Anthony Della Pella

Education

2017–2023 **Ph.D. Applied and Interdisciplinary Mathematics**, *University of Michigan*, Ann Arbor, MI
Focus: Approximation Algorithms & Combinatorial Optimization

2019 **Visiting Graduate Student**, *Simons Institute for the Theory of Computing*, Berkeley, CA
Focus: Geometry of Polynomials

2015–2017 **M.Sc. Applied and Interdisciplinary Mathematics**, *University of Michigan*, Ann Arbor, MI
Focus: Statistical Learning Theory

2010–2015 **B.Sc. Mathematics**, *University of Michigan*, Dearborn, MI
Minor: Statistics

Fellowships and Certifications

2021 **Data Analysis Boot Camp Fellow**, *Erdős Institute*, Virtual

2018 **Science Communication Fellow**, *University of Michigan Museum of Natural History*, Ann Arbor, MI

Experience

Industry Experience

2018-2019 **Data Analysis Consultant**, *Michigan State Lottery Commission*, Lansing
Probabilistic Analysis of Lottery Games and Fraud Detection

Teaching Experience

2022 **Course Reform Consultant**, *University of Michigan Foundational Course Initiative*, Ann Arbor
Pre-Calculus Expert

2022 **Graduate Student Course Coordinator**, *University of Michigan*, Ann Arbor
Pre-Calculus

2018-2022 **Course Instructor**, *Ross School of Business, University of Michigan*, Ann Arbor
Calculus I - Ross Summer Connection

2017-2022 **Academic Success Head Coach**, *Ross School of Business, University of Michigan*, Ann Arbor
Mathematics

2021 **Graduate Student Instructor**, *University of Michigan*, Ann Arbor
Multivariable Calculus - Online Instruction

2020 **Graduate Student Instructor**, *University of Michigan*, Ann Arbor
Pre-Calculus - Online Instruction

2018-2019 **Graduate Student Instructor**, *University of Michigan*, Ann Arbor
Pre-Calculus

2018 **Course Instructor**, *Washtenaw Community College*, Ann Arbor
Multivariable Calculus

2015-2016 **Graduate Student Instructor**, *University of Michigan*, Ann Arbor
Calculus I

2014-2015 **Teaching Assistant**, *University of Michigan*, Dearborn
Statistics

Languages

- English (Native Language)
- Arabic (Limited Working Proficiency)

Computer Skills

- Python
- MATLAB
- Hadoop
- Mathematica
- C++
- Minitab

Relevant Coursework

Aside from the traditional graduate mathematics curriculum, I've also taken the following courses:

2020 **Approximation Algorithms**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2019 **Concentration Inequalities**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2019 **Randomized Algorithms**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2018 **Stochastic Processes**, *University of Michigan*, Ann Arbor

2017 **Random Graphs in Data Science**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2016 **Machine Learning with Applications**, *University of Michigan*, Ann Arbor

2016 **High Dimensional Probability**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2015 **Theory of Machine Learning**, *University of Michigan*, Ann Arbor
Graduate Topics Course

2015 **Multivariate Statistical Analysis**, *University of Michigan*, Dearborn

Presentations

2022 **Traversal Sequences of Breadth-First and Depth-First Search**, 2^{nd} Annual Summer of Math Exposition

2021 **Detecting Fraud in Credit Card Transactions**, *Erdős Institute for Data Science*

2020 **Counting Cliques with Polynomials**, *University of Connecticut*, 2^{nd} Annual Mathematics Continued Conference

2019 **Applications of Machine Learning to Autonomous Robotic Systems**, *University of Michigan Museum of Natural History*, Young Scientists Expo
with Will Clark

2019 **Approximation via Partition Functions and the Interpolation Method**, *University of Michigan*, Analysis Seminar

2017 **Community Detection Through Polynomials**, *University of Michigan*, Michigan Institute for Data Science Research Forum

2016 **Multi-Armed Bandits with Self-Concordant Barrier Functions**, *University of Michigan - Dearborn*, Machine Learning Seminar

2014 **Zeroes of the Bergman Kernel Function Associated with a Class of Weights, and Computational Approximation**, *Western Kentucky University*, 34^{th} Annual Undergraduate Mathematics Symposium

Conferences

2021 **Symposium on Discrete Algorithms (SODA)**, *SIAM*, Virtual

2021 **Erdős Institute Data Science Boot Camp**, *Erdős Institute*, Virtual

2021 **Symposium on Foundations of Computer Science (FOCS)**, *IEEE*, Virtual

2020 **Symposium on Discrete Algorithms (SODA)**, *SIAM*, Virtual

2021 **Symposium on Foundations of Computer Science (FOCS)**, *IEEE*, Virtual

2019 **Simons Institute for the Theory of Computing** [0], *Simons Institute*, Berkeley, CA

2018 **Michigan Data Science Research Forum**, *University of Michigan*, Ann Arbor, MI

2016 **Conference on Learning Theory** [1], *Columbia University*, New York, NY

2016 **International Conference on Machine Learning** [1], *Marriott Marquis Hotel*, New York, NY

[0] Partial Funding Provided by NSF Grant
[1] Funding Provided by Rackham Graduate School

Research Interests

- Approximation Algorithms
- Combinatorial Optimization
- Statistical Learning
- Predictive Modeling with Large Datasets

Research Experience

Current Projects

Approximate Covering and Packing in Random Set Systems and Hypergraphs
with Euiwoong Lee

Polynomial Optimization and Sums of Squares Methods

Traversal Sequences of Breadth-First and Depth-First Search
with Jeremy Waters

Concentration for Sums of Geometric Random Variables

Previous Projects & Publications

2021 **Detecting Fraud in Credit Card Transactions**
with Matthew Salinger and Raihana Mokhlissi

2020 **Testing for Dense Subsets in a Graph via the Partition Function**, *SIAM Journal on Discrete Mathematics,* **34** (2019), no. 1, 308–327
with Alexander Barvinok

2018 **Spy vs. Spy: Describing a Model for Unconstrained Competition between Two Artificially Intelligent Agents**
With Jay Barraza

2017 **Community Detection via Polynomials**, *Conference Proceeding 2017*, Michigan Data Science Research Forum
With Neophytos Charalambides

2016 **Better Convex Optimization in Machine Learning with Optimal Self-Concordant Barrier Functions**
Under the Direction of Jacob Abernethy