

# Raphael A. Meyer

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Fourth Year Ph.D. Student      Theoretical Computer Science

## Education

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<b>New York University</b> <i>Ph.D. in Computer Science, 3.92 / 4.00 GPA</i> Advised by Prof. Christopher Musco Deborah Rosenthal, MD Award for Best Quals Examination: <i>Towards Optimal Spectral Sum Estimation in the Matrix-Vector Oracle Model</i>	<b>Brooklyn, NY</b> <i>2019–Present</i>
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<b>Purdue University</b> <i>B.S. in Computer Science Honors, 3.72 / 4.00 GPA</i> Concentrations in Foundations of CS, Computational Science, Machine Intelligence Minors in Math, Electrical Engineering Completed 15 Graduate Courses	<b>West Lafayette, IN</b> <i>2015–2020</i>
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## Research Interests

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I research the interplay of Statistics and Computation, largely through the lens of Linear Algebra.

- ▶ Randomized Linear Algebra (RandNLA)
- ▶ Foundations of Data Science
- ▶ Statistical & Computational Lower Bounds
- ▶ Optimization & Machine Learning

## Work Experience

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<b>Teaching Assistant</b> .....	
<b>Algorithmic Machine Learning and Data Science</b> <i>New York University</i>	<b>Brooklyn, NY</b> <i>Fall 2020</i>
<b>Introduction to Machine Learning</b> <i>New York University</i>	<b>Brooklyn, NY</b> <i>Spring 2020</i>
<b>Introduction to Algorithmic Analysis</b> <i>Purdue University</i>	<b>West Lafayette, IN</b> <i>Fall 2018</i>

<b>Undergraduate Research Assistant</b> .....	
<b>Theoretical Machine Learning</b> <i>Purdue University</i>	<b>West Lafayette, IN</b> <i>2018-2019</i>
<b>Information-Theoretic Cryptography</b> <i>Purdue University</i>	<b>West Lafayette, IN</b> <i>2016-2018</i>

<b>Internships</b> .....	
<b>Software Engineering Intern</b> <i>Bloomberg L.P.</i>	<b>New York, NY</b> <i>Summer 2017</i>

- Recognized, Tested, and Proved Inefficiencies with Existing Distributed Scheduler
- Integrated New Service to Observe System Load and be able to Learn Smart Solutions
- Cleared Technical Debt by Resolving bugs, Collecting Metrics, Automating Workflows

## Software Engineering Intern

New York, NY

*Bloomberg L.P.*

*Summer 2016*

- Integrated various Database, PubSub, and API platforms to provide a new format of data
- Iteratively designed to guarantee the API we produce matches Client Expectations
- Learned to code Effective, Maintainable, and Production-Worthy code

## Service

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<b>Organizer:</b> NYU Tandon TCS “Pandemic Presentations” Day ( <a href="#">link</a> )	2022
<b>Organizer:</b> NYU Tandon TCS Reading Group	2021
<b>ICLR Conference:</b> Conference Reviewer	2023
<b>SODA Conference:</b> External Conference Reviewer	2023
<b>NeurIPS Conference:</b> Conference Reviewer	2022
<b>ICML Conference:</b> Conference Reviewer	2022
<b>STOC Conference:</b> Conference External Reviewer	2022
<b>ICLR Conference:</b> Conference Reviewer	2022
<b>NeurIPS Conference:</b> Conference Reviewer	2021
<b>ISIT Conference:</b> Conference External Reviewer	2017

## Honors and Awards

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<b>Deborah Rosenthal, MD Award for Best Quals Exam:</b> New York University	2021
<b>Outstanding Reviewer Award:</b> NeurIPS Conference	2021
<b>Student Travel Grant:</b> ICML Conference	2019
<b>School of Engineering Fellowship:</b> New York University	2019
<b>Finalist:</b> CRA Outstanding Undergraduate Research Award	2018
<b>Student Travel Grant:</b> ISIT Conference	2017
<b>Outstanding Sophomore of the Year:</b> Purdue Computer Science	2016–2017
<b>Silver Medal, Giant Slalom:</b> Ecole de Ski Français	2016
<b>Qualcomm Rookie Team of the Year:</b> Boilermake Hackathon	2015
<b>Top Ten Hacks:</b> Boilermake Hackathon	2015
<b>Certificate of Cuisine:</b> Cordon Blue School of Gourmet Cuisine	2015

## Publications

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- **Near-Linear Sample Complexity for  $L_p$  Polynomial Regression**  
with Cameron Musco, Christopher Musco, David P. Woodruff, and Samson Zhou at *SODA 2023*.
- **Fast Regression for Structured Inputs**  
with Cameron Musco, Christopher Musco, David P. Woodruff, and Samson Zhou at *ICLR 2022*.

