Jacob Moorman

Applied Math Ph.D. Candidate at UCLA

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https://jacob.moorman.me

EDUCATION

Ph.D. in Mathematics — **2016 - Present**

M.A. in Mathematics — **June 2018**
University of California, Los Angeles (UCLA) — *Los Angeles, CA*

B.S. in Mathematical Sciences — **May 2016**

B.S. in Computer Science — **May 2016**
New Jersey Institute of Technology (NJIT) — *Newark, NJ*

SKILLS

Programming languages: Python, JavaScript, SQL, MATLAB, C++, Bash
Operating systems and other tools: Linux, macOS, Windows, SVN, Git, LaTeX, OpenCV, PyTorch, SNAP
Research interests: optimization, machine learning, statistics, network analysis, numerical linear algebra

EXPERIENCE

Graduate Researcher and Teaching Assistant
Sept 2016 – Present
University of California, Los Angeles (UCLA) — *Los Angeles, CA*

- Completed independent and collaborative research projects resulting in peer reviewed publications.
- Made novel contributions in network science, optimization, and numerical linear algebra.
- Communicated research results and ideas in oral and poster presentations.
- Implemented experiments and algorithms in Python; used git for version control and collaboration.
- Completed a variety of courses in numerical analysis, statistics, optimization, and machine learning.
- Taught undergraduate courses in probability theory, mathematics of finance, and image processing.

Research Intern
Summer 2019
HRL Laboratories — *Malibu, CA*

- Created a calibration procedure for dynamic multi-sensor systems.
- Implemented algorithms in Python with OpenCV and PyTorch.
- Established benchmark tests to objectively compare calibration accuracies.
- Integrated my calibration procedure into a hands-off sensor system.

Data Science Research Intern
Summer 2017
Neural Analytics — *Los Angeles, CA*

- Developed search algorithms for robotically performing TCD studies previously carried out by hand.
- Created simulations in Python for testing search algorithms to reduce the need for physical tests.
- Automated routine data visualization processes using Bash and Python.

Software Engineering Intern
Jan 2015 – May 2016
Trillium Labs — *New York, NY*

- Built an interactive data visualization web application with HTML and JavaScript to view detailed stock data.
- Implemented outlier detection methods in Python and C++ to identify anomalous stocks and transactions.
- Combined outlier detection and data visualization tools for generating market insights.

Undergraduate Researcher
Jan 2014 – Dec 2014
NJIT Department of Mathematics — *Newark, NJ*

- Applied a particle filtering approach to identify and track acoustic sources in 2 and 3 dimensions.
- Wrote simulations and benchmark tests in C++ and MATLAB to evaluate performance.

Game Development Consultant
Sept 2012 – Nov 2014
Mission Critical Studios — *Farmingdale, NJ*

- Designed and prototyped levels for a 2D puzzle game published on Steam.
- Added custom physics mechanics to a 3D action game in Unity using C#.

RESEARCH

Conference Papers

- **Jacob D. Moorman**, Thomas K. Tu, Denali Molitor, Deanna Needell,
  "*Randomized Kaczmarz with Averaging*."
  Proc. Information Theory and Applications Workshop, La Jolla, CA, Feb. 2019.
- **Jacob D. Moorman**, Qinyi Chen, Thomas K. Tu, Zachary M. Boyd, Andrea L. Bertozzi,
  "*Filtering Methods for Subgraph Matching on Multiplex Networks*."
  Proc. GTA³ 2.0 at IEEE International Conference on Big Data, Seattle, WA, Dec. 2018.

Preprints

- **Jacob D. Moorman**, Thomas K. Tu, Denali Molitor, Deanna Needell,
  "*Randomized Kaczmarz with Averaging*."
  Submitted Feb. 2020.
- **Jacob D. Moorman**, Qinyi Chen, Thomas K. Tu, Zachary M. Boyd, Andrea L. Bertozzi,
  "*The Subgraph Matching Problem on Multiplex Networks*."
  Submitted Feb. 2020.
- Robert M. Gower, Denali Molitor, **Jacob D. Moorman**, Deanna Needell,
  "*Adaptive Sketch-and-Project Methods for Solving Linear Systems*."
  Submitted Sept. 2019.

Presentations

- "*On Comparing Adaptive Sampling Rules for Sketch-and-Project Methods*." (Oral)
  Joint Mathematics Meeting, Denver, CO, Jan. 2020.
- "*Randomized Kaczmarz with Averaging*." (Poster)
  Information Theory and Applications Workshop, La Jolla, CA, Feb. 2019.

Awards

- 2018-2019 MENTOR NRT Fellowship $34,000

Reviewer

- Linear Algebra and its Applications
- Numerical Algorithms
- SIAM Journal on Matrix Analysis and Applications
- SIAM Journal on Scientific Computing

TEACHING

Teaching Assistant

Sept 2016 – May 2018
Los Angeles, CA

UCLA Department of Mathematics

- Math 174E: Mathematics of Finance (S'18)
- Math 171: Stochastic Processes (S'18, W'18, F'17)
- Math 155: Mathematical Imaging (W'18)
- Math 142: Mathematical Modeling (F'17)
- Math 170B: Probability Theory (S'17)
- Math 170A: Probability Theory (F'16)