

# AMEL AWADELKARIM

## EDUCATION

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### Stanford University

Sept 2017 - June 2023 (expected)

Ph.D. in Computational and Mathematical Engineering

*National Science Foundation (NSF) Graduate Research Fellow*

Dissertation: “Algorithmic design and choice-modeling in real-world graph systems”

Advised by: [Johan Ugander](#)

### The Pennsylvania State University

Aug 2016 - Dec 2017

M.S. in Engineering Science & Mechanics - GPA: 4.0/4.0

### The Pennsylvania State University

Aug 2012 - Aug 2016

B.S. in Engineering Science - Major GPA: 3.82/4.0

*Minor in Mathematics*

## TECHNICAL HIGHLIGHTS

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<b>Research Interests</b>	Computational social science, personalization & recommender systems
<b>Relevant Courses</b>	Applied Statistics, Machine Learning, Discrete Math & Algorithms, Social Networks (TA work), Optimization, Numerical Linear Algebra
<b>Languages &amp; Tools</b>	Python (numpy, pandas, PyTorch, matplotlib, Jupyter notebook), git

## WORK EXPERIENCE

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### Google - Software Engineering Internship

Jun 2019 - Sept 2019

- Developed an alternative quality score to the average star-rating of Google Maps features (places) by implementing a Bayesian skill-rating system on existing ratings.
- Average star-ratings suffer from the cold-start problem—the resulting metric better captures quality of scarcely-rated features by leveraging head-to-head comparisons within user ratings of similar places.
- The new metric aids in the decision-making of what to rank for Google Maps search results.

## PUBLICATIONS

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- A Awadelkarim, I Ashlagi, I Lo, J Ugander. “Equilibrium analysis of smart-matching-platform interventions in school choice”. (In preparation).
- A Awadelkarim, A Seshadri, I Ashlagi, I Lo, J Ugander. “Rank-heterogeneous preference modeling for school choice”. (Under review).
- A Awadelkarim, J Ugander. “[Prioritized restreaming algorithms for balanced graph partitioning](#)”. Proc. 26th ACM SIGKDD Int’l Conf. on Knowledge Discovery and Data Mining (KDD), 2020.
- A Awadelkarim, F Costanzo. “[Finite-element implementation and verification of complex fluid models based on evolving natural configurations, motivated by studies of blood](#)”. M.S. Thesis. The Pennsylvania State University. 2017.

## RESEARCH PROJECTS

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### Preference modeling for school choice

Jan 2021 - present

*PhD Research - Stanford University*

- *Why it matters:* We developed better models of how families rank schools, which advances our ability to design and analyze school choice mechanisms, facilitating better childhood educational outcomes.
- Applied recent advancements in discrete choice and ranking models to improve preference models for school choice research, in partnership with the San Francisco Unified School District.

- The incorporation of context effects in the model—effects of already-chosen items on the distribution of down-rank choices—greatly improves NLL loss and model stratification enhances top-choice prediction.

**“Prioritized restreaming algorithms for balanced graph partitioning”** May 2018 - Feb 2020  
*PhD Research - Stanford University*

- *Why it matters:* Our proposed method is most effective at minimizing the edge-cut objective compared to state-of-the-art algorithms, and can aid in efficient large-scale distributed graph computation.
- Developed a taxonomy of modern scalable algorithms for constrained graph partitioning, contributing a new family of algorithms with state-of-the-art performance.
- Empirically compared the new class of algorithms with a number of existing graph partitioning techniques, providing benchmarking that was previously void in the literature.

**“Training a playlist curator based on user taste”** Sept 2018 - Dec 2018  
*Project - Stanford University*

- *Why it matters:* A playlist is a form of self-expression that has the power to impact our mood and energy-level; this project aids in the task of playlist creation by learning the unique taste of the user.
- Built a playlist classifier, mapping a list of unclassified songs to user-created playlists based on similarity.
- Trained, validated, and tested various ML models, including neural network, SVMs, and perceptron.
- Performed feature engineering: collected Spotify API features like Spotify song metadata and artist genre tags, and computed node2vec artist embeddings (learned from related-artists graph).

**“Finite-element implementation and verification of complex fluid models based on evolving natural configurations, motivated by studies of blood”** May 2015 - Aug. 2017  
*M.S. Research - The Pennsylvania State University*

- *Why it matters:* New surgical procedures require great testing, in-vitro or in-vivo; computational simulation is a safe and inexpensive first step toward development and adoption.
- Numerically modeled novel thrombectomy procedure for less-invasive blood clot removal.
- Developed finite-element scheme using COMSOL Multiphysics to numerically solve balance laws of momentum and mass with a continuum model for an Oldroyd-B fluid and for blood.

## AWARDS

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- NSF Graduate Research Fellowship (Fall 2017 - Summer 2020).
- Outstanding Undergraduate Thesis Award (Spring 2016).
- 1<sup>st</sup> place at the Penn State Speaking & Presentation Contest (Fall 2015).

## ACTIVITIES

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**Member - [San Francisco Fury](#)** Jun 2018 - present

- Elite women’s Ultimate frisbee club, based in the Bay Area. National champions in 2018 & 2021.

**Coach - Stanford Women’s Ultimate team** Sept 2019 - Dec 2020

- Awarded [coaches of the year](#) across the entire college division.