudia Archetti and Alberto Santini

- Studied tactical-level workforce-sizing decisions for last-mile deliveries, incorporating demand uncertainties.
- Proposed three shift scheduling structures that balance the company's bottom line and the welfare of workers.
- Implemented the methods on **four European cities** and found a partially flexible shift schedule to be optimal.

#### LAST-MILE DELIVERIES USING PUBLIC TRANSPORTATION NETWORKS July'20 - Dec'21 Supervisor: Claudia Archetti

- Investigated utilizing public transportation networks for last-mile deliveries in urban areas.
- Proposed three decomposition-based matheuristic methodologies to solve the complex problem.
- Implemented instances based on real cities and achieved up to 85% reductions in usage of delivery trucks.

### **ROBUST PORTFOLIO OPTIMIZATION**

Supervisor: Laurent Alfandari

- Studied robust **mean-variance portfolio optimization** problem with return-dependent risk deviations.
- Developed an **adversarial approach** to model the robust problem.

### ENHANCED INDEX TRACKING IN PORTFOLIO SELECTION

Supervisor: Aparna Mehra

- Studied Markowitz model on portfolio optimization and implemented models from literature on Nifty50 index.
- Studied Fuzzy Credibility Theory, and developed and implemented a model for Index Tracking.

#### Jan'19 – Jun'21

Sep'16 - Apr'17

Dec'24 – Present

July'22 - Dec'24

## **Relevant** Publications

#### JOURNALS

- Minakshi Punam Mandal, Alberto Santini, and Claudia Archetti, "*Tactical Workforce Sizing and Scheduling Decisions for Last-Mile Delivery*", European Journal of Operational Research, 323 (1), pp. 153-169, 16 May 2025, https://doi.org/10.1016/j.ejor.2024.12.006.
- Minakshi Punam Mandal and Claudia Archetti, "Decomposition Matheuristics for Last-Mile Delivery Using Public Transportation Systems", Soft Computing, 29, pp. 1511-1539, 12 February 2025, https://doi.org/10.1007/ s00500-025-10513-2.

#### WORKING PAPERS

- Minakshi Punam Mandal, Laurent Alfandari, and Ivana Ljubić, "*Robust Facility Location in Disaster Preparation for Earthquakes with Aftershocks*", Submitted at **Productions and Operations Management**.
- Manuel Trotta, Claudia Archetti, Dominique Feillet, Alain Quilliot, Minakshi Punam Mandal, "*The Electric Pickup and Delivery Problem with Energy Management*"

#### THESES

- Minakshi Punam Mandal, "Three Essays in Sustainable Last-Mile Deliveries and Humanitarian Logistics," Ph.D. Thesis, (ESSEC Business School, 2024).
- Minakshi Punam Mandal, "Index Tracking and Enhanced Index Tracking in Portfolio Selection," M.Sc. Thesis, (Indian Institute of Technology Delhi, 2017).

### TEACHING EXPERIENCE

#### Associate Lecturer

ESSEC Business School, France

- Applied Mathematics for BBA Year 1 for the academic year 2023-24 (50 hours).
- Statistics for BBA Year 1 students in the academic year 2021-22 (25 hours) and 2022-23 (50 hours).

#### TEACHING ASSISTANT

ESSEC Business School, France

• Refresher Mathematics for Master in Management - Conducted Tutorial Sessions and Design of exercises.

2021

• Sustainability in Fast Fashion and Luxury Operations Management - Helped with relevant potential case studies and readings.

### ACADEMIC ACHIEVEMENTS

- Received the International Mobility Assistance Grant by the Commission of the Doctoral and the Postdoctoral College of CY Cergy Paris University, 2022.
- Awarded Best Poster Research at the 8th Ph.D. Poster Session at ESSEC Business School, 2021.
- Awarded Best Poster Design at the 8th Ph.D. Poster Session at ESSEC Business School, 2021.
- Awarded Jagat Ram Chopra Award for the Best M.Sc. project in Physics/Chemistry/Maths at IIT Delhi for the academic year 2016–17.
- Received Junior Research Fellowship (JRF) from Council of Scientific and Industrial Research (CSIR) for the academic year 2016–17.
- Secured All India Rank 71 in IIT Joint Admission Test for Masters (JAM) for M.Sc., 2015.

### ORAL PRESENTATIONS

#### Conferences

- Robust Facility Location in Disaster Preparation for Earthquakes with Aftershocks, Minakshi Punam Mandal, Laurent Alfandari, Ivana Ljubic, International Symposium on Mathematical Programming, July 21-26 2024, Palais de congres de Montreal, Montreal, Canada.
- Green Tactical Fleet-Sizing Decisions for Last-Mile Delivery Systems, Minakshi Punam Mandal, Claudia Archetti, Alberto Santini, **Transportation Science and Logistics Society Conference**, July 23-26 2023, Loyola University, Chicago, USA.
- Robust Facility Location for Earthquakes with Aftershocks, Minakshi Punam Mandal, Laurent Alfandari, Ivana Ljubic, **2023 POMS International Conference**, July 18-20 2023, Newcap Event Center, Paris, France.

