Jason Hughes

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Research Interests

I am primarily interested in data driven Optimal Transport and its applications to the various subfields of Scientific Computing. I am also interested in green computing.

Education

Fordham University — New York, NY
M.S. in Data Science, GPA: 3.84/4.00 — 2020–2021

- Thesis: Fair and Private Discrete Distributed Optimal Transport
- Expected Graduation: July 2021

Fordham University — Bronx, NY
B.S. in Mathematics *Cum Laude*, GPA: 3.70/4.00, Major GPA: 3.90/4.00 — 2016–2020

- Minor: Computer Science

Research Experience

Fordham University, Juntao Chen Group — New York, NY
Graduate Student Researcher — Sept. 2020 –Present

- Currently applying differential privacy to distributed optimal transport (OT) to protect user data.
- Added fairness constraints to OT for fairer resource allocation.
- Built a model for distributed OT that considers resource suppliers or targets that may be hacked and untrustworthy.
- Work 30 hours per week while a full time graduate student.
- Direct undergraduates to help with research.

Fordham University Robotics Lab — Bronx, NY
Undergraduate Student Researcher — Mar. 2019 –Aug. 2020

- Studied the ability to use drone IMU data to detect obstacles
- Employed ML algorithms and large sets of data to predict the location of the obstacle in relation to the drone.
- Programmed autonomous drone flights using ROS and Python.
- Worked 15 hours a week while a full time student.

Enterprise Analysis Corporation — Stamford, CT
Research Intern — Apr. 2016 –Aug. 2016

- Researched medical device market and interviewed lab professionals.
- Analyzed survey responses and maintained company database.

Journal Papers

1. **J. Hughes**, J. Chen, "Resilient and Distibuted Discrete Optimal Transport with Deceptive Adversary: A Game-Theoretic Approach", Submitted To: *IEEE Control System Letters (L-CSS)*, March 2021.

Conference Papers

1. **J. Hughes** and D. Lyons, "Wall Detection via Air-Disturbance Classification in Autonomous Quadcopters", *The 7th International Conference on Control, Automation and Robotics*, 2021, pp. 189-196.

2. **J. Hughes** and J. Chen, "Fair and Distributed Dynamic Optimal Transport for Resource Allocation over Networks", *2021 55th Annual Conference on Information Sciences and Systems (CISS)*, 2021, pp. 1-6.

3. **J. Hughes** and D. Lyons, "Obstacle Detection via Air-Disturbance Classification in Autonomous Quadcopters", *ICDATA 2020: 16th International Conference on Data Science*, 2020.

4. Q. Zhao, **J. Hughes** and D. Lyons, "Drone proximity detection via air disturbance analysis", Proc. SPIE 11425, *Unmanned Systems Technology XXII*, Vol. 114250, 2020, pp. 141-149.

Conference Presentations

- "Wall Detection via Air-Disturbance Classification in Autonomous Quadcopters", *7th International Conference on Control, Automation and Robotics (ICCAR).* April 2021
- "Fair and Distributed Dynamic Optimal Transport for Resource Allocation over Networks", *55th Annual Conference on Information Sciences and Systems (CISS).* March 2021
- "Obstacle Detection via Air-Disturbance Classification in Autonomous Quadcopters", *16th International Conference on Data Science (ICDATA).* July 2020

Advising & Teaching Experience

- **Graduate Student Advisor** at Fordham University — Mar. 2021 –Apr. 2021
  Advised students on incorporating fairness in optimal transport as a part of Google's ExploreCSR Program.
- **Graduate Student Advisor** at Fordham University Robotics & Computer Vision Lab — Mar. 2021 –May 2021
  Trained undergraduates in robotics lab systems such as ROS and drone environments.
- **Tutor** at Fordham University — Sept. 2019 –Aug. 2020
  Tutored five students in various subjects from Finite Math to Linear Algebra.
- **Grader** at Fordham University — Sept. 2018 –May 2020
  Graded homework and quizzes in multiple classes for professors.
- **Student Teacher** at Theodore Roosevelt High School — Sept. 2018 –Dec. 2018
  Taught a Math SAT prep class once a week to twelve students.

Awards & Scholarships

- ICCAR: Best Presentation Award — April 2021
- Google's Tri-State ExploreCSR: Second Place in Poster Competition — April 2021
- Fordham University: Centennial Scholarship — 2020–2021
- Fordham University: Summer Research Fellowship — Summer 2019
- Pi Mu Epsilon: Mathematics Honors Society — 2019–2020
- Fordham University: Dean's List — 2017–2020
- Fordham University: Dean's Scholarship — 2016–2020

Programming Languages

- **Pytohn:** packages: Numpy, Pandas, SciPy, Tensorflow/Keras, Matplotlib. object oriented programming.
- **MATLAB:** scripting for numerical analysis, PDEs, optimization and more.
- **C++:** object oriented programming.
- **R:** scripting for data analysis and graphing.

Skills

- **Linux:** Bash scripting for Linux (or Unix)
- **Big Data:** Hadoop (HDFS), Spark, Google Cloud
- **ROS:** Robotics Operating System
- **MySQL:** Database management
- **Others:** LaTeX, Microsoft Office, Soldering, Woodworking

Relevant Coursework

- **Graduate:** Algorithms for Data Science, Data Analytics: Tools & Scripting, Math for Data Science, Artificial Intelligence, Machine Learning, Data Visualization, Big Data Programming, Cloud Computing.
- **Undergraduate:** Multivariate Calculus I & II, Linear Algebra, Mathematical Modeling, Discrete Math, Differential Equations, Abstract Algebra, Numerical Analysis, Probability, Statistics, Partial Differential Equations, Computer Science I & II, Computer Organization, Data Mining, Programming for Math & Science.

Professional Organizations

- IEEE Student Member 2021 –Present
- SIAM Student Member 2020 –Present

Technical Reviewer

- IEEE Control System Letters 2021