Leslie O'Bray

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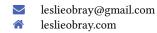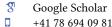
Summary

I am a PhD student in machine learning looking to develop models that solve real-world problems. My research focused on developing *graph machine learning* models, such as graph neural networks and graph transformers, with applications in bioinformatics and other domains. Previously, I did a Masters in Statistics and worked at Google in business strategy for ad products. There, I used large-scale datasets to find insights to inform business decisions, which sparked my interest in statistics and showed me the potential of machine learning in real-world applications.

Education

PhD in Machine Learning, **ETH Zürich**   Oct 2019–Apr 2023
○ Thesis: Leveraging global information for machine learning on graphs
○ Advisor: Prof. Karsten Borgwardt
○ Examiners: Prof. Michael Bronstein (U. Oxford), Prof. Christopher Morris (RWTH Aachen), Prof. Kristel Van Steen (KU Leuven)
○ Research interests: graph transformers, graph neural networks, topological data analysis, ML for biomedical applications

MSc in Statistics, **ETH Zürich**   Feb 2017–Sept 2019
○ Final grade: 5.7 (out of 6.0)
○ Thesis: Learning vector representations of graphs using recurrent neural network autoencoders
○ Advisors: Prof. Marloes Maathuis, Prof. Karsten Borgwardt, Dr. Bastian Rieck
○ Coursework included computational statistics, clinical biostatistics, causality, and machine learning

BSc in Foreign Service, **Georgetown University**   Aug 2007–May 2011
○ Final grade: 3.7 (out of 4.0, top 10%), *Magna Cum Laude*
○ Major: Science, Technology and International Affairs

Work Experience

ETH Zürich | Research Assistant   Sept 2018–Mar 2019
Social Network Analysis Lab of Prof. Ulrik Brandes   *Zürich, Switzerland*
○ Performed data collection using the Twitter API to reconstruct the Swiss user graph to enable research on influence propagation.

Google | Global Business Product Lead   Jan 2015–Jan 2017
Search Ads for Small & Medium Businesses   *California, USA*
○ Designed and executed the global sales strategy for billion dollar products (Google Shopping and Remarketing Lists for Search Ads), which included working cross-functionally with engineering, sales, customer service and marketing.
○ Performed extensive analysis on large-scale datasets to uncover hidden correlations and product deficiencies and presented findings to executive stakeholders to prioritize business and product changes.
○ Conducted analyses to identify revenue opportunities for the product (e.g. identifying signals for under-invested customers, market-level diagnosis of performance), set the corresponding targets for the sales team, and provided weekly reporting.
○ Increased product adoption by 50% in 3 months, outperforming the prior 9 months combined by:
  ○ Designing product-fit criteria for opportunities surfaced to sales, yielding the highest pitch rate of all product opportunities.
  ○ Leading an overhaul of the sales incentive structure, resulting in a 280% increase QoQ in successful implementations.

Google | Product Specialist   Jan 2013–Dec 2014
Search Ads for Small & Medium Businesses   *California, USA*
○ Provided in-depth product knowledge and identified top revenue opportunities for the North American sales teams.
○ Negotiated the inclusion of the small and medium business (SMB) segment into a beta product launch, and established SMBs as a critical partner for engineering for future launches due to 7x faster product adoption than the large customer segment.
○ Contributed to the rollout of the biggest platform change in AdWords, which included training 300+ Google employees.

Google | Account Strategist   Aug 2011–Dec 2012
Search and Display Ads for Small & Medium Businesses   *California, USA*
○ Managed & strategically consulted for 300 small and mid-market businesses on their marketing strategies for Google AdWords.

Selected Publications

In the publications below, [†] indicates equal contribution and [*] indicates equal supervision.

1. Dexiong Chen[†], **Leslie O'Bray**[†], and Karsten Borgwardt. *Structure-Aware Transformer for Graph Representation Learning.* Accepted for presentation at the 39th International Conference on Machine Learning (ICML), 2022. arXiv: 2202.03036 [stat.ML].

2. **Leslie O'Bray**[†], Max Horn[†], Bastian Rieck[*] and Karsten Borgwardt[*]. *Evaluation Metrics for Graph Generative Models: Problems, Pitfalls, and Practical Solutions.* Accepted as a spotlight at the 10th International Conference on Learning Representations (ICLR), 2022. arXiv: 2106.01098 [cs.LG].

3. Renming Liu[†], Semih Cantürk[†], Frederik Wenkel, Sarah McGuire, Xinyi Wang, Anna Little, **Leslie O'Bray**, Michael Perlmutter, Bastian Rieck, Matthew Hirn, Guy Wolf and Ladislav Rampášek. *Taxonomy of Benchmarks in Graph Representation Learning.* In the Learning on Graphs Conference, 2022.

4. **Leslie O'Bray**[†], Bastian Rieck[†] and Karsten Borgwardt. *Filtration Curves for Graph Representation.* Proceedings of the 27th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), pp. 1267–1275, 2021.

5. Karsten Borgwardt, Elisabetta Ghisu, Felipe Llinares-López, **Leslie O'Bray** and Bastian Rieck. *Graph Kernels: State-of-the-Art and Future Challenges.* Foundations and Trends® in Machine Learning 13:5–6, pp. 531–712, 2020. DOI: 10.1561/2200000076. Also available at arXiv:2011.03854.

6. Giulia Muzio[†], **Leslie O'Bray**[†] and Karsten Borgwardt. *Biological Network Analysis with Deep Learning.* Briefings in Bioinformatics, 22(2):1515–1530, 2020. DOI: 10.1093/bib/bbaa257.

7. Giulia Muzio, **Leslie O'Bray**, Laetitia Meng-Papaxanthos, Juliane Klatt and Karsten Borgwardt. *networkGWAS: A network-based approach for genome-wide association studies in structured populations.* DOI: 10.1101/2021.11.11.468206. Preprint, 2021.

Skills

Programming Languages	Python, R, SQL, LaTeX
Deep Learning Frameworks	`scikit-learn`, `PyTorch`, `TensorFlow`
Analysis and Visualization	`numpy`, `scipy`, `pandas`, `seaborn`, `ggplot2`, `TikZ`
Tools	`git`, `bash`, Vim, Visual Studio Code
Languages	English (native), German (proficient), Portuguese (conversational)
Communication	Strong writing and public speaking skills

Teaching experience

ETH Zürich | Data Mining II Teaching Assistant	Feb 2021–Jun 2021
ETH Zürich | Applied Analysis of Variance and Experimental Design Teaching Assistant	Sept 2018–Feb 2019

Awards & Honors

- Nominated for the ETH Medal for outstanding PhD thesis (awards the top 8%, decision Nov 2023)
- NeurIPS 2022 Top Reviewer Award
- ICML 2022 Participant Award
- Nominated and accepted into the European Laboratory for Learning and Intelligent Systems (ELLIS) PhD Program

Service to the Community

- **Reviewing:** NeurIPS (2022), Learning on Graphs (2022), UAI (2021), Bioinformatics (2020, 2021, 2022), RECOMB (2023), PLOS Computational Biology (2021), Machine Learning in Computational Biology (2021), Topology, Algebra, and Geometry in Machine Learning Workshop (ICML 2022)
- **Program Committee:** Topological Data Analysis and Beyond Workshop (NeurIPS 2020)
- **Panel Discussion Moderator:** at the Workshop on Geometrical and Topological Representation Learning (ICLR 2022)
- **Supervision:** Co-supervised 3 Master Theses and 1 semester project

References

Prof. Karsten Borgwardt
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Max Planck Institute of Biochemistry
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Helmholtz Zentrum München, Germany
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