# Gabriel **Mancino-Ball**

Applied Mathematician

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## Education

### *Ph.D. in Mathematics*

Rensselaer Polytechnic Institute | Expected 2023 | Troy, NY | 3.9/4.0

- **Research advisor:** Dr. Yangyang Xu
- **Research interests:** federated learning, asynchronous parallel computing, decentralized parallel computing, nonlinear programming
- **Relevant coursework:** linear and nonlinear programming, stochastic optimization, numerical optimization methods, geometric learning, large scale matrix computations and machine learning

### *B.S. in Mathematics*

Winona State University | Spring 2018 | Winona, MN | 3.9/4.0

## Professional Experience

### *AI Horizons Scholar*

IBM | Fall 2020–Present | Troy, NY/Boston, MA

- **Project title:** Decentralized Consensus Optimization with Applications to Graph Neural Networks
- **Project mentors:** Dr. Jie Chen (IBM) and Dr. Yangyang Xu (RPI)
- Ongoing research collaboration aimed at develoing and analyzing algorithms to be used in distributed computing environments to solve decentralized optimization problems
- Utilizing PyTorch to train decentralized graph convolutional neural networks with applications to node-level classification

### *Data Science Research and Development Intern*

3M - Corporate Research Systems Lab | Summer 2019 + Summer 2020 | Minneapolis, MN

- **Labs:** software research (2019) and artificial intelligence research (2020)
- Developed custom neural network in PyTorch and TensorFlow to solve predictive regression problems for chemical lab (2020)
- Implemented global optimization algorithms which suggested new sample configurations for chemical lab to test (2020)
- Supported additive manufacturing lab by creating and deploying computer vision algorithms using various Amazon Web Services (2019)

## Projects

### *CuriosityCode2.0*

3M - Corporate Research Systems Lab | Summer 2020 | Minneapolis, MN

- Week long Hack-A-Thon devoted to improving air filtration technology for consumer use with goal of decreasing COVID-19 infection probability
- Used differential equations to model infection rate and effectiveness of the proposed air filtration system
- Propsed further investigation via simulation demonstration and model CAD mock-up