

# VUSAL BABASHOV

DATA SCIENCE & ADVANCED ANALYTICS

## CONTACT

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## PROFILE

Applied research scientist with expertise in **operations research** and **machine learning** aiming to contribute to success of the organization by optimizing the decisions and improving the efficiency using advanced analytics.

## EDUCATION

2021 (Completed)  
UNIVERSITY OF OTTAWA [OTTAWA, ON]  
**Doctor of Philosophy in  
Management Analytics**

2012  
WESTERN UNIVERSITY [LONDON, ON]  
**Master of Science in Biostatistics**

2010  
UNIVERSITY OF PITTSBURGH  
[PITTSBURGH, OH]  
**Master of Science in Industrial  
Engineering**

2007  
BAKU ENGINEERING UNIVERSITY [BAKU,  
AZE]  
**Bachelor of Science in Industrial  
Engineering**

## DATA SCIENCE PROJECTS

March 2021

### House Prices Prediction | [GitHub](#)

- Developed a house price prediction model using **Python** with **Random Forest, LightGBM and Xgboost** methods to determine the model with the most accurate predictive power.
- Performed a **nested-cross validation** approach to choose an algorithm and conduct hyper-parameter tuning simultaneously.
- Demonstrated that **LightGBM** results in **32%** improvement in **MAE** compared to baseline **OLS Regression** model following the **feature engineering**.

## PRACTICAL RESEARCH PROJECTS

2016 - 2021

**Doctorate Research Assistant** | Telfer School of Management, Univ. of Ottawa

### Setting Wait Time Targets in a Multi-Priority Patient Setting

- Developed a **convex optimization** model using **simulation**, **deep neural network** approximation, and **linear programming** using **Python** to determine optimal targets in a case study for rheumatology clinic leading to reduction of **30%-60%** in total cost of waiting and overtime.

### Dynamic Advance Patient Scheduling with Follow-up Visits

- Developed a **Reinforcement Learning - Markov decision process (MDP)** model in **Java** to derive an optimal policy for capacity allocation decisions in a case study for endocrinology clinic leading to **500%** improvement in average daily costs compared to current practice (i.e., Myopic policy).

### Predictive Framework for Drug Formulary Decisions

- Built a **multi-criteria decision analysis** model in **R** to sort and classify alternatives along a set of criteria given decision maker's preferences and demonstrated utility of the **UTADIS<sup>GMS</sup>** method in a case-study to **reduce the human cognitive effort** and **streamline the decision-making process**.

2010 - 2012

**Graduate Research Assistant** | Biostatistics, Western University

**Economic Evaluation of brentuximab vedotin for persistent Hodgkin lymphoma**

- Developed a **Markov-Decision Tree** model to evaluate lifetime costs and benefits and perform cost-effectiveness analysis for brentuximab vedotin using a **survival analysis** resulting an **incremental cost-effectiveness ratio** of **\$164,248** per quality adjusted life years.

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## MANAGEMENT SKILLS

- Leadership
- Project Management
- Coaching
- Problem Solving
- Git/Github

## TECHNICAL SKILLS

- **Machine Learning:** scikit-learn, xgboost, lightgbm, keras, statsmodels
- **Operations Research:** Linear/Integer Programming, Markov Decision Process (Gurobi, Cplex)
- **Programming:** Python, R, SAS, SQL (SQLite, PostgreSQL), Java, LaTeX
- **Data Visualization:** Tableau, Matplotlib, Seaborn
- **Time Series Forecasting:** Arima, Exponential Smoothing
- Microsoft Azure

## EXPERIENCE

2019 - 2020

**Analyst, PhD Internship** | Currency Department, Bank of Canada

### Banknote Demand Forecasting

- Implemented **classical time series, random forest and deep neural network** models **in Python and R** to forecast the banknote demand by each denomination and region.
- Proposed a forecasting model for production that showed approximately **15%** improvement in **MAE** compared to the seasonal naïve approach.

2018 – 2020

**Instructor/ Lecturer** | Telfer School of Management, U of Ottawa

- **Business Analytics** (2018, 2019)
- **Business Forecasting Analytics** (2020)

Lectured BCom students on fundamentals of mathematical (e.g., linear, integer) programming, decision-tree models and time series forecasting models such as **Arima** and **Exponential Smoothing**.

2012 - 2014

**Health Economist** | Health Quality Ontario | Pivina Consulting Inc.

- Developed an **economic model** to inform a policy decision for funding of treatment in Ontario by the Ministry of Health.
- Built **cost-effectiveness, budget impact and survival analysis models** for medical products to support pharmaceutical companies for regulatory/reimbursement approval and market authorization in Canada.