



# Mohamadou Bella Bah

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## EDUCATION

### Massachusetts Institute of Technology (MIT)

August 2017 - Present

*Bachelor's Degree Candidate, 2021, Course 6-2 (Electrical Engineering and Computer Science)*

Cambridge, MA

- Relevant Coursework: Principles of Autonomy and Decision Making, Design and Analysis of Algorithms, Computational Inference, Machine Learning, Signals Systems and Inference, Feedback System Design, Interconnected Embedded Systems, Signal Processing, Control and Modelling of Electric Energy Systems, Circuits and Electronics

## RESEARCH AND EXPERIENCE

### MIT Energy Initiative, Massachusetts Institute of Technology (MIT)

June 2019 – Present

*Undergraduate Researcher*

Cambridge, MA

- Independently developed an architecture for multi-agent cyber-physical systems under the supervision of MIT's Active-Adaptive Control Laboratory (Advisor: Rabab Haider) – namely one that can solve distributed optimization problems while preserving the anonymity and data privacy of participating assets.
- The platform is an asynchronous service-oriented broker architecture that supports nonpermanent peer-to-peer interactions. Workers respond to explicit client requests and self-coordinate pursuant the task. (Work is being done to have workers/agents anticipate client needs.) Message passing is done via ZMQ in a TCP/IP local network composed of several computing units.

### Mechanical Engineering Department, Massachusetts Institute of Technology (MIT)

September 2018 – December 2018

*Undergraduate Researcher*

Cambridge, MA

- Project examined the market pairings of natural gas and wind power producers via bilateral contracts to improve productivity of renewable resources and firm capacity within electricity markets (Advisor: Dr. Anuradha Annaswamy, David D'Achiardi).
- Wrote program to find suitable pairings between natural gas power producers and wind power producers in the New England region. See GitHub (coordinate-ngpp-wpp) on top left of page.

### Physics Department, Massachusetts Institute of Technology (MIT)

July 2018 – September 2018

*Independent Undergraduate Researcher*

Cambridge, MA

- Designed multi-agent system (MAS) application for the U.S. electric grid (Advisor: Dr. Peter Fisher).
- Wrote papers detailing agent interactions, notably the protocols defining the relationship between an electric vehicle and a charging station.
- Programmed MAS platform in which autonomous agents negotiate on issues of price, quantity, and time of delivery of a bilateral contract. Agents possess diverse behaviours and capabilities including tit-for-tat, limited reasoning, and the ability to communicate dissatisfaction with counter-offers made by other agents. See GitHub (UROP-Multiagent-Platform) on top left of page.

## LEADERSHIP AND PROJECTS

### Project Auxo

January 2017 - Present

*Founder* Cambridge, MA

- Project Auxo is a research group that applies multi-agent system methods to large heterogeneous networks; current focus is smart grids.
- Project Auxo aims to give currently 'dumb' grid-devices (residential solar and electric vehicles) human-like agency. This includes a limited understanding of causality and the ability to coordinate themselves according to an objective signal.
- Created functioning testbed using several BeagleBone Blacks and open source power-system simulators RIAPS and Gridlab-D. AI agents are capable of limited coordination. See GitHub (Project-Auxo-MAS) on top left of page – work ongoing.

### ECOSOC Youth Conference

January 2018

*Participant*

New York City, NY

- One of five nominated by MIT's Political Science Department to attend the Economic and Social Council Youth Conference at the United Nations Headquarters in New York City.
- Engaged with high level policy makers, ministers of youth and sport, and youth delegates on issues regarding anticorruption and energy on a global and Africa-centric scale.

### TEDxYouth

September 2016

*Speaker*

Dubai, UAE

- Delivered TEDx Talk on the "Future of Solar Panels"; a talk focused on a free market platform that enables prosumer participation on the electric grid — video has over 35,000 views on YouTube.

## RESEARCH INTERESTS

**Programming Languages:** Python, C++, MATLAB, all with practical and academic experiences.

- *Learning, Decision Theory and Game Theory:* Multi-agent Systems, Reinforcement Learning
- *Systems, Networks and Control:* Coordination of Autonomous Systems, Distributed Intelligence, State Estimation