Maximilien Burq

Professional Experience

2020-present **Verily (f.k.a Google Life Sciences)** | Senior Research Scientist - Technical lead

Parkinson's disease lead: building novel digital biomarkers from wrist-worn physiological sensor data:

- ➢ Managed the work of a team of 4, set the long term research roadmap, oversaw multiple clinical studies such as the our Personalized Parkinson's Project.
- ➢ Designed and implemented bradykinesia and tremor severity models. (Lasso, Logistic Regression)
- ➢ Combined traditional signal processing feature extraction with deep self-supervised approaches (TensorFlow, Keras).

2018-2020 **Verily** | Research ML Scientist

Built human activity recognition & step counting models. (Scikit-learn, Tree ensembles)

- ➢ Led data collection effort, choice of corroborative devices and label adjudication procedures.
- ➢ Implemented framework for TB scale preprocessing, training, serving of models. (Apache Beam, GCP)
- ➢ 30% decrease in step count error, 200% reduction in user complaints.

2017 **Lyft** | Research Scientist Intern

Developed new marketplace optimization algorithms, from mathematical modeling to implementation.

- ➢ Improved pricing and queueing models using online optimization models.
- ➢ Tested and deployed models and algorithms in production.

2015 **Talentoday** | Data Scientist *(Talentoday is an HR analytics startup)*

Led data science projects to predict a candidate's performance in a team (Python, RForests, XGBoost).

- ➢ Implemented a predictive analytics module, leading to $300k recurring revenue.
- ➢ Grew the Data Science team by hiring two people full time.

2011-2012 **Paris Fire Brigade** | Emergency Medical Technician

In charge of a 3-person first-aid and rescue vehicle in 24h shifts.
Led over 1000 missions over the course of 8 months.

Education

2014 – 2018 **MIT** | Ph.D. in Operations Research *(with P. Jaillet, I. Ashlagi)*

Dissertation on dynamic matching algorithms (with applications to kidney exchange and ride-sharing).
Coursework in combinatorial, linear, mixed-integer optimization, online algorithms, bayesian learning, reinforcement learning, mechanism design, auction theory.

- ➢ Designed novel algorithms for online optimization and online learning. [1, 2]
- ➢ Simulation-based analysis in the context of kidney exchange and allocation. [3]

Projects:

- ➢ [2015] 30-day hospital Readmission Risk Prediction models. (in collaboration with DELL labs)
- ➢ [2017] Mixed-integer optimization with deep reinforcement learning for dynamic matching.

2016 **Stanford University** | Visiting Student Researcher

Developed and implemented an algorithm for dynamic matching under uncertainty. [2, 4]

2011- 2014
GPA: 3.89/4 **École Polytechnique** | MSc. in Applied Mathematics

Coursework in Operations Research, Statistical Inference, Machine Learning, Queueing Theory.
Minors in Computer Science and Physics. (Ranked 1st out of 10000+ on the nationwide entrance exam)

Languages

English (Fluent)
French (Native)

Programming Tools

Languages: Python (*Google readability*), SQL, R (*prior experience*).
Optimization: Gurobi, Pyomo, Cplex, JuMP.
Machine Learning: TensorFlow, Keras, Scikit-learn.
Data Analysis & Processing: Pandas, Numpy, Apache Beam, Google Cloud Platform, BigQuery, AI notebooks.

SELECTED PUBLICATIONS (full list on google scholar)

[1] Ashlagi, I., Burq, M., Jaillet, P., & Manshadi, V. (2019). On matching and thickness in heterogeneous dynamic markets. *Operations Research*, 67(4), 927-949. *

[2] Ashlagi, I., Burq, M., Dutta, C., Jaillet, P., Saberi, A., & Sholley, C. (2019, June). Edge weighted online windowed matching. In *Proceedings of the 2019 ACM Conference on Economics and Computation* (pp. 729-742). *

[3] Ashlagi, I., Bingaman, A., Burq, M., Manshadi, V., Gamarnik, D., Murphey, C., Roth, A.E., Melcher, M.L. and Rees, M.A., 2018. Effect of match-run frequencies on the number of transplants and waiting times in kidney exchange. *American Journal of Transplantation*, 18(5), pp.1177-1186. *

[4] Ashlagi, I., Burq, M., Jaillet, P., & Saberi, A. (2018). Maximizing efficiency in dynamic matching markets. *arXiv preprint* arXiv:1803.01285. *

[5] Ashlagi, I., Burq, M., Dutta, C., Jaillet, P., Saberi, A., & Sholley, C. (2020). Maximum weight online matching with deadlines. *arXiv preprint* arXiv:1808.03526. *

[6] Burq M., Rainaldi E., Ho KC., Chen C. Bloem BR., Evers L., Helmich R., Myers LJ., Marks W., Kapur R. (2021) Virtual Exam for Parkinson's Disease Enables Frequent and Reliable Remote Measurements of Motor Function. *MedRXiv* preprint

* Author order is alphabetical

CONTACT

email: burq.maximilien@gmail.com
linkedin: https://www.linkedin.com/in/mburq/