Shangdi Yu shangdiy@mit.edu, (347) 703-5162

MIT - Computer Science and Artificial Intelligence Lab
The Stata Center, Building 32- G728, 32 Vassar St.
Cambridge, MA 02139

Education

Massachusetts Institute of Technology, Cambridge, MA — Expected May 2024
Ph.D.; Electrical Engineering and Computer Science (Advisor: Julian Shun)

Cornell University, Ithaca, NY — Graduated May 2019
B.Sc. Summa Cum Laude; Computer Science & Operations Research

Awards and Honors

- Cornell University, Computer Science Prize for Academic Excellence and Leadership 2019
- Cornell University, Operations Research Prize for Academic Excellence 2019
- MIT EECS Department, Edwin S. Webster Graduate Fellowship 2019
- SIAM, APOCS20 SIAM Travel Award 2019

Research Experience

Parallel Clustering Algorithms *under Prof. Julian Shun, CSAIL MIT* **Sept. 2019 – Present**
- Developing both theoretically and practically efficient algorithms for Euclidean Minimum Spanning Tree and hierarchical spatial clustering
- Study parallel algorithms for various linkage problems, such as complete linkage and average linkage
- Developing a framework for different classes of density-based clustering algorithms

Stack-Exchange Community Networks Analysis *under Prof. Austin Benson, Cornell University* **April 2018 – May 2019**
- Modeled the Stack-Exchange communities as k-partite graphs and studied trends in users' interests using motifs
- Captured similarities between the communities' structures and created a random generative model for such networks
- Investigated the distributions of degrees and edge weights and clustering in folksonomy networks

Cornell Operations Research Applied Learning Team, *Algorithm Team, Cornell University* **April 2018 – May 2019**
- Analyzed the changes in music popularity by modeling music streaming numbers as a dynamic contagion process

Bike-Share Rebalancing Project *under Prof. David Shmoys, Cornell University* **May 2017 – May 2018**
- Developed a web tool and a mobile app for dispatchers to manage the rebalancing operations and communicate with drivers
- Integrated a greedy algorithm to the back-end of the web app tool
- Analyzed and visualized the ridership data
- Predicted the number of available bikes and docks at each Citibike station in New York City using a fluid model

Bike-Share Simulation Project *under Prof. Jamol Pender, Cornell University* **April 2017 – Sept. 2017**
- Simulated the bikes' distribution in a bike-sharing system over time with a delay model
- Incorporated a choice factor into the model using a choice function
- Visualized the resulting data of the simulations

Work Experience

Technology Intern, *New York Times Company, Messaging Team, New York City* **June 2018 – Aug. 2018**
- Analyzed the decomposition, engagement level, and subscription habits of more than fifteen million newsletter subscribers
- Automated data collection and visualization for more than thirty products and for customized timeframes

Leadership and Community Involvement

Co-chair, *Graduate Student Council Off-Campus Subcommittee, Cambridge, MA* **Aug. 2020 – Present**
- Manage the budget and organize monthly social events for graduate students living off-campus

Co-organizer, *Theory Lunch, Cambridge, MA* **Oct. 2019 – Present**
- Organized the Theory Lunch event, a weekly speaker series at MIT attended by ~50 students aiming to encourage academic discussions and create an opportunity for students to socialize with each other
- Involved with coordinating the schedule and food, setting up for each talk, managing the budget, and advertisement

Teaching Assistant, *Cornell University, Ithaca, NY* **Aug. 2017 – May 2019**
- Assisted "Intro to Computing Using Python" course under Prof. Walker White
- Assisted "Machine Learning for Intelligent Systems" course under Prof. Kilian Weinberger
- Assisted "Networks II: Market Design" course under Prof. Arpita Ghosh
- Assisted "Introduction to Analysis of Algorithms" course under Prof. Robert Kleinberg
- Provided face-to-face consultation to students who request assistance during lab sections or consulting hours
- Developed projects to encourage content understanding and graded students' assignments and exam papers

Panel Speaker, *Cornell explore CS Research, Ithaca, NY* **(delayed due to COVID19)**
- Invited to talk at Google's ExploreCSR series at Cornell, which aims to encourage undergraduates, especially women, underrepresented minorities and first-generation college students to consider pursuing a PhD

Volunteer, *MIT EECS Visit Day, Cambridge, MA* **Mar. 2020 – Mar. 2020**

- Helped with directing prospective students, answering students' questions, and organizing a dinner event during the visit day

Event Coordinator, *Cornell Welcome Weekend Committee, Ithaca, NY* **Dec. 2016 – May 2019**

- Organized the Cornell ClubFest which showcases over 300 registered student organizations on campus
- Arranged the biannual Cornell Welcome-Back events for over 1300 students

Volunteer, *Dewitt Middle School, Ithaca, NY* **Oct. 2016 – Dec. 2016**

- Organized the students of a local middle school after-school program, which provided equipment and taught middle school students to write scripts and create short movies

Participant, *various social issue seminars* **Oct. 2016 – Present**

- Participated in many seminars and community discussions organized by different student groups at Cornell University and MIT, such as "how to respond effectively to bias and harassment"

Publications, Preprints, and Posters

- "Modelling and analysis of tagging networks in Stack Exchange communities", *Journal of Complex Networks 2019*
  with X. Fu, A. R. Benson
- "Analyzing the Spotify Top 200 Through a Point Process Lens". *Submitted 2019*
  with H. Michelangelo, B. Liu, C. Park, R. Ramireddy, G. Ren, M. Ren, A. Daw, J. Pender
- "Constructing a GRASP Algorithm to Optimally Reallocating Bikes" *Poster Presentation for NSF Cornell site visit 2017*
  with E. Chen, D. Freund, D. B. Shmoys

Other Research Projects

Survey of Approximation Algorithms for Path TSP **2019**

- Surveyed different approaches for approximating the shortest Hamiltonian path between two vertices in a graph

Survey of Density-Based Clustering using Parzen Window Estimation **2019**

- Surveyed different approaches for clustering data by estimating the density in the data space

Parallel Algorithm Toolbox in Julia and a Comparison with C++ **2019**

- Developed several parallel primitives in Julia and benchmarked Julia parallel performance comparing with C++

Gaussian Process Framework for Deep Neural Networks **2018**

- Modeled CNNs as a shallow GP and implemented a GP representation for CNN in PyTorch

Low Precision Training in Distributed ML Systems **2018**

- Investigated the effectiveness of employing low-precision training in both centralized and decentralized architectures

Analysis of Probabilistic Temporal Networks **2018**

- Developed a stochastic dynamic programming algorithm to find the optimal routing policy in a nondeterministic graph
- Presented several heuristics to solve the above routing problem and compared their performances

Academic Service

Conference Subreviewer

- SPAA2020, Euro-Par2020, ESA20, HiPC 2020

Skills

Programming Languages: C++, Cilk Plus, Python, SQL, Java, R, Julia, OCaml, AMPL, C, HTML, Swift, Coq
Other Skills: Git, AWS, Google Cloud, PyTorch, TensorFlow, Simio, LaTeX
Languages: English, Mandarin, Japanese