- Tactical Green Fleet Sizing Decisions for Last-Mile Delivery Systems, Minakshi Punam Mandal, Claudia Archetti, Alberto Santini, **32nd European Conference in Operational Research**, July 3-6 2022, Aalto University, Espoo, Finland.
- A Decomposition Approach to Last Mile Delivery Using Public Transportation Systems, Minakshi Punam Mandal, Claudia Archetti, 8th meeting of the EURO Working Group on Vehicle Routing and Logistics Optimization (VeRoLog), June 12-15 2022, Kuhne Logistics University, Hamburg, Germany.
- A Decomposition Approach to Last Mile Delivery Using Public Transportation Systems, Minakshi Punam Mandal, Claudia Archetti, Odysseus 2021 (The Eighth International Workshop on Freight Transportation and Logistics), May 4-10 2022, Movenpick Hotel & Casino Malabata Tanger, Tangier, Morocco.
- A Decomposition Approach to Last Mile Delivery Using Public Transportation Systems, Minakshi Punam Mandal, Claudia Archetti, **31st European Conference in Operational Research**, July 11-14 2021, University of West Attica, Athens, Greece and Online (Hybrid).
- A Decomposition Approach to Last Mile Delivery Using Public Transportation Systems, Minakshi Punam Mandal, Claudia Archetti, **12èmes Journées Polyèdres et Optimisation Combinatoire (JPOC12)**, June 24-25 2021, Online.

#### WORKSHOPS

- Green Tactical Fleet-Sizing Decisions for Last-Mile Delivery Systems, Minakshi Punam Mandal, Claudia Archetti, Alberto Santini, **3rd EUROYoung Workshop**, June 5-6 2023, ESSEC Business School, Cergy (Paris), France.
- A Decomposition Approach to Last Mile Delivery Using Public Transportation Systems, Minakshi Punam Mandal, Claudia Archetti, **2nd EUROYoung Workshop**, June 21-22 2022, INESC-TEC and FEUP, Porto, Portugal.

### PH.D. SCHOOLS

- 2023 PhD School on Stochastic and Dynamic Programming at Milan, Italy.
- 2022 PhD School on Robust Optimization at Avignon, France.
- 2021 EUROPT Summer School 2021 in Robust Optimization (Online).
- 2021 JPOC Spring School in MINLP and Bilevel Optimization (Online).
- **2021** AIRO PhD School 2021 and 5th AIRO Young Workshop (Online).
- 2020 CO @ Work 2020 Summer School (Online).

### **TECHNICAL SKILLS**

Programming	Python, $LATEX$
Optimization Tools	CPLEX, Gurobi

### ADDITIONAL PROJECTS

#### INVESTOR DECISION MAKING IN CROWDFUNDING

 $Research \ Apprentices hip \ Module \ with \ Dr. \ Sara \ Rezaee \ Vessal$ 

- Studied investor's pledging decisions in crowdfunding campaigns.
- Proposed models based on Debt-sharing contracts and Revenue-sharing contracts.

### SUPPLY CHAIN CENTERS OF EXCELLENCE

Research Apprenticeship Module with Dr. Sara Rezaee Vessal

• Conducted a review of the literature on supply chain Centers of Excellence.

#### AN ANALYSIS ON AIRBNB DATA

- Course Project/Term Paper Machine Learning with Dr. Fragkiskos Malliaros
  - Conducted Exploratory Data Analysis to identify key features, and applied PCA and OHE for feature selection.
  - Built regression models Random Forest, Neural Networks, Elastic Net, SVR, DTR, RFR, and ADBR for price prediction, achieving top accuracy with Random Forest using 5-fold cross-validation.

### DETECTING SPAM EMAILS

Kaggle Competition for Machine Learning with Dr. Fragkiskos Malliaros

- Implemented Random Forest and AdaBoost classifiers with feature engineering and parameter tuning, achieving improved accuracy through LDA/PCA.
- Achieved a Kaggle test accuracy of 0.96 using 5-fold cross-validation and optimized ensemble methods.

#### Oct'19-Nov'19

Aug'19 – Jan'21

Jul'19 – Oct'19

Nov'19 - Dec'19

# SELECTED COURSEWORK

OPERATIONAL RESEARCH	Introduction to Optimization Methods, Advanced Optimization and Operations Research; Introduction to Decision Theory; Advanced Topics in Decision Theory; Sustainable Operations; Supply Chain Management
Management	Quantitative Research Methods in Management; Financial Mathematics; Macroeconomics for Business Research; Econometrics for Economics; Fundamentals of Strategic Marketing Management
MATHEMATICS	Machine Learning; Linear Algebra; Applied Statistics; Introduction to Game Theory; Differential Equations
References	
Dr Laurent Alfandari	Professor Department of Information Systems, Decision Sciences, and Statistics ESSEC Business School, Cergy, France Email: <b>alfandari@essec.edu</b>
Dr Claudia Archetti	Professor Department of Economics and Management University of Brescia, Brescia, Italy Email: claudia.archetti@unibs.it
	Professor

Dr Ivana Ljubić Department of Information Systems, Decision Sciences, and Statistics ESSEC Business School, Cergy, France Email: ivana.ljubic@essec.edu