- **Hutch++: Optimal Stochastic Trace Estimation**  
with Cameron Musco, Christopher Musco, and David P. Woodruff at *SOSA 2021*.  
*My most cited article!* ([link](#))
- **The Statistical Cost of Robust Kernel Hyperparameter Tuning**  
with Christopher Musco at *NeurIPS 2020*.
- **Optimality Implies Kernel Sum Classifiers are Statistically Efficient**  
with Jean Honorio at *ICML 2019*.
- **Characterizing Optimal Security and Round-Complexity for Secure OR Evaluation**  
with Amisha Jhanji and Hemanta K. Maji at *ISIT 2017*.

## Talks & Presentations

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### Invited Talks.....

<b>The Unreasonable Effectiveness of Single Vector Krylov for Low-Rank Approximation</b>	<b>Presentation</b>
<i>Theory Reading Group § Purdue University</i>	<i>2022</i>
<b>Hutch++ and More: Towards Optimal Spectral Sum Estimation</b>	<b>Presentation</b>
<i>Computational Lower Bounds in Linear Algebra § SIAM AN22</i>	<i>2021</i>
<b>Lessons from Trace Estimation Lower Bounds</b>	<b>Presentation</b>
<i>Computational Lower Bounds in Linear Algebra § SIAM AN21</i>	<i>2021</i>
<b>Hutch++: Optimal Stochastic Trace Estimation</b>	<b>Presentation</b>
<i>Theory Reading Group § Johns Hopkins University</i>	<i>2021</i>

### Conference Presentations.....

<b>The Unreasonable Effectiveness of Single Vector Krylov for Low-Rank Approximation</b>	<b>Presentation</b>
<i>GAMM ANLA Conference</i>	<i>2022</i>
<b>Fast Regression for Structured Inputs</b>	<b>Poster</b>
<i>ICLR Conference</i>	<i>2022</i>
<b>Hutch++: Optimal Stochastic Trace Estimation</b>	<b>Poster</b>
<i>WALD(O) Conference</i>	<i>2021</i>
<b>Hutch++: Optimal Stochastic Trace Estimation</b>	<b>Presentation</b>
<i>SOSA Conference</i>	<i>2021</i>
<b>The Statistical Cost of Robust Kernel Hyperparameter Tuning</b>	<b>Poster</b>
<i>NeurIPS Conference</i>	<i>2020</i>
<b>Statistical Efficiency of Optimal Kernel Sum Classifiers</b>	<b>Presentation, Poster</b>
<i>ICML Conference</i>	<i>2019</i>
<b>Statistical Efficiency of Optimal Kernel Sum Classifiers</b>	<b>Poster</b>
<i>Midwest Theory Day</i>	<i>2019</i>
<b>Optimal Secure OR Evaluation</b>	<b>Presentation</b>
<i>ISIT Conference</i>	<i>2017</i>

## Reading Groups.....

<b>Hutch++: Optimal Stochastic Trace Estimation</b> <i>NYU VIDA Reading Group</i>	<b>Presentation</b> <i>2022</i>
<b>Introduction to Leverage Scores</b> <i>NYU Tandon Theory Reading Group</i>	<b>Presentation</b> <i>2021</i>
<b>Strategies for Episodic Tabular &amp; Linear MDPs</b> <i>NYU Tandon Reinforcement Learning Reading Group</i>	<b>Presentation</b> <i>2021</i>
<b>Lagrangian Duality</b> <i>NYU Tandon Theory Reading Group</i>	<b>Presentation</b> <i>2021</i>
<b>Introduction to Differential Entropy</b> <i>NYU CDS Reading Group on Information Theory</i>	<b>Presentation</b> <i>2020</i>
<b>Lower Bounds for the Oracle Complexity of Convex Optimization</b> <i>NYU Tandon AMLDS Reading Group</i>	<b>Presentation</b> <i>2019</i>

## Programming Languages

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**Julia, Python, C++, C, LaTeX, Racket:** *Proficient*  
Wrote Production-Worthy Code in Multiple Software Engineering Internships